Winnemucca District
Proposed Resource Management Plan and Final Environmental Impact Statement

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BLM

Winnemucca District, Nevada

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

MISSION STATEMENT

To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/NV/WN/ES/13-11+1793

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LIST OF ACRONYMS

Acronym or Abbreviation	Full Phrase
ACEC	area of critical environmental concern
AFY	acre-feet per year
AML	appropriate management level
AMP	allotment management plan
AMSL	above mean sea level
APHIS	Animal and Plant Health Inspection Service
APHIS-WS	Animal and Plant Health Inspection Service-Wildlife Services
AQ	air quality
ASPCA	American Society for the Prevention of Cruelty to Animals
ATV	all-terrain vehicle
AUM	animal unit month
BA	Biological Assessment
BCB	Backcountry Byways
BEA	Bureau of Economic Analysis
BIA	US Department of the Interior, Bureau of Indian Affairs
BLM	US Department of the Interior, Bureau of Land Management
BMPs	best management practices
BO	Biological Opinion
BPS	budget planning system
BRDHRCET	Black Rock Desert High Rock Canyon Emigrant Trails
CA	common to all alternatives
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CHP	cultural/historic/paleontological
CK	cave and karst resources
CNHT	California National Historic Trail
CNIDC	Central Nevada Interagency Dispatch Center
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalents
CSP	concentrated solar power
CR	cultural resources
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
CWMA	Cooperative Weed Management Area
DFC	desired future condition
DM	Departmental Manual
DOE	Department of Energy
DOI	Department of Interior
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	US Environmental Protection Agency
ERMA	extensive recreation management area
ES	Executive Summary
ESA	Endangered Species Act of 1973

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
ES&R	emergency stabilization and rehabilitation
FERC	Federal Energy Regulatory Commission
FIP	Federal Implementation Plan
FLPMA	Federal Land Policy and Management Act
FLTFA	Federal Land Transaction Facilitation Act
FMU	Fire Management Unit
FMUD	final multiple use decision
FOFEM	First Order Fire Effects Model
FONSI	Finding of No Significant Impact
FPA	fire program analysis
FR	Federal Register
FRCC	fire regime condition class
FW	fish and wildlife
G	geology
GAWS	general aquatic wildlife survey
GHG	greenhouse gas
GIS	geographical information system
GWP	global warming potential as carbon dioxide equivalents
HA	herd area
HAP	hazardous air pollution
HMA	herd management area
HMAP	herd management area plan
HMP	habitat management plan
HUA	herd use area
HVH	high value habitat
IBLA	Interior Board of Land Appeals
IDT	interdisciplinary team
IMP	interim management policy or plan
IOP	interagency operation plan
IPC	integrated pest control
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
ISA	instant study area
ITAs	Indian Trust Assets
KGRA	known geothermal resource area
LCT	Lahontan cutthroat trout
LG	livestock grazing
LR	lands and realty
LUP	land use plan
LWC	lands with Wilderness characteristics
MACT	maximum available control technology
MBTA	Migratory Bird Treaty Act
MFP	management framework plan
MIST	minimum impact suppression tactics

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
MOU	memorandum of understanding
MR	mineral resources: leasable, locatable, salable
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NASA	National Aeronautics and Space Administration
NCA	National Conservation Area
NDEP	Nevada Division of Environmental Protection
NDOA	Nevada Department of Agriculture
NDOM	Nevada Division of Minerals
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDVI	Normalized Difference Vegetation Index
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act of 1969
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NGO	non-government organizations
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NOA	Notice of Availability
NOI	Notice of Intent
N_2O	Nitrous oxide
NO_x	Nitrogen oxides
NPS	National Park System
NRCS	US Department of Agriculture, Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	new source review
NSO	no surface occupancy
Sierra Front/NW RAC	Sierra Front Northwestern Great Basin Resource Advisory Council
NWSRS	National Wild and Scenic River Systems
NV	Nevada
OCTA	Oregon-California Trail Association
OHV	off-highway vehicle
ORV	Outstanding Remarkable Value
PAH	polycyclic aromatic hydrocarbon
PCPI	per capita personal income
PD	Paradise-Denio
PE	chemical and biological control
PFC	proper functioning condition
pH	the symbol for the logarithm of the reciprocal of hudrogen ion concentration in gram atoms per liter, measuring the acidity or alkalinity of a solution
PL	public law
$PM_{2.5}$	particulate matter smaller than 2.5 microns in diameter
PM_{10}	particulate matter smaller than 10 microns in diameter
PMU	population management unit
ppm	part per million

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
PR	paleontological resources
PRMP	Proposed Resource Management Plan
PS	public health and safety
PSD	prevention of significant deterioration
PV	photovoltaics
PVA	prospectively valuable area
PWR	Public Water Reserve
PYFC	Potential Fossil Yield Classification
R	recreation
R&PP	Recreation and Public Purposes Act
RAC	resource advisory council
RAS	Range Administration System
RAMS	risk assessment and mitigation strategy
RE	renewable energy
RFD	reasonably foreseeable development
RFDS	Reasonably Foreseeable Development Scenario
RFFA	reasonably foreseeable future action
RIP	range improvement project
RMIS	Recreation Management Information System
RMP	resource management plan
RMZ	recreation management zone
RNA	Research Natural Area
ROD	record of decision
ROG	reactive organic compounds
ROI	region of influence
ROS	Recreation Opportunity Spectrum
ROW	right-of-way
S	soils
SG	Sonoma-Gerlach SASEM Simple Approach Smoke Estimation Model
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMA	Special Management Area
SNPLMA	Southern Nevada Public Land Management Act
SOG	standard operating guideline
SOP	standard operating procedure
SO_x	sulphur oxides
SRH	standards for rangeland health
SRMA	special recreation management area
SRP	special recreation permit
SSS	special status species
T&E	threatened and endangered
TA	transportation and access
TC	tribal consultation
TCP	traditional cultural property
TDS	total dissolved solids
TIP	Tribal Implementation Plan
TM	transportation and travel management

LIST OF ACRONYMS *(continued)*

Acronym or Abbreviation	Full Phrase
TMDL	total maximum daily load
TNEB	thriving natural ecological balance
TNR	temporary nonrenewable
TSP	total suspended particles
TSS	total suspended solids
US	United States
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Department of Agriculture, Forest Service
USFWS	US Department of the Interior, Fish and Wildlife Service
USGS	US Geological Survey
VF	vegetation forest and woodland products
VOC	volatile organic compounds
VR	vegetation rangelands
VRI	visual resource inventory
VRM	visual resource management
VRW	vegetation riparian and wetlands
VW	vegetation weeds
WA	wilderness area
WAFWA	Western Association of Fish and Wildlife Agencies
WAPT	Wildlife Action Plan Team
WD	Winnemucca District
WDM	wildlife damage management
WDO	Winnemucca District Office
WFDSS	Wildland Fire Decision Support System
WFM	wildland fire ecology management
WFRHBA	Wild Free Roaming Horses and Burros Act
WFSA	wildland fire situation analysis
WHB	wild horses and burros
WR	water resources
WSA	wilderness study area
WSR	wild and scenic river
WUG	Western Utility Group
WUI	wildland urban interface
WWV	watchable wildlife viewing site

CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter provides a description of the biological, physical, and socioeconomic characteristics, including human uses that could be affected by implementing the alternatives for this Resource Management Plan / Environmental Impact Statement (RMP/EIS), as described in Chapter 2. Information from broad-scale assessments were used to help set the context for the planning area. The information and direction for Bureau of Land Management (BLM) resources has been further broken down into fine-scale assessments and information where possible. Specific aspects of each resource discussed in this section (e.g., weeds, fire, and off-highway vehicle [OHV] use) were raised during the public and agency scoping process. The level of information presented in this chapter is commensurate with and sufficient to assess potential effects of the alternatives in Chapter 4.

The planning area for the RMP is the Winnemucca District [WD] boundary outside of the National Conservation Area [NCA] and includes all lands regardless of jurisdiction. However, the BLM makes decisions on only those lands under its jurisdiction, that is, those on BLM-administered lands.

3.2 RESOURCES

This section contains a description of the biological and physical resources of the WD and follows the order of topics addressed in Chapter 2, as follows:

- Air quality;
- Geology;
- Soil resources;
- Water resources;
- Vegetation communities;
- Fish and wildlife;
- Special status species;
- Wild horses and burros;
- Wildland fire management;
- Cultural resources;
- Paleontological resources;
- Visual resources;
- Cave and karst;
- Livestock grazing;
- Minerals—leasable, locatable, and salable;
- Recreation and facilities;
- Renewable energy (see Minerals – Leasable – Fluid Minerals – Geothermal);
- Transportation and access;
- Lands and realty;
- Areas of Critical Environmental Concern and Research Natural Areas;
- Backcountry Byways;
- National Trails;
- Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics;
- Watchable wildlife viewing sites;
- Tribal interests;
- Public health and safety; and
- Social and economic conditions and environmental justice.

3.2.1 Air Quality

Climate and Meteorology

The arid to semiarid climate of the area results from a rain shadow effect of the Sierra Nevada Mountain Range, which lies between the Pacific Ocean and Nevada. The Sierra Nevada absorbs most storm-front moisture moving east across the area. Annual precipitation varies from five to seven inches at lower elevations and up to 15 inches in the mountains. Seventy percent of the precipitation occurs in the late fall, winter, and spring. Summer precipitation is light and infrequent. Average monthly temperatures vary from highs of about 40ºF in January, to 95ºF in July, and lows from around 20ºF in December and January to about 60ºF in July.

Prevailing wind from the west is strongest April through June. Wind gusts often reach 30 miles per hour and occasionally get higher. During other seasons, the wind is light and variable, occurring when weather fronts pass through the area, or as a result of daily heating and cooling of land surfaces. During the summer air quality is adversely affected by dust storms and wildfire.

Air Quality

In the Clean Air Act (CAA), 42 USC §§ 7401 et seq., Congress assigned the US Environmental Protection Agency (EPA) primary regulatory responsibility for air quality. EPA has established national ambient air quality standards (NAAQS) for ambient air pollutants known as "criteria" pollutants (ground-level ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, suspended particulate matter, and lead). EPA has established standards for two size fractions of suspended particulate matter: inhalable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). Typically, these criteria pollutants are produced in large quantities by widespread types of emissions sources. National primary ambient air quality standards are designed to protect the public health, and national secondary ambient air quality standards are designed to protect the public welfare, which includes sensitive natural vegetation and ecosystems.

Congress delegated the responsibility for implementing and achieving the NAAQS to EPA. EPA may in turn delegate responsibility to states and tribes, subject to EPA oversight. States may delegate responsibility to local governmental agencies. If an area is not in compliance with the NAAQS, then EPA may prepare a Federal Implementation Plan (FIP), a state may prepare a State Implementation Plan (SIP), or a tribe may prepare a Tribal Implementation Plan (TIP). Local governments do not prepare FIPs, SIPs, or TIPs. Local governments may prepare implementation plans and pass regulations which become part of the SIP. The SIP demonstrates how emissions controls and other requirements for stationary and mobile sources will enable their jurisdictions to attain the NAAQS by deadlines set by Congress. In turn, those agencies have established their own air quality regulations, which may be more, but not less, stringent than the federal regulations.

Nevada has adopted state ambient air quality standards that are equal to or more stringent than the comparable federal standards. Nevada also has adopted an ambient air quality standard for hydrogen sulfide, a pollutant that is not covered by federal ambient air quality standards. Table 3-1 summarizes current federal and Nevada ambient air quality standards.

Table 3-1
State and National Ambient Air Quality Standards Applicable in Nevada

Pollutant	Averaging Time	Nevada Standards in Parts Per Million by Volume (ppm)	National Standards in Parts Per Million by Volume (ppm)	Nevada Standards in Micrograms Per Cubic Meter	National Standards in Micrograms Per Cubic Meter	Nevada Violation Criteria	National Violation Criteria
Ozone	1 hour (outside Lake Tahoe Basin)	0.12	Standard rescinded	235	Standard rescinded	If exceeded	None
	1 hour (in Lake Tahoe Basin)	0.10	Standard rescinded	195	Standard rescinded	If exceeded	None
	8 hours	None	0.075	None	147	None	If exceeded by the mean of annual 4th highest daily values for a 3-year period
Carbon Monoxide	1 hour	35	35	40,500	40,000	If exceeded	If exceeded on more than 1 day per year
	8 hours (areas below 5,000 feet elevation)	9	9	10,500	10,000	If exceeded	If exceeded on more than 1 day per year
	8 hours (areas at or above 5,000 feet elevation)	6	9	7,000	10,000	If exceeded	If exceeded on more than 1 day per year
Nitrogen Dioxide	Annual average	0.05	0.053	100	100	If exceeded	If exceeded
Sulfur Dioxide	Annual average	0.03	Standard rescinded	80	Standard rescinded	If exceeded	If exceeded
	24 hours	0.14	Standard rescinded	365	Standard rescinded	If exceeded	If exceeded on more than 1 day per year
	3 hours	0.5	0.5	1,300	1,300	If exceeded on more than 1 day per year	If exceeded on more than 1 day per year

Table 3-1
State and National Ambient Air Quality Standards Applicable in Nevada

Pollutant	Averaging Time	Nevada Standards in Parts Per Million by Volume (ppm)	National Standards in Parts Per Million by Volume (ppm)	Nevada Standards in Micrograms Per Cubic Meter	National Standards in Micrograms Per Cubic Meter	Nevada Violation Criteria	National Violation Criteria
	1 hour	None	0.075	None	196	None	If exceeded by 99th percentile of 1-hour daily maximum values averaged over 3 years
Inhalable Particulate Matter (PM_{10})	Annual arithmetic mean	None	None	50	Standard rescinded	If exceeded	None
	24 hours	None	None	150	150	If exceeded	For 1997 non-attainment areas, if exceeded on more than 1 day per year. For other areas, if exceeded by the mean of annual 99th percentile values over 3 years
Fine Particulate Matter ($PM_{2.5}$)	Annual arithmetic mean	None	None	None	12.0	None	If exceeded as a 3-year spatial average of data from designated stations
	24 hours	None	None	None	35	None	If exceeded by the mean of annual 98th percentile values over 3 years

Table 3-1
State and National Ambient Air Quality Standards Applicable in Nevada

Pollutant	Averaging Time	Nevada Standards in Parts Per Million by Volume (ppm)	National Standards in Parts Per Million by Volume (ppm)	Nevada Standards in Micrograms Per Cubic Meter	National Standards in Micrograms Per Cubic Meter	Nevada Violation Criteria	National Violation Criteria
Lead Particles (TSP sampler)	Calendar quarter	None	None	1.5	1.5	If exceeded	If exceeded
	Rolling 3-month average	None	None	None	0.15	None	If exceeded in a 3-year period
Hydrogen Sulfide	1 hour	0.08	None	112	None	If exceeded	None

Notes:
All standards except the national PM_{10} and $PM_{2.5}$ standards are based on measurements corrected to 25 degrees C and 1 atmosphere pressure.
The national PM_{10} and $PM_{2.5}$ standards are based on direct flow volume data without correction to standard temperature and pressure.
The EPA is currently reconsidering the ozone NAAQS and has published a draft recommendation for a revised 8-hour standard of 0.070 ppm. EPA has indicated that it will issue final revisions to the ozone NAAQS in 2013.
The “$_{10}$” in PM_{10} and the “$_{2.5}$” in $PM_{2.5}$ are not particle size limits but identify the particle size class (aerodynamic diameter in microns) collected with 50 percent mass efficiency by certified sampling equipment. The maximum particle size collected by PM_{10} samplers is about 50 microns. The maximum particle size collected by $PM_{2.5}$ samplers is about 6 microns.
The Nevada standard for hydrogen sulfide represents an increment above naturally occurring background concentrations.
Sources:
40 Code of Federal Regulations [CFR] Parts 50, 53, and 58 (EPA No Date a, b, c).
Nevada Bureau of Air Quality Planning 2008.
US Environmental Protection Agency 2010 National Ambient Air Quality Standards (EPA 2011).
US Environmental Protection Agency Ozone Standards (EPA 2012).

Ozone, suspended particulate matter, and carbon monoxide are the air pollutants of greatest concern in the planning area. Ozone is seldom released directly into the atmosphere but forms from complex chemical reactions that occur in sunlight. The chemical reactions that produce ozone involve a wide range of organic compounds (volatile organic compounds or VOCs), nitric oxide, nitrogen dioxide, and oxygen. Reactive organic compounds and nitrogen oxides (the combination of nitric oxide and nitrogen dioxide) are the precursor emission products that form ozone. The atmospheric chemical reaction processes that produce ozone also produce chemically formed particulate matter and acidic compounds. Combustion processes and evaporation of volatile organic compounds are the major emission sources for organic compounds. Common fuel combustion sources include fuel combustion in motor vehicles, fuel combustion in industrial processes, agricultural burning, prescribed burning, and wildfires. Common evaporative sources of organic compounds include paints, solvents, liquid fuels, or liquid chemicals. Combustion processes are the major source of emissions for nitrogen oxides.

The major emission source categories for suspended particulate matter include combustion sources (fuel combustion in motor vehicles and industrial processes, agricultural burning, prescribed burning, and wildfires); industrial grinding and abrasion processes; soil disturbance by construction equipment, agricultural and forestry equipment, recreational vehicles, or other vehicles and equipment; mining and other mineral extraction activities; and wind erosion from exposed soils and sediments. Suspended particulate matter is also formed by atmospheric chemical reactions that produce ozone and acidic compounds.

The major sources of carbon monoxide are combustion processes, such as fuel combustion in motor vehicles and industrial processes, agricultural burning, prescribed burning, and wildfires.

Ozone is a strong oxidizing agent that reacts with a wide range of materials and biological tissues. It is a respiratory irritant that can have acute and chronic effects on the respiratory system. Recognized effects include reduced pulmonary function, pulmonary inflammation, increased airway reactivity, aggravation of existing respiratory diseases (such as asthma, bronchitis, and emphysema), physical damage to lung tissue, decreased exercise performance, and increased susceptibility to respiratory infections. In addition, ozone is a necrotic agent that significantly damages leaf tissues of crops and natural vegetation. Ozone also damages many materials by acting as a chemical oxidizing agent. Because of its chemical activity, indoor ozone levels are usually much lower than outdoor levels.

Suspended particulate matter represents a diverse mixture of solid and liquid material having size, shape, and density characteristics that allow the material to remain suspended in the air for meaningful time periods. The physical and chemical composition of suspended particulate matter is highly variable, resulting in a wide range of public health concerns. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals.

Public health concerns for suspended particulate matter focus on the particle size ranges likely to reach the lower respiratory tract or the lungs. Inhalable particulate matter (PM_{10}) represents particle size categories that are likely to reach either the lower respiratory tract or the lungs after being inhaled. Fine particulate matter ($PM_{2.5}$) represents particle size categories likely to penetrate to the lungs after being inhaled. The "$_{10}$" in PM_{10} and the "$_{2.5}$" in $PM_{2.5}$ are not upper size limits but refer to the particle size range collected with 50 percent mass efficiency by certified sampling devices; larger particles are collected with lower efficiencies, and smaller particles are collected with higher efficiencies.

In addition to public health impacts, suspended particulate matter causes a variety of material damage and nuisance effects: abrasion; corrosion, pitting, and other chemical reactions on material surfaces; soiling; and transportation hazards due to visibility impairment.

Carbon monoxide is a public health concern because it combines readily with hemoglobin in the blood and thus reduces the amount of oxygen transported to body tissues. Relatively low concentrations of carbon monoxide can significantly affect the amount of oxygen in the blood stream since carbon monoxide binds to hemoglobin 200 to 250 times more strongly than oxygen. Both the cardiovascular system and the central nervous system can be affected when 2.5 to 4.0 percent of the hemoglobin in the blood is bound to carbon monoxide rather than to oxygen.

Because of its low chemical reactivity and low solubility, indoor carbon monoxide levels usually are similar to outdoor levels.

The federal CAA requires each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a SIP to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of existing air quality problems. The SIP must be submitted to and approved by the US EPA. SIP elements are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated.

The status of areas with respect to federal ambient air quality standards is categorized as nonattainment, attainment (better than national standards), or unclassified (due to an absence of monitoring data). Areas that have been redesignated from nonattainment to attainment are considered maintenance areas, although this designation is seldom indicated in formal listings of attainment status designations. Unclassified areas are treated as attainment areas for most regulatory purposes. All of the WD area is considered attainment or unclassified for all federal ambient air quality standards. The closest areas with nonattainment designations are the Reno-Sparks area in Washoe County and the Lake Tahoe Basin.

The Nevada Division of Environmental Protection, Bureau of Air Quality Planning, operates a system of ambient air quality monitoring stations in those parts of Nevada outside Clark County and Washoe County. The Washoe County Health Department operates a network of air quality monitoring stations in the Reno-Sparks and Lake Tahoe parts of the county. There presently are no air quality monitoring stations in the WD area, although a PM_{10} monitoring station was operated in Lovelock between 1992 and 1997. PM_{10} monitoring stations previously operated outside the WD area in Fernley, Fallon, and Battle Mountain. A $PM_{2.5}$ monitoring station is currently operating outside the WD area in Fernley. Ozone monitoring stations are currently operating outside of the WD area in Fernley and Fallon. Table 3-2 below is a summary of available PM_{10} monitoring data from Lovelock, Fernley, Fallon, and Battle Mountain; Table 3-3 is a summary of available $PM_{2.5}$ monitoring data from Fernley; Table 3-4 is a summary of available 1-hour ozone monitoring data from Fernley and Fallon; and Table 3-5 is a summary of available 8-hour ozone monitoring data from Fernley.

Table 3-2
Summary of 24-Hour PM10 Monitoring Data

Year		Number of Samples	Highest Micrograms per Cubic Meter	2nd High Micrograms per Cubic Meter	Arithmetic Mean	Exceedances of 24-Hour Standard
1992	Lovelock Post Office	53	44	44	22	0
1993	Lovelock Post Office	51	67	59	31	0
	Fallon West End School	35	111	103	40	0
1994	Lovelock Post Office	43	56	53	25	0
	Fallon West End School	45	66	62	27	0
1995	Lovelock Post Office	27	55	55	24	0
	Fernley Intermediate School	40	37	35	21	0
	Fallon West End School	47	74	60	28	0

Table 3-2
Summary of 24-Hour PM10 Monitoring Data

Year		Number of Samples	Highest Micrograms per Cubic Meter	2nd High Micrograms per Cubic Meter	Arithmetic Mean	Exceedances of 24-Hour Standard
1996	Lovelock Post Office	56	69	62	26	0
	Fernley Intermediate School	59	104	96	19	0
	Fallon West End School	54	102	61	25	0
1997	Lovelock Post Office	27	47	42	24	0
	Fernley Intermediate School	59	43	37	16	0
	Fallon West End School	53	53	53	26	0
1998	Fernley Intermediate School	47	43	40	16	0
	Fallon West End School	25	79	47	19	0
	Battle Mountain High School	130	70	60	17	0
1999	Battle Mountain High School	147	120	100	27	0
2000	Battle Mountain High School	344	260	190	20	2
2001	Battle Mountain High School	355	110	90	22	0
2002	Battle Mountain High School	356	140	140	22	0

Sources: Nevada Bureau of Air Quality Planning Trend Report for 2003 and Nevada Air Quality Trend Report 1998-2009 (NBAQP 2003, 2011)

Table 3-3
Summary of 24-Hour PM2.5 Monitoring Data

Fernley Intermediate School Year	Fernley Intermediate School Number of Samples	Fernley Intermediate School 98th Percentile Micrograms per Cubic Meter	Fernley Intermediate School Arithmetic Mean	Fernley Intermediate School Exceedances of 24-Hour Standard
1999	186	20	Not available	0
2000	359	18	5.5	0
2001	345	27	5.3	0
2002	357	20	4.3	0
2003	281	9	3.8	0
2004	293	14	3.6	0
2005	267	19	4.1	0
2006	181	8	Not available	0
2007	255	11	3.5	0
2008	299	12	3.7	1
2009	315	20	5.4	1

Source: Nevada Air Quality Trend Report 1998-2009 (NBAQP 2011)

Table 3-4
Summary of 1-Hour Ozone Monitoring Data

Year	Location	1st Highest 1-Hour Parts Per Million	2nd Highest 1-Hour Parts Per Million	Exceedance Year
1998	Fernley Fire Department	0.08	0.08	No
1999	Fernley Fire Department	0.09	0.08	No
2000	Fernley Fire Department	0.08	0.07	No
2001	Fernley Fire Department	0.08	0.08	No
2002	Fernley Fire Department	0.08	0.08	No
2003	Fernley Fire Department	0.09	0.08	No
2004	Fallon West End School	0.074	0.070	No
2005	Fallon West End School	0.069	0.064	No
2006	Fallon West End School	0.079	0.071	No
2007	Fallon West End School	0.081	0.076	No
	Fernley Intermediate School	0.074	0.072	No
2008	Fallon West End School	0.082	0.079	No
	Fernley Intermediate School	0.083	0.081	No
2009	Fallon West End School	0.074	0.067	No
	Fernley Intermediate School	0.073	0.073	No

Source: Nevada Air Quality Trend Report 1998-2009 (NBAQP 2011)

Table 3-5
Summary of 8-Hour Ozone Monitoring Data

Year	Location	4th Highest 8-Hour Parts Per Million	Exceedance Year
1998	Fernley Fire Department	0.07	No
1999	Fernley Fire Department	0.07	No
2000	Fernley Fire Department	0.07	No
2001	Fernley Fire Department	0.065	No
2002	Fernley Fire Department	0.066	No
2003	Fernley Fire Department	0.067	No
2004	Fallon West End School	0.064	No
2005	Fallon West End School	0.059	No
2006	Fallon West End School	0.064	No
2007	Fallon West End School	0.071	No
	Fernley Intermediate School	0.062	No
2008	Fallon West End School	0.067	No
	Fernley Intermediate School	0.069	No
2009	Fallon West End School	0.059	No
	Fernley Intermediate School	0.058	No

Source: Nevada Air Quality Trend Report 1998-2009 (NBAQP 2011)

In addition to the NAAQS, EPA regulates hazardous air pollutants produced by limited categories of industrial facilities. Programs regulating hazardous air pollutants focus on substances that alter or damage the genes and chromosomes in cells (mutagens); substances that affect cells in ways that can lead to uncontrolled cancerous cell growth (carcinogens); substances that can cause birth defects or other developmental abnormalities (teratogens); substances with serious acute toxicity effects; and substances that undergo radioactive decay processes, resulting in the release of ionizing radiation.

Air quality management objectives for all of the RMP alternatives include achieving compliance with federal and state air quality standards and air quality management programs and carrying out FLPMA's instruction to protect air and atmospheric values while managing the public lands according to principles of "multiple use" and "sustained yield." Federal emission standards for hazardous air pollutants have been promulgated as National Emission Standards for Hazardous Air Pollutants (NESHAPS) and as Maximum Available Control Technology (MACT) standards. The federal MACT standard for mercury emissions from coal-fired power plants represents an example. Nevada has adopted a state MACT standard for mercury emissions from thermal process units at precious metals mining operations. The NESHAPS and MACT standards are implemented through federal and state air permitting programs.

The federal CAA generally requires major industrial emission sources to obtain preconstruction permits and operating permits. Separate preconstruction requirements have been established for nonattainment pollutants and for attainment pollutants. The Federal New Source Review (NSR) Program applies in nonattainment areas to the applicable nonattainment pollutants. A key element of the NSR Program is a requirement to implement emission offsets so that a new source of emissions will not cause a net increase in nonattainment pollutant emissions for the nonattainment area. The Federal Prevention of Significant Deterioration (PSD) Program applies to attainment pollutants. Key elements of the PSD Program include potential requirements for preconstruction and post-construction ambient air quality monitoring; establishment of baseline ambient air quality levels maximum cumulative pollutant increments allowed above those baseline levels; evaluation of proposed emission sources to determine their consumption of available PSD pollutant increments; and evaluation of visibility impacts in designated Class I wilderness, national park, and national monument areas. The federal operating permit program is referred to as the Title V permit program, which imposes reporting and recordkeeping requirements to ensure that conditions imposed by preconstruction permits are met.

In general, states have primary responsibility for enforcing most federal permit requirements, with the US EPA exercising a formal review and oversight responsibility. Some states, including Nevada, have separate air permit programs authorized by state legislation. State air permit requirements typically cover emission sources that are smaller than those subject to federal permit requirements. Many air permit programs have been integrated with federal NSR, PSD, and Title V requirements to provide a consolidated permit program.

There are no PSD program Class I visibility protection areas (those entitled to the most protection under the Clean Air Act) in the WD area. The only Class I area in Nevada is the Jarbidge Wilderness in north-central Elko County (75 miles from the planning area). Class I areas in southwestern Oregon include the Gearheart Mountain Wilderness (80 miles from the planning area), the Mountain Lakes Wilderness (135 miles from the planning area), and Crater Lake National Park (160 miles from the planning area). Class I areas in southern Idaho include the Craters of the Moon National Monument (200 miles from the planning area). Class I areas in northeastern California include the Lava Beds Wilderness (90 miles from the planning area), the South Warner Wilderness (40 miles from the planning area), Lassen Volcanic National Park (90 miles from the planning area), the Caribou Wilderness (85 miles from the planning area), the Desolation Wilderness (65 miles from the planning area), and the Mokelumne Wilderness (80 miles from the planning area).

Climate Change

Climate is the long-term average of annual and seasonal weather conditions in a region. Parameters measured are most often surface variables such as temperature, precipitation, and wind. Data are typically averaged in 30-year periods as defined by the World Meteorological Organization. "Climate change" is the shift in the average weather, or trend, that a region experiences. Thus, climate change cannot be represented by single annual events or individual anomalies and is currently evident on a continental scale. The state of science is rapidly advancing to provide predictive capability at the regional scale.

Greenhouse gases (GHGs) are compounds in the atmosphere that absorb infrared radiation and re-radiate a portion of that back to the earth's surface, thus trapping heat and warming the atmosphere. The most important naturally occurring GHG compounds are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Carbon dioxide, methane, and nitrous oxide are produced naturally by the following processes:

- Respiration and other physiological processes of plants, animals, and microorganisms;
- Decomposition of organic matter;
- Volcanic and geothermal activity;
- Naturally occurring wildfires; and
- Natural chemical reactions in soil and water.

GHGs, such as carbon dioxide (CO_2) and methane (CH_4), as well as water vapor and particulate matter in the atmosphere keep the planet's temperature warmer overall than it would be if these gases were absent, allowing the planet to sustain life.

Ozone is not released directly by natural sources but forms during complex chemical reactions in the atmosphere, among organic compounds and nitrogen oxides in the presence of ultraviolet radiation. While water vapor is a strong GHG, its concentration in the atmosphere is primarily a result of, not a cause of, changes in surface and lower atmospheric temperature conditions.

Although naturally present in the atmosphere, concentrations of carbon dioxide, methane, and nitrous oxide also are due to industrial processes, transportation technology, urban development, agricultural practices, and other human activity. The Intergovernmental Panel on Climate Change (IPCC) estimates the following changes in global atmospheric concentrations of the most important GHGs (IPCC 2001, 2007a):

- Atmospheric concentrations of carbon dioxide have risen from a preindustrial background of 280 parts per million (ppm) by volume to 379 ppm in 2005;
- Atmospheric concentrations of methane have risen from a preindustrial background of about 0.70 ppm to 1.774 ppm in 2005; and
- Atmospheric concentrations of nitrous oxide have risen from a preindustrial background of 0.270 ppm to 0.319 ppm in 2005.

Ongoing scientific research has identified the potential impacts of man-made GHG emissions and changes in biological carbon sequestration due to land management activities on global climate.

Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon fuels have caused GHG concentrations (represented as CO_2 equivalents or CO_2(e)) to increase dramatically and are likely to contribute to overall global climatic changes. The IPCC recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007b).

The IPCC further concluded that these changes in atmospheric composition are almost entirely the result of human activity, not the result of changes in natural processes that produce or remove these gases (IPCC 2007b).

The US EPA estimates that national GHG emissions in 2007 were 7,881 million tons of carbon dioxide equivalents (EPA 2009). National GHG emissions in 2007 represented a 17.24 percent increase from estimated 1990 national GHG emissions (6,722 million tons of carbon dioxide equivalents). The EPA categorized the major economic sectors contributing to US emissions of GHG compounds as follows:

- Electric power generation (34.2%);
- Transportation (27.9%);
- Industrial processes (19.4%);
- Agriculture (7.0%);
- Commercial land uses (5.7%);
- Residential land uses (5.0%); and
- US Territories (0.8%)

The Nevada Division of Environmental Protection (NDEP) (2008) estimated Nevada's statewide GHG emissions at 56.7 million tons of carbon dioxide equivalent in 2005. This was 0.79% of the US national GHG emission inventory for 2005. NDEP identified the following major economic sectors contributing to emissions of GHG compounds:

- Electric power generation (46.6%);
- Transportation (30.1%);
- Industrial Processes (4.4%);
- Agriculture (2.8%); and
- Residential, commercial, and industrial land uses (12.1%)

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24°N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.6°F to 10.4°F above 1990 levels (IPCC 2001). The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict. Other unevenly distributed effects of climate change include altered sea levels, wildland fire occurrences, desert distribution, and plant and animal distribution.

Sources of GHG emissions in the WD area are fossil-fueled power plants, wildfires and prescribed burns, vehicles (including OHVs), construction and operation for mineral and energy development, and grazing livestock, wild horses, and burros. To the extent that these activities increase, GHG emissions are also likely to increase.

The trend in future anthropogenic carbon dioxide emissions will likely be driven by a mix of technological, economic, and policy developments. As technology progresses, "carbon intensity" (the amount carbon dioxide emitted per unit of economic output) is typically reduced, resulting in a decrease in the carbon in carbon dioxide emissions growth rate. Additionally, significant research and development efforts are underway in the field of carbon capture and sequestration (CCS) technology. This technology is expected to become available in the next two decades and would allow the power generation industry to capture carbon dioxide and store it underground, drastically reducing emissions to the atmosphere (Department of Energy [DOE 2007]). There is also an increased emphasis on the development of renewable energy projects. Policy developments worldwide will likely accelerate the process of emissions reduction. In the near future, the US is expected to join the European Union and other nations in placing mandatory caps on carbon dioxide emissions (there is also a possibility of a carbon tax). Such mandatory caps would be even more effective in reducing global carbon dioxide emissions with the participation of developing nations such as China and India. Vehicle fuel economy standards will further serve to reduce carbon dioxide emissions worldwide. Ultimately, the levels of global dioxide emissions in the future will be determined by a mix of these technological, economic, and policy developments; thus, future increases and decreases in carbon dioxide emission rates remain uncertain at present.

The Great Basin is a large, semi-arid region that extends from the Sierra Nevada Range in California to the Wasatch Range in Utah, and from southeastern Oregon and Idaho to southern Nevada. The majority of the land (approximately 72 percent) is under federal management. The climate of the Great Basin has changed during the past 100 years. Chambers (2008) notes that historical data show an increase in mean annual temperature in the Great Basin. Most portions of the Great Basin show a warming of 0.6 to 1.1°F (0.3 to 0.6°C) over the past century. Regional climate models typically predict an additional warming of 3.6 to 9°F over the next century. Historical data also indicate an increase in annual precipitation amounts in the Great Basin over the past century, together with increased year-to-year variability in precipitation amounts and a decrease in winter snow pack. These changes have resulted in earlier snowmelt, higher winter streamflow volumes, reduced spring peak volumes, and lower summer and fall streamflow volumes.

This warming, while widespread, has varied across the region (Wagner 2003). Minimum temperatures have increased more than maximum temperatures and variability in interannual temperatures has declined. As a result, the probability of very warm years increased and very cold years declined. Across most of the Great Basin, annual precipitation has increased from 6 to 16 percent since the middle of the last century. Interannual variability in precipitation also has increased, with an increase in the probability of extreme high-precipitation years. This has been reflected in increases in streamflow across the region, especially in winter and spring (Baldwin et al., 2003). Since about 1950, trends in April 1 snow pack have been negative at most monitoring sites in the Great Basin. Elevation and mean winter temperature have a strong effect on snowpack with the warmest sites exhibiting the largest relative losses. In the warmer mountains, winter melt events have a strong negative effect on April 1 snow pack. Snow pack decline in the dry interior, which includes the Great Basin, has been among the largest observed, with the exception of central and southern Nevada (Mote et al. 2005).

The earlier arrival of spring has affected streamflow and plant phenology (the study of the timing of natural events). The timing of spring snowmelt-driven streamflow is now about 10 to 15 days earlier than in the mid-1900s, and an increase in interannual variability in spring flow has occurred (Baldwin et al. 2003; Stewart et al. 2005). Phenological studies indicate that in much of the West, the average bloom-date is earlier for both purple lilac (2 days per decade based on data from 1957 to 1994) and honeysuckle (3.8 days per decade based on data from 1968 to 1994) (Cayan et al. 2001; United States Forest Service [USFS] 2008).

Some climatologists have postulated the existence of climate “tipping points” (Trenberth 2009). A tipping point would occur if an aspect of the climate system were to reach a state such that strong amplifying feedbacks were activated by only moderate additional warming. Although the threshold conditions that would be required to trigger a tipping point in the climate system are not known, some climatologists are concerned that increasing atmospheric concentrations of GHGs in the future could move the climate system toward a tipping point.

3.2.2 Geology

The WD lies in the western part of the Basin and Range physiographic province (west of longitude 117 degrees West; Barker et al. 1995). The Basin and Range province extends west to the Sierra Nevada and Cascade Ranges in California and Oregon, and east to the Wasatch Mountains in Utah. Topography is comprised of an alternating series of moderate to high relief, north-south-trending mountain ranges typically 5 to 15 miles wide, and intervening broad, alluvium-filled valleys or basins from 10 to 20 miles wide. The ranges and valleys were created by faulting that resulted in horst and graben structures (large alternating up thrown and downthrown fault blocks) and large tilted fault blocks that characterize the Basin and Range Physiographic Province. Valley bottoms range from about 3,450 to 4,500 feet in elevation and mountain ranges have elevations from 5,000 to over 9,850 feet above mean sea level (amsl). Star Peak in the Humboldt Range at an elevation of 9850 feet (amsl) is the highest point in the planning area. Relief of 3,500 to 4,000 feet in a distance of a few miles is common (BLM 2006a).

From Paleozoic to Middle Jurassic time, this area of Nevada was dominated by marine deposition, varying between broad open seaways and relatively restricted basins. The Paleozoic sequences are thought to have been deposited in western Nevada and subsequently transported to the east, first on the Roberts Mountain thrust during the Antler orogeny of Late Devonian/Early Mississippian age, then on the Golconda thrust during the Sonoma orogeny of Early Triassic age. The lithologic and structural complexity of the involved formations precludes any detailed mapping of the structural features in most areas.

Another deformation during Jurassic and Cretaceous time is considered to be part of the Nevadan orogeny, an episode of low-grade metamorphism, variably directed folding, and thrust faulting. Thrust faults mapped in the Sonoma Range indicate overriding from east to west, and folds are overturned to the west.

Basaltic flows and rhyolitic lavas and ash flows were extruded during Tertiary and Quaternary time. Concurrent with the volcanism, Cenozoic normal (Basin and Range) faulting has been intermittently active from about 16 million years ago until the present, resulting in maximum uplifts of probably several thousand feet. During regional extension thick sequences of Tertiary sediments were deposited in the basins. Some of the highly extended basins are as deep as 10,000 feet to bedrock. The sedimentary rocks in these basins are primarily of lacustrine and fluvial-lacustrine origin and were deposited contemporaneously with volcanism.

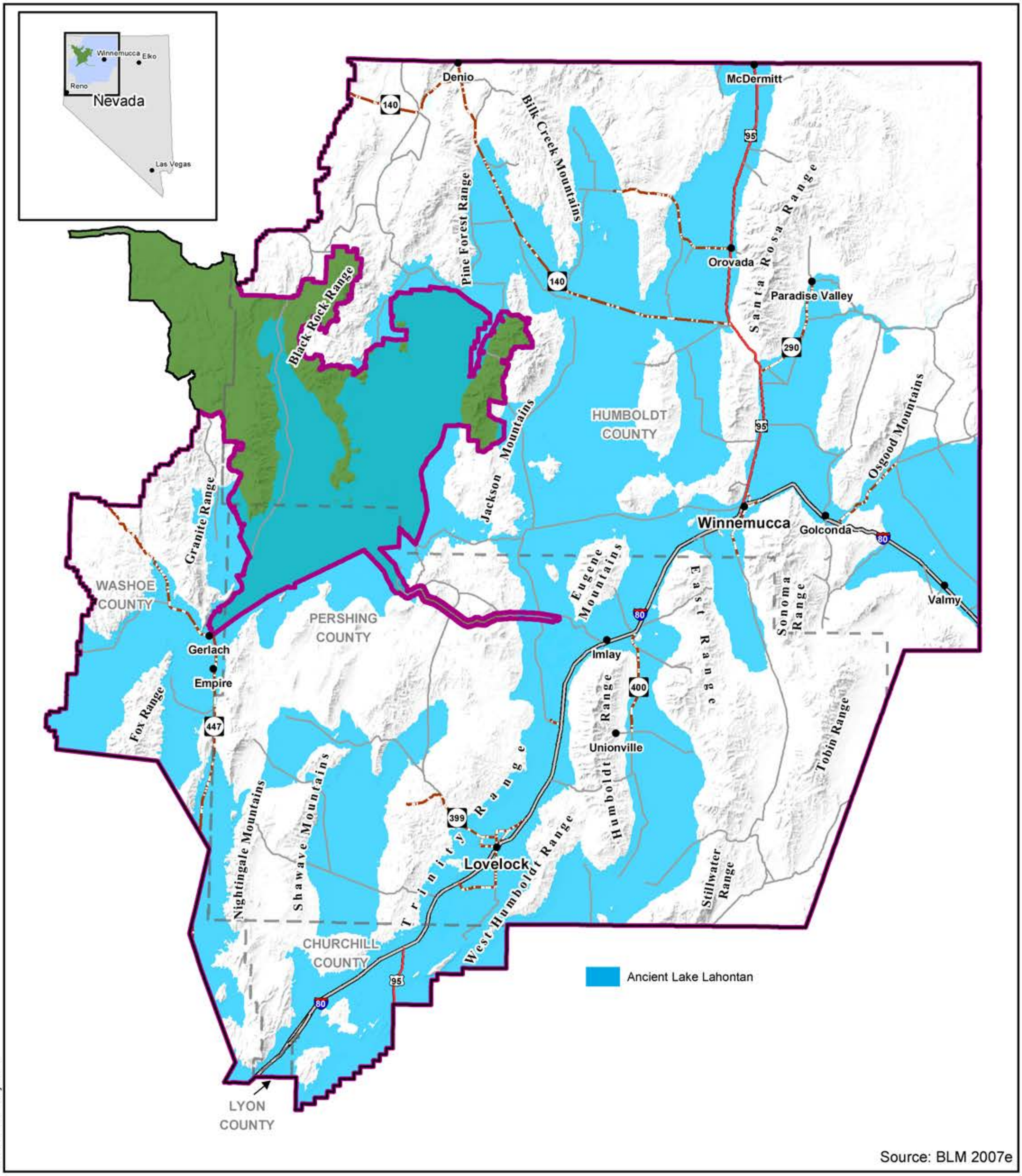
Thick sequences of lake sediments were also deposited in the basins in Pleistocene time, when pluvial Lake Lahontan inundated large areas of western Nevada. The interbedding of alluvium and colluvium with the lacustrine deposits records the history of high-stand and low-stand cycles of the lake.

Among the youngest regional deposits of Quaternary age are assemblages of fluvial, aeolian, lacustrine, and alluvial deposits primarily associated with Pleistocene Lake Lahontan and local tributaries (Figure 3-1). These younger sediments cover large portions of the planning area and are sources for many of the mineral material sources in the planning area. These basin-fill deposits locally have hydrocarbon generation potential, resulting mainly from hydrothermal alteration of algal organic matter in lacustrine marls and humic coals or coaly rocks, but no commercial hydrocarbon production has been established in the region (Barker et al. 1995).

Regional tectonic, igneous, and volcanic events accompanying regional extension have fractured the upper crust. This region of Nevada exhibits high heat flow, which, combined with the fractures and deep basins, provides conduits for thermal fluids to migrate through permeable zones to create ore deposits. The basins are reservoirs for geothermal resources.

Throughout geologic time there have been granitic intrusions accompanying the major tectonic events. Many of the granitic events are sources of fluids that create ore deposits. The granites also provide mineral material sources, such as decorative boulders and decomposed granite.

The Paleozoic and Mesozoic rocks include high-quality limestone that is mined in the planning area. It is considered possible, although no exploration has been done to confirm the hypothesis, that Permian-Triassic rocks may have potential for petroleum generation where traps are created by faulting and hydrothermal or contact metamorphism has altered organic matter contained in marine shales. Evidence includes oil or gas shows in the Augusta and Clan Alpine Ranges and in Buena Vista Valley. Figure 3-2 presents representative stratigraphic columns from the region.



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Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N S E W

0 10 20 Miles

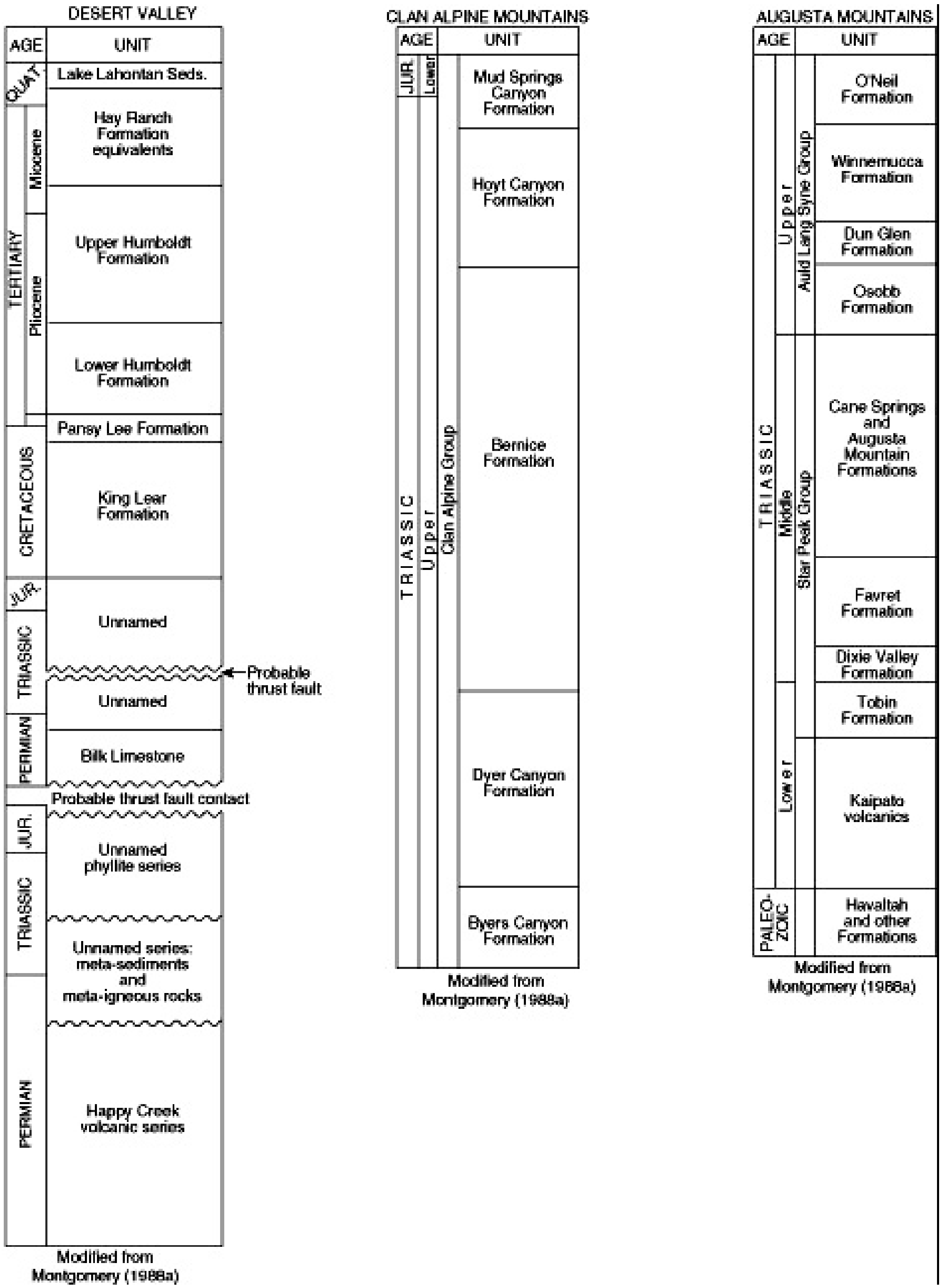
Winnemucca District RMP
Ancient Lake Lahontan

Northwest Nevada

Figure 3-1

Figure 3-2 Stratigraphic Units Present in the Planning Area

(from Barker et al. 1995)



3.2.3 Soil Resources

The overall resource condition for soils is good, with some areas demonstrating diminished, unstable, or eroded soils due to rangeland wildfires, overgrazing, and commercial operations.

Setting

Soil surveys in the region began in the Fallon area in 1909. By the 1940s the field surveys were supplemented with aerial photography. These surveys were known as Physical Surveys and Surveys for Better Land Use. Between 1950 and 1970, the surveys became more detailed, with soil taxonomy information and better aerial photography. The surveys concentrated on agricultural areas and uses. In the 1970s the surveys for key agricultural areas were completed as well as those for urban areas.

Between 1970 and 1978, a new relationship was forged between the United States (US) Department of the Interior (USDI)'s BLM and the Soil Conservation Service. This relationship paved the way for the rapid acceleration of the soil survey program, with major input of both time and money from the BLM. Since then, the number of soil surveys, their quality, and their use by the government and the public has greatly increased.

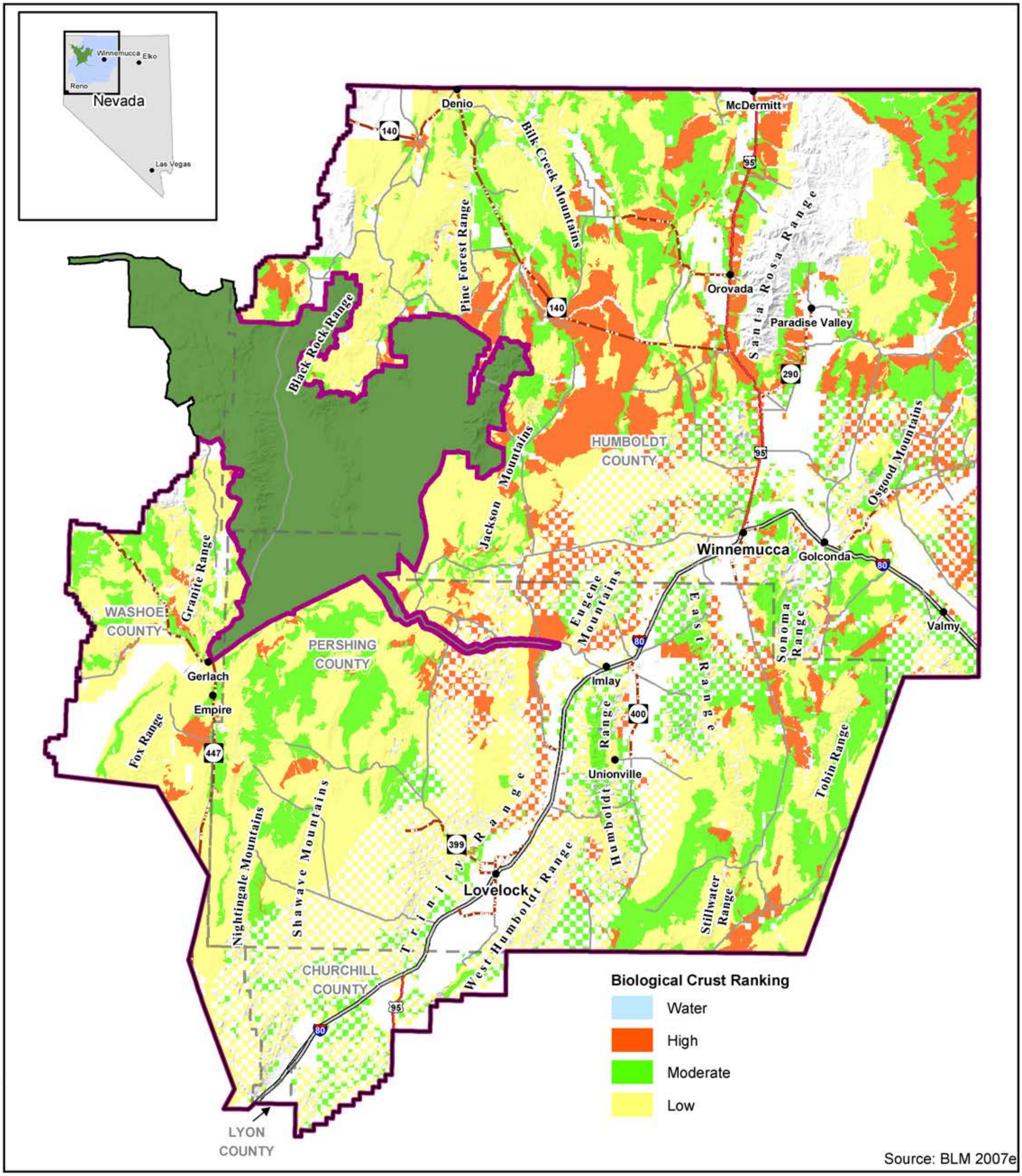
There are over a hundred different soils in the WD area. Special soils that require attention for management purposes include prime and unique farmlands and the presence of biological crusts. There are many soils in WD that are designated as potential prime farmlands but that would require irrigation or reclamation of excess salts and sodium.

Biological crusts grow on or just below the surface of the soil. They can also be known as microbiotic, cryptogamic, cryptobiotic, microphytic, or microfloral crusts or soils. The biological crusts are composed of a community of algae, cyanobacteria (blue-green algae), bacteria, lichens, mosses, liverworts, and fungi and their byproducts. They commonly occur in arid and semiarid environments.

Biological crusts are important for:

- Stabilizing soil;
- Increasing soil's fertility, making nutrients more available to grasses, forbs, and shrubs;
- Helping the soil retain more moisture; and
- Keeping out unwanted plants, such as exotic weeds.

Because of their functions in rangeland systems, biological soil crusts can be an indicator of rangeland health. Figure 3-3 shows where biological crusts are present in the WD. Crusts are well adapted to severe growing conditions, but are extremely susceptible to physical disturbances. Domestic livestock grazing and recreational activities (such as hiking, biking, and off-road driving) disturb the integrity of the crusts. Crust disruption brings decreased organism diversity, soil nutrients, stability, and organic matter. Another indirect physical disturbance occurs through crust burial. When the integrity of the crust is broken, the soil is more susceptible to wind and water erosion. Figure 3-4 shows those areas with high potential for wind erosion, and Figure 3-5 shows those areas with high potential for water erosion. This soil can be moved long distances, covering



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Winnemucca District RMP Potential Biological Crust

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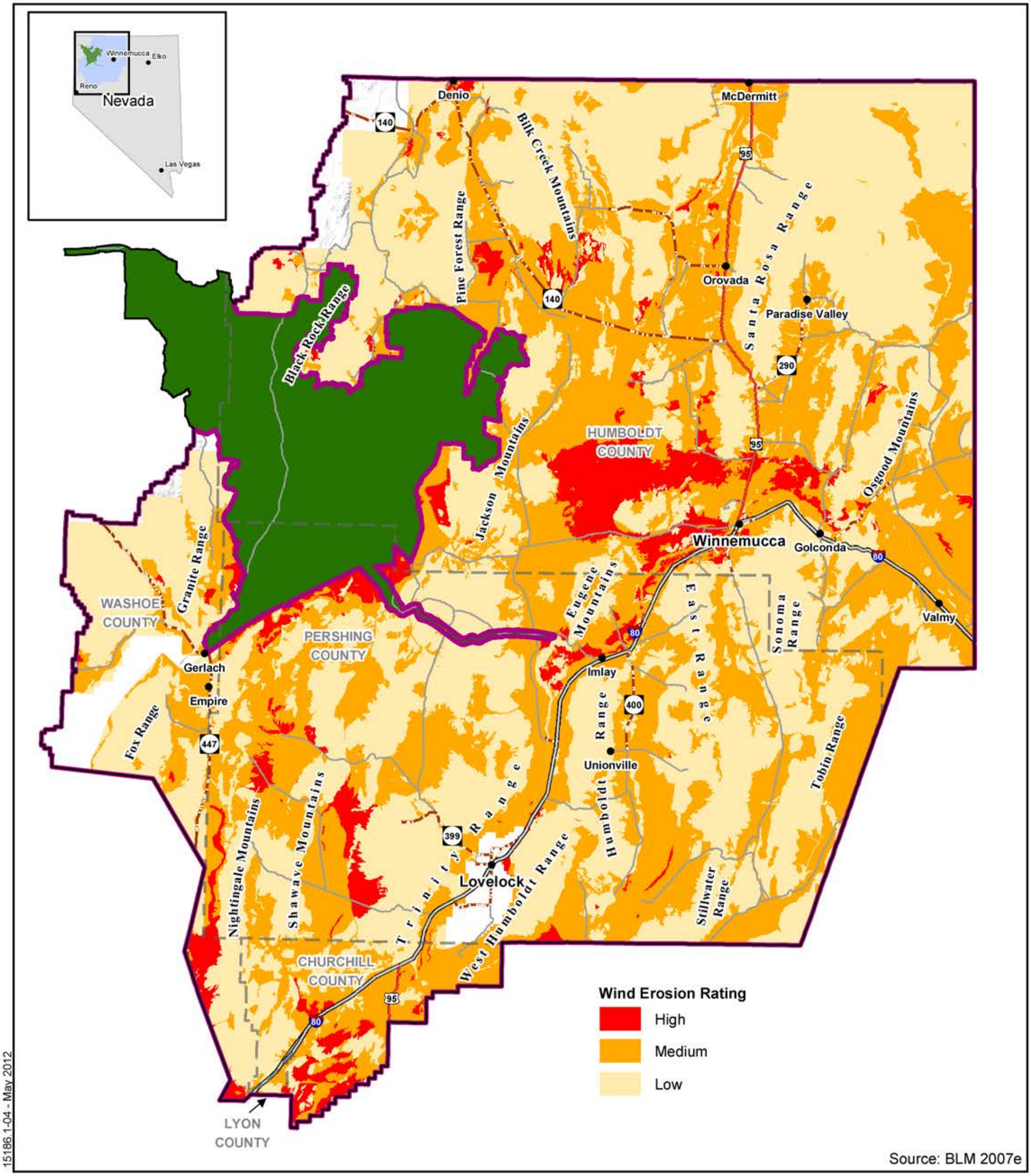
0 10 20 Miles

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

Northwest Nevada

Figure 3-3



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Winnemucca District RMP
Areas of Potential Wind Erosion

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
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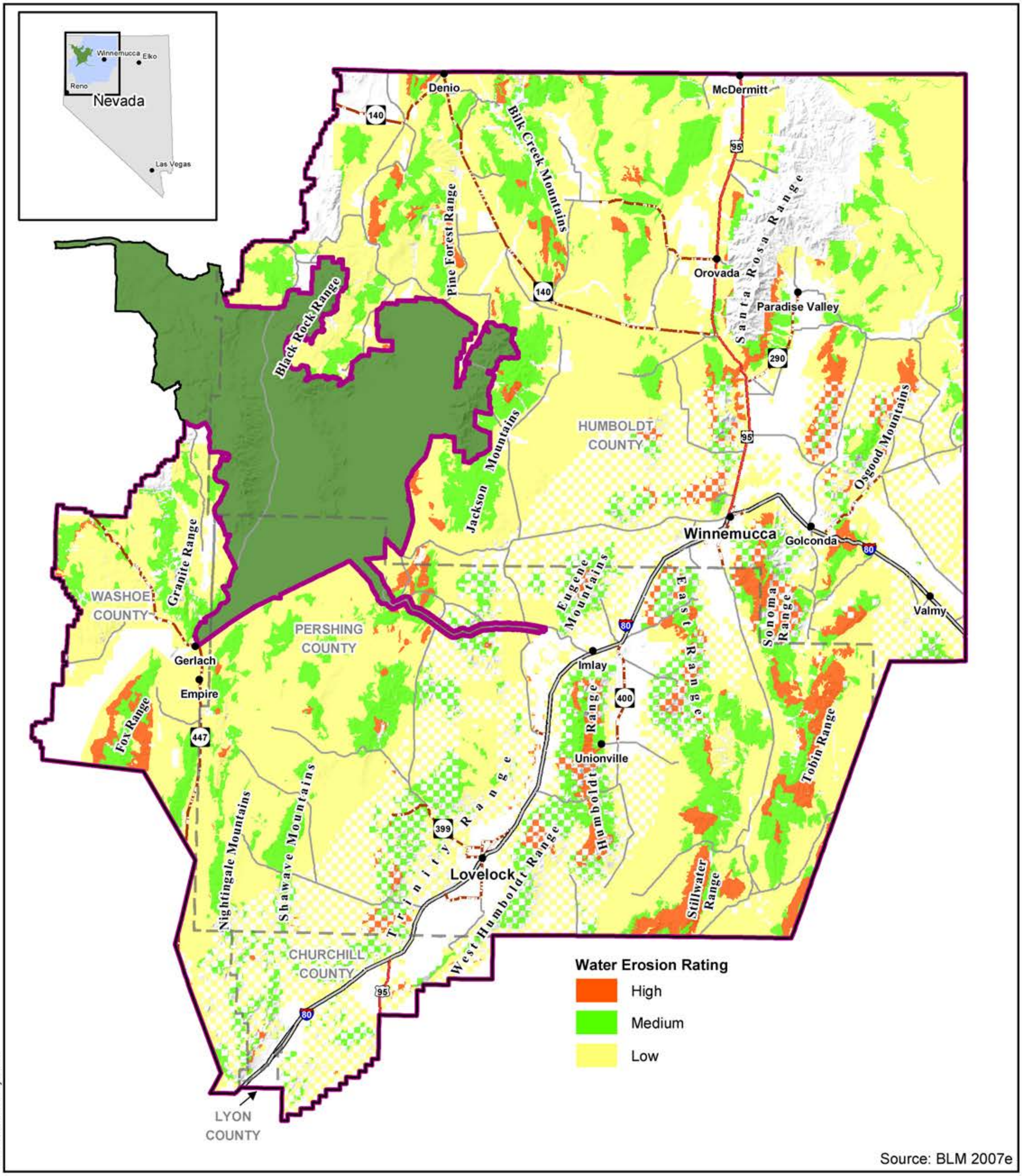
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N S E W

0 10 20 Miles

Northwest Nevada

Figure 3-4



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Winnemucca District RMP
Areas of Potential Water Erosion

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-5

intact crusts. Crusts tolerate shallow burial by extending sheaths to the surface to begin photosynthesis again. Deeper burial by eroded sediment will kill crusts. Fire can also damage the crust, although recovery depends on the intensity of the fire. Low-intensity fires do not remove all of the crust structure, which allows for regrowth without significant soil loss.

Erosion affects environmental aspects other than biological crusts. It can remove topsoil and bury prime and unique farmlands, degrading their agricultural potential. Erosion can also affect water sources and physical features, such as roads, pipelines, and power lines.

3.2.4 Water Resources

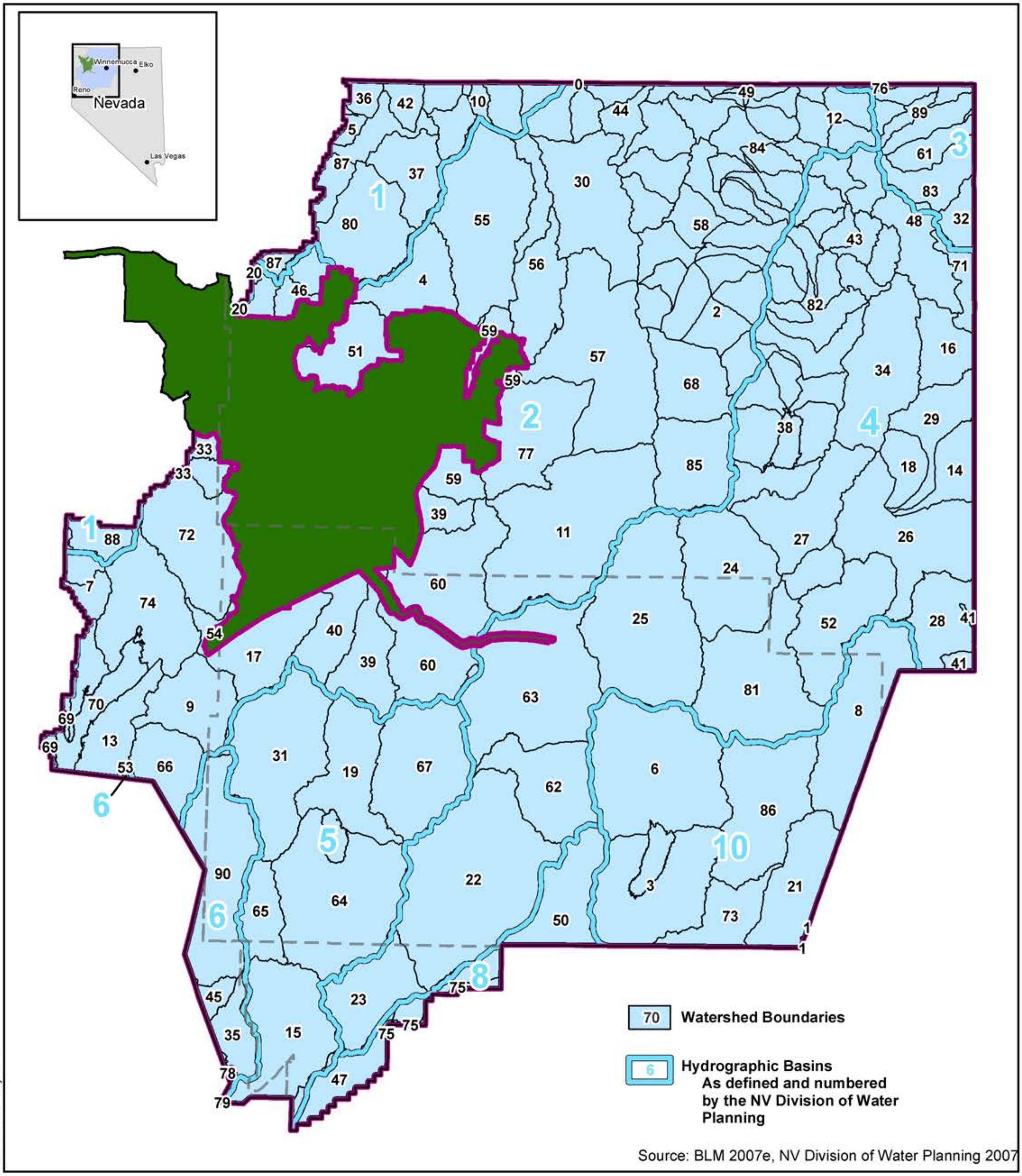
Water uses in the planning area include agricultural (mainly for irrigation, with a much smaller amount used for stock watering), potable (including municipal, small public water systems, and individual domestic wells), and industrial (mainly mining and milling). Geothermal groundwater production is significant, but geothermal waters are typically saline and nonpotable. Recreation and fish and wildlife uses are also important but as a rule do not consume appreciable quantities of water and are generally incidental to other uses. Stock watering is an important use on public lands. If water for livestock is not otherwise available, it is developed by various means on grazing ranges and other places of need, though quantities are not great.

Surface Water

Most of the land administered by the WD receives low rainfall, due to the shadow effect created by the Sierra Nevada Mountains. Average annual precipitation in the planning area varies between 5 and 15 inches, with most occurring as snow from November through March. Numerous small mountain streams flow in the area, many of which are perennial in their respective headwaters. Many of the streams are in terminal basins, and many basins contain deposits of salts remaining from evaporated Pleistocene lakes. In addition, because evaporation greatly exceeds rainfall in the valleys, salts tend to be transported from the higher elevations to the valleys, where they accumulate. Therefore, water quality tends to decline as it moves downstream in the basin.

Most stream flow occurs during the spring in direct response to the melting of the snow pack. Typical stream flow originates at the upper elevations and enters the stream by way of overland flow and shallow groundwater discharge (interflow). As this flow exits the mountain block and moves onto the alluvial fan, the surface expression is quickly lost as it infiltrates into the alluvium. Riparian vegetation exists in the mountainous areas prior to the water being lost as recharge to the alluvial aquifer.

According to the National Hydrography Dataset, there are approximately 126,000 miles of perennial, intermittent, ad ephemeral streams on lands administered by the WD, featuring three primary drainage features that have helped shape the landscape. These are the Quinn, Owyhee, and Humboldt Rivers. Humans have had a significant influence on water resources in the planning area, mainly by consuming freshwater resources for irrigation, which reduces stream flow and recharge. Biological diversity, water quantity, and water quality in many surface water bodies diverge significantly from their historic ranges of variability as a result of these influences. Where this occurs, it is usually downstream of the first point of diversion for irrigation. Watersheds in the WD are identified in Figure 3-6.



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Winnemucca District RMP
5th Order Hydrologic Unit Codes (HUC)

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries

0 10 20 Miles

Northwest Nevada

Figure 3-6

FID	WATERSHED NAME	WATERSHED
0	ALVORD LAKE	1712000902
1	ANTELOPE CREEK	1604010706
2	ANTELOPE CREEK/ PINE CREEK	1604020106
3	ANTELOPE VALLEY WASH	1606000112
4	BARTLETT CREEK	1604020203
5	BIG SPRING CREEK	1604020501
6	BUENA VISTA WASH	1606000111
7	BUFFALO CREEK	1604020304
8	BUFFALO VALLEY WASH	1606000101
9	COTTONWOOD CREEK	1604020302
10	COTTONWOOD CREEK	1712000901
11	DESERT VALLEY WASH	1604020109
12	EAST FORK QUINN RIVER	1604020103
13	EAST SMOKE CREEK DESERT WASH COMPLEX	1604020306
14	EVANS CREEK	1604010509
15	FERNLEY SINK	1605010402
16	FORKS OF THE LITTLE HUMBOLDT RIVER	1604010903
17	GERLACH WASH	1604020210
18	GRANITE CREEK	1604010510
19	GRANITE SPRINGS VALLEY WASH	1605010405
20	HIGH ROCK CANYON CREEK	1604020310
21	HOME STATION WASH	1606000103
22	HUMBOLDT LAKE	1604010807
23	HUMBOLDT RIVER TERMINAL DEPRESSION	1604010808
24	HUMBOLDT RIVER/ CLEAR CREEK	1604010803
25	HUMBOLDT RIVER/ DUN GLEN	1604010804
26	HUMBOLDT RIVER/ HERRIN SLOUGH	1604010511
27	HUMBOLDT RIVER/ ROCK CREEK	1604010801
28	HUMBOLDT RIVER/ SHEEP CREEK	1604010507
29	KELLY CREEK	1604010508
30	KINGS RIVER	1604020111
31	KUMIVA VALLEY WASH	1605010403
32	LAKE CREEK	1705010602
33	LITTLE HIGH ROCK CREEK	1604020309
34	LITTLE HUMBOLDT RIVER/ EDEN CREEK	1604010904
35	LITTLE VALLEY WASH	1605010306
36	LONG DRAW	1604020502
37	LOWER CRAINE CREEK	1604020504
38	LOWER LITTLE HUMBOLDT RIVER	1604010907
39	LOWER QUINN RIVER	1604020207
40	LOWER QUINN RIVER	1604020209
41	LOWER REESE RIVER	1604010710
42	LOWER RINCON CREEK	1604020507
43	MARTIN CREEK	1604010905
44	MC DERMITT CREEK	1604020102
45	MUD LAKE SLOUGH	1605010305
46	MUD MEADOWS CREEK	1604020208
47	MUSTANG POND	1605020304
48	NORTH FORK LITTLE HUMBOLDT RIVER	1604010901
49	OREGON CANYON CREEK	1604020101
50	PACKARD WASH	1605020306
51	PAHUTE CREEK	1604020204
52	PUMPERNICKEL VALLEY	1604010512
53	PYRAMID LAKE FRONTAL	1605010304
54	QUINN RIVER DEPRESSION	1604020211
55	QUINN RIVER/ BIG CREEK	1604020202
56	QUINN RIVER/ BILK CREEK	1604020201
57	QUINN RIVER/ BOTTLE CREEK	1604020112
58	QUINN RIVER/ CROWLEY CREEK	1604020105

Source: BLM 2007, NV Division of Water Planning 2007

Winnemucca Field Office RMP
5th Order HUC

Northwest Nevada

Figure 3-6 - Legend

Surface Water Quality

The chemical character and quality of a natural water source is determined by mineral content of the rock that water flows across or through and the ease with which the rock minerals dissolve into the water. Among the variables that influence the concentrations of dissolved constituents in water are contact time between water and rock minerals, evaporation (which reduces the volume of water and causes salts to concentrate), temperature (which influences solubility), and the concentration and character of the mineral constituents in the rock or sediment.

Precipitation, because it has not yet come in contact with geologic materials, typically has very low concentrations of dissolved minerals and is considered very good quality. The contact time between precipitation runoff and rock minerals is short for water in streams and lakes at higher elevations, where precipitation is most common. Generally, these waters also have low concentrations of dissolved minerals and are considered good quality. Groundwater moves relatively slowly through rocks that comprise an aquifer and therefore has greater potential to dissolve minerals. Greater distance from the recharge area implies greater contact time between groundwater and the aquifer rocks. As a result, groundwater chemistry at discharge areas generally exhibits somewhat higher concentrations of dissolved minerals and is of somewhat lesser quality than water in the recharge area. However, these variations may be masked by other influences in complicated flow systems.

Evaporation and evapotranspiration can have a significant impact on water quality. Because these processes remove water molecules from the source but leave dissolved minerals, the concentration of dissolved minerals increases in the water that remains. In some circumstances, lakes or ponds that do not have a consistent supply of fresh water and are subject to evaporation would exhibit a decrease in water quality owing to the increase in dissolved minerals.

This condition also occurs in groundwater that rises to near ground surface and is subject to evaporation and evapotranspiration. For these reasons, groundwater resources near the center or near the terminal playa of hydrographic basins are often somewhat saline. Temperature also has the potential to affect water chemistry and quality. Most rock minerals dissolve more easily under higher temperatures. Thus, groundwater that has been heated in geothermal systems typically contains higher levels of dissolved minerals than do low temperature groundwater resources. Additionally, thermal water may dissolve minerals that have potential to affect the pH (acidity/alkalinity) of the water.

In a typical hydrographic basin, water quality would be best in the mountains, where precipitation is most frequent and abundant. Surface water flowing from the mountains and groundwater near the mountain front would generally be of good quality. However, near the basin center or in discharge areas water quality would be poorer due to evapotranspiration. Perhaps the two most important physical water quality indicators are temperature and turbidity. (Turbidity is the opposite of clarity and results from suspension of particles, such as fine sediment, in the water column, which causes the water to appear cloudy or muddy). Temperature is important because many species are adapted to a specific range of temperatures. Temperature also affects water chemistry, especially the concentration of oxygen that can be dissolved in the water. Elevated water temperatures can result from both natural and human-related causes.

For example, removal of shade vegetation along streams can increase the amount of solar energy that reaches the stream. Shallow water tends to heat faster than deep water, so sediment deposition in a stream channel, which can cause a stream to become wider and shallower, can lead to increased water temperature. Slower stream velocity allows more time for water to equilibrate to ambient temperature and increases heat from solar radiation, so anything that causes a reduction in flow can also result in increased water temperatures. On the other hand, high flows can prevent sediment deposition and can cause scouring of the channel. Bedrock tends to heat faster than sediment and stores more solar energy.

One of the functions of a stream is to move sediment down slope. The amount of sediment that can be carried by a stream depends on the volume and velocity of the water, which in turn are dependent on factors such as climate and topography. The amount of sediment actually carried by a stream depends on these, as well as on the nature of the geologic materials drained by the stream. Fine particles, such as clay, silt, and fine sand, are more easily suspended in the water column, while large particles, such as coarse sand, gravel, and cobbles, tend to be dragged along the bottom of the stream. In arid climates, streams tend to be unable to remove sediment at the rate it is generated, and streams terminate in closed basins. A few infrequent large-flow events are responsible for moving most of the sediment, and over time streams become clogged with sediment and sediment accumulates in the basins. As a result, the turbidity of desert streams can vary over a wide range. At higher elevations, where there is more precipitation, steeper slopes, and smaller channels, streams convey a larger percentage of the sediment carried to them by runoff, but as the streams reach lower elevations, the energy of the stream decreases and the sediment load is deposited, forming broad alluvial fans on the basin margins.

Land management activities can disturb the ground and accelerate erosion. Concentrated runoff, such as in roadside ditches, can also accelerate erosion. Vegetation tends to hold soils in place, absorbs the impacts of raindrops, and slows overland flow of runoff, so erosion can also be accelerated in areas where vegetation cover is removed because of fires, grazing, or other activities.

Erosion rates in a watershed are reflected in channel geometry and streambed characteristics (the drainage condition). Stable channels tend to have graded streambeds and well-vegetated banks that are neither steep nor deeply incised. Unstable drainages show evidence of recent down cutting and gullying.

Biological indicators of water quality are of two types: those that are used as a direct measure of water quality, such as pathogens; and those that indirectly reflect the quality of the water, such as excessive algae production (which may be an indicator of elevated nutrient concentrations) or presence and abundance of indicator species or populations, such as trout or amphibians. Pathogens include a large variety of organisms that are present in the digestive systems of birds and mammals and are harmful to human health when present in drinking water, including fecal coliform bacteria, giardia, and cryptosporidia. Although pathogens may be present under natural conditions, elevated concentrations of pathogens suggest a human-caused condition, such as improper discharge or disposal of human or animal waste, or livestock watering at a stream or spring.

The State of Nevada is required to identify impaired surface water bodies under Section 303(d) of the Clean Water Act. A list of these impaired water bodies and a discussion of the status of each stream is presented in the final 303(d) report (NDEP 2005). The impaired water bodies identified in the planning area are presented in Table 3-6. In addition to the list of impaired streams, the report identifies water bodies warranting further investigation, which are also included in Table 3-7 below.

Table 3-6
Impaired Water Bodies in the Planning Area, from 303(d) List

Hydrologic Unit/Watershed	Water Body	Reach	Size	Existing TMDLs	Pollutant or Stressor of Concern
16040105	Humboldt River	Battle Mountain to Comus	81.36 miles	Total phosphorus, TDS, TSS	Boron, iron, TDS, total phosphorus, TSS, turbidity, zinc
16040108	Humboldt River	Comus to Imlay	114.09 miles	Total phosphorus, TDS, TSS	Iron, molybdenum TDS, total phosphorus, TSS, turbidity, zinc
16040108	Humboldt River	Imlay to Woolsey	44.43 miles	None	Molybdenum
16040108	Humboldt River	Woolsey to Rodgers Dam	13.22 miles	None	TDS, iron
16040108	Humboldt River	Rodgers Dam to Humboldt Sink	22.77 miles	None	Boron, iron, molybdenum
16040109	Little Humboldt River	Entire length	53.52 miles	None	Total phosphorus, zinc

Notes: TDS = total dissolved solids; TSS = total suspended solids
Source: NDEP 2004a

Table 3-7
Water Bodies in the Planning Area Warranting Further Investigation (NDEP 2004a)

Hydrologic Unit/Watershed	Water Body	Reach	Existing TMDLs	Pollutant or Stressor of Concern
16040109	N Fork Little Humboldt River	Below Buckskin Mine to forest boundary	None	Metals, pH
16040109	Little Humboldt River	Entire length	None	Dissolved oxygen, iron, temperature
16040108	Rochester Canyon Creek	Below historic mine site	None	Metals

Source: NDEP 2004a

Riparian areas and wetlands are those that support vegetation requiring free water and saturated soil conditions to survive. They comprise less than one percent of the WD's plant communities/associations (Table 3-10). Of these areas, the condition of an estimated 891 miles of lotic habitat and 2,103 acres of lentic habitat on public land in the planning area have been assessed. Table 3-8 presents a summary of the riparian proper functioning condition (PFC) of lotic and lentic riparian areas assessed in the WD.

Table 3-8
Summary of Riparian Functioning Condition in the Decision Area

	Functioning-at-Risk				
	Trend				
PFC	Up	Down	Not Apparent	Nonfunctional	Total Area Assessed
Lotic					
339 miles (38%)	154 miles (17%)	98 miles (11%)	247 miles (28%)	53 miles (6%)	891 miles
Lentic					
694 acres (33%)	110 acres (5%)	441 acres (21%)	821 acres (39%)	37 acres (2%)	2103 acres

Source: BLM 2012c

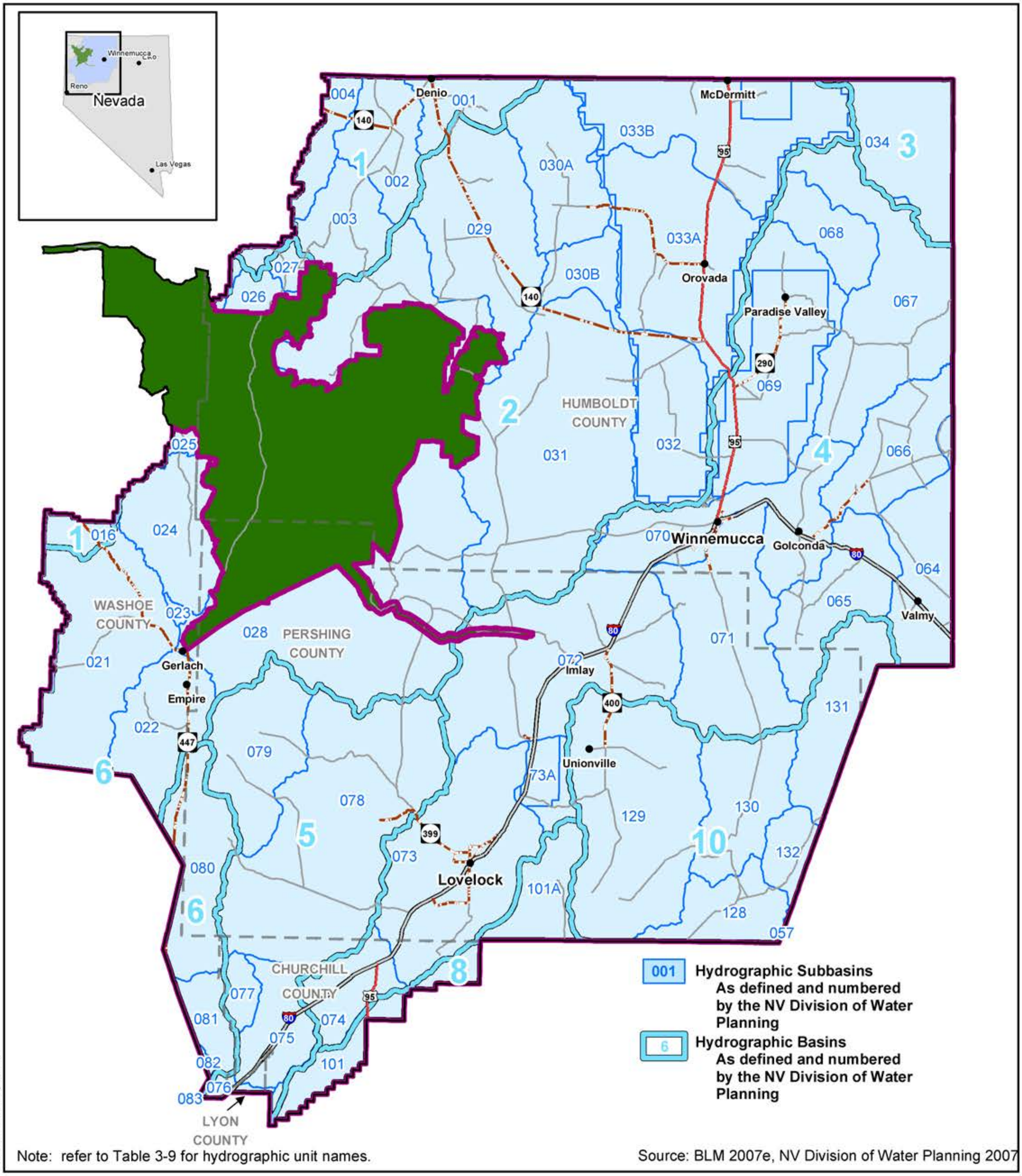
Groundwater

The hydrographic basin is the basic management unit used by the Nevada Division of Water Resources (NDWR). Generally, a hydrographic basin is defined by the topographic divide, or ridgeline, that separates adjacent basins. Most basins in the Basin and Range Physiographic Province are closed; surface waters in the basin originate in adjacent mountains and remain in the valley. In some cases, the boundary between basins may be arbitrarily defined at low divides covered by alluvial sediments. Surface drainage channels link a few of the hydrographic basins in the planning area. Because of the fault-bounded basin and range geology of the region, the boundaries of groundwater basins generally correlate well with surface water hydrographic units (watersheds). Figure 3-7 and Table 3-9 identify the groundwater hydrographic basins of the planning area.

Summary of Groundwater Resource Conditions in the Planning Area

Below is a summary of current groundwater supply and groundwater quality conditions in each of the groundwater regions identified by Rush (Rush 1968) and used by Garcia and Jacobini (Garcia and Jacobini 1991). Communities in the planning area collect and use groundwater and surface water. Figure 3-8 shows the locations in the planning area that supply water to these communities.

The term perennial yield is used to describe the volume of water that can be extracted over the long term without resulting in a decline in groundwater storage. The official definition used by the Nevada Division of Water Resources is: "The amount of usable water of a groundwater reservoir that can be withdrawn and consumed economically each year for an indefinite period of time. It cannot exceed the sum of the Natural Recharge, the Artificial (or Induced) Recharge, and the Incidental Recharge without causing depletion of the groundwater reservoir." Groundwater tends to be in constant motion, flowing from areas of recharge to areas of discharge, and groundwater basins are not typically isolated or independent from each other but may comprise a large dynamic regional system. Under natural conditions, groundwater tends to overflow or leak from one basin into adjacent basins. Therefore, although capturing the perennial yield of an upstream basin may not cause a noticeable decline in storage in that basin, it would reduce the perennial yield of the adjacent downstream basins. The amount of interbasin flow is influenced by the geometry and geology of the basin and the groundwater elevation, which in turn is influenced by the amount, timing, and location of recharge. In general, it requires a certain amount of recharge to maintain groundwater levels at a given elevation.



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Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

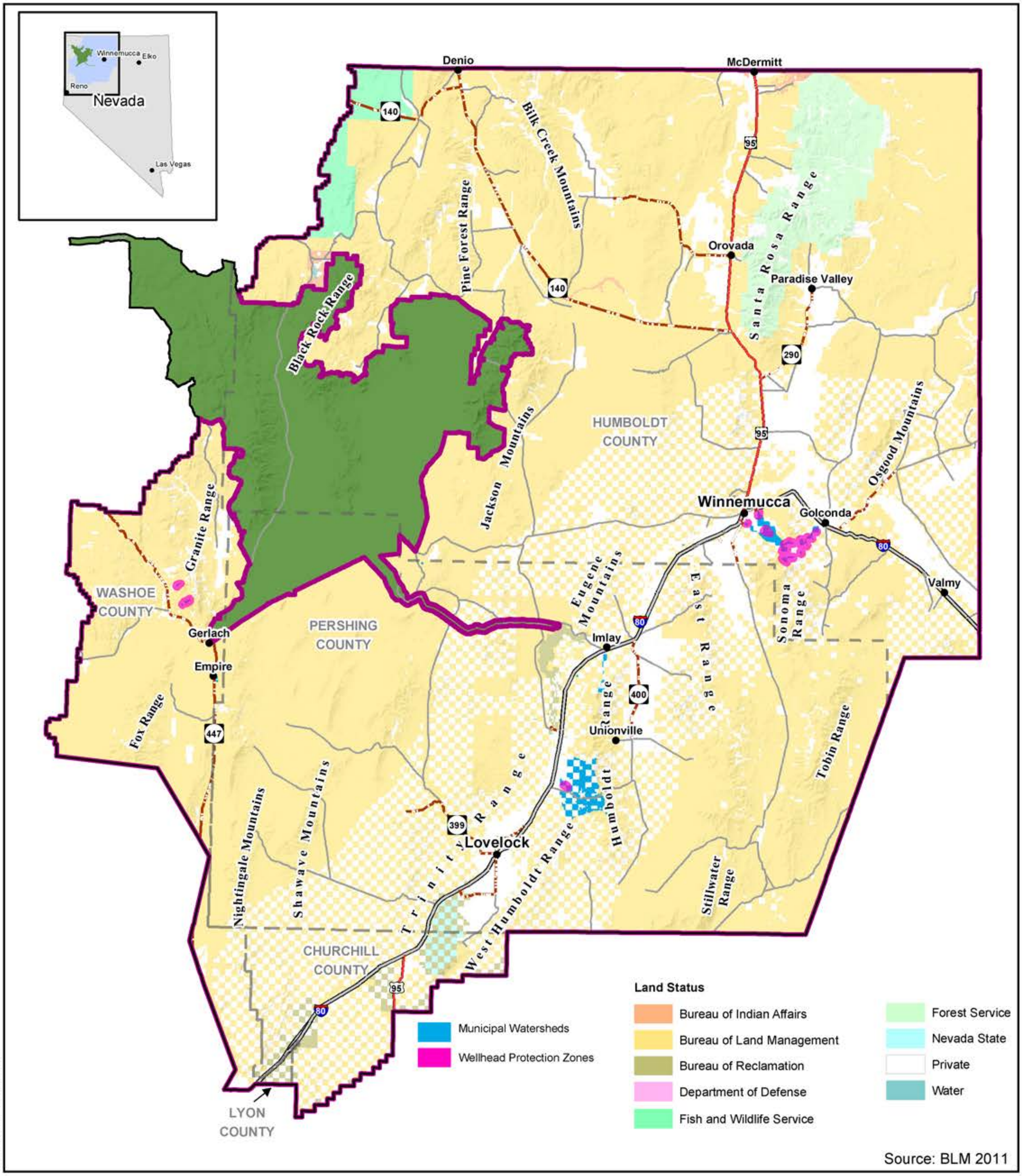
0 10 20 Miles

N S E W

Winnemucca District RMP Hydrographic Subbasins

Northwest Nevada

Figure 3-7



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Winnemucca District RMP Community Water Sources

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-8

Table 3-9
Groundwater Use by Hydrographic Basins

Northwest Region (1)	Northwest Region (1) Perennial Yield (AFY)	Northwest Region (1) Principal Groundwater Uses	Northwest Region (1) Active Annual Water Duty (geothermal)	Northwest Region (1) Over-Appropriated?	Northwest Region (1) Designated Basin? (Year)
1. Pueblo Valley	2,000	I >>D	1,913	N	
2. Continental Lake Valley	11,000	I >>M	7,812		
3. Gridley Lake Valley	3,000	I	4,751		
4. Virgin Valley	6,000	M	8.5		

Black Rock Desert Region (2)	Black Rock Desert Region (2) Perennial Yield (AFY)	Black Rock Desert Region (2) Principal Groundwater Uses	Black Rock Desert Region (2) Active Annual Water Duty (geothermal)	Black Rock Desert Region (2) Over-Appropriated?	Black Rock Desert Region (2) Designated Basin? (Year)
21. Smoke Creek Desert	16,000	I >>W>C	12,205		
22. San Emidio Desert	2,500	I >M>Ind, G	7,440 (1,303)	Y	Y (1980)
23. Granite Basin	200	-	0		
24. Hualapai Flat	6,700	I	28,046	Y	Y (2003)
25. High Rock Lake Valley	5,000	M>S	309		
26. Mud Meadow	13,000	I	3,971		
27. Summit Lake Valley	1,000	S	12		
28. Black Rock Desert	30,000	I>M>S	29,643		
29. Pine Forest Valley	11,000	I >>S>D	37,002	Y	Y (1978)
30. Kings River Valley		I/S	24,790?		
31. Desert Valley	9,000	I>M>Ind	38,178	Y	Y (1975)
32. Silver State Valley	5,900	I >>M>S	20,182	Y	Y (1965)
33. Quinn River Valley		I >>M&E	53,140?		

Humboldt River Basin (4)	Humboldt River Basin (4) Perennial Yield (AFY)	Humboldt River Basin (4) Principal Groundwater Uses	Humboldt River Basin (4) Active Annual Water Duty (geothermal)	Humboldt River Basin (4) Appropriated?	Humboldt River Basin (4) Designated Basin? (Year)
64. Clovers Area	72,000	M&E>I>M	41,094	Y (w/Clovers Area)	Y (1977)
65. Pumpernickel Valley	w/Clovers Area	I>M	14,336	Y (w/Clovers Area)	
66. Kelly Creek Area	w/Clovers Area	M>I	29,956	Y (w/Clovers Area)	Y (1975)
67. Little Humboldt Valley	34,000	I >>S	10,236	Y (w/Little Humboldt)	Y (1971)
68. Hardscrabble Area	w/Little Humboldt	-	0	Y (w/Little Humboldt)	Y (1971)
69. Paradise Valley	w/Little Humboldt	I>>S>D	116,173	Y (w/Little Humboldt)	Y (1971)
70. Winnemucca Segment	17,000	I >M&E>Env	46,374	Y	Y (1975, 2003)
71. Grass Valley	13,000	I >>M&E>M	42,961	Y	Y (1972, 2003)

Table 3-9
Groundwater Use by Hydrographic Basins

Humboldt River Basin (4)	Humboldt River Basin (4) Perennial Yield (AFY)	Humboldt River Basin (4) Principal Groundwater Uses	Humboldt River Basin (4) Active Annual Water Duty (geothermal)	Humboldt River Basin (4) Appropriated?	Humboldt River Basin (4) Designated Basin? (Year)
72. Imlay Area	3,000	M>> I/S>>S	7,508	Y	Y (1978)
73. Lovelock Valley	43,000	I>>M>M&E	7,200		
74. White Plains	100	M	315	Y	Y (1978)

West Central Region (5)	West Central Region (5) Perennial Yield (AFY)	West Central Region (5) Principal Groundwater Uses	West Central Region (5)) Active Annual Water Duty	West Central Region (5) Over-Appropriated?	West Central Region (5) Designated Basin? (Year)
75. Brady's Hot Springs Area	2,500	I>Ind>M	42 (15,862)	Y	Y (1986)
77. Fireball Valley	100	I	160	Y	N
78. Granite Springs Valley	4,500	I>>M	2,809		
79. Kumiva Valley	500	-	0		

Truckee Basin (6)	Truckee Basin (6) Perennial Yield (AFY)	Truckee Basin (6) Principal Groundwater Uses	Truckee Basin (6) Active Annual Water Duty	Truckee Basin (6) Over-Appropriated?	Truckee Basin (6) Designated Basin? (Year)
80. Winnemucca Lake Valley	3,300	I	305		

Carson River Basin (8)	Carson River Basin (8) Perennial Yield (AFY)	Carson River Basin (8) Principal Groundwater Uses	Carson River Basin (8) Active Annual Water Duty	Carson River Basin (8) Over-Appropriated?	Carson River Basin (8) Designated Basin? (Year)
101A. Packard Valley (Carson Desert)	710	M	451	Y (w/Carson Desert)	Y (1978)
101. Carson Desert (Packard Valley)	2,500	M&E>I>Ind, G	18,237 (1,479)	Y	Y (1978, 1995)

Central Region (10)	Central Region (10) Perennial Yield (AFY)	Central Region (10) Principal Groundwater Uses	Central Region (10) Active Annual Water Duty	Central Region (10) Over-Appropriated?	Central Region (10) Designated Basin? (Year)
128. Dixie Valley	15,000	I >Ind>>S, G	18,364 (13,428)	Y	Y (1978)
129. Buena Vista Valley	10,000	I >>M	27,903	Y	Y (1979)
130. Pleasant Valley	2,600	I>>M	3,348	Y (w/Dixie Valley)	Y (1978)
131. Buffalo Valley	8,000	M>I	20,850	Y	M
132. Jersey Valley	250	S	27	Y (w/Dixie Valley)	Y (1978)

Notes: I = irrigation; S = stock watering; M=mining; M&E=municipal & industrial; Ind = industrial; D = domestic; G=geothermal
Source*:* Nevada Division of Water Resources 1999 (NDWR 1999)

The groundwater basins in the WD have no outlet to the sea. Excess regional groundwater flow eventually flows into a terminal basin (such as the Carson Sink). If there is sufficient groundwater flow, the terminal basin fills to capacity and overflows at the surface, forming a lake or wetlands where the water evaporates and leaves behind its accumulated salts.

Note that limiting groundwater withdrawals to the perennial yield of the basin may not always result in the greatest long-term public good. Furthermore, even natural groundwater conditions change over time, and natural groundwater elevations merely reflect the current climate conditions. The climate and regional hydrologic regime of northern and central Nevada has changed radically even during the relatively brief period of human occupation, becoming increasingly drier during the past 10,000 years.

Note also that different groundwater uses can have very different effects on groundwater quality and sustainability. For example, water used for irrigation tends to dissolve salts from the soil, and some of this water recharges the aquifer. Similarly, treated municipal wastewater contains salts that may eventually contribute to groundwater recharge.

Accurate estimates of perennial yield and of the interconnections between basins require measurements over a wide area over a long period of time. Detailed information is lacking for many basins in the WD, and the historical record of groundwater conditions tends to be relatively recent. The following information represents the most current estimates and interpretations of basin water budgets and water quality conditions.

Northwest Region. The planning area overlies the eastern third of the Northwest Region.

Groundwater Supply. The current estimate of the perennial yield of the basins in the Northwest Region is 22,000 acre-feet per year (AFY). Committed water rights total 14,485 AFY, although actual annual use may be far less (as of 2002, the US Geological Survey estimated total pumped water at about 2,400 AFY). Most of the water rights are for irrigation (NDWR 2008). The State Engineer has designated no groundwater basins in the northwest region.

Groundwater Quality. Existing data are inadequate to characterize conditions in the basins of the Northwest Region that lie in the planning area. Some groundwater in the Pueblo Valley-Continental Lake area is apparently satisfactory for irrigation and domestic use because these uses are present. However, central areas of the basins are likely underlain by saline water (Sinclair 1963). The region includes volcanic rock aquifers in addition to the basin-fill aquifers.

Black Rock Desert Region. The WD overlies approximately the eastern two-thirds of the Black Rock Desert Region. About one-third of the portion inside the WD is in the NCA and is therefore not in the planning area. The region includes 13 hydrographic basins.

Groundwater Supply. The State of Nevada estimates the perennial yield of the region at over 150,000 AFY (NDWR 2008). A total of over 200,000 acre-feet of water rights have been committed in the region. Water rights in the San Emidio Desert, Hualapai Flat, Pine Forest Valley, Desert Valley, and Silver State Valley hydrographic basins are overcommitted, and the State Engineer has designated the basins. (Information about the Kings River Valley and the Quinn River Valley, two of the largest basins, was not available at the time of preparation.)

South of Gerlach, the San Emidio Desert area around Empire is a center of geothermal production. The US Geological Survey estimated that losses resulting from operating geothermal production facilities account for a net annual decrease in groundwater storage of more than 4,000 acre-feet (USGS 2004). Currently, water rights for geothermal production in the San Emidio Desert area total 1,303 AFY.

Groundwater Quality. Generally, groundwater of quality suitable for irrigation, domestic, and stock uses is available in all basins of the Black Rock Desert Hydrographic Region (Visher 1957; Sinclair 1962a, 1962b, 1962c, 1963; Malmberg and Worts 1966; Glancy and Rush 1968). In those basins where groundwater flows toward a central basin playa or lakebed, the water quality deteriorates toward the valley center.

Most of the Black Rock Desert and Mud Meadow hydrographic areas are in the NCA and are not part of the study area. The NCA contains many thermal springs or springs affected by geothermal waters, which also adversely affect water quality.

Humboldt River Basin. The Humboldt Basin is the largest hydrologic basin in the state, encompassing approximately 16,840 square miles. The basin can be divided into the Lower, the Middle, and the Upper Basins. The planning area contains nearly all of the lower Humboldt River Basin, including basins underlying the watershed of the Little Humboldt River, and it overlies a portion of the middle Humboldt River Basin west of Battle Mountain.

Groundwater Supply. In the basin overall, the State of Nevada has estimated the perennial yield at 182,100 AFY (NDWR 2008). Water rights totaling 316,153 AFY have been committed. All of the basins except Lovelock Valley are designated basins. The primary use in the Clovers Area is municipal and industrial; mining is the primary use in the Kelly Creek and Imlay Areas and in the White Plains Basin. Elsewhere, the primary use is irrigation.

Since 1995, the USGS has been conducting a regional groundwater study of the Humboldt Basin, including constructing numerical hydrologic models to simulate flow and evaluate the effects of various activities on water quality.

In the Middle Humboldt River Basin, which includes the Clovers Area, Pumpernickel Valley, and the Kelly Creek Area, the US Geological Survey estimated that most of the extracted groundwater was generated by mining operations (mine dewatering). However, mine-relating pumping has decreased recently as mines have shut down, and municipal and industrial use exceeds both mining and irrigation in the Clovers Area. According to the USGS, groundwater extraction in the Clovers Area exceeds the natural recharge rate, but inflow from the adjacent basin to the east more than offsets the difference. In the Kelly Creek Area groundwater recharge approximately balances groundwater pumping, and in the Pumpernickel Valley groundwater pumping greatly exceeds recharge. The net result is a decline in the quantity of groundwater moving from the Middle Humboldt River Basin to the Lower Humboldt River Basin through the narrow gap at the south end of the Osgood Mountains. These basins are designated by the State Engineer.

In the basins underlying tributaries of the main stem of the Humboldt River, including the Little Humboldt Valley, Hardscrabble Area, Paradise Valley northeast of Winnemucca, and Grass Valley to the south, the principal water use is irrigation.

In the Winnemucca segment of the basin, underlying the main stem of the Humboldt River near Winnemucca, groundwater use is about evenly distributed between irrigation and municipal and industrial uses, with environmental uses accounting for some of the water rights. As of 2003, the State Engineer found that groundwater withdrawals in the Winnemucca segment totaled 51,000 AFY, greatly in excess of the perennial yield of 17,000 AFY (NDWR 2008). Farther down the Humboldt River in the Imlay Area, which contains the Rye Patch Reservoir, natural recharge and interbasin inflows exceed the total rate of groundwater pumping. Irrigation and mining account for most of the approximately 2,500 AFY of groundwater consumed. In the Lovelock Valley, most of the groundwater use is for irrigation and pumping does not exceed inflows from other basins; however, the amount of groundwater use is small, at only a little more than 1,000 AFY.

Groundwater Quality. A few wells in the south end of Paradise Valley produce waters with high salinity and with sodium concentrations exceeding drinking water standards, which makes them hazardous for irrigation use and marginal for potable use; in general, however, the water quality is adequate (Harrill and Moore 1970). Groundwater samples collected in Grass Valley, in the upper portion of the basin, indicated that the water is generally suitable for irrigation and domestic use, although about ten percent of samples showed somewhat elevated salinity or trace elements, which would require special handling or would prevent use of the water for irrigation and domestic use (Cohen 1964). Domestic development in the northern end of Grass Valley over the past 30 years has led to increases in the concentrations of dissolved nitrogen-containing compounds in the groundwater.

Groundwater south of Lovelock, at the lower end of the basin, is of poor quality and is unsuitable for agricultural or domestic use (Everett and Rush 1965).

West Central Region. Most of the West Central Region is in the planning area.

Groundwater Supply. The State of Nevada has estimated the total perennial yield of the region at 7,600 AFY (NDWR 1999). Total committed water rights include 3,011 AFY not associated with geothermal water rights, plus an additional 15,862 AFY in geothermal water rights. The geothermal rights are in the Brady's Hot Springs Area, and the State Engineer has designated that basin based on the geothermal rights.

Groundwater Quality. Water quality in the Kumiva and Granite Springs Valleys is suitable for irrigation and domestic use, though the quality tends to deteriorate near the playa. In the Brady Hot Springs area, samples indicate unsuitable quality for domestic use, and high salinity levels would limit use for irrigation (Harrill 1970). The amount of groundwater use in these basins is small and limited to isolated domestic wells with low production (USGS 2004).

Truckee Basin. The planning area overlies most of the Winnemucca Lake Basin, which is in the northeast corner of the Truckee Basin Region. Conditions in the Winnemucca Lake Basin are not representative of the Truckee Basin Region overall, which is dominated by the urban area surrounding Reno and Sparks, extends into California, and includes Lake Tahoe.

Groundwater Supply. The largest groundwater uses in the Truckee Basin are municipal water supply and commercial and industrial uses. However, very little groundwater is used in the Winnemucca Lake Basin. As in the West Central Region, water use is limited to scattered domestic wells with low production (USGS 2004).

Groundwater Quality. Van Denburgh and others (Van Denburgh 1973) describe the quality of groundwater in the Winnemucca Lake Basin as generally poor in quality, especially in the central and eastern parts of the basin. The water is unsuitable for domestic use, and its suitability for agricultural use varies locally.

Carson Desert Region. Only a small part of the north end of the Carson Desert Region lies in the Winnemucca District Office planning area, and it extends to the southwest into California.

Groundwater Supply. Relatively little groundwater is used in the planning area. Committed water rights total 18,688, but most of these rights are outside the WD. The USGS reports that pumping in the Carson Desert basin is primarily for geothermal energy production. Geothermal operations reinject the geothermal fluids, with losses to evaporation accounting for about 20 percent of the extracted water. According to the USGS (USGS 2004), geothermal plants extract about 36,000 AFY, with consumptive use of about 6,000 AFY, although geothermal water rights currently total only 1,479 AFY in the Carson Desert-Packard Valley Basin. According to the USGS, municipal uses account for about 4,000 AFY, while mining, stock watering, and isolated domestic wells account for another approximately 6,000 AFY. Most of this use occurs outside the WD. The net annual decrease in storage for the Carson Desert Region is more than 11,000 AFY.

Groundwater Quality. Water quality information is reported for only one well in the Packard Valley (Glancy and Katzer 1975). This sample would be unsuitable for domestic use due to its high total dissolved solids content, and it would be marginal for irrigation use. Water quality on the upper margins of the basin is sufficiently good to supply some domestic and stock watering uses.

Central Region. The Central Region covers nearly one-third of the area of the state, extending south almost to the Colorado River, west into California, and eastward to near the border with Utah. Only part of the northwest arm of the region is in the planning area, including part of Dixie Valley and all of Jersey Valley, Pleasant Valley, and Buffalo Valley.

Groundwater Supply. The principal groundwater use in the Dixie Valley besides irrigation is geothermal energy production, which consumes about 3,000 AFY of the approximately 18,000 AFY that is extracted (USGS 2004). Perennial yield is estimated at about 35,850 AFY. Committed water rights exceed the perennial yields of all basins except the Buffalo Valley Basin. Buena Vista Valley is a separate terminal basin north of the Carson Desert. The principal water use in the Buena Vista Valley is irrigation, with a small amount used in mining or for scattered domestic wells. Inflows exceed pumping, and the excess inflows are lost to evaporation on the playa floor.

Groundwater Quality. Water quality in the Buena Vista Valley is reported for eight samples (Garcia and Jaconobi 1991). All but two of these well samples appear to have TDS concentrations in excess of drinking water standards.

3.2.5 Vegetation – General

Introduction

The planning area includes portions of the Northern Great Basin and Columbia Basin floristic provinces. In these provinces, precipitation and other climatic factors, availability of water, soils, elevation, and exposure all contribute to the diversity of vegetation. Nine primary plant communities/associations have been described in the planning area: sagebrush scrub, salt desert scrub, desert sink scrub, invasive annual grasslands, woodland, perennial grasslands, riparian and wetland, and altered/disturbed/agriculture (USGS National Gap Analysis Program 2004]) (Table 3-10; Figures 3-9; 3-10; 3-11).

Table 3-10
Plant Communities/Associations in the Decision Area

Plant Community/ Association	Acres on BLM Land
A. Sagebrush scrub	3,146,214
D. Salt desert scrub	1,858,725
B. Desert sink scrub	629,587
D. Invasive annual grasslands	446,056
E. Woodland	413,356
F. Perennial grasslands	103,998
G. Riparian and Wetland	11,952
H. Altered/Disturbed/Agriculture	25,423
I. Barren Lands, Non-specific	9,716

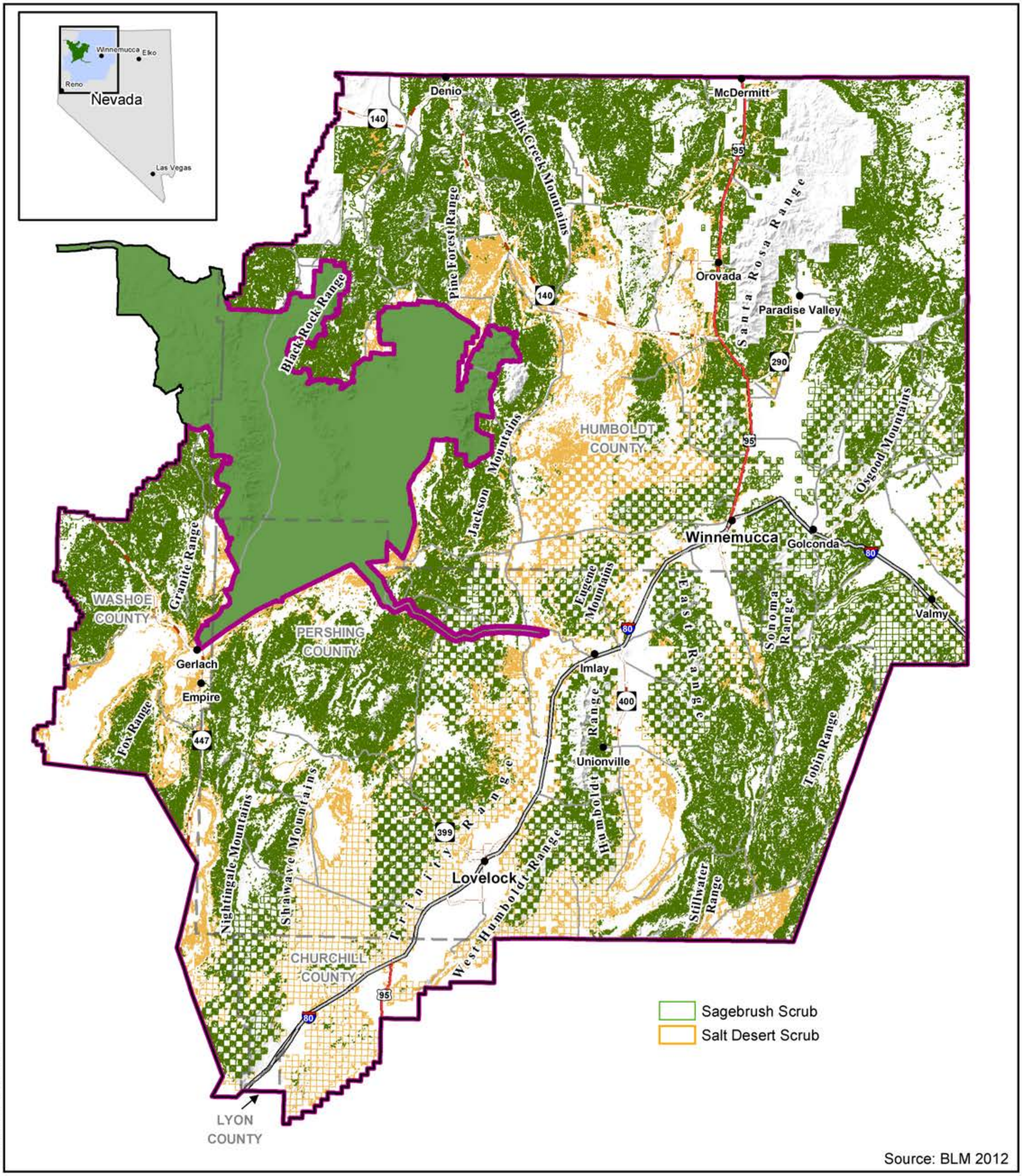
Sources: SWReGAP 2004, BLM 2012a

Sagebrush scrub covers 3,146,214 acres of BLM land in the planning area, based on vegetation geographic information system (GIS) coverage (SWReGAP 2004, BLM 2012) (Figure 3-9). There are three primary species of sagebrush, distributed according to elevation, precipitation, slope, and salinity. Kuchler (1970) divided areas supporting sagebrush into two major vegetation types: sagebrush steppe, where sagebrush can co-dominate with native bunchgrasses, and Great Basin sagebrush, where sagebrush can be the sole dominant. These two major types come into contact with each other in the planning area, with sagebrush steppe predominant in the north and Great Basin sagebrush predominant in the south.

Salt desert scrub covers 1,858,725 acres of BLM land (SWReGAP 2004, BLM 2012) (Figure 3-9). Salt desert scrubs occur in soils that are less salty than those of alkali sinks. Dominant species can include shadscale (*Atriplex confertifolia*), hop-sage (*Grayia spinosa*), and mixed saltbush (*Atriplex* spp.). This habitat type may be found in valleys, washes, lower slopes, and moderately drained flats.

Desert sink scrub covers 629,587 acres of BLM land (SWReGAP 2004, BLM 2012) (Figure 3-10). In the planning area, this habitat type is dominated by greasewood (*Sarcobatus vermiculatus*), with other species such as iodine bush (*Allenrolfea occidentalis*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), big sagebrush (*Artemisia tridentate spp.*), and shadscale (*Atriplex confertifolia*).

Invasive annual grasslands cover approximately 446,056 acres of BLM land (SWReGAP 2004, BLM 2012) (Figure 3-11). These are typically areas that have converted from dry site sagebrush scrub or saltbush scrub communities to cheatgrass (*Bromus tectorum*) monocultures from multiple, repeat disturbances such as excessive grazing pressure, drought and wildfires. Other annual species such as tansy mustard (*Descurainia pinnata*), tumble mustard (*Sisymbrium altissimum L.*) and Russian thistle species (*Salsoa L.*) also cycle through these grasslands.



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Winnemucca District RMP

Vegetation - Sagebrush and Saltbrush Scrub

Legend

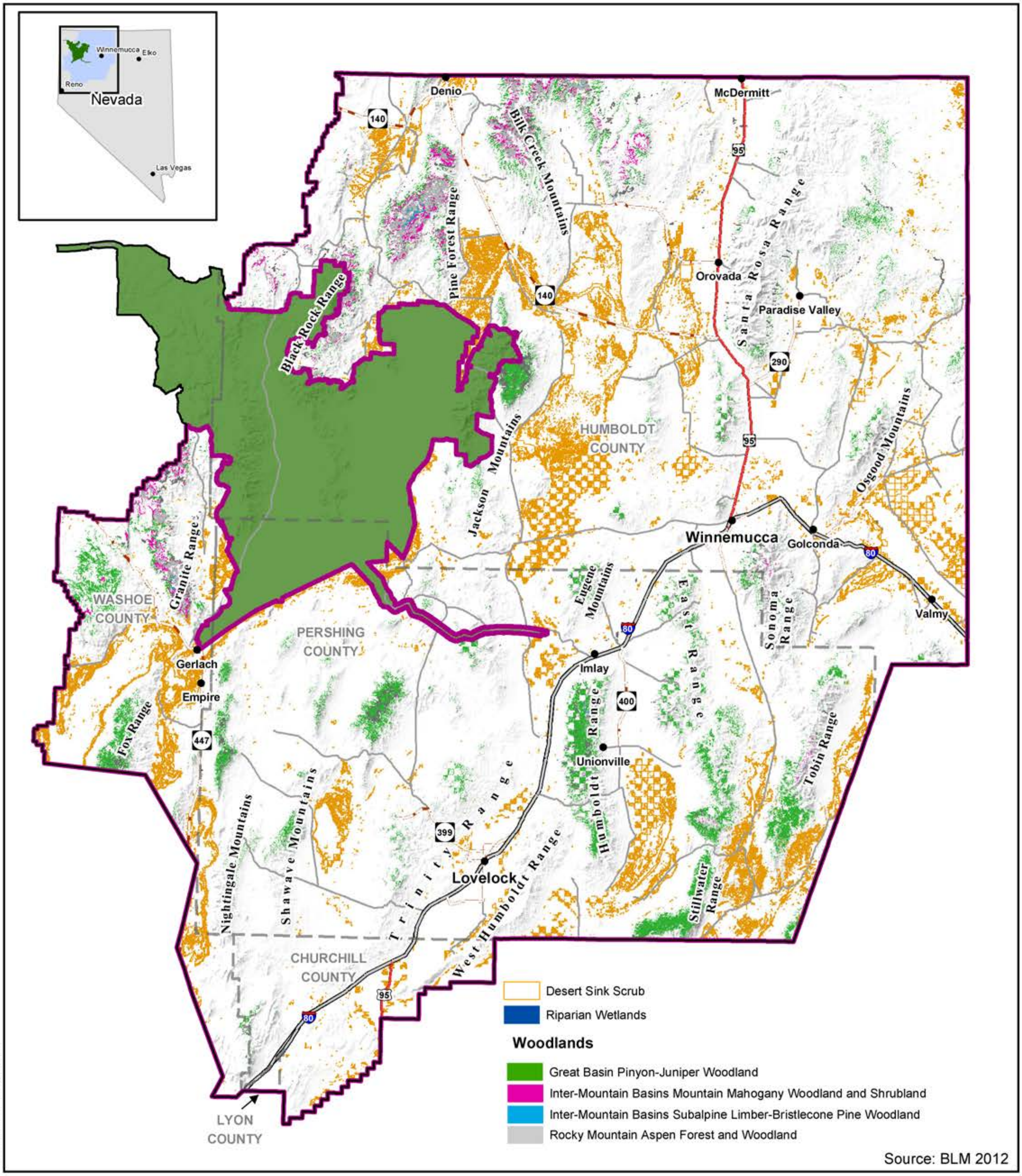
- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N W E S

0 10 20 Miles

Northwest Nevada

Figure 3-9



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Winnemucca District RMP
Vegetation - Desert Sink Scrub, Riparian Wetlands and Woodlands
Northwest Nevada

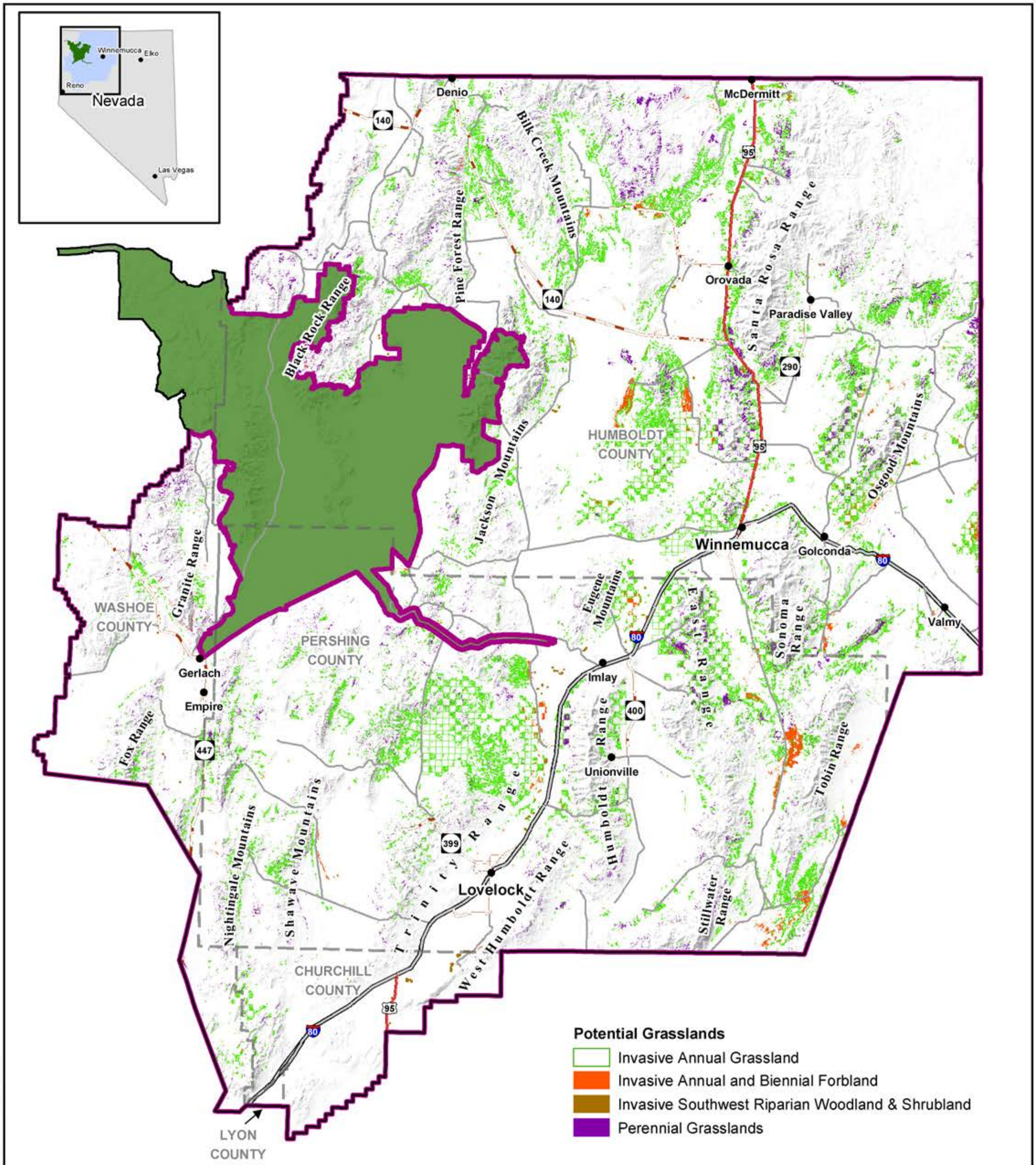
Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

N S E W

Figure 3-10



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Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Winnemucca District RMP
Vegetation - Perennial and Invasive Annual Grasslands

Northwest Nevada

Figure 3-11

Woodlands cover approximately 413,356 acres of BLM land (SWReGAP 2004, BLM 2012) (Figure 3-10). These will be discussed in detail in Section 3.2.6.

Perennial grasslands, also called dry meadows, cover 103,998 acres of BLM land (SWReGAP 2004, BLM 2012) (Figure 3-11). These communities/associations are difficult to quantify as they are often an understory component of several plant communities, such as sagebrush scrub and riparian communities. Grasslands are wet for a short period of the year and become increasingly drier as the growing season progresses. Species such as Baltic rush (*Juncus balticus*), perennial bunchgrasses, asters (*Aster* spp.), groundsel (*Packera* spp.), onions (*Allium* spp.), and hawksbeard (*Crepis* spp.) are commonly found in these communities. Rabbitbrush (*Chrysothamnus spp.*) and sagebrush (*Artemisia* spp.) may be at the meadow's edge.

Riparian areas and wet meadows cover 11,952 acres of BLM land (SWReGAP 2004, BLM 2012) (Figure 3-10). These are discussed in detail in the riparian and wetland resource section (Section 3.2.8).

Disturbed/Agriculture cover 25,423 acres of BLM land (SWReGAP 2004, BLM 2012). These are lands where vegetation has been removed or altered by the introduction, past or present, of agricultural activities, construction of homesteads and supporting structures, airstrips, travel routes, and similar.

Barren Lands, Non-specific cover 9,716 acres of BLM land (SWReGAP 2004, BLM 2012). These are typically lands devoid of vegetation due to naturally existing edaphic (soil related) effects.

3.2.6 Vegetation – Forest/Woodland Products

Forest and woodland types in the planning area consist of pinyon-juniper woodland (330,491 acres), mountain mahogany woodland and shrubland (50,818 acres), limber and whitebark pine forest (5,060 acres), and aspen forest and woodland (26,987 acres).

According to the Healthy Forests Restoration Act of 2003 (Sec. 102 (e)(1)(D) the term "old growth stand is based on the structure and composition characteristics of the forest type." Areas in the planning area that exhibit structural and composition features with old growth characteristics include the Pine Forest Range. This range contains stands of sub-alpine trees including limber pine and whitebark pine. These stands occur predominantly at higher elevations along steep slopes of Duffer Peak and surrounding areas. This area also features other woodlands stands including mountain mahogany intermixed with the pine species and extending along lower elevation slopes and ridgelines, and aspen stands which occur in pockets along drainage bottoms and other suitable sites.

Forest and woodland products include firewood, Christmas trees, posts, and pine nuts. Two harvest areas are designated in the planning area: the Stillwater Harvest Area, including approximately 22,000 acres designated in the Sonoma-Gerlach Management Framework Plan (MFP) for intense forest products management, and the Yellowstone Harvest Area, including approximately 890 acres, proposed in the Forestry Plan Amendment in 2003. No commercial harvesting of woodland products is allowed.

Access to the resource areas is poor overall, and impacts are currently concentrated in the few areas with easy road access, specifically in the vicinity of Fencemaker Canyon, Fencemaker Pass, and Gamble Basin.

Juniper and pinyon pine woodlands are not as widespread as in other parts of Nevada. Pinyon pine is expanding in some areas into sagebrush and grassland. Approximately 1,000 acres of former sagebrush are growing up to pinyon pine in the Gamble Basin area. This expansion is likely due to fire suppression and climatic change (BLM 2003a). In the Stillwater Range, nearly all of the pinyon pine stands (29,050 acres) are infested with pinyon dwarf mistletoe (*Arceuthobium divarcatum*). Dwarf mistletoe impacts tree health, resulting in decreased growth, decreased seed production, increased susceptibility to bark beetles or other insects or disease, decreased drought tolerance, and in most cases, mortality of the infected tree. Young trees are particularly susceptible, and mortality for these trees is generally very high. Infected older trees continue to infect any regeneration (Messmer 2008).

The trend in harvest of firewood, posts, and Christmas trees increased from 1976 to a peak usage in 1980 (for posts and Christmas trees) and 1981 (for firewood). After their peak years, use of all of these resources has declined. Quantitative data on the levels of harvest of pinyon pine nuts are not available, but their availability in some areas, is being affected by issues with forest health, primarily pinyon dwarf mistletoe. There has been increased harvest of wood products adjacent to roads in the area, primarily in Fencemaker Pass, Fencemaker Canyon, and Gamble Basin due to limited access in the majority of the Stillwater Range.

3.2.7 Vegetation – Invasive and Noxious Species

Weeds can be native or nonnative, invasive or noninvasive, and noxious or not noxious. Legally, a noxious weed is any plant designated as undesirable by a federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property. Noxious weeds are nonnative and invasive, and their control is based on resource or treatment priorities and is governed by budgetary constraints.

Invasive plants and noxious weeds are not the same. Invasive plants not only include noxious weeds, but also include other plants that are not native to the US. Not all nonnative plants are considered invasive, however. The BLM considers plants invasive if they have been introduced into an environment where they did not evolve and, as a result, usually have no natural enemies to limit their reproduction and spread (Westbrooks 1998). Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function (Cronk and Fuller 1995).

Many state and county governments in the west have designated noxious weed lists. The Nevada Department of Agriculture maintains the Nevada State Noxious Weed List (Nevada Department of Agriculture 2007), which includes 47 different species of weeds that are designated noxious by state law.

Weed species affect all resources that depend to some degree on vegetation. Weeds have degraded rangeland health and diversity by changing fire regimes. The primary invasive plant in the planning area, cheatgrass (*Bromus tectorum*), has led to an increase in continuous fine fuel and an earlier fire season than what occurred historically. Approximately 3.3 million acres of public lands in the Great Basin desert are reported to be dominated by cheatgrass, with an additional 76.1 million acres either infested with or susceptible to cheatgrass invasion (Pellant 1996). Management emphasis is directed toward areas of the planning area where cooperative management strategies are already in place and for which data exists though studies or GIS compilations. In addition to the species that are well documented in the planning area, new species are appearing there and may be even more disruptive to the native plant community than species that have existed in the planning area for a greater period of time.

Three community types dominated by invasive species have been documented in the planning area. These include 446,572 acres of invasive annual grassland (cheatgrass) (Figure 3-11), 364 acres of invasive southwest riparian woodland and shrubland (tamarisk), and 48,143 acres of invasive annual and biennial forb land (tall whitetop, Russian knapweed, and whitetop).

Nevada has listed 47 noxious weed species that require control, in accordance with NRS 555. Of these 47 species, 15 are commonly found on lands administered by the WD (Table 3-11).

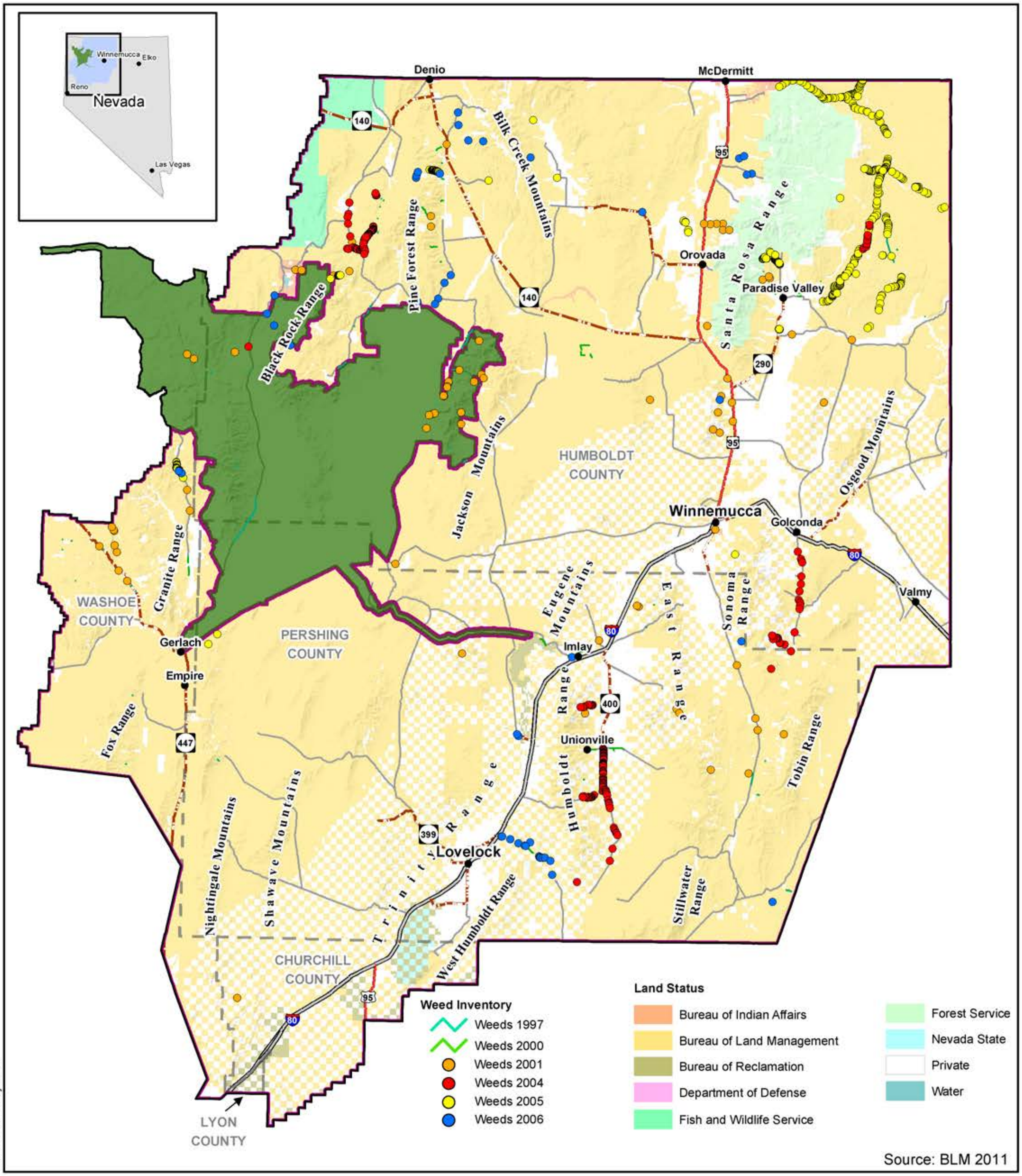
Table 3-11
Noxious Weed Species in the Decision Area

Common Name	Scientific Name
Black henbane	*Hysocyamus niger*
Poison hemlock	*Conium maculatum*
Hoary cress	*Cardaria draba*
Houndstongue	*Cynoglossum officinale*
Russian knapweed	*Acroptilon repens*
Spotted knapweed	*Centauria maculosa*
Leafy spurge	*Euphorbia elsua*
Mayweed	*Anthemis cotula*
Medusahead	*Taeniatherum caput-medusae*
Perennial pepperweed	*Lepidium latifolium*
Puncturevine	*Tribulus terrestris*
Purple loosestrife	*Lythrum salicaria*
Salt cedar (tamarisk)	*Tamarix ramosissima*
Canada thistle	*Cirsium avense*
Musk thistle	*Cardus nutans*
Mediterranean sage	*Salvia aethiopis*
Dyer's woad	*Isatis tinctoria*
Yellow starthistle	*Centaurea solstitialis*
Scotch thistle	*Onopordum acanthium*

Source: BLM 2005f.

Plants that are considered weeds in other areas and that are actively managed elsewhere, but which do not show up on Nevada's noxious weed list, have been found in the WD. Weed inventory data have been collected at numerous locations in the decision area and compiled in a database maintained by the Natural Resources Conservation Service (NRCS). Locations of major noxious weed infestations in the planning area in the last ten years are depicted in Figure 3-12. Control efforts have been conducted in the following locations:

- Pine Forest Range, Big, Pass, Granite, and Alta Creeks for Scotch thistle;
- Deer Creek Reservoir and Ranch area for perennial pepperweed and Russian knapweed;



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Winnemucca District RMP
Areas of Historical Weed Infestations

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-12

- Negro Creek for hoary cress and Russian knapweed;
- Leadville Canyon for perennial pepperweed, hoary cress, and Russian knapweed;
- Flowing Well for perennial pepperweed and Russian knapweed;
- Hycroft Mine vicinity and west side of Jackson Mountains for saltcedar;
- Silver State Valley for saltcedar and hoary cress;
- Coal Canyon for perennial pepperweed and yellow starthistle;
- Crutcher Canyon for medusahead;
- Thomas Canyon for leafy spurge;
- Elbow Canyon for yellow starthistle;
- Asa Moore Canyon for Scotch thistle;
- Buckskin Canyon for perennial pepperweed, hoary cress, and Scotch thistle;
- Lamance, Cottonwood, Mullinix, Solid Silver, and Indian Creek for leafy spurge;
- Little Owyhee BLM system road for Russian knapweed and hoary cress;
- Bartlett Creek for hoary cress;
- Leonard Creek roads (with Humboldt County Roads Department) for perennial pepperweed and hoary cress;
- Leadville Canyon (with Washoe County Roads Department, Gerlach Cooperative Weed Management Area (CWMA) Nevada Department of Agriculture, Cedarville BLM) for Russian knapweed and leafy spurge;
- McDermitt Reservation (with Humboldt County Weed Task Force) for Russian knapweed and leafy spurge;
- Spring Valley and Unionville for Hoary cress, Russian knapweed, and Iberian starthistle;
- Hole-in-the-Wall for Saltcedar;
- East Range for Scotch thistle, Russian knapweed, hoary cress, and perennial pepperweed;
- Soldier Meadows for yellow starthistle and perennial pepperweed;
- Water Canyon for hoary cress; and
- Chimney Reservoir (with Nevada Division of Forestry, University of Nevada Cooperative Extension, Paradise Valley Weed District, US Forest Service, and local landowners) for perennial pepperweed and saltcedar.

The WD performs a yearly ongoing weed inventory that is based on fund availability. Currently, the most widespread species are perennial pepperweed, hoary cress, saltcedar, Russian knapweed and Scotch thistle (Messmer 2007). Noxious weeds have been found in a variety of locations and habitat types, with transportation systems being a major vector for their spread. Other dissemination vehicles include OHV use, wind, water, wildlife, livestock, and humans.

3.2.8 Vegetation – Riparian Habitat and Wetlands

The term riparian is used here to include both lotic (running water) systems and lentic (standing water) systems. Wetlands occur in both lotic and lentic systems and typically provide livestock/wildlife with green forage, insects, and drinking water. Green forage is especially important for livestock and many wildlife species during the summer and fall, when upland vegetation has dried out. The structure, food, and water provided by these communities make them the most diverse and productive wildlife habitat in the planning area.

Riparian communities occur along the watercourses of the planning area and in association with streams. In the Great Basin, riparian communities are dominated by various mixtures of cottonwood, aspen, and willow species. Although riparian zones account for a very small proportion of the total acreage of the planning area, they play a critical role as habitat for wildlife. More than 75 percent of the wildlife species of the Great Basin are strongly associated with riparian areas (Dobkin 1998, Brussard and Austin 1993). Riparian areas are highly favored by livestock, which has led to disturbance of this habitat type in many areas. Where site potential allows, vegetation may develop multiple canopies, including trees, shrubs, grasses, forbs, sedges, and rushes. This complex vegetation structure is the goal of riparian management, and it can provide exceptionally valuable habitat for a wide array of wildlife species. PFC is a standardized gauge of whether a riparian system has adequate vegetation, landforms, or large woody debris to perform essential flood control, water quality, erosion control, and habitat functions. PFC can be reached at a lower level of vegetation development than the management goal of Desired Future Condition.

Even riparian areas dominated by herbaceous communities and lacking complex structure are important as sources of water and food for livestock/wildlife. As Table 3-10 in the vegetation section indicates, riparian areas occupy approximately 11,952 acres in the WD. Although this is a small percentage of the land area, the importance of these areas as wildlife habitat far exceeds their size.

Lotic Systems

Riparian functionality was intensely studied in over thirty watersheds in 1999 (Jensen et al. 1999). The average condition of the evaluated streams was determined to be in only “fair” condition, based on stream potential for riparian and stream habitats. Field data from the 1999 study throughout the WD indicate that approximately 40 percent of the lotic riparian habitats are in PFC, and 18 percent are improving in the direction of PFC. The remaining 42 percent are neither in PFC nor making significant progress toward this condition.

Because the riparian functionality data from the watersheds that were studied in 1999 nearly matched the BLM’s data of the percentage of streams not in PFC or making significant progress toward that condition (Table 3-8), the BLM is confident that its PFC assessments are representative of all watersheds in the planning area overall (including those not yet assessed). It should be noted, however, the intensely studied watersheds in 1999 were those that had been the location of Lahontan cutthroat trout recovery efforts, and therefore may have benefited by management efforts.

Lentic Systems

Lentic systems include other permanently wet or seasonally wet areas and include lakes, reservoirs, vegetated playas, meadows, and seeps. These areas commonly are found independently of a defined stream channel and can occur at various elevations and in diverse landscape settings. This is particularly true for meadows, springs, and seeps, which may be present in very arid areas and at low elevations. Lentic systems are typically small, and while they are extremely important ecologically, seeps in the planning area typically average less than 0.2 acre in size. Over 100 of these may occur in a grazing allotment, making management very difficult.

Wet meadow habitats generally have a simple structure, consisting of a layer of herbaceous plants. Shrub or tree layers are usually absent or very sparse; they may, however, be an important feature of the meadow edge. In the herbaceous plant community a microstructure is frequently present. Some species reach heights of only a few inches, while others may grow greater than three feet tall. Except where broken by boulders, canopy cover is dense (60 to 100 percent). At the substrate surface, distances between individual shoots may vary from 0.04 to 0.08 inches to as much as 0.8 to 1.2 inches, depending on the species present.

Wet meadows occur with a great variety of plant species, so it is not possible to generalize species composition. Species may differ, but several genera are common to wet meadows: *Agrostis*, *Carex*, *Danthonia*, *Juncus*, *Salix*, and *Scirpus*.

Wet meadows are vulnerable to grazing and other surface-disturbing uses that affect soil stability, water-holding capacity, and plant composition. All meadows are important watershed components that may be functionally impaired by gullies, sagebrush encroachment, and dominance by such species as iris (*Iris* sp.), which provides greatly diminished wildlife habitat values and indicates poor habitat health.

Where adequate site potential exists, vegetation associated with reservoirs or lakes commonly provides valuable nesting and brood-rearing habitat for waterfowl and shorebirds. Common vegetation associated with these types of wetlands includes inland saltgrass (*Distichlis spicata* var. *stricta*), Baltic rush (*Juncus balticus*), spikerush (*Eleocharis* spp.), alkali bulrush (*Scirpus robustus*), and cattail (*Typha angustifolia*).

Springs and seeps occur where water from underground aquifers reaches the surface. Many springs flow directly into streams, but others form small isolated ponds or marshy areas. Springs and seeps may also form channels to flowing streams, or they may lose their surface expression and recharge alluvial fill material or permeable strata.

Springs and seeps are also important to lotic habitat because of the perennial base flow they provide to streams. In winter, especially in small streams, this base flow prevents formation of anchor ice, which has been found to be detrimental to the survival of salmonids and other aquatic species. In summer, inflow from springs not only provides volume but also helps to lower maximum daily water temperatures and the magnitude of diurnal temperature change.

Depending on soil and topography, extensive riparian areas may be associated with spring sources. Because of the continuous flow and constant temperature of most springs, riparian communities frequently remain permanently green, providing habitat, thermal and escape cover, and forage for wildlife throughout the year.

Springs can also be a source of unique, often endemic, assemblages of invertebrates. Because these habitats are uncommon and isolated, a particular species may be found only at that site and may have little opportunity for dispersal or migration to other areas. Several rare snail species are restricted to springs and are vulnerable to impacts on the surrounding riparian vegetation and on the spring system's morphology and substrate composition.

Some springs are warm or hot because their aquifers are near a geothermal heat source. In addition to their high temperatures (above 95°F) hot springs are often characterized by large quantities of dissolved salts, carbon dioxide, carbon sulfide, or sulfur dioxide. Animals are never abundant at hot springs. In general, 77 to 86°F appears to be the dividing line between a diverse fauna at low temperatures and a poor fauna at high temperatures.

Because the thermal death-point of most freshwater invertebrates is between 86 and 104°F, many unique species of beetles, flies, amphipods, and snails are adapted to hot springs. These invertebrate communities generally rely on shallow rills of hot water and algae and cannot survive where dams or barriers form deep pools.

An extensive inventory of springs, their condition, and water yield to streams has not been conducted. The BLM estimates that 33 percent of the lentic systems are at PFC. The condition of lentic systems is typically linked to its spatial location on the landscape, site characteristics, the surrounding topography, and the type/season of grazing that is occurring.

3.2.9 Fish and Wildlife

The planning area falls in the greater Great Basin ecosystem. The assortment of topography, vegetation, and climate occurring in the planning area provides habitats for a variety of wildlife species. The presence of any species may be seasonal or year-round based on individual species requirements. Fish and wildlife found in this area are representative of those species found in Great Basin ecosystems, including sagebrush scrub, salt desert scrub, riparian and wetlands, and woodland habitats. Community composition and distribution information for these vegetation types are found in Section 3.2.5; their habitat functions are described below.

3.2.9.1 Wildlife Habitat

Wildlife habitat needs vary significantly by species; however, it is generally true that healthy and sustainable wildlife populations can be supported where there is a diverse mix of multi-canopied plant communities to supply structure, forage, cover, and other specific habitat requirements.

Sagebrush steppe/sagebrush includes a number of upland vegetation communities with a shrubland aspect and a variable understory of grass and forbs. Examples of generally short shrub species include varieties of big sagebrush (*Artemisia tridentata*), low sagebrush (*A. arbuscula*), and rabbitbrush (*Chrysothamnus* spp.). Mountain mahogany (*Cercocarpus ledifolius*), snowberry (*Symphoricarpos oreophilus*), and antelope bitterbrush (*Purshia tridentata*) are examples of taller steppe species collectively referred to as mountain shrub in this document. The shrubby plants in sagebrush scrub communities are important to most small and large wildlife because they supply food, hiding cover, and structure.

The thermal relief provided by shrub cover helps wildlife to survive the rigors of summer heat and winter cold.

Sagebrush habitats are a dominant type in the planning area, so the welfare of this important western shrub community has great influence on the health of many common and special status wildlife species, such as mule deer, sage-grouse, and pronghorn. Sagebrush provides direct benefits to some species, such as sage-grouse, and for others it provides indirect benefits, as in the case of raptors that depend on prey that inhabit sagebrush rangelands. As already described in the vegetation section, many sagebrush communities have been altered from their natural state by grazing use, fires and invasions of weedy species. The presence of a sagebrush overstory is strongly associated with wildlife community diversity. Maser et al. (1984) indicate that significantly more species of wildlife can find suitable breeding and feeding habitat in areas with a big sagebrush shrub overstory than in those with a grassland aspect.

Sagebrush is not the only important plant species valuable to wildlife in sagebrush scrub communities. Grasses and forbs also provide food and cover for wildlife. Habitats providing a predominately native mixture of grasses and forbs meet the needs of a wide range of species. Although there are exceptions to the rule, in most instances, native perennial herbaceous species are preferable as wildlife forage and cover.

Salt desert vegetation communities support a wide range of wildlife species with substantial overlap with the sagebrush communities. However, because salt desert types are substantially drier, the abundance of wildlife and diversity is lower. Notable salt desert wildlife species include kit fox (*Vulpes macrotis*) and antelope ground squirrel (*Ammospermophilus leucurus*). Reptiles are well represented in this type because of the lower elevations and warmer conditions.

Riparian areas consist of plant communities associated with streams and rivers. The structure, food, and water provided in riparian areas make them the single most diverse and productive habitat for wildlife. Where site potential allows, multi-canopy riparian areas with trees, shrubs, grasses, forbs, sedges, and rushes are exceptionally valuable as habitat for a wide array of wildlife species, including neotropical migrant birds (species that breed in North America and over-winter in Central and South America). Riparian areas dominated by herbaceous communities and with low potential for multi-canopy structure are nevertheless important as water and succulent food sources for wildlife. The presence of multiple-aged classes of woody and herbaceous vegetation is generally indicative of healthy wildlife habitat conditions. Riparian habitats or wetlands in nonfunctioning or functional-at-risk condition due to erosion, lowered water table, or degraded vegetation composition or structure, provide decreased wildlife habitat values.

Wetlands are similar to riparian areas in that the site potential for wildlife habitat can vary markedly. Regardless of the habitat type, wetlands typically provide wildlife with succulent green forage, insects, and drinking water. Green forage is especially important for many wildlife species during the summer and fall when upland vegetation has dried out.

Where the site potential exists, wetlands associated with reservoirs or vegetated playas commonly provide valuable nesting and brood-rearing habitat for waterfowl and shorebirds. Common vegetation associated with these types of wetlands includes inland saltgrass (*Distichlis spicata stricta*), Baltic rush (*Juncus balticus*), spikerush (*Eleocharis* sp.), alkali bulrush (*Scirpus robustus*), and cattail (*Typha angustifolia*).

Depending on soil and topography, extensive riparian or wetland areas may be associated with spring sources. Because of the continuous flow and constant temperature of most springs, riparian communities frequently remain permanently green, providing habitat and forage for wildlife throughout the year.

Woodlands composed of stands of Utah juniper (*Juniperus osteosperma*), pinyon pine (*Pinus edulis*), limber pine (*Pinus flexilis*), and white bark pine (*Pinus albicaulis*) vary greatly in their value as habitat depending on site-specific factors, such as height, stand density, age of trees, and understory composition. Scattered woodlands may be found in other parts of the planning area at midlevel elevations.

Large trees provide cavities for nesting birds like bluebirds (*Sialia* sp.) and northern flickers (*Colaptes auratus*) or features used by bats, and medium-sized trees provide nest sites on limbs for American robins and ruby-crowned kinglets. A BLM survey of songbird populations in clear-cut, burned, and old growth Utah juniper habitats, revealed a more robust and diverse population of songbirds in old growth compared to the treated areas (BLM and Golden Eagle Audubon Society 1997). Ferruginous hawks rely heavily on junipers for nesting. Mule deer (*Odocoileus hemionus*) use juniper for both thermal and escape cover. During severe winters, Utah juniper cover may be critical to deer survival (Leckenby et al. 1982). Many nongame species like the least chipmunk (*Eutamias minimus*) and scrub jay (*Aphelocoma coerulescens*) use Utah juniper for food and cover. Dead juniper trees and snags are important for wildlife cover, food and the recycling of nutrients back to the soil. Aspen-mahogany woodlands occur at higher elevations. Cavity-dependent species of forest-dwelling birds and mammals require snags for their reproduction. The size, age classes, and stand density influence their values as wildlife habitat for game and nongame species. Dead and downed material supply structure for a variety of purposes and plays and important role in the overall ecology of the forest and its wildlife, such as providing recycled nutrients.

Rock complexes in mountainous areas are used by roosting and nesting swallows, swifts, golden eagles, and prairie falcons, along with many other bird species. These rocks also provide important cover for large mammals, such as bighorn sheep, mountain lions, and bobcats, and for small mammals, such as ground squirrels, wood rats, rabbits, and marmots.

The following are descriptions of priority species, based on regulatory status, population levels, and estimated value to the area.

3.2.9.2 Big Game Species

Mule Deer

Mule deer (*Odocoileus hemionus*) are widespread, typically associated with complex middle to upper elevation landforms that support a variety of sagebrush, mountain shrubs, quaking aspen, juniper, and herbaceous vegetation. Mule deer also use lower elevations when deep snow forces them to move. Mule deer are frequently associated with meadow and riparian habitat and tend to be present yearlong where public land adjoins cultivated farmland.

Based on Nevada Department of Wildlife (NDOW) survey data, mule deer numbers are currently low, relative to historic numbers and state management objectives. Severe winters, drought, and loss of winter habitat due to wildfire and other biological factors have contributed to these low numbers.

Deer are generally classified as browsers, and forbs and shrubs make up the bulk of their annual diet. However, the diet of mule deer is quite varied, and the importance of various classes of forage plants varies by season. For example, in late fall and early spring, new grass may constitute an important part of their diet in some areas because it is highly palatable, nutritious, and abundant. In winter, especially when grasses and forbs are covered with snow, the entire diet may consist of shrubby species. Tall shrubs and trees are very important for food and cover.

Woodland and rangeland management actions all have the potential to influence mule deer cover and forage. Healthy quaking aspen, juniper, mountain shrub, and sagebrush communities are all important tall cover habitats for mule deer. Meadows and riparian areas provide succulent forage and water, especially during the fall and summer.

NDOW shows six seasonal mule deer habitats in the planning area (Figure 3-13; mule deer habitat classifications and definitions are shown in Table 3-12).

Pronghorn

Pronghorn (*Antilocapra americana*) are distributed throughout much of the planning area (Figure 3-14). NDOW has not established population management objectives for pronghorn but does manage for benchmark population characteristics. During the summer, pronghorn are widely distributed throughout valleys, mountain foothills, and mountaintops. This species has been known to pioneer new populations into previously unoccupied habitats, especially previously burned areas. They are associated with low and black sagebrush and shadscale habitats with short vertical structure.

Rangelands with a mixture of grasses, forbs, and shrubs provide the best habitat (Yoakum 1972). The sagebrush community is used for both thermal cover and forage. Competition for forage with cattle and wild horses is variable due to forage preferences. Lack of water at natural or developed sites can be a serious problem during droughts. BLM fence construction specifications allow for freedom of movement for pronghorn by having smooth bottom wires spaced at least 16 inches from the ground.

Elk

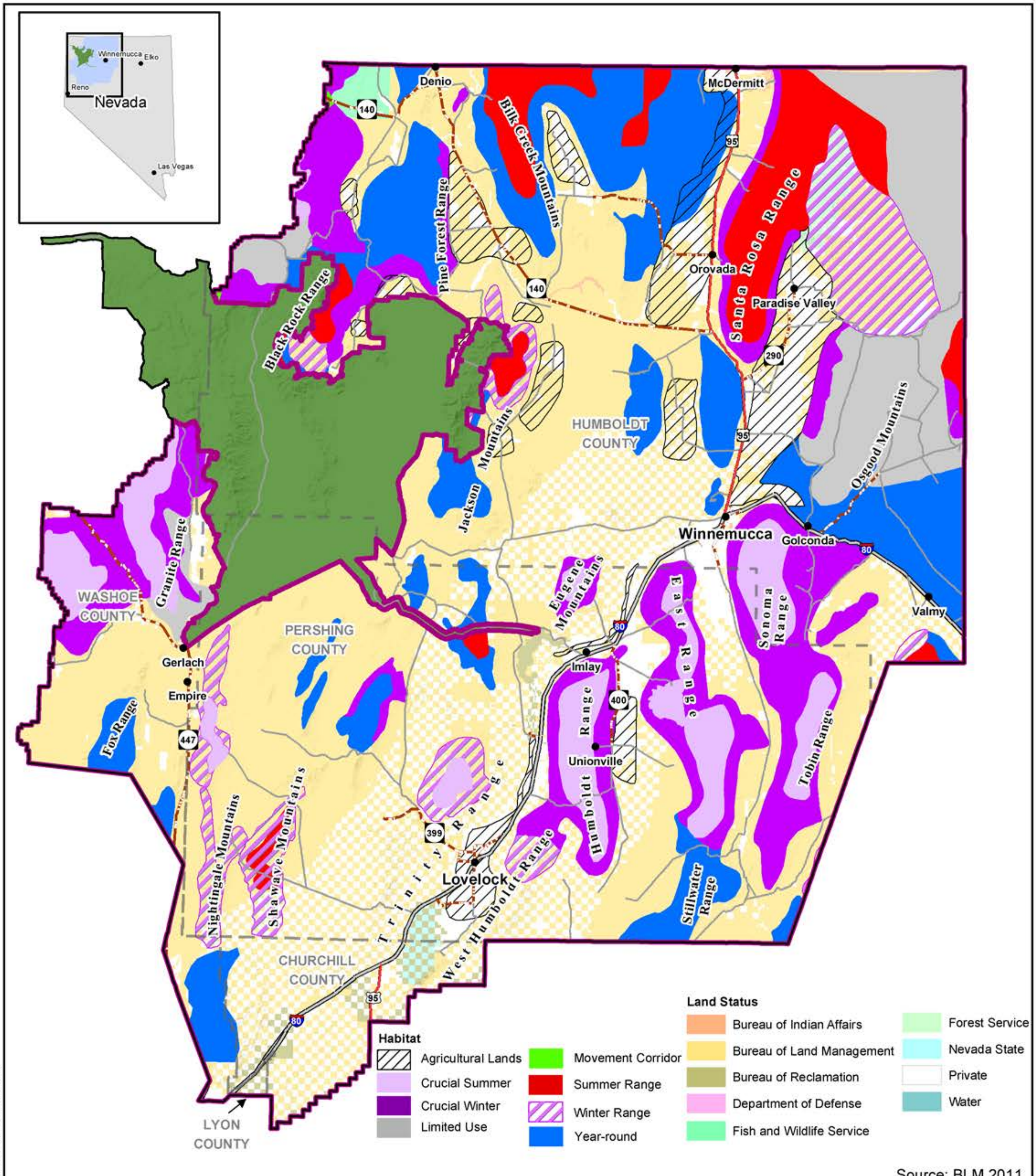
There are no known populations of elk (*Cervus canadensis*) in the WD, but there are established populations in Oregon to the north and the Elko District to the east, as well as in southern Nevada. Pioneering elk have been observed in the WD (Detweiler 2007b) and have the potential to become more abundant in the planning area over the coming years. Potential elk habitat in the planning area is presented in Figure 3-15.

Elk summer in alpine meadows and wooded hillsides and winter in valleys and open grasslands (NatureServe 2005). Calving is not limited to a specific area or habitat (Nature Serve 2005). In spring, male elk known as bulls will form small bachelor herds in the high country, until the rut in late summer (NatureServe 2005). Elk are primarily grazers but are opportunistic consumers of forbs and browsers of willow, aspen, and other tree vegetation (NatureServe 2005).

Table 3-12
Mule Deer Habitat Classifications and Definitions

Classification	Definition
Limited range	Includes habitat that is occasionally inhabited or contains small populations of scattered mule deer.
Summer range	That part of the overall range where 90 percent of the individuals are located between spring green-up and the first heavy snowfall. Summer range is not necessarily exclusive of winter range; in some areas winter range and summer range may overlap.
Crucial Summer Range	Part of the summer range that is vital or critical to the continued existence and propagation of the herd population. Crucial summer range is exclusive of other summer seasonal ranges.
Movement Corridors	Continuous natural pathway that allows wildlife to move between habitats in relative security over short or great distances. Movement Corridors are exclusive of other summer seasonal ranges.
Agricultural lands/unique habitat/other important habitats	Areas that are part of the overall range where higher quality habitat supports significantly higher densities than surrounding areas. These areas are typically occupied year-round and are not necessarily associated with a specific season. Examples are rough break country, riparian areas, small drainages and large areas of irrigated cropland, migration corridors, highway crossings, and fawning areas.
Winter range	That part of the overall range where 90 percent of the individuals are located during the average five winters out of ten, from the first heavy snowfall to spring green-up or during a site-specific period of winter.
Crucial winter range/winter concentration	That part of the winter range where densities are at least 200 percent greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten.
Year-round population	An area that provides year-round range for a population of mule deer. The resident mule deer use all of the area all year; it cannot be subdivided into seasonal ranges, although it may be included in the overall range of the larger population.

Source: Detweiler 2007c



15186.1-04 - June 2012

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Winnemucca District RMP
Mule Deer Habitat

Legend

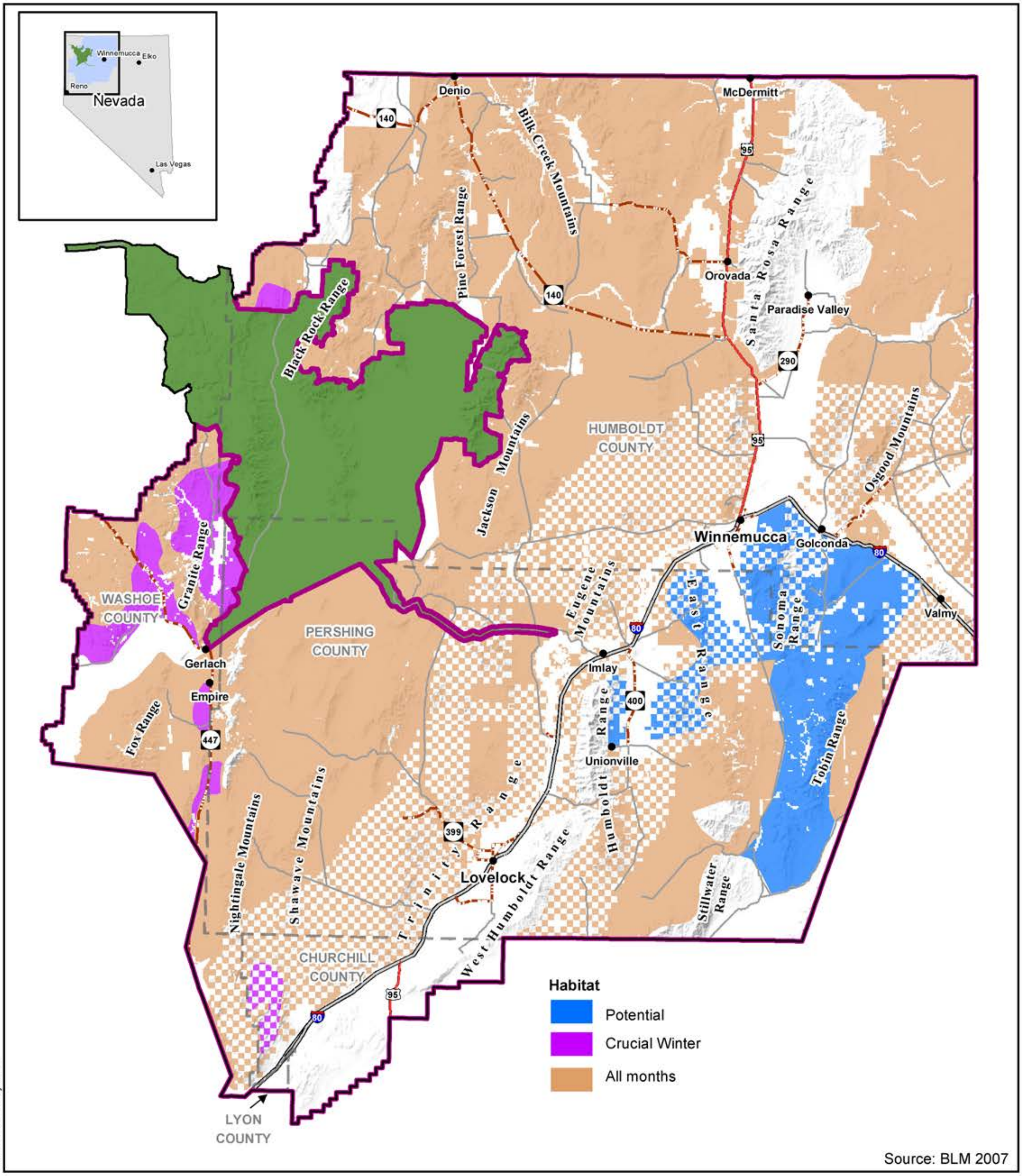
- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N S E W

0 10 20 Miles

Northwest Nevada

Figure 3-13



Winnemucca District RMP Pronghorn Antelope Habitat

No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Legend

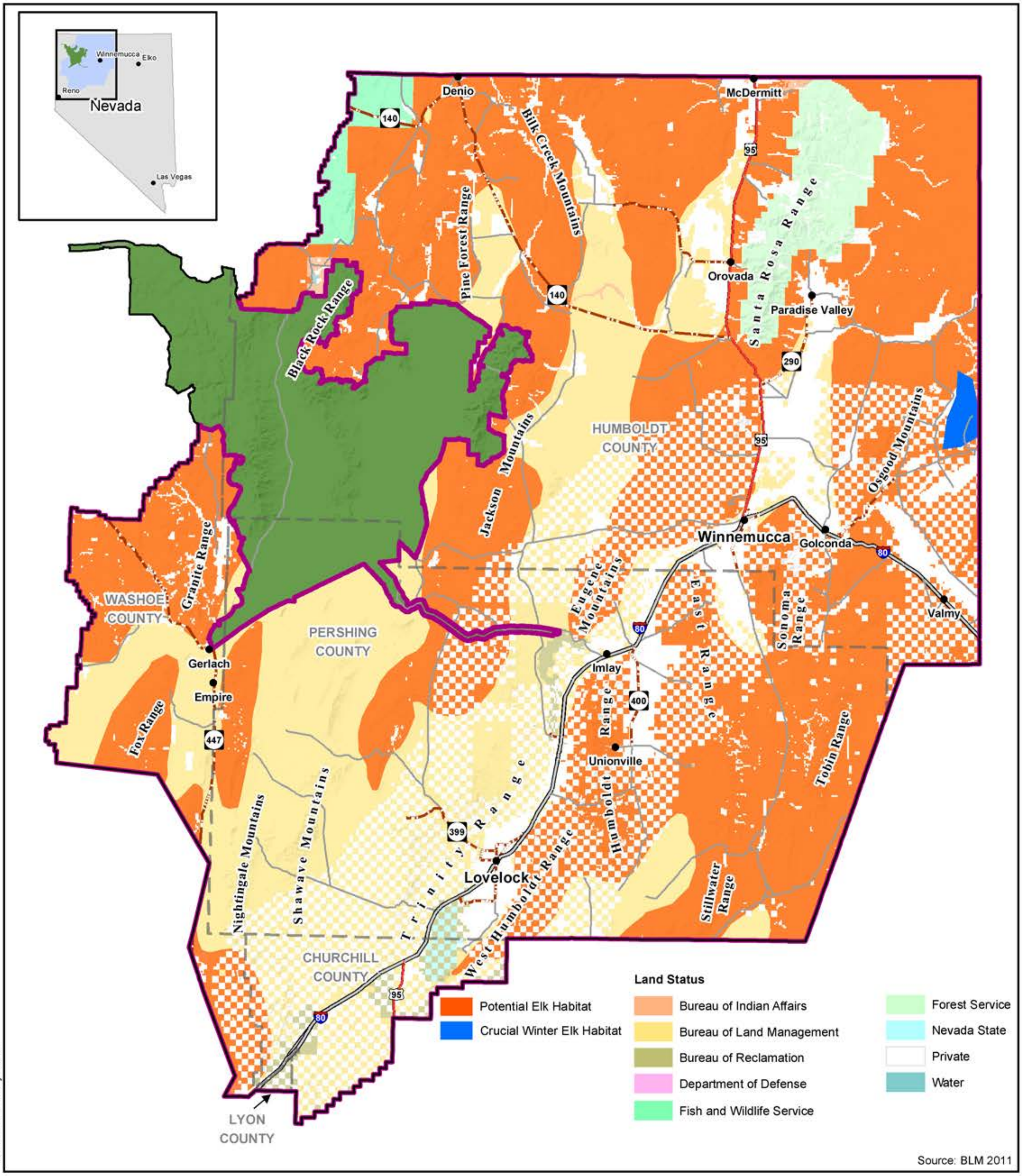
- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

N S E W

Northwest Nevada

Figure 3-14



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Winnemucca District RMP
Potential and Crucial Elk Habitat

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Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N S E W

0 10 20 Miles

Northwest Nevada

Figure 3-15

Bighorn Sheep

Two subspecies of bighorn sheep are found in the planning area: California bighorn (*Ovis canadensis californiana*) and desert bighorn (*O. c. nelsoni*). Potential or occupied habitat for California bighorn has been identified as all lands north of I-80 in the planning area, while lands south of I-80 are classified as desert bighorn habitat (United States Fish and Wildlife Service [USFWS] 2003). More information specific to the desert bighorn sheep is discussed under special status species in Section 3.2.10.

Due to a number of factors, bighorn sheep were eliminated from northern Nevada by 1915. Existing populations in the planning area are the result of numerous NDOW-initiated reintroductions and supplemental releases.

Bighorn sheep typically prefer remote and complex mountainous terrain where adequate water is available. Wildlife water developments have been installed in the planning area to assist with the reintroduction of bighorn sheep.

Because of separation in habitat preferences among deer, pronghorn, wild horses and burros (WHB), cattle, and bighorn sheep, forage competition in this planning area is generally limited (Ganskopp 1983). Known areas of overlapping cattle and bighorn sheep use have not presented issues of forage availability or disease transmission requiring resolution. Domestic sheep grazing/trailing permits occur in occupied bighorn sheep and potential range, so there is a risk of disease transmission between domestic sheep and bighorn sheep.

Wandering bighorn sheep or stray domestic sheep that have been found in unexpected areas occasionally require action by Nevada Department of Agriculture (NDOA) to avoid conflicts. Disease transmission between domestic sheep and bighorn sheep can result in massive bighorn sheep losses.

Although populations in the analysis area have recently increased, according to the NDOW's Bighorn Sheep Management Plan (USFWS 2003), the current distribution in Nevada still represents a small percentage of the former historic range (Figure 3-16).

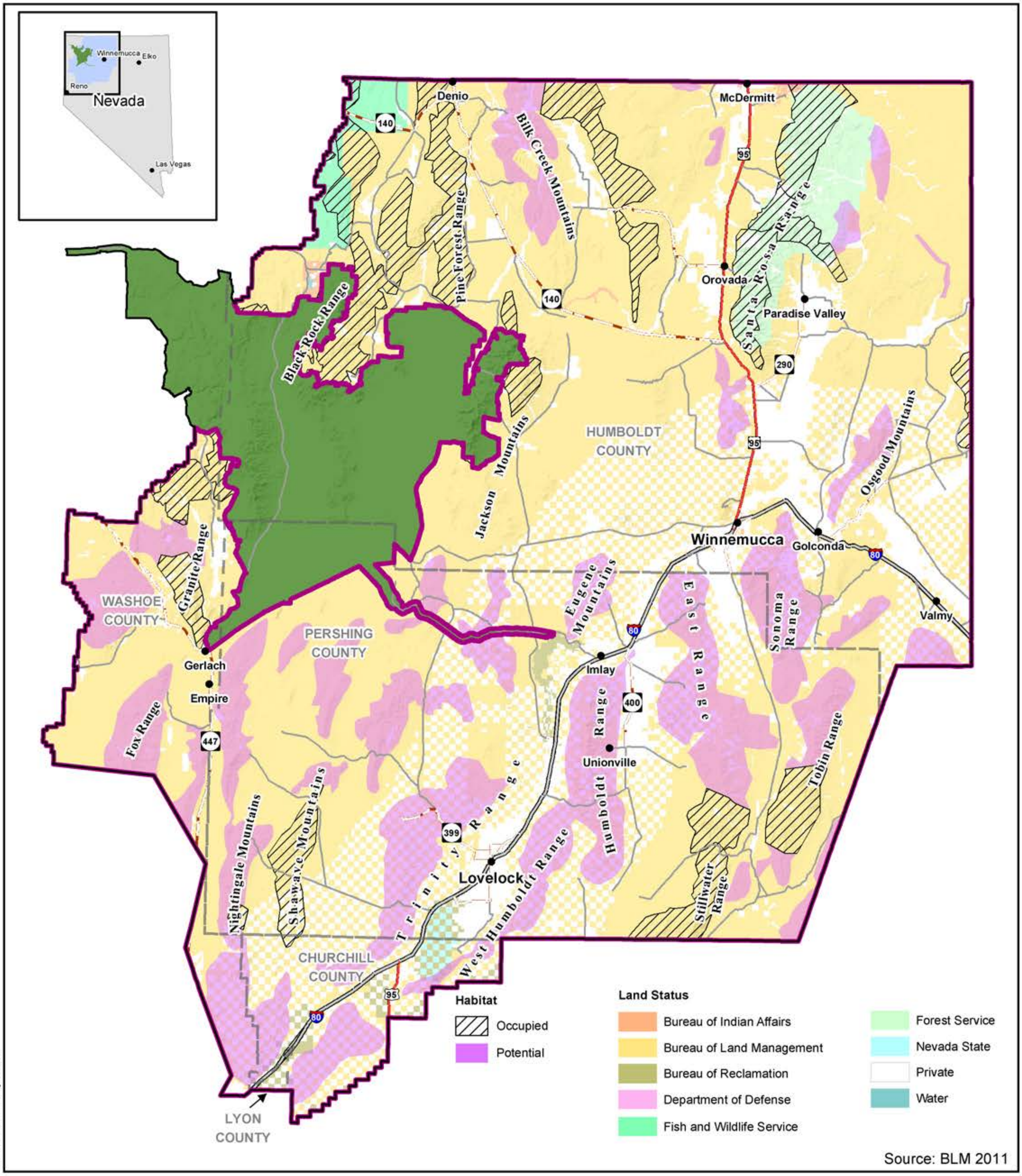
Mountain Lion

NDOW and BLM personnel have documented the presence of mountain lions (*Felis concolor*) in the planning area.

3.2.9.3 Small and Upland Game Species

Upland game bird habitat and general abundances are outlined in Table 3-13.

The quality of upland game bird habitat depends on the availability of mixed shrubby and herbaceous vegetation types for nesting, brood rearing, foraging, and thermal cover. Riparian habitat plays an important role as a source of food, water, and shelter for most species. Further, upland game birds, particularly the chukar partridge, respond well to wildlife water developments (guzzlers) in potential habitat.



15186.1-04 - May 2012

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Winnemucca District RMP
Distribution of Bighorn Sheep

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

N S E W

Northwest Nevada

Figure 3-16

Table 3-13
Upland Game Bird Species and Habitat Preferences

Species	Notes and Habitat
Chukar partridge (*Alectoris graeca*)	Associated with rocky canyons in mountainous terrain; widespread throughout the planning area.
Gray partridge (*Perdix perdix*)	Primarily found in grass-dominated areas, such as old burns. Uncommon in the planning area; found in scattered localized areas.
California quail (*Lophortyx californicus*)	Associated with riparian areas; moderately abundant on public land.
Mourning dove (*Zenaida macroura*)	Occupy a wide variety of habitats in the planning area, where they are widespread.
Greater sage-grouse (*Centrocercus urophasianus*)	Associated with foothills, plains, and mountain slopes where sagebrush is present in a mixture of sagebrush and meadows, in a variety of sagebrush mosaic habitats.

Source: NatureServe 2005

3.2.9.4 Nongame Species

Migratory Birds

Migratory birds are protected and managed under the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703 et seq.) and Executive Order (EO) 13186. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be intentionally killed. EO 13186 directs federal agencies to promote the conservation of migratory bird populations. Migratory birds in the planning area are discussed below.

Raptors

Raptors (predatory birds such as hawks, eagles, owls, and falcons) can be found throughout much of the planning area. Common breeding species include the red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), and long-eared owl (*Asio otus*). Other less common breeders that may be found locally include the ferruginous hawk (*Buteo regalis*), northern goshawk (*Accipter gentiles*) and burrowing owl (*Speotyto cunicularia*). Nesting habitats are found in Utah juniper, quaking aspen, and volcanic ledges and buttes. Some raptors nest on the ground or in burrows in treeless habitats. Prey species are more likely to be available for a wide range of raptors when plant communities are structurally diverse and support mixtures of grasses, forbs, and shrubs.

Most of the breeding species also winter in the planning area; however, the rough-legged hawk (*Buteo lagopus*) only uses the planning area for its wintering grounds.

Waterfowl, Shorebirds, and Wading Birds

Approximately 70 species of birds use the area's few wetlands during migration and as breeding habitat when surface water is present. Vegetation cover for nest concealment from predators and for protection from other disturbances is important during the breeding season. Representative species associated with wetlands in the planning area are presented in Table 3-14.

Table 3-14
Common Bird Species Associated with Wetlands in the Planning Area

Common Name	Scientific Name
American avocet	*Recurvirostra americana*
Canada goose	*Branta canadensis*
Cinnamon teal	*Anas crecca*
Gadwall	*A. strepera*
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
Spotted sandpiper	*Actitis macularia*
Wilson's phalarope	*Steganopus tricolor*

Sources: NatureServe 2007; Neel 1999

Neotropical Migrant Birds

The planning area supports a wide variety of neotropical migrant bird species, including more than 240 species, which represents the majority of birds found in the planning area[1]. Populations of some of these species are declining as a consequence of land use practices, depredation on nests by corvids, and an increase in cowbirds (*Molothrus ater*) (which as brood parasites [species that lay eggs in nests of other species] lower the reproductive success of other passerines), as well as other factors. Neotropical migrants exhibit quite variable habitat requirements and are found in most habitat types. Riparian and wetland areas represent less than one percent of the planning area, but provide habitat for most of the neotropical migrant species due to the presence of water and the structural and species diversity of the vegetation.

Mammals

Common nongame mammals in the planning area include coyote (*Canis latrans*), antelope ground squirrel, black-tail jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), deer mouse (*Peromyscus maniculatus*) and several other small mammal species.

Reptiles and Amphibians

According to the NDOW (2012) diversity database there are approximately 40 different species of reptiles that have been documented in the WD. These reptiles are lizards and snakes, such as the Great Basin rattlesnake (*Crotalus oreganus*), desert horned lizard (*Phrynosoma platyrhinos*), and the Great Basin fence lizard (*Sceloporus occidentalis*). There is potential habitat for the Columbian spotted frog (*Rana luteiventris*), a federal candidate species, and the Northern leopard frog (*Rana pipiens*), a state protected species in the District.

3.2.9.5 Fish and Aquatic Habitat

Aquatic habitat includes perennial and intermittent streams that have the capability to support fish. There are approximately 891 miles of perennial streams on lands administered by the WD. Further, aquatic habitats, such as streams, rivers, and creeks, contain a range of aquatic mollusk, fish, and insect species.

[1] For additional information on bird species common to the WD, see *Atlas of the Breeding Birds of Nevada*, Floyd et al., University of Nevada Press 2007.

Also found in the planning area are springs, where deep or shallow groundwater flows naturally from bedrock or natural fill onto the land surface and forms a body of water (NDOW 2002). These springs are isolated from other surface waters and as a result commonly support a diversity of endemic species (NDOW 2002).

Springs can be a habitat for unique native groups of invertebrates that are adapted to the constant temperatures and distinctive geothermal environments that some springs provide. Because these habitats are uncommon and isolated, a particular species may be found only at that site and may have little opportunity for dispersal or migration to other areas. The invertebrate communities generally rely on shallow areas of flowing hot water and algae and cannot survive where dams or barriers form deep pools.

Thermal springs, because of their high temperatures and concentrations of dissolved minerals, subject invertebrates to a rigorous environment that precludes high diversity or abundance. Nevertheless, some species of nematodes, mites, beetles, flies, amphipods, fish, and snails are adapted to hot springs. Several rare snail species are restricted to springs and are vulnerable to development that eliminates shallow pools and surrounding riparian vegetation. Two species of rare snails, Dixie Valley springsnail (*Pyrgulopsis dixensis*) and Fly Ranch pyrg (*P. bruesi*), have been collected from thermal springs in the planning area. Sensitive springsnail species include the northern Soldier Meadows springsnail (*P. militaris*), southern Soldier Meadows springsnail (*P. umbilicata*), elongate Mud Meadows springsnail (*P. notidicola*), squat Mud Meadows springsnail (*P. limaria*) and Wongs springsnail (*P. wongi*). Non-sensitive springsnail species collected in the planning area include two undescribed *Pyrgulopsis* species, and one undescribed *Fluminicola* species.

Table 3-15 lists the sport fish found in streams and reservoirs in the planning area, most of which were and continue to be introduced into the system for recreational purposes.

Table 3-15
Sport Fish in the Planning Area

Common Name	Scientific Name
Common carp	*Cyprinus carpio*
Rainbow trout	*Oncorhynchus mykiss*
Brook trout	*Salvelinus confluentus*
Brown trout	*Salmo trutta*
Brown bullhead	*Ictalurus nebulous*
Black bullhead	*I. melas*
Channel catfish	*I. punctatus*
White catfish	*Ictalurus catus*
Largemouth bass	*Micropterus salmoides*
Smallmouth bass	*M. dolomieui*
Black crappie	*Pomoxis nigromaculatus*
Green sunfish	*Lepomis cynellus*
Bluegill	*L. macrochirus*
Red-ear sunfish	*L. microlophus*
White crappie	*Pomoxis annularis*
Sacramento perch	*Archoplites interruptus*
Walleye	*Stizostedion vitreum*
Yellow perch	*Perca flavescens*

Source: BLM 2008a

The condition of fisheries habitat is intrinsically linked to the condition of the adjacent riparian habitat and also the stream channel characteristics. Riparian vegetation moderates water temperatures, adds structure to the banks to reduce erosion, and provides overhead cover for fish.

Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juvenile fish. Water quality, especially in regard to factors such as temperature, sediment, and dissolved oxygen, also greatly affects fisheries habitat.

Public land in the planning area provides habitat for one federally listed native fish species, Lahontan cutthroat trout (*Oncorhyncus clarkii henshawi*) as described in Section 3.2.10. Amphibians and aquatic invertebrates are integral components of the fish community. Several springsnail species are known to occur in the planning area and are generally associated with springs and spring brooks, as stated above; however, they are also found in perennial stream reaches that are strongly influenced by groundwater. Six of these species are on the BLM's sensitive species list for Nevada; Dixie Valley springsnail, Elongate Mud Meadows springsnail, Squat Mud Meadows springsnail, Northern Soldier Meadow springsnail, Southern Soldier Meadow springsnail, and the Wongs springsnail, described in Section 3.2.10.

3.2.10 Special Status Species

The BLM's special status species manual (6840) defines special status species, collectively, as federally listed or proposed and BLM sensitive species, which include federal candidate species and species that have been delisted in the last five years (BLM 2008b). Management of special status species would be implemented according to BLM policy and guidance provided in Manual #6840 - Special Status Species Management (2008). Table 3-16 lists the special status species that could occur in the planning area, their status, whether or not their occurrence has been documented in the planning area, and their habitat requirements (USFWS 2011).

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
PLANTS			
Margaret rushy milkvetch *Astragalus convallarius var. margaretiae*	NS	Y	Rocky slopes and flats among sagebrush in the pinyon-juniper and sagebrush zones. Elevation: 1400-2400 meters.
Tonopah milkvetch *Astragalus pseudiodanthus*	NS	Y	Deep loose sandy soils of stabilized and active dune margins, old beaches, valley floors, or drainages, with *Sarcobatus vermiculatus* and other salt desert shrub taxa. Dependent on sand dunes or deep sand in Nevada. Elevation: 1350-1850 meters.
Lonesome milkvetch *Astragalus solitarius*	NS	Y	Washes and banks of shallow soils on volcanic flat-rock with *Artemisia arbuscula*, *A. tridentata*, *Tetradymia glabrata*, *Poa sandbergii*, *Atriplex confertifolia*, *Chrysothamnus nauseosus*, etc. Elevation: 1400-1600 meters.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	**Status**	**Documented in Planning Area (Y/N)**	**Habitat**
Tiehm milkvetch *Astragalus tiehmii*	NS	Y	Whitish fluviolacustrine volcanic ash deposits weathering to deep clay soils, generally on gentle slopes of any aspect, with *Chrysothamnus*, *Sphaeralcea*, *Stanleya viridiflora*, etc., and frequently with *Cryptantha schoolcraftii* and/or *Eriogonum crosbyae*. Elevation: 1600-1800 meters.
Osgood Mountains milkvetch *Astragalus yoder-williamsii*	SE, NS	Y	Dry, open, coarse decomposed granodiorite soils among boulders on flats and gentle slopes(recently also found in loose silty soils on a moderate south slope) in healthy sagebrush steppe vegetation with *Artemisia arbuscula*, *A. tridentata* ssp. *vaseyana*, *Chrysothamnus nauseosus*, *Poa secunda* var. *secunda*, *Agropyron spicatum*, *Stipa thurberiana*, *Stipa comata*, *Festuca idahoensis*, *Elymus cinereus*, etc. Elevation: 1700-2250 meters.
Dainty moonwort *Botrychium crenulatum*	NS	N	Aquatic or wetland-dependent in Nevada. Elevation: 2500-3400 meters.
Schoolcraft catseye *Cryptantha schoolcraftii*	NS	Y	Whitish fluviolacustrine volcanic ash deposits weathering to deep clay soils, on gentle to steep slopes of mostly east, south, and west aspects, in the sagebrush steppe zone with *Chrysothamnus*, *Sphaeralcea*, *Stanleya viridiflora*, etc., and frequently with *Astragalus tiehmii* and/or *Eriogonum crosbyae*. Elevation: 1450-1800 meters.
Goodrich biscuitroot *Cymopterus goodrichii*	NS	Y	Moderate to steep scree and talus slopes of dark angular slate or limestone in the upper subalpine and lower alpine zones. Elevation: 2200-3400 meters.
Windloving buckwheat *Eriogonum anemophilum*	NS	Y	At high elevations on dry, exposed, relatively barren and undisturbed, gravelly, limestone or volcanic ridges and ridgeline knolls, on outcrops or shallow rocky soils over bedrock, with *Artemisia arbuscula*, *Ericameria viscidiflora*, *Poa secunda*, *Elymus elymoides*, *Arenaria kingii*, etc. At low elevations on dry, relatively barren and undisturbed knolls and slopes of light-colored, platy volcanic tuff weathered to form stiff clay soils, on all aspects, with *Tetradymia canescens, Ericameria nauseosa, E. viscidiflora, Atriplex confertifolia, Elymus elymoides, Elymus cinereus, Astragalus calycosus*, etc. Elevation: 1400-3000 meters.
Crosby buckwheat *Eriogonum crosbyae*	NS	Y	Outcrops of rhyolite or whitish fluviolacustrine volcanic ash deposits, and derived shallow sandy to clay soils, on gentle to steep slopes of all aspects, with *Chrysothamnus nauseosus, Tetradymia glabrata, Artemisia spp., Elymus cinereus, Stanleya viridiflora, Sphaeralcea, Ipomopsis congesta*, etc., and frequently with *Astragalus tiehmii*. Elevation: 1400-2150 meters.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
Schoolcraft buckwheat *Eriogonum microthecum var. schoolcraftii*	NS	N	Found in Lassen and Plumas County, CA; and Washoe County Nevada on Seven Lakes Mountain. Associated with *Juniperus* and *Artemisia* on a north-facing slope at 5675 feet elevation. Generally found in sagebrush communities of *Artemisia tridentata, Tetradymia canescens, Ericameria nauseosa, Ribes velutinum, Ephedra viridis,* and *Quercus kelloggii*
Sand cholla *Grusonia pulchella*	SP, NS	Y	Sand of dunes, dry-lake borders, river bottoms, washes, valleys, and plains in the desert. Dependent on sand dunes or deep sand in Nevada. Elevation: 1200-1950 meters.
Grimy mousetails *Ivesia rhypara var. rhypara*	NS	Y	Mostly on dry, relatively barren, yellowish or light-colored outcrops or badlands of welded, sometimes hydrothermally altered and re-cemented, ash-fall tuff, and on shallow gravel grus (an accumulation of angular, coarse-grained fragments) derived therefrom, in one case on unsorted cobbly riverbed deposits mixed with underlying volcanic ash, on gentle to steep side, shoulder, or toe slopes with east to south to west aspects, with few and sparse associated species such as *Trifolium andersonii, Poa secunda, Ericameria nauseosa*, and *Achnatherum hymenoides*. Elevation: 1600-1900 meters.
Davis peppercress *Lepidium davisii*	NS	Y	Hard-bottomed clay playas on volcanic plains in the sagebrush zone with sparse associated *Atriplex confertifolia* and *Artemisia cana*, surrounded by *Artemisia tridentata* vegetation. During spring, the playas are usually inundated up to a foot deep. Aquatic or wetland-dependent in Nevada. Elevation: 1550-1600 meters.
Pueblo Valley peppercress *Lepidium montanum var. nevadense*	NS	Y	Dependent on sand dunes or deep sand in Nevada. Elevation: 1250-1350 meters.
Owyhee prickly phlox *Leptodactylon glabrum*	NS	Y	Crevices in steep to vertical, coarse-crumbling volcanic canyon walls. Intolerant of water paths or seeps that may form in the rock crevices. Elevation: 1400-4000 meters
Succor Creek parsley *Lomatium packardiae*	NS	Y	Dry, open, rocky clay soils derived from rhyolite or volcanic ash deposits in the sagebrush zone. Elevation: 1300-2350 meters.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
Smooth stickleaf *Mentzelia mollis*	NS	Y	Dry, open, nearly barren, eroding shoulder and side slopes of brightly colored shrink-swell clay badlands formed by hydrothermal alteration and weathering of air-fall volcanic ash deposits, on all aspects with a very sparse cover of other annuals such as *Monolepis pusilla, Mentzelia albicaulis, Cleomella macbrideana*, and *Phacelia humilis*. Elevation: 1300-1600 meters.
Oryctes *Oryctes nevadensis*	NS	Y	Deep loose sand of stabilized dunes, washes, and valley flats, on various slopes and aspects, variously associated with *Psorothamnus polydenius, Tetradymia tetrameres*, *T. glabrata*, *Sarcobatus vermiculatus*, *S. baileyi*, *Atriplex canescens*, *A. confertifolia*, *Krascheninnikovia lanata, Grayia spinosa, Eriogonum nummulare, Achnatherum hymenoides, Hesperostipa comata, Oenothera deltoides*, *Cymopterus* corrugatus, *Penstemon arenarius*, *Gilia micromeria*, *Astragalus geyeri*, *Phacelia bicolor*, *Nama densum*, N. *aretioides*, etc. Dependent on sand dunes or deep sand in Nevada. Elevation: 1150-1850 meters.
Nevada dune beardtongue *Penstemon arenarius*	NS	Y	Deep loose sandy soils of valley bottoms, aeolian deposits, and dune skirts, often in alkaline areas, sometimes on road banks and other recovering disturbances crossing such soils, in the shadscale zone with *Psorothamnus polydenius*, *Achnatherum hymenoides*, *Astragalus geyeri* var. *geyeri*, *Atriplex canescens*, *A. confertifolia*, *Tetradymia glabrata*, *Gilia leptomeria*, *Tiquilia nuttallii*, *Sarcobatus baileyi*, *Chrysothamnus*, *Ephedra nevadensis*, etc. Dependent on sand dunes or deep sand. Elevation: 1150- 1850 meters.
Cordelia beardtongue *Penstemon floribundus*	NS	Y	Dry, open, mostly dark-colored volcanic talus, very rocky slopes, or alluvium derived therefrom, on all aspects but predominantly westerly, variously associated with *Juniperus osteosperma*, *Atriplex confertifolia*, *Sarcobatus vermiculatus*, *Artemisia spinescens*, *A. tridentata*, *Grayia spinosa*, *Ephedra nevadensis*, *Penstemon deustus*, *P. speciosus*, *Lewisia rediviva*, etc. Also reported but not confirmed on carbonate materials. Elevation: 1250-2300 meters.
Lahontan beardtongue *Penstemon palmeri var. macranthus*	NS	Y	Along washes, roadsides and canyon floors, particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the summer. Unknown if restricted to calcareous substrates. Elevation: 1000-1400 meters.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	**Status**	**Documented in Planning Area (Y/N)**	**Habitat**
Susanville beardtongue *Penstemon sudans*	NS	Y	Open, sagebrush- or woodland-dominated, rocky slopes on volcanic or other igneous substrates. 1200-1700 meters elevation.
Obscure scorpion flower *Phacelia inconspicua*	SE, NS	Y	Relatively deep, undisturbed, organic-rich soils on fairly steep, concave, N- to NE-facing slopes where snow drifts persist well into spring, on small, otherwise barren soil terraces in small clearings in shrub fields dominated by *Artemisia tridentata vaseyana* in association with *Holodiscus microphyllus*, *Symphoricarpos rotundifolius*, and *Leymus cinereus*. Elevation: 1500-2550 meters.
Playa phacelia *Phacelia inundata*	NS	Y	Grows in alkali playas and seasonally inundated areas with clay soils. Aquatic or wetland-dependent in Nevada. Elevation: 1500- 1750 meters.
Whitebark pine *Pinus albicaulis*	FC, NS	Y	Grows in dry, windy, and cold sites characterized by rocky, poorly developed soils and snowy, wind-swept exposures, it pioneers many harsh subalpine and alpine sites. Elevation: 1300-3700 meters.
Soldier Meadow cinquefoil *Potentilla basaltica*	FC, NS	Y	Moist salt-crusted clay in alkaline meadows above, and cooled outflow stream margins below, thermal springs, generally on slight southeast slopes, with *Juncus balticus*, *Scirpus maritimus*, *S. acutus*, *Triglochin maritima, Distichlis spicata*, *Sisyrinchium halophilum*, *Nitrophila occidentalis*, *Carex spp., Pyrrocoma racemosa, Solidago spectabilis, Sphaeromeria potentilloides, Astragalus argophyllus, Lotus purshianus, Ericameria nauseosa, Sarcobatus vermiculatus*, etc. Aquatic or wetland-dependent in Nevada. Elevation: 1300-1400 meters.
Holmgren smelowskia *Smelowskia holmgrenii*	NS	Y	Crevices, ledges, rubble, or small soils pockets on rock outcrops and cliffs, from high-elevation ridges to northfacing walls at lower elevations, on various rock types in the lower alpine, subalpine conifer, mountain sagebrush, and upper pinyon-juniper zones. Elevation: 1950-3500 meters.
AMPHIBIANS			
Columbia spotted frog *Rana luteiventris*	FC, NS	Y	Highly aquatic; rarely found far from permanent quiet water; usually occurs at the grassy/sedgy margins of streams, lakes, ponds, springs, and marshes. May disperse into forest, grassland, and brushland during wet weather, and may traverse uplands to reach wintering sites. Uses stream-side small mammal burrows as shelter. Overwintering sites in the Great Basin include undercut stream banks and spring heads. Wintering sites in central Idaho included deep lakes. Breeds usually in shallow water in ponds or other quiet waters.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
Northern leopard frog *Rana pipiens*	SP, NS	Y	Northern leopard frogs live in the vicinity of springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes; usually they are in or near permanent water with rooted aquatic vegetation. In summer, they commonly inhabit wet meadows and fields. Wintering sites are usually underwater, though some may overwinter underground.
BIRDS			
Northern goshawk *Accipiter gentilis*	SS, NS	Y	Nests in various forest types with a preference for taller, mature stands with significant canopy cover. In Nevada, they commonly nest in aspen "stringers" that trace mountain streams and ephemeral drainages. Also occur in shrub-dominated habitats likely used for foraging.
Golden eagle *Aquila chrysaetos*	SP, NS	Y	Nests in rugged crags, canyons, cliffs, and mountains. Forages in areas surrounding nest sites and can be found in any habitat type. Most common habitat use reported for foraging in Nevada are sagebrush scrub and sagebrush steppe.
Western burrowing owl *Athene cunicularia hypugaea*	SP, NS	Y	Uses a variety of habitats that are open, arid, and treeless with low vegetation. Most common where mammal burrows are available for nesting. Will often breed near agricultural lands, golf courses, and roadsides, but will not tolerate highly disturbed areas.
Ferruginous hawk *Buteo regalis*	SP, NS	Y	Inhabits open country including grasslands and shrublands, while avoiding forests, steep terrain, and high elevations. Most likely to be found in sagebrush scrub, but may also occur in salt desert scrub and sagebrush steppe. May also be associated with pinyon-juniper blocks.
Swainson's hawk *Buteo swainsoni*	SP, NS	Y	Uses open grasslands and shrublands, and is well adapted to agricultural areas. Typically nests in scattered trees near open areas for foraging. Usually nests in junipers in the Great Basin.
Greater sage-grouse *Centrocercus urophasianus*	FC, GS, NS	Y	Associated with sagebrush steppe habitats that include bunchgrass and forb components. Also requires sparsely vegetated sites in the sagebrush matrix for lekking, as well as riparian areas, wet meadows, springs, and seeps for brood foraging. Will move substantial distances to use seasonally appropriate microhabitats.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
Western snowy plover *Charadrius alexandrinus nivosus*	SP, NS	Y	Nests on the ground on broad open beaches or salt or dry mud flats, where vegetation is sparse or absent. In Nevada, they generally require hypersaline playas with minimum vegetation.
Western yellow-billed cuckoo *Coccyzus americanus*	FC, SS	Y	Breeding habitat is usually mature riparian woodland, often consisting of dense stands of cottonwood and willow. May also use smaller patches of mesquite, tamarisk, hackberry, and other woody vegetation. Nonbreeding habitat includes various types of forest, woodland, and scrub.
Peregrine falcon *Falco peregrinus*	SE, NS	Y	May be found in a variety of habitat types. Known nest sites in Nevada have occurred on cliff ledges or high buildings. Nests in Nevada generally occur near lakes, wetlands, or river systems.
Pinyon jay *Gymnorhinus cyanocephalus*	SP, NS	N	Nests and forages in pinyon-juniper woodland and may forage in other habitats such as sagebrush shrublands. Strongly associated with occurrence of pinyon pine.
Loggerhead shrike *Lanius ludovicianus*	SS, NS	Y	Nests in arid, open country with just a few perches or lookouts. Found throughout most habitat types in Nevada with lower probability of occurrence in forests, higher mountains, barren zones, and urban areas.
Black rosy-finch *Leucosticte atrata*	SP, NS	N	Barren, rocky or grassy areas and cliffs in alpine tundra atop high mountains. Usually nests in rock crevices or holes in cliffs about snow fields.
Lewis' woodpecker *Melanerpes lewis*	SP, NS	Y	Nests in open forest and woodland, often logged or burned, including oak, coniferous forest, riparian woodland, orchards, and pinyon-juniper. Primary habitat consists of burned coniferous woodlands and open riparian woodlands with a relatively intact grass or shrub understory.
Sage thrasher *Oreoscoptes montanus*	SS, NS	Y	Associated with intact, dense stands of sagebrush. Primarily uses sagebrush scrub and sagebrush steppe habitat, but may also occur in other Great Basin shrublands.
Brewer's sparrow *Spizella breweri*	SS, NS	Y	Strongly associated with sagebrush habitat including sagebrush scrub and sagebrush steppe. Also commonly found in salt desert scrub. May occur in most habitat types in Nevada.
Bald eagle *Haliaeetus leucocephalus*	SE, NS	Y	Usually nests in forests or tall trees near large water bodies

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
FISH			
Desert dace *Eremichthys acros*	FT, ST, NS	Y	Designated critical habitat on district. This species inhabits warm springs and their outflow creeks, in areas with temperatures of 18-40 C (most common in temperatures of 23-29 C downstream of spring orifices). Cooler temperatures of 21-24 C are required for spawning. Occupied habitat includes spring pools up to 15 meters in diameter and 3.4 meters deep; outflow streams typically less than 0.3 meters deep; alkali marsh areas with overland flow among cattails, hardstem bulrush, and other herbaceous plants; artificial impoundments; and earthen irrigation ditches. Endemic to eight spring systems in the Soldier Meadow area.
Lahontan cutthroat trout *Oncorhyncus clarki henshawi*	FT, GS, NS	Y	Lakes and streams; requires cool, well-oxygenated water. Adapted to highly mineralized waters. In streams, uses rocky areas, riffles, deep pools, and areas under logs and overhanging banks; optimally, cover should be available in at least 25% of the stream area.
Inland Columbia Basin redband trout *Oncorhyncus mykiss gairdneri*	GS, NS	Y	Winter habitat includes deep pools with extensive amounts of cover in third-order mountain streams. Summer surveys indicated that low-gradient, medium elevation reaches with an abundance of complex pools are critical areas for production.
MAMMALS			
Pallid bat *Antrozous pallidus*	SP, NS	Y	Arid deserts and grasslands, often near rocky outcrops and water. Less abundant in evergreen and mixed conifer woodlands. Usually roosts in rock crevice or building, less often in cave, tree hollow, mine, etc. Prefers narrow crevices in caves as hibernation sites.
Townsend's big-eared bat *Corynorhinus townsendii*	SS, NS	Y	Maternity and hibernation colonies typically are in caves and mine tunnels. Prefers relatively cold places for hibernation, often near entrances and in well ventilated areas. Uses caves, buildings, and tree cavities for night roosts. Throughout much of the known range, commonly occurs in mesic habitats characterized by coniferous and deciduous forests, but occupies a broad range of habitats.
Big brown bat *Eptesicus fuscus*	NS	Y	Various wooded and semi-open habitats, including cities. Much more abundant in regions dominated by deciduous forest than in coniferous forest areas. Summer roosts generally are in buildings; also hollow trees, rock crevices, tunnels, and cliff swallow nests; prefers sites that do not get hot.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
			Typically roosts in twilight part of cave. Maternity colonies form in attics, barns and occasionally tree cavities. Caves, mines, and especially buildings and manmade structures are used for hibernation.
Spotted bat *Euderma maculatum*	ST, NS	Y	Found in various habitats from desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, canyon bottoms, open pasture, and hayfields. Roosts in caves and in cracks and crevices in cliffs and canyons. Winter habits poorly known.
Silver-haired bat *Lasionycteris noctivagans*	NS	Y	Prefers forested (frequently coniferous) areas adjacent to lakes, ponds, and streams. During migration, sometimes occurs in xeric areas. Summer roosts and nursery sites are in tree foliage, cavities, or under loose bark, sometimes in buildings
Hoary bat *Lasiurus cinereus*	NS	Y	Prefers deciduous and coniferous forests and woodlands. Roosts usually in tree foliage 3-5 m above ground, with dense foliage above and open flying room below, often at the edge of a clearing and commonly in hedgerow trees. Sometimes roosts in rock crevices, rarely uses caves in most of range. Hibernating individuals have been found on tree trunks, in a tree cavity, in a squirrel's nest, and in a clump of Spanish-moss. Solitary females with young roost among tree foliage.
California myotis *Myotis californicus*	NS	Y	Western lowlands; sea coast to desert, oak-juniper, canyons, riparian woodlands, desert scrub, and grasslands. Often uses manmade structures for night roosts. Uses crevices of various kinds, including those in buildings, for summer day roosts. May roost also on small desert shrubs or on the ground. Hibernates in caves, mines, tunnels, or buildings. May form small maternity colonies in rock crevices, under bark, or under eaves of buildings.
Western small-footed myotis *Myotis ciliolabrum*	NS	Y	Generally inhabits desert, badland, and semiarid habitats; more mesic habitats in southern part of range. Roosts in summer in rock crevices, caves, tunnels, under boulders, beneath loose bark, or in buildings. Hibernates in caves and mines. Maternity colonies often are in abandoned houses, barns, or similar structures.
Long-eared myotis *Myotis evotis*	NS	Y	Mostly forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs. Often roosts in buildings, also in hollow trees, mines, caves, fissures, etc.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
Little brown myotis *Myotis lucifugus*	NS	Y	Has adapted to using human-made structures for resting and maternity sites; also uses caves and hollow trees. Foraging habitat requirements are generalized; usually forages in woodlands near water. In winter, a relatively constant temperature of about 40 F and 80% relative humidity is required; uses caves, tunnels, abandoned mines, and similar sites. Maternity colonies commonly are in warm sites in buildings and other structures; also infrequently in hollow trees. Narrow microclimate is suitable for raising young, and availability of suitable maternity sites may limit abundance and distribution.
Fringed myotis *Myotis thysanodes*	SP, NS	N	Primarily at middle elevations of 1,200-2,150 m in desert grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites. Nursery colonies occur in caves, mines, and sometimes buildings.
Long-legged myotis *Myotis volans*	NS	Y	Primarily in montane coniferous forests, in the south most often at 2000-3000 m; also riparian and desert habitats. May change habitats seasonally. Uses caves and mines as hibernacula, but winter habits are poorly known. Roosts in abandoned buildings, rock crevices, under bark, etc. In summer, apparently does not use caves as daytime roost site. In some areas hollow trees are the most common nursery sites, but buildings and rock crevices are also used.
Yuma myotis *Myotis yumanensis*	NS	Y	More closely associated with water than most other North American bats. Found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands and forests, but usually found near open water. Flys low. Nursery colonies usually are in buildings, caves and mines, and under bridges.
Brazilian free-tailed bat *Tadarida brasiliensis*	SP, NS	Y	Roosts primarily in caves in the southwestern US May use rock crevice, bridge, sign, or cliff swallow nest as roost during migration. Generally roosts high (at least 3 m) above ground to allow free fall required to attain flight. Large maternity colonies inhabitat buildings and caves; also uses culverts and bridges.
Brazilian free-tailed bat *Tadarida brasiliensis*	SP, NS	Y	Roosts primarily in caves in the southwestern US. May use rock crevice, bridge, sign, or cliff swallow nest as roost during migration. Generally roosts high (at least 3 m) above ground to allow free fall required to attain flight. Large maternity colonies inhabitat buildings and caves; also uses culverts and bridges.

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
Western pipistrelle *Pipistrellus Hesperus*	NS	Y	Deserts and lowlands, desert mountain ranges, desert scrub flats, and rocky canyons. Day and night roosts include rock crevices, under rocks, burrows and sometimes buildings or mines. May hibernate in cave, mine, or rock crevice. Typically visits water and drinks immediately after emergence each evening. Young are born in rock crevices or in buildings.
Pygmy rabbit *Brachylagus idahoensis*	GS, NS	Y	Generally use burrows found in the taller and denser big sagebrush in an area. May be found in broad valley floors, drainage bottoms, alluvial fans, and other areas with friable soils. May also occur in areas of large dense rabbitbrush and greasewood. Understory can vary from none to dense grasses and forbs.
Dark kangaroo mouse *Microdipodops megacephalus*	SP, NS	Y	In loose sands and gravel. Found in shadscale scrub, sagebrush scrub, and alkali sink plant communities. May occur in sand dunes near margins of range. Underground when inactive.
Pale kangaroo mouse *Microdipodops pallidus*	SP, NS	Y	Habitat is nearly restricted to fine sands in alkali sink and desert scrub dominated by *Atriplex confertifolia* (shadscale) or *Artemisia tridentata* (big sagebrush). This mouse often burrows in areas of soft, windblown sand piled at the bases of shrub.
Bighorn sheep *Ovis Canadensis*	GS, NS	Y	Occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons. Many of these grasslands are fire-maintained. Suitable escape terrain (cliffs, talus slopes, etc.) is an important feature of the habitat.
Preble's shrew *Sorex preblei*	NS	N	Recorded habitats include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush, willow-fringed creeks, marshes, bunchgrass associations, sagebrush-aspen associations, sagebrush-grass associations, and alkaline shrubland.
Pika *Ochotona princeps*	SP, NS	N	Restricted to rocky talus slopes, primarily the talus-meadow interface. Often above treeline up to limit of vegetation. Also found at lower elevations in rocky areas in forests or near lakes. Occasionally on mine tailings, or piles of lumber or scrap metal. Does not dig burrows but may enlarge den or nest site under rock. Arid areas such as desert.
REPTILES			
No known species listed			

Table 3-16
Special Status Species That Could Occur in the Planning Area

Common Name *Scientific Name*	Status	Documented in Planning Area (Y/N)	Habitat
INSECTS			
Mattoni's blue *Euphilotes pallescens mattonii*	NS	N	Arid areas such as desert flats and edges of sand dunes, associated with buckwheat species. Dependent on dune or deep sand habitats. Caterpillars associated with buckwheat species.
Rice's blue *Euphilotes pallescens ricei*	NS	Y	Dependent on dune or deep sand habitats. Caterpillars associated with buckwheat species.
Great Basin small blue *Philotiella speciosa septentrionalis*	NS	N	Deserts, edges of dry desert lakes, stream edges in foothills, associated with buckwheat species.
Bleached sandhill skipper *Polites sabuleti sinemaculata*	NS	Y	Baltazor Hots Springs Denio, NV.
Humboldt serican scarab *Serica humboldti*	NS	Y	Dependent on dune or deep sand habitats.
MOLLUSCS			
Dixie Valley Pyrg *Pyrgulopsis dixensis*	NS	Y	Endemic to springs near Hot Springs, Dixie Valley, Pershing County, NV.
Squat Mud meadows pyrg *Pyrgulopsis limaria*	NS	Y	Endemic to spring brook in Mud Meadow drainage, Humboldt County, NV.
Northern Soldier meadow pyrg *Pyrgulopsis militaris*	NS	Y	Endemic to springs in the Soldier Meadow area, Humboldt County, NV.
Elongate Mud Meadows pyrg *Pyrgulopsis notidicola*	FC	Y	Endemic to four spring systems near Mud meadow, Solider Meadow area, Humboldt County, NV. Occupies two basic habitat types; near the source of springs with temperatures greater than 45 degrees C in the splash zone on rocks and riparian grasses only in wetted areas, and downstream from spring sources submerged in gravel substrate.
Northern Steptoe Pyrg *Pyrgulopsis serrate*	NS	Y	Known from Steptoe Valley, White Pine County, NV Endemic to spring near Warm Springs Canyon in Soldier Meadow area, Humboldt County, NV.
Southern Soldier meadow pyrg *Pyrgulopsis umbilicata*	NS	Y	Endemic to spring near Warm Springs Canyon in Soldier Meadow, Humboldt County, NV.
Wongs pyrg *Pyrgulopsis wongi*	NS	N	Found in springs in CA-Mono County; NV-Douglas, Esmeralda, and Mineral County.

Source: USFWS 2011 including data from: Nevada Natural Heritage database 2011; NDOW Diversity database 2011 USDA Plants database 2011; Nature Serve 2011; Nevada Atlas of Breeding Birds 2007; Nevada Natural Heritage Rare Plant Atlas 2001; butterfliesofamerica.com 2011.
Status Codes: FE = federally listed endangered, FT = federally listed threatened, FC = federally listed candidate, SE = state listed endangered, ST = state listed threatened, SP = state protected , SS = state sensitive, GS = game species, NS = Nevada BLM sensitive species.

3.2.10.1 Federally Listed Species

In 2005 the USFWS (2005) provided the BLM with a list of species that were classified as threatened or endangered under the US Endangered Species Act of 1973 (ESA) that may occur in the vicinity of the WD. These species included Lahontan cutthroat trout (LCT) and bald eagle. The USFWS delisted the bald eagle on August 8, 2007. In 2012 the USFWS (2012) provided the BLM with a new list that included two threatened species: desert dace and LCT. Desert dace occurs near, but not in the planning area. LCT is the only species listed as threatened under the ESA that occurs in the planning area (USFWS 2012). No critical habitat has been designated for the LCT.

Lahontan Cutthroat Trout

LCT is a subspecies of cutthroat trout native to lakes and streams throughout the physiographic Lahontan Basin of northern Nevada, eastern California, and southern Oregon. Current populations exist in approximately 155 streams and six lakes in the Lahontan Basin. Currently LCT populations exist in approximately 17 streams and one lake in the planning area (Table 3-17). Potential LCT habitat has been identified in the LCT Recovery Plan (USFWS 1995) (Table 3-18), and more potential LCT habitat may be identified in the future. The principal threats to the subspecies include livestock grazing, WHB, urban and mining development, water diversions, poor water quality, hybridization with nonnative trout, and competition with other species of nonnative trout (USFWS 1995).

Table 3-17
Occupied LCT Habitat in the Planning Area

Lakes	Occupied Habitat (surface acres)
Summit Lake	600
Streams	**Occupied Habitat (miles)**
Crowley Creek	12
Little Humboldt River (South fork)	10
Riser Creek	9
Colman Creek	7
Washburn Creek	6
Pole Creek	4
Mahogany Creek	8.5
Rock Creek	3
Summer Camp Creek	2
Battle Creek (North fork)	2
Indian Creek	2
Abel Creek	2
Snow Creek	1.5
Denio Creek	1.5
First Creek	1
Winters Creek	1
Andorno Creek	0.5
Total	73

Source: Lynch 2008

Table 3-18
Potential LCT Habitat
in the Planning Area

Streams
Black Rock Basin
Leonard Creek
Chicken Creek
Big Creek
Happy Creek
Mary Sloan Creek
Rodeo Creek
Granite Creek
House Creek
Cold Springs Creek
Red Mountain Creek
Raster Creek
Bartlett Creek
Paiute Creek
Jackson Creek
Donnelly Creek
Cottonwood Creek
Log Cabin Creek
Quinn River Basin
Rock Creek
McDermitt Creek
Little Humboldt River Subbasin
Mullinex Creek
Singas Creek
Stonehouse Creek

Source: USFWS 1995

Historically, LCT populations occurred in a wide variety of cold water habitats, such as alpine lakes, low and moderate gradient rivers, and small headwater tributary streams. Stream-dwelling LCT are generally less than five years old, while in lakes, LCT may live as long as nine years. LCT feed on a variety of terrestrial and aquatic insects, and larger LCT may feed on fish. LCT populations in the planning area have been reduced by lessening and altering stream discharge, altering stream channels and morphology, degrading water quality and riparian habitats, drought, increasing chemical concentrations, and introducing nonnative fish. These changes are largely due to human activity (USFWS 1995).

The population recovery strategy for LCT includes managing populations for genetic variation, establishing metapopulations, and increasing distribution and abundance through reproduction and reintroductions (USFWS 1995). The strategy also includes habitat management that involves many BLM land uses and management strategies. Habitat provision strategies include providing adequate water, water quality, and cover for spawning and rearing through streamside management, monitoring, and research.

Bald Eagle (Delisted)

The species requires tall trees near a water source, such as coastal areas, bays, rivers, or lakes, and feeds on fish, waterfowl, and seabirds (NatureServe 2007). Bald eagles may occur incidentally for short periods as a rare migrant in the WD. However, no foraging, nesting, wintering, or roosting areas have been identified.

Although no longer afforded protection under the ESA, the bald eagle is still protected by the MBTA, the Bald and Golden Eagle Protection Act, and the BLM sensitive species list. On a statewide level, the Nevada Partners in Flight Bird Conservation Plan (Neel 1999) concluded that, since Nevada plays such a small role in the overall world population health of bald eagles, this species is not considered a candidate for conservation priority in the state.

3.2.10.2 State of Nevada

The State of Nevada maintains various lists of rare and protected plant and animal species. The Nevada Administrative Code 503 defines endangered species as "a species or subspecies that is in danger of extinction throughout all or a significant portion of its range." Nevada state threatened species are defined as "a species or subspecies that is likely to become an endangered species in the near future throughout all or a significant portion of its range." state special status species are included in Table 3-16.

3.2.10.3 BLM Sensitive Species

The BLM defines sensitive species as taxa that are not already included as BLM Special Status Species under federally listed, proposed, or candidate species or State of Nevada listed species. BLM policy is to provide these species with the same level of protection as provided for candidate species. BLM Manual 6840.06C (BLM 2008b) states, "ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed." The BLM sensitive species lists include mammals, birds, reptiles, mollusks, insects, and plants that may be found in the planning area (NNHP 2007; USFWS 2011). These are presented in Table 3-16. Changes in special status species lists will be incorporated into the RMP as they are amended. Additional detail is provided below for key special status species for management in the planning area.

3.2.10.4 Key Special Status Species for Management

In addition to bighorn sheep, western burrowing owl, and pygmy rabbit, the greater sage-grouse is a key special status species for management and is discussed below under federal candidate species.

Bighorn Sheep

Bighorn sheep historically occupied the central and southern portions of Nevada (NDOW 2002). Hunting the animals was prohibited from 1901 to 1952, and transplanting programs have been successful; between 1968 and 1988 more than 800 bighorn were transplanted (McCutchen 1995). Since 1960, bighorn have increased in numbers, but their population levels are still low when compared with the estimates of pre-European numbers and the amount of available unoccupied habitat (McCutchen 1995).

Western Burrowing Owl

Western burrowing owls have been observed in the planning area, but a complete survey of the planning area has not been completed. These migratory owls require open terrain, with low vegetation, burrows created by mammals, and an adequate prey base.

Pygmy Rabbit

The pygmy rabbit is the smallest North American rabbit. In the Great Basin, the species is typically restricted to the sagebrush-grass complex. A dietary study of pygmy rabbits showed that they depend on sagebrush year-round, and it supplies 51 percent of their diet in summer and 99 percent in the winter. Pygmy rabbits showed a preference for grasses and, to a lesser extent, forbs, in the summer (Green and Flinders 1980). These data seem to indicate that pygmy rabbits require sagebrush stands with an understory of perennial grasses to meet their seasonal dietary requirements. The pygmy rabbit mates in early spring and summer. No district-wide inventories for pygmy rabbits have been completed in the WD, but it appears that the species may be much more widespread than previously thought (Detweiler 2007a).

3.2.10.5 Federal Candidate Species

The USFWS provided the BLM with a species list of federal candidate species for listing that may occur in the vicinity of the Winnemucca Resource Management Plan Area. These include greater sage-grouse, western yellow-billed cuckoo the Columbia spotted frog, Whitebark Pine, Soldier Meadow Cinquefoil, and the Elongate Mud Meadows Springsnail (USFWS 2011). No species proposed for listing as endangered are known to occur in the planning area.

Greater Sage-Grouse

Evidence suggests that habitat fragmentation and destruction across much of the species' range has contributed to significant population declines over the past century. If current trends persist, many local populations may disappear in the next several decades, with the remaining fragmented population vulnerable to extinction (USFWS 2011). Historic records, which are mostly anecdotal and lack systematic survey data, indicate that greater sage-grouse populations have fluctuated widely in Nevada. NDOW has indicated that although the current population is relatively moderate, it is considered to be declining (Willis et al. 1993).

In much of the popular and scientific literature, sage-grouse are considered an indicator species, or "icon" of the sagebrush steppe. The Partners in Flight Western Working Group (Altman and Holmes 2000) consider sage-grouse a species of focus. This document highlights sage-grouse as a species that occupies habitats that have declined substantially in the interior Great Basin since historic times. Sage-grouse are wide ranging and occupy upland, meadows, and riparian habitats. It is for this reason that sage-grouse are identified as the primary indicator or umbrella species for sagebrush habitats in this plan.

This species is highly dependent on the presence of several species and subspecies of shrubs, notably Wyoming, mountain, and great basin sagebrush. Low sagebrush is also important. Greater sage-grouse nest at mid-elevation habitats that support adequate shrubby and herbaceous plant cover (Connelly et al. 2000). Nesting habitats (Figure 3-17) are typically associated with big sage/low sagebrush habitat complexes. Spring, summer, and fall ranges with a good complement of native grasses and forbs are associated with productive sage-grouse habitat. During the winter, sage-grouse forage almost exclusively on either big sagebrush or low sagebrush, depending on severity of snowfall and on the migratory habits of populations.

Mountain meadows, riparian areas, and moist upland range sites all provide succulent green forage and insects that are important food for grouse during the spring, summer, and fall. Sage-grouse habitat and breeding complex monitoring is an ongoing effort that NDOW and BLM have participated in jointly for several years.

Because leks (areas of display and courtship) are typically positioned in proximity of nesting and brood-rearing habitat, they are often considered an excellent reference point for monitoring and habitat protection measures.

Currently, sage-grouse and their habitats are managed in discreet areas called population management units (PMUs) (Figure 3-18). Three seasonal habitats, described as nesting, summer, and winter, are delineated in the PMUs. Management/implementation plans are completed for these PMUs by local area planning groups. The two planning groups identified in the planning area are the Washoe-Modoc and North-Central.

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo is a riparian obligate species that requires dense cottonwood-willow forested tracts (Neel 1999). There are no riparian habitats with those characteristics in the planning area; therefore, the cuckoo might transit the planning area, but they are unlikely to nest or be present in the planning area for any period of time.

Columbia Spotted Frog

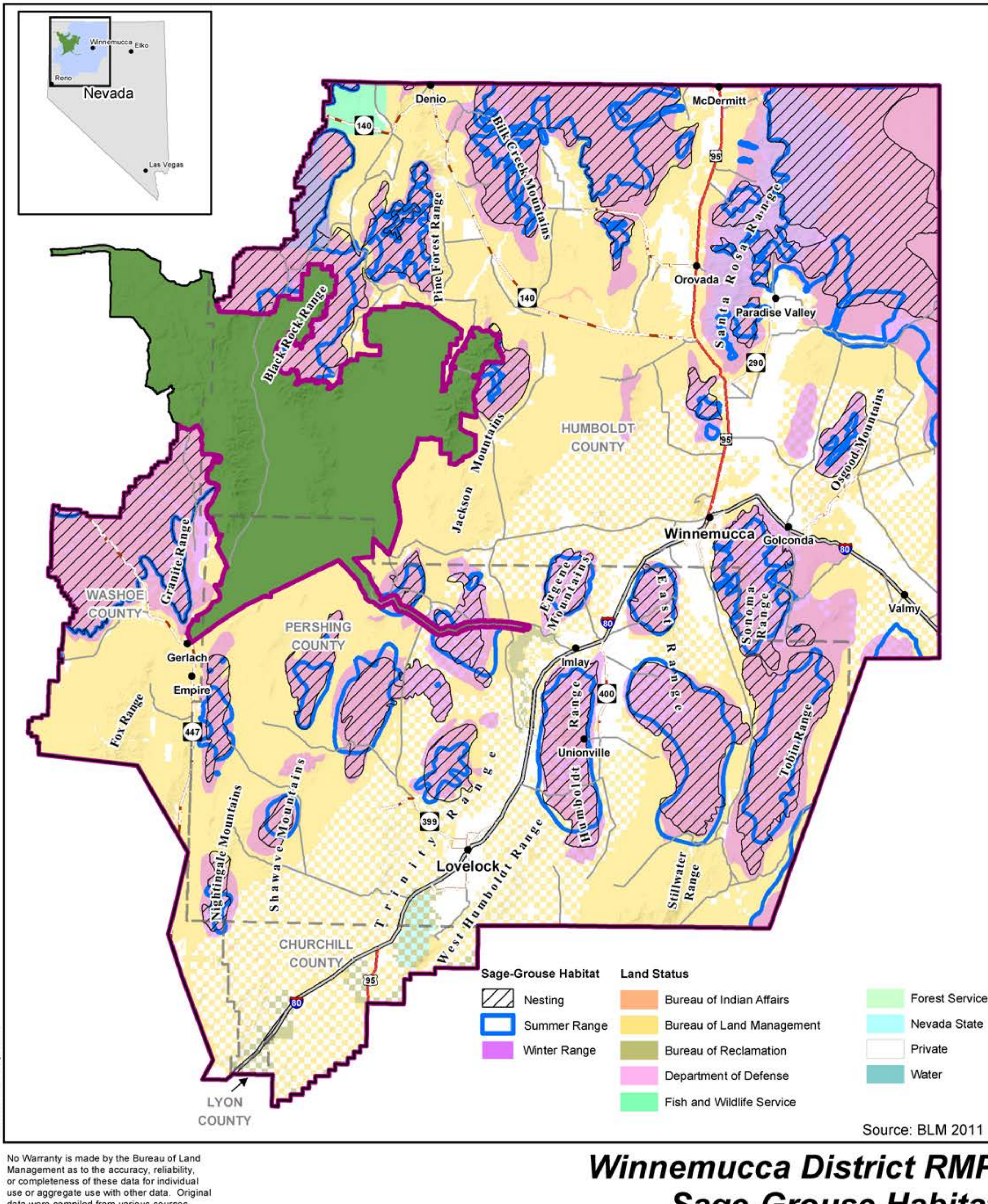
Although the species has not been documented in the planning area, the Columbia spotted frog has potential habitat in the planning area, including streams and springs.

Whitebark Pine

Whitebark pine grows in dry, windy, and cold sites characterized by rocky, poorly developed soils and snowy, wind-swept exposures. It pioneers many harsh subalpine and alpine sites.

Soldier Meadow Cinqufoil

Basalt cinquefoil is an herbaceous perennial plant that grows primarily in the Soldier Meadows area. The plant grows from prostrate stems extending from a low basal rosette. Bright yellow flowers occur in loose clusters at the end of the stems. The species blooms from late spring through summer. The species is associated with moist saline/alkaline soils associated with alkali seeps and meadows. The species appears to favor sites with micro-relief in saturated soils to obtain root aeration. Surveys completed by Nachlinger in 1990 and repeated by USFWS in 2002 and BLM in 2009 indicate stable to increasing populations. Most potential habitat is occupied, except where vehicle trails cross through small areas of otherwise suitable habitat. The current threats are associated with recreation use of



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Winnemucca District RMP
Sage-Grouse Habitat

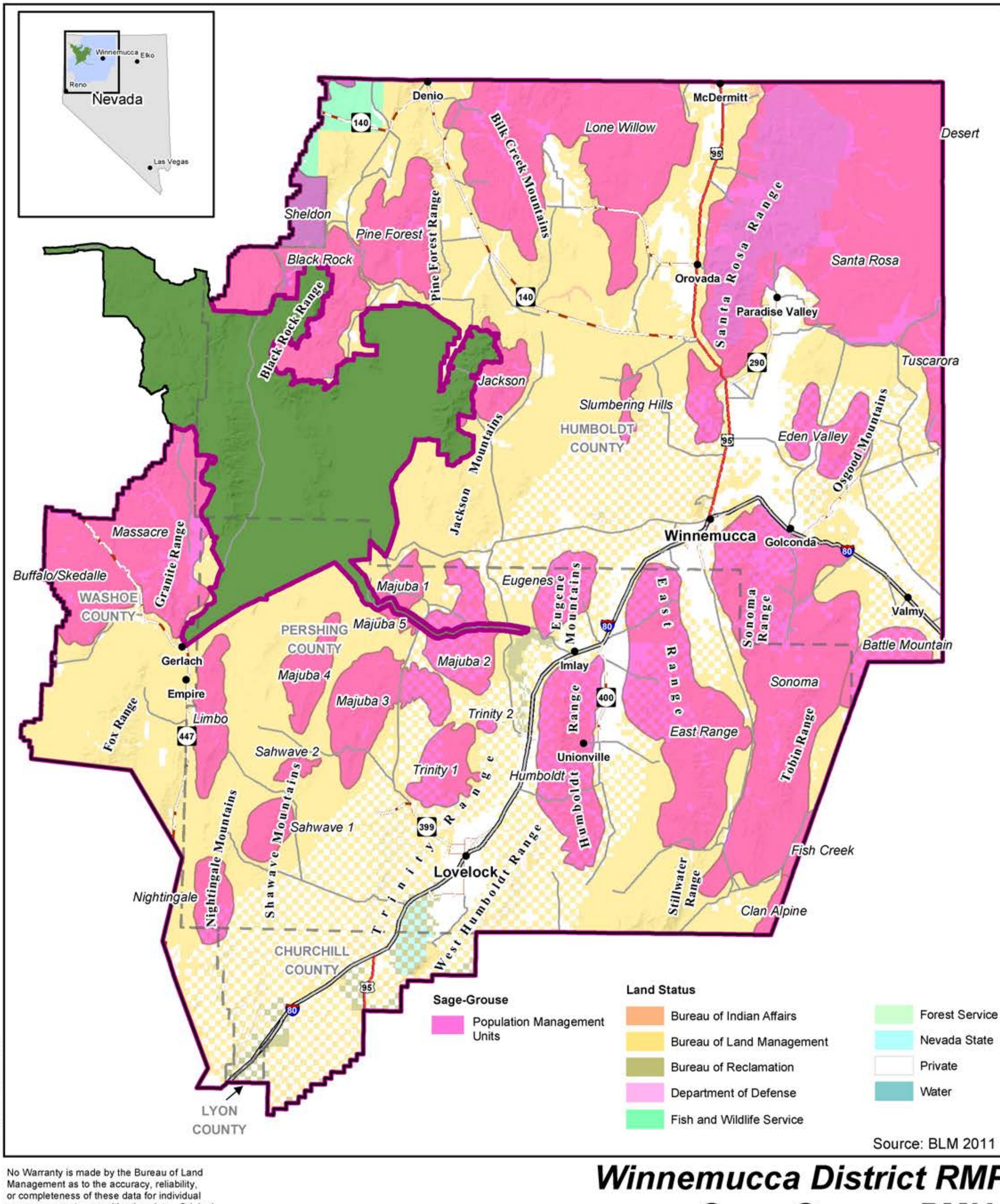
Legend

BLM Winnemucca District Administrative Boundary
BLM Winnemucca RMP Boundary
Black Rock/High Rock NCA RMP Area
County Boundaries
Towns
U.S. Highway
U.S. Interstate
County Road
State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-17



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Winnemucca District RMP
Sage-Grouse PMUs

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-18

occupied habitat. Basalt cinquefoil also exhibits the ability to colonize previously disturbed areas, including old livestock corrals and the raised rim of hoof prints in wet soils.

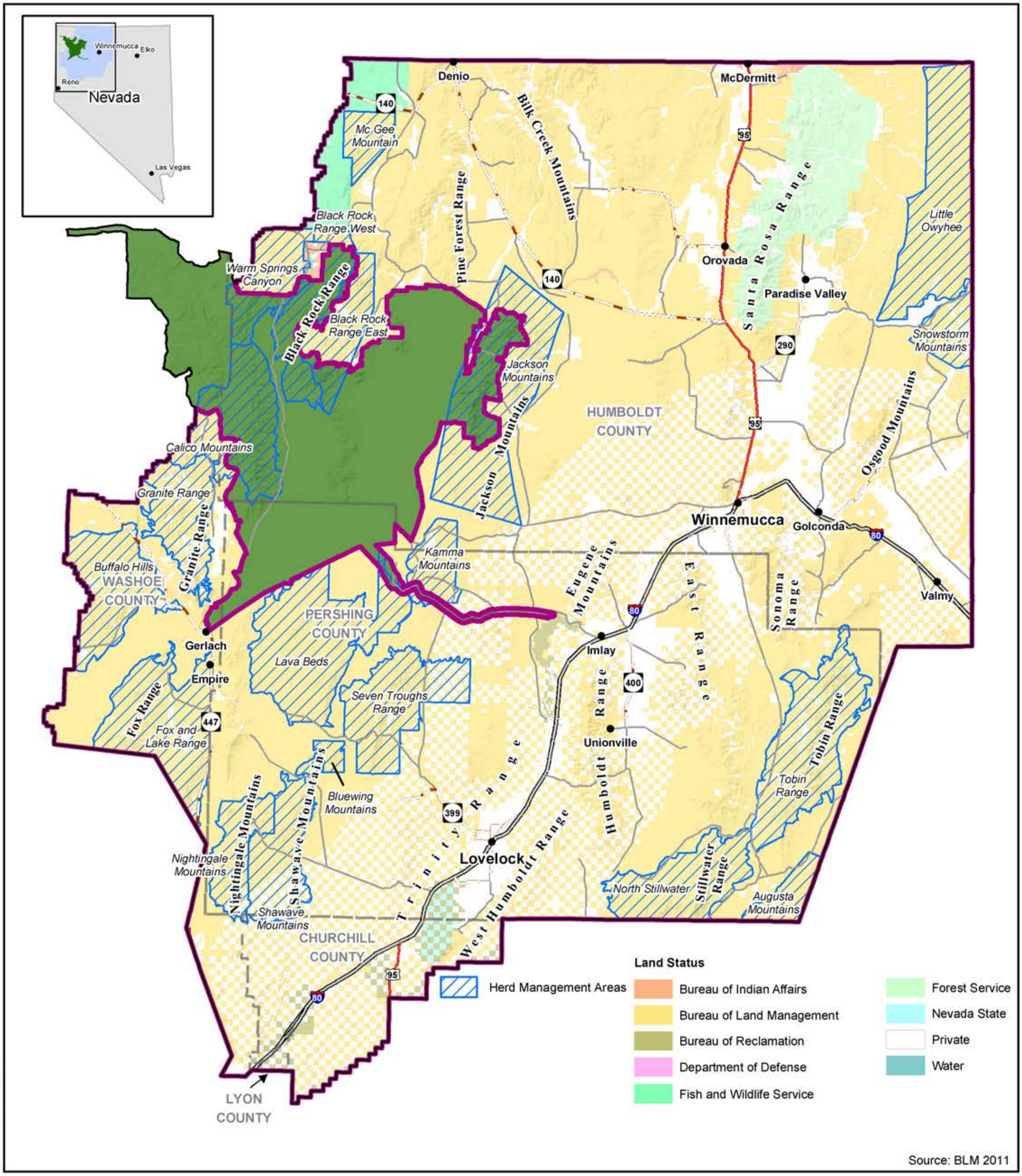
Elongate Mud Meadows springsnail

Numerous spring systems exist within the Soldier Meadows area, which range from cold (near or below mean air temperature), thermal (5-10o C above mean air temperature), or hot (more than 10° C above mean air temperature) (see Sada et al. 2001). Within the Soldier Meadows area several springsnails, which are small (1-8 mm high) mollusks that require high quality water (Sada et al. 2001), have been identified as being unique to the area. The majority of these species are members of the genus Pyrgulopsis, with one species belonging to the genus Fluminicola. These genera prefer cool, flowing water and gravel substrate (Sada et al. 2001). One species, the elongate mud meadows springsnail is listed by the USFWS as a candidate species for protection under the ESA. The primary areas of known springsnail concentrations on public lands occur in the vicinity of the desert dace critical habitats that were fenced to exclude livestock and wild horses in 2005.

3.2.11 Wild Horses and Burros

The BLM protects, manages, and controls WHB under the authority of the Wild Free-Roaming Horses and Burros Act of 1971 (as amended by Congress in 1976, 1978, 1996, and 2004) to ensure that healthy herds thrive on healthy rangelands. The BLM manages these living symbols of the Western spirit as part of its multiple-use mission under the 1976 Federal Land Policy and Management Act (BLM 1976). In addition, the BLM must meet or ensure progress is being made toward meeting the Sierra Front-Northwestern Great Basin Resource Advisory Council (RAC) Standards and Guidelines for WHB Management (Appendix K).

WHB populations are managed in herd management areas (HMAs). Following passage of the Wild Free-Roaming Horses and Burros Act of 1971 (Public Law [PL] 92-195, as amended), thirty-five herd areas (HAs) were originally delineated on the Winnemucca District (Figure 3-20). Subsequent land management plan decisions identified the removal of WHB from checkerboard HAs (alternating sections of privately owned lands and BLM lands) unless affected private landowners executed a cooperative agreement providing for their retention and protection. No cooperative agreements were obtained and to this day these HAs remain in the same status. WHB were gathered and removed from 15 checkerboard HAs in the early 1990s. HAs are not managed for WHB populations, but animals that migrate from HMAs are occasionally removed from these areas. Appropriate management levels (AMLs) for WHB are established through multiple use decisions. AML is expressed as a population range with an upper and lower limit. The AML upper limit is the number of WHB which results in a thriving natural ecological balance (TNEB) and avoids a deterioration of the range. The AML lower limit is normally set at a number that allows the population to grow to the upper limit over a four to five year period, without any interim gathers to remove excess WHB. AMLs are established based on "an intensive monitoring program involving studies of grazing utilization, trend in range condition, actual use, and climatic factors" (109 IBLA 120) (Interior Board of Land Appeals, no date). The BLM uses annual monitoring data to evaluate progress toward meeting management objectives established in multiple use decisions. WHB that establish home ranges outside the boundaries of an HMA are removed. WHB are removed from private lands at the request of the landowner. The WD manages for a high range AML of 3,233 wild horses and 155 burros on 20 HMAs (Figure 3-19 and Table 3-19).



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Winnemucca District RMP
Herd Management Areas

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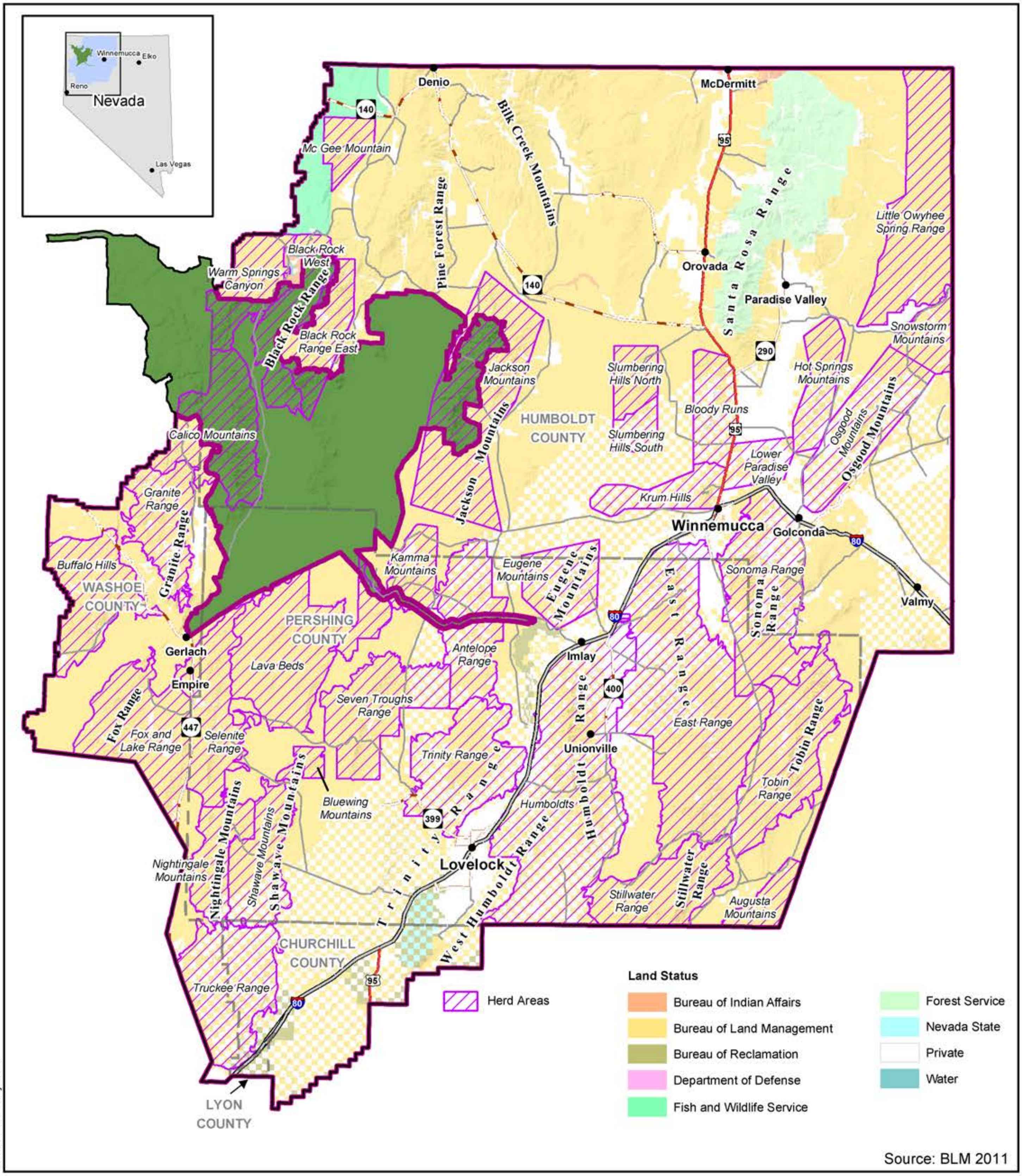
Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-19



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Winnemucca District RMP Herd Areas

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-20

Table 3-19
Characteristics of HMAs and HAs

HMA or HA	Total BLM Acres	Population Estimate FY 2012	Appropriate Management Level (AML)
Antelope Range HA (NV211)	131,600	10 H & 0 B	0
Augusta Mountains HA (NV311)	316,099	6 H & 0B	0
Augusta Mountains HMA (NV311)	182,900	310 H & 0B	185-308 H
Black Rock Range East HMA (NV209)	93,400	74 H & 0 B	56-93 H
Black Rock Range West HMA (NV227)	93,200	74 H & 0 B	56-93 H
Bloody Runs HA (NV204)	74,100	0	0
Bluewing Mountains HMA (NV217)	17,900	63 H & 32 B	22-36 H & 17-28 B
Buffalo Hills HMA (NV220)	132,400	498 H & 0 B	188-314 H
Calico Mountains HMA (NV222)	157,200	267 H & 0 B	200-333 H
East Range HA (NV225)	451,900	43 H & 0B	0
Eugene Mountains HA (NV207)	86,100	0	0
Fox & Lake Range HMA (NV228)	177,300	285 H & 0 B	122-204 H
Granite Range HMA (NV221)	101,700	207 H & 0B	155-258 H
Hot Springs Mountains HA (NV203)	68,200	0	0
Humboldt HA (NV224)	431,600	140 H & 0 B	0
Jackson Mountains HMA (NV208)	283,000	660 H & 0 B	130-217 H
Kamma Mountains HMA (NV214)	57,400	146 H & 0B	46-77 H
Krum Hills HA (NV206)	64,200	0	0
Lava Beds HMA (NV215)	233,000	340 H & 29 B	89-148 H; 10-16 B
Little Owyhee HMA (NV200)	460,100	936 H & 0 B	194-298 H
Lower Paradise Valley HA (NV233)	44,900	0	0
Mc Gee Mountain HMA (NV210)	41,100	0 H & 45 B	25-41 B
Nightingale Mountains HMA (NV219)	76,000	126 H & 417 B	38-63 H& 0B
North Stillwater HMA (NV229)	178,900	255 H & 1 B	138-205 H& 0B
Osgood Mountains HA (NV202)	142,100	0	0
Selenite Range HA (NV212)	125,300	0 H& 1 B	0 H& 0B
Seven Troughs Range HMA (NV216)	147,900	298 H & 88 B	94-156 H & 28-46 B
Shawave Mountains HMA (NV218)	107,100	140 H & 0 B	44-73 H
Slumbering Hills North HA (NV205)	46,500	0	0
Snowstorm Mountains HMA (NV201)	117,100	400 H & 0 B	90-140 H
Sonoma Range HA (NV223)	212,600	32 H & 0 B	0
Slumbering Hills South HA (NV230)	30,100	0	0
Tobin Range HMA (NV231)	195,100	32 H& 0 B	22-42 H
Trinity Range HA (NV232)	161,500	8 H & 0 B	0
Truckee Range HA (NV213)	171,200	0	0
Warm Springs Canyon HMA (NV226)	91,700	140 H & 34 B	105-175 H & 14-24 B
TOTALS	5,502,399	5,490H & 247 B	1,974-3,233 H & 94-155 B

Notes: H = Horses; B = Burros
Source: Fox 2012.

The acres listed in Table 3-19 includes portions of HMAs and HAs that are physically located in neighboring BLM Districts, but are administered by the WD and are, therefore, included in their entirety here.

Wild horses in Augusta Mountains Herd Management Area

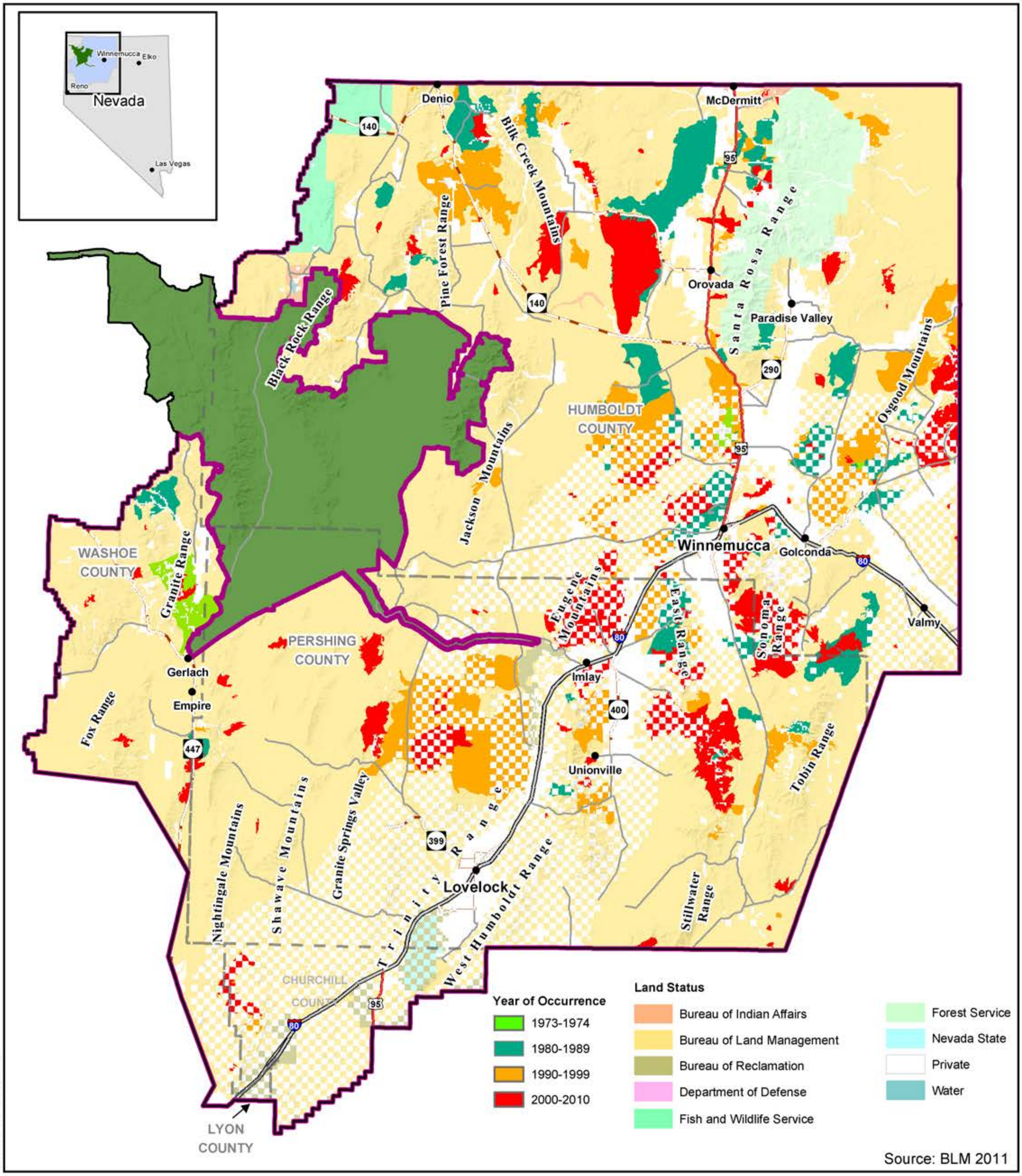
3.2.12 Wildland Fire Management

History

From 1990 through 2011 the WD has experienced a total of 1,127 fires that have burned a total of 1,813,683 acres. Of the total acres burned, 1,449,670 acres have burned in the period from 1997 to 2011, representing a majority of the acres burned due to continued drought cycles and the continual spread of invasive grass species, such as cheatgrass. The largest fire years were 1999 and 2000, where a total of 805,117 acres burned. Figure 3-21 identifies areas burned and fire history since 1973.

Average yearly occurrence of fires in the WD amounts to 50 fires for 82,440 acres during the period 1990-2011. This reflects changes that may vary radically during periods of high fire occurrence and large loss of acres. Over 100,000 acres were burned in each of the following years: 1996, 1999, 2000, and 2001. More than 200,000 acres burned in 1996, 1999, 2000, 2007 and 2011 (see Table 3-20).

The WD has seen an increase in acres lost due to the significant increase of cheatgrass, as well as an accelerated fire return interval and frequency in cheatgrass infested areas below 6,500 feet. As a result, it is estimated that two percent of desert sink scrub, 12 percent of the salt desert scrub, 23 percent of sagebrush scrub, two percent of the riparian habitat, four percent of meadows, and six percent of the woodland was impacted by fire. Fires that historically would occur in sage-perennial grass at a return interval of 50 to 85 years, and in the salt desert shrub at a return interval of 100 to 125 years have shown a trend downward to the five- to eight-year range. This has resulted in more aggressive suppression efforts by the WD in an attempt to keep the remaining intact communities from burning. Fire size and fire intensity on the WD correlate directly to conditions occurring during dry thunderstorms that produce most of the WD wildfires. Strong gusty winds will carry fire through cheatgrass monotypes that have spread onto past burned areas, shadscale-cheatgrass, Wyoming big sage-cheatgrass, or Great Basin big sage-cheatgrass.



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Winnemucca District Fire Occurrence

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca District Office Administrative Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-21

Table 3-20
Summary of 22-Year Wildland Fire History (1990 to 2011)

Year	Number of Fires*	Acres Burned
1990	37	5,167
1991	39	7,720
1992	33	11,412
1993	28	2,676
1994	36	27,469
1995	75	38,609
1996	105	270,960
1997	61	21,915
1998	41	25,910
1999	82	599,492
2000	57	205,625
2001	92	172,511
2002	38	13,573
2003	31	1,462
2004	29	651
2005	29	19,806
2006	75	88,123
2007	41	128,419
2008	31	2,390
2009	27	491
2010	49	12,315
2011	91	156,987
Grand Total	1,127	1,813,683

*Fires originating on BLM WD may have burned more than just BLM lands.
Sources: Wildland Fire Management Information (WFMI) 2012; CNIDC (Central Nevada Interagency Dispatch Center) 2012.

Fire Management

Fire Management in the WD is guided by the Federal Wildland Fire Management Policy established in 1995 and was updated in 2001. These policies have established guiding principles for managing wildland fires on public lands. Ensuring firefighter safety and public safety is the first priority. Others include; protecting human communities, infrastructure, and natural and cultural resources. Fire management also takes into account fire management objectives established in the District Fire Management Plans. Fires are managed for multiple objectives which may change as conditions change. These objectives also recognize the role of wildland fire as an ecological process and natural change agent.

Fire management also includes fire program preparedness to ensure capability to provide safe cost effective fire management to support the District. The emphasis of preparedness is to provide planning, staffing, training, equipment and management oversight in order to ensure the necessary fire support is in place.

The WD fire management program collaborates and coordinates on an interagency basis with involvement from federal, state and local governments along with other cooperators and partners.

Fire Suppression

The WD has an aggressive wildland fire suppression policy with strategies to respond to wildfires based on social, legal, and ecological consequences of the fire. Strategies also take into account the circumstances under which a fire occurs, the consequences on firefighter and public safety, and natural and cultural resources threatened. Suppression uses a decision support process to assess conditional and analyze risk and document decisions. The WD fire program also uses predictive service products to support prepositioning of resources and other decision making. Suppression operations include use of engines, aircraft, hand crews, heavy equipment (such as bulldozers) to suppress fires. Use of retardant and foam is an integral part of fire operations. According to the current Management Framework Plans, fire lines will not be constructed by heavy equipment on riparian stream zones and fire retardant will not be applied to water. Suppression operations also prioritize woodland stands for suppression and protection.

Allow Fire for Benefit

Fires are managed for multiple objectives. Fire managers may use less aggressive actions in order to accomplish a benefit. Allowing fire for resource benefit recognizes the role of fire to protect, maintain, and enhance resources to improve ecological conditions. Wildland fires may be managed for a benefit to maintain and enhance resources and allow fire to function in its natural ecological role. Currently there is no approved fire-for-resource-benefit management areas designated in the WD.

Hazardous Fuels Management

The WD uses an integrated vegetation management strategy to obtain hazardous fuels management objectives. These include assessing vegetation conditions, identifying goals and objectives and implementing management actions to achieve goals and objectives. Common management actions include treatments such as prescribed fire and non-fire hazardous fuel treatments (mechanical, chemical, and biological fuel breaks) to manipulate vegetation to achieve desired vegetation objectives. Treatments are strategically situated to protect human communities and resource values. They also serve to aid and support suppression operations, and to restore ecosystem health. Vegetation manipulation practices reduce fire intensity and spread and improve vegetative health by enhancing diversity, sustainability, and/or improving condition classes. Fuel treatments may be seeded wherever residual vegetation is not adequate to naturally revegetate sites and to prevent establishment and spread of invasive weed species. Seeding also occurs to meet ecosystem health restoration objectives. Monitoring treatments and maintenance of treatments are also integrated in fuels management. Fuel treatments occurring in the past 10 years are identified on Table 3-21.

According to the Healthy Forests Restoration Act of 2003, management of hazardous fuels includes the use of coarse scale spatial data using fire regimes and fire regime condition classes (FRCC). Vegetation in the District has been classified using fire regime groups. A natural fire regime is a general classification of the role fire would play across a landscape in absence of modern human mechanical intervention but including the influence of aboriginal burning.

Table 3-21
Winnemucca District Fuels Treatment Projects 2003-2010

Year	Project Name	Treatment Type	Additional Information	Acres
2003	Buffalo	Mowing		105
2003	Button Point	Mowing		74
2003	East Winnemucca	Mowing/Seeding	Maintenance in 2007,2010 Chemical Treatment 2010	88
2003	Hot Springs	Seeding/Mowing		111
2003	HWY 140	Disking	Maintained yearly 2004-2010, Chemical Treatments 2005 and 2009	71
2003	HWY 290	Disking	Maintained yearly 2004-2010, Chemical Treatments 2005 and 2009	50
2003	HWY 447	Disking	Maintained 2004-2005 and 2007-2010, Chemical Treatment 2009	63
2003	HWY 95	Disking	Maintained yearly 2004-2010, Chemical Treatment 2005 and 2009	173
2003	Long Canyon	Mowing/Seeding		174
2003	Middle	Mowing/Seeding		240
2003	Montana Mountain	Mowing/Seeding		103
2003	Peterman	Mowing		53
2003	Provo B	Mowing/Seeding	Maintained 2011	87
2003	Provo C	Mowing/Seeding	Maintained 2011	65
2003	Sentinel	Mowing/Seeding		324
2003	Stuart Gap	Mowing/Seeding		150
2003	Thacker Pass	Mowing/Seeding		180
2003	Water Canyon	Thinning/Chipping		25
2004	Black Mountain	Mowing/Seeding		200
2004	Majuba	Mowing/Seeding		650
2004	Stone house	Mowing/Seeding	Maintained in 2011	167
2004	Able Creek	Mowing/Seeding	Maintained in 2011	151
2004	Martin Creek 1	Mowing/Seeding		145
2004	Martin Creek 2	Mowing/Seeding		81
2004	Hinkey Rd	Mowing/Seeding		126
2004	Indian Creek	Brush removal by Hand/Seeding		24
2004	Dump	Mowing/Seeding		97
2005	Bilk Creek	Mowing Road Maintenance		117
2005	East Winnemucca	Hand Pile		100
2005	UC Allotment	Prescribed Fire		20
2005	Unionville	Chipping	Defensible Space Display	10
2006	East Winnemucca	Hand Pile Burning		100
2006	Little Owyhee	Chemical		1060
2006	Rye Patch	Mowing		18
2006	UC Allotment	Prescribed Fire		20
2006	Water Canyon	Thinning		30

Table 3-21
Winnemucca District Fuels Treatment Projects 2003-2010

Year	Project Name	Treatment Type	Additional Information	Acres
2006	Winnemucca WUI	Mowing	Seeded in 2007, Chemical treatment in 2010	109
2007	Jersey Valley	RX Grazing		1313
2007	Little Owyhee	Chemical		509
2007	Lone Willow	Chemical		512
2007	West Winnemucca	Mowing	Mowed again in 2010 Chemical Treatment 2010	91
2008	Double H	Chemical/Plant		4
2008	Little Owyhee	Chemical		637
2008	Lone Willow	Chemical		678
2008	Unionville	Brush Removal By Hand	Maintained 2009- 2010	12
2009	Double H	RX Fire/ Chemical/Plant		4
2009	Double H	Chemical		2
2009	Double H	Chemical/Plant		5
2010	HWY 95 (East side)	Disking	New Disk Line	20
2010	Little Owyhee	Chemical		502
2010	Santa Rosa	Dixie Harrow/ Mowing		1381
2010	Winnemucca WUI	Chemical	Addition	56
			Total Acres Treated	**11,087**

The five natural (historical) fire regimes in the WD planning area are based on the average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant over story vegetation. Natural fire regimes classification and acres by fire regime are identified in Table 3-22. Altered fire regimes are believed to be the single most important influence on loss of sagebrush scrub and habitat available to fish and wildlife and special status species (e.g., sage-grouse) in the WD planning area. Most species of sagebrush are killed by fire and take years to re-establish. Repeated wildfires, fueled by the encroachment of other vegetation communities (e.g., juniper) and exotic annual cheatgrass and other exotic species have altered vast acres previously containing sagebrush scrub. Cheatgrass alters fire frequency from historic intervals of 35 to 100 years to shorter cycles of fewer than five years.

Table 3-22
Natural Fire Regimes in the Planning Area

Fire Regime	Frequency (years)	Severity	Number of Acres
I	0-35	Low and Mixed	552,753
II	0-35	Replacement	4,270,543
III	35-100	Mixed	32,186
IV	35-100	Replacement	2,272,952
V	200+	All	1,282,023

Source: BLM 2011

A FRCC is a classification of the amount of departure from the natural fire regime (Hann and Bunnell 2001). Condition classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2002). There are three condition classes for each fire regime, based on a relative measure describing the degree of departure from the natural (historical) fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (e.g., species composition, structural stages, canopy closure and fuel loading); fuel composition; fire frequency, severity, and pattern; and other associated disturbance (e.g., insect-induced and diseased mortality, grazing, and drought).

The FRCCs in the planning area are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime. Low departure is considered to be in the natural (historical) range of variability, while moderate and high departures are outside. FRCC in the WD planning area is identified in Figure 3-22, FRCC on BLM Lands. The FRCC assessment can be used to set vegetation objectives across a landscape.

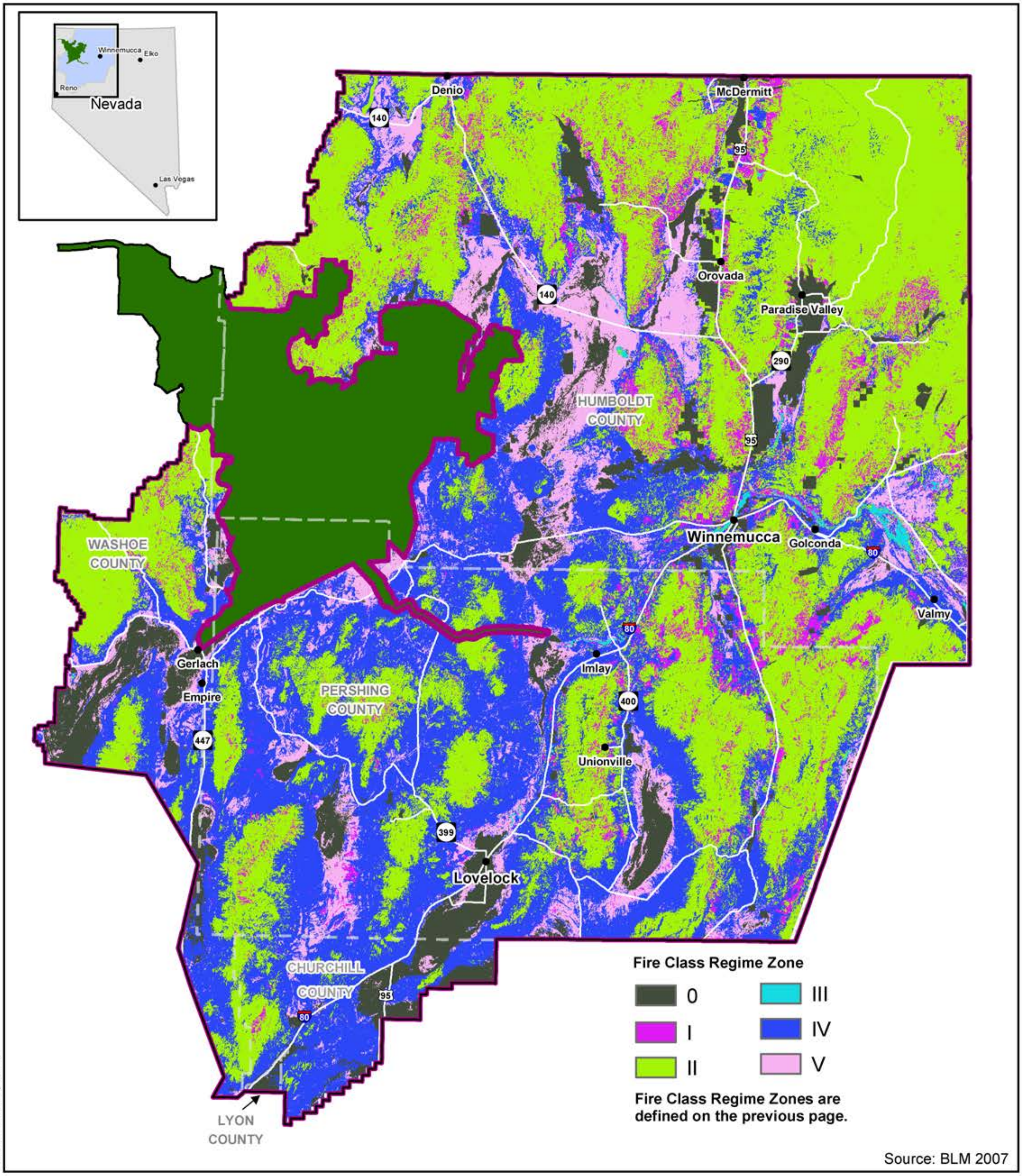
Applicable fire regimes and FRCC have been classified in the District Fire Management plan by fire management unit (FMU). The WD has twenty-seven FMUs that were developed by an interdisciplinary team and serve to define fire management objectives, physical characteristics, resource values, and treatment actions necessary to achieve resource management objectives (Table 3-23). FMUs are specific land management areas broken out by a general classification or type of FMU category types in the WD planning area. FMU types are represented as follows:

- High value habitat (HVH);
- Special management areas, cultural;
- Special management areas, National Conservation Areas;
- Vegetation, cheatgrass;
- Vegetation, salt shrub desert sink; and
- Wildland Urban Interface (WUI).

Management proposed for each of the FMUs is unique, as evidenced by strategies, objectives, and value attributes that set it apart from the management characteristics of an adjacent FMU.

FMUs have defined management objectives and pre-selected fire suppression strategies assigned to accomplish these objectives. Wildfire management priorities and objectives identified for each FMU include; protection of human life and human health and safety, as the single, overriding priority objective. Other priorities include protecting human communities and community infrastructure, property and improvements. Protection of natural and cultural resources is also prioritized based on resource values and the costs of protection.

Figure 3-24 shows the name of FMUs in the planning area by FMU category types, predominant fire regime by FMU and the FRCC summary. Based on the predominant fire regimes in each FMU about 6.2 million acres are in FRCC 3 status representing a high departure from the central tendency of the natural (historical) regime.



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N W E S

0 10 20 Miles

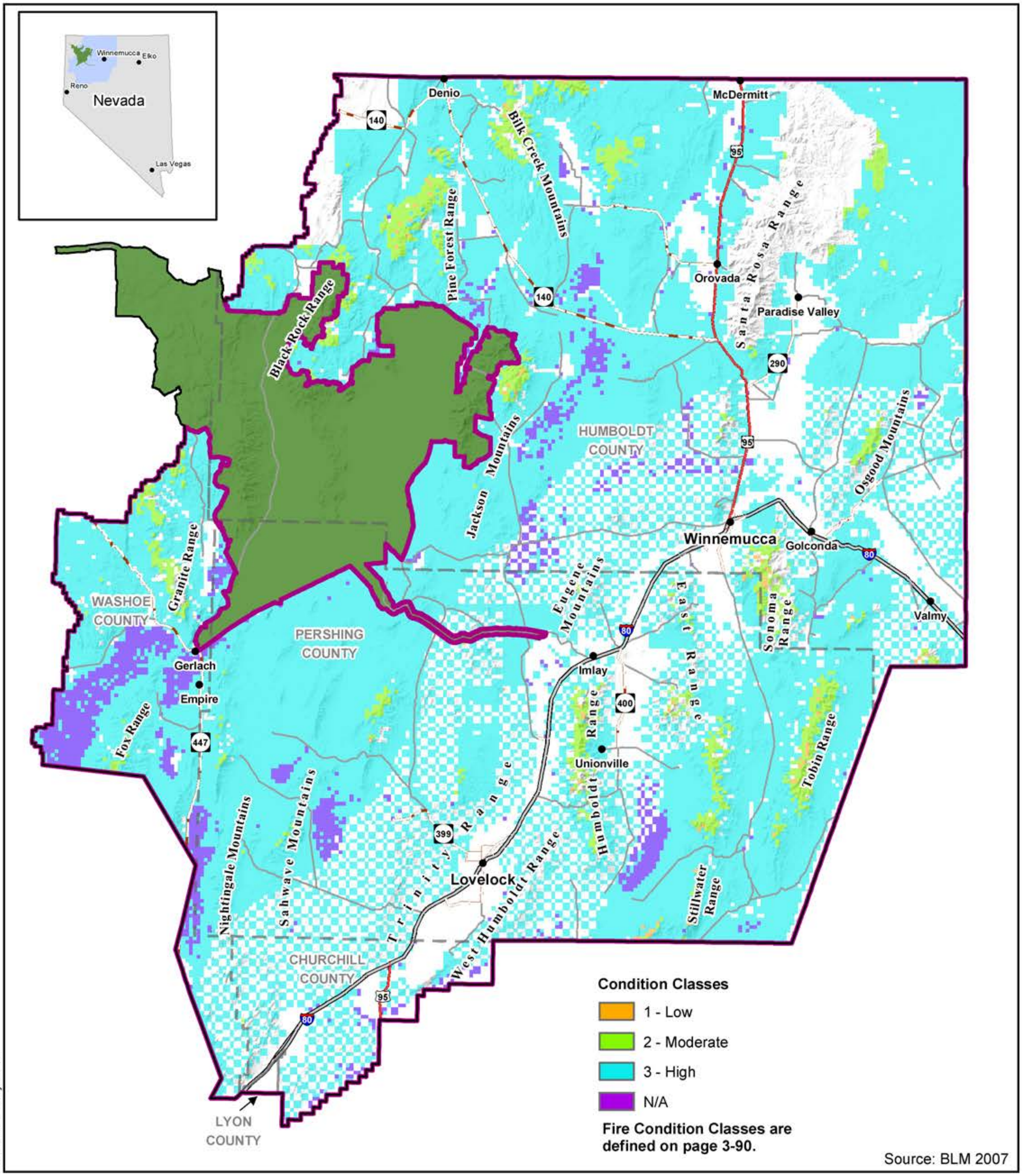
Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca District Office Administrative Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns

Winnemucca District RMP
Fire Regime

Northwest Nevada

Figure 3-22



Winnemucca District RMP
Fire Regime Condition Class

No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

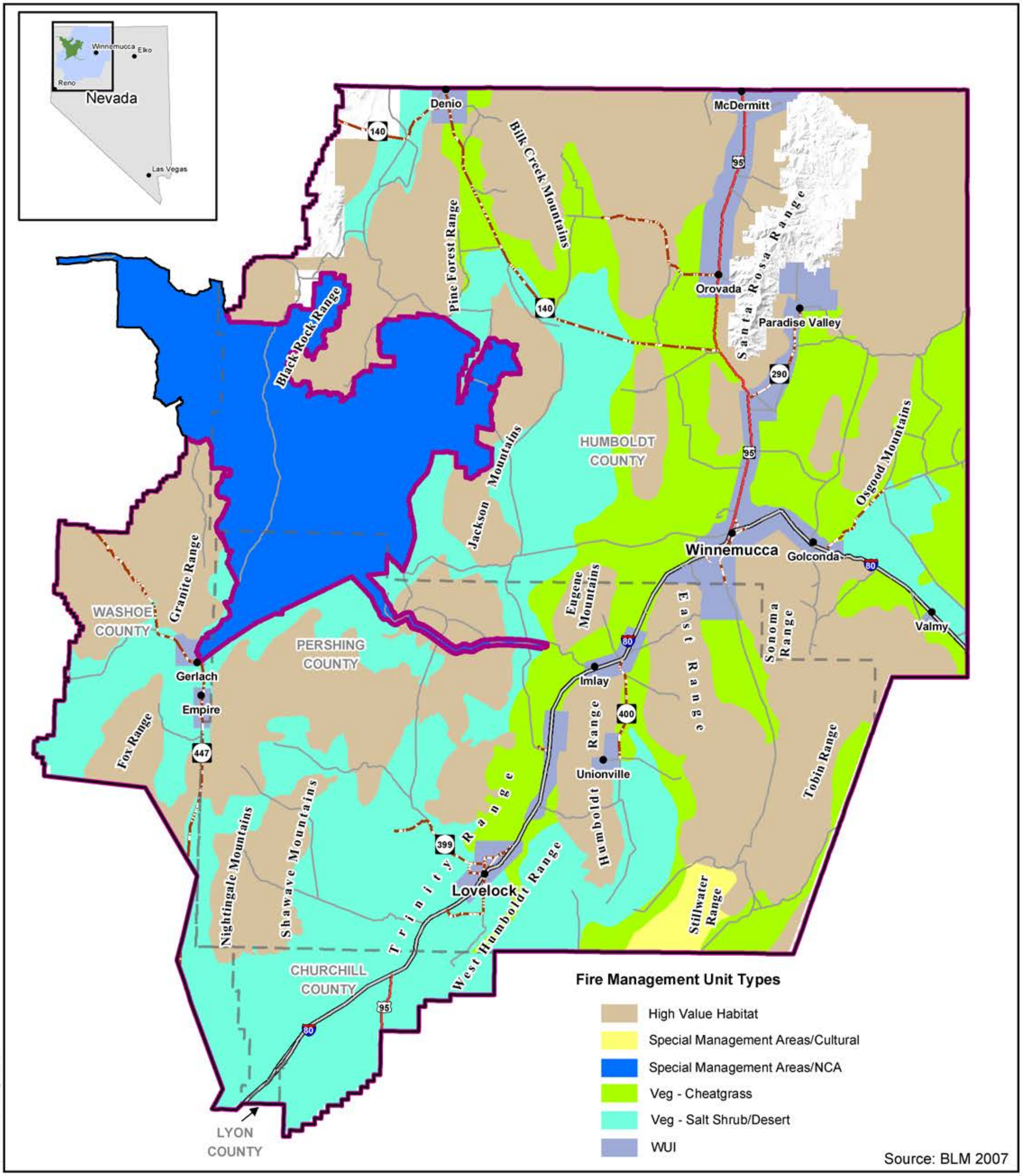
Legend

- BLM Winnemucca District Office Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-23



15186.1-04 - May 2012

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Winnemucca District RMP Fire Management Units

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-24

Table 3-23
Summary of FMUs in the Planning Area

FMU Number	FMU Name	FMU Type	Predominant Fire Regime/Acres	FRCC 3-Summary
NV 020-01	Hot Springs	Veg—Cheatgrass	II – 314,220	74%
NV 020-02	Silver State	Veg—Cheatgrass	II – 165,548 IV – 247,690	28% 42%
NV 020-03	Rye Patch	Veg—Cheatgrass	IV – 151,841 V – 29,938	75% 14%
NV 020-04	Valley	Veg—Cheatgrass	II – 211,662 IV – 39,838	16% 63%
NV 020-05	Iron Point	Veg—Salt Shrub/Desert Sink	III - 12,942 IV – 48,410 V - 50,104	11% 10% 37%
NV 020-06	Trinity	Veg—Salt Shrub/Desert Sink	II – 201,188	13%
NV 020-07	Desert Valley	Veg—Salt Shrub/Desert Sink	II - 6,973 IV – 16,856 V – 264,347	1.6% 37% 60.4%
NV 020-08	Continental Lake	Veg—Salt Shrub/Desert Sink	II – 21,858 IV – 23,393 V – 27,823	29.5% 31.6% 37.6%
NV 020-09	Black Rock Desert/ High Rock Canyon Emigrant Trails NCA	Special Management Area (SMA)/National Conservation Area	II – 206,189 IV – 203,899	34.5% 34%
NV 020-10	I-80 Corridor Communities	WUI	II – 17,187 IV – 51.094	20% 58.6%
NV 020-11	Winnemucca/ Golconda	WUI	II – 35,389 IV – 50,918	29.4% 42.3%
NV 020-12	Paradise Valley	WUI	II – 31,358	65%
NV 020-13	Orovada/ McDermitt	WUI	I - 22.341 II – 48,849 IV – 13,377	25% 55% 15%
NV 020-14	Denio	WUI	II – 6,470 IV – 6,596	36% 37%
NV 020-15	Santa Rosa	HVH	I – 57,203 II - 635,431	7.6% 85%
NV 020-16	Montana Mountains	HVH	I – 65,419 II - 402,461	11.5% 70.6%
NV 020-17	Pine Forest/ McGee Mtn.	HVH	II – 219,552 IV – 32,036	62% 9.0%
NV 020-18	Blue Wing/ Seven Troughs	HVH	II – 417,476 IV – 509,324	42.6% 52%
NV 020-19	Jackson	HVH	II - 49,337 IV – 130,937	22% 64.5%
NV 020-20	Humboldt	HVH	II - 75,315 IV – 27,893	48% 18%
NV 020-21	East Range	HVH	II - 208,766 IV – 53,793	62% 16%

Table 3-23
Summary of FMUs in the Planning Area

FMU Number	FMU Name	FMU Type	Predominant Fire Regime/Acres	FRCC 3-Summary
NV 020-22	Sonoma	HVH	I – 52,199 II - 366,881 IV – 92,812	8.6% 61% 15.4%
NV 020-23	Stillwater	SMA/CHP	II – 43,330 IV – 33,604	50% 39%
NV 020-24	Gerlach/ Empire	WUI	IV – 14,596	73%
NV 020-25	Valmy	WUI	IV -2,425	89%
NV 020-26	Granite	HVH	IV – 50,308	12%
NV 020-27	Eugene Mtns./ Slumbering Hills	HVH	I – 11,235 II – 71,679 V – 44,922	8.5% 54% 34%

Source: BLM 2011
Notes: CHP = cultural/historical/paleontological

Emergency Stabilization and Rehabilitation (ES&R)

Historical post fire emergency stabilization and rehabilitation treatments employed in the WD are identified in Table 3-24. ES&R efforts are undertaken to protect and sustain ecosystems, provide public health and safety, and to help communities protect infrastructure. ES&R objectives for the WD include the following:

- Minimize the threats to life or property;
- Promptly stabilize and prevent unacceptable degradation of natural and cultural resources;
- Repair damages caused by wildland fire and fire suppression operations in accordance with approved land use plans, regulations, policies, and all relevant federal, state, and local laws;
- Prescribe cost-effective post-fire stabilization measures necessary to protect human life, property, and cultural and natural resources;
- Repair, stabilize or improve lands damaged directly by wildland fire that is unlikely to recover naturally from fire damage;
- Restore or establish healthy stable ecosystems in the burned areas, even if these ecosystems cannot fully emulate historic or pre-fire conditions; and
- Deter the establishment and spread of noxious weeds.

Emergency stabilization treatments are planned actions taken to stabilize and prevent unacceptable degradation of natural and cultural resources and to minimize threats to life and property resulting from the effects of fire. The WD has established an aggressive emergency stabilization program to mitigate the adverse effects of wildfire. According to existing land use plans (MFPs) standard operating procedures, emergency stabilization measures are to be initiated immediately after suppression of fires, if necessary.

Table 3-24
Emergency Stabilization and Rehabilitation Projects (Funded) 2000-2010

Fire Year	Fire Number	Fire Name	Acres	Treatment Type	Treatment Acres
2000	X388	Amax	107	Natural Re-vegetation	All
2000	X399	Blue Mountain	437	Aerial Seeding	352
2000	X533	Box Canyon	1,032	Aerial Seeding	491
2000	X385	Bull Basin	640	Natural Re-vegetation	All
2000	X392	Button Point	643	Natural Re-vegetation	All
2000	X345	Cherry Creek	23,691	Aerial and Drill Seeding	21,871
2000	X381	Cow Creek	9,978	Aerial and Drill Seeding	2,585
2000	X353	Double H	70,989	Aerial and Drill Seeding with Greenstrip	38,411
2000	X407	Eight mile	453	Natural Re-vegetation	All
2000	X538	Elbow Fire	1,127	Aerial and Drill Seeding	986
2000	X360	Explosive Fire	509	Natural Re-vegetation	All
2000	X387	Fire Ball	2,897	Natural Re-vegetation	All
2000	X359	Gregg Canyon	1,777	Aerial and Drill Seeding	731
2000	X401	Hot Springs	292	Natural Re-vegetation	All
2000	X379	Jungo Complex	3,664	Aerial and Drill Seeding	934
2000	X540	Kelly Creek	36,416	Natural Re-vegetation	All
2000	X378	Keystone	6,371	Aerial Seeding	404
2000	X403	Mahogany Fire	12,255	Aerial Seeding	4,602
2000	X390	MM185	1,846	Aerial and Drill Seeding	1,208
2000	X355	Prince Royal	14,273	Aerial and Drill Seeding	1,142
2000	X380	Pronto	194	Natural Re-vegetation	All
2000	X356	Pumpernickle	772	Natural Re-vegetation	All
2000	X531	Raigan	202	Natural Re-vegetation	All
2000	X535	Rock Creek	247	Aerial and Drill Seeding	246
2000	X351	Santa Rosa	198	Natural Re-vegetation	All
2000	X394	South Willow	14,847	Aerial and Drill Seeding	13,992
2000	X537	Trenton	159	Natural Re-vegetation	All
2000	X393	Truckee Fire	13,348	Aerial and Drill Seeding with Greenstrip	15
2001	J384	Adalaide	486	Aerial Seeding	249
2001	J421	Bull Basin	1,859	Aerial Seeding	792
2001	J380	Butte	133	Natural Re-vegetation	All
2001	J422	Clear Creek	53,246	Aerial and Drill Seeding	15,317
2001	J415	Dry Mountain	2,437	Aerial Seeding	2,350
2001	J418	Dutch Flat	480	Drill Seeding	217
2001	J432	Golden Eagle	3,095	Aerial Seeding	884
2001	J389	Gooseberry	3,037	Drill Seeding	1,412
2001	J631	Granite	484	Drill Seeding	470
2001	J632	Imlay Summit	655	Aerial Seeding	373
2001	J409	Jordon Meadows	347	Natural Re-vegetation	All
2001	J417	Krum	12,084	Natural Re-vegetation	All
2001	J428	Kumiva	2,154	Drill Seeding	1,780
2001	J382	Lambert	202	Natural Re-vegetation	All
2001	J423	Lambert Road	4,745	Drill Seeding	3,690

Table 3-24
Emergency Stabilization and Rehabilitation Projects (Funded) 2000-2010

Fire Year	Fire Number	Fire Name	Acres	Treatment Type	Treatment Acres
2001	J424	Pedroli	726	Drill Seeding	305
2001	J438	Peru	1,482	Aerial Seeding	292
2001	J420	Quinn River	1,259	Natural Re-vegetation	All
2001	K857	Ranch	19,644	Natural Re-vegetation	All
2001	J395	Randy	140	Natural Re-vegetation	All
2001	J422	Spaulding	75,137	Aerial and Drill Seeding	38,830
2001	J379	Standard	1,280	Aerial Seeding	730
2001	J407	Summit	96	Natural Re-vegetation	All
2001	J385	Tippen Ranch	2,031	Natural Re-vegetation	All
2001	J446	Upper Willow	41,830	Aerial Seeding	5,467
2001	J381	Valmy II	255	Natural Re-vegetation	All
2001	J431	Willow Tree	5,603	Aerial and Drill Seeding	4,094
2002	X376	Tin Canyon	966	Natural Re-vegetation	All
2002	X416	Toulon	1,161	Natural Re-vegetation	All
2002	X415	Two Tips	970	Natural Re-vegetation	All
2003	J378	McKinnench	638	Natural Re-vegetation	All
2003	J379	Sombrero	480	Natural Re-vegetation	All
2004	A5LU	Peterman	214	Natural Re-vegetation	All
2005	B2KQ	Buckskin	1,149	Natural Re-vegetation	All
2005	B2GZ	Eden	217	Natural Re-vegetation	All
2005	B2DV	Kelly Creek	123	Natural Re-vegetation	All
2005	B2EG	North Jake	307	Natural Re-vegetation	All
2005	B5GH	North Road	12,855	Aerial Seeding	745
2005	B0NY	North Valley	5,158	Aerial and Drill Seeding	3,793
2006	CK98	Augusta	324	Natural Re-vegetation	All
2006	C6XL	Bloody Runs	1,409	Natural Re-vegetation	All
2006	CW6C	Blue Mountain	847	Natural Re-vegetation	All
2006	CW53	Clover	232	Natural Re-vegetation	All
2006	CSD9	Covert	2,147	Aerial Seeding	857
2006	CW4V	Cyanco	224	Natural Re-vegetation	All
2006	CX8Q	Eden	2,129	Natural Re-vegetation	All
2006	C6P1	Eden 2	123	Natural Re-vegetation	All
2006	CR3W	Empire	2,762	Aerial Seeding	1,486
2006	CSE1	Horse Creek	1,523	Aerial and Drill Seeding	1,400
2006	C1GD	Humboldt	542	Natural Re-vegetation	All
2006	CNT9	Humboldt Asst#1	889	Drill Seeding	521
2006	C0CT	Inskip Canyon	743	Natural Re-vegetation	All
2006	CTN7	Izzenhood	1,967	Natural Re-vegetation	All
2006	C1CE	Krum Hills	984	Natural Re-vegetation	All
2006	CW67	McConnell	1,438	Natural Re-vegetation	All
2006	CS2V	MM168	1,225	Natural Re-vegetation	All
2006	CPU9	Moonlight	765	Aerial Seeding	810
2006	C1A4	New York Peak	3,277	Aerial Seeding and Planting	2,393
2006	C0SC	North Blue Mtn	16,209	Natural Re-vegetation	All

Table 3-24
Emergency Stabilization and Rehabilitation Projects (Funded) 2000-2010

Fire Year	Fire Number	Fire Name	Acres	Treatment Type	Treatment Acres
2006	C6WF	Paiute Canyon	768	Natural Re-vegetation	All
2006	CSN2	Poito	5,582	Aerial and Drill Seeding	3,107
2006	CRT4	Porter	1,253	Aerial Seeding	560
2006	C58S	Prairie Dog	248	Natural Re-vegetation	All
2006	CMT1	River	112	Natural Re-vegetation	All
2006	CR6E	Sage	27,052	Natural Re-vegetation	All
2006	C6WB	Sand Pass	291	Natural Re-vegetation	All
2006	C0QT	Smelser Pass	4,511	Drill Seeding	239
2006	C0Z2	Soldier	962	Natural Re-vegetation	All
2006	CR2V	Squaw Valley	2,093	Aerial and Drill Seeding	1,453
2006	2158	Trident	5,507	Natural Re-vegetation	All
2007	DRM5	Barrel Springs	6,442	Aerial Seeding	3,333
2007	DS2P	Barrel Springs2	294	Natural Re-vegetation	All
2007	DRM9	Castle Place	4,620	Aerial Seeding	4,570
2007	DQ2K	Dump	158	Natural Re-vegetation	All
2007	DRE3	Dun Glen	1,990	Aerial Seeding	565
2007	D0KR	Farr	401	Natural Re-vegetation	All
2007	DRB3	Frazier	579	Aerial Seeding	579
2007	D1LD	Horse	5,471	Aerial Seeding	41
2007	DRM7	Kelly Creek	18,807	Aerial and Drill Seeding	14,686
2007	DOK9	Martin Creek	7,838	Aerial Seeding	7,029
2007	DY5Y	Melody	143	Natural Re-vegetation	All
2007	DNH2	Quinn River	611	Natural Re-vegetation	All
2007	DRV2	Red Hills	3,100	Aerial Seeding	3,126
2007	DH2C	Rochester	229	Natural Re-vegetation	All
2007	C92T	Schade Road	205	Natural Re-vegetation	All
2007	DRE4	Selenite	1,881	Natural Re-vegetation	All
2007	DNR0	Thomas	18,328	Aerial and Drill Seeding	10,695
2007	DNN7	Tungsten	61,951	Aerial Seeding and Planting	4,823
2008	D8LV	10 Mile	132	Natural Re-vegetation	All
2008	EC3K	Box Spring	394	Natural Re-vegetation	All
2008	EC3J	Burn Canyon	1,629	Natural Re-vegetation	All
2008	D8LK	Little Valley	562	Natural Re-vegetation	All
2009	E3VM	Limbo	478	Natural Re-vegetation	All
2010	FU4C	Cottonwood	1,571	Aerial Seeding	296
2010	FQQ7	Horse Creek	314	Aerial Seeding	210
2010	FM19	Rock Creek	5,358	Aerial and Broadcast Seeding	3,845
2010	FM4L	Seven Troughs	3,842	Aerial Seeding	1,200
2010	FPP6	Sheep Creek	286	Natural Re-vegetation	All
2010	FQ27	Virgin Creek	834	Aerial Seeding	716
Totals			**711,138**		**229,967**

Source: BLM 2011
Notes: Natural re-vegetation = Assessment that fire-damaged lands are likely to recover naturally

Burned area rehabilitation includes efforts undertaken in three years of containment of a wildland fire to repair or improve fire-damaged land. The four objectives of fire rehabilitation are to:

- Evaluate actual and potential long-term post-fire impacts on critical cultural and natural resources and identify those areas unlikely to recover naturally from severe wildland fire damage;
- Develop and implement cost-effective plans to emulate historical or potential natural plant community with structure, function, diversity, and dynamics consistent with approved land use plans, of if that is infeasible, then to restore or establish a healthy stable ecosystem in which native species are well represented;
- Repair or replace minor facilities damaged by wildland fire; and
- Deter the establishment and spread of noxious weeds.

Some treatments employed to stabilize or rehabilitate burned areas include; installation of erosion control structures (e.g., culverts), protect human health and provide public safety, repair and replacement of facilities, construction of fences, installation of cattle guards, hazard tree removal, soil stabilization treatments, seeding, planting, mulching, invasive plant control, road stabilization, and burned area closures.

Fire Mitigation, Education, and Prevention

The primary goal of the prevention program is to educate the public about wildland fire and to further reduce unwanted human-caused fire occurrences. Fire prevention focuses on activities needed to reduce human caused ignitions. Approximately 50 percent of fires in the WD are human caused.

Community education and prevention efforts are held in conjunction with local and regional community service organizations and during special events, such as fairs, parades, ethnic festivals, and school programs. For example, in Winnemucca, a defensible space demonstration project is ongoing as part of the community garden (a nonprofit corporation operating an organic garden and arboretum providing valuable community space for small agriculture, education, and recreation). This demonstration includes information on how to landscape and maintain a residence with defensible space to prevent wildfire damage or reduce human-caused fires.

With input from the Nevada Fire Safe Council and Living with Fire, emphasis has been placed on providing suppression assistance to local fire departments and defensible space programs in local communities and counties where fire protection needs are higher than normal. In 2003, the WD used Student Conservation Association teams to do community and neighborhood risk assessments. In addition, the WD provides information to all communities about joining the Nevada Fire Safe Council and developing Community Wildfire Protection Plans.

Another aspect of fire mitigation and prevention includes implementation of fire restrictions during times of high to extreme fire ratings.

3.2.13 Cultural Resources

Cultural resources are past and present expressions of human culture and history in the physical environment and include prehistoric and historic archaeological sites, structures, natural features, and biota which are considered important to a culture, subculture, or community. Cultural resources also include aspects of the physical environment that are a part of traditional lifeways and practices, and are associated with community values and institutions. Historic properties are a subset of cultural resources that meet specific eligibility criteria found at 36 CFR 60.4 for listing on the National Register of Historic Places (NRHP).

Cultural resources have been organized into prehistoric resources, historic resources, and ethnographic resources. Prehistoric resources refer to any material remains, structures, and items used or modified by people before Euro-Americans established a presence in northern Nevada. Historic resources include material remains and the landscape alterations that have occurred since the arrival of Euro-Americans. Ethnographic resources are places associated with the cultural practices or beliefs of a living community. These sites are rooted in the community's history and are important in maintaining cultural identity.

The vast majority of the recorded cultural resources on the land in the WD planning area are archaeological sites. Approximately 1,700,000 acres, or about seventeen percent of the WD planning area, has been surveyed for cultural resources, documenting approximately 8,500 prehistoric and historic archaeological sites. Many sites have been determined to be eligible for the NRHP, but few have been formally nominated for listing on the NRHP, and many others have not been evaluated. The BLM is organizing and automating all cultural resource records and reports.

The WD planning area was included in an ethnographic overview of lands in northern Nevada which provides the contextual basis for ongoing consultations between the BLM and contemporary tribes in northern Nevada on traditional cultural properties (TCPs), sacred sites, traditional use areas, and other culturally important places. The overview is a review, an analysis, and a synthesis of the ethnographic and ethnohistoric literature and archival materials (Bengston 2003). The BLM has recently prepared an ethnographic assessment focusing specifically on the WD and is actively consulting with tribal groups to support this RMP/EIS (Bengston 2006). There may be places in the WD planning area that are important to other contemporary communities, such as those associated with ranching or sheepherding traditions and lifeways.

Prehistoric Period Resources

The planning area contains archaeological evidence of habitation and use that may date to 10,000 or 12,000 years ago, corresponding to the final high stand of prehistoric Lake Lahonton. The subsistence pattern of these earliest inhabitants is unclear, but there is substantial evidence for use of the grasslands and marshes that developed as the lake receded. In time, the drying became extreme, and those occupants who remained adapted to environmental conditions by using mountain, lake, and desert resources. The marshes and lakes of the valleys were used intensively when environmental conditions became more favorable and with the adoption of bow and arrow technology. At the time Euro-Americans arrived, small family groups continued to seasonally exploit widely scattered resources from upland, lake, river, and desert locations, coming together for communal game drives and cultural activities (Smith et al. 1983).

Prehistoric archaeological sites in the planning area range widely in complexity, environmental setting, location, and type. Sites include rock shelters, residential sites (with probable buried deposits), temporary camps, petroglyphs, pictographs, hunting blinds, quarry sites, and surficial lithic scatters. The WD administers some of the most important archaeological sites in the development of Great Basin archaeology. For example, Lovelock Cave is listed on the NRHP. In addition to the length of time represented by these resources, a variety of behaviors is also indicated, including hunting and gathering, tool manufacture, trade and exchange, and spirituality.

In support of this RMP/EIS, the BLM has prepared a quantitative sensitivity model for prehistoric cultural resources on private and public lands in the WD (King and Young 2006). The model estimates the densities and types of prehistoric cultural resources on lands that have not yet been inventoried. The completed sensitivity model is a GIS dataset that can be overlain with other land use and project planning GIS datasets. The model is a useful tool for assisting with land use planning decisions and prioritizing future inventory efforts. However, this sensitivity model is statistical in nature and cannot predict the location of or eligibility of archaeological sites (King and Young 2006). Although this model cannot serve as a substitute for archaeological survey, it can, in consultation with SHPA, serve as a tool in designing archaeological survey efforts. It is important to note that because the model applies specifically to prehistoric sites, other tools must be used to assess sensitivity for historic sites..

For prehistoric sites overall, predicted densities range from 2.2 sites per square kilometer (5.8 per square mile) in the low sensitivity rank, to 34.2 sites per square kilometer (88.7 sites per square mile) in the very high rank. Of the lands modeled, 40.9 percent were considered of moderate sensitivity rank (3.0 sites per square kilometer, 5.8 per square mile). High sensitivity was predicted for 28.5 percent of the lands (7.6 sites per square kilometer, 19.6 per square mile). Low sensitivity was predicted for 27.9 percent of the lands, and 2.5 percent were assigned the very high sensitivity rank.

Historic Period Resources

Similarly, historic period sites indicate a considerable amount of variation in the activities that attracted people to the region. Represented in the area managed by the WD are mining and mining-related sites, transportation features (including historic trails and freight and stage roads), ranches and ranching-related features, homesteads, military sites, arbor glyphs and towns. Some historic sites are related to ethnic groups including the Chinese, Basque, Cornish, and Italian.

Mining

The earliest known prospecting by nonnatives in the area occurred in the mid-1800s. By the mid-1860s, the first mining districts were organized in the planning area. These historic mining districts still contain remnants of past activities, including prospects, shafts, adits, mining equipment, small structures, and foundations. Some of the better known historic mining districts include the Buckskin National District, Potosi District, Gold Run (Adelaide) District, Winnemucca District, Awakening District, Bottle Creek District, Sulphur (Rabbit Hole) District, Varyville, Rosebud, Scossa Districts, and the Warm Springs District.

Included in these districts are ghost towns and camps associated with the various "boom and bust" cycles characteristic of mining activity in the planning area. Some of the more prominent locations include Unionville, Star City, Dutch Flat, National, Red Butte, Humboldt City, Seven Troughs, Kennedy, and Dun Glen. The remains of these towns vary from multiple standing wooden structures and partial current occupancy to little more than a few stone foundations and scattered occupational debris.

A stone cabin in Black Canyon, Humboldt Mountains
Mining activity began in Black Canyon in the 1850s

Transportation

National events helped to mold the nature of historic resources in the planning area. The California Trail, initially established in 1841, became a key transportation route along the Humboldt River for emigrants traveling to California and western Oregon. With the discovery of gold at Sutter's Mill in 1848, travel along the trail exploded. Between 1849 and 1852, approximately 175,000 emigrants bound for the California goldfields traveled along the trail.

Using maps from the earlier Fremont Expedition, the Applegate brothers blazed the Applegate Trail from Oregon through the area in 1846. Peter Lassen, in turn, incorporated the Applegate Trail into his 1848 Applegate-Lassen cutoff from the California Trail. Between 1859 and 1860, F. W. Landers developed the 1856 Nobles Route as part of the Honey Lake Wagon Road.

In 1992, Congress designated the California Trail as a National Historic Trail. The Applegate-Lassen Trail and Nobles Route are cutoffs from the main California Trail and are included in this designation. The Applegate-Lassen Trail segments in the planning area are formally listed on the NRHP. The majority of the Applegate-Lassen Trail and part of the Nobles Route in the WD are in the Black Rock Desert High Rock Canyon Emigrant Trails (BRDHRCET) NCA and were addressed in the BRDHRCET NCA RMP (BLM 2004e).

Large segments of the main California Trail fall within the WD planning area. The National Park Service has prepared a Comprehensive Management and Use Plan/Final Environmental Impact Statement for the Oregon, California, Mormon Pioneer, and Pony Express National Historic Trails (USDI]/National Park System [NPS] 1999).

In addition to these trails, there are remnants of numerous stage and freight roads dating from the mid-1860s in the planning area. Among the most important of these is the Idaho Stage Route, which was a transportation link between the Comstock and Humboldt mines and mining operations in southern Idaho in the early Territorial Period.

The Central Pacific Railroad began laying track eastward from Sacramento in 1863, and the first transcontinental rail line was completed through the planning area by late 1868. Remnants of the original grade of the transcontinental railroad can still be seen at many points along present-day Interstate 80. A second transcontinental line constructed by the Western Pacific Railroad was completed through the planning area from 1907 to 1909, spawning the development of several depot towns, including Jungo, Sulphur, and Gerlach.

Ranching/Homesteading

By the 1870s, huge numbers of cattle and later sheep were driven throughout the region, and large ranches were established in the WD planning area. Among these large cattle operations were the well-known Miller and Lux Company. Remnants of these and smaller operations are numerous in the planning area and include abandoned wells, corrals, fencing, line shacks, and foundations.

Homesteaders followed the development of these ranches. Some tried to farm low lands, and others were agents for large ranching operations. Their traces remain as wood and stone houses, dugouts, foundations, irrigation systems, and fences scattered throughout the planning area. Some of these are still in use by modern ranching operations.

Use Categories

The BLM Land Use Planning Handbook (BLM 2005a) stresses the importance of meeting specified goals through the allocation of all cultural properties in the planning area, whether already recorded or projected to occur, into defined "use categories," based on their nature and relative preservation value.

The identified use categories are:

a) *Scientific use* - Sites preserved until research potential is realized;

b) *Conservation for future use* - Sites preserved until conditions or need for use are met;

c) *Traditional use* - Long-term preservation of sites;

d) *Public use* - Long-term preservation, on site interpretation;

e) *Experimental use* - Sites protected until used; and

f) *Discharged from management* - Sites are removed from protective measures.

In order to allocate the numerous known sites and sites "projected to occur" (those yet to be found or recorded) into the identified use categories, criteria have be created which employ a combination of easily recognizable site type and site attribute information that can, for example, differentiate between small, short duration, limited activity sites and large, complex multiple activity sites. For prehistoric resources, the criteria are weighted to emphasize the "information potential" because the determination significance for such sites is generally related to its scientific value. For historic resources, the criteria are more reflective of site "condition and integrity" characteristics, which play a greater role in the evaluation of historic properties.

It is also important to recognize that it is possible for sites to be placed into more than one use category. As an example, a prehistoric site with little or no scientific value could be placed in a discharge from management category, but also be useful in the experimental use category. Similarly, an historic site could be placed in the public use category, but require stabilization and preservation efforts and therefore warrant placement into the conserve for future use category as well.

Prehistoric Resources

Because the majority of the prehistoric sites in the planning area are defined as lithic scatters that represent either simple or complex habitation sites, it is important to be able to identify potential discriminating elements that can be used to segregate such a large category of prehistoric resources into different use categories. A qualitative assessment of certain aspects of material culture (relative diversity and quantity of artifactual materials) and complexity (spatial patterning of artifacts, presence/absence of features, presence/absence of buried deposits, etc.), coupled with a quantitative measure of site size, can be used to meet the purposes identified. These values serve as indirect indicators of relative site function, relative duration of occupation, research value and importance.

The important aspects of material culture include:

- *Artifact diversity* - Variety of cultural materials present such as raw material types, variety of materials present bone, stone, ethno botanical qualitatively measured from low to high.
- *Artifact quantity* - Relative quantity of material culture present (less than 25 items, hundreds, thousands, etc.) a qualitative measure intended to capture "magnitudes of difference."
- *Site complexity* - As indicated by any spatial patterning in distribution of cultural material, the presence or absence of associated features, the presence of buried deposits and stratigraphy. Site complexity is qualitatively measured from low to high.
- *Site size* - A quantitative measure, looking for model patterns in overall site size that may reflect a number of things, site function, duration of occupation, etc.

These variables can be used to distinguish between the small, more redundant and transient, or temporary, limited use lithic scatters, and larger, longer occupied, camps/habitation sites, and/ or extractive use locations.

Based on the above criteria, cultural sites in the WD would be allocated into use categories as follows:

- *Scientific use* - Prehistoric sites that exhibit high diversity and large quantity of material culture, high complexity (spatial patterning of artifacts/ activities, presence of features such as hearths or house rings/house pits, stratified or buried deposits), and relatively larger size properties would be placed into the scientific use category.
- *Conservation use* - Sites that are representative of rare, or exceptional examples (functionally or temporally), would be considered for conservation use. In the planning area these would include sites such as complexes of rock stacks and other stone built linear features in association with lithics, rock art sites, and Lovelock Cave.

- *Traditional use* - In consultation with Native American groups, certain types of prehistoric and historic sites retain particular importance and significance. These site types most commonly include: burial locations, rock art sites, pine-nut camps, and ceremonial locations.
- *Public use* - Prehistoric sites, like Lovelock Cave, can be considered for public use (interpretation) in instances where interpretive potential is high and site integrity could be insured through protective measures. Such uses should not be attempted without full consultation with interested Native American groups. Consequently, such prehistoric sites still require evaluation on a case-by-case basis. Currently, Lovelock Cave is the major site devoted for public use.
- *Experimental use* - Sites with low diversity and limited quantity (<50) of artifacts; low or limited complexity; and small size. After the information potential is exhausted for the site, the site can then be used for experimental use.

Historic Resources

Unlike prehistoric resources, historic properties are often commonly determined to be significant for reasons other than their "scientific value." Similarly, condition and integrity also tends to play a more obvious role in the evaluation of historic properties, which contain architectural or structural remains. Historic resources in the planning area also vary greatly in size, function, and complexity; ranging from small trash dumps, isolated prospect pits and claim markers to complex industrial properties such as mines, mills, and smelters; and from isolated trails, line shacks or miners cabins to abandoned wagon roads, railways, and ghost towns.

- *Scientific use* - Historic sites with archaeological and historical values and generally poor, structural integrity (collapsed or deteriorated), would be placed in this category.
- *Conservation use* - Historical sites that are rare or exceptional examples that retain integrity would be considered for conservation use. In the planning area these would include well-preserved remnants of historic mines, mills, ghost towns, and homesteads. It should be noted that the defined use categories are not necessarily mutually exclusive, and that many sites can be placed in both the conservation use category (need to stabilize and preserve the architectural features) and the public use category and possibly scientific use for example.
- *Traditional use* - Historic sites in this category would potentially include any sacred areas, traditional cultural properties, or plant gathering areas that have been historically used by Native American groups that have historically occupied the area. These sites would be determined in consultation with tribal representatives of the following tribes that have demonstrated historical use in the planning area. To date, Native American traditional use areas have been identified in the Stillwater Range, the Santa Rosa Range and the Montana Mountains.
- *Public use* - Historic sites that would be considered for public use include those where the interpretive potential is high and site integrity could be insured through protective measures. In addition, consideration is given for those standing structures that could be preserved and maintained for adaptive re-use for administrative or recreational uses. There are also numerous standing cabin structures and homesteads on public lands across the planning area that may potentially be sufficiently preserved, to be considered for a program of adaptive

reuse and used as BLM administrative structures and/or in a recreational cabin rental program.

- *Experimental use or discharge from use* - Like prehistoric sites, individual sites would be evaluated on a case-by-case basis before assignment to either the experimental use or discharge from use categories. In general, properties assigned to these categories would have been determined to contain little or no scientific or historical value. Sites in these categories would generally include isolated trash dumps and artifact scatters, isolated features such as prospect pits or claim markers, and collapsed structural remains that no longer retain integrity of design or workmanship. Only those sites that have been formally determined to be Not Eligible for the National Register of Historic Places, or have had their data potential exhausted, would be placed into either of these categories.

Cultural properties are evaluated with National Register criteria for the purposes of assessing their historical values and their public significance. Such evaluations are carefully considered when cultural properties are allocated to use categories. Although preservation and nomination priorities must be weighted on a case-by-case basis, Table 3-25 serves as a general guide illustrating the relationship between National Register evaluation and allocation to use categories.

Table 3-25
Relationship Among Cultural Resource Use Categories, National Register Eligibility, and Preservation/National Register Nomination

Cultural Resource Use Category	National Register Eligibility	Preservation/National Register Nomination	Site Types Generally Included
Scientific use	Eligible (usually under criterion d)	Long-term preservation not critical; National Register eligible but data recovery done as a form of mitigation for adverse effects.	**Prehistoric**: sites with high artifact count and diversity, high complexity, and larger size. **Historic**: sites with archaeological and historic values, and generally poor structural integrity.
Conservation for Future use	Always eligible (generally eligible under criterion d, a, or c and possibly b for historic sites)	Long-term preservation is required; highest nomination priority.	**Prehistoric**: sites inherently complex, or rare, or fragile and exhibit exceptional scientific values (e.g. wickiups, deeply stratified deposits, or large quarries with various stages of tool production). **Historic**: sites inherently complex, or rare, or fragile, generally significant standing structures (stabilization and preservation may be required).
Traditional use	May be eligible (generally under criterion a and d, possibly b and c as well)	Long-term preservation is desirable; nomination priority is determined in consultation with the	Sites and locations determined in consultation with Tribal Groups.

Table 3-25
Relationship Among Cultural Resource Use Categories, National Register Eligibility, and Preservation/National Register Nomination

Cultural Resource Use Category	National Register Eligibility	Preservation/National Register Nomination	Site Types Generally Included
		appropriate cultural group(s).	**Prehistoric** may include: burial locations, ceremonial locations, rock art sites. **Historic/Modern**: plant gathering locations, areas considered sacred for religious purposes, etc.
Public use	Eligible (generally criterion a, b, and c, possibly d as well)	Long-term preservation is desirable; high nomination priority.	**Prehistoric**: High interpretive potential and can insure protection. **Historic**: High interpretive potential and can insure stabilization and protection, and/or adaptive reuse.
Experimental use	May be eligible (generally under criterion d)	Long-term preservation is not anticipated; low nomination priority; data potential has been exhausted before assignment to this category.	**Prehistoric**: lithic scatters of limited artifact density and complexity; any site type where data potential has been exhausted. **Historic**: trash scatters, collapsed structures with no integrity or context.
Discharge from management	Not eligible	Long-term preservation and management are not considerations; nomination is inappropriate.	**Prehistoric**: isolated finds, sites not eligible for the National Register of Historic Places. **Historic**: isolated prospect pits; trash scatters, sites <50 years old; sites not eligible for the National Register of Historic Places.
Scientific use	Eligible (usually under criterion d)	Long-term preservation not critical; National Register eligible but data recovery done as a form of mitigation for adverse effects.	**Prehistoric**: sites with high artifact count and diversity, high complexity, and larger size. **Historic**: sites with archaeological and historic values, and generally poor structural integrity.
Conservation for future use	Always eligible (generally eligible under criterion d, a, or c and	Long-term preservation is required; highest nomination priority.	**Prehistoric**: sites inherently complex, or rare, or fragile and exhibit exceptional scientific

Table 3-25
Relationship Among Cultural Resource Use Categories, National Register Eligibility, and Preservation/National Register Nomination

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	possibly b for historic sites)		values (e.g. wickiups, deeply stratified deposits, or large quarries with various stages of tool production). **Historic**: sites inherently complex, or rare, or fragile, generally significant standing structures (stabilization and preservation may be required).
Traditional use	May be eligible (generally under criterion a and d, possibly b and c as well)	Long-term preservation is desirable; nomination priority is determined in consultation with the appropriate cultural group(s).	Sites and locations determined in consultation with Tribal Groups. **Prehistoric** may include: burial locations, ceremonial locations, rock art sites. **Historic/Modern**: plant gathering locations, areas considered sacred for religious purposes, etc.

Source: BLM 2012

Ethnographic Resources

The planning area lies in the traditional territory of Northern Paiute, and to a lesser extent, Western Shoshone peoples. Historically, the Northern Paiute and Western Shoshone were organized in hunting-gathering bands that generally traveled great distances in seasonal rounds, subsisting on a variety of plants, insects, small game, and fish. Game animals available to Native Americans in the planning area included pronghorn, rabbits, bighorn sheep, mule deer, and a variety of small mammals, reptiles, and birds. Pronghorn and rabbits were often hunted communally.

Seeds and roots were the primary plant foods gathered. Pine nuts were also extremely important to survival during the harsh winters and were harvested communally. Plant and animal products were also used for clothing, shelter, and other functional and ceremonial articles. Some plants were used for medicinal purposes. Lithic sources provided materials for tool manufacture. Some minerals were also used medicinally or ceremonially.

Several contemporary Northern Paiute and Western Shoshone groups are in or near the WD planning area: the Battle Mountain Band, Fallon Paiute-Shoshone Tribe, Fort McDermitt Paiute and Shoshone Tribe, Lovelock Paiute Tribe, Pyramid Lake Paiute, Winnemucca Tribe, and the Summit Lake Paiute Tribe. The Summit Lake Paiute Reservation was established in 1913 and includes the historic site of Fort McGarry. The Pyramid Lake Reservation, in the western portion of the planning area, was established in 1874. The Fort McDermitt Reservation, near the Oregon border, was a former US Army cavalry post that was converted to a reservation in 1889. Other Paiute and Western Shoshone groups outside of the planning area also retain cultural ties and interest in the WD.

The BLM is required to consult with Native American tribes concerning the identification of cultural values, religious beliefs and traditional practices of Native American people which may be affected by federal actions. This includes the identification of physical locations that may be of traditional, cultural, or historical importance to Native American tribes. EO 13175 requires federal agencies to coordinate and consult on a government-to-government basis with sovereign Native American tribal governments whose interests may be directly and substantially affected by activities on federally administered lands. Other laws, regulations, DOI guidance, and executive orders, require consultation to identify the cultural values, the religious beliefs, the traditional practices, and the legal rights of Native American people that could be affected by BLM actions on federal lands. These are the National Historic Preservation Act (NHPA) of 1966 (as amended), American Indian Religious Freedom Act of 1978, the Native American Graves Protection and Repatriation Act, DOI Secretarial Order No. 3215 (USDI 2000), 512 Department Manual Chapter 2 (USDI 1995), BLM Manual H-8160-1 (BLM 1994), and EO 13007 - Indian Sacred sites. In 2011, the DOI issued Secretarial Order 3317 to implement a consultation policy containing guiding principles, definitions, and guidelines which will be followed as they are further developed.

With the assistance of a contractor, BLM conducted an ethnographic assessment of the WD planning area (Bengston 2006). The primary objectives of this study were 1) to conduct a thorough archival and literature review to identify and document Native American traditional occupancy and use of lands and resources, as well as previously recorded Native American places of cultural and religious importance, in the study area; 2) elicit contemporary concerns and recommendations for management of traditional resources and cultural and religious values from tribal leaders, elders, or representatives; 3) document the WD's Native American consultation efforts; and 4) to elicit tribal recommendations for management of the lands administered by the WD.

Representatives of 21 Native American tribes and one tribal organization that claim ancestral ties to or traditional cultural use of these lands were contacted (Table 3-26).

All of these tribal entities, except the Winnemucca Indian Colony and Inter-Tribal Council of Nevada, are federally recognized as defined in the Code of Federal Regulations Title 25 Part 83.7 (25 CFR Part 83.7). Consultation with tribes is ongoing.

Places that may be of traditional, cultural, or historical importance to Native American people include locations associated with the traditional beliefs concerning tribal origins, cultural history, or the nature of the world; locations where religious practitioners go, either in the past or the present, to perform ceremonial activities based on traditional cultural rules of practice; ethnohistoric habitation sites; trails; burial sites; and places from which plants, animals, minerals, and waters possessing healing powers or used for other subsistence purposes, may be taken. Additionally, some of these locations may be considered sacred to particular Native American individuals or tribes.

Table 3-26
Tribes and Tribal Organizations Contacted for the WD RMP/EIS

Nevada	California	Oregon	Idaho
• Inter-Tribal Council of Nevada (Organization) • Battle Mountain Band • Shoshone-Paiute Tribes of the Duck Valley Reservation • Fallon Paiute-Shoshone Tribe • Fort McDermitt Paiute and Shoshone Tribe • Lovelock Paiute Tribe • Pyramid Lake Paiute Tribe • Reno-Sparks Indian Colony • Summit Lake Paiute Tribe • Walker River Tribe • Washoe Tribe • Winnemucca Indian Colony • Yomba Shoshone Tribe	• Alturas Indian Rancheria • Cedarville Rancheria • Fort Bidwell Indian Community • Pit River Tribe • Susanville Indian Rancheria	• Burns Paiute Tribe • Klamath Indian Tribe • Confederated Tribes of the Warm Springs Reservation	• Shoshone-Bannock Tribes

The specific concerns expressed by Northern Paiutes and Western Shoshones are as follows:

- Disturbance of burials through mining development and rock sales, and other activities;
- Disturbance of archaeological sites, regardless of National Register eligibility; some tribes oppose removing artifacts from sites for data recovery purposes;
- Disturbance of hot springs and other culturally sensitive places by energy development, mining, and motorized recreation, and other activities;
- Disturbance of mountain peaks, considered to be sacred areas, by wind energy development, construction of communication sites, and other activities;
- Disturbance of unique rock formations through rock sales and other activities;
- Disturbance of sage hen strutting areas;
- Disturbance of culturally important plant species in areas of mining development;
- Destruction of pine nutting areas due to Christmas wood cutting, commercial pine nut gathering, mining, fluid minerals development, and other activities;
- Destruction of medicinal and other plants, particularly in riparian zones and recreationists mechanically removing water and mud from hot springs to use in healing;
- Due to water development in and around springs, destruction of plants used for basket making and duck decoy manufacture; and
- Loss of access to lands traditionally used for plant gathering and hunting.

Additional tribal concerns regarding environmental management and socioeconomic issues are identified in Section 3.5.1 (Tribal Interests).

Approximately 110 locations or areas located in the administrative boundaries of the WD have been identified or were previously documented as culturally significant to the Northern Paiutes or Western Shoshones (Bengston 2006). This does not preclude the possibility that there are other areas that have not been identified or that the boundaries or impact areas have been precisely defined. In some situations Indian participants may decline to provide specific information about sensitive areas for a variety of reasons. The BLM maintains strict confidentiality about certain types of information about traditional, cultural or religious properties. Location and content of traditional resources, religious sites, or burials are confidential in the confines of the law.

3.2.14 Paleontological Resources

No systematic field survey has been conducted for paleontological resources in the planning area. However, numerous paleontological localities have been identified by independent researchers. To prepare for a Unit Resource Analysis, BLM contracted paleontologist David Lawler (Lawler 1978; Lawler and Roney 1978) to review the literature, summarize previously known paleontological resources, and analyze the potential for unknown resources. Since then, paleontologists have identified numerous additional paleontological localities in the planning area. Many sedimentary units that lie in the assessment area are potential sites for fossils.

Some of the most important paleontological resources in the planning area include Mesozoic icthyosaurian fossils and Triassic hybodont shark remains. The former represent some of the earliest North American members of the reptilian group, while the latter are some of the few known occurrences in North America.

Fossil mammal and fish remains in the planning area include early horse, beaver, rhinoceros, two distinct species of fossil camels, mastodon, mammoths, a variety of fossil forms of rodents, and representatives of several other distinct families of mammals. The planning unit also includes a wealth of invertebrate paleontological resources, including ammonites, pelecypods, and brachiopods. Flora fossil types include rushes, willows, an abundance of fossilized wood of early conifers, and a variety of grasses, ferns, and other plant types.

The Lund Petrified Forest is a petrified wood paleoflora in Washoe County between Gerlach and Vya that includes a large variety of conifer species with affinities to *Calocedrus*, *Chamaecyparis*, *Abies*, *Picea*, *Pinus*, *Taxodium*, *Sequoia*, and *Sequoiadendron* and hardwood trees such as *Quercus*, *Fagus*, *Acer*, *Platanus*, and *Ulmus*. Lands surrounding the Lund Petrified Forest have been withdrawn from mineral entry and also from use for disposal sites.

The planning area also includes several sources of paleo-environmental information. These include fossil pollen sites, ancient woodrat middens, and quaternary sedimentary shoreline features and deposits related to Lake Lahontan history. Areas that have been continuously wet through time (e.g., springs and meadows) or, conversely, areas that have been continuously dry (e.g., dry caves or woodrat middens) are most likely to preserve fossil pollen records. Woodrat middens are found in dry caves and on cliff faces. Volcanic ashes are also important stratigraphic and chronological markers. The Trego Hot Springs area contains an important ash layer. Streams also have the potential to yield valuable information on changing stream flow and erosion through time. Information on fluctuations of Pleistocene Lake Lahontan is provided in wave-cut terraces, gravel bars, beaches, and tufa deposits.

The BLM Potential Fossil Yield Classification system will be used to classify paleontological resource potential to assess possible resource impacts and mitigation needs for actions involving surface disturbance, land tenure adjustments, and land-use planning. This system replaces the Condition Classification in the Handbook (H-8270-1) for Paleontological Resource Management and uses geologic units as base data, which is more readily available to all users.

3.2.15 Visual Resources

Visual resources are the visible physical features on a landscape, such as land, water, vegetation, animals, and structures (BLM 2007b). The region of influence for visual resources is the 7.2 million acres of public land in the planning area of northwestern Nevada.

Visual Resource Management System

The BLM operates under the visual resource management system (VRM) where visual resource values and management of values on public lands must be considered in all land use planning efforts and surface-disturbing activities. The goal is to accommodate resource management activities while protecting the visual environment, in accordance with the prescribed VRM objectives. Visual values must be considered and those considerations must be documented in the decision making process.

A proposed plan for development should demonstrate how the visual management objectives will be achieved and the visual impacts will be mitigated before approval will be granted for resource development/extraction. Every attempt should be made to reduce visual impacts even when projects are in conformance with the VRM class objective. Proposed plans for development must meet the VRM class objective in order to be in conformance with the RMP land use decisions. Proposed actions found to be out of conformance would need to be modified to reduce visual contrast until projects demonstrate conformance with the VRM objectives; otherwise discretionary projects would not be approved or the RMP would be appropriately amended in accordance with the policies and procedures described in the VRM Manual and Handbooks M-8400, H-8410-1, and H-8431-1.

The objective of the VRM system is to manage public lands in a manner that will protect the quality of the scenic values of these lands. The BLM's VRM system provides a way to identify and evaluate scenic values to determine the appropriate levels of management. It also provides a way to analyze potential visual impacts and apply visual design techniques to ensure that surface-disturbing activities are in harmony with their surroundings. The BLM's VRM system consists of three stages: inventory (visual resource inventory), project planning, and analysis (visual resource contrast rating).

Inventory

The visual resource inventory process provides BLM managers with a means for determining visual values. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes, representing the relative value of the visual resources. Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value (Table 3-27). The inventory classes provide the basis for considering visual values in the resource management planning process. Visual resource management classes are established

Table 3-27
Bureau of Land Management Visual Resource Management Class Objective Descriptions

BLM Visual Resource Management Class	BLM Visual Resource Management Class Objective Description
I	Objective: Preserve landscape character. This class provides for natural ecological changes but does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	Objective: Retain existing landscape character. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract a casual observer's attention. Any changes must repeat the basic elements of line, form, color, and texture found in the predominant natural features of the characteristic landscape.
III	Objective: Partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	Objective: Provide for management activities that require major modification of the landscape character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.

Source: BLM 1986

through the RMP process for all BLM-administered lands (see also Manual 1625.3). During the RMP process, the class boundaries are adjusted as necessary to reflect the resource allocation decisions made in RMPs. Visual management objectives are established for each class.

In 2009, the WD conducted a visual resource inventory to characterize the visual resources on the lands it manages (BLM 2009a). In the region of influence, WD public land is characterized as follows:

- Visual resource inventory Class II: 316,310 acres;
- Visual resource inventory Class III: 1,731,788 acres; and
- Visual resource inventory Class IV: 5,158,845 acres.

It is important to note that Classes II, III, and IV are assigned based on combinations of scenic quality, sensitivity levels, and distance zones identified during the inventory process. Class I is assigned to all special areas where the current management situation requires maintaining a natural environment essentially unaltered by humans. In the region of influence, these special areas are the WSAs (Figure 3-33). If a WSA is released from consideration as a wilderness area, the area would be managed according to its original inventory class listed above. By designating WSAs as Class I, however, the visual resource inventory is as follows:

- Visual resource inventory Class I: 416,652 acres;

- Visual resource inventory Class II: 273,642 acres;
- Visual resource inventory Class III: 1,517,278 acres; and
- Visual resource inventory Class IV: 4,999,372 acres.

Project Planning

The project planning process involves an interdisciplinary team that provides general site design guidelines and typical design/mitigation procedures and examples. The systematic Visual Resource Contrast Rating Process (H-8431-1) analyzes potential visual impacts of proposed projects and activities.

Analysis

The analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. A visual contrast rating process is used for this analysis, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. This process is described in BLM Handbook H-8431-1, Visual Resource Contrast Rating. Visual contrast rating simulations are performed for projects proposed in areas designated as VRM Class I, II, III, and IV (high sensitivity areas and projects with high visual impact) for disclosing visual impacts and the effectiveness of the mitigation plan. A visual contrast rating is not required for areas designated as VRM Class IV; however, minimizing visual impacts is still required and is to be reflected in the proposed development plan.

The analysis can then be used as a guide for resolving visual impacts. Once potential impacts on visual resources have been identified for each location, visual design considerations would be incorporated into proposed surface-disturbing projects on a case-by-case basis. Mitigation measures, using the following design techniques, would be developed for each site to minimize adverse impacts on visual resources and to maintain visual resource class objectives:

- Choose site locations to minimize adverse effects;
- Minimize disturbance during construction;
- Repeat form, line, texture, and color in the design elements;
- Select color for exterior building materials;
- Be sensitive when grading to minimize variations in natural topography;
- Use appropriate reclamation and restoration during project closure; and
- Incorporate linear alignment in design.

Once every attempt is made to reduce visual impacts, managers have the option of attaching additional mitigation stipulations to bring the proposal into compliance.

General Visual Setting

Figure 3-25 identifies the current VRM areas in the WD. VRM was defined in the Paradise-Denio and Sonoma Gerlach Management Framework Plans (1982). VRM has been proposed in the RMP through a range of alternatives using the inventory process completed in 2009.

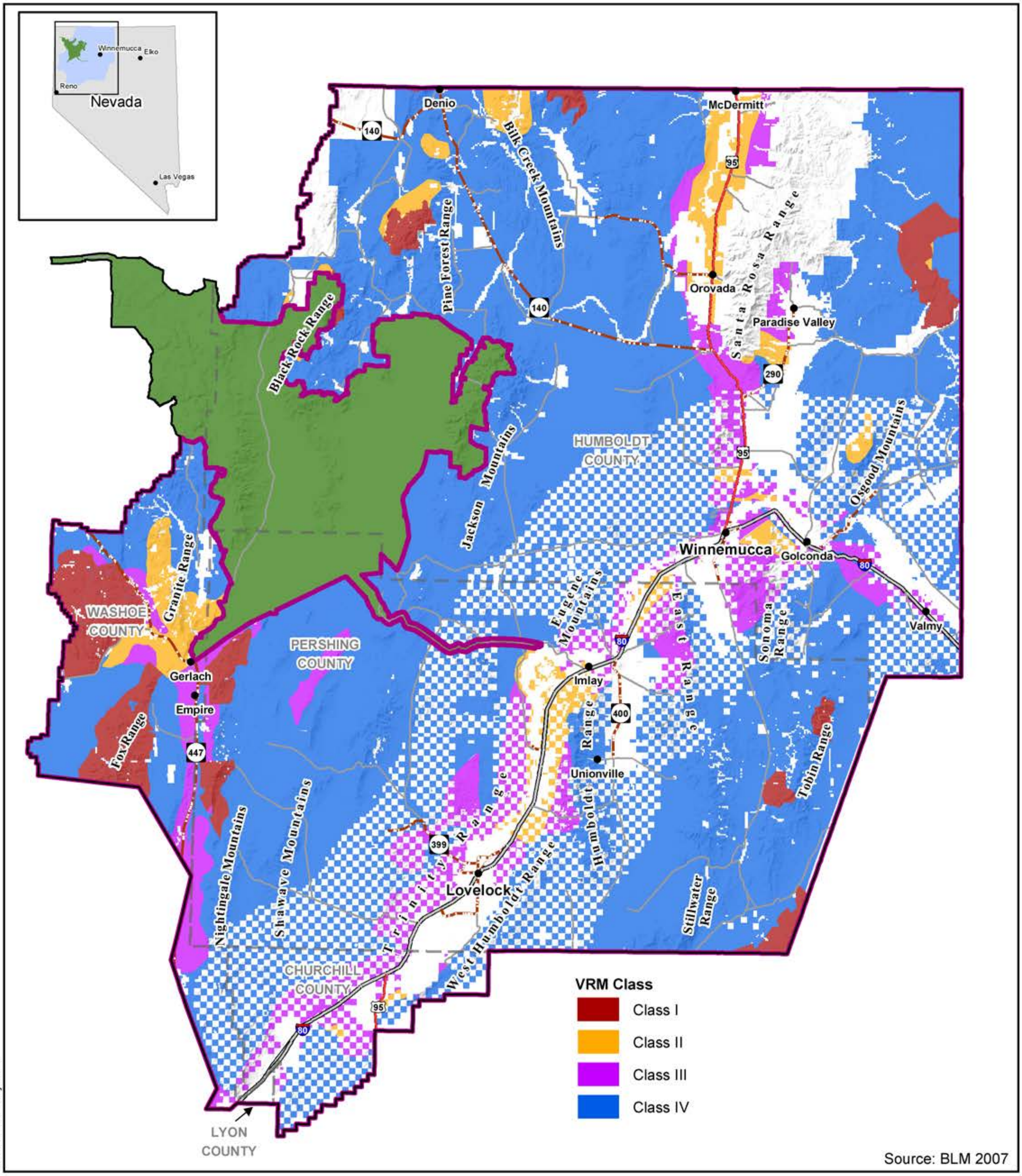
The current condition of visual resource management is stable. For example, reclamation management strategies required by permits for mining and mitigation measures to design structures on BLM land to blend in with the natural background are used to minimize disturbances to the visual landscape.

VRM Class I, the most protective class, is found in Wilderness Areas and WSAs. VRM Class II and III areas are generally the scenic mountain ranges near communities and along Interstate 80, State Highway 95, and State Highway 140, and the other well-traveled corridors in the planning area. Also, the NCA in the northwest portion of the WD area is VRM Class II. Current Nevada policy is to manage the setting of historic trails to VRM Class II. The remainder of the area is VRM Class IV.

The scenic features of the management area are characteristic of the Great Basin area of the western US. Gold and brown hills diffuse into steep rugged mountains (US Navy 1997). Alkali flats and low desert brush dominate the valley lowlands, allowing expansive views from the valleys to the surrounding mountains. The higher elevations support sagebrush, juniper, and pinyon pine, which provide visual diversity and contrasting darker color along ridgelines in the distant background. Vegetation grows low and evenly on the valley floor and primarily consists of monochromatic desert brush.

The planning area is in the northern Basin and Range physiographic province. Basin and Range landscapes in northern Nevada are characterized by elongated, generally north-south trending mountain ranges separated by broad open basins. This type of landscape allows for long viewing distances. The dominant natural features in the planning area includes steep rugged mountains, volcanic highlands and table lands, expansive valleys, dune fields, springs (hot and cold), streams, the Humboldt River, Little Humboldt River, Kings River, and Quinn River and associated floodplains and marshes. Human-made features include the emigrant trails, ranches, fences, irrigated and cultivated fields, power plants (two geothermal and one coal), I-80, other main and secondary roads, OHV trails, railroads, power lines, utility corridors, large open-pit mines, gravel pits, small dams along the river, one large dam at Rye Patch Reservoir, communication towers and repeaters, satellite dishes, and radio towers. Additionally there are several towns and communities in the planning area.

Noticeable valleys in the planning area are Granite Springs Valley, Desert Valley, Buena Vista Valley, Grass Valley, Dixie Valley, Jersey Valley, Quinn River Valley, Smoke Creek Desert, Pleasant Valley, Pumpernickel Valley, Buffalo Valley, Paradise Valley, and Kings River Valley. The visible ranges in the planning area are the Jackson Mountains, Trinity Range, East Range, Tobin Range, Sahwave Mountains, Humboldt Range, West Humboldt Range, Bilk Creek Mountains, Double H Mountains, Montana Mountains, Pine Forest Range, Black Rock Range, Granite Range, Fox Range, Seven Troughs Range, Augusta Mountains, Sonoma Range, Tobin Range, Stillwater Range, Osgood Mountains, Buffalo Mountain, Lone Tree Hill, Majuba Mountain, Eugene Mountains, and Selenite Range. The planning area is drained by the Humboldt River. Rye Patch Reservoir in north-central Pershing County is another water feature visible in the planning area. Smaller water features in the



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Winnemucca District RMP
Visual Resource Management Areas

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-25

planning area include Quinn River and Kings River in the northern planning area and Humboldt Sink in the southern portion of the planning area.

Public perception of and concern for visual resources is critical in land use planning. The visual character of the planning area is valuable to a spectrum of residents, recreation users, and sightseeing travelers. Receptors sensitive to visual resources on BLM land include people recreating and areas of human settlement. Recreation on BLM land includes picnicking, wildlife watching, camping, biking, fishing, hunting, and photography. A large portion of the planning area is located along the Humboldt River and I-80 corridors, which contains the highest concentration of human-made features. Several communities are situated along this corridor, including Valmy, Golconda, Winnemucca, Mill City, Imlay, Rye Patch, Oreana, and Lovelock. Other areas are in more remote areas along major secondary routes and include the towns of Denio, McDermitt, Orovada, Empire, and Gerlach. These areas contain typical small community developments and facilities. The remaining parts of the planning area are in very remote locations where human-made features are predominantly ranch settings and access roads.

Ranch settings typically include small dwellings, outbuildings, barns, fences, trees, corrals, and fields. They are all on private lands, and only the larger features are visible from a distance. Newer buildings painted with light colors contrast with background landscapes. The ranches have been there for many years, and the structures tend to be weathered, blending in with the surroundings.

The mines in the area vary from highly visible to slightly visible depending on viewing distance and location. Large open pit, waste rock dumps, heap leach pads, and access and haul roads to the pits are the most visible distance features of mines.

Private residences on private lands are visible from a distance when traveling along local roads. Color contrasts between the private structures and the surrounding landscapes account for the high visibility.

3.2.16 Cave and Karst

Caves and rock areas provide day and night roosting habitat for bat species and are important elements needed to support the sensitive species in the planning area. They also provide opportunities for recreation. Lovelock Cave is listed on the National Register of Historic Places. Caves and rock areas provide day and night roosting habitat for bat species and are important elements needed to support the sensitive species in the planning area. Caves are often significant cultural and paleo-environmental resources that preserve information found nowhere else in the WD and therefore deserve special consideration when identified. Lovelock Cave is listed on the National Register of Historic Places. Caves also provide opportunities for recreation.

Karst features can occur in carbonate rock formations; however, no significant karst features have been identified in the WD.

3.3 Resource Uses

3.3.1 Livestock Grazing

The primary laws that govern grazing on public lands are the Taylor Grazing Act of 1934, the Federal Land Policy and Management Act of 1976, and the Public Rangelands Improvement Act of

1978. The BLM manages grazing lands under 43 CFR Part 4100 and BLM Handbooks 4100-4180, and it conducts grazing management practices through BLM Manual H-4120-1 (BLM 1984). In addition, the BLM must meet or ensure progress is being made toward meeting the Sierra Front-Northwestern Great Basin RAC Standards and Guidelines for Rangeland Health (Appendix E) for each allotment.

The WD manages the livestock grazing on public lands administered by the BLM in Churchill, Storey, Washoe, Pershing, and Humboldt Counties. The WD encompasses approximately 8.4 million acres of public land. There are 102 allotments (Figure 3-26), consisting of over seven million acres of BLM land, with the largest allotments averaging over 1,000,000 acres and the smallest allotments averaging 1,500 acres. BLM District boundaries were established after grazing allotments, and they did not coincide with grazing allotment boundary lines. Therefore, the WD administers a few allotments outside of the WD administrative boundary, and, conversely, there are a few allotments in the WD administrative boundary that are administered by other district offices under an MOU with the parent district office. A few examples are:

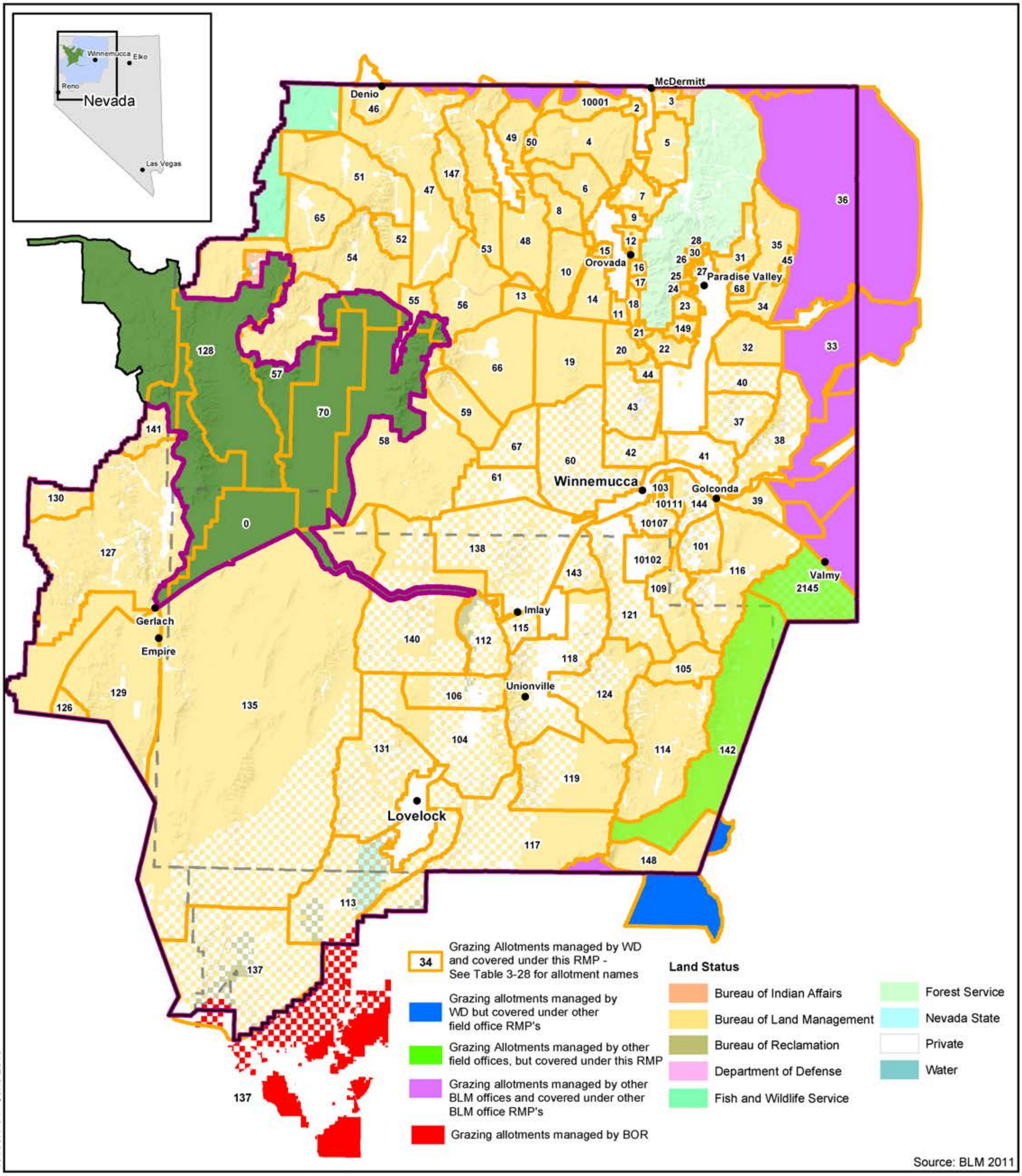
- The WD administers the Bullhead and Little Owyhee Allotments, the majority of which is inside the WD boundary and smaller portions are in the Elko District boundary;
- The WD administers the Hole in the Wall Allotment inside the Carson City District boundary; and
- The North Buffalo and South Buffalo Allotments are in the WD but are managed by the Battle Mountain District; however they are covered under this RMP.

Authorized grazing on lands in the following locations (legal descriptions) is administered by the US Bureau of Reclamation rather than the BLM:

- Township 21 North, Range 25 East, Sections 25, 26, 34, 35, 36;
- Township 21 North, Range 26 East, Sections 30, 32;
- Township 21 North, Range 27 East, Section 36 (portion thereof); and
- Township 23 North, Range 29 East, Sections 24, 26, 32, 34, 36.

Most of the permittees are licensed to graze cattle with a few authorized to graze sheep and horses. Some grazing allotments are considered to be “common” allotments, meaning that there is more than one permittee authorized to run livestock. The grazing year begins March 1 and runs through February 28, with an average of 339,195 animal unit months (AUMs) harvested annually. Grazing usually begins in spring in the valleys and lower foothills and progresses to higher elevations in early summer. About half the permittees are authorized to graze livestock during the winter. Hay and private pasture provide forage for the remaining livestock through the winter. Most permittees adjacent to the Forest Service lands graze BLM lands in the spring and summer on the National Forest, and then return to BLM or private lands in the fall.

Two large land areas in the WD, Smoke Creek Desert and the Old Gunnery Range, are not allocated to grazing. These two areas are not allocated because the range suitability criteria applied in the Sonoma-Gerlach and Paradise-Denio Grazing EIS, considered land not suitable for grazing because of inadequate vegetation production if the land was not able to produce one AUM of usable



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Winnemucca District RMP Grazing Allotments

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns

0 10 20 Miles

Northwest Nevada

Figure 3-26

perennial vegetation per 32 acres. In order for land to be considered available, it must produce 25 pounds of usable vegetation per acre annually, to provide one AUM on 32 acres. Because these areas are playas and do not produce 25 pounds of useable vegetation per acre annually, they were not allocated for livestock grazing.

Temporary exclosure areas may exist in individual allotments to protect other resources. For example, newly developed spring sources and wetland-riparian areas may be fenced to exclude livestock These exclosures are closed to livestock grazing unless specific resource prescriptions or objectives are approved by the authorized officer.

The WD issues grazing permits for a period of ten years and reviews them before reissuance. Table 3-28 provides detailed information on livestock grazing by allotment. Final multiple use decisions (FMUDs), which guide livestock grazing, have been issued for 53 allotments.

The BLM must meet or ensure progress is being made toward meeting Standards and Guidelines for Rangeland Health for each allotment as described at the beginning of this section. Table 3-29 displays cumulative results of allotments meeting, or progress towards meeting, these standards in the WD from 1999 through 2011. Data is summarized from the national Rangeland, Inventory, Monitoring and Evaluation (RIME) Reports (BLM 2012b).

Based on data from these reports, 55 allotments containing 5,365,124 acres are meeting standards or making significant progress towards meeting the standards; 3 allotments containing 21,829 acres are not meeting all standards with livestock as a causal factor; 12 allotments containing 162,493 acres are not meeting all standards based on other causes; and 1,470,794 acres are yet to be evaluated for meeting standards.

Table 3-28
WD Grazing Allotment Information

Allotment Name	RAS Number[1]	Area of BLM Land (acres)	Active AUMs	Season of Use	Livestock Type
Abel Creek	23	11,607	1,954	2/1-4/10	c
Alder Creek	51	123,362	5,913	4/1-8/15, 10/1-2/28	c
Andorno	18	9,578	873	4/1-10/31	c
Antelope	16	4,746	563	4/15-8/15	c
Asa Moore	44	7,074	685	4/1-9/15	c
Bilk Creek	147	40,999	3,030	4/1-10/31	c, s, h
Bloody Run	43	37,482	2,193	3/1-6/30, 7/1-8/11, 11/1-2/28	c
Blue Mountain	61	32,255	2,315	9/1-4/30	c
Blue Wing/Seven Troughs	135	1,192,775	20,114	3/1-2/28,11/1-5/31	s
Bottle Creek	66	132,485	3,434	4/1-1/31	c
Buffalo	17	3,650	338	4/1-5/31	c
Buffalo Hills	127	440,981	4,114	4/1-10/15	c
Bullhead	33	142,603	11,003	3/1-8/31, 11/1-2/28	c
Buttermilk	31	23,512	2,525	4/1-5/23	c

Table 3-28
WD Grazing Allotment Information

Allotment Name	RAS Number[1]	Area of BLM Land (acres)	Active AUMs	Season of Use	Livestock Type
Chimney Creek	21	3,091	460	4/15-12/31	c
Clear Creek	109	48,370	2,931	3/1-2/28	c
Coal Canyon-Poker	104	97,828	3,144	3/1-2/28	c, s
Cordero	2	5,374	189	4/1-10/31	h
Coyote	130	34,337	3,051	4/1-10/30	c, s
Coyote Hills	53	38,315	2,633	1/15-11/28	c, h
Crowley Creek	6	49,983	3,303	4/1-12/23	c
Daveytown	19	107,305	5,165	11/1-2/28	c, h
Deer Creek	55	30,340	754	3/1-7/31, 10/01-12/31	c
Desert Queen	137	122,215	3,355	11/30 - 4/15	c
Desert Valley	59	56,965	1,596	4/1-9/30, 10/16-12/27	c
Diamond S	144	19,070	1,158	4/1-9/15	c
Dolly Hayden	121	53,154	1,067	12/1-1/31	c
Double H	10	47,275	1,687	4/1-10/31	c, h
Dyke Hot	52	23,346	1,636	3/1-2/28	c, h
Eden Valley	37	32,621	2,629	3/1-8/15, 10/15-2/28	c
Flat Creek	7	24,378	3,168	4/1-1/31	c
Ft. McDermitt	3	12,843	1,553	4/1-6/30	c
Fort Scott	26	2,702	361	5/4-8/3	c
Gallager Flat	14	34,707	1,720	10/1-4/15	c, h
Golconda Butte	41	17,597	1,089	8/15-2/28	c
Goldbanks	105	37,526	2,350	12/1-4/19, 5/1-02/28	c, s
Granite	27	1,966	216	4/15-5/20	c
Hanson Creek	25	1,664	151	4/23-5/20	c
Happy Creek	56	95,126	3,724	4/1-8/30, 10/15-2/28	c, s
Harmony	10111	6,786	348	4/8-9/15	c
Horse Creek	49	39,165	4,449	4/15-9/14	c, h
Hot Springs Peak	32	53,198	2,536	3/1-7/10, 11/1-2/28	c
Humboldt House	112	22,550	728	10/15-4/15, 7/16-8/5	c, s
Humboldt Sink	113	60,666	1,582	4/1-11/30	c
Humboldt Valley	138	105,189	2,900	10/22-7/31	c
Indian Creek	29	960	250	4/15-5/31	c
Iron Point	39	20,221	1,240	3/1-3/31,11/1-2/28	c, h
Jackson Mountain	58	364,990	8,857	3/1-2/28	c
Jersey Valley	148	66,740	917	5/1-7/31, 8/1-11/30	c

Table 3-28
WD Grazing Allotment Information

Allotment Name	RAS Number[1]	Area of BLM Land (acres)	Active AUMs	Season of Use	Livestock Type
Jordan Meadow	4	106,494	11,720	3/1-9/30, 11/1-12/31	c
Kings River	48	146,040	12,192	3/15-11/30	c
Klondike	124	83,451	4,610	3/15-11/30	c
Knott Creek	65	64,062	5,813	3/1-4/30	c
Leadville	141	54,013	1,291	5/1-10/15	c
Little Horse Creek	50	3,843	524	4/1-9/30	c, h
Little Owyhee	36	560,806	27,800	3/1-2/28	c
Long Canyon	20	27,025	1,697	4/1-9/13, 11/1-2/28	c
Lower Quinn	11	6,787	464	11/1-12/31	c
Majuba	140	186,083	3,325	10/15-6/30	c, s
Martin Creek	68	6,160	300	4/15-6/19	c
Melody	103	4,048	1,020	4/10-8/10	c
Mormon Dan	67	27,822	1,998	9/1-4/30	c
Mullinix	30	1,485	133	4/16-5/20	c
North Buffalo[2]	2145	55,390	3447	3/1-2/28	c, s
Old Gunnery Range	70	0	Not allocated	Not allocated	0
Osgood	38	48,535	3,387	3/1-8/31, 11/1-2/28	c
Paiute Meadows	57	168,538	4,299	3/1-10/6, 11/01-1/15	c
Paradise Hill	22	21,711	2,191	3/1-6/25, 11/1-2/28	c
Pine Forest	54	136,199	9,700	4/1-2/28	c, h
Pleasant Valley	114	173,405	10,553	3/01-12/31	c
Pole Canyon	126	13,863	540	6/1-9/30	c
Pole Creek	8	34,348	2,988	4/1-10/31	c
Prince Royal	115	9,961	153	11/1-4/15, 6/5-6/14	c, s
Provo	149	9,878	1,120	3/1-5/20, 9/15-12/15	c
Pueblo Mountain	46	34,318	2,137	4/1-8/30,10/1-1/8	c
Pumpernickel	116	126,142	9,417	3/1-2/28	c, s
Ragged Top	131	85,920	Exchange of Use Only	12/1-4/24	s
Rawhide	119	126,645	2,740	1/01-10/31	c
Rebel Creek	12	8,376	1,000	4/1-5/30, 8/20-12/15	c
Rock Creek	101	23,275	2,392	4/1-10/31	c
Rodeo Creek	129	193,224	5,542	3/1-2/28	c
Rose Creek	NA	Part of Dolly Hayden	213	5/1-7/21	c

Table 3-28
WD Grazing Allotment Information

Allotment Name	RAS Number[1]	Area of BLM Land (acres)	Active AUMs	Season of Use	Livestock Type
Ryepatch	106	40,019	1,981	11/1-4/15, 8/6-8/31	c, s
Sand Dunes	60	87,634	3,865	3/1-8/31	c
Sand Pass	42	20,985	887	3/1-7/31	c
Scott Springs	40	22,764	419	3/1-6/30, 11/1-2/28	c
Singus	24	2,774	350	4/5-5/20, 9/20-10/20	c
Sod House	13	21,012	382	4/1-6/15, 9/15-12/31	c
Soldier Meadows	128	329,129	12,168	7/15-4/30, 1/16-12/15	c
Solid Silver	28	1,901	246	4/20-5/20, 10/1-10/31	C
Sonoma	10102	20,089	1,485	4/22-8/20	c
South Buffalo[2]	142	233,446	122*	4/1-11/30	c
South Rochester	117	170,180	3,186 (WD)/ 777(CCFO)**	1/1-10/31	c
Spring Creek	34	22,791	2,488	4/1-8/10, 12/1-2/1	c
Star Peak	118	81,356	3,075	4/1-10/31	c, s
Sugar Loaf	45	5,567	602	4/1-5/31, 7/25-7/31	c
Thomas Creek	10107	11,780	532	4/16-8/15	c
U C	5	45,248	12,902	3/1-8/31, 10/1-2/28	c
Upper Quinn River	15	6,291	436	11/1-2/28	c
Washburn	10001	32,213	1,464	1/1-8/31	c, h
White Horse	143	21,973	1,970	11/1-8/31	c
Wilder-Quinn	47	188,283	14,379	3/1-9/15, 11/1-2/28	c, s
William Stock	35	63,989	5,905	3/28-7/20	c
Willow Creek	9	8,127	1,536	3/1-5/31, 8/16-1/30	c

Notes: c=cattle; h=horses; s=sheep
[1]The Range Administration System (RAS) number also corresponds to the numbers identified on Figure 3-26.
[2]The North Buffalo and South Buffalo Allotments are managed by the Battle Mountain District; however they are covered under this RMP.
*Although the Battle Mountain District administers livestock grazing on the South Buffalo Allotment, the WD administers a small grazing permit, consisting of 122 AUMs.
**The WD administers livestock grazing on the South Rochester Allotment, with Carson City District administering a 777-AUM permit on the allotment, in conjunction with its Copper Kettle Allotment.

Table 3-29
Number of Allotments and Total Area by Rangeland Health Category

Standards for Rangeland Health Category	Number of Allotments	Total Area in Allotments (acres)*
Rangelands meeting all standards or making significant progress toward meeting the standards.	32	2,753,866
Rangelands not meeting all standards or making significant progress toward meeting the standards, but appropriate action has been taken to ensure significant progress toward meeting the standards (livestock is a significant factor).	23	2,611,258
Rangelands not meeting all standards or making significant progress toward meeting the standards, and no appropriate action has been taken to ensure significant progress toward meeting the standards (livestock is a significant factor).	3	21,829
Rangelands not meeting all standards or making significant progress toward meeting the standards due to causes other than livestock grazing.	12	162,493
Total Allotments Assessed	70	6,361,876
Total Allotments Not Assessed	32	1,470,794
Total Allotments	102	7,832,670

Source: BLM 2012b
Notes: These data are based on yearly RIME reports submitted annually following the end of the fiscal year. Seventy allotments have been evaluated or re-evaluated based on meeting or not meeting standards, and data is cumulative, so that allotments stated as not meeting standards may have been re-evaluated or had changes made to address non-attainment of standards in subsequent years. Allotments reported as not meeting standards were evaluated during that fiscal year, and changes would have been made the subsequent year. Allotments reported as not meeting standards with cattle grazing not a significant factor had been impacted by another activity or event such as a wildfire, or other use that caused a non-attainment of standards.
* Acres listed for each category in this table are the total acres for allotments in each category and do not represent the number of acres in each category.

3.3.2 Minerals – Leasable, Locatable, and Salable

Leasable

Leasable minerals defined by the Mineral Leasing Act (February 1920; and 43 CFR 3000-3599, 1990) include the subsets leasable solid and leasable fluid minerals (BLM 2006a). Leasable solid minerals include coal, oil shale, native asphalt, phosphate, sodium, potash, potassium, and sulfur. Leasable fluid minerals include oil, gas, and geothermal resources.

Leasable mineral areas exhibiting a priority for use include the oil and gas lease area at Kyle Hot Springs, areas formerly designated as Known Geothermal Resource Areas (KGRAs), hot springs, existing geothermal leases, and lease application areas. KGRAs were areas that the BLM determined; based on geologic and technical evidence, that a person with geothermal knowledge would spend money to develop the geothermal resource, areas that were located near wells capable of commercial production of geothermal fluids, or areas where there was a competitive interest in geothermal resource development (not a singular criterion existed). The BLM geothermal leasing regulation of May 2007 replaced the term KGRA with "lease areas" to identify potential lease areas. The most likely geothermal development sites are expected to be in areas adjoining or reasonably near power transmission facilities that have excess capacity.

Solid Minerals

While solid leasable minerals are present in the planning area, no significant production of these minerals is underway or anticipated.

Fluid Minerals

Fluid minerals referred to in this document include oil and gas (sources of non-renewable energy) as well as geothermal resources (a source of renewable energy). Geothermal resources on federal lands are subject to lease under the Geothermal Steam Act of 1970, as amended (30 USC § 1001, et seq.), and geothermal resource leasing regulations (43 CFR §3200). Renewable energy sources involving geothermal resources are discussed below.

Oil and Gas. Bedrock geologic mapping, gravity geophysical data, and oil and gas test wells provide information on the geology of the WD as it relates to oil and gas deposits (BLM 2006a) (Table 3-30). Detailed bedrock geologic maps of 1:250,000 quadrangles were compiled by the US Geological Survey by county and are available as electronic files from the Nevada Bureau of Mines and Geology.

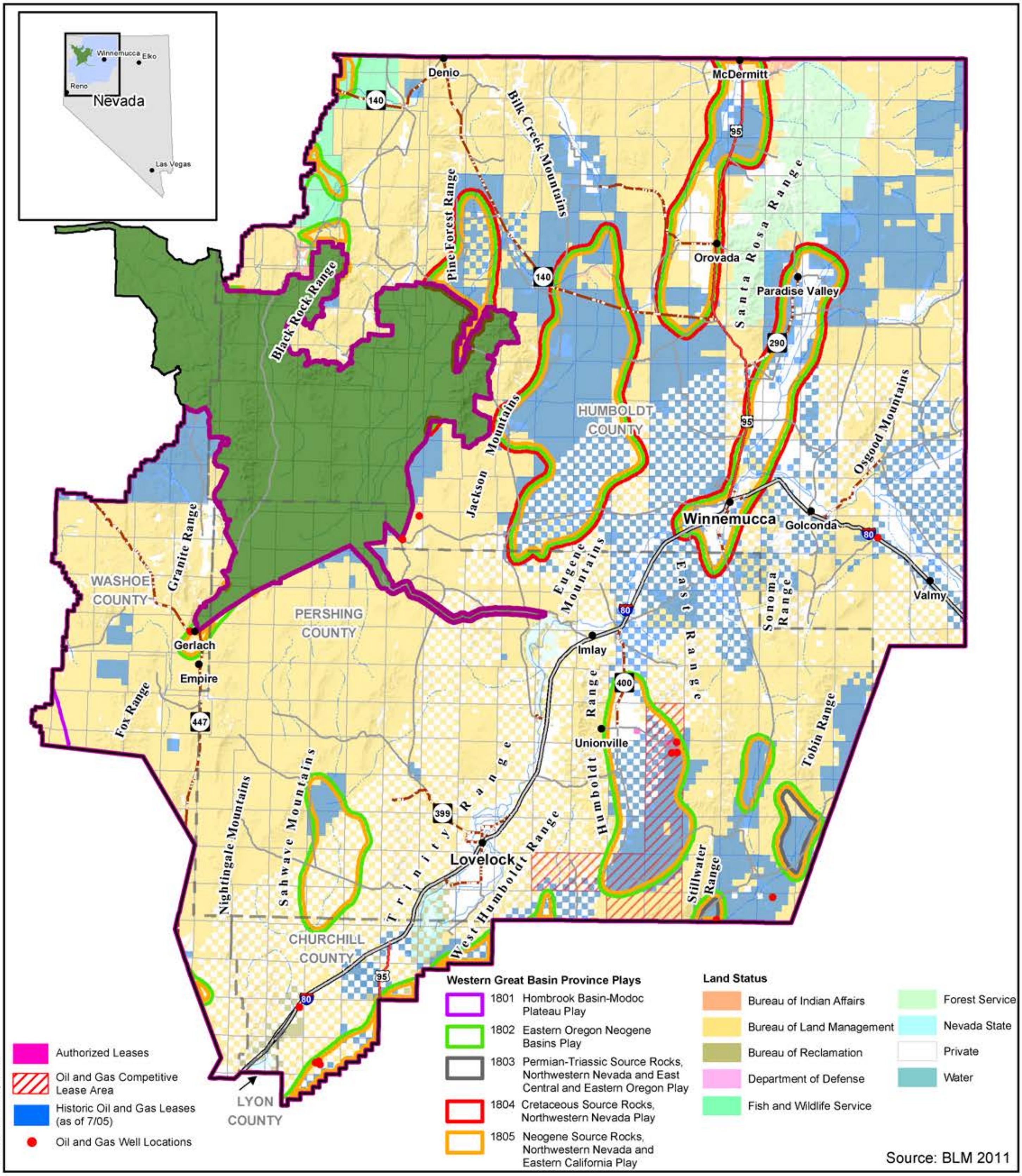
The occurrence of oil and gas in the planning area is believed to be primarily restricted to geologically young basins. Almost all of the historical drilling activity in northwest Nevada, particularly in the WD, has been focused in tertiary basins (BLM 2006a). Any fields discovered in the tertiary basins of the WD are likely to be small, as high regional heat flow and faulting have worked together to destroy any large stratigraphic or structural traps that may have formed prior to basin and range faulting. The discovery of an oil and water mix in the Triassic-age Favret Formation indicates the potential for local occurrence of oil in rocks of an older age in the southern portion of the planning area (BLM 1993).

Although there has been exploration drilling in the WD, there are no producing oil or gas wells (BLM 2006a). Nine oil and gas exploration wells have been drilled since 1992 (one as recently as 2004), and three new wells were permitted for drilling in 2005 on existing oil and gas leases in the Kyle Hot Spring area in Buena Vista Valley. Table 3-30 is a listing of wells drilled in the planning area showing operator, lease name, hole name, field name, county, permit number, permit date, drilled depth, spud date, completion date, and last activity date.

There are three active leases in the WD that encompass approximately 3,799 acres (Figure 3-27) (BLM 2006a). These leases are in the Neogene Basin playa area of the Buena Vista Valley (west of the Stillwater and East Ranges and east of Unionville) in the southeastern-most portion of the planning area. A number of oil and gas parcels, totaling approximately 244,000 acres of public land in Buena Vista Valley, the northern Stillwater Range and the Double H Mountains were offered for lease sales during March of 2006. There were no bids on any of these lands, which was likely due to very strict resource protection Lease Stipulations attached to the parcels. None of these parcels were offered for lease sales in either the June or September 2006 offerings. Portions of the Buena Vista Valley were re-offered for lease in September 2010. No parcels were bought at the sale, but five have since been acquired non-competitively.

Table 3-30
Oil and Gas Wells in the Decision Area

Operator Current Name	Lease Name	Name	Field Name	County Name	Permit #	Permit Date	Total Drilled	Date Spud	Date Completion	Date Last Activity
BLACK ROCK O&G CO	GOVT	1	WILDCAT	HUMBOLDT		11/23/1921	800	12/3/1921	12/30/1921	12/1/1998
HUMBOLDT ASSOC	ELLISON	2	WILDCAT	HUMBOLDT	383	6/16/1984	1020	6/26/1984	7/4/1984	12/1/1998
HUMBOLDT ASSOC	ELLISON	1	WILDCAT	HUMBOLDT	268	11/4/1979	986	11/14/1979	7/3/1984	12/1/1998
SUN EXPL & PROD CO	KING LEAR-FEDERAL	1-17	WILDCAT	HUMBOLDT	347	4/7/1983	7931	4/17/1983	6/4/1983	12/1/1998
W PACIFIC RR CO	SULPHUR M.P.	474.67		HUMBOLDT		1909	970			
ARCO OIL & GAS CORP	ARCO TOBIN UNIT	1	WILDCAT	PERSHING	408	10/28/1984	2065	11/7/1984	12/6/1984	12/1/1998
CHEVRON USA INC	KYLE-FEDERAL	84-2	WILDCAT	PERSHING		9/7/1980	2104	9/17/1980	10/11/1980	12/1/1998
EVANS BARTON LTD	KYLE SPRING	11-42A	WILDCAT	PERSHING	838	7/10/2001	607	7/24/2001		8/10/2004
EVANS BARTON LTD	KYLE SPRING	12-13D	WILDCAT	PERSHING	759	9/21/1995	1000	10/1/1995	6/1/1997	1/14/2004
EVANS BARTON LTD	KYLE SPRING	12-13	WILDCAT	PERSHING	730	8/2/1994	1162	8/12/1994	8/25/1994	1/23/2003
EVANS BARTON LTD	KYLE SPRING FED	11-14	WILDCAT	PERSHING	791	10/27/1996	2633	11/6/1996	6/1/1997	1/14/2004
EVANS DAVID M	KYLE SPRING	12-13	UNNAMED	PERSHING		10/27/1996	230	11/6/1996	11/6/1996	8/20/2003
EVANS DAVID M	KYLE SPRING FED	11-43	WILDCAT	PERSHING	821	7/13/1998	868	9/23/1998	12/20/2002	9/24/2004
EVANS DAVID M	KYLE SPRING FED	11-23	WILDCAT	PERSHING		5/12/1998	2020	8/1/2000	8/9/2000	5/30/2003
OUIDA OIL CO	DIXIE	1	WILDCAT	PERSHING	743	2/17/1995	4536	2/27/1995	5/24/1995	12/1/1998
PHILLIPS PETRLM CO	CAMPBELL	E-2	HUMBOLDT	PERSHING		12/27/1978	8061	1/6/1979	10/1/1979	12/1/1998
PHILLIPS PETRLM CO	CAMPBELL	E-1	WILDCAT	PERSHING		10/23/1977	1848	11/2/1977	12/10/1977	12/1/1998
TREGO WELL BLACK R DES	TREGO WELL			PERSHING			1500			
CAITHNESS POWER		32-5	STEAMBOAT SPR	WASHOE	79	10/8/1987	3000	10/18/1987	11/8/1987	12/1/1998
PHILLIPS PETRLM CO	COX	I-1	WILDCAT	WASHOE		3/22/1981	3471	4/1/1981	7/1/1981	8/20/2003
SUNOCO ENRGY DEV CO	HOLLAND LIVESTOCK	1-2-FR		WASHOE		2/6/1979	5210	2/16/1979	4/26/1979	2/26/2002
SUNOCO ENRGY DEV CO	HOLLAND LIVESTOCK	1-15G	WILDCAT	WASHOE		12/7/1978	5871	12/17/1978	2/20/1979	12/1/1998



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Winnemucca District RMP
Oil and Gas Wells, Leases and USGS Plays

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N W E S

0 10 20 Miles

Northwest Nevada

Figure 3-27

Geothermal. The Planning Area is in the Great Basin, where there are two types of recognized geothermal systems: (1) magmatically induced systems; and (2) extensional fault systems associated with regionally high heat flow and active faulting (BLM 2006a). Groundwater circulating at depth in rocks heated by either of these systems can be used as a medium to transfer heat to the surface to be used either directly for heating buildings or by converting it into electricity. Geothermal energy resources are considered to be renewable.

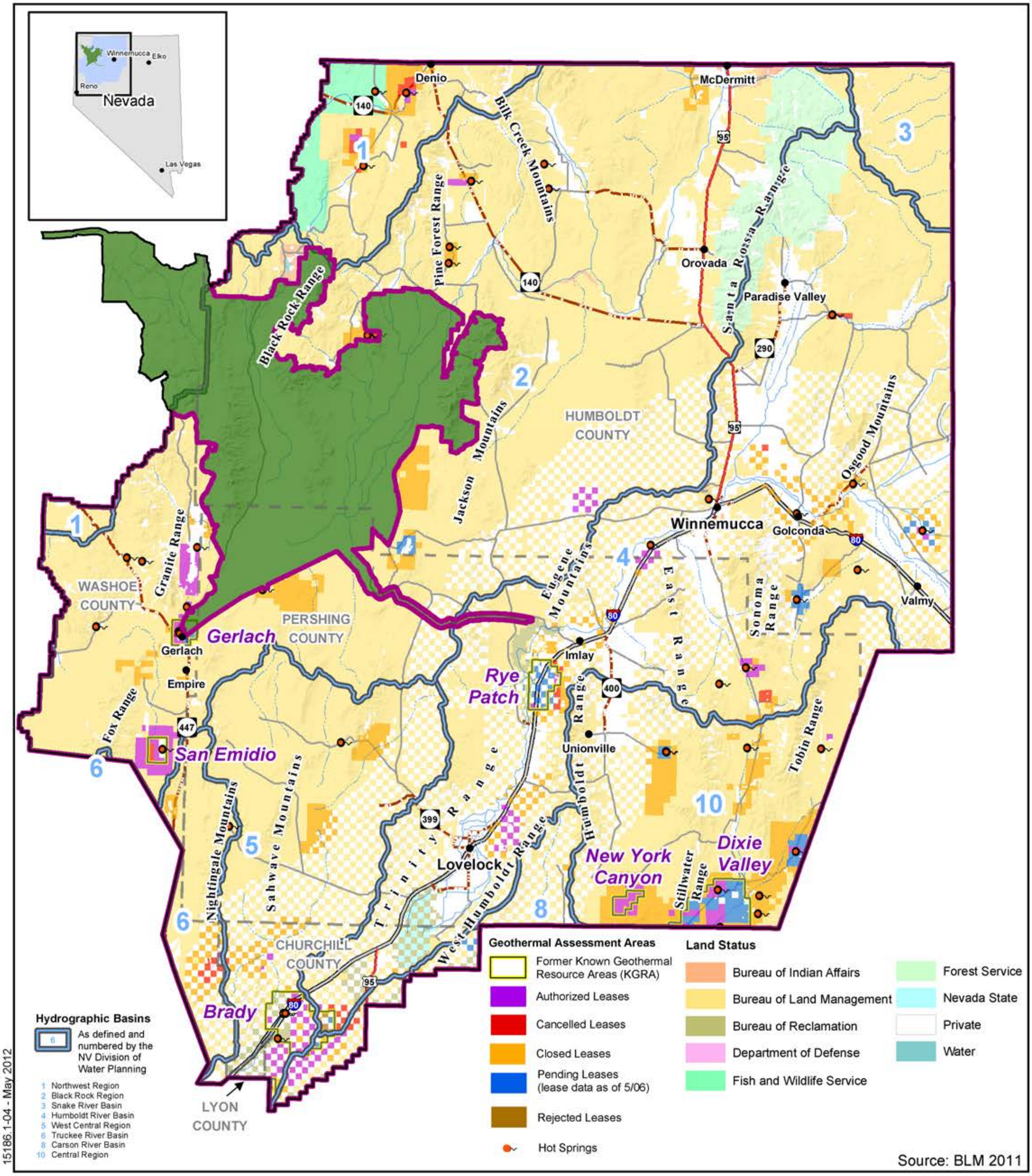
The Ormat geothermal project near Jersey Hot Springs with the snow covered Tobin Range in the background

Geothermal resources occur most often in areas where there is anomalously high heat flow caused by volcanism or near-surface magma or by some other exceptionally hot subsurface body. They often occur along fault or fracture zones, where fracturing allows groundwater to circulate to depths for warming prior to being circulated back toward the surface. The planning area has abundant geothermal resources, including thermal springs, where warm or hot water comes to the surface naturally, and thermal wells, which must be drilled, developed, and sometimes pumped (Figure 3-28).

The BLM issues permits for actions associated with developing geothermal resources on BLM-administered public lands, including exploration that creates surface disturbances, field development and operation, and close-out phases (BLM 2006a) (Figure 3-27). All lands in the WD are open to geothermal resources leasing and development, with the exception of the BRDHRCET NCA, wilderness areas, WSAs, community watersheds, the Mahogany Creek Natural Area, and Pine Forest Closure Area.

The BLM WD prepared the *Geothermal Resources Leasing Programmatic Environmental Assessment* in 2002 (BLM 2002a) to expedite processing pending lease applications and to update the Winnemucca District Regional Geothermal EA for public lands in the assessment area. *Geothermal Resources Leasing Programmatic*, analyzed only those lands that were in areas outlined as potentially valuable for geothermal resource areas, the known geothermal resource areas, and the areas that had existing lease applications. These areas comprise about 28 percent of the land in the WD and are mainly in the southern half of the planning area.

There are six former KGRAs in the WD (BLM 2006a). The former KGRAs in WD were Brady, located in the southwest corner of the planning area in Churchill County; San Emidio, located north of Pyramid Lake on the western edge of the planning area in Washoe County; Gerlach, located just north of San Emidio, also in Washoe County; Rye Patch, located off of US Interstate 80 near Rye Patch Reservoir about 40 miles west of Winnemucca in Pershing County; New York Canyon, located near the southeast corner of the planning area, also in Pershing County; and Dixie Valley, which straddled the planning area boundary and was located in both Pershing and Churchill Counties. The 2003 BLM/National Renewable Energy Laboratory study identified the WD as one



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Winnemucca District RMP Geothermal Occurrence

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

N W E S

0 10 20 Miles

Northwest Nevada

Figure 3-28

of the BLM planning areas with the highest potential for geothermal resources. The top sites for geothermal development were the Brady, Rye Patch, San Emidio, and Dixie Valley KGRAs.

Geothermal energy resource exploration and development has increased dramatically since 2001, with 221 geothermal leases issued from then through 2011. Two large and one small geothermal exploration projects were permitted in 2006 and 2007. The Blue Mountain Drilling Plan of Operations was approved in February of 2006 for seven production wells and five temperature gradient holes. In 2009, a 45-megawatt power plant came on line at Blue Mountain. The Gerlach Green Energy production well was approved in July of 2006 but was never completed. The Jersey Valley Drilling Plan of Operations was approved in June of 2007 for three observation wells and three production wells. A 15-megawatt plant has since been developed there, and came on line in 2010. Geothermal operations that pre-dated the initiation of the RMP process include three power plants and two vegetable dehydration plants within the planning area administrative boundary. The power plants are located at Brady Hot Springs, Desert Peak, and in the San Emidio Desert and range in generation capacity from 5.8 to 30 megawatts. There is also one power plant in the former Dixie Valley KGRA, but it is south of the planning area. The dehydration plants are located at Brady Hot Springs and San Emidio Desert.

In May 2007, the BLM Geothermal Leasing Regulations were updated based on the 2005 Energy Policy Act. The new regulations have disbanded KGRA areas, and all leases are now considered competitive. In August 2007, all parcels offered were leased. The geothermal industry continues to place a high emphasis on public lands being offered for lease. Nevada BLM is conducting lease sales annually. However, BLM is required to hold lease sales every two years. BLM and the USFS completed the Programmatic EIS for Geothermal Leasing in the Western US (BLM and USFS 2008). This EIS addresses what lands would be open or closed to geothermal leasing and presents standardized stipulations, restrictions, and mitigations for geothermal exploration, development, and production.

Locatable

Locatable minerals are minerals for which the right to explore, develop, and extract mineral resources on federal lands open to mineral entry is established by the location (or staking) of lode or placer mining claims as authorized under the General Mining Law of 1872, as amended (BLM 2006a). Mining is also regulated under 40 CFR 3802, Exploration and Mining, Wilderness Review Program, 40 CFR 3809, Surface Management, and 43 CFR 6304, Uses Addressed in Special Provisions of the Wilderness Act, 43 CFR 3715, Use and Occupancy, and other applicable federal regulations.

Lands in the jurisdiction of the WD have a long history of minerals development dating back to the 1860s. Some of the locatable minerals that have been developed and mined include gold, silver, mercury, tungsten, manganese, molybdenum, copper, barite, sulfur, gypsum, limestone, iron, diatomite, and clay, as well as precious and semiprecious gemstones. In addition, uranium, lithium, and vanadium resources have been identified.

Gold and silver are by far the most important metallic minerals mined in the planning area and are produced from ten active mines (BLM 2006a). Most of these gold and silver mines have been in operation for a number of years and include Getchell Underground and Turquoise Ridge Mines, Hycroft Mine, Lone Tree Mine, Marigold Mine, Twin Creeks Mine, Coeur Rochester Mine, and

Florida Canyon Mine. Table 3-31 lists the gold and silver deposits in the planning area and nearby, by name using the same identification number as that originally used by Davis and Tingley (1999). In addition to the metal mines, there are six active industrial mineral mines in the planning area, including two diatomite mines, two dolomite mines, a gypsum mine, and one opal deposit being mined in the Virgin Valley area in the northwestern portion of the planning area on land administered by the USFWS. Table 3-32 lists the industrial mineral mines, prospects, and deposits in the planning area. It should be noted that sodium minerals are leasable, as are some zeolites. Several other industrial mineral commodities may be either salable or locatable depending on the presence or lack of special characteristics. Major mines in the planning area are shown in Figure 3-29; some of these mines are inactive due to market conditions or are undergoing reclamation and closure. Most active mining is occurring between the Osgood Mountains and Battle Mountain, but there is significant activity in other locations in the planning area.

Mine sites administered by the WD are summarized in Table 3-33. As indicated by the number of mines, gold is the primary mineral of interest in the planning area. Approximately 1.2 million ounces of gold were produced in 1995 in the WD-administered boundaries; gold production in 2003 was 1.52 million ounces; in 2010 gold production was 1.05 million ounces.

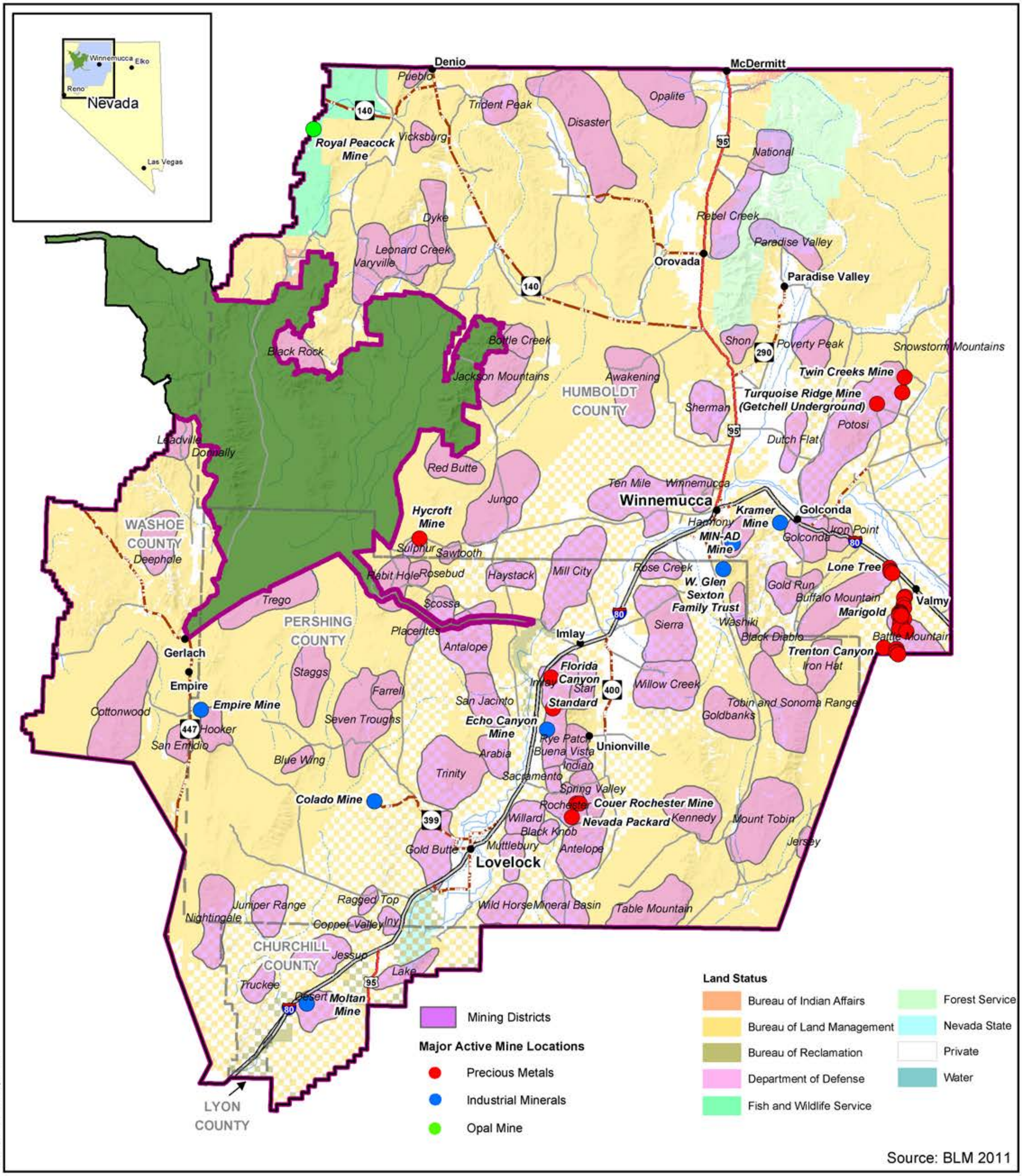
Intense exploration and associated claimstaking has occurred since 1982 in response to the discovery of large gold deposits. The amount of exploration and development has fluctuated with the price of gold. The mining claims located in the WD cover approximately 1.07 million acres assuming no overlap (see Table 3-34, BLM 2006a).

The number of active claims for gold and other locatable mineral deposits in the planning area are presented in Table 3-34.

New development of mineral resources in existing claims and outside of current permitted mine boundaries at idle and active mine sites is possible as new ore deposits and extensions of existing ones are discovered. The development of these ore deposits will be influenced largely by the price of minerals in the marketplace and technological advances that lower the price to mine and process ore. Locatable mineral areas identified as exhibiting a priority for use include existing metal and industrial mineral mines and exploration projects and development of existing mining claims.

Salable

Salable minerals associated with the planning area include aggregate, sand, gravel, clay, pumice, cinder, petrified wood, boulders, and building, ornamental or specialty stone. The WD has an active mineral materials sales program (BLM 2006a). The primary commodities produced in the planning area are sand and gravel. A minor quantity of decorative and building stone, clay, and decomposed granite is also sold to the public. There are about 32 active sales contracts and 73 free use permits issued to state and local government entities, and 33 established community pits. In addition, there are about 170 material site rights-of-way issued to the Nevada Department of Transportation (NDOT) for sand and gravel operations.



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Winnemucca District RMP
Major Active Mines and Mining Districts

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway
- Perennial Stream
- Intermittent Stream

N W E S

0 10 20 Miles

Northwest Nevada

Figure 3-29

Table 3-31
Gold and Silver Mines and Prospects in the Planning Area

Mine #	County	Mine Name	Mine #	County	Mine Name
4	Churchill	Fireball Ridge	214	Humboldt	Kramer Hill
	Churchill	Jessup (7-10)		Humboldt	Lone tree (215-218)
7	Churchill	Central Jessup	215	Humboldt	Wayne Zone (Lone tree)
8	Churchill	North Jessup	216	Humboldt	East Zone
9	Churchill	San Jacinto Zone	217	Humboldt	NW-1
10	Churchill	So. San Jacinto Zone	218	Humboldt	Southeast Zone
	Humboldt	Adelaide Crown (191-192)		Humboldt	Marigold (219-232)
191	Humboldt	North Pit	219	Humboldt	5 North
192	Humboldt	South Pit	220	Humboldt	5 Northeast
193	Humboldt	Ashdown	221	Humboldt	8 North
194	Humboldt	Buckskin National	222	Humboldt	8 South
195	Humboldt	Elder Creek	223	Humboldt	30
	Humboldt	Getchell (197-200)	224	Humboldt	31 North
196	Humboldt	Bud Hill	225	Humboldt	31 South
	Humboldt	Getchell 1978-200)	226	Humboldt	East Hill
197	Humboldt	Central Pit	227	Humboldt	East Hill South
198	Humboldt	Hansen Creek Pit	228	Humboldt	Old Marigold
199	Humboldt	North Pit	229	Humboldt	Pond
200	Humboldt	South Pit	230	Humboldt	Red Rock
201	Humboldt	Powder Hill	231	Humboldt	Ridge
202	Humboldt	Summer Camp	232	Humboldt	Top
203	Humboldt	Turquoise Ridge	233	Humboldt	Pansy Lee
204	Humboldt	Turquoise Ridge shaft		Humboldt	Pinson (234-239)
205	Humboldt	Golden Sage	234	Humboldt	A Zone
206	Humboldt	Golden Shears	235	Humboldt	B Zone
	Humboldt	Hycroft (207-213) (Crowfoot/Lewis)	236	Humboldt	C Zone
207	Humboldt	Brimstone	237	Humboldt	CX
208	Humboldt	Gap Pit	238	Humboldt	Felix Canyon
209	Humboldt	Graveyard Pit	239	Humboldt	Mag
210	Humboldt	Lewis Pit	240	Humboldt	Preble
211	Humboldt	North Pit (Crowfoot)		Humboldt	Redline(241-242) (Converse)
212	Humboldt	South Central Pit	241	Humboldt	North Redline
242	Humboldt	South Redline	414	Pershing	Majuba Hill
243	Humboldt	Sandman	415	Pershing	Nevada Packard
	Humboldt	Sleeper (244-247)	416	Pershing	Relief Canyon
244	Humboldt	Office		Pershing	Rochester (417-418)
245	Humboldt	Sleeper	417	Pershing	East Pit
246	Humboldt	West Wood	418	Pershing	West Pit
	Humboldt	Trenton Canyon (248-254)	419	Pershing	Rosebud
248	Humboldt	North Peak	420	Pershing	Standard
249	Humboldt	Northwest Valmy	421	Pershing	Trinity
	Humboldt	Trenton Canyon (250-253)	422	Pershing	Wildcat (Tag)

Table 3-31
Gold and Silver Mines and Prospects in the Planning Area

Mine #	County	Mine Name	Mine #	County	Mine Name
250	Humboldt			Pershing	Willard (423-428)
251	Humboldt	East Pit	423	Pershing	Honey Bee Nose Pit
252	Humboldt	South Pit	424	Pershing	Section Line Pit
253	Humboldt	West Pit	425	Pershing	South Pit
254	Humboldt	Valmy	426	Pershing	South West Pit
255	Humboldt	Trout Creek	427	Pershing	Willard Draw Pit
	Humboldt	Twin Creeks (256-257)	428	Pershing	Willard Hill Pit
256	Humboldt	Chimney Creek		Washoe	Hog Ranch (436-444)
257	Humboldt	Rabbit Creek	436	Washoe	139
258	Humboldt	Winnemucca	437	Washoe	Airport
	Humboldt	Buffalo Valley (284-288)	438	Washoe	Bell Spring
284	Humboldt	A/B/O Complex	439	Washoe	East
285	Humboldt	Dore Hill	440	Washoe	Geib
286	Humboldt	North Margin Zone	441	Washoe	Hog Ranch
287	Humboldt	Roof Zone	442	Washoe	Krista
288	Humboldt	South Zone	443	Washoe	West
	Pershing	Bruce (406-408)	444	Washoe	White Mountain
406	Pershing	Discovery Zone	445	Washoe	Mountain View
407	Pershing	Santa Fe East Zone		Washoe	Olinghouse (446-447)
408	Pershing	Santa Fe West Zone	446	Washoe	Main Pit
409	Pershing	Clear	447	Washoe	North Pit
410	Pershing	Colado	448	Washoe	Wind Mountain
411	Pershing	Florida Canyon			
	Pershing	Goldbanks (412-413)			
412	Pershing	KW Zone			
413	Pershing	Main Zone			

Source: BLM 2006a.

Table 3-32
Industrial Mineral Deposits in the Planning Area

Commodity	Deposit # This Report	County	Mine Name	Deposit # Map #142*
Stone, Building	1	Humboldt	Virgin Valley (Wegman Quarry)	9
Clay	2	Humboldt	Bull Basin (Montana Mountains)	8
Clay	3	Humboldt	Disaster Peak	9
Fluorspar	4	Humboldt	Sunset	7
Zeolite	5	Humboldt	Spring Creek	11
Zeolite	6	Humboldt	Chimney Reservoir	12
Barite	7	Humboldt	Anderson	37
Wollastonite	8	Humboldt	Getchell	3
Clay	9	Humboldt	Barret Springs	10
Silica	10	Humboldt	Stone Corral	13
Barite	11	Humboldt	Redhouse	38
Barite	12	Humboldt	Horton – Little Britches	39

Table 3-32
Industrial Mineral Deposits in the Planning Area

Commodity	Deposit # This Report	County	Mine Name	Deposit # Map #142*
Sulfur	13	Humboldt	Sulphur	3
Carbonate	14	Pershing	W. Glen Sexton Mine	13
Silica	14a	Humboldt	Kramer Hill Mine	none
Clay	15	Pershing	Rosebud Canyon	27
Carbonate	16	Pershing	Min-Ad Mine East Range	14
Fluorspar	17	Pershing	Mammoth	34
Sodium Minerals	18	Washoe	Buffalo Springs	19
Gypsum	19	Pershing	Empire	20
Perlite	20	Pershing	North Trinity Range	16
Sulfur	21	Pershing	Humboldt House	4
Fluorspar	22	Pershing	Piedmont	35
Fluorspar	23	Pershing	Valery	36
Clay	24	Washoe	San Emidio	31
Diatomite	25	Pershing	Rye Patch	20
Carbonate	26	Pershing	Humboldt Range	15
Sulfur	27	Washoe	San Emidio	5
Diatomite	28	Pershing	Colado (Velvet District)	21
Perlite	29	Pershing	Trinity Range	17
Aluminum Minerals	30	Pershing	Champion	3
Fluorspar	31	Pershing	Needle Peak	37
Zeolite	32	Pershing	Lovelock	24
Perlite	33	Pershing	Pearl Hill (Velvet District)	18
Aluminum Minerals	34	Pershing	Lincoln Hill	4
Talc Minerals	35	Pershing	Humboldt Range Pinite	13
Pumice	36	Pershing	Lovelock	13
Clay	37	Pershing	Coal Canyon Deposits	28
Fluorspar	38	Pershing	Emerald Spar	38
Carbonate	39	Pershing	Buffalo Mountain	16
Zeolite	40	Pershing	Jersey Valley	25
Gypsum	41	Pershing	Lovelock area	21
Fluorspar	42	Pershing	Susie	39
Fluorspar	43	Pershing	Nevada Fluorspar	40
Clay	44	Pershing	New York Canyon (Stoker)	29
Gypsum	45	Pershing	Corn Beef	22
Silica	46	Washoe	Winnemucca Lake	18
Diatomite	47	Churchill	Nightingale (Truckee Range)	1
Zeolite	48	Churchill	Trinity Range	1
Carbonate	49	Churchill	Ocala	1
Stone, Building	50	Churchill	Trinity Range	1
Diatomite	51	Washoe	Nixon	26
Diatomite	52	Churchill	Trinity	2
Sodium Minerals	53	Churchill	White Plains	1
Diatomite	54	Churchill	Moltan Mine Desert Peak (Hot Spring Mountain area)	3
Stone, Building	55	Churchill	Black Mountain	2

Table 3-32
Industrial Mineral Deposits in the Planning Area

Commodity	Deposit # This Report	County	Mine Name	Deposit # Map #142*
Sodium Minerals	56	Churchill	Eagle Marsh	4
Sodium Minerals	57	Churchill	Carson Sink	3
Pumice	58	Churchill	Posalite	2
Diatomite	59	Churchill	Black Butte	4

Notes: *Deposit number from Nevada Bureau of Mines and Geology Map 142 Industrial Minerals of Nevada.
Source: BLM 2006a.

Table 3-33
Major Active Mines in the Planning Area

Mine Name	Commodity
Nevada Packard	Silver
Turquoise Ridge and Getchell Underground	Gold
Hycroft	Gold
Lone Tree	Gold, Silver
Marigold	Gold, Silver
Twin Creeks	Gold, Silver
Coeur Rochester	Silver, Gold
Empire	Gypsum
Florida Canyon	Gold/Silver
W. Glen Sexton	Dolomite
Colado	Diatomite, Perlite
Moltan	Diatomite
MIN-AD	Dolomite
Standard	Gold, Silver

Source: BLM 2006a

Table 3-34
Locatable Mineral Claims in the Planning Area

Active Claim Type	Number of Active Claims	Approximate Total Claim Acres
Lode	41,236	824,720
Mill Site	361	1,805
Placer	2,713	244,170

Source: BLM 2006a

3.3.3 Recreation and Facilities

Recreation

BLM-administered lands in the WD provide opportunities for a wide variety of outdoor recreation activities and related benefits. While most recreation users participate in dispersed recreation activities, either individually or in small groups, others participate in organized events as participants or spectators. Many types of dispersed and organized uses provide for a diverse range of visitor needs and expectations. The BLM manages a large percentage of the landbase in the region, making BLM lands a critical resource for providing recreation opportunities to visitors.

The Water Canyon Management Plan (BLM 1997), Environmental Assessment of the Water Canyon Implementation Plan (August 2005), Porter Springs Recreation Management Plan (BLM 2007c), Pine Forest Recreation Area Management Plan (BLM 1992), the Humboldt County Winnemucca Mountain Hiking/Biking Trail Environmental Assessment (June 2011), and Bloody Shins Trail System Environmental Assessment (BLM 2001a) guide the management of recreation in these specific areas. Due to wildfires during the summer of 2007, most of the Water Canyon area was burned, however the area has since been revegetated and facilities have been added.

Not far from Lovelock, Nevada is Porter Springs, a historic mining site, and modern "oasis in the desert." The spring, along with the surrounding trees, provides a striking contrast to the rugged nearby mountains and sweeping arid landscape of the Great Basin. The area provides habitat for a wide variety of animals, from WHB to migratory birds. Birdwatchers, hunters, campers, and other desert travelers enjoy the spot as a destination or rest stop during outings.

The Pine Forest Range is a site of unique environmental and recreational significance. Emerging from the Black Rock Desert, the Pine Forest Range rises out of desert sage to a subalpine coniferous forest. Of central focus to the site is the glacial moraine-dammed Blue Lake complex. Scattered about the site are numerous mountain meadows and a mix of curlleaf mountain mahogany and aspen forest, in addition to the coniferous forests.

Table 3-35 shows visitation estimates for the entire district and individual sites or areas. Estimates were derived from the Recreation Management Information System (RMIS), a BLM recreation database. Approximately 148,262 recreational users visited the WD planning area in 2010; the Water Canyon and Pine Forest/Blue Lakes Recreation Areas accounted for over 60 percent of total visitor activity in this year. Winnemucca Mountain, which is in the Winnemucca urban interface, is increasing in popularity for area residents, accounting for more than 12 percent of total visitor activity.

Table 3-35
Local Recreation Visitation (2010)

Recreation Area	Annual Visitors
Water Canyon Recreation Area	49,767
Pine Forest/Blue Lakes Recreation Area	43,135
Winnemucca Mountain	19,189
Bloody Shins Mountain Bike Trail	12,485
Lovelock Cave BCB	10,420
Winnemucca Dry Lakebed OHV	7,397
Humboldt Range	3,562
California National Historic Trail	2,195
Caves	112
Total	148,262

Source: BLM 2011

Table 3-36 shows the total visitation to the WD planning area over a six-year period by visits and visitor days. A visit is one person's trip, or visit, to planning area public lands. A visitor day represents one person engaging in an activity for any part of one day.

Table 3-36
Trends in Visitation

	2005	2006	2007	2008	2009	2010	2011
Visits	84,728	97,539	105,939	112,490	111,711	215,444	240,248
Visitor Days	89,069	152,651	159,564	166,781	167,534	291,950	348,349

Source: BLM 2012

Black Rock Desert—High Rock Canyon NCA

In 2000, approximately 1.2 million acres in the northwestern portions of the WD were designated for protection of their scenic, cultural, biological, and recreational resources. Opportunities to participate in unique recreation activities attract visitors from across the country, through the WD, to the Black Rock Desert Playa and surrounding wilderness. Although this RMP does not address recreation in the NCA, the location of the NCA and its popularity among residents of Nevada and surrounding states contributes to the overall recreation visitation to the WD.

Dispersed Recreation

Dispersed recreation activities include but are not limited to OHV use, camping, hunting and fishing, visiting interpretive and educational exhibits, touring the historic trails, sightseeing, pleasure driving, rock and mineral collecting, photography, picnicking, hiking, mountain biking, and hot spring bathing. This wide range of activities is possible because most of the lands in the WD boundary are public and accessible and offer a variety of settings suitable for different recreation activities. The WD began collecting recreation data in 1990. Table 3-37 shows the number of participants in 2011 engaging in various dispersed recreation activities while visiting the WD planning area.

Table 3-37
Dispersed Recreational Activity (2011)

Activity	Number of Participants
OHV	123,690
Hunting	112,437
Pleasure driving	91,360
Fishing	60,955
Camping	59,393
Skiing	55,525
Snowboarding	53,502
Picnicking	49,466
Bicycling (mountain and road)	40,840
Hiking/Walking/Running	34,253
Target practice	28,491
Photography	26,145
Horseback Riding	14,458
Rockhounding	13,846

Table 3-37
Dispersed Recreational Activity (2011)

Activity	Number of Participants
Viewing cultural sites	12,896
Backpacking	9,845
Specialized Motor Sport/Event	8,188
Boating (motorized and non-motorized)	4,456
Environmental Education	3,488
Nature Study	3,310

Source: BLM 2012.

Commercial, Competitive, and Organized Group Recreation Uses

A variety of commercial, competitive, and organized group uses occur in the WD, all of which are administered under the special recreation permit (SRP) program. SRPs allow specified recreational uses of public lands and related waters. Many of the commercial permits, such as those issued to hunting outfitters and guides, are used throughout the district. Competitive permits, such as motorcycle races, are confined to a preapproved race course. A large percentage of the races that have occurred in the Winnemucca District have taken place in the southwest portion of the WD. Other examples of permitted activities include OHV racing, mule racing, mountain bike races, various horse events, wagon trains, cattle drives, four-wheel drive tours, rocketry, and other miscellaneous events. Table 3-38 shows the number and type of permits and the number of participants over a ten-year period. The numbers of visitor use authorizations, used for noncommercial tours, noncompetitive activities, and other uses requiring stipulations but with a smaller degree of management are also displayed in Table 3-38.

While only 12 permits were issued to commercial guides and outfitters from the WD in 2004, the current state-wide permitting system allows other offices to permit use in the planning area as well. The actual number of permitted guides and clients varies each year based on the various NDOW tags the clients draw in, hunt units around the state, and which guides they hire. Unauthorized group uses have also become an issue in recent times.

Table 3-38
Special Recreation Permits

Year	Permit Type (Competitive, Commercial, Organized Group)	Number of Permits	Number of Participants
2003	Competitive	6	2,263
	Commercial	9	
2004	Competitive	5	3,244
	Commercial	12	
2005	Competitive	2	2,619
	Commercial	9	
2006	Competitive	1	4,277
	Commercial	8	
2007	Competitive	0	3,066
	Commercial	9	

Table 3-38
Special Recreation Permits

Year	Permit Type (Competitive, Commercial, Organized Group)	Number of Permits	Number of Participants
2008	Competitive	6	1,455
	Commercial	6	
2009	Competitive	12	3,997
	Commercial	5	
2010	Competitive	7	2,699
	Commercial	6	
2011	Competitive	0	923
	Commercial	7	

Source: BLM 2012

OHV Use

The Winnemucca District has outstanding opportunities for OHV recreation on system roads, thousands of miles of user-classified, unmaintained ways, and several dry lake beds that are passable by vehicle. Approximately 60 percent of visitors to the planning area use OHVs at some point during their visit. OHV use is dispersed throughout the WD. For most visitors, OHVs are used to access recreation destinations by road and to tour remote jeep trails and historic trails. However, a certain percentage of OHV users travel cross-country (off roads or ways) as part of their recreation activity, for example to chase or retrieve game or for challenging play, which has led to resource impacts and conflicts among user groups. Past MFPs and amendments have imposed vehicle restrictions to protect high-value resource areas in the Pine Forest SRMA and in WSAs.

Sand dunes and playas have become popular destination areas for OHV users and may be suitable for cross-country vehicle travel. However, areas adjacent to the dune and lakebeds that appear resilient to users sometimes suffer degradation. Intensive OHV use has adversely affected the visual integrity of unique landscape features, important scenic landmarks, and significant cultural resources. Cross-country travel by ATVs and dirt bikes has created numerous new trails and roads, often in areas that are susceptible to erosion and are not suitable for vehicle travel.

OHV Designations

OHV designations in the WD were established in 1983[2]. The RMP for the NCA included OHV designations for the entire planning area. Discretionary closures are made in emergency situations such as imminent resource damage, and areas in WSAs are limited to existing routes.

BLM-administered lands are open, limited, or closed for OHV use. The BLM maintains current designated areas as follows:

- Closed: 25,242 acres are closed to OHV use (17,838 acres in the Pine Forest Area, 160 acres of the George W. Lund Petrified Forest, 4,544 acres of critical habitat in the Granite Range and any other bighorn habitats deemed appropriate annually during bighorn sheep lambing

[2] *Federal Register* (FR) 48, no. 176 (September 1983)

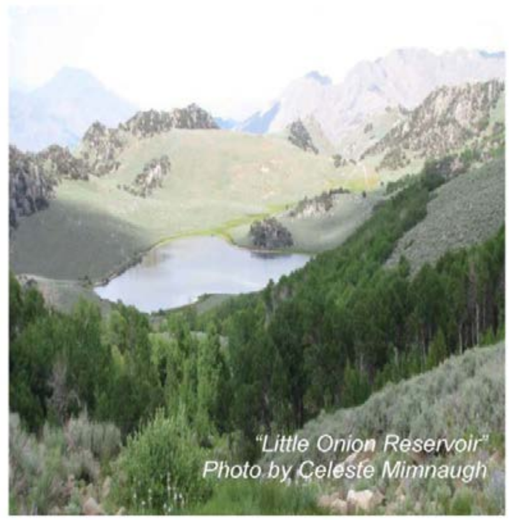
season [February 1-May 31], 121 acres in Water Canyon Zone 1 [permanent], and 2,579 acres in Water Canyon Zone 2 [seasonal]);

- Open: Most of the planning area is designated as open to OHV use (6,782,790 acres, including culturally sensitive areas, areas surrounding the Lovelock Cave, Class I, II, III, IV, and V segments of National Historic Trails, and the trail viewshed); and.
- Limited: All WSAs would be managed to limit OHV use to existing ways and trails (416,570 acres).

Key Features

The most popular recreation destinations include areas that contain water resources, developed facilities, or trails and opportunities to experience historic and prehistoric sites (Table 3-39). Other features that attract visitors include areas with high game populations, opportunities for rock and mineral collecting, and the large, flat dry lakebeds in the district. The table lists areas that the BLM has managed by developing and implementing activity level plans. However, several of the plans are either incomplete or in need of revision to address new issues or needs.

Table 3-40 identifies the areas and resources that represent some of the most popular destinations for dispersed uses in undeveloped areas. These sites and resources are not actively managed for recreation uses and benefits, but they significantly contribute to the overall recreation opportunities available in the WD planning area.



Little Onion Reservoir in the Pine Forest Ranges

Table 3-39
Developed and Semi-developed Recreation Areas in the Decision Area

Management Area/Site	Attractions and Recreation Uses	Recreation Facilities
Blue Lakes Threshold	Glacial Lakes, hiking, camping, self-guided exploration, hunting and fishing opportunities	Rustic campsites (fire ring, picnic table), a vault toilet trailhead kiosk, hiking trails, and parking
Onion Valley Reservoir	Perennial reservoir, camping, self-guided exploration, hunting and fishing opportunities	Rustic campsites (fire rings, picnic tables, vault toilets), and day-use picnic areas
Little Onion Reservoir	Perennial reservoir, camping, self-guided exploration, hunting and fishing opportunities	No facilities
Knott Creek Reservoir	Perennial reservoir, camping, self-guided exploration, hunting and fishing opportunities	No facilities

Table 3-39
Developed and Semi-developed Recreation Areas in the Decision Area

Management Area/Site	Attractions and Recreation Uses	Recreation Facilities
Water Canyon Recreation Area	Perennial stream, trail riding and hiking, camping, self-guided exploration, and hunting opportunities	Primitive campsites, picnic areas, and an interpretive walking trail. Upper trailhead for Bloody Shins Trail
Bloody Shins Trail System	Multiple use trail system, trail riding, hiking, cross-country skiing, and other types of self-guided exploration	Two trailheads, one in Kluncy Canyon and the other in Water Canyon. Multiple use trail system includes: 5.6 mi. easiest 6.9 mi. intermediate 6.9 mi. advanced
Lovelock Cave BCB	Interpretive/picnic site	Two interpretive panels, a half-mile interpretive trail, toilets, and parking area
Winnemucca Mountain Hiking/Biking Trail	Multiple use trails system for hiking and mountain biking. One trail head is adjacent to the Veteran's Memorial Park and where the pavement ends on Bengochea Circle. The Summit Trailhead is located at the top of Winnemucca Mountain.	Constructed trail, kiosks, directional and informational signage Trail system includes: 3.4 mile loop rated 'Easy' 3.9 mile loop rated 'Difficult'

Table 3-40
Undeveloped Recreation Areas in the Decision Area

Management Area/ Resource	Attractions and Recreation Uses	Recreation Facilities
Winnemucca Sand Dunes	Sand dunes and a user-defined road network; hiking, biking, OHV riding	Many miles of roads and trails; a paved road to the top of Winnemucca Mountain; trailhead kiosk at sand dunes and outside of town
Hot Springs	Numerous hot springs at various temperatures and flow rates	No BLM facilities. Warning signs posted alerting visitors of dangers associated with bathing in the springs
Historic trails	California Trail, California Trail (Truckee Route), 1856 Nobles Route, California Trail (Carson Route), 1843-44 Fremont Exploration Route, 1852 and 1856 Nobles Route, 1852 Nobles Route, and Applegate-Lassen Trail	No BLM facilities. Historic trail segments in the WD planning area total 420 miles

Facilities

While BLM does place an emphasis on resource-based versus facilities-based recreation activities, developed facilitates do occur in the planning area. Existing facilities include numerous capital improvements, such as fences, spring developments, windmills, trails, roads signs, or cattle guards. Recreation facilities are sited in the Pine Forest and Water Canyon recreation areas. Onion Valley Reservoir maintains organized campgrounds at Onion Valley Reservoir and at the nearby Blue Lakes Trailhead, with a total of six public primitive restrooms, fire rings, tables, and a number of public information kiosks. The Water Canyon recreation area maintains several campgrounds dispersed along Water Canyon Road throughout Recreation Management Zone 1, complete with picnic tables, and public primitive restrooms. An informational kiosk is located at the entrance of the recreation area and a camp host is available during the peak season of use, from Memorial Day to Labor Day. BLM also manages the McDermitt administrative site, established for fire suppression activities. The site is near the Oregon border in the WD planning area and contains barracks for approximately 15 to 20 seasonal firefighters, water, and septic; one permanent full-time staff person lives on-site year round.

3.3.4 Renewable Energy

Renewable energy includes solar power, wind, and biomass resources. As demand has increased for clean and viable energy to power the nation, consideration of renewable energy sources available on public lands has come to the forefront of land management planning.

In cooperation with the National Renewable Energy Laboratory, the BLM assessed renewable energy resources on public lands in the western US (BLM and DOE 2003). The BLM reviewed the potential for concentrated solar power (CSP), photovoltaics (PV), wind, biomass, and geothermal energy on USDI , Bureau of Indian Affairs, and Forest Service lands in the West. Hydropower was not addressed. While geothermal is a renewable energy source, it is considered a leasable mineral and, therefore, is covered under Section 3.3.2, Minerals – Leasable, Locatable, and Salable, of this document.

Solar

Approximately nine percent of BLM lands in the WD are considered favorable for developing a solar resource of six kilowatt-hours or greater per square meter per day on a slope of less than or equal to one percent. The solar resource would be in the form of CSP systems that track the sun throughout the day, such as trough collectors or dishes. The planning unit ranked fourth in total land area among the top 25 BLM planning units in the US having the highest CSP potential. About four percent of BLM lands in the WD are considered favorable (with a solar resource of six kilowatt-hours per square meter per day or greater) for PV development (BLM and DOE 2003). Areas favorable for PV are concentrated southeast of Empire. The planning area also was among the top 25 BLM planning areas in the US having the highest PV potential.

Wind

Wind power classes range from 1 (lowest) to 7 (highest). BLM-managed lands in portions of the planning area are Class 3 and higher, although the planning area is not in the top 25 BLM planning units in the US having the highest wind energy potential (Class 5 and higher) (BLM and DOE 2003).

The Programmatic EIS on Wind Energy Development on BLM-Administered Lands in the Western US (BLM 2004b) categorizes BLM-administered lands into areas having a low, medium, or high potential for wind energy development from 2005 through 2025, on the basis of their wind power classification. Wind resources in Class 3 and higher could be developed economically with current technology over the next 20 years. Class 3 resources have medium potential; resources in Classes 4 and higher have high potential. The Programmatic EIS identifies scattered public land parcels in the planning area with medium or high wind resource potential that might be developed economically with current technology; these are concentrated along ridgetops near the western and southeastern WD boundaries. There has been some interest in developing wind energy in the WD. Current activity includes placement of meteorological towers.

Biomass

The BLM/National Renewable Energy Laboratory study evaluated the long-term sustainability to support biomass plants using the monthly Normalized Difference Vegetation Index (NDVI) computed from National Aeronautics and Space Administration's (NASA's) Advanced Very High Resolution Radiometer Land Pathfinder satellite program. The WD is not in the top 25 BLM planning areas having the highest potential for biomass resources. For an area to have biomass development potential, it had to meet the following criteria: an NDVI of 0.4 for at least four months between April and September, a slope less than 12 percent, no more than 50 miles from a town with at least 100 people, and BLM- and USFS-compatible land use. About three percent of BLM lands in the WD meet these criteria, along I-80 near Lovelock, Winnemucca, and Golconda, along Route 140 between Winnemucca and Denio, along US 95 near Orovada, and near Paradise Valley. The areas with the highest biomass potential are near Lovelock, slightly north of Golconda, and just south of the Disaster Peak WSA (BLM and DOE 2003).

3.3.5 Transportation and Access

Roads in the WD planning area provide access for recreationists, ranchers, resource specialists, and administrators. Interstate Highway 80, US 95 Veterans Memorial Highway, and State Highway 447 are the primary paved roads in the planning area. Other improved roads in the planning area include Little Owhyee, High Road, Water Canyon, Blue Lakes, and Onion Reservoir. The transportation network is composed of state, county, and BLM System Roads.

Most of BLM's System Roads fit into one of three functional classifications: resource roads, local roads, and collector roads. Each BLM road is assigned a maintenance level, ranging from 1 to 5, with 1 representing the lowest level of maintenance and 5 representing the highest. Routes designated as maintenance level 1 are not registered in the BLM maintenance system, and there are no maintenance level 5 classifications in the planning area. Approximately 80 percent of the roads in the planning area are classified as maintenance level 2. User cost, safety, comfort, and travel time are primary road management considerations.

BLM's System Roads inventory includes 75 roads. Approximately 70 percent of these are resource roads, which receive minimum maintenance, are typically open seasonally, receive limited traffic, and are primarily for BLM administrative use. They are frequently classified at maintenance level 2. Local roads normally serve a larger resource area and connect to collector roads or to county or state highways. Collector roads normally provide access to large blocks of public land and connect to or are extensions of county and state highways. They generally receive the highest volume of traffic of all the roads in the BLM road system and require the highest standards for safety, comfort, and travel time. Collector roads are commonly classified at maintenance level 4, receiving the highest amount of maintenance annually and comprising five percent of the BLM's road network.

All BLM System Roads in the planning area are considered low-volume native surface roads; there are no bituminous-surfaced roads, but there are numerous crushed/pit run aggregate surfaced roads. Most roads have evolved into the system over the years as the public created their own access. Roads with the highest public use receive regular routine maintenance. Native surfaced roads are susceptible to seasonal damage by users and closure due to weather conditions. Use of these roads during the wet season causes irreparable resource damage to both the resource and the road itself. Increased levels of visitor use in the planning area are triggering the need to improve roads and upgrade maintenance levels based on that use.

BLM System Roads classified maintenance level 4 have the highest use and need for public safety. Maintenance classifications are updated through on-the-ground condition surveys and observations performed by the District Engineering staff. Roads of high priority use in the planning area include the following:

- Little Owhyee, maintenance level 4;
- High Road, maintenance level 4;
- Water Canyon, maintenance level 4;
- Blue Lakes, maintenance level 3; and
- Onion Reservoir, maintenance level 3.

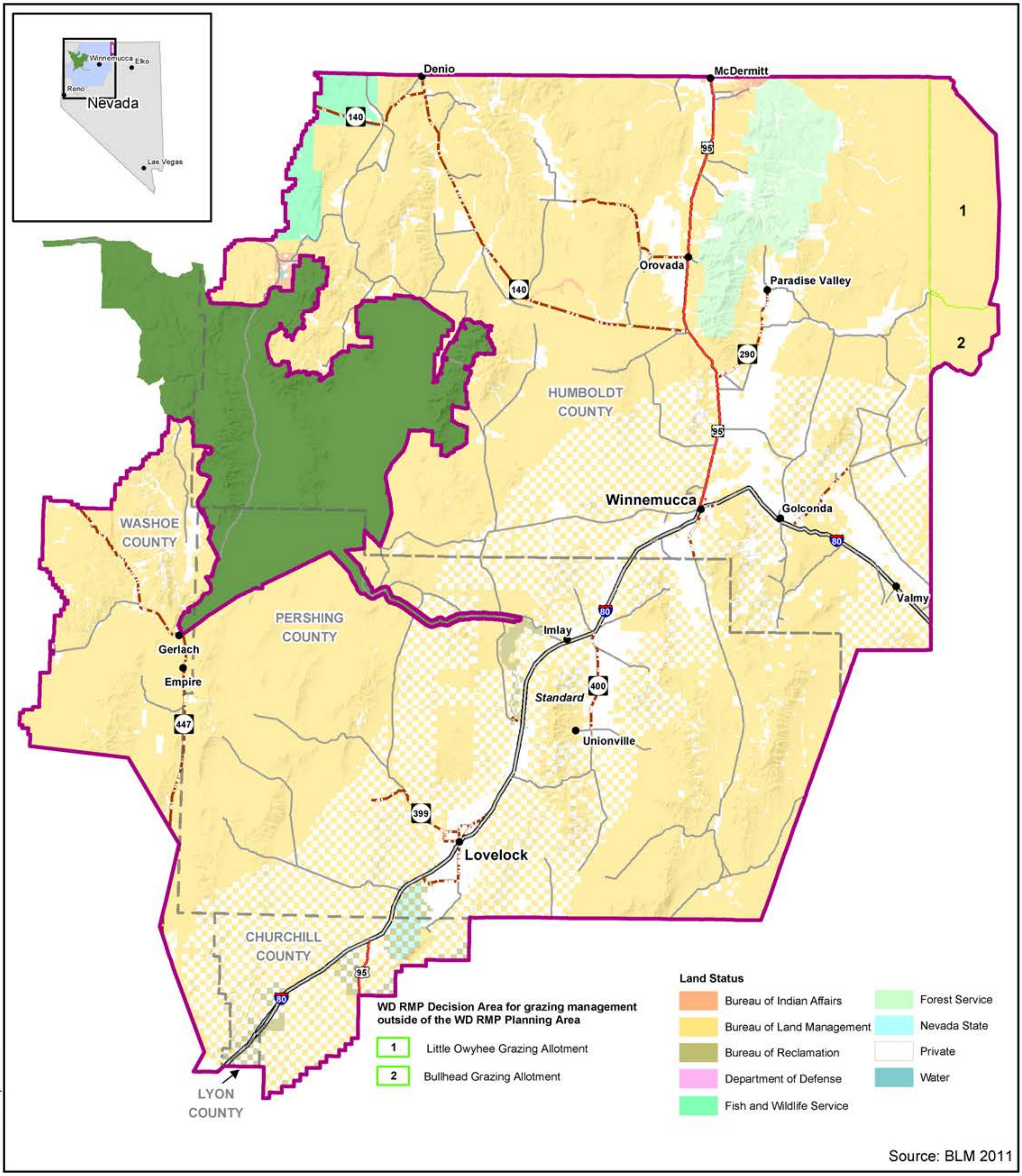
BLM is designated as its authority for road maintenance through 23 US Code from Federal Highways Administration through Federal Lands Highway Program. Even though no BLM roads are considered "public roads" at this time, BLM is still responsible for the safety of its employees and the public that uses BLM System Roads.

3.3.6 Lands and Realty

Land Status

The WD decision area encompasses about 8.4 million acres of public lands and includes most of the resources or resource uses on public land for which the BLM has authority and makes decisions (Figure 3-30). The BLM's decision area includes minerals of split estate (areas where the BLM administers federal subsurface minerals, but the surface is owned by a nonfederal entity, such as private land). It does not include other private lands, state lands, Indian reservations, federal lands not administered by the BLM, and lands in the planning area of the RMP for the Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area and Associated Wilderness Areas and other contiguous lands.

The WD planning area administrative boundary encompasses 11,280,888 acres in Humboldt and Pershing counties and parts of Washoe, Lyon, and Churchill counties; this acreage includes all lands in the WD administrative boundary regardless of ownership. The WD decision area, which is the



No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Winnemucca District RMP/EIS Decision Area

Legend

- BLM Winnemucca RMP Decision Area
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-30

area applicable to this planning effort, encompasses about 8.4 million acres of public lands and does not include the BLM NCA in the northwestern portion of the WD planning area (Table 3-41). Due to the scattered land pattern and the isolated nature of many of the public land parcels, management can be difficult.

Table 3-41
Landownership in the Planning Area

Landowner	Acres
Bureau of Land Management*	8,427,078
Bureau of Indian Affairs	21,473
US Fish and Wildlife Service	107,460
US Forest Service	275,278
State of Nevada	16,426
Private	2,349,873
Water Features	840
Department of Defense	17
Total Planning Area**	11,280,888

*Includes NCA acres.
**Does not reflect land administered by WD outside of administrative boundary.
Source: BLM 2011

The Railroad Act of 1862 and water resources are the main influences on land ownership in the planning area. Under the Railroad Act, the government gave the railroad company ten square miles of land for each mile of track that was completed (National Park Service 2005). The Railroad Act granted to the railroad every other section (one square mile) twenty miles each side of the railroad centerline. This grant resulted in a checkerboard pattern of public-private land parallel to the railroad right-of-way that still exists. Along with the land grants, a 400-foot right-of-way was also given to the railroad company.

Where there was water, the railroad sold the land. Where there was no water the railroad retained ownership until the 1990s. The Homestead Act of 1862 turned over vast amounts of the public domain to private citizens, who homesteaded where there was water. In the planning areas, private landownership follows the path of streams down canyons. In some places settlers claimed the land around springs.

Withdrawals

A withdrawal is a formal action that results in one or more of the following actions:

- Transfers total or partial jurisdiction of federal land between federal agencies;
- Segregates (closes) federal land to some or all of the public land laws and mineral laws; or
- Dedicates land for a specific public purpose.

The three major categories of formal withdrawals are congressional, administrative, and Federal Power Act or FERC withdrawals. Congressional withdrawals are those made by Congress in the form of public laws (Acts of Congress). Administrative withdrawals are made by the President, Secretary of the Interior, or other authorized officers of the executive branch of the federal government. Federal Power Act or FERC withdrawals are power project withdrawals established under the authority of the Federal Power Act of 1920.

The WD area includes several withdrawals (Figure 3-31). The land around Rye Patch Reservoir and land in the area of Toulon and the Humboldt Sink were withdrawn for the Bureau of Reclamation. In addition, the Sheldon National Wildlife Refuge was withdrawn for the USFWS, and the Santa Rosa Ranger District was withdrawn for the USFS. Also, the Fort McDermitt Indian Reservation and Summit Lake Indian Reservation are in the northern portion of the planning area. Other types of withdrawals or de facto withdrawals include land use classifications for recreation and public purposes. These withdrawn lands receive varying degrees of management, depending on the land uses and type of withdrawal.

By Executive Order, dated April 17, 1926, Public Water Reserve 107 (PWR 107), all public lands of the US containing a spring or water hole needed or used for public purposes were included in a blanket withdrawal without identification of the lands affected. According to the Executive Order, the land is "withdrawn from settlement, location, sale, or entry." Lands withdrawn under PWR 107 have not all been identified on Master Title Plats, so a land transaction can occur without the knowledge that the land is withdrawn under PWR 107. This makes protection and management under this Executive Order difficult.

Land Use Authorizations

Land use authorizations are issued for a variety of purposes, both short-term and long-term. Examples of short-term uses include agricultural leases and other uses involving minimal land improvements or disturbances. Examples of long-term uses include rights-of-ways for power lines, highways, roads, communication sites, and sand and gravel sites.

Land Use Permits and Leases

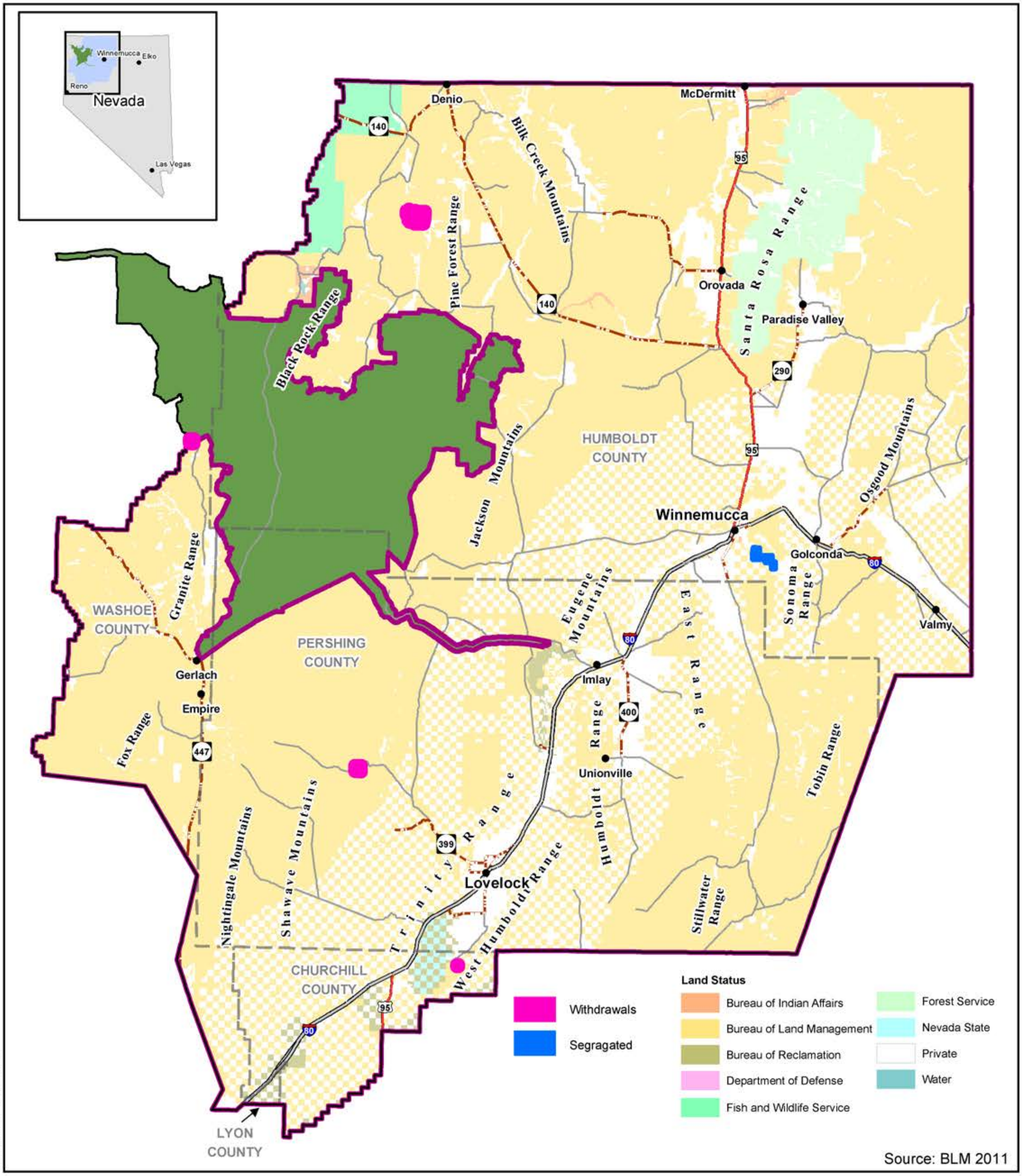
A lease is an authorization to possess and use public land for a fixed period. A lease is issued when there is going to be substantial construction, development, and improvement and there is an investment of large amounts of capital that will be amortized over time.

Permits are authorized when uses of public lands will be short-term and involve little or no land improvement, construction, or investment. Permits have been a method used to clear up unauthorized use, stipulating that the applicant remove or halt the unauthorized use and rehabilitate the land if necessary.

The Recreation and Public Purposes Act allows state and local governments, as well as qualified nonprofit organizations, the opportunity to lease (and potentially patent) public land where there is a strong public need for a particular use. The WD has leased lands under this authority for a variety of purposes.

Rights-of-Way

The WD has designated one utility corridor on the Black Rock Playa along the Western Pacific Railroad tracks. In addition there is a utility corridor for the nationwide gas line from Owyhee across the planning area and Valmy power lines from the Valmy power plant across the planning area.



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Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Winnemucca District RMP Existing Withdrawals

Northwest Nevada

Figure 3-31

Transportation system authorizations include reservations made for state and federal highways and ROWs granted to counties and individuals for access roads. Attempts are made to group compatible facilities where possible.

The BLM has had a longstanding partnership with the Western Utilities Group concerning planning, identification, and designation of utility corridors in the western US. The BLM endorsed the Western Utilities Group's 1992 Western Regional Corridor Study and committed to using it as a primary reference in designating utility corridors through the land use planning process.

With the large number of varying ROW authorizations, it is important that all environmental resources and concerns be taken into consideration. There could be loss of resources or environmental damages that may be prevented if compatible uses are analyzed and, where possible, consolidated.

The BLM typically uses avoidance and exclusion areas to protect resources and to prevent unnecessary or undue environmental damages.

According to current BLM guidance and the President's National Energy Policy, the BLM objective is to continue to make BLM-administered land available for needed ROWs where consistent with national, state, and local plans and to use ROWs in-common to minimize environmental impacts and proliferation of separate ROWs. This guidance and policy also pertains to ROWs for alternative, renewable energy resources, such as wind, solar, geothermal, and biomass.

Communication Sites

The WD has numerous communication sites in its boundaries. Most of the sites are occupied by more than one user.

Land Tenure Adjustment

As stated above, the WD area contains a mixed ownership land pattern. Although the potential for resource values may be high on some public land parcels, lack of access or isolation from other resources of these parcels make it very difficult to manage. Land tenure adjustments in the planning area help to resolve split mineral estate situations, to consolidate public land (through sale, exchange, or acquisition), to acquire access, and to resolve unauthorized use cases. Land tenure adjustments are also important to the local and state governments to consolidate ownership and to make lands available for public purposes. FLPMA and other federal laws, Executive Orders, and policies suggest criteria to use when categorizing public lands for retention or disposal and for identifying acquisition priorities.

Split Mineral Estate

Split mineral estate situations typically involve private surface ownership and federal subsurface ownership. There is no statistical data as to the percentage of split estate lands in the planning area. Additionally, there are some split estate situations where the federal government owns the surface and the mineral estate is held by private individuals. Through various acts, the federal government has retained mineral values, while encouraging settlement. As late as the 1980s, BLM policy concerning mineral estate was to reserve all oil and gas rights, as well as any other mineral values. Those lands in which the US has reserved minerals and which contain valuable mineral resources are generally kept in federal ownership. Many of the private surface owners have requested that the subsurface minerals be sold or transferred to their ownership. Management of the existing split estates has been and will continue to be a challenge.

Consolidation

With the current scattered land pattern of the WD area, the BLM continues to struggle with the management of isolated or small parcels. Many of these parcels have little resource value and would be a benefit to a private citizen and the local tax base. Large areas of land would be categorized for land tenure adjustments allowing the BLM to use the proper authority to block up land. By blocking up lands, management would be more effective. The BLM could dispose of lands with lower resource values and could acquire lands with valuable habitat, recreational value, scenic value, or opportunity for resource development. More acreage would be available for lease or conveyance under the Recreation and Public Purposes Act, allowing the state and nonprofit organizations to develop and use lands for important community recreation and public purposes.

Land Disposal

BLM lands classified as being available for disposal are identified in the 1999 Lands Amendment (BLM 1999). Public lands that may be suitable for disposal through transfer to another agency, exchange, or public sale are identified as Zone 3 lands (2,989,030 acres). Public lands identified in Zone 2 (1,281,383 acres) are evaluated on a case-by-case basis to determine if they are suitable for disposal. All lands in Zone 1 (2,936,548 acres) will be retained in federal ownership. Public land is exchanged when parcels meet the criteria under Section 206 of FLPMA. Public land is sold when parcels meet the disposal criteria under Section 203 of FLMPA.

Zone 3 lands are located throughout the WD. However, no criteria are identified in the Lands Amendment defining the exact locations of boundaries separating Zone 3 lands from Zone 1 and 2 lands. As a result of having to rely on lines drawn on a map, it has been difficult identifying the boundaries of Zone 3 lands, especially around Interstate 80.

Certain lands have been excluded from disposal through the planning process or congressional action. Excluded from disposal are crucial wildlife habitat areas, as identified in the Paradise-Denio MFP and Sonoma-Gerlach MFP (BLM 1982a, 1982b). Lands that have been withdrawn from appropriation under the public land laws are also excluded from disposal. Additionally, lands in a designated wilderness or wilderness study area are required to be retained in federal ownership.

Land Acquisition

Private land acquisition is authorized under section 205 of the FLPMA, primarily through land exchanges with private landowners and the state. According to the 1999 Lands Amendment, land acquisitions are considered on a case-by-case basis and must meet acquisition criteria outlined in the Lands Amendment (BLM 1999).

The Southern Nevada Public Land Management Act (SNPLMA) became law in October 1998. One of the provisions of SNPLMA was for the orderly disposal of certain federal lands in Clark County, Nevada, and for the acquisition of environmentally sensitive lands in the state of Nevada. The WD has acquired lands using SNPLMA funding and may do so in the future.

IM NV-2005-062 provides guidance on the administration of purchased lands. Acquisitions of land and interests in land using funds authorized under the SNPLMA are completed for special purposes and require special management considerations to protect the resource values on these lands. NEPA compliance is required for all acquisitions. Unless the existing land use plan and activity plan and the accompanying NEPA documents are sufficiently detailed, site-specific analysis and a distinct written decision would be required for acquisitions funded under the authority of the SNPLMA.

Lands can also be acquired via the Land and Water Conservation Fund Act of 1965, which provides funds for the Federal acquisition and development of certain lands.

Land Retention

According to the 1999 Lands Amendment, in general, all public lands (Zone 1, 2, and 3) administered by the WD will be retained unless, through environmental analysis and public scoping, it is determined that the lands meet the criteria for disposal and the disposal action is in the public's interest (BLM 1999). However, all lands in Zone 1 (2,936,548 acres) will be retained in federal ownership.

Access

Access needs are subsequently prioritized and worked on when there are landowners willing to grant an easement to the BLM or sell land in order to provide access to public lands. In recent years private property owners have begun to close access to public lands where that access is across private lands. Usually this closure is due to a change in ownership of the private property. The closings pose two problems to the BLM. First, they create problems in managing the public lands. Land managers and specialists must find alternate routes into the public lands. This can be critical in emergency situations such as fire suppression.

The first problem is difficulty in managing public lands. The second problem is that the public expects to have access to their public lands, especially when there has been a traditional route that is suddenly closed. The public then demands that the BLM acquire access through the private property.

It is anticipated that these access problems will continue as traditional properties are sold to individuals and entities that do not wish to allow the public to cross their property to access public lands.

Trespass

Trespass includes unauthorized use, unauthorized occupancy, and unauthorized development. Unauthorized use refers to activities that do not appreciably alter the physical character of the public land or vegetative resources. Some examples of unauthorized use include the abandonment of property or trash, enclosures, and use of existing roads and trails for purposes that require a right-of-way grant. Unauthorized occupancy refers to activities that result in full- or part-time human occupancy or use. An example would be the construction, placement, occupancy, or assertion of ownership of a facility or structure (such as a cabin, house, natural shelter, or trailer). Unauthorized development means an activity that physically alters the character of the public lands or vegetative resources. Examples include cultivation of public lands and road or trail construction/realignment.

There are some documented and unresolved trespass cases in the WD area. The BLM expects that there are trespass cases that have not been discovered or documented. Some of the trespasses include dumps, roads, and occupancy. Workload priorities and limited staffing usually require that unauthorized use/occupancy cases are prioritized. Public safety issue associated with unauthorized use/occupancy, as well as a potential loss of valuable resources would be prioritized as high for resolution. If the unauthorized use damages the lands or resources, the BLM is required to pursue cost recovery from the potentially responsible party.. Resolving the unauthorized use of public lands could protect valuable resources, prevent damage to resources, protect public safety, and allow the BLM to collect money for damages, processing, monitoring, and rental.

3.4 SPECIAL DESIGNATIONS

There are special designations that fall in the WD administrative boundary, but several areas are in the planning area of the Black Rock Desert-High Rock Canyon Emigrant Trails (Black Rock) National Conservation Area (NCA) Plan, which was approved in 2004. Special designation areas addressed in the Black Rock NCA plan will not be addressed in the Winnemucca RMP.

3.4.1 Areas of Critical Environmental Concern and Research Natural Areas

An area of critical environmental concern (ACEC) is an area of public land where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes or to protect life and safety from natural hazards. The restrictions associated with an ACEC designation are determined at the time the designation is made and are designed to protect the values or serve the purposes for which the designation was made.

There is one ACEC in the administrative boundary of the WD. The Osgood Mountains ACEC, located in the WD RMP decision area, is approximately 60 acres. This ACEC is habitat for the Osgood Mountains milkvetch (*Astragalus yoder-williamsii*), which is state listed as critically endangered.

Appendix F contains the relevance and importance evaluation analysis report of 29 areas nominated as ACECs for the BLM, Winnemucca District Office, RMP/EIS. The evaluations document whether nominations meet the relevance and importance criteria as provided in *BLM Manual 1613 Areas of Critical Environmental Concern* (BLM 1988). Three of the 29 nominations meet the criteria and will move forward for further consideration. The Osgood Mountains ACEC will also be brought forward. The remaining 25 nominations have been dropped from further analysis as potential ACECs.

Future management of ACECs would be outlined in a subsequent ACEC management plan. The plan may, for example, indicate that ACECs could be considered for mineral withdrawal in order to protect the resources for which the ACECs were designated.

3.4.2 Wild and Scenic Rivers

According to the Wild and Scenic River Report (Appendix G-BLM 2006b), three stream segments have potential for inclusion in the National Wild Scenic Rivers System, as follows:

- North Fork of the Little Humboldt River
  - Length in Planning Area, 18.0 miles,

  - Tentative classification, 18 miles Wild,
  - Proposed boundary, approximate 0.5-mile corridor centered on the river, from private land at Greeley Crossing to private land upstream of Chimney Reservoir;
- Crowley Creek
  - Length in Planning Area, 13.6 miles in the Montana Mountains,
  - Tentative classification: 5 miles Wild and 8.6 miles Scenic,
  - Proposed boundary: Approximately 0.5-mile corridor centered on the river, from the headwaters to private property;
- Washburn Creek
  - Length in Planning Area, 11.8 miles in the Montana Mountains,
  - Tentative classification, 5 miles Wild and 6.8 miles Scenic, and
  - Proposed boundary, approximately 0.5-mile corridor centered on the river, from the headwaters to confluence with Little Washburn Creek.

The outstandingly remarkable values of these river segments and land use along these rivers are described in detail in the Wild and Scenic River Report (BLM 2006b). The NWSRS eligible segments of Washburn Creek and Crowley Creek fall within Priority Habitat and Priority Watersheds as defined in this RMP. The entirety of the NWSRS eligible North Fork of the Humboldt River segment falls within the North Fork of the Little Humboldt River WSA. The North Fork of the Little Humboldt River segment flows through the Little Owyhee and William Stock Allotments. Washburn Creek segments flow through the Jordan Meadows and Washburn Allotments. Crowley Creek segments flow through the Jordan Meadows and Crowley Creek Allotments.

3.4.3 Backcountry Byways

The WD currently maintains one backcountry byway (BCB), the Lovelock Cave BCB. This is a 20-mile driving tour, showcasing thousands of years of human history. The tour begins in Lovelock at the historic Marzen House Museum, which has a BLM exhibit featuring artifacts from Lovelock Cave and vicinity. From there, 11 numbered stops (12 total including the museum) highlight the Central Pacific Railroad, Lovelock's Chinatown, its unique courthouse, the California Trail, the area's agricultural, natural, and cultural history, and Lovelock Cave. Discovered in the early twentieth century, prehistoric artifacts found in Lovelock Cave, including the world's oldest duck decoys, provided a valuable insight into lifestyles of the native people who had once lived in the area. A short nature trail at the site identifies many of the plants that were essential to survival of those early inhabitants. An interpretive driving guide leads the visitor along the route, and interpretive signs at the Marzen House and Lovelock Cave provide additional information. A children's activity book makes the byway family friendly. There is a restroom and sheltered picnic table and parking area at the cave. The byway was designated in 1994 and was dedicated in 2003. A recreation area management plan and a cultural resource management plan have been completed. The Lovelock Cave BCB is also addressed under Section 3.3.3, Recreation and Facilities.

3.4.4 National Historic Trails

National Historic Trails include the California Trail, the Applegate-Lassen Trail, and the Nobles Route (Figure 3-32). These trails are described under Section 3.2.13, Cultural Resources. National Historic Trails addressed in the Black Rock NCA plan will not be addressed in the Winnemucca RMP.

In September 2012, the BLM issued new guidance (BLM 2012f, 2012g) for management of National Scenic and Historic trails and trails under study or recommended as suitable for Congressional designation. The WD Proposed RMP was under final internal review at the time the guidance was issued. The WD would manage to protect National Historic Trails while a National Trail corridor is defined. A viewshed analysis inventory and assessment would be completed for projects that would likely cause adverse impacts on trails and trail settings. Mitigation measures would be implemented to reduce adverse impacts on trails or trail settings.

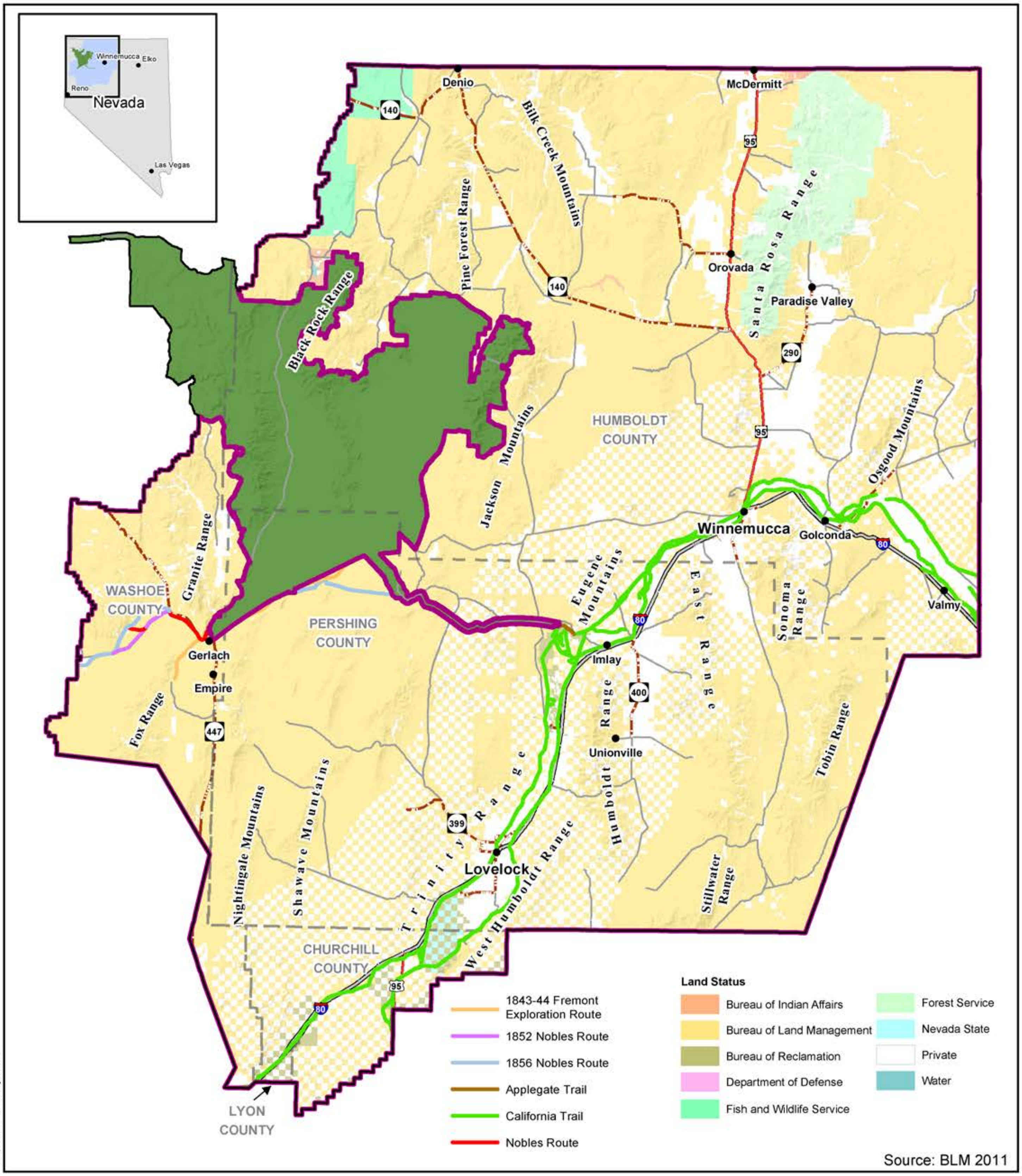
The WD contains trails that are currently under a National Trail Feasibility Study which is being conducted by the National Park Service (NPS). The NPS is in the process of completing an environmental assessment for these studies. Public scoping was held in the spring and summer of 2011.

3.4.5 Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics

As described in the Wilderness Act of 1964 (PL 88-577), naturalness occurs when an area generally appears to have been affected primarily by the forces of nature with the imprint of humans substantially unnoticeable. Wilderness character conditions tend to be more qualitative in nature, measuring the overall landscape and naturalness of an area as a result of changes to levels of recreational activities, development, and surrounding land use trends. Indicators that can quantitatively be measured include changes to route designations, including the number of unauthorized trails, the number of encounters with other users, and anticipated facility development. Human-caused sights and sounds outside the inventory area should not automatically lead to a conclusion that the area lacks wilderness characteristics.

Areas that offer solitude should provide "outstanding" opportunities for individuals to avoid sights, sounds, and evidence of other people in the inventory area. Factors influencing solitude may include natural screening, such as vegetation or topography, or the opportunity for a person to find a secluded spot. Unconfined recreational experiences focus on undeveloped recreational activities or those that do not require facilities or motorized equipment.

IM 2003-275, Consideration of Wilderness Characteristics in Land Use Plans (Excluding Alaska), provides guidance regarding the consideration of wilderness characteristics in the land use planning process (BLM 2003b). Typically, the resource information contained in the BLM wilderness inventories was collected to support a land use planning process. Public wilderness proposals represent a land use proposal. In either case, the BLM is authorized to consider such information during preparation of a land use plan amendment or revision. For example, information contained in BLM wilderness inventories and public wilderness proposals may be considered when developing the affected environment section of the NEPA document that accompanies the land use plan. The information may also be used to develop the range of alternatives or to analyze the environmental impacts on the various natural, biological, and cultural resources, as well as resource uses.



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Winnemucca District RMP
National Historic Trails

Legend

BLM Winnemucca District Administrative Boundary
BLM Winnemucca RMP Boundary
Black Rock/High Rock NCA RMP Area
County Boundaries

Towns
U.S. Highway
U.S. Interstate
County Road
State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-32

During the RMP/EIS public scoping period, a public advocacy group identified the following areas as having potential for wilderness character:

- Lava Beds/Dry Mountain;
- Bluewing Mountains;
- North Sahwave Mountains;
- Fencemaker Area of the East Range; and
- Portion of the Tobin Range, between the China Mountain WSA and the Mount Tobin WSA.

These citizen-proposed areas were evaluated by the Nevada Wilderness Coalition, the Pershing County Checkerboard Lands Committee, and BLM staff. The Nevada Wilderness Study Area Notebook (BLM 2001b) was used as a basis for the evaluations. In general, the remote and rural natures of the lands in the planning area have helped to protect the potential wilderness characteristics of the areas. Wilderness characteristics, such as roadlessness, naturalness, and areas that offer solitude and opportunities for primitive, unconfined recreational experiences should be evaluated.

Existing BLM records and institutional knowledge of the area indicate the Lava Beds/Dry Mountain area is crisscrossed with several roads that are frequently used. Also, the western portion of the Bluewing Mountain area (the playa) is also crisscrossed with roads and is used heavily for recreation by motorized and mechanized vehicle and model aircraft operators. Because of this, the Lava Beds/Dry Mountain Area and the western portion of the Bluewing Mountain area will not be analyzed. The remaining portion of the Bluewing Mountains and the other three identified areas are analyzed in this RMP (Appendix A, Figure 2-74).

There are ten designated wilderness areas and portions of two others in the Black Rock NCA RMP area, which is encompassed by the WD administrative boundary. The Lahontan Cutthroat Trout WSA/Instant Study Area [ISA] is also in the planning area boundary of the Black Rock NCA. Because these areas were addressed in the Black Rock NCA RMP, they are not mentioned further in this document.

The BLM has conducted a wilderness characteristics inventory of certain lands purchased in 2008. Also identified as the Jaksick Purchase, these lands were acquired with SNPLMA funds. SNPLMA authorizes the BLM to sell certain public lands in the Las Vegas Valley and to use the proceeds to acquire environmentally sensitive lands throughout Nevada. The BLM conducted the wilderness characteristics inventory during the summer of 2009 to analyze two groups of acquired land parcels, both in the Granite Range north of Gerlach, Nevada. A wilderness characteristics area is at least 5,000 roadless acres that are largely natural and with outstanding opportunities for either solitude or a primitive and unconfined type of recreation. As a result of the inventory, the following two areas were identified as having wilderness characteristics:

- Granite Peak Wilderness Characteristics Area (approximately 42,700 acres) and
- Buckhorn Peak Wilderness Characteristics Area (approximately 23,400 acres).

These two areas are analyzed in this RMP/EIS.

The EIS for the Ruby Pipeline Project (FERC 2008) included desktop evaluation of the pipeline route for wilderness characteristics. The desktop analysis, conducted November 2009, determined that four parcels likely possessed wilderness characteristics. The parcels were:

- Bilk Creek 24,045 acres
- Mahogany Mountains 28,618 acres
- Ten Mile Spring 11,468 acres
- Warm Springs 54,975 acres

In March 2011, an interdisciplinary team conducted a more in-depth analysis of the four parcels. Additional information discovered during the course of the further analysis such as existing uses, seasonal uses, historic wildfires, valid mineral rights, invasive species, and roads resulted in the determination that Bilk Creek, Mahogany Mountains, and Ten Mile Spring did not possess wilderness characteristics. Further analysis of the Warm Springs area reduced the acreage found to have wilderness characteristics from 54,975 acres to 18,145 acres. The reduced acreage is analyzed in this document.

The BLM will continue to inventory the planning area for the presence or absence of wilderness characteristics in accordance with FLPMA and agency policy throughout the life of the plan.

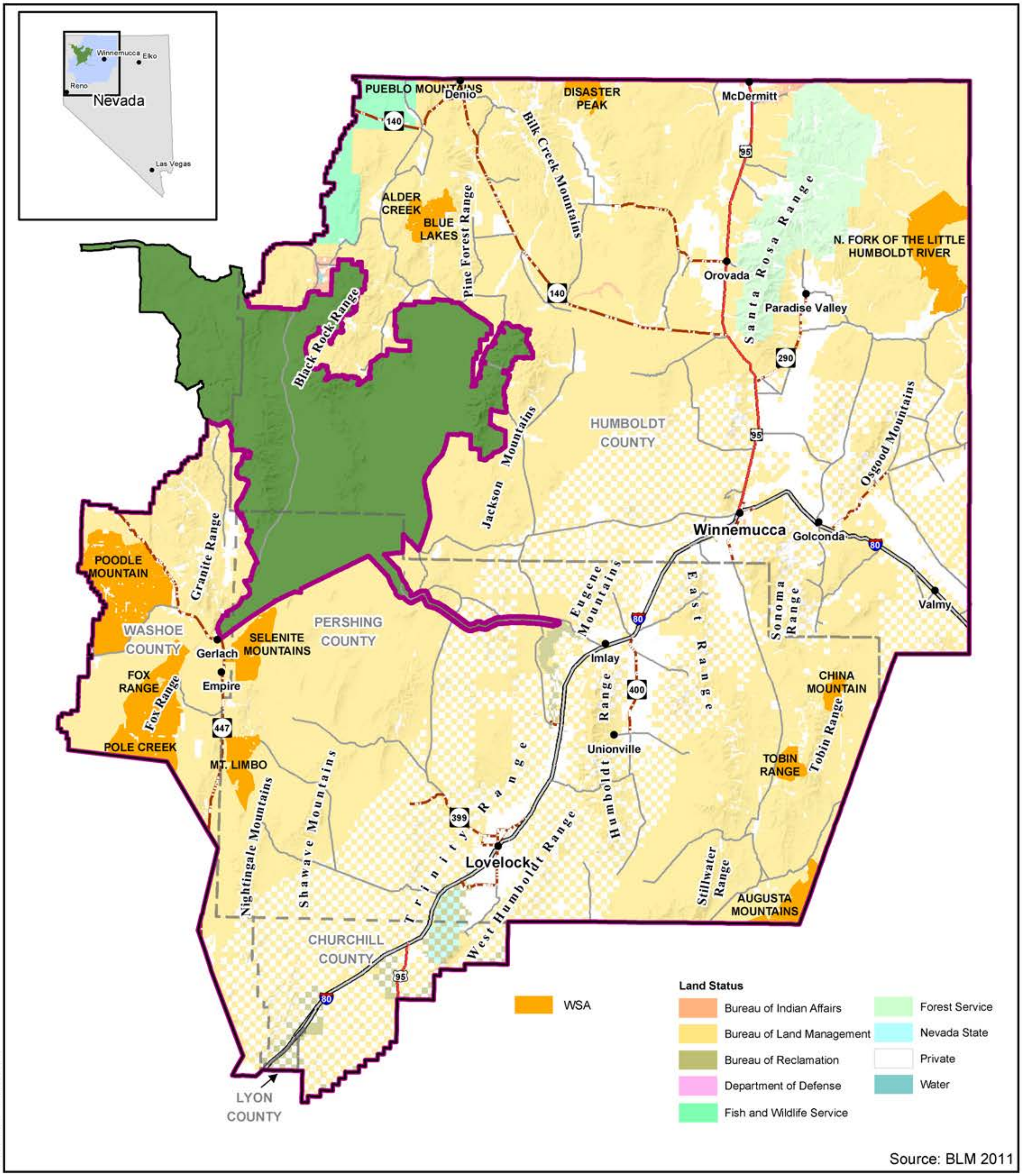
There are 13 WSAs in the WD administrative boundary (Table 3-42 and Figure 3-33). These WSAs total approximately 493,670 acres, about 416,652 acres of which are in the WD decision area boundary. The conditions of the WSAs have remained largely the same since they were designated in 1980, although there have been some impacts associated with increased OHV use.

The WD manages WSAs in other districts, and other districts manage WSAs in the WD. The Disaster Peak and Pueblo Mountain WSAs are partially in Oregon, and Poodle Mountain is partly in the BLM Eagle Lake District Office jurisdiction. Augusta Mountain is partly in both the Carson City and Battle Mountain District Office jurisdictions, and the North Fork of the Little Humboldt River WSA is partly in the BLM Elko District Office jurisdiction.

Detailed descriptions of the characteristics and features of each of the WSAs are included in the Nevada Wilderness Study Area Notebook, April 2001 (BLM 2001b). WSAs are managed in accordance with the BLM Manual #6330 (BLM 2012e).

The following summary provides the BLM's recommendation based on the Nevada Wilderness Study Area Notebook (BLM 2001b):

- Poodle Mountain—The recommendation for this WSA is to release all 142,050 acres to uses other than wilderness;
- Fox Range—The recommendation for this WSA is to release all 75,404 acres to uses other than wilderness;
- Augusta Mountains—The recommendation for this WSA is to release all 89,372 acres to uses other than wilderness;



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Winnemucca District RMP Wilderness Study Areas

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- County Road
- State Highway

0 10 20 Miles

Northwest Nevada

Figure 3-33

Table 3-42
Wilderness Study Areas in the Decision Area

Wilderness Study Area	WSA Number	Total Area (acres) of WSA	Total Area (acres) of WSA in the Planning Area	Total Area (acres) of WD BLM-administered lands in the WSA	Planning Area Boundary
Poodle Mountain	NV020-012	141,646	113,617	116,134	WD/Eagle Lake District
Fox Range	NV020-014	75,659	75,646	75,528	WD RMP
Augusta Mountains	NV020-108	88,286	24,267	24,256	WD Carson City District/Battle Mountain District
Mount Limbo	NV020-201	24,857	24,856	24,810	WD RMP
North Fork Little Humboldt	NV020-827	69,590	69,474	69,305	WD/Elko
Selenite Mountains	NV020-200	31,947	31,948	31,948	WD RMP
Disaster Peak	NV020-859	32,040	12,697	12,696	WD/OR
China Mountain	NV020-406P	10,296	10,296	10,201	WD RMP
Tobin Range	NV020-406Q	13,291	13,291	13,161	WD RMP
Blue Lakes	NV020-600	19,951	19,951	19,904	WD RMP
Alder Creek	NV020-600D	5,179	5,179	5,143	WD RMP
Pole Creek	NV020014A	12,959	12,959	12,957	WD RMP
Pueblo Mountains	NV020-642	72,690	607	607	WD/OR

Source: BLM 2001b.

- Mt. Limbo—The recommendation for this WSA is to designate 12,750 acres as wilderness (including 50 acres outside the WSA) and to release 11,002 acres to uses other than wilderness;
- North Fork Little Humboldt—The recommendation for this WSA is to designate 8,900 acres as wilderness and to release 60,783 acres to uses other than wilderness;
- Selenite Mountains—The recommendation for this WSA is to release all 32,041 acres to uses other than wilderness;
- Disaster Peak—The recommendation for the WSA is to designate 31,170 acres as wilderness and to release 2,400 acres to uses other than wilderness;
- China Mountain—The recommendation for this WSA is to release all 10,358 acres to uses other than wilderness;
- Tobin Range—The recommendation for this WSA is to release all 13,107 acres to uses other than wilderness;
- Blue Lakes*—The recommendation for the WSA is to designate 16,400 acres as wilderness and to release 4,108 acres to uses other than wilderness;

- Alder Creek*—The recommendation for this WSA is to release all 5,142 acres to uses other than wilderness;
- Pole Creek—The recommendation for this WSA is to release all 12,969 acres to uses other than wilderness; and
- Pueblo Mountains—The recommendation for the WSA is to designate 26,150 acres as wilderness and to release 46,654 acres to uses other than wilderness.

  * A citizen's working group evaluated the Blue Lakes and Alder Creek WSAs and submitted bill H.R. 337 and S. 1788 to Congress proposing these areas be designated as Wilderness which are currently pending review and determination.

These recommendations are based on conditions in 2001, and in some situations, the conditions may have changed. Acreage discrepancies between the acreage figures identified in the Nevada Wilderness Study Area Notebook and Table 3-42 are due to changes in land status from 1991 to 2009.

3.4.6 Watchable Wildlife Viewing Sites

The following are watchable wildlife viewing sites in the planning area:

- High Rock Canyon;
- Mahogany Creek;
- Pine Forest Mountains;
- McGill Canyon;
- Santa Rosa Mountains; and
- Sonoma Creek.

High Rock Canyon is near High Rock Lake and east of Vya, Nevada (Clark 1993). The lake attracts tundra swans (*Cygnus columbianus*) and killdeer. Steep canyon walls shelter nests used by golden eagles, great horned owls, red-tailed hawks, American kestrels (*Falco sparverius*), and prairie falcons. Cliff crevices and holes provide habitat for roosting bats and nesting white-throated swifts (*Aeronautes saxatalis*). Brushy areas and riparian thickets offer views of calliope hummingbirds (*Stellula calliope*), lazuli bunting (*Passerina amoena*), and green-tailed towhees (*Pipilo chlorurus*). Wrens, sparrows, snakes, and lizards are common. Sage-grouse, mule deer, coyotes, and pronghorn are visible among the mountain mahogany and sagebrush.

Bounded by wet meadows and corridors or aspens and willows, Mahogany Creek is a high mountain creek in big sagebrush country near Sheldon National Wildlife Refuge (Clark 1993). It supports spawning populations of Lahontan cutthroat trout. Riparian growth is inhabited by resident and migratory songbirds, including mountain bluebirds (*Sialia currucoides*), yellow warblers (*Dendroica petechia*), hermit thrushes (*Catharus guttatus*), and red-naped sapsuckers (*Sphyrapicus nuchalis*). Pacific tree frogs (*Pseudacris regilla*) and Great Basin spadefoot toads (*Spea intermontana*) are found in seeps. Chukars, sage-grouse, ground squirrels, northern goshawks, Cooper's hawks (*Accipiter cooperii*), red-tailed hawks, coyotes, long-eared owls, bobcats (*Lynx rufus*), mountain lions, mule deer, and pronghorn are also found at this site.

Pine Forest Mountains is south of Denio Junction and contain rugged granite spires flanked by high-elevation meadows and lakes (Clark 1993). Sage thrashers (*Oreoscoptes montanus*), California quail, and black-tailed jackrabbits (*Lepus californicus*) inhabit foothill sagebrush. Golden eagles, American kestrels, northern harriers, red-tailed hawks, and burrowing owls are found at this site. Creek drainage contains chukars. Northern slopes contain California bighorn sheep and mule deer. Pronghorn are in the flatlands. A large meadow attracts mule deer and sage-grouse. Meadowlarks (*Sturnella neglecta*), mountain bluebirds, and other songbirds inhabit aspen-lined basins. Mule deer, yellow-bellied marmots (*Marmota flaviventris*), and coyotes are found around lakes. Onion Valley Reservoir is populated by occasional waterfowl and shorebirds. A spring-fed playa is a late spring staging area for many waterfowl and shorebirds, particularly snowy plovers (*Charadrius alexandrinus*).

McGill Canyon is northwest of Winnemucca. Jagged limestone ridges and outcroppings tower above this narrow canyon, sheltering California bighorn sheep and mule deer (Clark 1993). Golden eagles, prairie falcons, red-tailed hawks, black-tailed jackrabbits, cottontails (*Sylvivagus* spp.), and ground squirrels are found at this site. Sage-grouse, chuckars, and mourning doves inhabit the grassy basin. Streamside vegetation provides cover for warblers, wrens, hummingbirds, and occasional porcupines (*Erethizon dorsatum*) and long-tailed weasels (*Mustela frenata*). Yellow-bellied marmots are in rocky areas, and rock wrens are in crevice nests. Coyotes, kit foxes, mountain lions, and bobcats may also be found at this site.

Santa Rosa Mountains is east of Orovada. Bighorn sheep, mule deer, and ruffed grouse (*Bonasa umbellus*) inhabit this mountain desert (Clark 1993). Mule deer, chukars, yellow-bellied marmots, golden eagles, northern goshawks, ruffed grouse, red-shafted flickers (*Colaptes auratus cafer*), and many songbirds are found at this site. Streams contain Lahontan cutthroat trout, and deer and great blue herons (*Ardea herodias*) are found in wet meadows. Pronghorn and sage-grouse are on the plateaus. Rocky outcrops contain California bighorn sheep.

Sonoma Creek is south of Winnemucca. Black-tailed jackrabbits, mule deer, and coyotes can be found on the arid sideslopes (Clark 1993). Prairie falcons, golden eagles, American kestrels, and California quail are also found at this site. The creek's leafy canopy sustains northern flickers and many songbirds, including green-tailed towhees, song sparrows (*Melospiza melodia*), and lazuli buntings. Fallen tree and underbrush shelter chukars, long-tailed weasels, and mountain cottontails. In years of good runoff, the creek supports toad populations, common snipe (*Gallinago gallinago*), and waterfowl, including spring-nesting mallards. Many horse management areas may offer opportunities to view wild horses and burros. Further inventory and evaluations would be necessary prior to establishing viewing areas.

3.5 Social and Economic

3.5.1 Tribal Interests

Native American tribes with interest in the planning area are the Alturas Indian Rancheria, the Battle Mountain Band, the Burns Paiute Tribe, the Cedarville Rancheria, the Confederated Tribes of Warm Springs Reservation, the Fallon Paiute-Shoshone Tribe, the Fort Bidwell Indian Community, the Fort McDermitt Paiute and Shoshone Tribe, the Klamath Indian Tribe, the Lovelock Paiute Tribe, the Pit River Tribe, the Pyramid Lake Paiute Tribe, the Reno-Sparks Indian Colony, the Shoshone-Bannock Tribes, the Shoshone-Paiute Tribes of the Duck Valley, the Summit Lake Paiute Tribe, the Susanville Indian Rancheria, the Washoe Tribe, the Winnemucca Indian Colony, and the Yomba

Shoshone Tribe. These tribes are in or close to the planning area counties or have economic or cultural interests in the planning area. Tribal members contribute to local and regional economies by purchasing goods and services, disbursing salaries, and providing contractual services and general operating expenses.

Larger reservations in the planning area include the Summit Lake Indian Reservation and Fort McDermitt Indian Reservation, both of which fall in the northern region of the planning area in Humboldt County. The Summit Lake Indian Reservation consists of approximately 10,098 tribal land acres and 765 allotted acres. The Fort McDermitt Indian Reservation covers approximately 16,355 tribal land acres, 145 allotted acres, and 160 acres of tribal fee land (Inter-Tribal Council of Nevada 2004).

Indian trust resources are legal interests in assets held in trust by the federal government for federally recognized Indian tribes or nations or for individual Indians. These assets can be real property, physical assets, or intangible property rights. Examples include lands, minerals, water rights, hunting and fishing rights, other natural resources, money, or claims.

Tribes have expressed interest in general land use and natural resource management issues in the planning area and in access and use of traditional lands, religious areas, and resources. Native American traditional uses are discussed in the cultural resources section.

Some of the environmental management concerns of the Northern Paiutes and Western Shoshones are as follows:

- The potential for an increase in pollution of the air, water, and earth and the interrelatedness of these impacts throughout the region;
- Concerns about transportation and spills of potentially hazardous chemicals from mining;
- Reduction in the water table due to mining, geothermal development, and water resource development, affecting springs and riparian areas that contain culturally important berries and medicinal plants;
- Disruption in the life cycles of wildlife; and
- Loss of plant and wildlife habitat in mining areas and the need for appropriate measures to reestablish plant and animal species during reclamation.

Tribal representatives also raised other concerns and issues, as follows:

- Hiring of Native American workers, particularly tribal environmental/cultural liaisons, in mining expansion;
- Hiring of tribal monitors for construction of fiber optic lines and geothermal development;
- The desirability of transfers of BLM-managed lands to tribes in the WD administrative boundaries; and
- The perceived lack of regulations regarding OHV use on WD-administered lands.

Additional issues documented in the ethnographic assessment are as follows:

- The need for tribal notification before any archaeological excavation;
- Timely tribal notification when human remains are discovered on lands administered by the WD;
- Appropriate procedures for the use of tribal monitors in mining operations;
- The need to enforce confidentiality regarding the location of culturally sensitive sites; and
- The view of many Western Shoshones that most of present-day Nevada was never ceded to the US (Bengston 2006).

3.5.2 Public Health and Safety

Public health and safety management is intended to protect public health and safety on BLM-administered public lands, to comply with applicable federal and state laws, to prevent waste contamination, and to minimize physical hazards due to any BLM-authorized actions or illegal activities on public lands. When health and safety hazards from past grazing, mining, or milling activities, illegal dumping, and natural hazards are identified, they are reported, secured, or cleaned up according to federal and state laws and regulations, including the federal Comprehensive Environmental Response, Compensation, and Liability Act. Parties responsible for contamination are liable for cleanup and resource damage costs, as prescribed by law.

Mines

The Nevada Division of Minerals (NDOM), a part of the Commission on Mineral Resources, is responsible for administering programs and activities to promote, advance, and protect mining and the development and production of petroleum and geothermal resources in Nevada (Durbin and Coyner 2004). NDOM administers the Abandoned Mine Lands Program under the authority provided by Nevada Administrative Code 513. The regulations make current mining claimants responsible for abating hazardous conditions on lands under their control. In March 1999, the BLM initiated the formation of a Nevada Abandoned Mine Land Environmental Task Force to begin remediating environmental problems associated with abandoned and inactive mines. The BLM and NDOM cooperatively manage the Abandoned Mine Lands Program through a formal memorandum of understanding. In certain mining districts, the planning areas have numerous abandoned mine workings. Structures such as shafts, adits, winzes, tunnels, and pits pose safety hazards to the public. Hazardous materials and dynamite are also safety hazards at abandoned mine sites. According to NDOM's *Abandoned Mine Lands Program Fact Sheet* (January 30, 2008), 1,367 physical hazards associated with abandoned mine lands have been discovered in Humboldt and Pershing Counties, and 1,041 mines have been secured. Mine hazards that may result from modern mining are managed by the BLM's Minerals Administration Program, described in Section 3.2.2.

Hazardous Materials

The BLM has limited regulatory authority over hazardous materials or substances, which are defined in various ways under a number of regulatory programs. Hazardous materials represent potential risks to public health and safety when not managed properly during transportation, storage, and use.

Hazardous materials may include chemical, biological, and radioactive materials. They may be on or near public land where hazardous or regulated material use and storage are authorized. Hazardous sites also result from unauthorized or illegal use or disposal. Contamination of air, soil, surface water, and groundwater contamination may result from improper handling or storage.

The two primary types of hazardous material sites on or near public land are related to mining or agricultural use or storage. Other sites are occupancy related and both authorized and unauthorized shooting ranges. Periodically the WD uses herbicides to treat land that has been invaded by noxious weeds and invasive exotic species. All EPA use restrictions and requirements for toxicants are followed wherever control devices are used on public lands. Hazardous materials are transported over the interstate and rail systems that cross or are near public land. Most sites are permitted by NDEP, the Nevada State Fire Marshal, BLM surface management regulations, or realty programs. The BLM does not maintain a comprehensive database of hazardous materials sites, but the Nevada State Fire Marshal maintains a list of sites with current hazardous materials permits.

The Winnemucca District Office provides for public safety by maintaining a hazardous material emergency contingency plan to facilitate correct responses to hazardous materials situations, to establish procedures for reporting such incidents, and, in some cases, to guide possible remediation of the situation. This plan provides guidance to district office employees on how to react to a hazardous materials situation and whom to contact for assistance.

Health and safety may be affected by hazardous materials and conditions that have resulted from prior industrial or commercial activities on public lands or adjacent privately held properties, three of which are the following:

- American Antimony abandoned mill site in Antelope Valley, where there is lead and cadmium flue dust in an uncontained pile;
- Orovada pesticide dump, where pesticide containers have been buried in trenches over the years; and
- A leaking underground fuel tank at Denio Junction, which may have contaminated nearby public land.

Remediation or monitoring of these sites is ongoing. No hazardous material sites in the resource area are listed on the US EPA National Priorities List.

Solid Waste

Solid waste issues include illegal dumping (either in conjunction with a residence or simply at a convenient location), dumping in reclaimed gravel pits, and littering along roadsides and in areas frequented by ATV users, for example, the sand dunes. Although there is no database detailing the locations of all the solid waste sites, some sites are known. Many of the rural ranches have solid waste sites, and a few ranchers have been warned about dumping on public land. Most sites are small, generally less than five acres.

The only permitted solid waste sites on public land would be the Class III landfills operated by the mines. Many of the larger mines have Class III landfills waivers that are permitted by NDEP. A waiver is obtained from NDEP and inspected by them, and, on occasion, by BLM inspectors under BLM surface management regulations.

Most sites contain typical household garbage and debris. Any hazardous materials are household chemical products in small quantities or regulated materials, such as petroleum products. A few sites in agricultural areas may have pesticide or herbicide containers.

The number of discarded tires has increased since the landfill has started charging for taking them. Sites are more of a problem if they contain unknown chemicals that need characterization. There has not been a significant increase in known sites.

Illegal Dump Sites

Illegally dumped wastes are primarily nonhazardous materials that are dumped either to avoid disposal fees or the time and effort required for proper disposal (US EPA 1998b). Illegal waste dump sites usually contain the following materials:

- Construction and demolition waste, such as drywall, roofing shingles, lumber, bricks, concrete, and siding;
- Abandoned automobiles, auto parts, used oil and filters, and scrap tires;
- Appliances;
- Furniture;
- Yard waste;
- Household trash; and
- Medical waste.

If not addressed, illegal dumps often attract more waste, potentially including hazardous wastes, such as asbestos, household chemicals and paints, automotive fluids, and commercial or industrial wastes.

The largest issue related to public health and safety is the illegal dumping of waste in an unpermitted area (US EPA 1998b) because the health risks may be significant. Areas used for dumping may be easily accessible to people, especially children, who are vulnerable to public health and safety issues that include the following:

- Physical hazards (protruding nails or sharp edges) and chemical hazards (harmful fluids or dust);
- Rodents, insects, and other vermin. Dump sites with scrap tires provide a breeding ground for mosquitoes, which can multiply 100 times faster than normal in the warm stagnant water standing in scrap tire casings. Severe illnesses, such as encephalitis and dengue fever, have been attributed to disease-carrying mosquitoes originating from scrap tire piles;
- Dump sites can catch fire, either by spontaneous combustion or, more commonly, by arson;
- Illegal dumping can affect proper drainage, making areas more susceptible to flooding when wastes block ravines, creeks, culverts, and drainage basins. In rural areas, open burning at

dump sites can cause forest fires and severe erosion as fires burn away trees and undergrowth;

- Dump site runoff containing chemicals may contaminate wells and surface water used as sources of drinking water; and
- Dump sites serve as magnets for additional dumping and other criminal activities.

Hot Springs

Hot springs may be associated with geothermal power sites or be located in isolated areas. No hot springs are maintained for recreational use, but unauthorized use of geothermal waters for recreation does occur. Hot springs on public lands can be extremely hot and dangerous. Use can result in scalding, contact with chemical fumes, cuts and abrasions, and bacterial irritations or diseases. The WD informs visitors to stay out and stay safe. Some springs can be extremely hot and should be avoided to prevent being scalded. The BLM maintains and places warning signs at dangerous hot springs with temperatures above 100 degrees Fahrenheit. Hot springs with a temperature above 120 degrees Fahrenheit are fenced to discourage entry.

Explosives

Public health and safety could be affected by the presence of mining-related explosives or unexploded ordnance on or near public lands. Incidents in Nevada have included lost live ordnance, crashes, dumped fuel tanks, and wayward missiles. Mining-related explosives from historic and active mining operations have been found on public land. BLM personnel or contractors remove accumulations of hazardous materials or solid waste from public land; this includes removing, disarming, or neutralizing explosives. The BLM coordinates with the Defense Department and Army Corps of Engineers to study and mitigate hazards from formerly used defense sites.

3.5.3 Social and Economic Conditions and Environmental Justice

This section discusses the socioeconomic resources of the planning area and reflects updated information since issuance of the Draft RMP/EIS. The planning area encompasses about 7.2 million acres of land managed by the BLM in west-central Nevada. These lands are in portions of five northwestern Nevada counties: Churchill, Humboldt, Lyon, Pershing, and Washoe. These counties are the focus for the socioeconomic analysis because most of the effects on the population and economy would occur in these areas, including effects on local government tax bases and social services and infrastructure. Data for Nevada is presented for comparison and to analyze the possible broader effects of the proposed project. Socioeconomic conditions addressed include population, housing, employment, schools, and the protection of children. Social and economic data has been updated since issuance of the Draft RMP/EIS.

The project area is predominantly rural. Project area communities include cities, rural towns, and outlying rural areas. The cities of Winnemucca and Lovelock provide services, shopping, and diverse amenities for leisure and recreation. The region's rural towns, such as Denio, Empire, Gerlach, Golconda, Imlay, and McDermitt, have smaller populations. The presence of services, hospitals, affordable housing, schools, shopping, and recreation are directly related to where the counties' populations reside. The employment base for most of these communities is mining, agriculture, industry, gaming, and tourism.

With almost 83 percent of lands in Nevada under federal ownership, Nevada's economy is affected by BLM land management decisions. Humboldt County, which has the largest percentage and total acreage of land under federal ownership in the WD, has the greatest opportunity for effect. Whereas Lyon County, which is composed of approximately 67 percent federal land and has the lowest total acreage of federal lands in the WD planning area, would be less likely to be affected. The recreation, mining, and agricultural sectors are dominant economic interests represented on BLM-administered lands in the WD planning area in Nevada; the forestry and timber sectors have a minimal economic presence on WD lands.

The high percentage of BLM lands in the planning area counties has made the WD planning area a highly desirable recreation area for activities, including boating, fishing, hiking, hunting, and mountain biking. The counties attract both local visitors and those from other counties. As a result, local economies receive economic benefit from recreation activities that occur nearby through recreation and use fees that are returned to the state and through visitor expenditures in the traveler accommodations industry and for other goods and services. Nevada has the highest per capita receipts generated from travel expenditures in the US, and the traveler accommodation industry is projected to be the fastest-growing employment sector in the state. With the rising popularity of outdoor recreation and the demand for use of federal lands, visitor use of public lands in the WD and local economic activity also can be expected to increase. While most recreational use on public lands does not require a permit, some activities (such as the Burning Man Festival) are permitted activities that provide recreation opportunities to thousands of people while generating significant revenue for the WD.

Nevada's gold production accounts for about 79 percent of the total US production (Dobra 2010). Numerous commodities are produced in the state, several of which occur on BLM administered lands. The influence of the mining sector in Humboldt and Pershing Counties makes them economically vulnerable because of their lack of diversity in the dominant types of businesses and industries. However mining continues to show strong growth even during the down turn of the nationwide economy.

Grazing revenues are found to be the greatest in those counties with the highest proportion of BLM land, and northern Nevada has been identified as one of these areas (BLM 2000). These areas typically have low population densities and low per capita income (Sections 2.1 and 2.2). Grazing is most important to the economies in areas that are agriculturally dependent, very rural, and not economically diverse. With three of the five planning area counties (Lyon, Humboldt, and Churchill) among the top five generators of agricultural sales, the economies of these counties are most likely to be affected by grazing management decisions in the WD. Beginning in early 2008, the US economy experienced a decline in economic activity at the onset of a recession lasting several years. Unemployment rates jumped in most counties. Economic activity has slowly rebounded; however, unemployment rates still have not returned to levels experienced in 2000.

Churchill County

Churchill County is the southernmost county in the planning area, bordered by portions of Washoe and Lyon Counties on the west, Pershing County on the north, Lander County on the east, and portions of Nye and Mineral Counties on the south. The northwestern portion of this county is in the planning area (BLM 2006c). The only urban area in Churchill County is the city of Fallon, and there is property proposed for development between Fernley and Fallon (near Hazen). Churchill County ranked eighth among the seventeen Nevada counties in population in 2010 and tenth in area (BLM 2006c; US Census Bureau 2010).

Humboldt County

Humboldt County is in the northern portion of the planning area, bordered by Elko County on the east, Lander County on the southeast, Pershing County on the south, Washoe County on the west, and Oregon on the north (BLM 2006c). In 2010, it ranked ninth among the seventeen Nevada counties in population and fourth in area (BLM 2006c; US Census Bureau 2010). Humboldt County is sparsely populated, with most of its population living in the only incorporated city, Winnemucca, or in unincorporated areas of Grass Valley. The most rapidly growing area of the county is Grass Valley, which is adjacent to and immediately south of Winnemucca. Other urban areas in the county include Denio, McDermitt, Orovada, Paradise Valley, and Golconda.

Lyon County

Lyon County is in the extreme southwest portion of the planning area, bordered by Churchill County on the northeast, Mineral County on the southeast, California on the south, small portions of Douglas and Carson City Counties on the west, and Storey County on the northwest (BLM 2006c). It ranks fourth among the seventeen Nevada counties in population and fourteenth in area (BLM 2006c; US Census Bureau 2010). Dayton, Fernley, and Silver Springs are the county's three largest cities. Increasing at the rapid rate of 51 percent from 2000 to 2010, Lyon County was the fastest growing county in Nevada.

Pershing County

Pershing County lies in the middle of the planning area, bordered by Washoe County on the west, Churchill County on the south, Lander County on the east, and Humboldt County on the north (BLM 2006c). It ranks eleventh among the 17 Nevada counties in population and eighth in area (BLM 2006c; US Census Bureau 2010). Lovelock is the county's largest city.

Washoe County

Washoe County is in the far west portion of the planning area, bordered by California on the west, Oregon on the north, Humboldt, Pershing, Churchill, and Lyon Counties on the east, and Storey and Carson City Counties on the south (BLM 2006c). It ranks second among the 17 Nevada counties in population and seventh in area (BLM 2006c; US Census Bureau 2010). Reno, the second largest city in Nevada, is in Washoe County, as are Sparks and Incline Village, at Lake Tahoe.

Definition

Socioeconomic resources include population, employment, income, housing, earnings, and schools. Population is the number of residents in the area and the recent change in population growth; employment data takes into account labor sectors, labor force, and statistics on unemployment; income information is provided as an annual total by county and as per capita income; housing includes numbers of units, ownership, and vacancy rate; earnings-by-industry provides a measure of the health of local business activity; and school enrollment and capacity are important considerations in assessing the effects of potential growth.

Population

Table 3-43 presents population figures for Nevada and the five planning area counties in 2000, 2005, and 2010. From 2000 to 2005 the populations in all counties increased, with the exception of Pershing County, whose population decreased by 4.52 percent. Lyon County experienced the largest increase (37.22 percent) in population. Washoe County was the most populous county in both 2000 and 2005, while Pershing County was the least populous county in the project area (US Census Bureau 2004). The population of Nevada increased by nearly 20.72 percent between 2000 and 2005.

Table 3-43
County Population Totals and Changes 2000, 2005, 2010

County	2000	2005	2010	% Change 2000-2005	% Change 2005-2010
Churchill	23,982	24,680	24,877	2.91	0.79
Humboldt	16,106	17,155	16,528	6.51	-3.7
Lyon	34,501	47,344	51,980	37.22	9.7
Pershing	6,693	6,390	6,753	-4.52	5.6
Washoe	339,486	389,775	421,407	14.81	8.1
Planning Area	420,768	485,344	521,545	15.34	7.4
Nevada	1,998,257	2,412,301	2,700,551	20.72	20.7

Source: US Census Bureau 2010

Population figures for the five counties within the planning area were updated for 2010. Since 2005, Lyon and Washoe counties continue to show moderate population growth rates of 9.7 and 8.1 percent. The counties growing the least were Humboldt at a negative 3.7 percent and Churchill County with a 0.79 percent growth rate. From 2005 to 2010 only Humboldt County experienced a decline in population (US Census Bureau 2010). It is anticipated that population growth will increase in 2012 and 2013 due to employment needs for mine expansions.

Churchill County's population is influenced by its proximity to employment centers outside the county, providing residences for workers with jobs primarily in Carson City, Fernley (Lyon County), and the Reno–Sparks area (Washoe County). Population fluctuations in Humboldt and Pershing Counties are most likely due to trends in the mining and farming industries. Mining replaced farming as the dominant economic sector in Humboldt County's economy, affecting employment, personal income, and other regional economic sectors. Most of Lyon County's growth is occurring at manufacturing sites in Fernley and along the lower Carson River, where present day "bedroom" communities (for Carson City) have taken the place of nineteenth century mining camps and milling sites. While a significant portion of the county's population lives in this Dayton area, many of these persons hold jobs and are counted as being employed in Carson City. Population trends in Washoe County are heavily influenced by the Reno-Sparks area gaming industry, the most dominant industry in Washoe County in terms of jobs, payrolls, personal incomes, and its direct and indirect effects on other sectors of the county's economy (BLM 2006c).

Table 3-44 presents population projections for the five counties of the planning area and Nevada from 2010 to 2030. The population of all of the counties in the planning area is projected to increase over this period by between roughly 11.9 percent (in Pershing County) to approximately 33.0

Table 3-44
County Population Projections 2000-2030

County	Population 2000	Population 2010	Percent Change 2000-2010	Population Projection 2030	Percent Change 2010-2030
Churchill	23,982	24,877	3.7	32,771	31.7
Humboldt	16,196	16,528	2.0	21,977	33.0
Lyon	34,501	51,980	50.7	68,134	31.1
Pershing	6,693	6,753	0.9	7,558	11.9
Washoe	339,486	421,407	24.1	497,028	17.9
Planning Area	420,768	521,545	24.0	627,468	20.3
State of Nevada	1,998,257	2,700,551	35.1	3,338,310	23.6

Source: Nevada State Demographer's Office 2010 and 2012; US Census Bureau 2000; US Census Bureau 2010; and BLM 2012d

percent (in Humboldt County). On average the population within the planning area is expected to increase by 20.3 percent, which is close to the state average of 23.6 percent. Although the percentage population increase project for Washoe County is one of the lower values (17.9 percent, which is below the state average), it would have the largest absolute increase (by 75,621 people) and accounts for the majority of the expected increase in the planning area (about 71.4 percent of the planning area total) (Nevada State Demographer's Office 2012).

Housing

Table 3-45 presents 2000, 2005, and 2010 housing data for the five planning area counties and Nevada. Washoe County and Lyon County have had the greatest percent increases, 16.97 percent and 16.58 percent, respectively, in the number of housing units added between 2000 and 2005. Pershing County had a decrease in housing units by -0.37 percent. Between 2000 and 2005, Nevada increased its housing supply by 191,970 units.

Table 3-45
County Housing Estimates 2000-2005 and 2010

County	Housing Units 2000	Vacancy Rate 2000	Persons per Household 2000	Housing Units 2005	Vacant Housing Units 2005	Persons per House-hold 2005	Housing Units 2010	Vacancy Rate 2010	Housing Units Change 2005 – 2010
Churchill	9,732	2.6%	2.64	10,332	820	2.64	10,826	10.7%	4.7%
Humboldt	6,954	3.9%	2.77	7,030	1,221	2.77	7,123	11.7%	1.3%
Lyon	14,279	3.1%	2.61	16,647	1,272	2.61	22,547	12.1%	35.4%
Pershing	2,389	3.5%	2.69	2,380	427	2.68	2,464	18.1%	3.4%
Washoe	143,908	2.0%	2.53	168,342	11,824	2.53	184,841	11.6%	9.8%
Nevada	827,457	2.3%	2.64	1,019,427	76,292	2.62	1,173,814	14.3%	11.5%

Source: Nevada State Demographer's Office 2007 and 2010, BLM 2012d

Between 2005 and 2010 housing in Lyon County increased by more than three times the average for the state, and the vacancy rate increased from 7.6 percent to 12.1 percent. Lyon County and Washoe County have had the greatest percent increases, 35.4 percent and 9.8 percent, respectively, in the number of housing units added between 2005 and 2010. The percentage increase in the housing stock in all the planning area counties but Lyon County was well below the state average over this time. Pershing County reversed a decrease in housing units from -.37 percent (between 2000 and 2005) to a 3.4 percent growth (between 2005 and 2010). The vacancy rate in Humboldt County decreased from 17.4 percent to 11.7 percent between 2005 and 2010; while, it increased in the other planning area counties and the state (Nevada State Demographer's Office 2010).

Employment

Table 3-46 provides basic data on employment in the five planning area counties and Nevada. Total employment for all of the counties in 2011 was estimated at 273,596 jobs, with an average unemployment rate of 13.1 percent. Of the planning area counties, Lyon County had the largest unemployment rate (17.5 percent), while Humboldt County had the lowest unemployment rate (7.2 percent). The low unemployment rate for Humboldt County is due to mining growth and strong mineral commodity prices. Nevada's unemployment rate of 13.5 percent was close to the planning area average of 13.1 percent.

Table 3-46
County Employment Statistics (2011)

County	Employed	Unemployed	Unemployment Rate
Churchill	13,426	1,472	11.0
Humboldt	9,960	719	7.2
Lyon	23,157	4,044	17.5
Pershing	2,775	325	11.7
Washoe	224,278	29,294	13.1
Total Planning Area	273,596	35,854	13.1
Nevada	1,198,140	187,732	13.5

Source: Nevada Department of Employment, Training, and Rehabilitation 2012

Table 3-47 provides a breakdown of the planning area counties' employment by sector and average sector growth between 1990 and 2000, with updated information for 2011. On average, the category with the largest number of jobs (in 2000) and the largest sector growth in the counties between 1990 and 2000 was the services sector. However the number of jobs in the services sector has declined in all five counties since 2000. Other industry sectors that experienced employment increases in the five counties were the government, finance/insurance/real estate, and trade sectors. Since 2000, manufacturing remained stable or increased in Humboldt and Lyon Counties, while showing declines in growth in Churchill and Washoe Counties.

Updated, detailed current employment by industry is summarized in Table 3-48.

Humboldt and Pershing Counties have higher local retail trade demand and higher percentages in the accommodation and food services industry due to the location of the cities of Winnemucca and Lovelock along the Interstate-80 corridor.

Table 3-47
County Employment by Sector (1990, 2000, 2011)

Sector (Total Percent Change)	Churchill	Humboldt	Lyon	Pershing	Washoe	Planning Area Total
Agriculture/Forestry/Fishing/Mining						
2011	(D)	(D)	438	(D)	1,812	(D)
2000	632	1,726	777	517	1,292	4,944
1990	728	1,850	895	675	2,993	7,141
Construction						
2011	1,109	781	858	(D)	11,702	(D)
2000	958	559	1,464	95	13,008	16,084
1990	810	620	898	132	9,519	11,979
Manufacturing						
2011	452	279	2,116	(D)	11,563	(D)
2000	854	252	1,892	177	12,903	16,078
1990	492	275	1,271	91	10,438	12,567
Transportation/ Utility/Information						
2011	1,434	535	870	34	15,095	17,968
2000	877	542	1,196	182	14,528	17,325
1990	517	384	466	116	11,995	13,478
Trade						
2011	2,365	1,366	2,677	234	35,485	42,127
2000	1,559	963	2,615	218	27,693	33,048
1990	1,430	1,193	1,530	359	29,364	33,787
Finance/Insurance/ Real Estate						
2011	2,114	389	1,373	74	27,914	31,864
2000	343	103	790	46	10,584	11,866
1990	374	162	274	32	8,993	9,835
Services						
2011	3,988	2,067	3,115	280	77,320	86,770
2000	3,989	2,447	5,470	707	84,268	96,881
1990	2,244	1,501	2,716	411	61,645	68,517
Government						
2011	2,867	1,478	2,329	710	28,459	35,843
2000	1,076	425	1,195	326	7,447	10,469
1990	678	415	533	131	5,787	7,544

Sources: US Census Bureau 2004; Bureau of Economic Analysis (BEA) 2004 and 2011
D=Not shown to avoid disclosure of confidential information.

Table 3-48
Employment by Industry within the Planning Area Compared with State of Nevada

Number Employed/Percent of Total

Industry	Churchill County	Lyon County	Washoe County	Humboldt County	Pershing County	State of Nevada
Farming	673/2.9	650/4.2	410/0.17	444/4.7	216/10	4,509/0.3
Forestry, fishing and Related Activities	(D)	182/11.2	215/0.09	(D)	(D)	1,551/0.1
Mining	(D)	256/1.7	1,597/0.65	2,001/21.0	585/27.0	19,326/1.3
Utilities	101/.4	66/0.4	490/.2	141/1.5	0	4,365/.3
Construction	1,109/4.8	858/5.6	11,702/4.8	781/8.2	(D)	68,728/4.6
Manufacturing	452/2.0	2,116/13.8	11,563/4.7	279/2.9	(D)	42,089/2.8
Wholesale Trade	384/1.7	331/2.2	9,687/4.0	157/1.7	33/1.5	37,341/2.5
Retail Trade	1,981/8.6	2,345/15.3	25,798/10.5	1,209/12.7	201/9.3	154,710/10.3
Transportation & Warehousing	1,065/4.6	734/4.8	11,578/4.7	295/3.1	34/1.6	55,172/3.7
Information	268/1.2	76/0.5	3,027/1.2	99/1.0	(D)	17,683/1.2
Finance and Insurance	2,114/9.2	557/3.6	14,312/5.8	154/1.6	74/3.4	86,601/5.8
Real estate and Rental and leasing	2,978/12.9	816/5.3	13,602/5.6	235/2.5	(D)	95,320/6.4
Professional, Scientific & Technical Services	1,379/6.0	703/4.6	16,700/6.8	(D)	49/2.3	82,026/5.5
Management of Companies and Enterprises	686/3.0	34/0.2	3,168/1.3	(D)	(D)	21,639/1.4
Administrative and Waste Services	1,446/6.3	720/4.7	16,179/6.6	525/5.5	(D)	100,281/6.7
Educational Services	223/1.0	(D)	3,039/1.2	(D)	(D)	14,653/1.0
Health Care and Social Assistance	1,516/6.6	(D)	23,196/9.5	(D)	(D)	111,901/7.5
Arts, Entertainment, and Recreation	1,293/5.6	856/5.6	8,724/3.5	169/1.8	25/1.0	48,565/3.2
Accommodation and Food Services	940/4.0	770/5.0	29,725/12.1	1,079/11.3	143/6.6	297,650/19.9
Other Services (Except Public Administration)	1,577/6.8	919/6.0	11,677/4.8	469/4.9	88/4.0	67,953/4.5
Government and government enterprises	2,861/12.4	2,329/15.2	28,459/11.6	1,478/15.5	710/32.9	166,064/11.0
Totals	**23,046**	**15,318**	**244,848**	**9,515**	**2,158**	**1,498,127**

Source: BEA 2011; BLM 2012d

Notes: D = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

L = Less than ten jobs, but the estimates for this item are included in the totals.

* Includes farm employment.

Schools and Protection of Children

In April 1997, President Clinton signed EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. This EO requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. This section identifies school and student enrollment in the planning area.

The school districts of all five counties provided K-12 education for approximately 80,305 students during the 2004-2005 academic year. Washoe County had the largest student enrollment (63,322 students), and Pershing County had the smallest student enrollment (797 students) of the planning area counties (National Center for Education Statistics 2007).

Environmental Justice

On February 11, 1994, President Clinton signed EO 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. It requires federal agencies to identify and avoid disproportionate impacts on minority or low-income communities. This section identifies any minority or low-income communities that could be affected by the proposed project.

Table 3-49 provides demographic information for the five planning area counties in 2011. According to US Census Bureau data, the white population was the dominant race in all five planning area counties, and the Latino/Hispanic ethnic group comprised nearly 20 percent of the population of the planning area, followed by Native American/Alaska Natives. Between 2000 and 2011, Latino/Hispanic populations increased from 19.7 percent to 27.1 percent statewide.

Table 3-49
Total Percentage of Population by Race/Ethnicity (2011)

County	White	Black, African American	Native American, Alaska Native	Asian, Pacific Islander	Two or More Races	Latino, Hispanic, Any Race
Nevada	77.7	8.6	1.6	8.4	3.7	27.1
Churchill	85.6	2.1	5.1	3.4	3.8	12.7
Humboldt	91.1	0.9	4.7	1.1	2.2	24.7
Lyon	90.7	1.2	3.1	1.8	3.2	15.4
Pershing	88.3	4.0	4.0	1.4	2.3	22.5
Washoe	86.1	2.6	2.1	6.2	3.1	22.7
Average Total	88.4	2.2	3.8	2.8	2.9	19.6

Note: The categorical figures/percentages for "White", "Black, African American", "Asian, Pacific Islander", and "Two or More Races" may add up to more than the total population (100 percent) because of rounding. The ethnic category for "Latino, Hispanic, Any Race" should be considered independently.
Source: US Census Bureau 2011

As discussed in Section 3.5.1, Tribal Interests, several tribes that use WD lands have concerns regarding health and safety with respect to mining activities and overall pollution levels, as well as maintaining access to traditional lands and uses. These groups of Native Americans could be disproportionately affected by changes in land management, depending on the location, timing, extent, and types of changes that would be implemented. The concerns of these groups are described in Section 3.5.1, and the potential for effects on these populations is further discussed in

Section 4.5.1, Environmental Consequences, Tribal Interests. While other racial and ethnic groups are present, there is no evidence to suggest that they would be disproportionately impacted by WD land management decisions. To the extent that a particular racial or ethnic group would rely on ranching on WD lands as a sole or primary source of income, that group could be disproportionately affected by decisions on grazing permits.

Table 3-50 provides income statistics for the planning area's five counties and for Nevada in 2010. The poverty threshold for an individual in 2010 was $11,139 (US Census Bureau 2012). Per capita farm income was lowest in Washoe County but was not below the poverty line. In Churchill and Washoe Counties farm income was below average per capita income. Throughout the planning area, except in Churchill and Washoe Counties, farm income per capita was above the state average. These figures indicate that BLM management of grazing would affect grazing permittees. Availability of forage or AUMs could affect low-income populations, to the extent that the incomes of grazing permittees in the WD would be considered low-income and that these permittees rely on ranching as their sole or primary source of income (BLM 2009b).

Nevada had a per capita personal income (PCPI) of $36,938 in 2010 (Table 3-50). Compared to the national PCPI of $39,937, Nevada's PCPI was about 92% of the national average. According to 2010 figures, Humboldt County had a PCPI of $40,627 this was about 110% of the state average. In 2010, Pershing County had a PCPI of $23,735 which was 64% of the state average (BEA 2012). The median household income increased about 22.2% from the year 2000 to 2010 in Humboldt County and 11.2% for the same period in Pershing County (US Census Bureau 2003 and 2011).

Table 3-50
Income and Poverty Statistics (2010)

County	Median Household Income	Per Capita Income	Percentage of Population Living in Poverty (2010)	Farm Income per Capita
Nevada	$50,987	$36,938	14.8%	$28,751
Churchill	$48,235	$40,581	11.6%	$22,145
Humboldt	$59,960	$40,627	9.9%	$44,254
Lyon	$47,108	$27,608	11.4%	$36,971
Pershing	$44,684	$23,735	18.5%	$32,810
Washoe	$50,839	$42,134	15.3%	$11,642
Planning Area Average	$50,165	$34,937	13.3%	$29,504

Sources: US Census Bureau 2011; BEA 2012.

According to the Council on Environmental Quality guidance, minority and low income communities can be identified where (a) the minority/low income population of the affected area exceeds 50 percent or (b) the minority/low income population percentage in the affected area is meaningfully greater than the minority/low income population percentages in the general population or other appropriate unit of the geographic analysis. Information obtained from the EPA "EJ View" Web site, which presented 2010 Census population data and 2010 American Community Survey data on poverty at the time it was accessed, shows 10 to 20 percent of the population within the planning area is minority and 10 to 20 percent of the population is considered below the poverty level (EPA 2013). Table 3-49 reflects slightly higher minority percentages. The potential for Environmental Justice communities within the planning area is low.

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Chapter 4 presents the direct, indirect, and cumulative impacts on the human and natural environment in terms of environmental, social, and economic consequences that are projected to occur from implementing the alternatives presented in Chapter 2. Separate sections describing irretrievable or irreversible commitment of resources and unavoidable adverse impacts are presented at the end of the chapter.

Impact analyses and conclusions are based on interdisciplinary team knowledge of the resources and planning area, information provided by experts in the Bureau of Land Management (BLM) and Tetra Tech or in other agencies' monitoring data, and information contained in pertinent literature. The baseline used for the impact analysis is the current condition or situation, as described in Chapter 3 (Affected Environment). Analysis assumptions have also been developed to help guide the determination of effects (see Section 4.1.1, Analytical Assumptions). Because the Proposed Resource Management Plan (RMP)/Final Environmental Impact Statement (EIS) provides a broad management framework, the analysis in this chapter represents best estimates of impacts because exact locations of development or management are often unknown. Impacts are quantified to the extent practical with available data. In the absence of quantitative data, best professional judgment provides the basis for the impact analysis.

The land use planning-level decisions that the BLM would make regarding this RMP are programmatic decisions based on analysis that can only be conducted on a broad scale. Because of the broad scope, impact analysis of planning-level decisions is speculative with respect to projecting specific activities. Subsequent documents tiered to this RMP would generally contain a greater level of detail and would be subject to National Environmental Policy Act (NEPA) analysis and compliance. Subsequent tiered activity- and project-level plans are more definitive than plans found in an RMP. An activity-level plan typically describes projects in detail that would lead to on-the-ground action and traditionally focused on single resource programs. A project-specific plan is typically prepared for a project or several related projects. Activity plans (such as travel management plans) are generally more site specific and less speculative than the RMP analyses. Project-level plans (such as stream restoration) contain specific proposed actions, and site- or area-specific analysis is conducted. Activity plans may contain information that is as detailed or specific at a project level.

4.1.1 Analytical Assumptions

Several assumptions were made to facilitate the estimation of the effects of the alternatives. These assumptions are made only for the purpose of analysis and do not represent potential RMP decisions. The assumptions do provide reasonably foreseeable projected levels of development that could occur within the planning area. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative described in Chapter 2. Following are the general assumptions applicable to all resource categories. Any specific resource assumptions are provided in the Methods of Analysis subheading for that resource.

- Sufficient funding and BLM personnel would be available for implementing the final decision;

- Implementing actions from any of the RMP alternatives would comply with all valid existing rights, federal regulations, BLM policies, and other requirements;
- Local climate patterns of historic record and related conditions for plant growth would continue;
- The functional capability of all developments would be maintained;
- The discussion of impacts is based on the best available data. Knowledge of the planning area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used to infer environmental impacts where data are limited;
- Acreage figures and other numbers used in the analyses are approximate projections for comparative and analytic purposes only. Readers should not infer that they reflect exact measurements or precise calculations; and
- Acreages were calculated using geographical information system (GIS) technology, and there may be slight variations in total acres between resources. These variations are negligible and would not affect analysis.

4.1.2 Types of Effects (Direct, Indirect, and Cumulative)

Direct, indirect, and cumulative impacts are considered in this effects analysis, consistent with direction provided in 40 Code of Federal Regulations (CFR) 1502.16.

Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place.

Indirect impacts result from implementing an action or alternative but are usually later in time or removed in distance and are reasonably certain to occur.

Cumulative effects is defined below in Section 4.1.3, Cumulative Impacts.

Effects are quantified where possible, primarily by using GIS applications. In the absence of quantitative data, best professional judgment prevailed; impacts are sometimes described using ranges of potential impacts or in qualitative terms. Only management programs with impacts are discussed. Unless otherwise identified, analyses of the effects under Alternative C (Option 1 and 2), where the effects would be the same, are mutually discussed under the term Alternative C. Effects specific to Option 1 or Option 2 are designated accordingly. The standard definitions for terms referring to impact duration that are used in the effects analysis are as follows, unless otherwise stated:

Short-Term Effect: The effect occurs only during or immediately after implementation of the alternative. For the purposes of this RMP, short-term effects would occur during the first five years.

Long-Term Effect: The effect could occur for an extended period after implementing the alternative. The effect could last several years or more and could be beneficial or adverse. For the purposes of this RMP, long-term effects would occur beyond the first five years and perhaps over the life of the RMP.

4.1.3 Cumulative Impacts

The CEQ regulations implementing NEPA define *cumulative impacts* as "…[T]he impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions." Cumulative impacts can result from minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Guidance for implementing NEPA requires that federal agencies identify the timeframe and geographic boundaries within which the potential cumulative effects of actions would be evaluated with specific past, present, and reasonably foreseeable actions.

The CEQ regulations explain "significance" as it relates to environmental analysis and requires consideration of both context and intensity of impacts. The degree of intensity or severity of impacts is included in the analysis of direct, indirect, and cumulative effects. CEQ regulations include the following considerations for evaluating intensity:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
10. Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

Cumulative Impact Geographic Assessment Area

The cumulative impact geographic assessment area for the Winnemucca District (WD) RMP/EIS is shown in Figure 4-1 and is applicable to all resources or uses analyzed. The assessment area was defined by using the major land resource areas identified in the Natural Resource Conservation Service (NRCS) USDA Handbook 296. Major land resource areas are geographically associated land resource units that are typically coextensive with general soil map units that may be further subdivided based on geographic differences in soils, climate, water resources or land use (NRCS 2006). For the purposes of this analysis, past and present actions span from 1982 to present and correspond to when existing management framework plans (MFP) were implemented. The time frame for reasonably foreseeable future actions (RFFAs) extends to 2032 based on the expected life of this plan.

Past, Present, Reasonably Foreseeable Future Actions

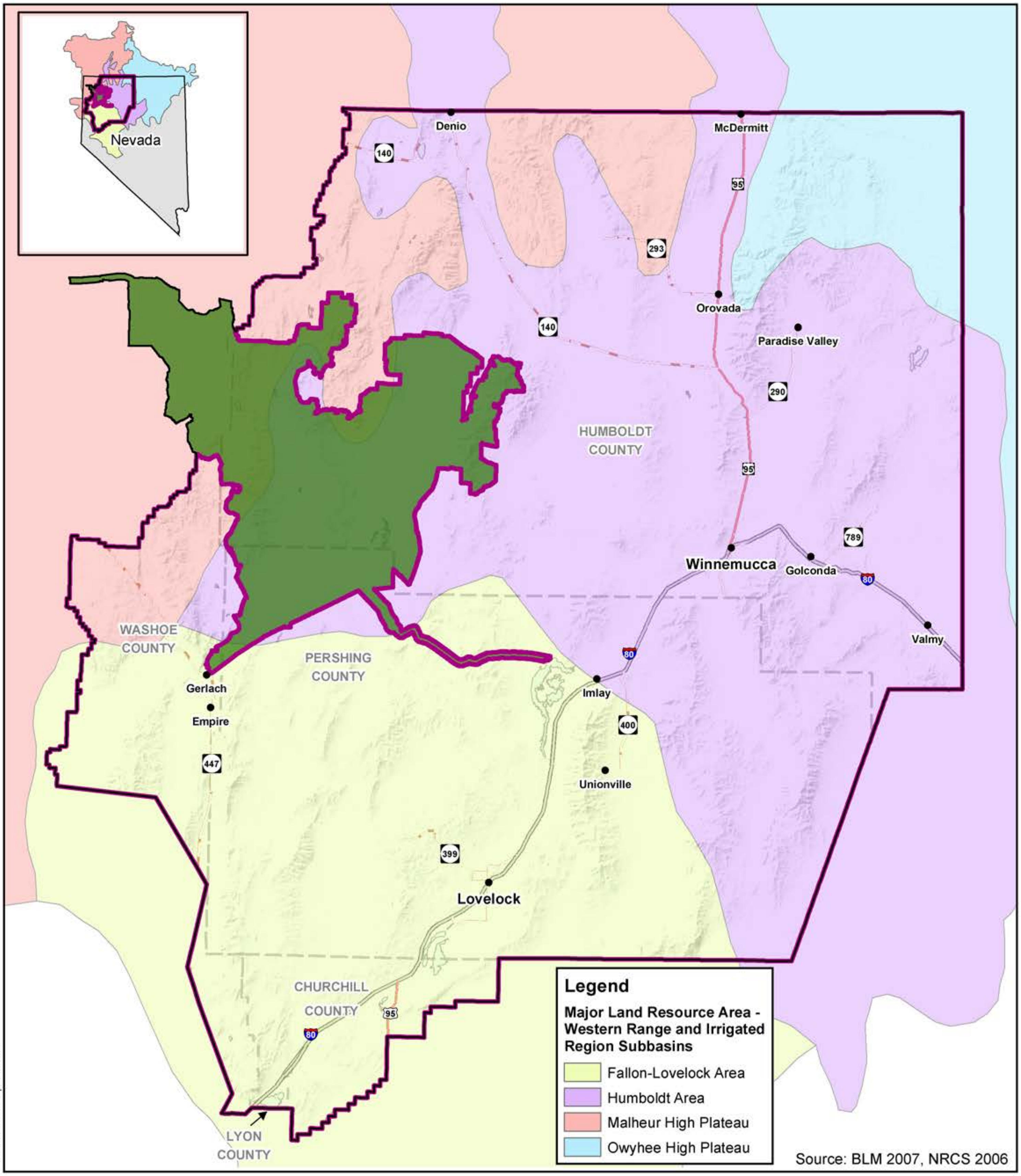
Based on review of the planning issues; agency records, including existing decisions and formal proposals; and actions which are highly probable based on known trends, and review of non-federal actions on lands not administered by BLM, including private land actions and other federal, local, and state land actions, the following past, present, and RFFAs, have been identified:

- Livestock grazing;
- Minerals (exploration and development);
- Lands and realty (land tenure adjustments, rights-of-way [ROWs]) and communication site authorizations);
- Renewable energy (exploration and development);
- Recreation (special recreation permits and off-highway vehicle [OHV] travel management);
- Wildlife and special status species management;
- WHB (wild horses and burros) - managing to appropriate management level (AML); and
- Wildland fire management (suppression, fuels management, emergency stabilization and rehabilitation).

RFFAs for these resources and resource uses are described below. Table 4-1 summarizes the components of cumulative impacts for the RMP by describing the impacts from past, present, RFFAs, and incremental impacts from implementing each alternative by resource. More detail on the cumulative impacts of implementing the RMP are described at the end of each resource and resource use Sections 4.2 – 4.5.

Livestock Grazing - Reasonably Foreseeable Future Actions

Domestic livestock (cattle, sheep, and horses) have grazed and may continue to graze for the reasonably foreseeable future on public and private lands within most of the cumulative assessment area. Management of livestock grazing, and associated developments, would focus on meeting standards for rangeland health.



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No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

N W E S

0 10 20 Miles

Legend

- BLM Winnemucca District Administrative Boundary
- BLM Winnemucca RMP Boundary
- Black Rock/High Rock NCA RMP Area
- County Boundaries
- Towns
- U.S. Highway
- U.S. Interstate
- State Highway

Winnemucca District RMP Cumulative Impact Analysis - Region of Influence

Northwest Nevada

Figure 4-1

Assumptions for analysis – Livestock forage allocations and animal unit months (AUM) would be permitted on case by case basis with livestock grazing allocations and AUMs remaining at present levels, except under the no grazing option (Alternative C, Option 2). Under this option vegetative health would improve and fuel loads would increase.

Minerals - Reasonably Foreseeable Future Actions

The WD has a rich history of mineral exploration and mining that would continue in the future, to varying degrees, based on commodity prices. The RFD for mineral resources on public lands is presented in Appendix I.

Assumptions for analysis - The BLM assumes that closure of six existing mines would occur with seven new locatable mines being developed during the life of the plan. New mines would average 5,400 acres each. The RFD for geothermal development is five future power plants, totaling 217 acres per plant (1,085 acres over the life of the plan). The RFD for oil and gas exploration is two discoveries with a total disturbance of 72 acres. Impacts on mineral resources would vary based on acres available as open or closed to mineral entry including segregated or withdrawn lands. Natural and cultural resources within areas identified for proposed mineral withdrawals would be protected. Areas delineated with use restrictions or with special stipulations would reduce feasibility of projects and increase operating costs.

Lands and Realty - Reasonably Foreseeable Future Actions

Land tenure adjustments, via acquisitions, exchanges, or sales, and authorizations of ROWs, leases and communication sites, have occurred in the past and would continue into the future. Future land tenure adjustments would facilitate efficient management of public lands, especially in areas with mixed public/private land status ("checkerboard"). It is anticipated that an increase in ROWs would occur based on energy development demand, especially renewable energy, and to support mineral development. Activities associated with ROW authorizations could include development and maintenance of roads, power lines, communication sites, etc.

Assumptions for analysis – Public demands for ROWs would increase based on renewable energy demands and minerals development. Lands and realty designations for ROW exclusion or avoidance areas would reduce ROW feasibility and/or increase costs.

Renewable Energy - Reasonably Foreseeable Future Actions

Past renewable energy actions have centered on geothermal (analyzed as fluid minerals) and wind energy exploration and development. Potential for future renewable energy would include solar and biomass. Demands for ROWs would increase based on renewable energy demands. Lands and realty designations for ROW exclusion or avoidance areas would reduce ROW feasibility and/or increase costs.

Assumptions for analysis –- Based on national energy policy and direction, renewable energy projects should continue to increase in activity in the future. Demands for ROWs would increase based on renewable energy demands. Lands and realty designations applicable to ROW exclusion or avoidance areas would reduce ROW demands, feasibility and/or increase costs. RFFAs include five new geothermal plants.

Recreation - Reasonably Foreseeable Future Actions

Recreation use continues to expand based on population growth in the state and new technologies that promote varying types of recreation.

Assumptions for analysis – Recreation use would increase five percent per year. Designation of areas that protect resource values would increase recreation visitation. Designation of Special Recreation Management Areas (SRMAs) would provide for public health related to recreation. Off Highway Vehicle restrictions would protect resource values based on the number of acres with closed or limited OHV travel designations. Recreation experiences are affected to varying degrees based on closed or limited OHV travel restrictions. Visual resource management impacts would be based on the number of acres designated as I, II, III, and IV visual resource management classes. Impacts on the general visual setting would be lower in areas identified as VRM I and II.

Wildlife and Special Status Species Habitat Management - Reasonably Foreseeable Future Actions

Habitat for wildlife and special status species continues to be affected by wildfire, land uses, and conversion of habitat to areas dominated by annual invasive plant species. Managing to protect and rehabilitate wildlife and sensitive species habitat would continue and increase over time.

Assumptions for analysis – Habitat conditions would improve based on the number of acres containing use restrictions, priority habitat areas, special status species management of population management units (PMU), priority watersheds, and areas of critical environmental concern (ACEC).

Wild Horse and Burro Management - Reasonably Foreseeable Future Actions

Since the passage of the Wild Free-Roaming Horses and Burros (WHB) Act, BLM continues to manage WHB populations and habitat. Past and present actions to maintain AMLs primarily through WHB gathers have occurred and are anticipated to continue in the future, with more emphasis on managing herds using fertility control agents, sex ratio adjustments, and the use of non-reproductive animals.

Assumptions for analysis – WHB would be managed at or below AML.

Fire Management - Reasonably Foreseeable Future Actions

Trends indicate that the number of wildfires would continue to gradually increase based on climate, conversion of habitat to areas dominated by annual invasive plants, and increased potential for human caused fires due to population growth and increases in recreation use. Past and present fuels treatments, including construction of fuel breaks, have focused on protecting wildland urban interface (WUI) areas to protect communities and property. Future fuels management would continue within WUI areas. However, a greater focus would center on landscape level planning to protect sensitive species habitat and rangeland. These efforts would likely reduce the potential for large fires to spread. Depending on the type of vegetation established, wildfires would re-burn areas. Emergency stabilization and rehabilitation (ES&R) of areas that have burned from wildfire would continue based on the number of acres burned by wildfires. ES&R treatments would be prioritized to provide for human life and safety, soil/water stabilization, restoration of important habitat for special status species, and to deter establishment of invasive plants. Areas previously seeded post fire would re-establish vegetation and deter the establishment and spread of invasive annual plants. Continued integrated weed management would also deter the establishment and spread of annual invasive species and weeds.

Assumptions for analysis – Analysis would be based on the assumption that the fire history for the RFFAs would be based on the average fire size for a 20 year period. Assumptions include an increase in the number of fires with fewer acres burned. It is also assumed that fuel breaks would be effective and would limit the size or spread of wildfire.

Other Assumptions

ES&R treatments would be effective in re-establishing vegetation and deterring establishment and spread of invasive species and weeds. Delineation of priority wildlife habitat, special status species management, priority watersheds, and ACECs would restrict certain uses and contribute to improving riparian areas and improve habitat conditions for wildlife and sensitive species. Improving PFC would also stabilize, improve habitat conditions, and help maintain water quality.

Summary of Cumulative Impacts

Table 4-1 summarizes cumulative impacts described under each resource throughout Chapter 4. General impacts from past and present actions; anticipated impacts from RFFAs; and anticipated incremental impacts resulting from the combination of past, present and future actions when combined with the proposed management alternatives are listed. Incremental impacts on each resource from actions under Alternatives A, B, C, and D are summarized as low (L), moderate (M), or high (H).

Table 4-1
Cumulative Impacts Summary by Resource and Alternative

Resource	Impacts from Past and Present Actions	Anticipated Impacts from Reasonably Foreseeable Future Actions (RFFAs)	Anticipated Incremental Impacts (past + present + future) based on RFFAs	Incremental Impacts by Alternative			
				A	B	C	D
Air Quality	Attainment/or unclassified – Minimal degradation	In compliance	In compliance minimal degradation	L	L	L	L
Geology	Minimal impacts – site specific mitigation measures	Minimal Impacts	Minimal Impacts Equivalent	L	L	L	L
Soils See Figure 4-2	88% Meeting Standards	Low Impacts	Low Impacts Equivalent	L	L	L	L
Water Resources/ Riparian – Vegetation See Figures 4-3, 4-4	Moderate Slight Upward Conditions 55% lotic and 38% lentic meeting PFC or upward trend	Moderate Slight Upward Conditions	Moderate Improving Upward Conditions	M	M	M	M

Table 4-1
Cumulative Impacts Summary by Resource and Alternative

Resource	Impacts from Past and Present Actions	Anticipated Impacts from Reasonably Foreseeable Future Actions (RFFAs)	Anticipated Incremental Impacts (past + present + future) based on RFFAs	Incremental Impacts by Alternative			
				A	B	C	D
Vegetation – Forest/Woodland	Minimal Impacts – Stands in WSAs	Equivalent	Minimal Impacts	L	L	L	L
Invasive Species/Weeds	Moderate 446,572 acres of annual invasive / weeds	Moderate 446,572 acres of annual invasive / weeds	Moderate 893,144 acres of annual invasive / weeds	M	M	M	M
	7percent of major plant communities	7percent of major plant communities	Impacts 14percent to major plant communities	M	M	M	M
Vegetation – Rangeland See Figure 4-5	Moderate	Moderate	Moderate	M	M	M	M
Fish & Wildlife See Figure 4-6	Moderate due to populations and habitat decline	Moderate due to populations and habitat decline	Moderate	M	M	M	M
Special Status Species See Figure 4-7	Moderate due to populations and habitat decline for Sagebrush obligates	Moderate due to populations and habitat decline for Sagebrush obligates	Moderate	M	M	M	M
Wild Horse and Burro	AML	AML	Equivalent	M	M	M	M
Fire See Figure 4-8	Moderate -20 year history – Burned acres 1,656,864	Moderate - Life of plan – Avg. Burned acres 1,656,000	Moderate – High	M	M	M	M
Cultural (including BCBs and NHTs) See Figure 4-9	Low due to inventories and site specific mitigation measures	Low – Moderate due to continuing inventories and site specific mitigation measures	Low – Moderate	M	M	L	L
Tribal Consultation	Compliance with EO and other policy or guidance	Compliance with EO and other policy or guidance	Equivalent	L	L	L	L
Paleontological Resources	Low due to site specific mitigation measures	Low due to site specific mitigation measures	Minimal Equivalent	L	L	L	L

Table 4-1
Cumulative Impacts Summary by Resource and Alternative

Resource	Impacts from Past and Present Actions	Anticipated Impacts from Reasonably Foreseeable Future Actions (RFFAs)	Anticipated Incremental Impacts (past + present + future) based on RFFAs	Incremental Impacts by Alternative A	B	C	D
VRM	Class I 420,271 acres 6percent	Low due to current management of VRM management class objectives	Low Impacts Fewer impacts on landscape settings based on more restrictive VRM class designations.	L	L	L	L
	Class II 346,302 acres 5percent						
	Class III 678,883 acres 9percent						
	Class IV 5,667,437 acres 80percent						
Cave & Karst	Low	Low	Low	L	L	L	L
Livestock Grazing	Moderate	Moderate	Moderate	M	M	M	M
Minerals	Locatable 7 Active Mines - 46,900 acres Saleable Moderate Fluid Mineral Leasing	Locatable 8 Active Mines 46,900 acres Saleable Moderate	Locatable Saleable Moderate	M	M	M	M
	Geothermal 6 plants - 509 Acres	Geothermal 5 plants - 1,595 Acres	Geothermal	M	M	L[1]	M[1]
	Oil & Gas 0 Discoveries	Oil & Gas 2 Discoveries - 72 acres	Oil & Gas	M	M	L[1]	M[1]
	Solid Mineral Leasing Moderate	Solid Mineral Leasing Moderate	Solid Mineral Leasing Moderate	M	M	M[1]	M[1]
Recreation See Figure 4-10	Visitor Days 74,000 - Low	Visitor Days 150,000 - Mod	Moderate	L	M	M	M
	OHV Moderate	OHV Moderate	Moderate	H	M	M	M
Renewable Energy Wind/Solar Projects (Geothermal addressed under minerals)	Low to moderate due to use restrictions	Wind/Solar Projects Low to moderate due to continuation of use restrictions	Equivalent	L	L	M[1]	M[1]

Table 4-1
Cumulative Impacts Summary by Resource and Alternative

Resource	Impacts from Past and Present Actions	Anticipated Impacts from Reasonably Foreseeable Future Actions (RFFAs)	Anticipated Incremental Impacts (past + present + future) based on RFFAs	Incremental Impacts by Alternative			
				A	B	C	D
Lands and Realty	ROW – Exclusion Areas – 0 Avoidance Areas – acres 0		Moderate due to ROW use restrictions	M	M	M[1]	M[1]
ACECs	Low impacts on the 1 ACEC in district due to other resource protections (e.g., for special status species)	Low due to continuation of resource protections	Low due to additional resource protections	L	L	L	L
Wild and Scenic Rivers	Low – eligible stream segments protected through use restrictions based on other resources	None – no eligible segments	None	None			
Wilderness Study Areas	Low impacts on the 13 WSA in WD due to WSA management	Continued low impacts	Equivalent	L	L	L	L
Watchable Wildlife Viewing Sites	No Impacts	No Impacts	No Impacts				
Public Health and Safety				L	L	L	L
Socio-Economic and Environmental Justice See Figures 4-1, 4-12	Low-Moderate	Low – Moderate	Moderate	M	M	M H[2]	M

Notes:
[1]Use restrictions based on management actions such as designations of priority wildlife habitat, priority watersheds, special status species management, ACECs, Lands and Realty – Exclusion or Avoidance Areas.
[2] No grazing option under Alternative C.

4.1.4 Incomplete or Unavailable Information

The CEQ established implementing regulations for NEPA requiring that a federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an EIS (40 CFR 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS. Knowledge and information is and would always be incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the RMP. Considerable effort has been taken to acquire and convert resource data into digital format for use in the plan—both from BLM sources and from outside sources.

Certain site-specific information was unavailable for use in developing this plan, usually because inventories have either not been conducted or are not complete. Some of the major types of data that are incomplete include cultural resources (most of the WD has not been inventoried for cultural resources), paleontological resources, vegetation, wildlife, riparian inventories, and noxious weeds. The BLM has information to support planning level decisions, although the data is incomplete for specific areas. Ongoing data collection and analysis provide a general understanding of the resources trends that were used in developing the alternatives and assessing impacts. The BLM would continue monitoring and taking inventory, as needed, and this information would be used to assess the effectiveness of management measures.

The resource management plan sets objectives for broad level management of the decision area, while implementation level planning requires subsequent site specific-analysis. During the implementation phase, additional surveys and data could be required to analyze site-specific decisions made in implementation level planning, such as in the ACEC management plans and the travel management plan.

This RMP is also based on the concept of adaptive management, so it is dynamic enough to account for changes in resource conditions (such as changes due to climate change or large-scale wildfire), new information and science, and changes in regulation and policies. The RMP may be amended to respond to these factors. No incomplete or unavailable information was deemed essential to a reasoned choice among the alternatives portrayed in this EIS.

4.2 RESOURCES

4.2.1 Air Quality

Summary

The major sources of air pollution emissions within the WD area include wildland fires, agricultural burns, vehicle traffic on unpaved roads, OHV use of unpaved roads, OHV use itself, wind erosion from dry lakebeds and other poorly vegetated areas, mining and mineral developments, and energy resource developments. Wildland fires generally are the emission source with the greatest and most widespread impact on air quality in the WD area. Depending on wind conditions, wildland fires and prescribed burns elsewhere can have an impact on air quality conditions in the WD area. Other emission sources tend to have more localized effects on air quality.

Air quality management objectives for all of the RMP alternatives include maintaining compliance with federal and state air quality standards and air quality management programs and carrying out the Federal Land Policy and Management Act's (FLPMA) instruction to protect air and atmospheric values while managing public lands according to the principles of "multiple use" and "sustained yield." Owners and operators of mineral and energy resource development projects would continue to be subject to state and federal air quality management programs, including air permit programs and fugitive dust control programs. Both existing and future gold and silver mining operations would be subject to Nevada and US Environmental Protection Agency (EPA) mercury regulations. The WD area has been designated as being attainment of federal ambient air quality standards for all federally regulated pollutants. The EPA exceptional events policy excludes air quality impacts associated with natural events from consideration when determining whether or not an area complies with federal ambient air quality standards. If wildland fires occur at more frequent intervals, air quality may be impacted and it may be necessary to seek EPA approval of certain fires as "exceptional events" to avoid exceeding the National Ambient Air Quality Standards (NAAQS). Existing programs, procedures, and the Nevada Bureau of Air Quality Planning's Smoke Management Plan (2005) are designed to ensure that if prescribed burns do occur, they would not result in excessive smoke impacts on smoke-sensitive areas. Alternatives A and C would not allow the use of conditional fire suppression management for a benefit, while Alternatives B and D would. Allowing wildfires to burn in situations where the fire provides resource benefits would result in some increase in emissions for Alternatives B and D compared to Alternatives A and C. However, conditional fire suppression management for a benefit is likely to be only a minor contributor to total annual emissions from wildfires.

Table 4-2 summarizes general air quality considerations for each of the RMP alternatives. Future mining activities, oil and gas developments, geothermal developments, and renewable resource developments would be expected to be similar under all RMP alternatives. RMP alternatives would be expected to differ somewhat in the location and amount of recreational activity, especially OHV activity. Because the spread of cheatgrass has been a major factor affecting the location, frequency, and intensity of wildland fires, differences among RMP alternatives in the effectiveness of cheatgrass control would be expected to produce differences in wildland fire emissions. Alternative C would be distinguished in two aspects from the other alternatives in terms of air quality implications. On the one hand, Alternative C would be expected to have the lowest level of OHV use among the alternatives since OHV use generally would be limited to established roads and trails. On the other hand, Alternative C may indirectly increase the recurrence interval for wildland fires since it is likely to have less effective programs for cheatgrass control than the other alternatives.

Table 4-2
Summary of Effects on Air Quality—Alternatives A, B, C, and D

Indicator	Alternative A	Alternative B	Alternative C *	Alternative D
Compliance with air quality standards	In compliance.	In compliance.	In compliance.	In compliance.
Air quality degradation from baseline conditions	Minimal degradation.	Minimal degradation.	Minimal degradation.	Minimal degradation.
Clean Air Act conformity review requirements	Not required.	Not required.	Not required.	Not required.
Wildland fires	Similar to recent patterns.	Possibly lower than current patterns, depending in part on success of cheatgrass control program.	Possibly higher than recent patterns if cheatgrass control is less effective than under other alternatives.	Possibly lower than current pattern, depending in part on success of cheatgrass control program.
PM_{10} emissions from wildfires	752 tons per year, based on 1997 to 2006 average.	Similar to Alternative A, perhaps slightly lower.	Similar to Alternative A, perhaps slightly higher.	Similar to Alternative A, perhaps slightly lower.
Prescribed burns and conditional fire suppression	Prescribed burns similar to recent	Prescribed burns similar to recent	No prescribed burns; no	Prescribed burns similar to recent

Table 4-2
Summary of Effects on Air Quality—Alternatives A, B, C, and D

Indicator	Alternative A	Alternative B	Alternative C *	Alternative D
management for a benefit allowed.	patterns; no conditional fire suppression management for a benefit allowed.	patterns; some conditional fire suppression management for a benefit possible.	conditional fire suppression management for a benefit allowed.	patterns; some conditional fire suppression management for a benefit possible.
OHV use	OHV use similar to current patterns; 6,789,612 acres open to OHV use; 423,786 acres limited OHV use; 17,698 acres closed to OHV use.	Overall effects on OHV use uncertain; 1,460,200 acres open to OHV use; 5,743,198 acres limited OHV use; 17,698 acres closed to OHV use.	OHV use generally limited to roads and trails; possible decrease in overall OHV use; 0 acres open to OHV use; 7,187,575 acres limited OHV use; 43,521 acres closed to OHV use.	Overall effects on OHV use uncertain; 288,105 acres open to OHV use; 6,925,414 acres limited OHV use; 17,577 acres closed to OHV use.
Mining activity	Closures of existing operations likely to be offset by new operations.	Closures of existing operations likely to be offset by new operations.	Closures of existing operations likely to be offset by new operations.	Closures of existing operations likely to be offset by new operations.
Oil and gas development	248 acres disturbed; 2 discoveries. One well with small scale production.	248 acres disturbed; 2 discoveries. One well with small scale production.	248 acres disturbed; 2 discoveries. One well with small scale production.	248 acres disturbed; 2 discoveries. One well with small scale production.
Geothermal development	1,085 acres disturbed; 5 power plants.	1,085 acres disturbed; 5 power plants.	1,085 acres disturbed; 5 power plants.	1,085 acres disturbed; 5 power plants.
Renewable energy development	Changes not identifiable.	Changes not identifiable.	Changes not identifiable.	Changes not identifiable.
Greenhouse gas emissions from livestock grazing	1,083,840 tons per year of methane emissions, 24,928,315 tons per year carbon dioxide equivalents.	1,083,840 tons per year of methane emissions, 24,928,315 tons per year carbon dioxide equivalents.	For Option 1, 1,083,840 tons per year of methane emissions, 24,928,315 tons per year carbon dioxide equivalents. For Option 2, no greenhouse gas emissions from	1,083,840 tons per year of methane emissions, 24,928,315 tons per year carbon dioxide equivalents.

Table 4-2
Summary of Effects on Air Quality—Alternatives A, B, C, and D

Indicator	Alternative A	Alternative B	Alternative C *	Alternative D
			livestock grazing in WD area, but increased greenhouse gas emissions from livestock operations outside WD area.	
Greenhouse gas emissions from wild horses and burros	39,111 tons per year of methane emissions, 899,555 tons per year carbon dioxide equivalents.	39,111 tons per year of methane emissions, 899,555 tons per year carbon dioxide equivalents.	39,111 tons per year of methane emissions, 899,555 tons per year carbon dioxide equivalents.	39,111 tons per year of methane emissions, 899,555 tons per year carbon dioxide equivalents.
Greenhouse gas emissions from wildfires	301,507 tons per year carbon dioxide equivalents, based on 1997 – 2006 average.	Similar to Alternative A, perhaps slightly lower.	Similar to Alternative A, perhaps slightly higher.	Similar to Alternative A, perhaps slightly lower.
Roadway construction and maintenance	Similar to current patterns.	Similar to current patterns.	Similar to current patterns.	Similar to current patterns.
Vehicle traffic on unpaved roads	Similar to current patterns.	Slight increase from current patterns.	Slight increase from current patterns.	Slight increase from current patterns.

Source: Alternatives as described in Chapter 2
*Options 1 and 2.

Methods of Analysis

Methods and Assumptions

Available information was insufficient to develop quantitative emission estimates for activities addressed by the RMP alternatives. Quantitative emissions estimates were developed for historical wildland fires to provide context for evaluating wildland fire management policies under the different alternatives. Wildland fire emissions were quantified using the First Order Fire Effects emissions model, or FOFEM. Additionally, potential ambient smoke concentrations were analyzed using the Simple Approach Smoke Estimation Model, or SASEM4. Quantitative estimates of greenhouse gas emissions were made using generalized livestock methane generation factors developed by the Intergovernmental Panel on Climate Change (2006). Qualitative evaluations of air quality issues are presented for management topics when quantitative analyses were not feasible.

Air Quality: Effects from Air Quality Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from air quality management.

Effects under Alternatives A, B, and D

RMP air quality management objectives and actions under all alternatives include maintaining compliance with state and federal requirements and programs and carrying out FLPMA's instruction to protect air and atmospheric values while managing public lands according to principles of "multiple use" and "sustained yield." The most important regulatory programs are those related to prescribed burns or allowing conditional fire suppression management for a benefit and those related to control of fugitive dust from surface area disturbance. Wildland fires release both criteria air pollutants and greenhouse gas emissions. Surface area disturbance is a source of fugitive dust. State and federal regulatory programs related to these emission sources are designed to minimize the resulting air pollutant concentrations downwind of the emission sources. Alternatives A, B, and D include policies and actions that would allow the use of prescribed burns. The BLM would continue to comply with Nevada permit program requirements for prescribed burns. Any prescribed burn expected to emit more than one ton of PM_{10} would require an open burn permit from the Nevada Bureau of Air Pollution Control. Prescribed burns expected to emit more than 10 tons of PM_{10} would require a more detailed permit application than those expected to emit less than 10 tons of PM_{10}. In addition, a burn plan is required for prescribed burns expected to emit more than 10 tons of PM_{10}. There are no air permit requirements for wildland fire suppression activities. Programs allowing conditional fire suppression management for a benefit require an annual permit application that identifies areas being considered for prescribed fires or for allowing conditional fire suppression management for a benefit. The permit application must identify the conditions under which naturally ignited wildfires may be allowed to burn rather than being suppressed. BLM road construction and road maintenance activities that would disturb more than 20 acres would be subject to Nevada surface area disturbance permit requirements and would require preparation of a fugitive dust control plan. Air quality effects would be similar under Alternatives A, B, and D. The extent to which air quality effects would be greater than those under Alternative C would depend on the extent of prescribed burn activities.

Effects under Alternative C

RMP air quality management objectives and actions under Alternative C (Options 1 and 2) include achieving compliance with state and federal requirements and programs and carrying out FLPMA's instruction to protect air and atmospheric values while managing public lands according to principles of "multiple use" and "sustained yield." Alternative C differs from the other alternatives in that it does not include a prescribed burn program or a program to allow conditional fire suppression management for a benefit. Thus, Alternative C would not involve compliance with Nevada permit requirements for prescribed burns. There are no air permit requirements for wildland fire suppression activities. Construction and maintenance of unpaved roadways can be a source of fugitive dust. BLM road construction and road maintenance activities that would disturb more than 20 acres would be subject to Nevada surface area disturbance permit requirements and would require preparation of a fugitive dust control plan. Air quality effects from air quality management programs under Alternative C would be slightly less than those under the other alternatives, with the magnitude of the difference depending on the extent to which other alternatives implement prescribed burn activities. The WD has conducted only limited prescribed burns in the past.

Air Quality: Effects from Geology Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from geologic resource management.

Effects under Alternative A

Under Alternative A, areas containing unique geologic resources would remain open to OHV use. OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Consequently, Alternative A might produce slightly more OHV fugitive dust and engine emissions than the other alternatives. In addition, Alternative A would be expected to have higher levels of OHV use than under the other alternatives.

Effects under Alternative B

Under Alternative B, OHV use would be limited to existing roads. In addition, OHV management policies under Alternative B would be expected to result in slightly higher OHV use than under Alternative D but less OHV use than under Alternative A. OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Consequently, Alternative B might produce slightly less OHV fugitive dust and engine emissions than under Alternative A and slightly more OHV fugitive dust and engine emissions than under Alternatives C and D.

Effects under Alternative C

Under Alternative C, roads within exclusion zones would be closed to OHV use. In addition, Alternative C would have the most restrictive policies and actions concerning OHV use and consequently are likely to have lower OHV use levels than under the other alternatives. OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Thus, Alternative C might produce slightly less OHV fugitive dust and engine emissions than the other alternatives.

Effects under Alternative D

Protecting unique geologic resources while providing for multiple uses, would have little impact on air quality. Surface disturbance would be limited in areas near unique geologic resources in order to avoid or protect these resources. Site specific mitigation developed to protect unique geologic resources would also serve to reduce impacts on air quality from dust if surface disturbance is proposed.

Air Quality: Effects from Soil Resources Management

Effects Common to All Alternatives

Exposed soils in disturbed or poorly vegetated areas are a potential source of fugitive dust from wind erosion, which can cause elevated concentrations of suspended particulate matter in downwind locations. Vegetation cover greatly reduces the amount of fugitive dust generated by wind erosion, and even sparse vegetation cover can significantly reduce fugitive dust generation when wind speeds are not extreme. All alternatives include generalized policies and actions to reduce soil erosion and apply BMPs. Vegetation management actions would be the primary mechanism for implementing measures that reduce wind erosion. All alternatives would continue to implement on-going emergency stabilization, burned area rehabilitation, and mine reclamation programs that help reduce soil erosion from wind and water. Other effects from soil resources management are discussed separately for each alternative.

Alternatives A and D would be similar and have the greatest potential to reduce wind erosion through vegetation management; Alternative C would be more effective than Alternative B at reducing wind erosion.

Effects under Alternative A

Vegetation management measures would be the primary wind erosion controls implemented under Alternative A.

Effects under Alternative B

Alternative B would implement various measures to reduce soil erosion but would not apply soil amendments.

Effects under Alternative C

Alternative C would implement various measures to reduce soil erosion, including the use of soil amendments and seasonal closures to avoid compaction of moist soils. Because it would eliminate livestock grazing, Alternative C, Option 2 would have the least amount of wind erosion from unburned areas.

Effects under Alternative D

Alternative D would implement various measures to reduce soil erosion, including the use of soil amendments and seasonal closures to avoid compaction of moist soils.

Air Quality: Effects from Water Resources Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from water resources management.

Effects under Alternative A

Water resources policies and actions under Alternative A would have only negligible air quality impacts from actions, such as well construction and livestock, WHB, or wildlife watering facilities. Alternative A has no express policy with respect to water import or export projects. The air quality implications of water resource management policies are so indirect that it is not possible to distinguish among alternatives in this regard.

Effects under Alternative B

Water resources policies and actions under Alternative B would have only negligible air quality impacts from actions, such as well construction and livestock, WHB, or wildlife watering facilities. Any water import or export projects approved under Alternative B might result in limited air quality impacts from construction activities. Water import or export projects may also have the potential to decrease groundwater levels and lead to desertification which could lead to increased wind erosion if plant communities are weakened. The air quality implications of water resource management policies are so indirect that it is not possible to distinguish among alternatives in this regard.

Effects under Alternative C

Water resources policies and actions under Alternative C would have only negligible air quality impacts from actions, such as well construction and livestock, WHB, or wildlife watering facilities. Any water import or export projects approved under Alternative C might result in limited air quality impacts from construction activities. Water import or export projects would not be expected to have the same potential impact to air quality as described under Alternative B because the projects would only be permitted if they would not compromise the multiple use mandate or if they could be fully mitigated. The air quality implications of water resource management policies are so indirect that it is not possible to distinguish among alternatives in this regard.

Effects under Alternative D

Effects under Alternative D would be the same as those discussed in Effects under Alternative C.

Air Quality: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

Wildland fires release both criteria air pollutants and greenhouse gas emissions. Vegetation treatments to improve stand health would reduce the buildup of fuels and ultimately would reduce emissions should treated areas burn. Other effects from forest and woodland products management are discussed separately for each alternative.

Effects under Alternative A

Alternative A would encourage prompt fire suppression efforts in broadleaf woodland habitats. Prescribed fires would be used to enhance deteriorated aspen and cottonwood stands. WD has conducted only limited prescribed burns in the past. Compliance with burn plans and state of Nevada air quality permits would help ensure impacts on air quality from forest and woodland product management would remain in compliance.

Effects under Alternative B

Policies under Alternative B would allow the use of wildland fires in broadleaf woodland habitats to achieve stand health and structure objectives. Consequently, some wildfires may not be suppressed or controlled as quickly under Alternative B as fire could be used for a benefit within conditional suppression areas, resulting in slightly higher wildfire emissions. The air quality implications of forest and woodland products management policies are so uncertain that it is not possible to distinguish among alternatives in this regard.

Effects under Alternative C

There would be less fire suppression under Alternative C than under other alternatives. Alternative C also would not implement prescribed burns for resource management purposes but would allow conditional fire suppression management for a benefit. Consequently, some wildfires may not be suppressed or controlled as quickly under Alternative C as they would be under Alternatives A or D, resulting in slightly higher wildfire emissions under Alternative C than under Alternatives A or D. The air quality implications of forest and woodland products management policies are so uncertain that it is not possible to distinguish among alternatives in this regard.

Effects under Alternative D

Policies under Alternative D would use prescribed fires to enhance deteriorated aspen stands. WD has conducted only limited prescribed burns in the past. Delineating conditional suppression areas for a benefit would increase smoke emissions in the short term. The air quality implications of forest and woodland products management policies are so uncertain that it is not possible to distinguish among alternatives in this regard.

Air Quality: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from weeds management.

Effects under Alternative A

The use of prescribed fires and herbicides to control noxious and invasive weeds would produce small quantities of air pollutant emissions. Prescribed fires release both criteria air pollutants and greenhouse gas emissions. Herbicides often include volatile organic compounds that are a precursor of ozone. The WD has conducted only limited prescribed burns in the past. Emissions associated with weed management under Alternative A would be similar to emissions under Alternatives B and D and slightly more than emissions under Alternative C.

Effects under Alternative B

The use of prescribed fires and herbicides to control noxious and invasive weeds would produce small quantities of air pollutant emissions. Wildland fires release both criteria air pollutants and greenhouse gas emissions. Herbicides often include volatile organic compounds that are a precursor of ozone. The WD has conducted only limited prescribed burns in the past. Emissions associated with weed management under Alternative B would be similar to emissions under Alternatives A and D and slightly more than emissions under Alternative C.

Effects under Alternative C

In contrast to the other alternatives, Alternative C would not use prescribed fire or chemical treatments to control noxious and invasive weeds. Thus, Alternative C would have slightly lower direct air pollutant emissions from weed management activities than the other alternatives.

Indirectly, Alternative C might lead to somewhat higher emissions from wildland fires due to less effective control of cheatgrass.

Effects under Alternative D

The use of prescribed fires and herbicides to control noxious and invasive weeds would produce small quantities of air pollutant emissions. Wildland fires release both criteria air pollutants and greenhouse gas emissions. Herbicides often include volatile organic compounds that are a precursor of ozone. The WD has conducted only limited prescribed burns in the past. Emissions associated with weed management under Alternative D would be similar to emissions under Alternatives A and B and slightly more than emissions under Alternative C.

Air Quality: Effects from Chemical and Biological Control

Effects Common to All Alternatives

There would be no effects common to all alternatives from chemical and biological control management.

Effects under Alternative A

The use of herbicides and pesticides under Alternative A would produce small quantities of volatile organic compound emissions. Air quality implications would be minor because large quantities of herbicides and pesticides are not expected to be used. Emissions associated with chemical controls under Alternative A would be similar to emissions under Alternatives B and D and more than under Alternative C, which does not call for chemical controls.

Effects under Alternative B

The use of herbicides and pesticides under Alternative B would produce small quantities of volatile organic compound emissions. Air quality implications would be minor because large quantities of herbicides and pesticides are not expected to be used. Emissions associated with chemical controls under Alternative B would be similar to emissions under Alternatives A and D and more than under Alternative C, which does not call for chemical controls.

Effects under Alternative C

In contrast to other alternatives, Alternative C would not use herbicides and pesticides and thus would have lower air pollutant emissions from biological and chemical control programs than under the other alternatives.

Effects under Alternative D

The use of herbicides and pesticides under Alternative D would produce small quantities of volatile organic compound emissions. Air quality implications would be minor because large quantities of herbicides and pesticides are not expected to be used. Emissions associated with chemical controls under Alternative D would be similar to emissions under Alternatives A and B and more than under Alternative C, which does not call for chemical controls.

Air Quality: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Vegetation management efforts to stabilize, rehabilitate, and reclaim burned areas and disturbed sites would reduce impacts on air generated from fugitive dust and ash in the long term. Short term impacts on air quality would persist until vegetation is established.

Effects under Alternative A

Alternative A would not include specific actions to control cheatgrass, but it would allow actions to maintain and improve vegetation conditions.

Effects under Alternative B

Wildland fires release both criteria air pollutants and greenhouse gas emissions. Alternative B would include the use of prescribed fire for control of cheatgrass in mixed perennial or cheatgrass communities. Consequently, there may be slightly higher direct emissions from cheatgrass control programs under Alternative B than Alternatives A and C.

Effects under Alternative C

Alternative C would employ various methods to control cheatgrass but would not employ prescribed burning or chemical treatments. Alternative C, Option 2 would prohibit the use of prescriptive grazing for control of cheatgrass. Consequently, Alternative C, Option 2 may have slightly lower direct emissions from cheatgrass control programs than Alternatives A and B and about the same emissions as under Alternative D. If cheatgrass control proves less effective under Alternative C than under other alternatives, then there would be an indirect effect on overall wildland fire emissions due to higher wildland fire recurrence intervals.

Effects under Alternative D

Prescribed fire objectives and actions under Alternative D would be similar to those under Alternatives A and B. However, Alternative D would include objectives and actions suitable for conditional fire suppression management for a benefit. Consequently, management under Alternative D could include allowing some wildfires to burn within conditional fire suppression areas where appropriate.

Air Quality: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Riparian and wetlands management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Fish and wildlife management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Special Status Species Management

Effects Common to All Alternatives

Special status species management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

WHB management policies would have few identifiable air quality implications under any of the alternatives. Wild horses and burros are a minor source of direct soil disturbance through animal trailing, which can lead to localized wind erosion. WHB population management operations (gather & removal operations) may also be a minor source of direct soil disturbance due to confining animals in the temporary gather site(s) and holding facilities, which creates disturbance through hoof action as well as vehicle traffic. In addition, wild horses and burros are a source of greenhouse gas emissions from digestive fermentation and manure decomposition. Table 4-3 is a summary of estimated annual greenhouse gas emissions from wild horses and burros in the WD area. The emission estimates presented in Table 4-3 are based on estimated WHB population numbers and annual methane emission rates published by the Intergovernmental Panel on Climate Change (IPCC 2006). Annual methane emissions from wild horses and burros are less than four percent of the annual methane emissions from livestock grazing in the WD area.

Table 4-3
Estimated Annual Greenhouse Gas Emissions from Wild Horses and Burros in the WD Area

Animal	Annual Average Population	Annual Methane Emissions, Tons per Year Digestive Fermentation	Annual Methane Emissions, Tons per Year Manure	Annual Methane Emissions, Tons per Year Total	GWP as CO_2e, tons per year
Wild horses	3,042	33,197	4,316	37,513	862,790
Wild burros	291	1,415	184	1,599	36,766
Total	3,333	34,612	4,500	39,111	899,555

Source: Tetra Tech analysis based on BLM data
CO_2e = carbon dioxide equivalents
GWP = global warming potential as carbon dioxide equivalents (CO_2e)

Air Quality: Effects from Wildland Fire Management

Effects Common to All Alternatives

It is not feasible to make quantitative predictions about the future extent of wildland fires in the WD area under the different alternatives because wildfire ignition is typically caused by unpredictable sources, such as lightning or human activities. However, historical trends show that the annual acreage burned by wildland fires in the WD area has increased significantly in the past ten years, compared to the previous ten years. For example, while the number of wildland fires increased by 9.4 percent between 1987 and 1996 and between 1997 and 2006, the individual acreage burned increased by 171 percent. Because wildfires are not planned, they are not subject to federal or state regulatory or permit programs. Prescribed fires are subject to federal agency management procedures and to state and local regulatory programs. The vast majority of wildland fires in the WD area are wildfires, rather than prescribed burns. The wildfire emissions and smoke impact tables below provide a description of the impacts of wildland fires, even though wildfires are not subject to federal or state regulatory programs.

The FOFEM 5.5 model was used to estimate annual emissions of criteria pollutants and greenhouse gases from historical wildland fires in the WD area. The criteria pollutants addressed in the FOFEM model include suspended particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide, nitrogen oxides, sulfur oxides, and total organic gases (labeled as methane in the model output). The greenhouse gas emissions addressed in the FOFEM model include carbon dioxide and methane. Emission estimates from the FOFEM model were supplemented by spreadsheet calculations of nitrous oxide greenhouse gas emissions based on EPA data (1996). FOFEM results for total organic gases were partitioned into reactive organic compounds and methane using data from EPA (1996) and Ottmar et. al (2000). Table 4-4 is a summary of annual emissions from past wildland fires in the WD area. These emissions estimates provide an indication of the magnitude of annual wildland fire emissions that can reasonably be expected in the future. The historical data also indicate that most wildland fires in any year burn only a few acres. Most of the acreage burned annually by wildland fires occurs during a small number of large wildland fires, which typically are started by natural causes. Table 4-4 shows that the annual acreage burned by wildfires in the WD area varies dramatically. Table 4-4 also shows that there has been a historical trend toward increased acreages being burned by wildfires. As indicated at the bottom of Table 4-4, the annual average number of acres burned in the WD area increased by 171 percent from 1987 to 1996 and from 1997 to 2006, with a resulting increase in annual air pollutant and greenhouse gas emissions.

While various management programs and policies under the different alternatives may have an effect on the size and frequency of future wildland fires, it is unlikely that any alternative would substantially alter the historic pattern of wildland fires in the near future.

The air quality impacts of wildland fires were further evaluated using SASEM4. This model estimates the distance range within which ambient air quality standards for suspended particulate matter (PM_{10} and $PM_{2.5}$) are likely to be exceeded. SASEM was run for five different sizes of generic wildland fires for each of the two most important vegetation categories identified in the wildland fire database (western annual grasslands and sagebrush with grass). Table 4-5 is a summary of the results of the SASEM analyses for fires in western annual grasslands; Table 4-6 is a summary of the results of the SASEM analyses for fires in sagebrush with grass.

Table 4-4
Historical Wildland Fire Emissions in the WD Area

Year	Acres Burned	ANNUAL EMISSIONS, TONS PER YEAR									
		PM_{10}	$PM_{2.5}$	CO	NO_x	SO_x	ROG	CO_2	CH_4	N_2O	CO_{2e}
1987	32,896	210	177	1,071	140	41	39	80,396	35	11	84,329
1988	25,865	165	139	840	110	32	31	63,040	27	8	66,124
1989	12,165	78	65	395	52	15	15	29,649	13	4	31,100
1990	5,167	33	28	168	22	6	6	12,593	5	2	13,210
1991	7,720	49	41	251	33	10	9	18,816	8	2	19,736
1992	11,412	73	61	371	48	14	14	27,814	12	4	29,175
1993	2,676	17	14	87	11	3	3	6,522	3	1	6,841
1994	27,469	175	148	892	117	34	33	66,949	29	9	70,225
1995	38,609	246	207	1,254	164	48	46	94,101	41	12	98,704
1996	270,960	1,727	1,456	8,803	1,151	339	323	660,404	286	87	692,713
1997	21,915	140	118	712	93	27	26	53,413	23	7	56,026
1998	25,910	165	139	842	110	32	31	63,150	27	8	66,239
1999	599,492	3,820	3,221	19,476	2,547	749	715	1,461,127	634	192	1,532,610
2000	205,625	1,310	1,105	6,680	873	257	245	501,165	217	66	525,683
2001	172,511	1,099	927	5,604	733	216	206	420,457	182	55	441,027
2002	13,573	86	73	441	58	17	16	33,081	14	4	34,700
2003	1,462	9	8	47	6	2	2	3,563	2	0.5	3,738
2004	651	4	3	21	3	1	1	1,587	1	0.2	1,664
2005	19,806	48	41	246	32	9	9	18,489	8	2	19,394
2006	88,123	883	702	4,244	555	163	156	318,415	138	42	333,993
1987-1996 Average	**43,503**	**277**	**234**	**1,413**	**185**	**54**	**52**	**106,029**	**46**	**14**	**111,216**

Table 4-4
Historical Wildland Fire Emissions in the WD Area

Year	Acres Burned	ANNUAL EMISSIONS, TONS PER YEAR									
		PM_{10}	$PM_{2.5}$	CO	NO_x	SO_x	ROG	CO_2	CH_4	N_2O	CO_{2e}
1997-2006 Average	117,937	752	634	3,831	501	147	141	287,445	125	38	301,507
1987-2006 Average	80,720	514	434	2,622	343	101	96	196,737	85	26	206,362

Source: Tetra Tech calculations based on BLM fire history data
PM_{10} = inhalable particulate matter
$PM_{2.5}$ = fine particulate matter
CO = carbon monoxide
NO_x = nitrogen oxides (ozone precursor)
SO_x = sulfur oxides
ROG = reactive organic compounds (ozone precursors)
CO_2 = carbon dioxide (greenhouse gas); GWP multiplier = 1
CH_4 = methane (greenhouse gas); GWP multiplier = 23
N_2O = nitrous oxide (greenhouse gas), GWP multiplier = 296
CO_{2e} = carbon dioxide equivalents of all greenhouse gases (CO_2, CH_4, and N_2O), computed using the GWP multipliers for each compound.
GWP = global warming potential as CO_2 equivalents (CO_{2e}); GWP multipliers from Intergovernmental Panel on Climate Change (2001), third assessment report, 100-year time frame
Emission estimates based on per-acre emission rates calculated by FOFEM 5.5 for sagebrush with grass and for saltbush or greasewood (moderate shrub cover) vegetation types.
Based on the historical ratio of acreages burned for each vegetation type, emission rates were weighted 75 sagebrush with grass and 25 saltbush or greasewood.
The FOFEM model output labeled as CH_4 is actually total organic compounds (ROG plus CH_4), assumed to be 53 ROG and 47 CH_4 for the dominant vegetation types in the WD area.
Nitrous oxide emissions estimated using emission rates from AP-42 Section 13.1 (EPA 1996).

Table 4-5
Smoke Impact from Fires in Western Annual Grass Vegetation

Size of Burn	Burn Duration	Stability Class	Wind Speed	Distance to Which Standards are Exceeded PM_{10}	Distance to Which Standards are Exceeded $PM_{2.5}$
10 acres	8 hours	A (very unstable)	1-3 mph	None	None
		B (moderately unstable)	1-5 mph	None	None
		C (slightly unstable)	2-10 mph	None	None
		D (neutral)	4-10 mph	None	None
		E (slightly stable)	1-2 mph	None	Out to 2.8 miles
		E (slightly stable)	3-5 mph	None	None
		F (moderately stable)	1-3 mph	None	Out to 6.21 miles
100 acres	24 hours	A (very unstable)	1-3 mph	None	None
		B (moderately unstable)	1-5 mph	None	None
		C (slightly unstable)	2-10 mph	None	None
		D (neutral)	4-10 mph	None	None
		E (slightly stable)	1-3 mph	None	Out to 5.34 miles
		E (slightly stable)	4-5 mph	None	None
		F (moderately stable)	1-3 mph	None	Out to 19.76 miles
500 acres	24 hours	A (very unstable)	1-3 mph	None	None
		B (moderately unstable)	1 mph	None	Out to 0.87 mile
		B (moderately unstable)	2-5 mph	None	None
		C (slightly unstable)	2 mph	None	Out to 0.81 mile
		C (slightly unstable)	3-10 mph	None	None
		D (neutral)	4-5 mph	None	Out to 0.93 mile
		D (neutral)	6-10 mph	None	None
		E (slightly stable)	1-5 mph	None	Out to 29.14 miles
		F (moderately stable)	1-3 mph	None	Out to 44.17 miles
1,000 acres	24 hours	A (very unstable)	1-3 mph	None	None
		B (moderately unstable)	1-2 mph	None	Out to 1.18 miles

Table 4-5
Smoke Impact from Fires in Western Annual Grass Vegetation

Size of Burn	Burn Duration	Stability Class	Wind Speed	Distance to Which Standards are Exceeded PM_{10}	Distance to Which Standards are Exceeded $PM_{2.5}$
		B (moderately unstable)	3-5 mph	None	None
		C (slightly unstable)	2-3 mph	None	Out to 1.18 miles
		C (slightly unstable)	4-10 mph	None	None
		D (neutral)	4-7 mph	None	Out to 1.55 miles
		D (neutral)	8-10 mph	None	None
		E (slightly stable)	1-5 mph	None	Out to 60.27 miles
		F (moderately stable)	1-3 mph	None	Out to 62.19 miles
5,000 acres	24 hours	A (very unstable)	1 mph	None	Out to 0.62 mile
		A (very unstable)	2-3 mph	None	None
		B (moderately unstable)	1-4 mph	None	Out to 2.42 miles
		B (moderately unstable)	5 mph	None	None
		C (slightly unstable)	2-8 mph	None	Out to 2.86 miles
		C (slightly unstable)	9-10 mph	None	None
		D (neutral)	4-10 mph	None	Out to 5.53 miles
		E (slightly stable)	1-2 mph	Out to 19.22 miles	Out to 62.19 miles
		E (slightly stable)	3-5 mph	None	Out to 31.77 miles
		F (moderately stable)	1-2 mph	Out to 62.14 miles	Out to 62.14 miles
		F (moderately stable)	3 mph	None	Out to 62.15 miles

Source: Tetra Tech analyses

Table 4-6
Smoke Impact from Fires in Sagebrush with Grass Vegetation

Size of Burn	Burn Duration	Stability Class	Wind Speed	Distance to Which Standards are Exceeded PM_{10}	Distance to Which Standards are Exceeded $PM_{2.5}$
10 acres	8 hours	A (very unstable)	Under 3 mph	None	None
		B (moderately unstable)	1-3 mph	None	Out to 1.68 miles
		B (moderately unstable)	4-5 mph	None	None
		C (slightly unstable)	2-5 mph	None	Out to 1.80 miles
		C (slightly unstable)	6-10 mph	None	None
		D (neutral)	4-10 mph	None	Out to 2.73 miles
		E (slightly stable)	1-3 mph	Out to 6.21 miles	Out to 6.21 miles
		E (slightly stable)	4-5 mph	None	Out to 6.21 miles
		F (moderately stable)	1-3 mph	Out to 6.23 miles	Out to 10.89 miles
100 acres	24 hours	A (very unstable)	1 mph	None	Out to 0.68 miles
		A (very unstable)	2-3 mph	None	None
		B (moderately unstable)	1 mph	Out to 0.93 mile	Out to 2.98 miles
		B (moderately unstable)	2-5 mph	None	Out to 1.62 miles
		C (slightly unstable)	2 mph	Out to 0.87 mile	Out to 3.67 miles
		C (slightly unstable)	3-10 mph	None	Out to 2.36 miles
		D (neutral)	4-5 mph	Out to 0.99 mile	Out to 8.39 miles
		D (neutral)	6-10 mph	None	Out to 4.10 miles
		E (slightly stable)	1-5 mph	Out to 19.76 miles	Out to 19.76 miles
		F (moderately stable)	1-3 mph	Out to 19.71 miles	Out to 45.37 miles

Table 4-6
Smoke Impact from Fires in Sagebrush with Grass Vegetation

Size of Burn	Burn Duration	Stability Class	Wind Speed	Distance to Which Standards are Exceeded PM_{10}	Distance to Which Standards are Exceeded $PM_{2.5}$
500 acres	24 hours	A (very unstable)	1-3 mph	None	Out to 0.99 mile
		B (moderately unstable)	1-3 mph	Out to 1.86 miles	Out to 6.21 miles
		B (moderately unstable)	4-5 mph	None	Out to 1.74 miles
		C (slightly unstable)	2-6 mph	Out to 2.05 miles	Out to 8.89 miles
		C (slightly unstable)	7-10 mph	None	Out to 2.24 miles
		D (neutral)	4-10 mph	Out to 3.29 miles	Out to 34.98 miles
		E (slightly stable)	1-5 mph	Out to 44.18 miles	Out to 62.01 miles
		F (moderately stable)	1-3 mph	Out to 55.13 miles	Out to 62.18 miles
1,000 acres	24 hours	A (very unstable)	1 mph	Out to 0.62 mile	Out to 1.18 miles
		A (very unstable)	2-3 mph	None	Out to 0.87 mile
		B (moderately unstable)	1-4 mph	Out to 2.49 miles	Out to 8.45 miles
		B (moderately unstable)	5 mph	None	Out to 1.99 miles
		C (slightly unstable)	2-8 mph	Out to 2.92 miles	Out to 12.99 miles
		C (slightly unstable)	9-10 mph	None	Out to 2.49 miles
		D (neutral)	4-10 mph	Out to 5.90 miles	Out to 62.20 miles
		E (slightly stable)	1-5 mph	Out to 62.20 miles	Out to 62.20 miles
		F (moderately stable)	1-3 mph	Out to 62.15 miles	Out to 62.15 miles

Table 4-6
Smoke Impact from Fires in Sagebrush with Grass Vegetation

Size of Burn	Burn Duration	Stability Class	Wind Speed	Distance to Which Standards are Exceeded PM_{10}	Distance to Which Standards are Exceeded $PM_{2.5}$
5,000 acres	24 hours	A (very unstable)	1-2 mph	Out to 0.87 mile	Out to 1.80 miles
		A (very unstable)	3 mph	None	Out to 1.06 miles
		B (moderately unstable)	1-5 mph	Out to 4.67 miles	Out to 17.35 miles
		C (slightly unstable)	2-10 mph	Out to 6.34 miles	Out to 31.31 miles
		D (neutral)	4-10 mph	Out to 20.34 miles	Out to 62.17 miles
		E (slightly stable)	1-5 mph	Out to 62.18 miles	Out to 62.18 miles
		F (moderately stable)	1-3 mph	Out to 62.18 miles	Out to 62.18 miles

Source: Tetra Tech analyses

The SASEM results show that the distance at which smoke impacts can exceed federal PM_{10} and $PM_{2.5}$ standards varies significantly with meteorological conditions and with the size of the area burning at one time. While there is no control over weather conditions during wildland fires, prescribed fires can be scheduled to coincide with weather conditions that minimize the extent of downwind smoke impacts.

Effects from wildland fire management are discussed separately for each alternative.

Effects under Alternative A

Wildland fires produce large quantities of PM_{10} and carbon monoxide emissions and lower quantities of other air pollutant emissions. Smoke from wildland fires can cause visibility and traffic safety problems in addition to air quality problems. Wind erosion from burned areas can cause post-fire air quality, visibility, and traffic safety problems. Fire suppression objectives and actions under Alternative A would be similar to those under the other alternatives. Vehicles and aircraft used for fire suppression operations and post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions.

Prescribed burns can produce large quantities of PM_{10} and carbon monoxide emissions and lower quantities of other air pollutant emissions, depending on the size of the fire. Smoke from prescribed burns can cause visibility and traffic safety problems in addition to air quality problems. Wind erosion from burned areas can cause post-fire air quality, visibility, and traffic safety problems. These impacts would be reduced by implementing prescribed fire burn plans that take into consideration mitigation measures to reduce air quality, visibility and traffic impacts.

Vehicles, equipment, and aircraft used for fuel treatments and post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions. The WD has conducted only limited prescribed burns in the past. If this pattern is continued under Alternative A, then prescribed burns would not be a frequent source of localized air pollutant emissions. In contrast to Alternatives B and D, Alternative A does not designate specific acreages for fire use programs.

Effects under Alternative B

Wildland fires produce large quantities of PM_{10} and carbon monoxide emissions and lower quantities of other air pollutant emissions. Smoke from wildland fires can cause visibility and traffic safety problems, in addition to air quality problems. Wind erosion from burned areas can cause post-fire air quality, visibility, and traffic safety problems. Fire suppression objectives and actions in Alternative B would be similar to those in the other alternatives. However, Alternative B includes objectives and actions allowing conditional fire suppression management for a benefit; consequently, some wildfires may not be suppressed or controlled as quickly under Alternative B as they would be under Alternatives A or C. This would result in slightly higher wildfire emissions under Alternative B than under Alternatives A or C. Vehicles and aircraft used for fire suppression operations and post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions.

Prescribed fire objectives and actions under Alternative B would be similar to those under the other alternatives. However, Alternative B includes objectives and actions allowing conditional fire suppression management for a benefit; consequently, the appropriate management may include allowing some wildfires to burn for resource benefit. This would result in slightly higher wildfire emissions under Alternative B than under Alternatives A or C. Vehicles, equipment, and aircraft used for post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions.

The WD has conducted only limited prescribed burns in the past. If this pattern is continued under Alternative B, then prescribed burns would not be a frequent source of localized air pollutant emissions. In contrast to Alternatives A and C, Alternative B designates specific acreages for fire use programs.

Effects under Alternative C

Wildland fires produce large quantities of PM_{10} and carbon monoxide emissions and lower quantities of other air pollutant emissions. Smoke from wildland fires can cause visibility and traffic safety problems, in addition to air quality problems. Wind erosion from burned areas can cause post-fire air quality, visibility, and traffic safety problems. Fire suppression objectives and actions under Alternative C would be similar to those under the other alternatives. Vehicles and aircraft used for fire suppression operations and post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions.

In contrast to the other alternatives, Alternative C would not make use of prescribed burns or wildfire use programs. However, because the WD has conducted only limited prescribed burns in the past, it is not clear whether this difference from other alternatives would result in a significant overall difference in prescribed fire emissions. In contrast to Alternatives B and D, Alternative C does not designate any fire management areas that include a full spectrum of management responses including the achievement of a resource benefit. This would result in slightly lower wildfire emissions under Alternative C than under Alternatives B or D. Emissions from vehicles and equipment used for fuel treatments would generate higher amounts of fugitive dust because prescribed fire and herbicides treatments would not be allowed; thus, there may be more mechanical treatments. There would be no associated smoke emissions from prescribed fire.

Effects under Alternative D

Wildland fires produce large quantities of PM_{10} and carbon monoxide emissions and lower quantities of other air pollutant emissions. Smoke from wildland fires can cause visibility and traffic safety problems, in addition to air quality problems. Wind erosion from burned areas can cause post-fire air quality, visibility, and traffic safety problems. Fire suppression objectives and actions under Alternative D would be similar to those under the other alternatives. Vehicles and aircraft used for fire suppression operations and post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions.

Prescribed fire objectives and actions under Alternative D would be similar to those under Alternatives A and B. However, Alternative D includes objectives and actions that may be appropriate for management of wildfires for a benefit within conditional fire suppression areas; consequently, the appropriate management may include allowing some wildfires to burn in identified conditional fire suppression areas for a benefit. This would result in slightly higher wildfire emissions under Alternative D than under Alternatives A or C. Vehicles, equipment, and aircraft used for post-fire land stabilization programs contribute minor amounts of vehicle engine exhaust and fugitive dust emissions.

The WD has conducted only limited prescribed burns in the past. If this pattern is continued under Alternative D, then prescribed burns would not be a frequent source of localized air pollutant emissions. In contrast to Alternatives A and C, Alternative D includes a program for wildfire use.

Air Quality: Effects from Cultural Resources Management

Effects Common to All Alternatives

There would be minimal impacts, if any to air quality from cultural resource management. Protecting or avoiding sensitive cultural areas would possibly reduce disturbance and reduce potential for fugitive dust emissions.

Air Quality: Effects from Tribal Consultation

Effects Common to All Alternatives

Tribal consultation policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Paleontological resources management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Visual Resources Management

Effects Common to All Alternatives

Visual resources management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Cave and Karst Resources Management

Effects Common to All Alternatives

Cave and karst resources management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Livestock Grazing Management

Effects Common to All Alternatives

Livestock is a source of greenhouse gas emissions from digestive fermentation and manure decomposition. Table 4-7 is a summary of estimated annual greenhouse gas emissions from livestock grazing in the WD area. Livestock population estimates used for the analysis were derived from grazing allotment data, assuming one AUM was equivalent to either one cow, one horse, or five sheep. For grazing allotments that allow a mix of livestock types, the available AUMs were split evenly among allowable livestock types. The emission estimates presented in Table 4-7 are based on estimated livestock population numbers and annual methane emission rates published by the Intergovernmental Panel on Climate Change (IPCC 2006). Livestock grazing in the WD area is a source of greenhouse gas emissions. Other effects from livestock grazing management are discussed separately for each alternative.

Table 4-7
Estimated Annual Greenhouse Gas Emissions from Livestock Grazing in the WD Area

Livestock Type	Annual Average Population	Annual Methane Emissions, Tons per Year Digestive Fermentation	Annual Methane Emissions, Tons per Year Manure	Annual Methane Emissions, Tons per Year Total	GWP as CO_2e, tons per year
Cattle	24,676	1,033,603	27,200	1,060,803	24,398,474
Horses	1,359	14,831	1,928	16,759	385,447
Sheep	10,582	6,066	212	6,278	144,393
Total	36,617	1,054,499	29,340	1,083,840	24,928,315

Source: Tetra Tech calculations based on BLM data
CO_2e = carbon dioxide equivalents
GWP = global warming potential as carbon dioxide equivalents (CO_2e).

Effects under Alternative A

Livestock grazing can be a minor source of fugitive dust emissions by direct soil disturbance and reduced vegetation density and resulting in minor increases in wind erosion. When vehicles are used for transporting livestock to and from grazing allotments, the resulting vehicle traffic is a minor source of fugitive dust and vehicle engine emissions. Alternative A would have similar overall AUM designation as the other alternatives but would designate slightly more acres as open to grazing than would be the case under Alternative C Option 1 and Alternative D. Overall emissions associated with livestock grazing under Alternative A would be similar to those under Alternatives B, C Option 1, and D.

Effects under Alternative B

Livestock grazing can be a minor source of fugitive dust emissions by direct soil disturbance and reduced vegetation density and resulting minor increases in wind erosion. When vehicles are used for transporting livestock to and from grazing allotments, the resulting vehicle traffic is a minor source of fugitive dust and vehicle engine emissions. Alternative B would have similar overall AUM designation as the other alternatives but would designate slightly more acres as open to grazing than would be the case under Alternative C Option 1 and Alternative D. Overall emissions associated with livestock grazing under Alternative B would be similar to those under Alternatives A, C Option 1, and D and would be higher than those under Alternative C Option 2.

Effects under Alternative C

Option 1

Livestock grazing can be a minor source of fugitive dust emissions by direct soil disturbance and reduced vegetation density and the resulting minor increases in wind erosion. When vehicles are used for transporting livestock to and from grazing allotments, the resulting vehicle traffic is a minor source of fugitive dust and vehicle engine emissions. Alternative C, Option 1 would have the same overall AUM designation as under the other alternatives but would designate slightly fewer acres as open to grazing than would be the case under Alternatives A or B. Overall emissions associated with livestock grazing under Alternative C, Option 1 would be similar to those under Alternatives A, B, and D and would be higher than those under Alternative C, Option 2.

Option 2

Alternative C, Option 2 would eliminate livestock grazing within the WD area. Consequently, Alternative C, Option 2 would have no emissions in the WD area associated with livestock grazing. However, eliminating grazing from the WD area would almost certainly lead to increased livestock grazing or livestock feed operations outside the WD area. Increased livestock production outside the WD area would result in increased greenhouse gas emissions outside the WD boundaries. There is insufficient information to determine whether or not Alternative C, Option 2 would result in any net change in regional greenhouse gas emissions from livestock operations.

Effects under Alternative D

Livestock grazing can be a minor source of fugitive dust emissions by direct soil disturbance, reduced vegetation density, and resulting minor increases in wind erosion. When vehicles are used for transporting livestock to and from grazing allotments, the resulting vehicle traffic is a minor source of fugitive dust and vehicle engine emissions. Alternative D would have same overall AUM designation as the other alternatives but would designate slightly fewer acres as open to grazing than would be the case under Alternatives A, B, or C, Option 1. Overall emissions associated with livestock grazing under Alternative D would be similar to those under Alternatives A, B, and C, Option 1, and higher than those under Alternative C, Option 2.

Air Quality: Effects from Minerals Management

Effects Common to All Alternatives

General

Construction activities associated with mineral development projects would generate fugitive dust emissions from earthmoving and ground disturbance associated with facility, road, and right-of-way (ROW) construction. Construction equipment operations also would be a source of engine exhaust emissions, which include both criteria pollutants and greenhouse gases. Owners or operators of mineral development projects would need to comply with state and federal air quality management requirements, including obtaining air quality permits and implementing fugitive dust control plans. Most mining operations and energy developments would be subject to stationary source permit requirements. Nevada dust control program regulations would apply to mineral or energy developments that disturb more than 20 acres. In addition, Nevada regulations on mercury emissions (Regulation R189-05), which became effective in May 2006, apply to owners and operators of both existing and new gold or silver mining facilities, according to schedules established in the Nevada regulations, and the EPA's final rule on Mercury standards was published on May 3, 2011 (40 CFR Part 63).

Saleable

Saleable minerals include aggregate, sand, gravel, clay, pumice, decorative stone and similar minerals. Fugitive dust from extraction, processing, and material transport operations is the primary air quality issue of concern. Equipment used for extraction, processing, and material transporting is also a source of engine exhaust emissions, which include both criteria pollutants and greenhouse gases. Owners and operators of extraction and processing facilities for these minerals would need to comply with state and federal air quality management requirements, including obtaining air quality permits and implementing fugitive dust control plans.

Fluid

Fluid mineral resources include oil, natural gas, and geothermal resources. Oil and gas development would include construction of access roads and drilling pads, exploratory drilling operations, production drilling operations, transport pipeline construction, and initial fluid processing. Fugitive dust and equipment engine exhaust emissions would be generated during construction and drilling phases. Equipment engine emissions, which include both criteria pollutants and greenhouse gases, and volatile organic compound emissions would occur during production drilling and initial fluid processing. Oil and gas development can also lead to fugitive emissions of methane, a greenhouse gas. There are no producing oil or gas wells in the WD area, and only a small amount of additional oil and gas development activity is anticipated. The reasonably foreseeable development (RFD) scenario, discussed below, anticipates a total of 12 wildcat exploratory wells over the next 15 to 20 years, resulting in only two discoveries in the WD area. However, the distance to gas transmission lines is expected to prevent significant commercial production during the next 15 to 20 years. Only one small-scale production well is anticipated in the WD area during the next 20 years. Development of producing facilities would typically require stationary source air permits from the Nevada Bureau of Air Pollution Control.

Geothermal development could include both power plant development and facilities for the direct use of geothermal fluids as a heat source. Both geothermal power plants and direct use facilities (for example, vegetable dehydrators) currently exist in the WD area. The RFD, discussed below, anticipates 500 new geothermal leases with 100 exploratory holes and the development of 5 new 45-megawatt geothermal power plants in the WD area over the next 20 years totaling 1,085 acres for the life of the plan. Geothermal development would typically include construction of access roads and drilling pads, exploratory drilling operations, production drilling operations, pipeline construction, power plant or direct use facility construction, and electrical transmission line construction for power plants. Depending on the type of power plant or direct use facility constructed, there would be requirements for cooling towers, cooling ponds, and reinjection wells. Fugitive dust and equipment engine exhaust emissions, which include both criteria pollutants and greenhouse gases, would be generated during construction and drilling phases. Emissions associated with production well and power plant or direct use facility operations would depend on the type of heat transfer system that is used. Binary heat transfer systems are closed loop systems, with no significant air pollutant emissions. Flash steam systems release steam and minerals contained in geothermal fluids as a result of flashing to steam for heat transfer and cooling of geothermal fluids in cooling towers or cooling ponds. Hydrogen sulfide and particulate matter from minerals contained in geothermal fluids would be the most important air pollutants from flash steam power plants. Particulate matter released as dissolved or suspended mineral in the steam and cooling tower drift can include a wide range of heavy metals and other substances. Facilities using cooling towers would have a greater air quality impact than those using cooling ponds. Emissions from geothermal facilities would be regulated by stationary source air permits from the Nevada Bureau of Air Pollution Control.

Solid

Leasable energy minerals include coal and oil shale. There are no known economically viable coal deposits in the WD area. Leasable nonenergy minerals can include sodium, phosphate, potash, potassium, or sulfur deposits. Fugitive dust from extraction, processing, and material transport operations would be the primary air quality issue of concern. Equipment used for extraction, processing, and material transport would also be a source of engine exhaust emissions, which include both criteria pollutants and greenhouse gases. Owners and operators of extraction and processing facilities for these minerals would need to comply with state and federal air quality management requirements, including obtaining air quality permits and implementing fugitive dust control plans.

Locatable

Locatable minerals include metallic minerals, precious and semiprecious gemstones, and industrial minerals. Gold and silver are the dominant metallic minerals mined in the WD area. Most existing metallic mineral mining operations in the WD area employ open pit operations with chemical leaching for mineral recovery. Dolomite, diatomite, and gypsum are important industrial minerals mined there. Fugitive dust from extraction, processing, and material transport operations are the primary air quality issue of concern. Equipment used for extraction, processing, and material transport are also a source of engine exhaust emissions, which include both criteria pollutants and greenhouse gases. Chemical and thermal processes used for ore processing can be an additional source of air pollutant emissions. Owners and operators of extraction and processing facilities for these minerals would need to comply with state and federal air quality management requirements, including obtaining air quality permits and implementing fugitive dust control plans. Nevada regulations on mercury emissions (Regulation R189-05) apply to owners and operators of both existing and new gold or silver mining facilities, according to schedules established in the Nevada regulations, and the EPA's final rule on Mercury standards was published on May 3, 2011 (40 CFR Part 63).

RFDs

Reasonably foreseeable development scenarios for the next 15 to 20 years have been identified for oil and gas development and for geothermal resource development. The scenario for oil and gas resources assumes the drilling of 12 wildcat wells totaling 72 acres of disturbance. Two of these would result in discoveries. Each of the two discoveries would have two subsequent step-out wells to define the limits of the discovery. Ground disturbance associated with this scenario includes 21 acres disturbed for well sites (10.5/discovery includes 2 step-out well and 1 discovery – See Table I-4) and 63.2 acres (31.6 x 2 – See Table I-4) disturbed for road and pipeline construction. However, the distance to pipelines is expected to prevent significant commercial production during the next 15 to 20 years.

The scenario for geothermal development assumes 500 leases, with 100 exploratory holes drilled over the next 20 years. Out of the 500 leased, only 40 leases would be expected to be developed. Five 45-megawatt geothermal power plants would be developed in five-fifteen-megawatt increments. Ground disturbance associated with each power plant would total 217 acres (30 acres for power plants, 84 acres for wells, 10 acres for pipelines, 38 acres for access roads, 30 acres for mainline roads, and 25 acres for transmission lines). The reasonably foreseeable development scenario for geothermal facilities represents a typical facility size, not a maximum facility size.

Effects under Alternative A

Effects under Alternative A would be the same as those discussed under Effects Common to All Alternatives.

Effects under Alternative B

Effects under Alternative B would be the same as those discussed under Effects Common to All Alternatives.

Effects under Alternative C

Effects under Alternative C would be the same as those discussed under Effects Common to All Alternatives.

Effects under Alternative D

Effects under Alternative D would be the same as those discussed under Effects Common to All Alternatives.

Air Quality: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

Effects from recreation, visitor outreach, and services management are discussed separately for each alternative.

Effects under Alternative A

On-road and off-road vehicle use is the major source of air pollutant emissions associated with visitor activities. In addition to on-road vehicle travel, approximately 60 percent of visitors engage in some type of OHV use. Campfires, camp stoves, and small portable generators are additional sources of emissions associated with recreational visitor activities. Vehicle engines, campfires, camp stoves, and portable generators are sources of both criteria pollutant and greenhouse gas emissions. Under Alternative A, most of the WD area (6,789,612 acres) would be open to OHV use. An additional 423,786 acres would have OHV use restricted to existing roads. Under Alternative A, 17,698 acres would be closed to OHV use. Alternative A would not designate any new special recreation management areas. Alternative A would have fewer visitor outreach and educational programs than the other alternatives. Although no visitor use projections are available, it is possible that Alternative A would have slightly lower visitor use than the other alternatives. Alternative A, however, has more area open to OHV use and fewer acres limited to OHV use on existing roads than the other alternatives. Consequently, Alternative A may have higher OHV use levels than the other alternatives. Because OHV activity emissions are likely to dominate overall recreation-related emissions, Alternative A may have higher recreation-related emissions than the other alternatives.

Effects under Alternative B

On-road and off-road vehicle use is the major source of air pollutant emissions associated with visitor activities. In addition to on-road vehicle travel, approximately 60 percent of visitors engage in some type of OHV use. Campfires, camp stoves, and small portable generators are additional sources of emissions associated with recreational visitor activities. Vehicle engines, campfires, camp stoves, and portable generators are sources of both criteria pollutant and greenhouse gas emissions. Under Alternative B, 1,460,200 acres would be open to OHV use. An additional 5,743,198 acres would have OHV use restricted to existing roads. Under Alternative B, 17,698 acres would be closed to OHV use. Three new special recreation management areas would be designated, and there would be more visitor outreach and educational programs than under Alternative A. Although no visitor use projections are available, it is possible that Alternative B would have slightly higher visitor use and slightly lower OHV use levels than Alternative A. It is unclear whether overall visitor use would be higher or lower than under Alternatives C and D. OHV use levels under Alternative B may be slightly higher than those under Alternatives C and D and slightly lower than those under Alternative A. Because OHV activity emissions are likely to dominate overall recreation-related emissions, Alternative B may have slightly lower recreation-related emissions than under Alternative A and slightly higher recreation-related emissions than under Alternatives C and D.

Effects under Alternative C

On-road and off-road vehicle use is the major source of air pollutant emissions associated with visitor activities. In addition to on-road vehicle travel, approximately 60 percent of visitors engage in some type of OHV use. Campfires, camp stoves, and small portable generators are additional sources of emissions associated with recreational visitor activities. Vehicle engines, campfires, camp stoves, and portable generators are sources of both criteria pollutant and greenhouse gas emissions. Under Alternative C, no areas in the WD would be designated as open to OHV use, but 7,187,575 acres would have OHV use restricted to existing roads. Under Alternative C, 43,521 acres would be closed to OHV use. Under Alternative C, two new special recreation management areas would be designated, and there would be more visitor outreach and educational programs than under Alternative A. Although no visitor use projections are available, it is possible that Alternative C would have slightly higher visitor use than Alternative A and overall visitor use similar to Alternatives B and D. OHV use levels under Alternative C may be slightly lower than those under the other alternatives because there would be no areas open to off-road OHV use. Because OHV activity emissions are likely to dominate overall recreation-related emissions, Alternative C may have somewhat lower recreation-related emissions than the other alternatives.

Effects under Alternative D

On-road and off-road vehicle use is the major source of air pollutant emissions associated with visitor activities. In addition to on-road vehicle travel, approximately 60 percent of visitors engage in some type of OHV use. Campfires, camp stoves, and small portable generators are additional sources of emissions associated with recreational visitor activities. Vehicle engines, campfires, camp stoves, and portable generators are sources of both criteria pollutant and greenhouse gas emissions. Under Alternative D, 288,105 acres would be open to OHV use. An additional 6,925,414 acres would have OHV use restricted to existing roads. Under Alternative D, 17,577 acres would be closed to OHV use. Under Alternative D, three new special recreation management areas would be designated, and there would be more visitor outreach and educational programs than under Alternative A. Although no visitor use projections are available, it is possible that Alternative D would have slightly higher visitor use than Alternative A and overall visitor use similar to Alternatives B and C. OHV use levels under Alternative D may be slightly lower than those under Alternative B and slightly higher than those under Alternative C. Because OHV activity emissions are likely to dominate overall recreation-related emissions, Alternative D may have somewhat lower recreation-related emissions than Alternatives A and B and slightly higher recreation-related emissions than Alternative C.

Air Quality: Effects from Renewable Energy Management

Effects Common to All Alternatives

Renewable energy programs include solar and wind energy projects. The primary emissions impacts associated with solar and wind energy projects are related to fugitive dust and equipment engine emissions during facility construction and from vehicle traffic associated with facility operation and maintenance. Construction equipment and vehicle engines are sources of both criteria pollutant and greenhouse gas emissions. In addition to emissions from facility construction and operational traffic, biomass energy facilities would typically produce criteria pollutant and greenhouse gas emissions from fuel conversion processes or from direct biomass combustion. Any renewable energy project that would disturb more than 20 acres would be subject to Nevada surface area disturbance permit requirements and would require preparation of a fugitive dust control plan. Biomass energy projects would probably require a stationary source permit from the Nevada Bureau of Air Pollution Control.

Air Quality: Effects from Transportation and Access Management

Effects Common to All Alternatives

Road maintenance activities and construction of new roadways would result in fugitive dust and equipment engine emissions. BLM road construction and road maintenance activities that would disturb more than 20 acres would be subject to Nevada surface area disturbance permit requirements and would require preparation of a fugitive dust control plan. Use of unpaved roadways in the WD area would be an ongoing source of fugitive dust and vehicle engine emissions.

Air Quality: Effects from Lands and Realty Management

Effects Common to All Alternatives

While the alternatives differ in terms of policies and actions related to land sales and other land disposal actions, such actions and changes in land ownership per se have no air quality impacts. Because the eventual use of lands subject to disposal actions is not clear, no conclusions can be made concerning the indirect air quality effects of land sales and other land disposal actions. Other effects from lands and realty management are discussed separately for each alternative. Construction of authorized pipelines, power lines, roads, communication sites, etc. would include dust and vehicle emissions. However, BMPs, mitigation measures, and stipulations would be required to minimize impacts.

Effects under Alternative A

Alternative A would not designate any lands as ROW avoidance or exclusion areas. Available information does not allow a determination of whether differences in the acreage of avoidance and exclusion areas would result in differences in air quality effects from future mineral and energy development.

Effects under Alternative B

Alternative B would designate 716,528 acres as ROW avoidance areas but would not designate any lands as exclusion areas. Available information does not allow a determination of whether differences in the acreage of avoidance and exclusion areas would result in differences in air quality effects from future mineral and energy development.

Effects under Alternative C

Alternative C would designate 869,645 acres as ROW avoidance areas and 1,279,481 acres as exclusion areas. Available information does not allow a determination of whether differences in the acreage of avoidance and exclusion areas would result in differences in air quality effects from future mineral and energy development.

Effects under Alternative D

Alternative D would manage 1,773,199 acres as ROW avoidance areas and 1,199,539 acres as exclusion areas. Available information does not allow a determination of whether differences in the acreage of avoidance and exclusion areas would result in differences in air quality effects from future mineral and energy development.

Air Quality: Effects from ACEC/RNA Management

Effects Common to All Alternatives

ACEC/RNA management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Backcountry Byways Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from BCB management.

Effects under Alternative A

Alternative A would evaluate three new BCBs for possible designation. Designated BCBs may encourage some visitor use that would not otherwise occur, thus resulting in a minor increase in vehicle traffic and resulting fugitive dust and vehicle engine emissions. Thus, BCB designations under Alternative A might result in a minor increase in emissions from visitor vehicle traffic. Emissions from BCB use under Alternative A would probably be similar to those under Alternative D and perhaps slightly higher than those under Alternatives B and C.

Effects under Alternative B

Alternative B does not identify any specific new BCBs for possible designation but would consider new BCB designations to stimulate local economies. Designated BCBs may encourage some visitor use that would not otherwise occur, thus resulting in a minor increase in vehicle traffic and resulting fugitive dust and vehicle engine emissions. Thus, BCB designations under Alternative B might result in a minor increase in emissions from visitor vehicle traffic. Emissions related to BCB use under Alternative B would be slightly higher than those under Alternative C and slightly lower than those under Alternatives A and D.

Effects under Alternative C

Alternative C does not identify any specific new BCBs for possible designation but would consider new BCB designations for areas currently receiving visitor use if such designations would not pose a risk to resources. Designated BCBs may encourage some visitor use that would not otherwise occur, thus resulting in a minor increase in vehicle traffic and resulting fugitive dust and vehicle engine emissions. Alternative C would be likely to result in fewer new BCB designations and smaller increases in emissions from visitor vehicle traffic than the other alternatives.

Effects under Alternative D

Alternative D would evaluate three new BCBs for possible designation. Designated BCBs may encourage some visitor use that would not otherwise occur, thus resulting in a minor increase in vehicle traffic and resulting fugitive dust and vehicle engine emissions. Thus, BCB designations under Alternative D might result in a minor increase in emissions from visitor vehicle traffic. Emissions related to BCB use under Alternative D would probably be similar to those under Alternative A and perhaps slightly higher than those under Alternatives B and C.

Air Quality: Effects from National Historic Trails Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from national historic trails management.

Effects under Alternative A

OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Under Alternative A, national historic trails and their viewsheds would remain open to OHV use. Consequently, Alternative A might produce slightly more OHV fugitive dust and engine emissions than Alternatives C and D and about the same amount of OHV fugitive dust and engine emissions as Alternative B.

Effects under Alternative B

OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Under Alternative B, national historic trails and their viewsheds would remain open to OHV use. Consequently, Alternative B might produce slightly more OHV fugitive dust and engine emissions than Alternatives C and D, and about the same amount of OHV fugitive dust and engine emissions as Alternative A.

Effects under Alternative C

OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Under Alternative C, Class I segments of national historic trails would be closed to OHV use and other segments of national historic trails and their viewsheds would be classified as limited for OHV use. Consequently, Alternative C might produce slightly less OHV fugitive dust and engine emissions than Alternatives A and B and about the same amount of OHV fugitive dust and engine emissions as Alternative D. In addition, under Alternative C no mineral development surface occupancy would be allowed within a mile of the CNHT.

Effects under Alternative D

OHV use generates fugitive dust and releases both criteria air pollutants and greenhouse gas pollutants from engine exhaust. Under Alternative D, Class I segments of national historic trails would be closed to OHV use and other segments of national historic trails and their viewsheds would be classified as limited for OHV use. Consequently, Alternative D might produce slightly less OHV fugitive dust and engine emissions than Alternatives A and B and about the same amount of

OHV fugitive dust and engine emissions as Alternative C. In addition, under Alternative D no mineral development surface occupancy would be allowed within a mile of the CNHT.

Air Quality: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

In general, management actions which preserve air quality would have a positive effect on habitats along the 43.4 miles of NWSRS eligible streams regardless of their suitability or designation status. Because of the requirement of air quality management to maintain conformance with national standards across all alternatives, the effects from all alternatives are equivalent.

Air Quality: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

Wilderness study areas management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

Watchable wildlife viewing sites management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Public Health and Safety Management

Effects Common to All Alternatives

Public health and safety management policies have no identifiable air quality implications under any of the alternatives.

Air Quality: Effects from Sustainable Development Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from sustainable development management.

Effects under Alternative A

Alternative A has no sustainable development policies and consequently would have no air quality impacts from sustainable development management.

Effects under Alternative B

Alternative B incorporates sustainable development objectives for disposal and reuse of lands previously used for mineral development. Such reuse could establish new sources of emissions associated with stationary sources and vehicle traffic. Any new industrial operations would likely be subject to air permit requirements from the Nevada Bureau of Air Pollution Control.

Effects under Alternative C

Alternative C incorporates sustainable development objectives for disposal and reuse of lands previously used for mineral development. Such reuse could establish new sources of emissions from stationary sources and vehicle traffic. Any new industrial operations would likely be subject to air permit requirements from the Nevada Bureau of Air Pollution Control.

Effects under Alternative D

Alternative D incorporates sustainable development objectives for disposal and reuse of lands previously used for mineral development. Such reuse could establish new sources of emissions from stationary sources and vehicle traffic. Any new industrial operations would likely be subject to air permit requirements from the Nevada Bureau of Air Pollution Control.

Air Quality: Cumulative Effects

Air Quality

Cumulative air quality impacts typically occur when multiple projects affect the same geographic areas at the same time or when sequential projects extend the duration of air quality impacts on a given area over a longer period of time. In addition, attainment of national ambient air quality standards for ozone and particulate matter require evaluation of conditions over three years. Thus, air pollution emissions that occurred in the recent past can affect attainment or nonattainment designations. The available air quality monitoring information for the WD area (see Section 3.2.1) does not reveal any distinct trends in terms of peak ozone or particulate matter concentrations.

Industrial source air permits issued under the prevention of significant deterioration (PSD) program require an analysis of cumulative air quality degradation in potentially affected areas since the first PSD program permit was issued for the area affected by the new proposed facility. PSD increments established in the federal Clean Air Act apply to emissions of nitrogen oxides, sulfur oxides, and particulate matter. If the increment consumption modeling analysis required for a new stationary source indicates that the allowable degradation increment has been used by the cumulative effect of past and present emission sources, the requested stationary source permit cannot be approved.

PSD increment consumption effects would be the cumulative air quality consideration of greatest significance to the WD area. PSD increments are established by hydrographic subarea. At present, most of the WD area is not affected by emission sources that have triggered the tracking of nitrogen oxide, sulfur oxide, or particulate matter increment consumption. Six hydrographic subareas within the WD area are currently subject to PSD increment consumption analyses under the PSD program: subarea 064 (Valmy area), subarea 072 (Imlay area), and four subareas that reach into the southern tip of the WD area (subareas 076, 082, 083, and 101). PSD increment consumption issues have the potential for affecting future mineral and energy developments in portions of the WD area.

Climate Change

Greenhouse gas emissions from sources within the WD area would contribute to cumulative climate change effects occurring in the region. Sources of greenhouse gas emissions in the WD area include fossil-fueled power plants, wildfires and prescribed burns, vehicles and OHVs, construction for mineral and energy development projects, operational activities for mineral and energy development projects, and grazing livestock, wild horses, and burros. To the extent that these activities increase, greenhouse gas emissions are also likely to increase.

Chambers (2008) notes that historical data show an increase in mean annual temperature in the Great Basin, with most of the change resulting from higher minimum temperatures rather than higher maximum temperatures. Most portions of the Great Basin show a warming of 0.6 to 1.1 degrees F over the past century. Regional climate models typically predict an additional warming of 3.6 to 9 degrees F over the next century. Historical data also indicate an increase in annual precipitation amounts in the Great Basin over the past century, together with increased year-to-year variability in precipitation amounts, and a decrease in winter snowpack. These changes have resulted in earlier snowmelt, higher winter stream flow volumes, reduced spring peak volumes, and lower summer and fall stream flow volumes. Chambers (2008) also notes that while historical data indicate an increase in annual precipitation in the Great Basin, regional climate models tend to show little long-term change in precipitation amounts for the Great Basin as a whole, with some areas predicted to have increased precipitation amounts and other areas predicted to have reduced precipitation amounts.

Over the long term, climate change may have indirect effects on emissions from wildfires and prescribed burns in the WD area. These changes may also have indirect effects from greenhouse gas emissions associated with livestock grazing and WHB populations. Climate change would alter temperature, precipitation, and snowpack conditions, resulting in changes to vegetation, stream flow, and the flow of springs. Vegetation changes would in turn have an effect on wildfire frequency and intensity, the necessity for conducting prescribed burns, and forage availability. This could lead to changes in livestock grazing or changes in WHB populations. Climate change is likely to increase the spread of cheatgrass, which would increase the potential for wildfires. Increasing temperatures are likely to extend the duration of the wildfire season.

Past and Present Actions

Few quantifiable impacts on air quality have occurred from livestock grazing, for example methane generation. Ground-disturbing activities from mineral, lands and realty, renewable energy, recreation, wildlife and special status species, WHB, and wildfire management activities have generated short term air quality impacts from fugitive dust associated with construction or rehabilitation actions. The intensity of impacts varies based on the nature, size and duration of disturbance. Associated air quality impacts include emissions released from active mines, geothermal plants and ROWs. These emissions are regulated through NDEP Air Quality permits. However, mining and renewable energy emissions are widely dispersed throughout the assessment area. Wildfires generate particulate matter emissions primarily from smoke on a more regional level. These impacts on air quality are generally limited to when the fire is burning. Short term blowing dust and ash can occur in areas after the fire has been suppressed and during seeding of burned areas. Re-establishment of vegetation through implementation of fire rehabilitation projects has reduced impacts on air quality by re-establishing vegetation and thereby stabilizing soils.

Reasonably Foreseeable Actions

Impacts on air quality from reasonably foreseeable future actions would remain similar to those analyzed under past and present actions for; livestock grazing, wildlife, special status species and WHB management. No livestock grazing would reduce methane emissions in areas. Increased ground-disturbing activities from an increase in minerals, lands and realty, and renewable energy activities would increase dust, vehicle, and processing emissions. These impacts would be localized and dependent on the size, number, and duration of projects authorized. Permit requirements, governed by the Clean Air Act of 1990 would continue to limit impacts on air quality from emissions associated with mining and renewable energy development. An increase in OHV travel would have short term impacts on air quality due to soil disturbance and vehicle emissions. Direct and immediate impacts on air quality from future wildfires would be affected by implementation of fuel treatments that would limit fire size. Rehabilitation efforts would continue to reduce blowing dust.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

The degree and intensity of impacts on air quality would vary based on the size of surface disturbance, types of facilities, duration of activities and the types of emissions released. Incremental effects of management actions under all alternatives would be similar as all would be required to comply with state and federal air quality standards and requirements. Wildfire management actions that include construction of fuel breaks to reduce fire size and spread would help stabilize smoke emissions. The number and intensity of wild fire and the amount of smoke emissions generated would be dependent on climate, weather, and increased potential for human caused fires. It is anticipated that incremental impacts should remain low with ambient pollutant levels below measurable limits in most of the assessment area and/or are in compliance with federal and state air quality standards

4.2.2 Geology

Summary

This section is a discussion of the potential impacts of the alternatives on the geology and unique geologic resources of the WD. Areas with geologic resources considered to be potentially unique include Lake Lahontan shore features (e.g., gravel bars or shore terraces), Lake Lahontan tufa mounds, Humboldt Range Arch, columnar basalt near Lava Beds, McFarlane Hot Spring, the 1915 earthquake fault trace, Disaster Peak, Trego Mountain, and Pulpit Rock.

Impacts on geologic resources occur from large-scale surface disturbance, such as mining, erosion, off-road vehicles, excavation, and vandalism. Damage and vandalism are usually concentrated near roads and trails.

Methods of Analysis

Methods and Assumptions

The analysis of potential impacts on geologic resources is based on the expertise of BLM resource specialists at the WD, review of existing literature, and geologic maps.

Specific impacts on geologic resources are not always readily identifiable because some impacts on geology are difficult to separate from impacts on other resources that geology supports. Thus, the impacts on geology are often discussed, either implicitly or explicitly, in the impacts section of other resources, such as paleontology and scenic quality (visual resources). Effects are quantified where possible; in the absence of quantitative data, best professional judgment was used.

The following assumptions regarding the resource base and management practices were considered in the analysis:

- The greatest potential for impacts would be from direct large-scale disturbance activities;
- All surface-disturbing activities include mitigation measures to reduce impacts on geologic resources. Analysis of impacts assumes that all mitigation measures are in place;
- Vandalism can destroy a feature or reduce its resource value (e.g., visual resources); and
- Education of the public increases support for protection of geologic resources but also increases visitation.

The area of analysis for cumulative effects on geologic resources is northwestern Nevada.

Geology: Effects from Air Quality Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from air quality management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives are essentially equivalent.

Geology: Effects from Geology Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from geologic resource management.

Effects under Alternative A

Mitigations and restrictions would be determined on a case-by-case basis.

Effects under Alternative B

Under Alternative B, the BLM would continue to evaluate sites containing unique geologic resources as to their significance and need for protection. Areas with unique geologic resources would remain open for all methods of mineral disposal, subject to mitigation measures sufficient to protect the values at risk. These measures include avoidance, reclamation, and other applicable use restrictions. Proposed activities that may impact unique geologic features would be authorized. Overall, unique geologic resources would be protected less under Alternative B than under Alternative A, where cases may include stronger limitations or mitigations.

Within areas with unique geologic resources, OHV use would be designated as "Limited" on existing roads and trails. OHV travel directly impacts the geologic resource through surface disturbance and increase in erosion. Damage and vandalism to geologic resources are usually concentrated near roads and trails due to larger number of visitors and higher frequency of visits. Impacts on unique geologic resources would be limited to those already damaged by existing roads and trails. Other geologic resources would be protected by these limitations, which would be greater than those under Alternative A, would be equivalent to those under Alternative D, and would be less than those under Alternative C. Materials would be produced and made available to educate the public about the unique geologic resources and encouraging them to visit and protect these resources.

Effects under Alternative C

Under Alternative C, the BLM would continue to evaluate sites containing unique geologic resources as to their significance and need for protection. Areas with unique geologic resources would be designated as exclusion zones for ROWs and other discretionary actions, and the areas would be closed to saleable mineral disposal. The areas would not be available for leasable minerals exploration and development, even with a no surface occupancy (NSO) stipulation. The unique geologic resources within the exclusion zones would be protected from degradation and impairment by restricting all mining activities. The protection of the unique geologic resources would be greatest under Alternative C.

Proposed nondiscretionary activities that may affect geologic features would be authorized with appropriate mitigation measures to protect the values at risk, while discretionary activities that may affect geologic features would not be allowed.

Withdrawing these areas from the General Mining Law would be pursued. The size of any mineral withdrawal would be commensurate with what is desirable to protect the values requiring the withdrawal. The unique geologic resources within the mineral withdrawals would be protected from degradation and impairment.

Within the exclusion zones, OHV travel would be closed. OHV travel directly impacts the geologic resource through surface disturbance and increase in erosion. Damage and vandalism to geologic resources are usually concentrated near roads and trails due to larger number of visitors and higher frequency of visits. Impacts on unique geologic resources would be minimized. Other geologic resources would be protected by these limitations, which would be greater than those under Alternatives A, B, and D. Materials would be produced and made available to educate the public about the unique geologic resources and encouraging them to protect these resources.

Effects under Alternative D

Unique geologic resources would be protected using permit stipulations or mitigation measures to limit or avoid adverse impacts. Impacts such as removal of geologic features or impacts on the settings of these features would be dependent on the amount and size of surface disturbance proposed from multiple uses. Requirements to avoid features and reclaim areas should reduce impacts and maintain the integrity of settings containing unique features.

Geology: Effects from Soil Resource Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from soil resources management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives are essentially equivalent.

Geology: Effects from Water Resources Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from water resources management objectives or actions under any of the alternatives. Management of priority watershed areas to include no surface occupancy or no surface disturbance and ROW exclusion and avoidance areas would protect those unique geologic resources located within priority watershed areas. With respect to effects on unique geologic resources, all of the alternatives are essentially equivalent.

Geology: Effects from Vegetation—Forest/Woodland Products Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from forest/woodland products management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives are essentially equivalent.

Geology: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from weeds management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives are essentially equivalent.

Geology: Effects from Chemical and Biological Control

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from chemical and biological control management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives are essentially equivalent.

Geology: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from rangeland management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from riparian and wetlands management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from fish and wildlife management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent. Unique geologic features would be protected from impacts based on use restrictions applicable to saleable, solid and fluid minerals leasing, and ROWs should these features be located within priority wildlife habitat areas.

Geology: Effects from Special Status Species Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from special status species management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent. Unique geologic features would be protected from impacts based on use restrictions applicable to saleable, solid minerals leasing, fluid minerals and ROW should these features be located within priority sage-grouse habitat areas.

Geology: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from WHB management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Wildland Fire Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from wildland fire management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Cultural Resources Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from cultural resource management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Tribal Consultation Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from tribal consultation objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Paleontological Resources Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from paleontological resources management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Visual Resources Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from visual resources management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Cave and Karst Resources Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from unique cave and karst resources management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Livestock Grazing Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from livestock grazing management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Minerals Management

Effects Common to All Alternatives

Unique geologic resources could be altered or removed from mining activity. These impacts would be addressed and adverse effects mitigated through development of mitigation measures including avoidance. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from recreation, visitor outreach, and services management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Renewable Energy Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from renewable energy management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Transportation and Access Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from transportation and access management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Lands and Realty Management

Effects Common to All Alternatives

Pursuing acquisition of private lands with unique geologic resources would provide protection of such resources, however they would also be more vulnerable to disturbance from multiple uses should they become public lands. Public lands identified for disposal would be evaluated on a case by case basis in accordance with FLPMA. Issuance of ROW may affect the setting and could detract from the uniqueness of geologic resources. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from ACEC/RNA Management

Effects Common to All Alternatives

Pursing acquisitions of lands with unique geologic resources would provide protection of the resources. Public lands identified for disposal would be evaluated on a case by case basis, retaining lands with any valuable resources.

Geology: Effects from Backcountry Byways Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from BCBs management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from National Historic Trails Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from national historic trails management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no impacts because there are no geology management actions that are likely to affect NWSRS eligible river segments.

Geology: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from wilderness study areas or lands with wilderness characteristics management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from watchable wildlife viewing sites management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Public Health and Safety Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from public health and safety management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Effects from Sustainable Development Management

Effects Common to All Alternatives

There likely would be no impacts on unique geologic resources resulting from sustainable development management objectives or actions under any of the alternatives. With respect to effects on unique geologic resources, all of the alternatives would be essentially equivalent.

Geology: Cumulative Effects

Past and Present Actions

There have been few impacts on unique geologic resources from livestock grazing, minerals, renewable energy, lands and realty, recreation, wildlife and special status species management, WHB, or wildfire management. Potential impacts would be reduced due to implementation of site specific mitigation measures or use restrictions developed on a case by case basis.

Reasonably Foreseeable Actions

Impacts would be similar to past and present analysis. There would be no impacts on geologic resources from grazing, WHB management, and fire management. Other impacts would depend on the location of disturbance relative to unique geologic features and the size and number of new land use proposals (i.e., mineral or renewable energy projects, ROW authorizations, communication sites, etc.). Increased recreation use may make unique geologic resource more vulnerable to vandalism or damage. Implementation of BMPs, SOPs, site specific mitigation measures and use restrictions would continue therefore future impacts are expected to remain low. Features that are located in priority wildlife habitat or priority watershed designations would receive further protection as certain uses would be restricted in those areas.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

Overall, the incremental impacts on these resources from past, present, and RFFAs coupled with the management actions would be minimal and would be mitigated on a case by case basis.

4.2.3 Soil Resources

Summary

This section presents potential impacts of the alternatives on the soil resources in the WD. (See Chapter 3 for a more detailed discussion of soil resources in the WD.) Soil resources would be managed to maintain the natural habitat of the area and to minimize the potential for accelerated (human-caused) wind and water erosion. In order to maintain soil processes, a healthy, productive, and diverse plant community is necessary. Improved ecological condition would increase productivity, litter, biological soil crusts, soil fertility, infiltration, and nutrient cycling.

Methods of Analysis

Methods and Assumptions

The analysis of potential impacts on soil resources is based on the expertise of BLM resource specialists at the WD and a review of literature and soil resource maps.

Impacts on soil resources are from management actions related to land use, grazing, fire management, recreation use, OHV travel, and other resources. Management actions for the other resources would vary the amount of land available for surface-disturbing activities and those that could impact the soil resources. Changing activities that would increase erosion would be mitigated by implementing BMPs and SOPs (Appendix B) through reclamation or environmental enhancement activities to stabilize or maintain soil processes. Effects are quantified where possible; in the absence of quantitative data, best professional judgment is used.

The following assumptions regarding the resource base and management practices were considered in the analysis:

- Wind erosion has the greatest impact on soil resources within the WD. Actions that decrease the ability of the soil resources to withstand the wind have the greatest potential for impacts. These actions include those that remove existing vegetative cover or that actually disturb the soil itself.
- Roads and trails contribute to soil compaction and erosion. Higher road and trail densities would result in more adverse impacts on soil resources. Roads and trails that receive more traffic would be at greater risk for soil erosion unless they are improved.
- All surface-disturbing activities include mitigation and SOPs and BMPs (Appendix B) to reduce impacts on soil resources.

The area of analysis for cumulative effects on soil resources is defined as the WD. Approximately 88 percent of the RMP area is meeting the soil standard. Areas defined as not meeting the soil standard are "altered or disturbed land cover types" (eight percent) and "non-vegetated cover types" (four percent). Altered or disturbed land cover types include recent burns, mines or quarries, and invasive and noxious weeds species. Nonvegetated cover types include primarily dune lands and playas.

Soil Resources: Effects from Air Quality Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from air quality management objectives for actions under any of the alternatives. Air quality mitigation measures including dust suppression requirements would reduce the potential for blowing dust and wind erosion of soils.

Soil Resources: Effects from Geology Management

Effects Common to All Alternatives

Implementing geology management actions would protect soils near unique geologic resources on a case-by-case basis through implementation of mitigation measures to limit or avoid undue adverse impacts.

Soil Resources: Effects from Soil Resource Management

Effects Common to All Alternatives

Small-scale activities, including monitoring activities, small construction, implementation, and maintenance activities, and fence building with less than one acre of surface disturbance, involve short-term increases in erosion and soil compaction. Due to the small size of the areas, these activities would have negligible impacts on soil resources.

Under all alternatives, erosion would be reduced on areas with a good perennial grass or forb understory (late seral). These areas are expected to be maintained and improved, resulting in reduced erosion, natural fire cycle returned, and reduced emergency stabilization. Also, burned area rehabilitation treatments would be reduced.

Research projects are encouraged in the WD to gain a better understanding of the ecological processes and to improve rehabilitation and reclamation treatments. Research projects affect soil resources; those of less than 100 acres would have a negligible impact on soil resources, and research plots greater than 100 acres would have negligible or minor impact on soil resources, depending on the treatment implemented.

Effects under Alternative A

Soil erosion would be reduced by maintaining and improving the vegetative cover in areas designated as having high erosion susceptibility. Natural processes, such as plant growth, litter accumulation, and biological crust formation would be encouraged; moisture retention in the soil resources would be maintained. BMPs and erosion control techniques, such as seeding, straw bales, and matting, would be required. Reduced erosion results in less impact on water courses and less burial of biological soil crusts and reduces loss of growth material.

Activities that would result in trampling or excessive shearing of biological soil crusts would be minimized, especially when soil surfaces are dry, as appropriate for the soil type. These actions would reduce the loss of biological soil crust and would protect against increased erosion and loss of growth media. These mitigations would be greater than those discussed under Alternative B.

Land reclamation would be pursued in disturbed areas, thereby improving soil conditions. Reclamation conditions and methods would be determined on a case-by-case basis.

The Sierra Front/NW RAC-RAC Standards and Guidelines and site-specific allotment objectives would be used for authorizations. These guidelines include specific directions to prevent erosion and protect soil resources.

Effects under Alternative B

Soil erosion would be reduced by maintaining and improving the vegetative cover in areas designated as having high erosion susceptibility. The components of soil surface, vegetation, soil litter, and biologic crusts would be maintained or improved rather than just encouraged as under Alternative A, thereby increasing protection against erosion, increasing moisture retention, and improving the organic content of the soils. BMPs and erosion control techniques, such as seeding, straw bales, and matting would be required, further reducing erosion, burial of biological soil crusts, and loss of growth material.

No seasonal restrictions for activities that would result in compaction of soils with biological crusts would be applied. While multiple uses that could result in soil compaction would be allowed, adverse effects would be mitigated.

Land reclamation would be pursued in disturbed areas. The best available material for growth medium would be salvaged for surface disturbance and reclamation. Reclamation would improve the existing soil resources to conditions similar to those existing before the surface-disturbing activity. Soil amendments to improve the organic or nutrient or cohesive properties of the soils would not be applied.

The Sierra Front/NW RAC-RAC Standards and Guidelines and site-specific allotment objectives would be used for livestock grazing authorizations. These guidelines include specific directions to prevent erosion and protect soil resources. The guidelines would be applied in the same manner as under Alternative A.

Effects under Alternative C

Soil processes would be maintained, protected, and improved in ways that are appropriate to soil types, climate, and land form. The vegetative cover would be improved by increasing litter, biological soil crusts, and vegetation as appropriate for soil type increasing protection against erosion, increasing moisture retention, and improving the organic content of the soil resources. These mitigations would be applied generally instead of just in areas designated as having high erosion susceptibility as under Alternatives A and B. BMPs (Appendix B), SOPs (Appendix B), and mitigation measures would be applied to all BLM and BLM-authorized activities to maintain, protect, or reduce adverse impacts on soil resources.

Surface disturbances to biological soil crusts would be eliminated or fully mitigated when the soil surfaces are dry. Surface disturbances within high potential biological crust areas would be seasonally eliminated, and soil resources would be protected from excessive compaction by implementing seasonal use restrictions. These actions would reduce the loss of biological soil crust and would protect against increased erosion and loss of growth media. Moisture retention in the soils would be maintained. These mitigations would be greater than those under Alternatives A, B, and D.

Reclamation would be required for all surface-disturbing activities. Growth medium for surface disturbance and reclamation would be salvaged or imported, and soil resources would be improved by applying natural or organic amendments. Importing growth media from within the individual mining areas would not result in disturbance and loss of growth media in other areas. Reclamation would improve the existing soils to conditions similar to or better than those existing before the surface-disturbing activity through the use of natural and organic soil amendments to improve the soil's organic or nutrient or cohesive properties. Applying the Land Health Standards (e.g., Sierra Front/NW RAC Standards and Guidelines and site specific objectives) to land use authorizations would protect soils and minimize overall impacts on soil resources.

Effects under Alternative D

Impacts on soils would be similar to Alternative A. Development of mitigation measures, implementation of BMPs/SOPs would maintain, improve, protect, and reduce soil erosion. Soil Resources: Effects from Water Resources Management

Effects Common to All Alternatives

Efforts to improve surface water quality can involve measures that effect soils. Implementation of BMPs, including erosion control structures, would reduce impacts from erosion of soils. Water importation/exportation projects can impact groundwater levels at either end of the project. Potential increases in desertification and wind erosion of soils can occur in areas where water is drawn away.

Effects under Alternative B

Management of priority watersheds would protect soils by limiting uses or disturbance.

Effects under Alternative C

Management of priority watersheds would protect soils by limiting uses or disturbance.

Effects under Alternative D

Management of priority watersheds would protect soils by limiting or uses or disturbance.

Soil Resources: Effects from Vegetation—Forest/Woodland Products Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from forest/woodland products management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives are essentially equivalent. Vegetation treatments may expose soils to wind or water erosion, and impacts would depend on the nature and degree of disturbance.

Soil Resources: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from weeds management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives are essentially equivalent.

Soil Resources: Effects from Chemical and Biological Control

Effects Common to All Alternatives

There would be no effects common to all alternatives from chemical and biological control management.

Effects under Alternative A

Alternative A would allow the use of herbicides and pesticides. Once invasive and noxious weeds have been treated, soils would be more vulnerable to wind and water erosion as plant cover would be affected. Potential for erosion would continue until vegetation re-establishes. Herbicides would be present in the soil from short to long term depending on chemical composition and labeled application methods. Some pre-emergent herbicides intended to be applied directly to the soil surface would be present in the soil for up to several years. Pesticides would produce small quantities of volatile organic compounds, which would dissipate in the long term. Chemical impacts from the use of herbicides and pesticides are minor.

Effects under Alternative B

Alternative B would allow the use of herbicides and pesticides. The effects would be similar to Alternative A.

Effects under Alternative C

No herbicides or pesticides would be used under Alternative C, thereby eliminating the release of volatile organic compounds into soil resources.

Effects under Alternative D

Alternative D would allow the use of herbicides and pesticides. The effects would be similar to Alternative A.

Soil Resources: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Small-scale activities, including livestock impoundments, vegetation mowing, and seed collection, with less than one acre of surface disturbance, involve short-term increases in erosion and soil compaction. Due to the small size of the areas, these activities would have negligible impacts on soil resources.

Grazing plans or grazing permit renewals or annual grazing authorizations would identify actions to maintain or improve soil conditions.

Effects under Alternative A

Vegetation cover under Alternative A is improved by using a diversity of native and introduced grasses, forbs, and shrub seeds and seedlings. Under Alternative A, native seed is preferred over introduced seed. Vegetation objectives are based on maintaining and improving desirable perennial vegetation cover and densities. Alternative A identifies cover and density objectives to be met over three years for emergency stabilization and burn area rehabilitation. As discussed under Effects from Soil Resource Management above, the Sierra Front/NW RAC-RAC Standards and Guidelines and site-specific allotment objectives would be used for livestock grazing authorizations. These guidelines include specific directions to prevent erosion and protect soil resources.

Alternative A would have a greater reduction in erosion than Alternative B. Vegetation management objectives would be more stringent under Alternative A than under B. Soil processes would be improved at a faster rate than under Alternative B.

Effects under Alternative B

Vegetation cover under Alternative B is improved by using introduced grasses, and forbs. Under Alternative B, primarily introduced seed would be used. Vegetation objectives are based on maintaining and improving desirable perennial vegetation cover and densities. As discussed under Effects from Soil Resource Management above, the Sierra Front/NW RAC- Standards and Guidelines and site-specific allotment objectives would be used for livestock grazing authorizations. These guidelines include specific directions to prevent erosion and protect soil resources. The guidelines would be applied in the same manner as under Alternative A.

Alternative B has a two-year closure for livestock/WHB grazing to reduce cheatgrass. Seeding success is anticipated to be less than 20 percent under Alternative B versus greater than 75 percent under Alternative A.

Effects under Alternative C

Under Alternative C, rehabilitation seedings would be limited based on the amount of native seed available. In most years, native seed supplies are exhausted because of demand, so large areas would be untreated and would be dominated by invasive plants. Most of the vegetation communities do not have the potential for natural recovery because they lack perennial understory grasses and forbs. Under Alternative C, wildland fires would increase and expand, resulting in increased erosion. Alternative C, Option 1, five-year livestock/WHB grazing fire closure, would not improve soil processes where desirable perennial understory plants are lacking. Alternative C, Option 2, elimination of livestock grazing, would increase fuels on areas lacking potential for natural recovery. Objectives for soil resources are most stringent under Alternative C. Prescribed fire would not be used under Alternative C, so potential erosion from prescribed fire would be eliminated.

As discussed under Effects from Soil Resource Management above, applying the Land Health Standards (e.g., Sierra Front/NW RAC Standards and Guidelines and site-specific allotment objectives) to land use authorizations instead of just livestock grazing authorizations, as under Alternatives A and B, a larger amount of soils would be protected and impacts on soil resources would be minimized. Alternative A has a greater reduction in erosion than Alternative C.

Effects under Alternative D

Vegetation cover under Alternative D would be improved by using a diversity of native and introduced grasses, forbs, and shrub seeds and seedlings. Under Alternative D, native seed is preferred over introduced seed. Vegetation objectives are based on maintaining and improving desirable perennial vegetation cover and densities. Under Alternative D, an increase in perennial vegetation would reduce erosion by increasing desirable cover and would increase years between fires (fire cycle) by reducing annual invasive species. As discussed above, under Effects from Soil Resource Management, applying the Land Health Standards (e.g., Sierra Front/NW RAC Standards and Guidelines and site-specific allotment objectives) to land use authorizations instead of just livestock/WHB grazing authorizations, as under Alternatives A and B, a larger amount of soils would be protected and impacts on soil resources would be minimized.

Under Alternative D, desirable perennial vegetation cover would increase, reducing erosion, and the fire cycle would be reduced. Desirable perennial vegetation would improve under Alternative D at a faster rate than under Alternative A. Vegetation management objectives are more stringent under Alternative D than A.

Soil Resources: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Appropriate management of riparian areas would help reduce anthropogenically accelerated erosion (and resultant deposition) of sediments that are directly related to the health and function of wetland soils. This effect would be localized and similar under all alternatives except that its degree would be dependent on the degree of functionality reached within riparian areas.

Soil Resources: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Small-scale activities, including wildlife water development with less than one acre of surface disturbance, involve short-term increases in erosion and soil compaction. Due to the small size of the areas, these activities would have negligible impacts on soil resources.

Implementation of mitigation measures to protect wildlife habitat would also protect soils. Applying Land Health Standards, BMPs and SOPs to maintain or improve wildlife habitat would also maintain or improve soils.

Soil Resources: Effects from Special Status Species Management

Effects Common to All Alternatives

All alternatives would provide varying special status species management strategies that would protect or improve soil resources. These strategies include use restrictions, development of mitigation measures to improve special status species habitat, and buffer zones. Habitat improvement projects would also serve to protect and stabilize soils.

Soil Resources: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

The impacts of WHB management on soils are discussed above in the larger context of Effects from Soil Resource Management and Effects from Vegetation - Rangeland Management.

Direct impacts associated with the WHB gathers would consist of disturbance to soil surfaces immediately in and around the temporary gather site(s) and holding facilities. Impacts would be created by vehicle traffic and hoof action as a result of concentrating horses/burros, and could be locally high in the immediate vicinity of the gather site(s) and holding facilities. Generally, these sites would be small (less than one half acre) in size. Any impacts would remain site specific and isolated in nature. Impacts would be considered minimal as gathering and herding would be of short duration.

Normally, these gather sites are located near or on roads, pullouts, water haul sites or other flat areas, which have been previously disturbed, to enable easy access by transportation vehicles and logistical support equipment. These common practices would minimize the potential impacts on soils.

Indirect impacts from reduced concentrations of wild horses and burros would be reduced soil erosion and compaction. This reduction in soil erosion and compaction would be most notable and important in the vicinity of small springs and meadows currently experiencing high levels of disturbance and bare ground from the excess WHB.

As WHB populations increase over time and if they exceed high range AML, soil loss from wind and water erosion, and invasion of undesired plant species would continue or expand as a result of over-utilization of vegetation, loss of perennial native grasses and heavy trailing due to an overpopulation of wild horses within the HMA. This loss would be most notable in the vicinity of small springs and meadows and other water sources with high levels of WHB use.

Soil Resources: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildland fire within the WD reduces plant cover, litter, and biological soil crust, making soil resources highly susceptible to erosion. Emergency stabilization and burned area rehabilitation treatments would be implemented to reduce these impacts. Wildland fire increases wind erosion, which may be a minor to substantial impact on public health, depending on fire location, especially among sensitive groups, such as children, the elderly, or those individuals with asthma or emphysema. Wildland fire increases water erosion, which may be either a minor or greater impact. Impacts from erosion are greatest the first year after the fire, diminishing to minor after three years as vegetation is reestablished. Water erosion can be substantial on limited areas, especially if the sediment impacts residential or industrial areas and transportation systems. These impacts would occur until vegetation becomes fully established.

Fire impacts would include reduction of soil nutrients from wind and water erosion, loss of shrubs or deep-rooted plants, reduced nutrient cycling, reduced vegetation productivity, increased compaction from loss of surface litter, and reduction in organic matter and the loss of biological crusts.

Initiation of ES&R actions would ensure timely stabilization of watersheds, reduction of flood hazards, replacement or reestablishment of vegetation through seeding and recovery of perennial plants. The reestablishment of vegetative cover, litter, and viable root mass would reduce the impacts of wind and water erosion. Stabilization of watersheds would prevent undue loss of topsoil, reducing loss of site potential. Short-term increases in water and wind erosion are unavoidable in the first year following a wildfire.

Soil Resources: Effects from Cultural Resources Management

Effects Common to All Alternatives

Small-scale activities, including excavations of cultural resources sites for data recovery with less than one acre of surface disturbance involve short-term increases in erosion and soil compaction. Due to the small size of the areas, these activities would have negligible impacts on soil resources.

Soil Resources: Effects from Tribal Consultation Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from tribal consultation objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Small-scale activities, including excavations of paleontology sites for data recovery with less than one acre of surface disturbance, involve short-term increases in erosion and soil compaction. Due to the small size of the areas, these activities would have negligible impacts on soil resources.

There likely would be no impacts on soil resources resulting from paleontological resources management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Visual Resources Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from visual resources management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Cave and Karst Resources Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from soil resources management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Livestock Grazing Management

Effects Common to All Alternatives

The impacts of grazing to soils are discussed above in the larger context of Effects from Soil Resource Management and Effects from Vegetation - Rangeland Management.

Soil Resources: Effects from Minerals Management

Effects Common to All Alternatives

Construction activities that involve geothermal, oil and gas, and mine development, mineral material pits and power plants would remove vegetation, thereby increasing erosion and soil compaction in the short term. Erosion would involve impacts from negligible to greater, depending on the level of disturbance and the soil type. Long-term mitigations and reclamation are common to all alternatives. With reclamation and mitigation, impacts would be minor. Differences among types and degree of reclamation and mitigations are discussed below.

Effects under Alternative A

Mine operators would be encouraged to minimize disturbance to biological soil crusts and to reduce soil erosion by using BMPs (Appendix B), SOPs (Appendix B), and erosion control techniques, such as seeding, placing straw bales, and matting. The BLM would pursue land reclamation in disturbed areas.

Under Alternative A, 418,938 acres would be closed to saleable mineral disposition, 446,887 acres would be closed to fluid leasable minerals activities, 416,652 acres would be closed to solid leasable minerals activities, and 6,543 acres would be withdrawn from locatable mineral activities. Soil resources would be protected from related mineral development within these areas, reducing the potential for impacts.

Effects under Alternative B

Mine operators would be encouraged to minimize disturbance to biological soil crusts and to reduce soil erosion by using BMPs and erosion control techniques, such as seeding, placing straw bales, and matting. Multiple uses would be allowed with mitigations without seasonal closures. The BLM would pursue land reclamation in disturbed areas. Those involved in surface-disturbing activities would be required to salvage the best available material for use as growth medium for reclamation. Soil resources in any areas with limitations on surface disturbance would be protected (see detail below).

Under Alternative B, 418,938 acres would be closed to saleable mineral disposition, 1,132,594 acres would be closed to fluid leasable minerals activities, 1,124,266 acres would be closed to solid leasable minerals activities, and 6,543 acres would be withdrawn from locatable mineral activities. Soil resources would be protected from related mineral development within these areas, thereby reducing the potential for impacts. Alternative B includes the same amount of land closed to the various mining activities, except for solid leasable minerals activities. For these mineral activities, more area would be closed under Alternative B than under Alternative A.

Effects under Alternative C

Mining activities would be required to maintain, protect, or reduce adverse impacts on soil resources. Surface disturbances within high potential biological crust areas would be seasonally eliminated. The BLM would require that all land where the surface has been disturbed to be reclaimed, which would require salvaging or importing growth medium. Soil resources in any areas with limitations on surface disturbance would be protected (see detail below).

Under Alternative C, 837,049 acres would be closed to saleable mineral disposition, 4,455,028 acres would be closed to fluid leasable minerals activities, 4,455,645 acres would be closed to solid leasable minerals activities, and 281,892 acres would be withdrawn from locatable mineral activities. Soil resources would be protected from related mineral development within these areas, thereby reducing the potential for impacts. More land would be closed to the various types of mining activities under Alternative C than under Alternatives A, B, or D.

In addition, the area of the George Lund Petrified Forest mineral withdrawal would be enlarged to a total of 141 acres, further reducing potential impacts on soil resources.

Effects under Alternative D

Mining activities would be encouraged to maintain, protect, or reduce adverse impacts on soil resources. Where appropriate, the BLM would manage surface-disturbing activities to ensure reclamation. Those engaged in surface-disturbing activities would be required to salvage the best available material for use as growth medium for reclamation. Soil resources located in any areas with limitations on surface disturbance would be protected (see detail below).

Under Alternative D, 694,991 acres would be closed to saleable mineral disposition, 1,740,928 acres would be closed to fluid leasable minerals activities, 1,740,930 acres would be closed to solid leasable minerals activities, and 7,296 acres would be withdrawn from locatable mineral activities. Soil resources would be protected from related mineral development within these areas, reducing the potential for impacts. More land would be closed to the various types of mining activities under Alternative D than under Alternatives A or B, but less land than under Alternative C.

In addition, the area of the George Lund Petrified Forest mineral withdrawal would be enlarged to a total of 141 acres, further reducing potential impacts on soil resources.

Soil Resources: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

SRMAs are public land units that provide specific structured recreational activities, experience, and benefit opportunities. Increased areas designated as SRMAs could affect soils by increased vehicle and pedestrian traffic and associated increases in compaction and erosion. Mitigations, including limits to new roads, vehicle access, trails, and activities, would be considered to limit impacts on resources. Impacts from OHV use are discussed below. There would be likely impacts on soil from recreation, visitor outreach, and services management objectives or actions under any of the alternatives.

Effects under Alternative A

Alternative A would include only the existing Pine Forest SRMA (37,259 acres) and would result in the least soil disturbance associated with SRMAs. Under Alternative A, OHV use is restricted which would result in a minor increase in erosion over the other alternatives. Under Alternative A, the Winnemucca Sand Dunes RMZ would not be implemented resulting in less erosion in that specific area.

Effects under Alternative B

Under Alternatives B and D, the new SRMAs of Winnemucca (151,824 acres), Granite Range (44,911 acres), and Nightingale (925,593 acres) would be designated, and the Pine Forest SRMA would be expanded to 98,874 acres. Through increased vehicle and pedestrian traffic and associated increases in compaction and erosion, these alternatives would have the most impact on soils associated with SRMAs. Under Alternative B, the Winnemucca Sand Dunes RMZ would be implemented and OHV use would increase, thereby increasing the potential impact on soil resources by removing vegetation and increasing blowing soil to State Highways 95 and Delaney subdivision.

Effects under Alternative C

Under Alternative C, the new SRMA of Winnemucca (151,824 acres) would be designated. The Pine Forest SRMA would be expanded to 98,874 acres and would have more impacts on soils associated with SRMAs, through increased vehicle and pedestrian traffic and associated increases in compaction and erosion, than under Alternative A but fewer impacts than under Alternatives B and D. Under Alternative C, OHV use would be restricted, having least impact on soil resources. Under Alternative C, the Winnemucca Sand Dunes RMZ would not be implemented resulting in less erosion in that specific area.

Effects under Alternative D

Under Alternatives B and D, the new SRMAs of Winnemucca (151,824 acres), Granite Range (44,911 acres), and Nightingale (925,593 acres) would be designated, and the Pine Forest SRMA would be expanded to 98,874 acres. Through increased vehicle and pedestrian traffic and associated increases in compaction and erosion, these alternatives would have the most impact on soils associated with SRMAs. Under Alternatives B and D, the Winnemucca Sand Dunes RMZ would be implemented and OHV use would increase, thereby increasing the potential impact on soil resources by removing vegetation and increasing blowing soil to State Highways 95 and Delaney subdivision.

Soil Resources: Effects from Renewable Energy Management

Effects Common to All Alternatives

Implementing any projects would include project-specific mitigation and impacts. With respect to the effects on soil resources, all of the alternatives are essentially equivalent. Construction activities associated with renewable energy projects would remove vegetation increasing erosion and soil compaction. Implementing projects would include project specific BMPs, mitigation measures and stipulations to reduce impacts. Effects from Alternative A include surface disturbing activities from renewable energy development would disturb remove vegetation and disturb soils making them vulnerable to wind and water erosion. Implementing site specific mitigation measures to reduce impacts from surface disturbance activities by renewable energy projects would reduce erosion potential. Ensuring disturbed areas are seeded would help stabilize soils from wind and water erosion. Implementation of BMPs and SOPs, would also stabilize and protect soils.

Effects under Alternative B

Delineation of ROW avoidance areas would include management of these areas requiring mitigation measures to reduce or avoid impacts on resources including soils. Implementation of mitigation measures, BMPs, SOPs would reduce soil erosion potential.

Effects under Alternative C

Delineation of ROW avoidance and exclusion areas would include mitigation measures to reduce impacts on resources and use restricts that include NSO or no surface disturbance. Implementation of these management actions would reduce disturbance or uses thereby protecting soils. Fewer acres are identified as ROW exclusion areas with use restrictions under this alternative compared to Alternative C

Effects under Alternative D

Delineation of ROW avoidance and exclusion areas would include mitigation measures to reduce impacts on resources and use restricts that include NSO or no surface disturbance. Implementation of these management actions would reduce disturbance or uses thereby protecting soils.

Soil Resources: Effects from Transportation and Access Management

Effects Common to All Alternatives

Roads and trails contribute to soil compaction and erosion; higher road and trail densities would result in more adverse impacts on soil resources; roads and trails that receive more traffic would be at greater risk for soil erosion.

Small-scale activities, including road maintenance with less than one acre of surface disturbance, involve short-term increases in erosion and soil compaction. Due to the small size of the areas, these activities would have negligible impacts on soil resources.

Soil Resources: Effects from Lands and Realty Management

Effects Common to All Alternatives

Various construction activities and ROW authorized under lands and realty management (such as wind power, solar power, communication sites, transmission lines, roads, and pipeline projects, etc.) would impact soil resources. Land sales could affect soil resources by changing the vegetative cover through agricultural uses, urbanization, or industrial development. Erosion would increase during construction and would be short term. Erosion would involve impacts from negligible to greater, depending on the level of disturbance and the soil type.

Soil Resources: Effects from ACEC/RNA Management

Effects Common to All Alternatives

Under all alternatives, mitigation measures would be developed to reduce impacts important resource values within ACECs which would also serve to reduce impacts on soils. All new proposed ACECs (Alternatives B, C and D) include use restrictions for saleable, solid minerals, fluid minerals, which would also protect soils.

Other than the conditions discussed above, there would be no restrictions under any of the alternatives to the amount of land open to locatable mining based on ACEC/RNA management objectives or actions. The impacts from mining and the mitigations and reclamation requirements are discussed under Effects from Soil Resource Management and Effects from Minerals Management above. Erosion would be mitigated by implementing BMPs (Appendix B) and SOPs (Appendix B) through reclamation or environmental enhancement activities to stabilize or maintain soil processes.

Soil Resources: Effects from Backcountry Byways Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from BCBs management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives are essentially equivalent.

Soil Resources: Effects from National Historic Trails Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from national historic trails management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from wild and scenic rivers (WSR) management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures within the 13,583 acres of WSR corridors that would promote natural rates of erosion and deposition of alluvial and colluvial sediments. Additionally, activities that would result in direct loss or degradation of these soils would be restricted to maintain the ORVs of the eligible segments.

Effects under Alternative B

There would be no impacts on soil resources resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on soil resources resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would be no impacts on soil resources from WSR management so long as WSA, priority habitat, and priority watershed management, as outlined in the remainder of the RMP, are implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented within the 13,583 acres of eligible WSR corridors, which would prevent loss or degradation of soils until a new determination of NWSRS suitability is made.

Soil Resources: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from wilderness, wilderness study areas, or lands with wilderness characteristics management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from watchable wildlife viewing sites management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Public Health and Safety Management

Effects Common to All Alternatives

There likely would be no impacts on soil resources resulting from public health and safety management objectives or actions under any of the alternatives. With respect to effects on soil resources, all of the alternatives would be essentially equivalent.

Soil Resources: Effects from Sustainable Development Management

Effects Common to All Alternatives

The identified sustainable development projects all involve areas where the soil resources have already been disturbed. Through concentrating efforts to reuse areas, disturbance to soils would be less because already disturbed areas would be used instead of disturbing new areas. Soils would remain vulnerable to erosion over a longer period of time in reuse areas. These impacts would be reduced, subject to concurrent reclamation. There likely would be no impacts on soil resources resulting from sustainable development management objectives or actions under any of the alternatives.

Effects under Alternative A

Other than the conditions discussed above, under Alternative A, there likely would be no impacts on soil resources resulting from sustainable development management objectives or actions. With respect to effects on soils resources, Alternatives A, C, and D would be essentially equivalent.

Effects under Alternative B

Under Alternative B, guidance and standards for reclamation and closure, for operators of sites that have a reasonable prospect for economic use, would be deferred or delayed for up to five years from the end of active mining. Soils in reuse areas would remain vulnerable to erosion over a longer period of time under Alternative B, which would be less protective of soils resources than would Alternatives A, C, and D.

Effects under Alternative C

Other than the conditions discussed above, there likely would be no impacts on soil resources resulting from sustainable development management objectives or actions under Alternative C. With respect to effects on soils resources, Alternatives A, C, and D would be essentially equivalent.

Effects under Alternative D

Other than the conditions discussed above, there likely would be no impacts on soil resources resulting from sustainable development management objectives or actions under Alternative D. With respect to effects on soils resources, Alternatives A, C, and D would be essentially equivalent.

Soil Resources: Cumulative Effects

Past and Present Actions

Past and present impacts on soils have occurred in areas where vegetation has been removed and soil surface and underlying horizons disturbed. Soils have been vulnerable to wind and water erosion in areas of concentrated livestock and WHB grazing. Current land use plans have employed management actions to reduce concentrated grazing in order to meet land health standards. Minerals, renewable energy and lands and realty activities have also impacted soils in order to construct roads, drill pads, power lines and facilities. Impacts on soils have varied based on the extent of disturbance. Land management tools, such as the designation of utility corridors has concentrated impacts within defined areas. Recreation activities have impacted soils where concentrated recreational use has occurred or in areas popular for OHV uses. These areas of higher OHV use experience increased vegetation community impacts, increasing potential for accelerated erosion of soils. Wildfires have exposed large areas where vegetation has been consumed increasing wind and water erosion potential for soils. Few impacts on soils from wildlife and special status species management have occurred and have been dependent on the timing, extent and type of habitat improvement projects. Generally, habitat improvement projects improve or protect soils. Limited impacts on soils have occurred from WHB management. Areas experiencing concentrated WHB grazing have been prioritized for gathering of WHB, if above AML, in order to maintain a thriving natural ecological balance. Use of BMPs and SOPs, project specific mitigation measures, permit stipulations, post fire emergency stabilization and rehabilitation treatments, and WHB gathers have reduced impacts on soils by protecting or re-establishing vegetation communities.

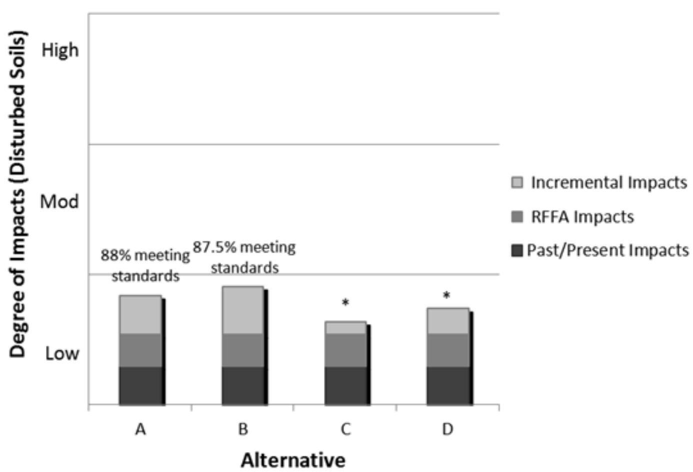
Reasonably Foreseeable Actions

Impacts would be similar to the past and present actions from livestock and WHB grazing. No grazing under Alternative C, option 2, would reduce impacts on soils in management areas. Increased mineral, lands and realty, and renewable energy developments would increase potential for impacting soils. Intensity of impacts would be based on the extent and timing of disturbance. Impacts associated with mineral exploration and development would vary depending on the market value of minerals. Increased recreation OHV use would further increase potential for soil disturbance with the level of impacts dependent on the number of acres designated as “open, closed, or limited” through travel management. Impacts from wildfire would continue and is dependent on climate, weather, and potential for human caused fires. Soil disturbance impacts based on ROW authorizations would be concentrated in designated utility corridors. Management actions that would reduce the intensity and degree of impacts include: managing livestock grazing to meet rangeland health standards; applying BMPs, SOPs, permit stipulations and mitigation measures to minerals, lands and realty, and renewable energy activities; limiting OHV use to existing roads, implementation of fuel breaks at a landscape scale; and rehabilitation efforts. Soils located in lands and realty designated as avoidance or exclusion areas, priority wildlife habitat or priority watershed areas or within ACECs would receive further protection due to use restrictions

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

As the population grows and the demand for energy and mined commodities increases, impacts on soils would also increase. However, implementation of management strategies across all alternatives would continue to reduce the potential for wind and water erosion of soils over time. Requirements to meet standards for rangeland health and the no livestock grazing option would also reduce impacts on soils to varying degrees overtime from livestock and WHB grazing. Development of the OHV travel management plan and habitat management plans should further protect and improve soils. Designation of priority wildlife habitat and watershed areas combined with special status species habitat management would reduce impacts due to use restrictions in those areas depending on the size or number of acres designated. Emergency stabilization and rehabilitation treatments would stabilize soils in the long term following disturbance and associated impacts from wildfire. Overall incremental impacts would remain low. Qualitative cumulative impacts of management actions on soils, by alternative, are visually depicted in Figure 4-2.

Figure 4-2. Cumulative Impacts on Soils by Alternative



Degree of Impact Assumptions: *Altered or disturbed soils – Management of priority wildlife areas, special status species management, and priority watersheds would include use restrictions, protecting soils and/or reducing disturbance of soils. Alternative C is assumed to have less total disturbance than Alternative D as more areas are proposed with use restrictions. Note: Percentage of area meeting standards is noted as a component of impact intensity. The height of the bars on the graph do not represent the percent meeting standards.

4.2.4 Water Resources

Summary

The mandate to manage the land for multiple uses requires the BLM to consider some uses that have the potential to degrade water quality. Minimizing such impacts is a common theme of all of the alternatives. Actions that increase the intensity of land use, or that would introduce new or larger sources of pollutants into new or existing use areas, could adversely impact water resources.

Activities as far ranging as recreation, mineral extraction, road construction, grazing, and energy production all have potential to adversely impact water resources. Activities that disturb soils or reduce vegetation cover can lead to increased erosion, which in turn may result in more sediment being carried to streams or other surface water bodies.

Each alternative has a different emphasis, which is expected to result in different priorities for resource development. These priorities would be expected to result in higher probabilities for adverse impacts on water resources under some of the alternatives.

Alternative A represents current management under guidance of the 1982 Sonoma-Gerlach and Paradise-Denio Management Framework Plans and the amendments of 1999. Alternative A contains fewer, and generally less specific, management actions than the other alternatives. In some cases this is because new objectives have been formulated based on experience gained under the previous plans. In other cases, new or different management options have been formulated to address existing objectives that are carried forward in the RMP. Where Alternative A is silent about a new objective or less specific regarding existing objectives, this does not mean that the issues identified under the other alternatives would not be addressed under Alterative A. Without the guidance offered by an updated management plan, not only would Alternative A allow the BLM more latitude in addressing these issues, but the lack of guidance would also make it more difficult to implement actions that were not anticipated when the MFPs were developed. This is especially true in cases where there is disagreement among stakeholders about the direction that should be taken to address resource management issues. In some cases, preferences would be determined through public participation during preparation of project-specific NEPA documents.

Alternative B generally prioritizes development of resources for economic return while relying on mitigation to reduce, rather than prevent, adverse impacts. Alternative B would likely have greater impacts on water quality than would Alternatives C and D.

Alternative C is the most protective of water resources because it involves the least new development, excludes potentially impactful uses, and prioritize protection and restoration of resources when conflicts among uses occur. As one measure of the difference between Alternatives B and C on water quality, Alternative C would reduce road use, resulting in less potential for associated erosion impacts. However, some management actions under Alternative C may also enhance impacts on water resources. For example, less aggressive fire management and greater reliance on natural processes could lead to greater potential for large fires in the short term and associated short-term adverse impact on water resources.

Alternative D is less didactic in its overall approach, alternatively emphasizing development priorities or preservation priorities according to resource realm. Alternative D therefore represents a compromise, and its impacts on water resources are expected to be generally intermediate between Alternatives B and C. Overall, it tends to encourage economic development, but recognizes sensitive environmental concerns on a greater amount of land area, resulting in more acres excluded or restricted from conflicting uses than Alternative B.

Methods of Analysis

Methods and Assumptions

The management actions for each resource were compared to identify differences, which, where they occur, are usually differences of degree. Actions that would increase demand for water could have significant impacts in basins or watersheds where committed water rights allocations are already near the perennial yield. Alternatives with lower potential for soil disturbance are generally expected to result in fewer indirect impacts on water quality from sediment and nutrient loading. Alternatives with lower potential for introducing new sources of chemical inputs are generally expected to have lower potential for water quality degradation.

Water Resources: Effects from Air Quality Management

Effects Common to All Alternatives

While all alternatives include measures to reduce impacts of emissions on water resources via deposition, aspects of all alternatives may increase the use of water to reduce the transmission of potential pollutants. This includes, but may not be limited to, the use of water in dust abatement and the use of water in fire suppression activities. The level of water use for these types of activities would vary among alternatives.

Impacts on water quality may result from deposition of contaminants onto the land or directly into water bodies. Mercury, for example, is a volatile heavy metal that has historically been used in the gold mining industry to extract gold from ore. Microscopic droplets of mercury vapor can become airborne but gradually settle to the ground at some distance from the source. Most of the mercury is recovered and reused in modern mining operations, but emission controls were not as effective in the past. The WD and adjacent areas contain mercury ore deposits where historic mercury mining operations and recovery of mercury resulted in releases, including atmospheric releases. Similarly, mercury vapor has been released to the atmosphere from gold ore processing. As a result of this (and in addition to waste mercury that is directly deposited on tailings piles with processed slag), some of this mercury eventually makes its way to streams and lakes where it can become concentrated in sediments or can be taken up by aquatic biota.

Compliance with applicable regulatory requirements is expected to continue to result in emission of fewer pollutants as air quality standards become increasingly more stringent, tracking of emissions inventories improves, and technologies (stack gas scrubbers, alternative processes that emit fewer pollutants) improve. Although all of the alternatives would comply with applicable regulatory standards, differences may occur in the amounts and types of atmospheric emissions that would occur under each alternative, with potential indirect effects on water quality. There is little available information about the impacts of air pollutants on water quality in the WD. It is difficult to differentiate the impacts on water quality from air deposition of mercury versus disposal of mercury-containing waste tailings. In general, the effects on water resources from atmospheric pollutants are expected to be small under all of the alternatives.

Effects under Alternative A

Under current management, the primary sources of emissions that may impact water quality include particulates from fires, vehicle exhaust emissions, emissions from mining operations (mercury, volatile organic compounds), and wind erosion. Fire has the potential to generate carcinogens, such as dioxins, polycyclic aromatic hydrocarbons (PAHs), and other combustion products, trace concentrations of which may then be transported to water and aquatic sediment. Wind erosion can generate dust that transports agricultural chemicals that may have been applied to crops, or herbicides applied to control invasive and noxious weeds, some distance from the point of application where the chemicals or their degradation products, if persistent, may contribute to contamination of water or sediments.

Effects under Alternative B

Alternative B emphasizes economic development of mineral and other resources, which has the potential to result in more new fixed emissions sources (generators, mineral processing sites, etc.) and more nonpoint mobile emissions sources (automobiles, OHVs, campfires, herbicide applications) than the other alternatives. While each of the sources may be in compliance with regulatory requirements, the cumulative effect of more sources could be an increase in trace concentrations of pollutants in water bodies.

Effects under Alternative C

Alternative C places the most restrictions on resource uses and therefore would result in the lowest potential for emissions of human-made air pollutants. Alternative C would involve reliance on more natural fire management and less active fire suppression, which could initially result in larger or more destructive fires, with the potential for more deposition of the products of combustion onto land and eventually into receiving waters.

Effects under Alternative D

Alternative D allows the most flexibility in managing the development of resources and is therefore likely to result in more new emissions sources than Alternative C but fewer than Alternative B. Similarly, fire management and herbicide use would be likely to result in effects that would be intermediate between Alternatives B and C.

Water Resources: Effects from Geology Management

Effects Common to All Alternatives

The impacts of geology management on water resources would be indirect. Protecting sites or features of special geologic value would tend to reduce or restrict development of mineral resources and to limit any activities that might be destructive of the noneconomic values of the geologic resource. It would also tend to emphasize visitor uses of the protected areas. As discussed in other sections, such as mineral resources, resource development may indirectly impact water resources by introducing sources of pollutants to the development site that can be transported to a water body, or it may increase the potential for soil erosion. Increased visitor use to a site can also result in the following:

- Impact water resources, for example by increasing the potential for fires, which can lead to increased soil erosion and can contaminate water;
- Increase the need for facilities and infrastructure (such as roads, campgrounds, and trails), which require construction and can lead to increased erosion impacts or introduce contaminants to an area;
- Increase demand for potable water and the need for springs or wells; and
- Introduce pathogens associated with sanitary waste, garbage disposal, or development of water recreation facilities near the protected site.

The same specific geologic features have been identified for protection under Alternatives B and C, but these alternatives differ in the degree, nature, and emphasis of protection measures that would be implemented. Alternative C identifies a few more areas for protection than Alternative B.

Effects under Alternative A

Alternative A does not identify or provide protections for specific unique geologic resources, but each project would be evaluated on its own merits to determine if such resources are present and should be protected, resulting in the greatest risk to water quality from the indirect impacts identified above. However, impacts would be expected to be negligible since water resource protections are incorporated into existing regulatory and permit requirements and would be limited to effects resulting from accidents or inadequate planning.

Effects under Alternative B

Alternative B identifies specific geologic features for protection. The effects on water resources would be similar to those under Alternative A. This is because neither alternative would limit methods of mineral disposal or other uses that could be implemented in the protected areas and would use the minimum level of mitigation needed to protect the resource value at risk. While sufficient, the minimum level of mitigation allows for greater risk of unanticipated effects. Alternative B is less restrictive on reclamation, rehabilitation, and livestock grazing than the other alternatives, and fewer restrictions could result in greater potential for soil erosion. The potential for indirect effects from soil erosion related to OHV use would be less under Alternative B than Alternative A because Alternative B would limit OHV use to existing roads and trails, while Alternative A would not provide these limits. Alternative B would encourage visitors through information and publications, which could result in greater potential for the impacts of visitor use described above. In contrast, Alternative C would do less to encourage visitor use.

Effects under Alternative C

Saleable mineral activity would be excluded, leasable minerals would be subject to "No Surface Occupancy," and the BLM would pursue a mineral withdrawal of the lands containing unique geological resources from the General Mining Law. Each of these types of use restrictions would result indirectly in protecting water resources from indirect effects, such as erosion and sedimentation or point and nonpoint pollutant discharges that may be associated with the activity. Because mineral activity is likely to have the greatest potential for impacts on water resources (compared to OHV use or recreational use), these alternatives provide the highest amount of protection and least potential for impacts on water resources.

Effects under Alternative D

Similar to Alternative A, allowing for multiple uses near unique geologic resources may affect water if water resources are located nearby. Implementation of mitigation measures such as avoiding unique features would also help protect water quality by limiting disturbance in areas near these features. Avoiding unique geologic features may also increase surface disturbance to reroute or relocate roads and facilities to avoid features. Impacts on water would be dependent whether water resources are present and on the size and location of disturbance.

Water Resources: Effects from Soil Resources Management

Effects Common to All Alternatives

The most important concern to water resources is soil erosion. Soil erosion is a natural process and occurs under natural conditions at varying rates, dependent on geology, climate, slope, vegetation cover, and many other factors. One of the functions of streams is to transport sediment. The sediment carrying capacity of a stream increases with flow. Streams in desert regions tend to decrease in velocity and power to transport sediment as they reach lower elevations, depositing their sediment loads onto alluvial fans or playas at the base of the mountain ranges where they originate. Many streams are ephemeral and carry flows only after the spring thaw or for short periods following local thunderstorms. Desert streams tend to carry high sediment loads during these brief high flow periods. Many streams within the WD have perennial flows only in the upper watersheds.

Soil disturbance and removal of vegetation cover tends to make soils more vulnerable to water erosion. However, the effects of increased erosion rates on water quality or morphology of streams at lower elevations where most streams tend to be ephemeral are very different from the effects on streams at higher elevations in the upper watersheds, where the streams tend to be perennial. Ephemeral streams tend to be highly turbid when they are flowing because they flow only when discharge rates are high enough to transport sediment. Ephemeral streams frequently migrate and cut new channels, resulting in a braided channel system on alluvial fans. Perennial streams or stream segments tend to form established channels. Riparian vegetation becomes established along these channels. During periods of high spring runoff or after thunderstorms, these streams also carry high flows supplemented by overland flow from the surrounding watershed, and the water may become briefly turbid from the increased sediment load. However, at most times, the flow of water to these perennial streams from shallow groundwater and springs is moderate and clear.

Soil disturbance caused by human activities, WHB or livestock can alter drainage patterns, remove protective vegetation, and expose soils to erosion by wind and water. Sediment loading to streams can increase as a result, leading to increased turbidity and sedimentation. Both can adversely impact aquatic biota. Sedimentation can lead to more frequent flooding. Nutrients or chemicals contained in soils may be transported with soil particles, leading to increased algal production and reduction in dissolved oxygen concentrations.

Actions that protect and stabilize soils are expected to have beneficial impacts on water resources under each of the alternatives because they would reduce soil erosion. The alternatives differ in degree and probability of effectiveness.

All of the alternatives include the basic soil management actions of Alternative A, such as reducing soil erosion by maintaining or improving vegetation cover, using existing standards and guidelines for livestock WHB grazing, implementing BMPs, "pursuing" land reclamation in "disturbed areas," and minimizing disturbance of biological soil crusts. The other alternatives go farther than Alternative A in identifying additional soil conservation measures.

Effects under Alternative A

Alternative A relies on a basic set of measures included in all of the alternatives to conserve soil, but does not specify some measures included in the other alternatives that might provide additional protection against erosion. Despite the lack of specificity, Alternative A would have fewer impacts on water quality than Alternative B, which would provide fewer protections against impacts from grazing.

Effects under Alternative B

In addition to the actions under Alternative A, Alternative B would salvage material for growth medium. This action is included in Alternatives C and D also and would indirectly benefit water resources to the extent that it is effective in reducing erosion by helping vegetation cover become reestablished in damaged areas. However, it would discourage application of soil amendments and it would allow multiple land uses while discouraging the use of seasonal closures as a tool for preventing soil compaction. These latter two restrictions on the use of erosion management tools would probably impede reestablishment of vegetation cover in damaged areas. Since closures are one of the most effective means of enabling vegetation cover to become reestablished, Alternative B would be expected to have limited success in preventing soil erosion in susceptible areas, thereby reducing the overall indirect benefits to water resources. Under Alternative B, only introduced seed species of grasses and forbs would be used in seeding damaged areas, because they are lower in cost and are more fire resistant. Alternative B allows spring grazing for cheatgrass control on emergency stabilization and burn rehabilitation areas. Alternative B could result in more soil erosion than under the other alternatives because establishment of perennial seeded species would be reduced or eliminated by prescribed grazing.

Effects under Alternative C

Alternative C calls for eliminating or fully mitigating surface disturbances to biological crusts and require reclamation of all surface-disturbing activities, rather than merely pursuing reclamation. Alternative C calls for improving soils by applying natural or organic amendments and for eliminating surface disturbances within areas with high potential for biological crusts. It also calls for implementing seasonal restrictions on use to protect soils from compaction. These measures, especially the use restrictions, would be expected to provide greater indirect benefits to water resources than either Alternative A or B.

Effects under Alternative D

Alternative D is similar to Alternative C, except that it requires less stringent measures to avoid disturbance of biological crusts and would make seasonal use restrictions more discretionary than under Alternative C. Alternative D would be expected to result in benefits to water resources similar to Alternative C, but by allowing greater discretion to managers to accept trade-offs and use limited funds more strategically.

Water Resources: Effects from Water Resources Management

Effects Common to All Alternatives

Water resources management actions common to all alternatives would apply BMPs BLM-authorized activities; ensure that all planning area watersheds and surface waters are evaluated against and managed to meet the specifications of land health standards which include watershed health, riparian health, and water quality standards; provide that waters used by the BLM will be governed by applicable state and federal regulations; ensuring that water use does not over-tax hydrographic basins based on NV State Engineer's determinations; and provide that any water rights acquired and any water sources developed by the BLM will be restricted to those actions consistent with multiple use. These actions would reduce impacts on water resources, promote healthier watersheds and surface waters while allowing for multiple uses, promotes the protection of prior existing water rights for non-BLM water right holders, and provide that any water rights acquired and any water sources developed by the BLM will be restricted to those actions consistent with multiple use.

Effects under Alternative A

Alternative A includes no specific action similar to Action WR 1.1 or WR 1.2 in Alternatives B, C, and D, to protect water resources in watersheds that provide habitat to threatened and endangered species or that function as source areas or recharge areas for municipal water supplies. Current water resources protection in these watersheds is limited to indirect protection afforded by enforcing the Endangered Species Act and by protections afforded by the State of Nevada's wellhead protection program. This program requires that all water suppliers develop emergency or contingency plans detailing the procedures to be followed in the event of water quality or quantity problems (NAC 445A.66665). The wellhead protection program guidelines encourage restriction of sources of pollution within at least 3,000 feet of a wellhead, or the distance that water travels in ten years (NDEP 2004b). Due to their reliance on a distance or travel time criterion, the state guidelines would not necessarily support a prohibition on introducing a pollutant source into a watershed where it could present a longer term threat to municipal water supplies. In this way, the wellhead protection program and the contingency plan program focus on protecting water consumers, rather than on protecting watersheds.

Under Objective 2, Alternative A and Alternative B do not require consideration of the perennial yield of a groundwater basin in projects that involve import or export of water. Under current management, the BLM has no authority to restrict projects involving interbasin water transfers, even if the transfer would exceed remaining sustainable yield of the basin. Since the State Engineer already is charged with preventing water rights from being over appropriated, the effect of this lack of authority should be minor.

Effects under Alternative B

Action B-WR 1.2 would manage priority watersheds for multiple uses. Compared to Alternatives C and D, this could present greater risk of incompatible uses and introduction of pollution sources in these watersheds. Action B-WR 1.5 would manage wellhead protection zones as avoidance zones (as in Alternative D), which is less protective of water resources than under Alternative C.

Objective B-WR 2 encourages private water rights filings for uses on public lands and does not require consideration of source basin perennial yield in management decision making. Action B-WR 2.1. promotes commercial development by allowing water importation and exportation projects. The value of water is increasing, such that there is financial incentive to transfer water rights out of basins in the WD, to the possible detriment of potential future in-basin demand.

Effects under Alternative C

Action C-WR 1.2 would make priority watersheds exclusion areas for incompatible discretionary actions. This action allows the BLM latitude to restrict activities that present an unacceptable potential for water quality degradation. Similarly, Action C-WR 1.5 calls for managing wellhead protection zones as exclusion zones for discretionary actions.

Alternative C allows importation and exportation of water only if the perennial yield of the source basin is adequate and other (multiple) uses are not compromised. In effect, this means that the BLM would have a tool for rejecting interbasin transfers if the proponent were to demonstrate that the project has a negative impact on basin groundwater storage.

Effects under Alternative D

Under Alternative D, occupied Lahontan cutthroat trout (LCT) and recovery LCT watersheds would be managed with use restrictions, which would protect water resources in these areas and maintain or improve water quality. Portions of municipal watersheds would also contain use restrictions within wellhead protection zones. The balance of municipal watersheds would include management actions that would mitigate adverse impacts on watersheds in order to protect municipal water supply. Water quality would be maintained, improved and protected.

Action D-WR 2.2 allows for developing water sources for fire suppression. This use is not precluded under Alternatives B and C, even though it is not specifically identified. However, under Alternative C, fire suppression activities would be more restricted than under Alternative D.

Water Resources: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to all Alternatives

Healthy vegetation cover tends to protect soils from the direct impact of raindrops and slow runoff, which helps to reduce erosion. When runoff is slowed, water has more time to infiltrate the soil and recharge groundwater. Plant litter also softens the impact of raindrops and helps to maintain soil moisture. Plant roots help to stabilize soil and reduce erosion. All of the alternatives promote diverse and healthy woodlands, which would have the indirect effects of maintaining good surface water quality and maximizing groundwater recharge and storage. The alternatives differ in the degree to which these beneficial impacts would be achieved.

Effects under Alternative A

Alternative A allows for use of herbicides to enhance aspen and cottonwood stands. Since these trees are phreatophytes, the use of herbicides may be expected to have potential for impacts on water quality. It also calls for using pesticides to protect harvest areas and chemical treatments to manage designated stands to enhance old growth characteristics, which would introduce potential for impacts on water quality. However, since the chemical treatments would be monitored and chemicals would be selected to have least impact on aquatic species, the impacts would be expected to be small.

Alternative A includes prohibitions on harvesting trees within 100 feet of springs and riparian areas in the Stillwater Range and Yellowstone Canyon within the East Range, which would provide some protection to water quality in these areas.

Effects under Alternative B

Alternative B allows harvesting of trees within 100 feet of springs and riparian areas, which would increase potential for impacts on surface water quality from soil erosion. BMPs would be used to ensure that impacts on surface water would be mitigated.

Alternative B would use a variety of methods to achieve cottonwood and aspen stand health, including fencing, mechanical and chemical treatments, and planting. The emphasis of Alternative B is on sustainable production of forest products. Alternative B would not designate any acres of old growth forest, which contains a broad mix of species and has not been cut. In general, the emphasis on production of forest products means that there would be periodic cutting and disturbance of soils on the forest floor associated with commercial management of the forest. This disturbance could result in spikes in soil erosion. Production of forest products is sometimes associated with the need to build new roads, which can alter flow patterns, concentrate drainage, and destabilize slopes, leading to potential impacts on water quality from enhanced erosion.

Effects under Alternative C

Alternative C relies on no chemical use and would have least potential for impacts on water resources from these chemicals. They also allow natural fire regimes to replace higher maintenance regimes, which in the long-term may result in fewer and smaller fires and replacement with more rapid-growing species capable of stabilizing the soil.

Alternative C allows the least amount of harvesting and allows for natural replacement of stands, which would probably result in least potential for erosion and therefore fewest impacts on water quality from sediment loading. This alternative prohibits harvesting of pinyon/juniper woodland stands for woodland products and would prohibit harvesting within a 100 feet of springs. Harvesting restrictions would reduce the potential for soil erosion from harvest areas and would reduce impacts on water sources adjacent to such areas.

Alternative C would designate 27,605 acres of old growth forest as well as other stands if an area exhibits old growth characteristics. Since old growth implies minimal soil erosion and since the old growth would be maintained by allowing natural ecosystem functions to occur, it is likely that this would result in least impact on water quality.

Effects under Alternative D

Alternative D includes the fewest constraints on management and allows the most flexibility for adaptively managing to achieve the conflicting objectives of healthy ecosystem and productive forest. This alternative would allow managers to shift priorities to protect water resources or other resource values instead of adhering to a predetermined plan.

Like Alternative C, Alternative D includes designation of 27,605 acres of old growth forest. Alternative D does not rely on natural fire regimes as under Alternative C but relies on suppression to an extent commensurate with the resource values to be protected. The effects on water quality and quantity are therefore expected to be intermediate between Alternative B and Alternative C.

Water Resources: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Control of invasive and noxious weeds generally would indirectly improve water quality and quantity in areas where impacts have occurred. Noxious weeds tend to out-compete native species and to have undesirable effects, such as decreasing ground cover, removing soil moisture, or enhancing fire hazard. The actions under Alternatives B, C, and D designed to address objective VW 1 would be the same and would have similar impacts on water resources. Alternatives B, C, and D include a number of actions that would not be implemented under No Action.

Action CA-VW 1.3 would encourage activities to eradicate noxious weeds. This may cause localized, short term impacts on surface water quality (through application of chemicals, temporary loss of groundcover, etc.) while promoting longer term protection of surface water quality.

Effects under Alternative A

As discussed below, Alternative A would be expected to have the least positive effect on water resources.

Effects under Alternative B

Alternatives B through D include a number of actions that would not be implemented under the No Action Alternative. To the extent that these actions are successful in reducing the spread of noxious weeds, they may also have beneficial impacts on water resources.

Effects under Alternative C

The effects would be the same as those under Alternative B.

Effects under Alternative D

The effects would be the same as those under Alternative B.

Water Resources: Effects from Chemical and Biological Control

Effects Common to All Alternatives

Actions under Alternatives B, C, and D reflect the fact that chemical and biological pest control methods have advanced greatly since the 1980s in recognition of the need to avoid adverse impacts on water quality and sensitive biota. These advances include development of new products and new methods, such as integrated pest control (IPC), which focuses on addressing the conditions that attract pests and on encouraging natural pest predators, rather than on chemical eradication methods. Chemical pesticides have been developed that have very short half-lives (they degrade rapidly in the environment) and do not bioaccumulate in the food web.

Thus, for example, all of the actions under Alternatives B, C, and D would be the same; except Actions 1.1 and 1.4, and all are directed toward ensuring that appropriate pest control methods would be used, relying as little as possible on chemical pesticides.

Effects under Alternative A

Alternative A does not include many of the specific actions that are included in Alternatives B, C, and D, such as actions associated with various aspects of an IPC program since IPC was not widely established at the time the previous RMP was developed. This does not mean that IPC would not be implemented under No Action but rather that the current plan does not specifically identify these actions. Current practice does include many of the actions identified under Alternatives B, C, and D, such as employing BMPs. However, if not specified in the RMP, some actions that may ultimately be protective of water resources, such as educational programs and seeking out new techniques, may not be implemented if they require expenditures. Therefore, it is expected that Alternative A would be somewhat less effective in reducing impacts on water resources than Alternatives B, C, and D.

Effects under Alternative B

Action B-PE 1.1 would select pest control methods from among the approved methods available, based on cost/benefit analysis. Since the emphasis is on cost, and "benefit" is not well defined, pesticides that cost less or are not as effective would tend to be used even if they were to result in the greatest risks to water quality. Therefore, Alternative B is expected to have the greatest impacts on water quality among Alternatives B, C, and D.

Action B-PE 1.4 is more likely to result in adverse impacts on water quality than Alternative C because it includes chemical pest control, while Alternative C does not. The impacts would be the same as those for Alternative D.

Effects under Alternative C

Alternative C differs from Alternatives B and D in that it would minimize chemical pesticide use as a matter of policy and would rely primarily on mechanical, cultural, and biological control methods. Therefore, Alternative C is expected to have the least impact on water quality. However, if Alternative C is not effective, there may be some pressure to revise the strictures of Alternative C to allow chemical pest control in the future. Similarly, if lack of effectiveness of nonchemical weed control methods leads to greater risk of fire or increased erosion, the impacts on water resources from the increase fire risk may be greater than the benefits achieved by not using chemical pest control.

Effects under Alternative D

The effects on water resources are expected to be intermediate between Alternatives B and C, mainly because under Action D-PE 1.1, Alternative D does not rely on cost effectiveness as the sole criterion for selecting pesticides and does not exclude the use of chemical pesticides.

Water Resources: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

The effects of most of the rangeland management actions on water resources are expected to be beneficial, since achieving the principal goal of maintaining and improving healthy vegetative communities would also tend to result in minimizing soil erosion, retaining water, and avoiding or reversing the adverse effects on vegetation and soils largely caused by grazing animals or fire. The alternatives differ mainly in the degree to which these benefits would be achieved.

Action CA-VR 1.1 would ensure that all WD rangelands are evaluated against and managed to meet the specifications of land health standards which include watershed health, riparian health, and water quality standards.

Effects under Alternative A

Alternative A allows for chemical treatments, which could result in impacts on water quality, and prescriptive grazing, which may result in increased erosion and sediment loading. Although some types of management actions included in Alternatives B, C, and D are not specifically included in Alternative A, most of the management actions proposed under Alternatives B, C, or D (except Option 2 of Alternative C) are currently implementable under Alternative A, and current management most resembles Alternative D. Among rangeland environments, sagebrush scrub is perhaps the most important to water resources because it occurs on higher elevations with greater slopes, where perennial streams are more likely to be found, than in salt desert scrub. Among the most critical issues in sagebrush scrub is the increased potential for fire caused by spread of cheatgrass. Actions that successfully reduce or reverse the spread of cheatgrass would indirectly benefit water resources by reducing fire hazard. Management actions under Alternative A are less proactive than under Alternative D, as indicated by Action A-VR 7.2, and rely more on fire suppression (A-VR 6.3, 6.4). These methods have been largely unsuccessful in arresting the spread of cheatgrass, and therefore indirect impacts on water resources from wildland fire would be expected to increase under Alternative A.

Effects under Alternative B

Alternative B focuses on maintaining rangeland for livestock grazing. For example, Action B-VR 1.3 calls for reseeding with forage grasses rather than on restoring native grasses that may be better adapted to natural rangeland conditions; Action B-VR 4.1 calls for seeding disturbed areas with grasses and forbs, rather than with a more natural and wider range that includes shrubs (as under Alternative D).

Alternative B also calls for a shorter rest (from grazing) of burned areas than do Alternatives C or D and does not wait for monitoring objectives established in emergency stabilization or burned area rehabilitation plans to be achieved, as under Alternatives A and D.

Action B-VR 5.1 calls only for seeding with introduced species in areas "lacking potential for natural recovery," and Action B-VR 5.2 would not establish vegetation release criteria. Overall, this emphasis on grazing use and less effort and funds to reestablish native vegetation than the other alternatives is expected to continue to result in indirect adverse impacts on water resources from erosion and sediment loading.

Effects under Alternative C

Alternative C does not allow chemical treatments and, under Option 1, does not include prescriptive grazing. Therefore, it is expected to have the least potential for direct adverse impacts on surface water quality, although the ultimate impacts on water resources would also depend on relative success of these methods in restoring rangeland vegetation.

Option 2 of Alternative C does not include grazing. Where cattle use is currently the greatest impact to degraded wetland and riparian areas (i.e., outside HMAs or areas of high recreational use), this option is expected to have the greatest benefits to water resources. Recovery of riparian vegetation in these areas would lead to improved hydrologic function with greater filtration of water as it moves as surface water through vegetation or as groundwater, improved flood water retention and increased groundwater discharge, decreased sediment loading due to decreased erosion, and decreased surface water temperatures due to increased shading and restoration of narrower and deeper stream channels depending on slope and landscape setting. Option 1 would limit prescriptive grazing more than the other alternatives by requiring that "best science shows a reasonable chance of success" in achieving reduced biomass production and restoring decadent plant vigor. Since there would be less grazing under Option 1, this is expected to result in more benefits to water resources than the other alternatives.

Actions C-VR 1.3, C-VR 4.1, and C-VR 5.1 call for greater reliance on seeding with native species than the other alternatives. In some cases, this may severely limit implementability and increase cost of reseeding, where native seeds are in short supply. This may delay reseeding, leading to potential adverse impacts on water resources because of continued erosion hazard or allow greater opportunity for noxious or invasive plant species (such as cheatgrass) to gain a foothold.

Effects under Alternative D

Alternative D allows more flexibility to land managers in the choice of methods for restoring rangeland health than does Alternative C. For example, it would allow reseeding with nonnative species where appropriate and seeding with species that have the greatest potential to resist wildland fire could be used. Alternative D allows grazing but puts a higher priority on restoring natural range conditions than does Alternative B. As a result, impacts on water resources are expected to be least under Alternative D.

Water Resources: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

The objectives (VRW 1) of each of the alternatives differ regarding the amount of riparian and wetland areas to be progressing toward or attaining proper functioning condition (PFC). Currently 55 percent of the lotic (stream) and 38 percent of the lentic areas are progressing toward or have attained PFC. Under Alternative B the objective is 60 percent lotic and lentic to be in PFC. Under Alternative C it is 85 percent lentic and lotic and under Alternative D to be 85 percent progressing towards or attainment of PFC for both lentic and lotic areas. Therefore, even if the management actions were the same, (for example, Action VRW 1.3, which addresses non-livestock grazing impacts on riparian areas is the same for Alternatives B, C [Option 1], and D), the intended outcome under each of the alternatives would be different.

Grazing has historically been one of the principal causes of damage to riparian areas and of water-related impacts, and accounts for most of the non-PFC riparian areas. Therefore, Option 2 is expected to result in the greatest improvements in water resources. Damage to riparian areas is not a function of numbers of animals since relatively few animals can cause substantial damage. Instead, most damage results from repeated use during the hot season (July through September), when animals concentrate in riparian areas. Most impacts on water resources occur at mid- to higher elevations, where perennial surface water is more abundant. Therefore, avoidance of these sensitive areas during the hot season may be the most effective means of restoring and maintaining PFC and reducing impacts on water resources.

Riparian and wetland areas are a crucial part of the environment and serve as an interface between precipitation, surface water, ground water, and soil. Healthy riparian and wetland areas provide several benefits to water resources including, but not limited to filtering of sediments, increased recharge to groundwater (potentially leading to extended baseflow of perennial streams), and decreased water temperatures. All alternatives aim to improve the overall health of riparian and wetland areas within the WD which would lead to improved surface water quality as a whole.

Effects under Alternative A

Management Action A-VRW 1.1 calls for improving riparian areas by determining causal factors, developing strategies, and coordinating with the public. However, in the years since this management action was formulated, many of the causal factors have become much better understood, and strategies have been developed to address them, which are described in Alternatives B, C, and D. This points out one of the weaknesses of Alternative A: that it is somewhat anachronistic and does not reflect current knowledge.

Alternative A relies heavily on engineering controls, as indicated in Action A-VRW 1.2, such as development of structures, alternative water developments, and exclusion fencing. Experience has shown that maintaining these controls is difficult and not always successful. Lack of successful maintenance of engineering controls can result in impacts on water resources.

Effects under Alternative B

Management actions under Alternative B are generally the same as those under Alternative A because Alternative B represents the status quo with respect to livestock grazing. For example, Alternative B relies on engineering controls to prevent livestock from concentrating in riparian areas, rather than reducing livestock use of these areas. The principal difference between Alternative A and Alternative B is that Alternative B sets the moderate objective of achieving 60 percent PFC, an increase of 12 percent over current conditions. PFC tends to be associated with high water quality, especially with respect to sediment loading, pathogens, and nutrients. It also tends to be coupled with good water retention and storage in the watershed. Therefore, an improvement in PFC is expected to be coupled with an improvement in water quality.

Effects under Alternative C

Alternative C sets the most challenging objective: to achieve 85 percent PFC, nearly double the current area in PFC. Alternative C would achieve this objective through eliminating grazing (Option 2) or implementing grazing management objectives, reducing grazing, and adjusting season of use, duration, AMLs, or AUMs (Option 1). If the objectives for PFC are achieved, beneficial impacts on water resources would be greatest under Alternative C. Since the 85 percent PFC objective applies to both options 1 and 2, it is more likely that the objective would be achieved sooner under Option 2 than Option 1.

Effects under Alternative D

Alternative D sets an objective of progressing toward PFC to 85 percent. Achievement of this objective would take longer than proposed under alternative C. Management strategies to improve PFC are similar to Alternative C, which would indirectly maintain or improve water resources.

Water Resources: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Each of the alternatives contains actions intended to improve wildlife habitat and protect riparian habitat. Measures that limit uses in order to benefit fish and wildlife (particularly fish) also have the potential to indirectly improve water quality and increase water retention in watersheds.

Management actions that would be the same or similar under all alternatives include CA-FW 1.1 and CA-FW 2.1. Management actions that would have the same or very similar effects on water resources under Alternatives B, C, and D include FW 2.1, FW 2.2, FW 7.1, FW 8.1, and FW 9.2. Additionally, some of the management actions would have negligible or no effect on water resources, including (in addition to those listed above), the actions under Objective FW 6.

Effects under Alternative A

As discussed elsewhere, current management actions were developed when there were fewer quantitative data and less understanding of the effects of management decisions. Therefore, management actions tend to be broader and less specific under Alternative A than under the other alternatives. This does not mean that more specific actions could not be implemented under

Alternative A, but since many actions require commitment of time and financial resources, there is much less assurance that such actions would be implemented under Alternative A.

Potential minor adverse impacts on water quality could result from increased populations of big game animals such as elk and deer since these animals contribute to similar impacts caused by livestock grazing (trampling riparian areas, compacting soils, being a source of waterborne pathogens). Alternative A could result in an increase in use by hunters, as a result of increased numbers of game animals, with potential indirect adverse effects on water resources associated with OHV use, increased fire danger, and pathogen loading associated with human use.

Alternative A allows for use of chemical treatments to improve wildlife habitat, which could result in impacts on surface water quality, as described under rangeland management.

Action A-FW 9.1 calls for implementation of engineered improvements, such as instream structures and fish barriers to improve aquatic habitat. Such measures have historically had a low rate of success and sometimes lead to additional riparian problems, for example if the structure needs to be removed or is damaged by high flows.

Action A-FW 10.1 calls for water barring access roads to specific streams. This engineering method of reducing erosion impacts of roads in steep narrow canyons has not been entirely successful.

Effects under Alternative B

Alternative B would designate the fewest acres for restricted use to protect wildlife. It would designate 716,528 acres as priority 2 wildlife habitat. This designation would result in some indirect beneficial effects on water since activities that could impact water quality or impact riparian habitat might be restricted.

Management Action B-FW 1.5 would have the opposite effect since it would not allow introductions of wildlife whose habitat requirements would interfere with other multiple uses. Since those multiple uses would include potential pollutant-generating or soil-disturbing activities, this action would reduce restrictions on land use that could indirectly protect water resources.

Actions under Objective B-FW 3 may have indirect positive impacts on water resources by protecting aquatic bird habitat. Alternative B, however, provides the least protection since it would not preclude multiple uses.

Action B-FW 8.2 would not allow fencing to keep livestock from reservoirs that support fisheries. There are five reservoirs of this description in the WD, and they are grouped together in this analysis because the existence of a fishery is an indicator of relatively good water quality and potential for recreational use. Livestock use of reservoirs would have potentially adverse impacts on water quality in this group of reservoirs.

Action B-FW 8.3 calls for not having a minimum pool requirement on new irrigation reservoirs. The minimum pool would help to prevent development of anoxic conditions as water levels decline during the hot season. However, maintaining a minimum pool would require use of water rights allocated by the state to a private entity, and imposing a requirement to maintain minimum pool may be construed as a taking of property. Alternative B avoids this potential legal issue but would continue the status quo, which is to allow anoxic conditions to develop.

Alternative B allows for chemical treatments to restore or improve wildlife habitat. Chemical treatments carry some risk of adversely impacting water quality. These would be mitigated through BMPs.

Action B-FW 9.1 calls for improving aquatic habitat by emphasizing restoration of natural processes. Related to this, Action B-FW 9.3.1 calls for improving stream bank and shoreline stability by limiting stream bank alteration to 20 percent or less of linear bank length on fishery waters. These actions would be the same as under Alternative D and would have beneficial impacts on water resources intermediate between Alternatives A and C.

Action B-FW 10.1 allows several options (maintain, alter, or remove) for addressing the erosion impacts from access roads on streams and gives priority to routes affecting fishery resources. This action is less extreme than Alternative C, which calls for removing access routes that adversely impact aquatic resources. The short-term impacts on water quality of removing a road could result in water contamination since the exposed soil on the altered road cut would be vulnerable to erosion.

Effects under Alternative C

Benefits would be greatest under Alternative C, which designates almost 1.3 million acres as priority 1 wildlife habitat (exclusion areas closed to fluid mineral development), and about 0.9 million acres as priority 2 wildlife habitat (avoidance areas). Alternative C also limits annual stream bank alterations to less than 10 percent of linear bank length, which would be half of the allowable annual stream bank alterations allowed under Alternatives B and D. These restrictions would reduce the potential for pollutant-generating activities to be introduced into the watersheds of these areas.

Action C-FW 3.2 would protect shorebird habitat and could limit some conflicting uses, resulting in indirect beneficial impacts on water quality. And Action C-FW 4.1 would prohibit some uses of migratory bird nesting areas during the wet season when potential for damage to soils from compaction is greatest. Soil compaction can lead to adverse impacts on water quality because it can reduce infiltration and increase runoff and may lead to loss of vegetation and consequent increased soil erosion.

Alternative C prioritizes nonchemical methods for improving habitat and places the least reliance on active management measures. Alternative C would allow introduction of native wildlife species into historical habitat areas, even though this may result in the need to restrict other uses in such areas (for example, increased ruffed grouse habitat might result in expansion of areas subject to mineral stipulations).

Action C-FW 8.2 calls for fencing to keep livestock from reservoirs that support fisheries. If effective, this would result in a beneficial impact on water quality in the reservoir and inlet or outlet streams.

Action C-FW 8.3 would require maintaining a minimum pool on new irrigation reservoirs. As discussed under Alternative B, the minimum pool would help to prevent development of anoxic conditions as water levels decline during the hot season. However, maintaining a minimum pool would require use of water rights allocated by the state to a private entity, which could be construed as a taking of property. Alternative C would test this potential legal issue but might avoid the adverse water quality impacts associated with anoxic conditions, including odors, organism die-off, and possible chemical changes favoring increased solubility of heavy metals.

Alternative C would prohibit construction of artificial water developments, such as guzzlers, for wildlife use, and it would limit use of OHVs in certain areas, such as Gridley and Continental Lakes, for protection of shorebird habitat. The combined impacts on water resources of these measures would be beneficial on water quality to the extent that they limit uses that could have adverse impacts on water quality (for example, OHV use can lead to enhanced soil erosion, and guzzlers can encourage congregation of grazing animals, leading to consequent soil compaction).

Action C-FW 9.1 calls for restoring natural processes to improve aquatic habitat. Action C-FW 9.3.1 calls for improving stream bank and shoreline stability by limiting stream bank alteration to 10 percent or less of linear bank length on fishery waters, and Action C-FW 9.3.2 calls for limiting annual stream bank alteration impacts on five percent or less of linear bank length in sensitive channel types. Although they are intended to have greater beneficial impacts on water resources than the corresponding actions under Alternatives B and D, it should be noted that natural alteration may be greater than the ten percent or five percent goals, and the intention of the management action is to encourage restoration of natural function rather than to achieve numerical goals. Similarly, relying entirely on natural processes may result in greater adverse impacts in the short term if current conditions are far from the natural range of conditions.

Action C-FW 10.1 calls for removing (rather than repairing or altering) access roads in steep canyons that are adversely impacting aquatic resources. The short-term impacts on water resources of removing a road could result in water contamination, but in the long term the impacts on water resources are expected to be beneficial, both because the road would no longer contribute to enhanced erosion and because removing the road would limit access to the stream and reduce the potential impacts associated with human use.

Effects under Alternative D

Alternative D would manage 1,199,539 acres of priority wildlife habitat which would include use restrictions that would limit disturbance. Water resources would also benefit from these restrictions. Management of streambank alteration to 20 percent of bank length on fishery streams would also maintain or improve water resources. Similar to Alternative C, Action D-FW8.2 would call for fencing reservoirs supporting fisheries which would also serve to maintain, protect or improve water resources

Water Resources: Effects from Special Status Species Management

Effects Common to All Alternatives

Each of the alternatives includes actions that would limit or prohibit incompatible uses of sensitive habitat. Such use limitations would have the potential to also limit uses that might lead to degradation of water quality. The alternatives differ primarily in the degree and timing of limitation. The impacts on water resources would be indirectly beneficial.

Action SSS 1.3 would restrict uses in sensitive species habitat, although the nature of the restriction would be determined on a case-specific basis and might vary by alternative. For example, Alternative

B generally calls for the fewest use restrictions, and Alternative C generally calls for the most, so implementation of Action SSS 1.3 might reflect these differences. Such use limitations would have the potential to limit uses that might lead to degradation of water quality while also placing limitations which could preclude or delay the completion of habitat restoration project components which are intended to or have the capability improve water quality (i.e., the relocation of roads or cattle troughs, installation of check dams, etc.).

Effects under Alternative A

As noted elsewhere, management actions under Alternative A are generally not as specific as under the other alternatives, and they were formulated when the knowledge base was less sophisticated than it is now. This appears to allow more opportunity for discretionary actions, but in practice it may lead to inaction because funding or policy direction are lacking.

Effects under Alternative B

Alternative B tends to rely on mitigation to offset impacts on sensitive species and habitat, rather than proactive measures to avoid impacts. Mitigation may or may not be effective or beneficial to water resources.

Alternative B would manage existing LCT habitat without seeking expansion of LCT range. Designation as LCT habitat would confer additional protection on those water bodies so designated, so Alternative B would be less protective in comparison to the other alternatives.

Action B-SSS 1.1 does not specify a two-mile inventory zone around sensitive plant occurrences, as under No Action and the other alternatives. It allows for a variety of mitigation measures, including buffers of unspecified size. This is less restrictive of incompatible uses than the other alternatives and could result in greater potential for adverse impacts on water resources. Similarly, sage-grouse habitat does not receive any standard protection under Alternative B but would be evaluated by an interdisciplinary team on a case-by-case basis.

Action B-SSS 1.5, which allows prescriptive grazing on a case-by-cases basis in wet meadows and riparian areas that have been closed to grazing, could have adverse impacts on water resources. However, such impacts would be carefully planned and monitored to balance the benefits with the potential impacts.

Effects under Alternative C

Alternative C is likely to have the greatest benefit to water quality because it limits human activities in larger areas and for longer periods than the other alternatives.

Action C-SSS 1.2 includes specific guidelines for sage-grouse habitat, including prohibiting all surface disturbance or occupancy within 2 miles of leks, or within known nesting, summer, or winter habitats. Action C-SSS 1.2.3 also prohibits high profile structures within 2 miles of an active sage-grouse lek. Because sage-grouse habitat requirements include riparian areas, these actions would restrict further future disturbance of riparian wetland areas. This may promote the functionality of these areas leading to increased water quality. Additionally, prohibition of surface disturbance or occupancy in these areas may preclude future development of water for wildlife or livestock. This could prevent further demands on certain stream, spring, and underground water sources. This may also inhibit management efforts to distribute livestock away from riparian wetland areas. Alternative C is also more restrictive of surface uses near bat habitat, setting a 500-yard distance limit rather than 200 yards as in other alternatives. This small difference would likely have little impact on water resources, although fewer surface-disturbing uses would generally reduce the potential for water resource impacts.

Alternative C would encourage expansion of LCT populations into new waters or waterways, potentially increasing water quality protection in those waters.

Effects under Alternative D

Management of priority sage-grouse habitat would include use restrictions which would also protect water resources from surface disturbance that are located within delineated priority habitat boundaries. Management of general sage-grouse habitat would include implementation of mitigation measures to protect sage-grouse habitat. Depending on the type of mitigation measures developed, water resource should also benefit.

Water Resources: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

WHB cause adverse impacts on water quality when the animals congregate near surface water, overgraze sensitive areas, spread plant pests, increase pathogen loading to water bodies via surface water contact with manure, and compact or otherwise damage soil. Unlike livestock, which can be moved to other areas when impacts are observed, movements of WHB are not controlled because maintaining the free-roaming nature of WHB is an objective of all of the alternatives (though Alternative B makes it a secondary objective). WHB tend to stay in the same watering areas all year, and this does not allow damaged areas to rest and recover.

Historical observation indicates that water resources impacts would be highest in areas with a moderate abundance of water and higher variability in abundance from year to year, because animal numbers increase during good years and cannot be supported during low water years. Areas with relatively abundant sources of water experience few impacts. Areas that are consistently dry and have relatively few sources of water experience few impacts because these areas do not support significant WHB populations.

The most effective measures for reducing impacts on water resources are controlling populations and preventing WHB from using damaged or sensitive areas during low water periods. Each of the alternatives includes the objective of ensuring unencumbered access to water by WHB and of maintaining WHB populations, but each presents different approaches to implementing these objectives.

Actions A-WHB 3.2 and 3.3 indicates that BLM would acquire water rights for WHB use. The overall volume of water obtained under this action is relatively low compared to other consumptive uses (i.e., domestic, irrigation, etc.) and would not likely have a significant impact on the available water in any given hydrographic basin. However, current political and legal conditions indicate that obtaining water rights for WHB use in the future may become more difficult or impossible. This may cause a direct conflict between state water law and direction under this RMP.

Effects under Alternative A

Alternative A is protective of water quality to the extent that it would limit WHB to existing HMAs that cover all or portions of identified HAs that can sustain WHB management.

Management Action A-WHB 5.1 calls for maintaining established AMLs as a population range rather than a single number, in recognition of how populations tend to fluctuate. This gives managers greater discretion to take fluctuations in environmental conditions into account when estimating AMLs. In contrast, Alternative B would use a single AML number.

Actions A-WHB 5.2, and A-WHB 5.3 call for gathering WHB on minimum four-year cycles, to AMLs (predetermined through the FMUD process), while controlling population growth rates with fertility control agents. Since the most severe impacts on water resources tend to occur at the upper end of the AML range, maintaining lower populations for longer periods would help reduce impacts on water resources. Much depends on what the AMLs actually are, and Alternative A is a relatively unbiased method of determining AMLs using available data.

Effects under Alternative B

Alternative B would avoid potential adverse effects on water resources that might occur under Alternative A by limiting WHB to lands that can support them.

Action B-WHB 5.6 calls for adjusting AMLs with emphasis on multiuse needs. Action B-WHB 5.6.1 provides further insight on how the multiuse needs analysis would emphasize livestock grazing over WHB grazing. When forage is low, Action B-WHB 5.6.1 calls for preferentially removing WHB over livestock. Since more control of seasonal use of ranges can be exercised over livestock than WHB, the emphasis on reducing WHB may lead to more effective water resource management under Alternative B.

Alternatives B and D specify gathering to the low AML when numbers exceed the upper AML. As with Alternative A, a four-year minimum gather cycle would be maintained. The impacts of these actions on water resources would be similar to Alternative A.

Action B-WHB 1.3 calls for the modification of HMA boundaries. This may change the access of WHB to certain water sources, increasing use on current water sources or requiring new water developments in some areas and decreasing the use in others. The net effect would likely be negligible.

Effects under Alternative C

WHB populations are likely to expand faster under Alternative C than other alternatives. Since WHB tend to remain in watering areas all year, impacts from increased use of ranges by WHB may result in greater impacts on water resources under Alternative C than under the other alternatives. Alternative C limits management tools (such as population control measures, fences, and more frequent gathers) that might be used to protect water resources, and this may also result in adverse impacts on water quality. Option 1 would remove livestock when rangeland indicators show adverse impacts, and Option 2 eliminates livestock grazing altogether.

Alternative C specifies adjusting AML to maintain healthy threatened and endangered species habitat in priority watersheds. Although this would affect only a small portion of the total herd areas and herd management areas, it is expected to result in a beneficial impact on water quality in those priority watersheds.

Effects under Alternative D

Alternative D emphasizes reduction of impacts on rangeland by grazing animals, rather than emphasizing either livestock use or use by WHB. Actions D-WHB 5.1, D-WHB 5.2, and D-WHB 5.3, which have to do with controlling herd sizes, would be similar under Alternative B. Action D-WHB 5.6 calls for reevaluating AML to ensure they are consistent with the thriving natural ecological balance (TNEB) of the specific habitat and with other multiple uses. This action differs from Alternative B in the requirement to be consistent with TNEB. Further, Action D-WHB 5.6.1 calls for removing animals from areas that do not provide adequate suitable habitat to support healthy populations of WHB. The emphasis on TNEB, and its application to all HMAs instead of just to priority watersheds, (unlike in Alternative C), and the ability to set AMLs to zero if appropriate, is expected to result in beneficial impacts on water resources and returning the HMA to HA status.

Action D-WHB 1.3 calls for the modification of HMA boundaries. This may change the access of WHB to certain water sources, increasing use on current water sources or requiring new water developments in some areas and decreasing the use in others. The net effect would likely be negligible.

Water Resources: Effects from Wildland Fire Management

Effects Common to all Alternatives

Fire removes vegetation cover and exposes soils to erosion, increasing the potential for sediments to be transported into water resources. Combustion can create a variety of toxic chemicals that may eventually be transported to water bodies in runoff or because of atmospheric deposition.

Fire suppression can result in soil disturbance from vehicles and equipment such as fire engines and dozers. Impacts include removal of vegetation and disturbance to soils increasing erosion potential and impacts on water. Use of retardant may impact water directly. These impacts are greater to lentic resources verses perennial streams because lentic areas are less dynamic and slower to recover. Impacts include reduced water quality and possible oxygen depletion. These direct impacts would be reduced based on implementation of mitigation measures that include buffer zones from water sources where retardant would not be applied.

Effects under Alternative A

The BLM would continue to use management tools, such as prescribed fire and vegetation manipulation (mechanical, biological, and chemical treatments), to construct fuel breaks or green strips.

Fire management under Alternative A is geared toward suppression, which, because it implies maintenance of conditions that may be out of equilibrium with the natural threat of fire, could be unsustainable in the long-term and result in greater loss of vegetation cover in individual fires. Loss of vegetation cover can lead to soil erosion, and larger fires at less frequent intervals might also lead to more soil erosion over a longer period of time, with greater effects on water quality than if the fires are smaller and more frequent.

Effects under Alternative B

Alternative B manages 110,167 acres as conditional fire suppression areas for resource benefit and would allow prescribed burns to achieve vegetation management objectives. Alternative B represents the upper extreme in use of fire as a vegetation management tool. The impacts of prescribed fire or allowing conditional fire suppression management for a benefit on water resources are expected to be minor since they would be conducted under controlled conditions on small areas.

Effects under Alternative C

Alternative C would not allow prescribed fire as a tool for fuel reduction. Eliminating prescribed fire as a tool for vegetation management could have short-term beneficial impacts on water quality but may have adverse impacts on water in the longer term if severe fires occur that could have been prevented earlier by fire treatments. The BLM would not use chemical treatments, which would reduce the possibility of contaminating water bodies.

Fire severity would intensify under Alternative C, no grazing option. More fuels would be available for combustion. Depending on the degree of fire severity, watersheds would be vulnerable to soil erosion and subsequent transport of sediments into water sources. These impacts are intensified as prescribed fire would not be a tool available to construct fuel breaks in order to protect watersheds.

Alternative C may lead to greater soils erosion in the long term, and may increase fire severity.

Effects under Alternative D

Alternative D is similar to Alternative B, and the impacts on water resources would be similar to those described above. Fire suppression would be prioritized to protect priority watersheds. This would help protect waters resources within those watersheds.

Alternative D allows prescribed fire and conditional fire suppression management for a benefit for 110,167 acres. Therefore, the impacts on water resources are expected to be similar to Alternative B.

Water Resources: Effects from Cultural Resources Management

Effects Common to Alternatives

Each of the alternatives could indirectly and beneficially impact water quality and might reduce water consumption in some areas. This would take place to the extent that project actions would require avoidance of or exclusion from some or all uses in areas with cultural value, for example, occupancy of mineral lands might be restricted due to presence of cultural resources. To the extent that many cultural sites may be located near water resources, these beneficial impacts might be cumulatively important.

Effects under Alternative A

Most of the WD would remain open to OHV use under management Action A-CR 1.2. OHV use has the potential to increase soil erosion and thus to adversely impact receiving waters, by disturbing soil, creating ruts that become conductors of runoff, and compacting moist soils.

Effects under Alternative B

Action B-CR 1.2 and its impacts on water resources would be the same as those for Alternative A.

Effects under Alternative C

Action C-CR 1.2 would limit OHV use in culturally sensitive areas. This would indirectly benefit water quality by reducing the potential for soil erosion and sediment loading.

Effects under Alternative D

Action D-CR 1.2 is the same as that under Alternative C, and the effects on water resources would be the same.

Water Resources: Effects from Tribal Consultation

Effects Common to all Alternatives

The impacts of tribal consultation are not predictable. It is possible that more water resources would be protected if sensitive culturally significant areas are given restricted access status. Avoidance of sacred sites and restricted use of, or exclusion from, other culturally sensitive sites would protect water resources in the vicinity of these restricted areas by reducing the potential for sources of pollution to be introduced. The impacts would be expected to be the same for all of the alternatives.

Alternatives A, B, C, and D would result in similar indirect beneficial impacts on water resources from restricted access and avoidance of culturally sensitive sites.

Protection of water resources identified through tribal consultation as culturally sensitive or as sacred sites would also limit the access to water for other beneficial uses by the BLM and potentially the public as a whole.

Water Resources: Effects from Paleontological Resources Management

Effects Common to all Alternatives

All of the alternatives might result in indirect beneficial impacts on water quality if human activities are restricted from lands containing important paleontological resources. The types of activities that might be restricted could be moderately destructive to water quality, such as OHV use and mineral extraction. Grazing and recreation, which can have adverse impacts on water quality, probably would not be restricted to protect paleontological resources.

Objective A-PR 1 calls for developing stipulations, use restrictions, and mitigation measures to avoid or reduce adverse impacts on lands containing paleontological resources would indirectly result in beneficial impact to waters resources by reducing erosion potential and transport of sediments that effect water quality.

Water Resources: Effects from Visual Resources Management

Effects Common to all Alternatives

Visual resource management actions are not expected to impact water resources since visual resource classification would not restrict uses but would only require that they conform to visual aesthetic guidelines.

Effects under Alternative A

No impacts on water resources are expected.

Effects under Alternative B

No impacts on water resources are expected.

Effects under Alternative C

No impacts on water resources are expected.

Effects under Alternative D

No impacts on water resources are expected.

Water Resources: Effects from Cave and Karst Resource Management

Effects Common to all Alternatives

Karst refers to a geological terrain, which may underlie a wide area. Many karst features are found below the ground surface, and caves are just one of the more spectacular features associated with karst terrain. Cave and karst features would be inventoried under Alternatives B, C, and D, and the inventory process would identify and prioritize the specific features requiring protection. Not all caves in karst terrain are associated with existing flowing water, but protecting karst features may directly protect some waters that flow through karst. Some surface manifestations of karst terrain, such as sinkholes, make convenient dump sites that may also be conduits to groundwater. Furthermore, groundwater can flow rapidly through cavernous limestone and carry pollutants long distances. Therefore, public awareness of karst and of these hazards to water resources may lead to lower potential for these impacts on water quality. Education about caves and karst, which is common to all alternatives except Alternative A, could also increase public awareness and sensitivity about other fragile natural systems, like streams and high quality watersheds.

Effects under Alternative A

No management actions are identified, so cave and karst resources would receive no specific protection. Water resources associated with these resources would have the same protections as they do in other environments without cave and karst resources, including protections related to cultural resources or paleological resources that may be present in cave and karst terrain.

Effects under Alternative B

Alternative B would treat cave and karst features in much the same way that other unique geological features would be protected. Use restrictions, including seasonal closures and avoidance would help to reduce the potential for adverse impacts on water resources in the vicinity of cave and karst features.

Effects under Alternative C

Alternative C would not allow surface-disturbing activities which would have potential beneficial impacts on exposed water in these caves or the aquifers these caves may interact with.

Effects under Alternative D

Management actions under Alternative D would be the same as those under Alternative B, so effects on water resources would be expected to be about the same as those under Alternative B.

Water Resources: Effects Common to all Alternatives from Livestock Grazing Management

Effects Common to all Alternatives

Livestock grazing under all of the alternatives (with the exception of Option 2 of Alternative C, which would eliminate livestock grazing) is expected to continue to have impacts on water resources, especially on surface water quality.

Potential impacts of grazing include sediment loading from soil eroded by wind and water. Grazing may cause vegetation loss, soil compaction, reduced runoff retention, riparian function loss, biological crust loss, direct soil disturbance, and runoff concentrated into animal trails, with consequent enhanced erosion. Grazing animals can alter vegetation communities, spread undesirable species, alter natural succession patterns, and potentially create conditions more susceptible to erosion.

Grazing animals tend to congregate in riparian areas, such as accessible stream crossings, springs, shady level areas, or other small areas that may not be able to support large numbers of animals, independent of the adequacy of forage available within the grazing allotment. Therefore, forage adequacy, which is an indicator of the number of animals that can be sustained on a given allotment, may not account for concentrated impacts in riparian areas.

Grazing animals create waste that can introduce nutrients and pathogens to streams directly or in runoff. Excessive nutrient loading can lead to algal growth, depleted dissolved oxygen needed to support aquatic fauna, reduced water clarity and consequent increased water temperature, and other effects that reduce riparian function.

Under each of the alternatives (except Option 2 of Alternative C), 399,073 AUMs of livestock forage would be allocated, subject to adjustment based on monitoring (and on other criteria in the case of Alternative C [Option 1]).

The effects of grazing occur at very low animal densities, vary over a wide spectrum, temporally and spatially and with slope, soil, climate, and vegetation. Relatively low effects tend to be considered acceptable, and both subjective and objective criteria are used to evaluate them. These include estimates of sustainability (proper functioning condition of riparian habitat), trend analysis, and comparison to numerical standards (such as fecal coliforms and nitrate concentrations). In most areas, knowledge about the resilience of receiving waters is lacking because long-term studies have not yet been undertaken. In other areas, such as on stream segments or watersheds where TMDLs have been developed, a relatively high degree of knowledge is available. Water quality standards have not been set on many smaller streams. The Nevada tributary rule requires that tributaries should not contain waters of lower quality than the downstream segment. Most of the streams in the WD are tributary to the Lower Humboldt River, which is much lower in quality than the streams higher in the watershed.

Because of the difficulties involved in quantifying and evaluating effects, some effects may not be recognized in a timely fashion or the causes may not be correctly diagnosed until damage has occurred. Thus, management entails risks of failure to meet objectives, and those risks are greater in sensitive or fragile environments. In recognition of the inherent difficulties in identifying and diagnosing effects, all of the alternatives rely to some degree on adaptive management, allowing managers to apply mitigation measures appropriate to specific conditions.

Effects under Alternative A

The objectives of each alternative differ in their emphasis on livestock grazing, and so the management actions designed to achieve the objectives also differ in the degree of impact they would have on water resources.

Alternative A attempts to strike a balance between livestock grazing and other uses, minimizing conflicts between livestock and other uses. Alternative A is the baseline against which the effects of other alternatives can be compared. Under Alternative A, about 38 percent of lotic riparian habitat is functioning at PFC, and about 23 percent of lentic habitat is at PFC. About 17 percent of lotic habitat is classified as improving, and about 11 percent is getting worse; about 4 percent of lentic habitat is improving, and about 15 percent is getting worse (see Chapter 3.2.4). Since PFC is an indicator of the state of surface water resources, these figures suggest that under current management, slow progress is being made toward improving stream water quality, while the reverse is true of water quality in wetland areas. One of the primary causes of this slow progress is management of livestock grazing, and a key component is hot season grazing.

Closure to grazing is one of the most effective methods of preventing adverse effects on water resources. Alternative A does not close any acreage to livestock grazing, while Alternative B closes 293,447 acres, about 3,000 acres fewer than Alternative C Option 1 and about 20,000 acres fewer than Alternative D. Therefore, Alternatives A and B would result in more of the types of impacts on water quality described above than would Alternatives C and D.

Alternative A provides guidance on criteria for issuing grazing permits and relies on post-permit adaptive management to mitigate adverse impacts. This would result in higher risks to water resources but would not necessarily result in adverse impacts if managers had adequate information and tools to anticipate and correct adverse effects.

Alternatives A and B, and to a lesser extent Alternative D, allow continued development of new springs and wetland-riparian areas for livestock watering with constraints. The development of these new watering sources would allow animals to be rotated among a larger number of sites and would allow more opportunity for disturbed sites to rest and recover.

Alternatives A and B allow TNR on a case-by-case basis, without specifying criteria under which use of TNR would be evaluated. These criteria would likely include the same criteria indicated under Alternative D, but Alternatives A and B do not limit use of TNR. Since grazing can result in water quality impacts from soil compaction and vegetation removal, as well as direct impacts from congregation of animals in riparian areas, Alternatives A and B have greater potential for these impacts than Alternative D. TNR also has the potential to reduce impacts on water resources associated with fire, since the primary purpose of TNR would be to reduce fuel and cheatgrass infestations that increase the potential for fire.

Management Action A-LG 5.3 calls for all new spring developments for livestock watering to be constructed in such a way as to maintain, improve, or restore the biotic integrity of the spring system. Under Alternative A this would be accomplished by the following:

- Ensuring proper installation of water developments;
- Protecting newly developed springs, wetlands, and riparian areas by fencing to exclude livestock and WHB; and
- Placing troughs away from springs and riparian areas.

These actions are intended to minimize impacts on water resources.

Effects under Alternative B

Alternative B closes over 290,000 more acres to grazing than Alternative A and therefore would provide more beneficial impacts on water quality than would Alternative A.

Action B-LG 1.4 calls for voluntary submittal of annual grazing plans by the permit holder for BLM approval. These plans would require BLM approval of methods and criteria for evaluating impacts, including impacts on water resources, and coordination with the permit holder on corrective actions. If voluntary grazing plans are not submitted, management decisions would default to existing grazing permits. The goal of both permits and grazing plans is to achieve land health standards, but the grazing plans allow for more active participation of the permit holder in developing effective management actions. The impacts on water resources are expected to be beneficial since land health standards include minimizing soil loss and protecting riparian areas.

Action B-LG 5.3 is the same as under Alternative A and is intended to minimize impacts on water resources.

Effects under Alternative C

Option 1

Option 1 reduces grazing use of rangeland during critical growing periods, and generally allows grazing to be curtailed or revised if land health standards cannot be maintained.

Option 1 calls for closing about 296,000 more acres to grazing than Alternative A and so would be more protective of water resources than would Alternative A.

Grazing permits and annual authorizations would only be issued when grazing is complementary and secondary to other resource values. This is potentially a far more stringent limiting requirement than under Alternatives A and B and could result in reductions in grazing allocations. Specifically, Action C-LG 1.4 (Option 1) implies that if water resources are not protected by grazing and grazing is not complementary to the resource value obtained from the water resource in a given allotment area, then the grazing permit would not be issued.

Alternative C (Option 1) would effectively remove and reduce range improvements, such as water developments, in the context of making grazing secondary to other resource values.

Alternative C (Option 1) would allow relinquishment of grazing permits, effectively making the issuance of permits competitive, and increasing the likelihood that lands would be permanently taken out of grazing, since, once permits are not renewed, other resource values would have greater probability of superseding grazing. For example, wildlife and recreation might become higher values on lands where grazing permits have been relinquished.

TNR would not be allowed, limiting the options available for addressing fire hazards associated with invasive species such as cheatgrass, and with over-abundant fuel, and therefore increasing the potential for impacts on water resources associated with fire.

Alternative C (Option 1) would not allow new spring developments to support livestock grazing. This would effectively result in a phaseout or reduction in grazing in some allotments. The measure may not be protective of undeveloped springs, but other actions described above give rangeland managers broad authority to limit impacts on undeveloped springs if they occur.

Action C-LG 5.3 calls for restoring or developing springs to benefit wildlife, rather than livestock. No new springs would be developed to support livestock, and newly developed springs would be fenced to exclude livestock and WHB. The combination of these actions is expected to reduce impacts on water resources to a greater extent than under Alternative B.

Option 2

Option 2 excludes grazing. No grazing would lead to reduced impacts on water resources. It would have the potential for altering vegetation cover, increasing water retention of watersheds, slowing erosion, reducing nutrient and pathogen loading to streams and other water bodies, and would generally contribute to PFC of riparian areas and consequently to improved water quality. As indicated in the Vegetation Management discussion, Option 2 would not allow prescribed burns. Increased vegetation cover resulting from no grazing might lead to increased wildlife and WHB populations, but it would also result in higher fire risk in some areas. (See separate discussion of impacts on water resources from wildlife management, WHB management, and fire management).

Effects under Alternative D

Alternative D would close about 313,000 more acres to grazing than would Alternative A. Closure provides the highest level of protection to water resources because livestock impacts from turbidity, fecal coliform, and nitrates would be eliminated. Riparian areas closed to livestock grazing would achieve proper functioning condition in the short term, and functionality can be used as a surrogate for water quality.

Grazing permits would be issued if it is consistent with existing policy and standards. Action D-LG 1.4 would make issuance of grazing permits contingent on achieving or moving toward land health standards and guidelines, implementation of rangeland standard operating procedures, and consultation with USFWS. Progress would also be evaluated in the context of PFC objectives discussed under Riparian/Wetland Management. Achievement of these standards would result in beneficial impacts on water resources, compared to current conditions, by reducing soil erosion that leads to sediment loading, reducing soil compaction, and other factors that degrade water quality.

Alternatives A, B, and D allow TNR. Under Alternative D, TNR would be allowed without further analysis when a number of specified criteria are met; making TNR potentially more implementable under Alternative D than under Alternatives A and B. TNR would not be used in sensitive riparian areas, or where T&E habitat is present. TNR introduces the potential for impacts on water resources such as increased erosion from soil compaction, soil disturbance, and removal of vegetation cover, which would not occur under Alternative C. However, because the purpose of TNR would be to control invasive species, or reduce fuel, the effectiveness of TNR with respect to impacts on vegetation and soils would be closely monitored. Therefore, although use of TNR introduces some risk to water resources from grazing that would not occur under Alternative C (Option 1), it also provides an option for reducing potential impacts on water resources from fire.

Action D-LG 5.3.1 under Alternative D is similar to the corresponding action under Alternatives A and B. However, Action D-LG 5.3.1 provides more explicit guidance than Alternatives A and B on how new spring or wetland-riparian water developments would be installed, providing greater assurance that upstream water quality would be protected.

Water Resources: Effects from Minerals Management

Effects Common to all Alternatives

General

The primary goal of mineral resource management is to "make federal mineral resources available to meet domestic needs, and to encourage responsible development of economically sound and stable domestic minerals and energy production, while assuring appropriate return to the public." This goal does not necessarily have to conflict with the goal of "minimizing [impacts on] other resources," such as water resources, and "preventing unnecessary or undue degradation."

In practical terms, based on past experience, the degree of impacts (especially long-term impacts) on water resources would likely depend highly on careful planning to accurately identify and quantify the impacts before a mineral project is started and on providing adequate financial assurances that impacts would be prevented or mitigated if they occur.

Thus, it is important that projects be carefully reviewed to ensure that they are bonded. Nearly all mineral extraction or geothermal energy projects must pass through a public review process, in which the general public, public agencies, and stakeholders are given the opportunity to comment on project plans and identify the means by which the project proponent would comply with the management goals of "minimizing [impacts on] other resources, returning disturbed lands to productive uses, and preventing unnecessary or undue degradation."

Mineral resources development projects have the potential for impacting water resources in a variety of ways, and project impacts would vary greatly based on resource-specific and project-specific conditions. At the general level, a supply of water is usually needed to meet process requirements and to meet the demand created by workers, support facilities, and economic growth or development that may result from the project.

Mineral resource projects also generally generate waste, including wastewater and waste solids that may come into contact with water. For some mineral extraction projects, dewatering is required that may generate large volumes of wastewater or fluids that must be contained until they can be safely discharged. Additionally, inactive pit mines which are below the water table and allowed to fill in once operation are ceased ultimately act as a ground water sink inasmuch as they can allow for perpetual loss of large volumes of water due to evaporation. Currently, there is no method employed by the Nevada State Engineer to account for these evaporative losses in groundwater basin water budgets.

In most cases, compliance with existing laws, regulations, and policies is sufficient to ensure that water resources would be protected. However, it remains very costly to clean up environmental damage once it occurs, so planning, prevention, and monitoring are the most important aspects of compliance.

Most of the mineral resources management actions relate to the goal of "assuring long-term health and diversity of the public lands by minimizing impacts on other resources, returning lands disturbed to productive uses, and preventing unnecessary or undue degradation." As a result, these actions are generally expected to have beneficial impacts on water resources. The alternatives differ primarily in their emphasis, as dictated by slightly different objectives. For example, Objective MR 1 is the same for all of the alternatives: to return lands to condition compatible with FLPMA, the Surface Management Regulations at 43 CFR 3809, and other applicable laws. Alternative B expands on this objective to specify that lands disturbed by mineral operations would remain in a condition that provides for continued economic activity. By contrast, Alternative C emphasizes that the lands would be restored to approximately preoperational topography and vegetation, and if previously disturbed, then to a stable natural-appearing form. Alternative D allows for delaying or limiting the degree of restoration if a viable plan is in place for productive use of the site. None of the actions identified to achieve these objectives requires or implies that degradation or depletion of water resources would occur.

All else being equal, the more restrictions on mineral development and the more land excluded from development, the less likely it is that water resources impacts would occur, although projects may differ greatly in the potential to impact water resources. Therefore, the assumption is that mineral stipulations to protect wildlife or other resource values would also indirectly provide protection of water resources.

Saleable

None of the alternatives requires or implies that degradation or depletion of water resources would occur.

Fluid

Fluid minerals (oil, gas, and geothermal resources) have relatively limited potential to impact water resources within the WD, based on existing reconnaissance data about the occurrence of these minerals. Therefore, in practice, the alternatives would have similarly low potential for impacts on water resources by fluid mineral activities. Fluid minerals impacts within the District center on geothermal development and exploration. Most of these impacts relate to reduction of surface flows where there are surface expressions of thermal springs. These springs generally discharge under a low hydraulic head and are therefore easily impacted by reductions in reservoir pressures. Drilling or placement of wells are activities that can reduce reservoir pressures. New geothermal facilities could reduce reservoir temperatures due to reinjection of fluids.

Solid

Most leasable solid minerals, such as coal and bitumen or phosphate, are not plentiful in the WD. Perhaps the most important leasable solid mineral is potash. Therefore, for practical purposes, few impacts on water resources are expected to result from development of these resources. The impact on water resources would parallel the impacts discussed for fluid minerals.

Locatable

Locatable minerals, which include precious metals and gems, are the most important economic mineral resource type in the WD. All of the alternatives would maintain over seven million acres open to locatable mineral development. Mining operations include large open pit gold and silver mines. Open pit mining operations can threaten both groundwater and surface water quality and quantity.

Effects under Alternative A

Objective MR 1, which addresses rehabilitation of disturbed lands, varies among the alternatives, so the management actions vary. As a result, the outcomes with respect to water might be expected to differ also; however, this is not necessarily the case because current mining regulations provided significant assurances that mines would be properly closed and the land rehabilitated.

Compared to other alternatives, objective A-MR 1 includes the fewest specifics regarding closure. It calls for returning lands to safe, stable, productive, and visually compatible condition in accordance with applicable regulations, and preventing unnecessary or undue degradation of public lands. In the past, reaching these objectives has been slowed, particularly with large locatable open pit mining operations, by lack of adequate funding and because mining operations expanded without adequate planning, leading to larger areas requiring rehabilitation than originally anticipated. Adequate funding was an issue because rehabilitation costs accrue at the end of mining activities, when mines are no longer productive and do not generate the profits needed to support rehabilitation costs. Although Alternative A is the least specific of the alternatives, with regard to rehabilitation requirements, current regulations would provide similar assurances under all alternatives that water resources would be protected after mining operations cease or are temporarily curtailed.

Saleable

Alternative A would maintain about 6.8 million acres open to disposal of saleable minerals (rock quarry operations, gravel pits, and construction and building materials). These are typically small sites, most of which would be developed by municipalities or other government agencies for roads or other public projects. Some gravel operations involve dredging stream gravels and can directly impact surface water. However, since saleable minerals are widespread in the WD, quarry operations can generally be located away from perennial streams. Typically, saleable minerals do not contain significant amounts of soluble constituents that may leach from the waste material even if it comes into contact with water. Therefore, most quarry operations in the WD present minor threats to surface or groundwater quality.

Alternative A does not include management actions to address many of the issues addressed in the other alternatives.

Fluid

Impacts on water resources from fluid mineral development activities include soil disturbance due to construction of roads, pipelines, and structures, which can increase erosion and lead to sediment loading of streams; spills and releases of petroleum or other chemicals, which can degrade surface or groundwater quality; and groundwater extraction and injection activities (especially of geothermal fluids) that can impact aquifers, alter groundwater flow regimes, and under some conditions cause groundwater quality degradation. The impacts would be specific to each area of fluid mineral development, and environmental impacts would be analyzed in detail in project-specific environmental documents, as required by NEPA.

Under Alternative A, fewer than half a million acres would be closed to fluid mineral development, and about 30,000 acres would be subject to No Surface Occupancy stipulations. These restrictions would result in protections from water resources impacts in these areas, although Alternative A includes fewer restrictions than other alternatives. But there are few oil and gas reserves in the WD, and even geothermal resources are relatively limited. Most known geothermal resources are accessible at lower elevations on or near valley floors, where surface water quality naturally degrades toward the center of the basin. Geothermal operations typically rely on reinjection of geothermal fluids, so that water consumption is relatively low, and geothermal fluids are typically brines that reside within aquifer systems that are hydrologically isolated from potable water resources. Therefore, as a practical matter, the impacts on water resources from fluid mineral resources are expected to be relatively minor and would be evaluated and mitigated project by project.

Solid

As with any mineral extraction activities, solid minerals extraction could result in ground disturbance, leading to erosion and sediment loading to surface water. Such impacts would be addressed through BMPs, including avoidance. In practice, leasable solid minerals are not plentiful in the WD, so few impacts on water resources are expected to result from development of these resources.

Locatable

Operations to extract locatable minerals represent the principal source of adverse impacts on water resources (from minerals management) within the WD. Historically, mining operations have increased in size and volume of rock processed. Large open pit mining involves the following:

- Removing overburden and country rock to expose ore bodies, sometimes involving thousands of acres;
- Removing ore to depths of hundreds of feet below the surface and sometimes below existing water tables; and
- Processing millions of tons of ore, which creates waste that contains uneconomical residual sulfides, heavy metals, and residual process chemicals that can leach from the rock when exposed to atmospheric conditions and water.

In those cases where mines excavate to depths below the regional water table, mining operations often require dewatering large volumes of water. Impacts associated with dewatering include loss of water availability to nearby ground water users. Dewatering may require treating of excess water depending on water temperatures or type of metals or other constituents within the water. Without treatment, disposal of excess ground water may affect existing groundwater aquifers or surface water quality depending on mode of disposal of excess water is (e.g., re-infiltrated or discharge into existing streams or rivers). Processing the ore requires large volumes of water and the use of chemicals, including cyanide, surfactants, and other compounds that may be highly toxic if they are released into the environment. Unless the waste materials and process water are contained and isolated they may present a long-term threat to water resources. These impacts apply to open pit mining operations as well as to subsurface tunnel mining operations. Rehabilitation of large mining operations is costly and often involves construction of containment and treatment systems that may require long-term indefinite monitoring and maintenance to prevent impacts on water resources far into the future. Pit mine operations sometimes result in pit lakes, where the pit has been excavated below the water table, so that the lake is maintained by groundwater. The water may become acidic by contact with sulfide or other minerals in rock that has been recently exposed by mining operations, and the acidity may increase concentrations of metals relative to surrounding groundwater. In addition, the water may present a threat to wildlife or human health. The Surface Management Regulations, 43 CFR 3809, requires financial guarantees from operators to ensure locatable mineral reclamation is completed. Financial guarantees may also be required to ensure long term treatment of water to maintain water quality.

Actions A-MR 1.1 and 1.2 call for reclaiming mineral extraction sites, but provide minimal guidance to land managers to ensure that impacts on water resources do not occur.

Action A-MR 9.2 under each of the alternatives calls for withdrawal of lands from locatable mineral development on a case-by-case basis and notes that any mineral withdrawal of more than 5,000 acres must be initiated by Congress. Mineral withdrawal would prevent effects on water resources resulting from mineral extraction. Under Alternative A, 60 acres at Porter Springs is currently identified for mineral withdrawal. Alternatives A and B propose fewer acres for mineral withdrawal than Alternatives C and D.

Effects under Alternative B

Objective B-MR 1 amends A-MR 1 to add that lands disturbed by mineral operations would remain in a condition that provides for continued economic activity at the site. Mineral activity is sensitive to commodity price, so that mining activity may stop when prices make continued operations uneconomical; however, the same mine may become economical when the price rises or the extraction cost decreases. Closing a mine and rehabilitating the land could make restarting operations more expensive. In some cases, continued activity may generate the revenues needed to support additional rehabilitation. Therefore, planning mineral operations in such a way as to facilitate reopening mineral operations may result in beneficial impacts on water resources. However, Action B-MR 1.1 calls for reclamation activities to be implemented only when there is no reasonable prospect for continued use. This makes rehabilitation highly contingent on the interpretation of what is a "reasonable prospect," and could delay rehabilitation indefinitely. Final reclamation that is deferred would be subject to regular updates of reclamation cost estimates and the provision of appropriate financial guarantees. To counter this, Action CA-MR 1.1 calls for interim reclamation measures to be employed whenever facilities would remain unused for more than one year. If interim measures are adequately funded and effective (which would be evaluated in project-specific environmental review of mining permits), then these measures could result in minor impacts on water resources.

Saleable

Like Alternative A, Alternative B would maintain about 6.8 million acres open to disposal of saleable minerals. More acres (about 4.5 million) would be open with only standard stipulations than under Alternatives C and D. About 1.4 million additional acres of WHB HMAs would also be subject to seasonal or other restrictions. About 0.87 million acres would be open only to permits to government entities. About 0.42 million acres would be closed to mineral material disposal altogether. Alternative B is the least restrictive of the alternatives and therefore would have the greatest potential for adverse impacts on water resources.

Fluid

Just over one million acres would be closed to fluid mineral development under Alternative B, and about 0.22 million acres would be subject to No Surface Occupancy stipulations. These restrictions would protect more water resources than under Alternative A (but less than under Alternatives C and D) by reducing the number of acres on which soil-disturbing activities or potential pollution sources could be located.

Solid

Effects on water resources would be negligible, as described for Alternative A.

Locatable

As discussed under Alternative A and above in respect to Actions B-MR 1.1 and B-MR 1.2, impacts on water resources from Alternative B are less than those under Alternative A.

Action B-MR 9.2 is the same Action A-MR 9.2, with 60 acres at Porter Springs currently identified for mineral withdrawal.

Action B-MR 9.5 calls for compliance inspections only to the extent required by law or regulation. Thus, although this action is not specified under Alternative A, both Alternatives A and B are equivalent, with respect to compliance inspections. In those cases where mines excavate to depths below the regional water table, mining operations often require dewatering large volumes of water. Impacts associated with dewatering include loss of water availability to nearby ground water users. Dewatering may require treating of excess water depending on water temperatures or type of metals or other constituents within the water. Without treatment, disposal of excess ground water may affect existing groundwater aquifers or surface water quality depending on mode of disposal of excess water is (e.g., re-infiltrated or discharge into existing streams or rivers)

Effects under Alternative C

Alternative C effectively provides managers with discretion to deprioritize mineral development where the development would conflict with other significant resource values, giving greater emphasis to the protection of water resources.

Objective C-MR 1 provides additional specific guidance regarding rehabilitation of mineral sites that is not included in Alternative A and would help to reduce potential impacts on water resources. It calls for restoring lands to approximately preoperational topography and vegetation. These objectives are translated into management actions in Action C-MR 1.1. Restoring preoperational topography may help to reduce surface erosion, particularly in areas where the topography was relatively level. Restoring native vegetation would probably have no impact on water. Otherwise, the rehabilitation actions specified in Alternative C would be equivalent to those in Alternative B.

Saleable

Alternative C opens about 400,000 fewer acres to saleable mineral extraction than Alternatives A and B. About 3.6 million acres would be open only to permits to government entities. About 0.84 million acres would be closed to mineral material disposal altogether. Alternative C is more restrictive of saleable mineral disposal because it specifies that saleable mineral disposal would be open only where it is compatible with important resource values.

Fluid

Alternative C maintains the fewest acres open to fluid mineral leasing (2.7 million acres compared to more than 6 million acres for each of the other alternatives) and the largest number of acres closed (4.4 million, compared to just over one million acres under Alternatives B and D, and less than half a million acres closed under Alternative A). Alternative C also makes the most restrictive stipulations to protect other resource values.

Solid

Effects on water resources would be negligible, as described for Alternative A.

Locatable

Alternative C includes more stringent protections of other resources, and more lands are identified under Alternative C for mineral withdrawal than under the other alternatives. Alternative C involves more stipulations and restrictions on use than the other alternatives, in keeping with the objective of giving maximum protection to other resources. As a result, Alternative C would indirectly afford the highest level of protection of water resources. Alternative C also includes provisions for off-site mitigation of impacts on resources at every opportunity available. As a result, water resources impacts that occur in one area might be mitigated by offsetting the impact with improvements in another area. This gives land managers a tool to allow a project to go forward if the proponent can provide compensation for the effects.

Under Alternative C, in addition to the 640 acres at Porter Springs identified for mineral withdrawal under Alternatives A and B, a number of other areas, each smaller than the 5,000-acre limit requiring congressional approval, are identified for mineral withdrawal. Most of these are also included in Alternative D, but Alternative C also identifies ACECs in Pine Forest, Raised Bog, and the Stillwater Mountains, for mineral withdrawal. Thus, Alternative C would withdraw the largest number of acres and is expected to result in the largest beneficial impact on water resources.

Action C-MR 9.5 calls for sufficient compliance inspection to not only ensure conformance with the notice or approved plan (as under Alternative D), but also to maximize protection of other resource values. Through this action, Alternative C contains a mechanism to provide greater protection of water quality, including both groundwater and surface water (such as in pit lakes), than under the other alternatives.

Effects under Alternative D

Overall, Alternative D restricts use on more acreage than Alternatives A and B, but fewer acres would be restricted than under Alternative C. By this measure, Alternative D would provide greater protection to water resources than would Alternatives A and B but less protection than under Alternative C.

Objective D-MR 1 is generally equivalent to that under Alternative B. However, Action D-MR 1.1 calls specifically for addressing post-operational use and site reclamation configuration before mineral development. This enables BLM to ensure that rehabilitation is adequately addressed before mineral operations start and allows monitoring and corrective action elements to be required so that rehabilitation efforts are adequately sized and modified if mining operations expand.

Saleable

Alternative D opens about 270,000 fewer acres to saleable mineral extraction than Alternatives A and B. About 2.9 million acres would be open with only standard terms and stipulations. In addition, about 2.4 million acres would be subject to seasonal or other restrictions, and within WHB HMAs. About 1.3 million acres would be open only to permits to government entities. About 0.69 million acres would be closed to mineral material disposal altogether. Assuming that these restrictions would provide indirect protection from potential impacts on water resources, Alternative D would have lower potential for water resources impacts than under Alternative B and greater potential than under Alternative C.

Fluid

Alternative D would maintain fewer acres (about 576,000) open to fluid mineral leasing than would Alternative B. About 1.7 million acres would be closed to leasing, and about 0.21 million acres would be subject to No Surface Occupancy stipulations. Alternative D is more restrictive, and therefore more protective, of water resources than under Alternatives A and B, but it is less protective than under Alternative C. However, although large areas would be open to fluid mineral development, geologic conditions are not favorable to fluid mineral development (other than geothermal) in the WD, so the risk of adverse impacts on water resources from most fluid mineral leasing would be low under all alternatives. Potentially valuable geothermal resource areas comprise about 28 percent of the land within the WD, so even considering geothermal resources, the practical differences between the alternatives would not be as large as they seem, based on acreage open to leasing alone.

Solid

Effects on water resources would be negligible, as described for Alternative A.

Locatable

Slightly fewer acres would be open to locatable mineral development under Alternative C than under Alternative D, but both would open fewer acres than Alternatives A and B. As described above, rehabilitation planning would be required before mining operations begin, providing additional assurance that long-term impacts on water resources would be minimized.

Water resources benefits would be greater than under Alternatives A and B but less than under Alternative C. Alternative D would include most of the same proposed mineral withdrawals as Alternative C, except the Pine Forest, Raised Bog, and Stillwater Mountains ACECs. Alternative D would require compliance inspections sufficient to meet policy and to ensure conformity with an approved plan but without additional protections, as under Alternative C.

Water Resources: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to all Alternatives

Many recreation destinations center on areas where perennial surface water is present, such as streams or lakes in upper watersheds. These are often sensitive areas, where increased visitor use might lead to soil compaction (as at campsites or on trails), increased use of OHVs, and generation of water pollutants (sanitary waste, pathogens). Increased visitor use might require additional support facilities and infrastructure, such as improved access roads, potable water, sanitary facilities, waste disposal, and other facilities. Each of these can have adverse impacts on water resources. Improved access may lead to more visitor use and demand for more support facilities. Many areas of the WD are remote, but there is increased demand for recreation opportunities from urban expansion in the Reno area. Visitors from outside the WD are more likely to stay longer and to require facilities to support extended stays. Therefore, increased concentration of visitor use on few areas with desirable riparian settings are likely to result in increased impacts on the water resources in those areas.

Similarly, demand for OHV use areas is increasing. OHV use can disturb soils and increase erosion. As with most recreational activity, OHV destinations would typically include riparian areas, which are particularly vulnerable to OHV use. All of the alternatives include measures to monitor and control visitor use and associated impacts on other resources, but the alternatives differ in the degree and type of recreational development they would promote.

Except for Alternative A, each of the alternatives calls for an inventory and designation of routes and trails throughout the WD in limited and closed areas. This inventory is important to identify and minimize areas that have contributed to or that may contribute to impairment of surface water and other resources and uses.

Action CA-R 7.2 would lead to the protection of water resources through use restrictions, permit stipulations, and mitigation measures.

Effects under Alternative A

Unlike the other alternatives, Alternative A does not explicitly include any adaptive management actions. Adaptive management is a tool that enables resource managers to monitor and evaluate responses to a management action and to adjust the management action based on the observed responses. Adaptive management is effective when the impacts of a prescribed action are not adequately predictable or if there are potential significant adverse consequences of implementing an action. Under Alternative A, any benefits to water resources that may be derived from adaptive management would not occur.

All of the alternatives allow dispersed recreation throughout the WD, but Alternative A includes no detailed criteria for managing dispersed recreation, while the other alternatives do. These criteria would help to protect water resources. Lack of criteria in Alternative A could result in additional impacts on water resources.

Alternative A would continue management of existing SRMAs rather that designating new ones, as in the other alternatives. Designation of new SRMAs is a response to known and perceived public demand for recreational opportunities. SRMAs provide a means of formally planning and managing recreational uses within a defined geographic area. Designation of SRMAs would not impact water resources. Management actions applied to SRMAs may result in effects on water resources. Outside of SRMAs, management of recreational uses is more generalized and use oriented rather than location oriented and is managed largely through Special Recreation Permits. SRPs would be issued on a case-by-case basis and would set particular requirements according to the requested use. They apply mainly to organized group activities, such as OHV events. Outside of SRMAs, SRPs are the primary tool for protecting water and other resources.

Action A-R 3.1 would not promote visitation to areas where increased recreation use could create unacceptable impacts. This action calls attention to the possibility that such areas may exist and provides a tool for preventing impacts, including impacts on water resources. Since sensitive riparian environments are often desirable recreation destinations, this action could result in a beneficial impact on water resources. This action is included in Alternatives C and D but not in Alternative B.

Most of the WD (6,789,612 acres) is open to OHV use. Alternative A would close 17,698 acres to OHV use, (including 17,436 acres in the Pine Forest Area, 141 acres in the George Lund Petrified Forest, and 121 acres of Zone 1 in Water Canyon). It would limit OHV use to existing trails on 423,786 acres. Since OHV use disturbs and compacts soil, closure to OHV use is expected to reduce impacts on water resources in these areas.

Effects under Alternative B

Alternatives B, C, and D each include similar adaptive management measures recognizing the need to protect other resource values as recreational use expands. This may help to adjust visitor use to prevent adverse effects on water resources.

Alternative B would rely on permit systems to limit visitor use in areas that are overcrowded. The other alternatives do not include this measure. Overcrowding may have adverse impacts on water resources, including damaging soils and vegetation cover and increasing pollutant sources and fire danger.

Alternative B (and Alternative D) designates over six million acres as an extensive recreation management area (ERMA). Among the criteria that would benefit water resources, consistent with state regulations, is a prohibition on camping within 300 feet of a spring. This would help to further prevent adverse impacts on water quality.

Alternatives B and D would designate three new SRMAs, within which certain recreation uses would be emphasized, and supporting infrastructure would be developed.

The Nightingale SRMA includes 925,593 acres and would be subdivided into five recreation management zones, in which a high interaction with the natural world and strong dependency on equipment would be promoted. The Nightingale SRMA includes relatively low motorized and mechanized use in four of the five zones. Higher elevation areas (the Selenite Mountains WSA and the Mount Limbo WSA, totaling 55,743 acres) would be primarily maintained for hiking, camping, and hunting, with little motorized use. The Blue Wing and Shawave Mountains (59,738 acres) would be used primarily for hiking, backpacking, hunting, and camping. The Blue Wing and Winnemucca Lake Playas (34,511 acres) would be used for competitive and commercial events. The largest zone is a 773,968-acre area in which the primary activities would include OHV and 4x4 use and motorcycle travel. Motorized trail use, car camping, and other developed uses imply increased risk to water quality. Because motorized uses in the Nightingale SRMA would occur mainly on low elevation lands with sparse, low quality water resources, impacts on water resources would be minimized.

The Winnemucca SRMA includes 151,824 acres subdivided into six Recreation Management Zones. The largest of these are the Sonoma Range (91,156 acres) and the Winnemucca Sand Dunes (34,922 acres). Both areas would include OHV use among the primary activities. Also included are lowland and upland zones of Water Canyon (121 acres and 2,579 acres, respectively), the Bloody Shins RMZ (13,084 acres), and Winnemucca Mountain (10,119 acres). All areas would include OHV use, as well as mountain biking. Overnight camping would not be allowed in the upper portion of Water Canyon. The Winnemucca Mountain RMZ contains a paved road to a scenic overlook. Most of the Winnemucca SRMA is on low elevation sagebrush rangeland, including the Sonomas.

The third new SRMA is the Granite Range SRMA (44,911 acres), adjacent to the Black Rock Desert. It would include two RMZs. The Granite Foothills RMZ (1,443 acres) is at the entrance to the Black Rock Desert, and private entities would be encouraged to develop visitor facilities there. The Granite RMZ (43,468 acres) would be managed for hiking, camping, viewing, and hunting. The Granite Range SRMA contains numerous springs but no reservoirs.

The Pine Forest SRMA (98,874 acres) would be expanded. The primary activities in the Pine Forest SRMA would be backpacking, hunting, fishing, canoeing, and primitive camping. It includes three RMZs: Pine Forest Lakes (25,000 acres), Pine Forest Creeks (73,717 acres), and Knott Creek (164 acres). Although the area is remote and gets relatively few visitors, use of the area is focused on water, enhancing the potential for impacts on water resources if visitor use increases.

About 1,460,200 acres on flat playa surfaces and checkerboard lands would be open to OHV use under Alternative B. Alternative B would close 17,698 acres to OHV use in the same areas as under Alternative A. It would limit OHV use to existing trails on 5,743,198 acres. Since OHV use disturbs and compacts soil, closure to OHV use is expected to reduce impacts on water resources in these areas.

Effects under Alternative C

Alternative C would develop and provide access to new water-based recreation only when a public need has been identified. Compared against Alternatives A and B, this suggests that fewer new water-based recreation sites would be developed under Alternative C. The impact on water resources would probably be small, but Alternative C would likely avoid some impacts on water quality from introduction of pathogens, pollutants, and erosion related to construction of access and other facilities. New water-based activities are likely to be centered on relatively few areas.

Alternative C designates over seven million acres as an ERMA. In addition to the criteria under Alternatives B and D that would be applied throughout this area, camping would be prohibited within 300 feet of spring sources, consistent with state regulations. This would help to further prevent adverse impacts on water quality.

Alternative C includes designation of the Winnemucca SRMA (it does not include the Nightingale or the Granite Range SRMAs that are included in Alternatives B and D). Under Alternative C, the Winnemucca SRMA would not include the Winnemucca Sand Dunes RMZ, which is primarily an OHV use area. All three alternatives include the Pine Forest SRMA, which would be only about a third as large under Alternative C as under Alternatives B and D.

Alternative C emphasizes more wilderness and primitive experiences and involves much less development of new infrastructure than Alternatives B and D. As a result, Alternative C is likely to encourage less concentrated and organized recreational uses and less recreational uses overall, with consequently lower risk of impacts on water resources.

About 43,521 acres would be closed to OHV use under Alternative C, including the same areas that would be closed under Alternative D, plus about 25,945 acres in the Blue Wing area. It would limit OHV use on 7,187,575 acres, which would reduce potential impacts on water resources from OHV use more than any of the other alternatives.

Effects under Alternative D

Alternative D, like Alternative B, includes three new SRMAs.

About 288,105 acres would be open to OHV use under Alternative D, which would close 17,577 acres to OHV use in sensitive areas. It would limit OHV use to existing trails on 6,925,414 acres.

Based on these closures and limitations, Alternative D is expected to have water resources effects (primarily from sediment loading) that are intermediate between Alternatives B and C.

Water Resources: Effects from Renewable Energy

Effects Common to all Alternatives

Development of renewable energy would require road access to the sites. All projects would involve construction, soil disturbance, and the potential for enhanced erosion to impact surface water quality. Solar projects tend to be located on level terrain, such as on valley floors, where there are few sensitive surface water resources, and soil erosion by water would tend not to be significant.

Wind farms typically consist of a series of turbines located along ridges, at the highest points in a watershed. Typically, soils are thin and the terrain is rocky in these areas. Although soil erosion may be enhanced, the effects on surface water resources are likely to be small. However, there may be few existing roads and these may be unsuitable for transporting the components and equipment to the site. Constructing new roads or improving existing roads is likely to result in enhanced erosion and a potential threat to surface water quality. Roads would need to be maintained to allow continued access for turbine maintenance.

Biomass projects would likely be located on valley floors, in areas that are not far from the sources of biomass, such as urban or agricultural areas. Biomass production is low in the WD and would likely result in only minor adverse impacts on water resources.

Construction impacts on water resources would be mitigated through BMPs.

Renewable energy development projects would have varying potential for impacting water resources based on resource-specific and project-specific conditions. Generally, concentrating solar projects would require the greatest amount of water during operation. Wind energy and photovoltaic projects would require minimal use of water resources. In all cases, some supply of water is usually needed to meet the demand to operate these projects. Generally, requirements ensuring compliance with existing laws, regulations, and policies would address impacts related to water resources.

Effects under Alternative A

Action A-RE 1.3 would maintain existing exclusion areas applicable to wind energy projects in WSAs, ACECs, TCPs, and critical habitat areas. While these would reduce the potential for water resources impacts in sensitive areas, they would not address impacts in other areas. Project-specific NEPA environmental review would be performed. Construction-related impacts would be mitigated by implementing BMPs.

Effects under Alternative B

Action B-RE 1.2 would designate avoidance areas, and granting of ROWs would include stipulations to mitigate impacts on water resources. As discussed above, the principal source of impacts on water resources is likely to result from constructing, improving, and maintaining access roads to remote wind farm sites.

Alternative B would not designate any exclusion zones, but each project would undergo project-specific environmental review so that the merits of each site would receive public scrutiny, and environmentally unfavorable sites would likely be rejected.

Delineation of rights-of- way avoidance and exclusion areas would ensure mitigation measures or use restrictions are implemented for location of ROWs. Such measures or restrictions would help protect water resources depending on the proximity of water to projects.

Effects under Alternative C

As with mineral leases, Alternative C would reduce impacts through development of lease stipulations to protect other resources. Alternative C would designate 1.2 million acres of exclusion zones and nearly one million acres of avoidance areas. Less available area and exclusion of more sensitive lands is expected to reduce the potential for impacts on water resources under Alternative C, relative to the other alternatives.

Delineation of rights-of- way avoidance and exclusion areas would ensure mitigation measures or use restrictions are implemented for location of ROW. Such measures or restrictions would help protect water resources depending on the proximity of water to projects.

Effects under Alternative D

Alternative D would designate 1,773,199 acres of avoidance areas, which is 913,355 acres more than Alternative C, and 1,199,539 acres of exclusion zones, which is similar to but slightly less protective than Alternative C.

Delineation of rights-of- way avoidance and exclusion areas would ensure mitigation measures or use restrictions are implemented for location of ROW. Such measures or restrictions would help protect water resources depending on the proximity of water to projects.

Water Resources: Effects from Transportation and Access Management

Effects Common to All Alternatives

Little or no new road construction is expected under any of the alternatives because almost every area within the WD is accessible by some form of road. However, existing roads may require improvement to accommodate actions under each of the alternatives.

Most of the management actions would be the same for all alternatives, or at least for Alternatives B, C, and D. Differences in impacts on water resources would derive less from transportation and access management and more from the different road densities and construction techniques required to implement the alternatives.

As discussed under Effects Common to All Alternatives for Recreation Management and consistent with management action TA 4.1, an inventory of all roads in the WD would be undertaken under Alternatives B, C, and D to identify potential sources of impacts and to identify roads that would be removed or improved.

Roads have the potential to impact water resources during construction and maintenance and in normal operation. Roads collect, divert, concentrate, and otherwise alter natural drainage patterns and create potential for erosion during construction and use in the case of unimproved roads. They introduce pollutants via petroleum-based paving materials, deicing materials, dust palliatives, and spills from vehicles using the roads. Also, they provide routes for human activities to be rapidly introduced into new environments. Inadequately sized or poorly designed culverts, inadequate drainage and shoring, poor roadbed design, and other engineering issues can result in erosion or slope failure, leading to enhanced sediment transport to streams. Road surfaces can be preferential pathways for runoff. They cross every type of terrain and feature, from playa to sage lands to riparian corridors, interrupting natural continuity and creating abrupt boundaries. Roads may cut and undermine slopes, and road fills may block natural drainage features. Each mile of a 15-foot-wide roadway represents nearly two acres of compacted soil taken out of productive use. These impacts would be similar under each of the alternatives, but the alternatives would differ greatly because of differences in total road miles that would be required to implement the various management actions. Roads also allow OHVs to penetrate all areas of the WD, and OHV trails create additional erosion impacts. There are currently no accurate estimates of road density in the WD and no estimate of the density of OHV trails. In many areas, perennial streams follow narrow canyons or gullies with steep side slopes, where the most favorable flat land for building a road is on the floodplain of the stream. The narrow valley floors require many cuts and fills that create potentially unstable roadbeds or slopes, and the unstable soils contribute to sediment impacts in the adjacent streams.

Decommissioning roads may result in short-term impacts on water resources from soil disturbance until vegetation and slope stability are reestablished. All alternatives include provisions to reduce the impacts o*f* roads *on* hydrologic function. Alternative *B* relies on engineering options to reduce concerns related to flow of water across roadways. Alternatives C *and* D *would* promote seasonal road closures to reduce or eliminate the impacts of traffic to water flow and vice versa.

Effects under Alternative A

Under Action A-TA 1.6, Alternatives A, C, and D would improve or decommission roads that are presenting problems to the environment. These problems are described generally above, and since many of the problems created by roads have to do with impacts on water resources, decommissioning problematic or unnecessary roads and improving existing roads is expected to result in beneficial impacts on water resources.

Under Alternative A, Action A-TA 5.1.1, funds for new restroom facilities would be requested. This action is carried over to Alternatives B and D, but not C. The construction of restroom facilities would partially mitigate impacts on water quality associated with visitor use of recreation sites in the WD.

Effects under Alternative B

Under Action B-TA 1.6, Alternative B would decommission roads only if alternative access is provided, and B-TA 4.1 calls for working with local communities to recognize their needs before decommissioning roads. Potentially much larger cumulative road miles are needed to accomplish the objectives of Alternative B, compared to Alternative C. Although no roads would be built as a direct result of Alternative B, it presents greater potential for impacts on water resources because of the greater number of roads that would be retained, improved, maintained, and used (such as to provide access to OHV drivers).

Action B-TA 4.3 calls for removing, rerouting, or rehabilitating roads or trails that adversely impact wildlife, but only if alternative access is provided. As discussed under Transportation and Access Management, decommissioning roads could result in beneficial impacts on water resources. Some of these benefits would be offset by providing alternative access.

Effects under Alternative C

Based on evaluation of other management actions, and restricted or excluded acres under Alternative C, Alternative C would require the fewest road miles and least transportation facility construction of the alternatives, so this alternative is expected to have the fewest adverse impacts on water resources.

Action C-TA 4.1 calls for limiting access to habitat areas through an active road and trail closure policy, emphasizing closing roads for protection of habitat, rather than on maintaining roads to support community needs. The greater emphasis on habitat is likely to support lower road density and therefore to result in fewer impacts on water resources.

As under Alternative B, Action C-TA 4.3 calls for removing, rerouting, or rehabilitating roads or trails that adversely impact wildlife. But unlike Alternative B, the actions under Alternatives C and D do not require that alternative access be provided. As discussed under Transportation and Access Management, decommissioning roads could result in beneficial impacts on water resources.

Action C-TA 5.1.1 calls for not constructing restroom facilities, consistent with the general approach of minimizing increased visitor use of the WD, and reducing associated impacts on resources. If, as expected, the existing restroom facilities are adequate to support future visitor use, then the impacts on water resources would be minor.

Effects under Alternative D

Action D-TA 4.1 emphasizes protection of sensitive habitats and calls for closing or decommissioning roads and trails to achieve the appropriate road density. Appropriate road density would be determined relative to the overall objectives of the alternative for each resource area. Alternative D is generally intermediate between Alternatives B and C in terms of closed or restricted acres and other restrictions that would limit new projects and the need for vehicle access. Therefore, the number of roads that could be decommissioned would also be intermediate.

Decommissioning roads and trails under Action D-TA 4.3 is the same as under Alternative C, except that fewer roads may be decommissioned because of the different wildlife objectives of Alternatives C and D.

Water Resources: Effects from Lands and Realty Management

Effects Common to All Alternatives

Continued management by the BLM provides public involvement in the decisions that affect those lands. BLM management may result in some benefits to water resources that would not occur under more dispersed ownership and management, particularly with respect to managing priority watersheds and other sensitive environments.

Most of the management actions would be the same for all of the alternatives, but the impacts on water resources may differ because of different objectives of the alternatives.

Action LR 4.1.2 calls for a set of criteria to be considered when evaluating land acquisition actions. The criteria would be the same for all of the alternatives, but the decisions taken under each alternative may differ because of the different objectives of the alternatives. The criteria to be considered in land acquisitions include public resource values, such as riparian areas, floodplains and wetlands, and fisheries, which would provide direct beneficial impacts on water resources because management of currently discontinuous holdings within watersheds could be more consolidated. Checkerboard ownership is an artifact of historical decisions to encourage construction of railroads, with no consideration of hydrologic conditions and natural watershed boundaries. In general, management of contiguous areas within watersheds would give the BLM improved ability to influence outcomes at the watershed level, including regulating access and effectively controlling uses to benefit water.

Divesting lands that have low value for protecting water and other resources, but that could benefit municipalities, and increasing the tax base provide an opportunity to offset the cost of acquiring lands under Action LR 4.1.2, with no impact on water resources. Land acquisitions and sales would be subject to project-level environmental evaluation and public participation under NEPA. Impacts from water importation and exportation would reduce availability of water within watersheds possibly effecting lentic and lotic flows. Water might not be available to maintain healthy ecosystems

Under Alternatives B and D, private lands within wellhead protection areas would be given priority for acquisition on the theory that public ownership of certain watersheds containing municipal supply wells would provide better long-term protection of the water resource than private ownership would provide. Nevada regulations recognize "wellhead protection zones" and allow municipalities latitude in defining their boundaries. While state regulations and guidelines set minimum standards and focus on providing a high degree of protection to water users, adherence to the minimum guidelines may provide only moderate long-term protection for municipal water supplies.

Impacts on groundwater are not necessarily restricted to sources that migrate vertically downward and then travel at the rate of groundwater to municipal wells. Some uses can threaten the health of a watershed, reducing water retention and storage capacity. Some pollutants may be transported in surface water or by overland flow before migrating vertically to groundwater, so that groundwater flow rates do not adequately represent the level of threat.

State wellhead protection guidelines do not set any upper limit on the definition of source protection areas. Where feasible, priority watershed management is preferable to localized wellhead management because it sets management for long-term protection of municipal water supply as the priority watershed use.

Effects under Alternative A

Under Management Action A-LR 1.3 of Alternatives A and D, not only would public lands in priority watersheds (wellhead protection areas expanded to include the watershed containing municipal water supplies) be retained, but private lands in specific municipal watersheds would be given priority for acquisition. Prioritization of use of these watersheds for public water supply protection would directly benefit water quality within these areas. To the extent that private lands are acquired, Alternatives A and D would provide greater protection to water resources than Alternatives B and C.

Effects under Alternative B

Management Action B-LR 1.3 under Alternatives B and C calls only for retaining existing holdings within priority watersheds, rather than for acquiring private lands in priority watersheds as under Alternatives A and D. As a result, Alternatives B and C are less protective of municipal water supplies than are Alternatives A and D.

Effects under Alternative C

Alternative C provides the most protection of water resources because it involves the least new developments and the most restrictions on human use, although Action C-LR 1.3 does not call for the BLM to acquire additional lands in priority watersheds to protect municipal water supplies.

Under Action C-LR 5.3, 877,426 acres would be designated as avoidance areas to protect resources, and 1.2 million acres would be designated as exclusion zones where no corridors, ROWs, or nonrenewable energy projects would be allowed, in order to protect wildlife habitat. These designations would be indirectly protective of water quality and water supplies since exclusion of such uses would reduce the potential for soil disturbance, introduction of pollutants, and all of the other activities described for each of the resources.

Effects under Alternative D

Delineating ROW avoidance and exclusion areas would protect water resources within delineated areas by implementing use restriction on ROWs and/or would require development of mitigation measures to maintain, improve and protect wildlife habitat. These strategies would also benefit water resources. Land tenure adjustments either through acquisition, disposal, or exchange would affect water resources depending on land tenure objectives and needs, impacts would be difficult to qualify.

Water Resources: Effects from ACEC/RNA Management

Effects Common to All Alternatives

The effects of ACEC/RNA management on water resources would be beneficial because they are intended to protect fragile resources from irreparable damage. Such areas are typically associated with high water quality and often include pristine upper watershed areas that are a source of high quality water to streams and aquifers at lower elevations. If they are functional, these areas also protect lower areas from flooding by retaining and delaying runoff. The alternatives differ in the amount of land they would protect. All of the alternatives include the 60-acre Osgood Mountains ACEC.

Effects under Alternative A

There would be beneficial impacts on water resources from maintaining the Osgood Mountains ACEC.

Effects under Alternative B

The impacts on water would be the same as under Alternative A and would be beneficial.

Effects under Alternative C

Alternative C includes three additional ACECs compared to Alternatives A and B. The additional designations would provide indirect beneficial impacts on water resources by protecting habitat and other values for approximately 97,500 acres.

Effects under Alternative D

There would be the same beneficial impacts as those under Alternative C.

Water Resources: Effects from Backcountry Byways Management

Effects Common to All Alternatives

BCBs provide visitors with improved vehicle access routes to areas that otherwise would not be visited because they are not easily accessible. The impacts on water resources would result from construction and maintenance of roads and from additional visitor use of these areas. However, since the byways are typically developed on existing routes, the effects on water resources are expected to be low.

Effects under Alternative A

Action A-BCB 1.1.1 under both Alternatives A and D include evaluating the need for developing the Gold Country, Silver Backcountry, and Blue Lake-Knott Creek BCBs. As indicated above, byways may result in increased visitor use and consequent greater potential for some impacts on water resources, although the impacts would be expected to be small.

Effects under Alternative B

Alternative B would encourage greater use, partly to stimulate local economies. It does not specify additional byways to be evaluated. As indicated above, the impacts of byways on water resources are generally expected to be low.

Effects under Alternative C

Alternative C would create the fewest new BCBs and would avoid areas that have received low visitor use. Therefore, Alternative C is expected to have fewer impacts on water resources than the other alternatives.

Effects under Alternative D

The impacts would be the same as those under Alternative A.

Water Resources: Effects from National Historic Trails Management

Effects Common to All Alternatives

No impacts would be expected.

Water Resources: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures within the 43.4 miles of WSR corridors that would promote water quality and restrict actions that would impact the free flowing nature of these streams.

Effects under Alternative B

There would be no impacts on water resources resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on water resources resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would not likely be impacts on water resources from WSR management so long as WSA, priority habitat, and priority watershed management as outlined in the remainder of the RMP is implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented within the 43.4 miles of eligible WSR corridors which would prevent alteration of the free flowing nature and promote water quality until a new determination of NWSRS suitability is made.

Water Resources: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

Water resources within WSAs would benefit from use restrictions and other management strategies in accordance with the WSA Implementation Management Plan. If released by Congress those WSAs would be managed in accordance with the multiple use mandate of FLPMA. Wilderness Characteristics would all be managed according to FLPMA.

If released by Congress, management of the WSAs would be equivalent under each of the alternatives. The management of WSAs as non-wilderness areas would include certain uses that may result in adverse impacts on water resources, such as OHV use.

Effects under Alternative A

Wilderness characters would be managed on a case-by-case basis and subject to site specific mitigation measures to reduce impacts on wilderness characteristics. Water resources located within areas containing wilderness characteristics would benefit.

Until released by Congress, the 13 WSAs would be managed for protection of wilderness values, which would result in beneficial impacts on water resources. If released by Congress, the WSAs would not be managed as wilderness but would be managed for other unspecified appropriate uses. These uses probably would be determined consistent with the overall policy established under each alternative, with greater restrictions, and hence greater beneficial impacts on water, under Alternative C.

Effects under Alternative B

Impacts under Alternative B would be the same as Alternative A.

Effects under Alternative C

Areas with Wilderness Characteristics would be managed with use restrictions to protect values. Such restrictions would also protect water resources located within these areas.

Alternative C impacts would be the most beneficial after release from wilderness status.

Effects under Alternative D

Impacts under Alternative D would be the same as Alternative A.

Water Resources: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

The impacts on water resources would be negligible but of the same type as those described for BCBs.

Effects under Alternative A

There would be minor impacts on water resources resulting from visitor use. Impacts would depend on facilities.

Effects under Alternative B

There would be minor impacts on water resources resulting from visitor use, similar to Alternative A. Impacts would depend on facilities.

Effects under Alternative C

There would be minor impacts on water resources resulting from visitor use, but probably less than under Alternative B since Alternative C would avoid attracting increased traffic to remote areas. Impacts would depend on facilities.

Effects under Alternative D

There would be minor impacts on water resources resulting from visitor use, similar to Alternative B. Impacts would depend on facilities.

Water Resources: Effects from Public Health and Safety Management

Effects Common to All Alternatives

The alternatives are nearly equivalent in how they would manage environmental hazards, except that Alternative A is slightly less specific about the particular hazards that the BLM would manage.

The differences among alternatives are not consequential to the impacts on water resources. The impacts on water resources would be beneficial. Existing solid and hazardous waste sites and illegal dump sites would be identified and remediated. Remediation methods would depend on the nature of the sites. In general, these actions would be beneficial to water resources because they would address sites that present potential threats to surface or groundwater quality.

Public safety hazards would be addressed in the same way under each of the alternatives, including fencing dangerous hot springs.

Effects under Alternative A

Action A-PS 5.2 would restrict the use of poisons on public land that result in a secondary killing effect, such as use of rodenticides that could poison predators.

Effects under Alternative B

Action B-PS 5.2 under Alternatives B, C, and D does not call out a restriction on poisons that result in secondary killing effect since use of such poisons would be limited under the pest management program. Instead, Action B-PS 5.2 calls for maintenance of the Orovada pesticide disposal area. These actions are unrelated. Neither is expected to result in impacts on water resources.

Effects under Alternative C

Impacts would be similar to those under Alternative B.

Effects under Alternative D

Impacts would be similar to those under Alternative B. Alternative D would provide additional law enforcement compared to the other alternatives, which may help in preventing and investigating illegal dumping, with associated potential beneficial impacts on water resources to the extent that pollution sources are reduced or responsible parties are identified.

Water Resources: Effects from Sustainable Development Management

Effects Common to All Alternatives

Lands containing important wetlands or riparian wildlife habitat or other water resources would not be included in the proposed land exchanges, resulting in minor potential for impact on water quality under Alternatives B, C, and D. However, sale of lands for sustainable development may increase water use associated with that development. The amount of increase would depend on the nature of the development but could include direct impacts, ranging from increased irrigation from agricultural development to increased industrial process water use. It may include indirect impacts associated with increased demand from population growth resulting from increased economic activity.

Effects under Alternative A

No impacts on water resources are expected because no land disposal actions are proposed.

Effects under Alternative B

There would be an undetermined increase in water consumption, as described under Effects Common to All Alternatives, above. Reuse would reduce disturbance to soils over time as development of new facilities would use existing disturbed areas. This reduction of disturbance in new areas would help maintain water quality in those areas.

Effects under Alternative C

The effects would be the same as under Alternative B.

Effects under Alternative D

The effects would be the same as under Alternative B.

Water Resources: Cumulative Effects

Past and Present Actions

Past and present management of cattle grazing and WHB herds has led to short term, persistent, and in some cases virtually irreversible impacts on water resources. Short term impacts include minor disturbance of sediments in streams and direct introduction of urine and feces into water sources. These impacts are generally unnoticed once the cause is removed. Persistent impacts include over grazing of riparian vegetation and stream bank alteration which can lead to increased erosion and sedimentation as well as temperature increases in non-thermal water sources due to lack of shade. These impacts can take as little as one growing season to diminish or may take many years, but can eventually rehabilitate to a pre-disturbance state. Virtually irreversible impacts include severe erosion through stream widening or downcutting which alter natural surface water flow processes and can lead to dewatering of wetland and riparian areas. These impacts would require decades of natural recovery or large scale anthropogenic (human controlled) rehabilitation before the impacts were no longer evident.

WHB have been managed by the previous LUP in 25 percent of the planning area. These areas contain 25 percent of the perennial, intermittent, and ephemeral streams and 25 percent of the springs in the WD. Cattle grazing has been managed by the previous LUP in 96 percent of the assessment area. These areas contain 96 percent of the perennial, intermittent, and ephemeral streams and 96 percent of the springs in the WD. Objectives and goals in the previous LUP have sought to increase amount of functioning riparian habitat which, in turn, is intended to increase water quality within the planning area. Specifically, the BLM has made changes to timing and numbers of cattle allowed in grazing permits as well as attempting to manage WHB herds based on AMLs. The outcome of these management efforts are qualitatively reflected, in part, in Table 3-8.

An additional impact on water resources due to the past and present activities related to cattle grazing and WHB management is the use of surface and groundwater sources for watering these animals. Stock water and wildlife represent a greater number of water rights held within the planning area, however the volumes of water used for those rights are minimal relative to irrigation, municipal, mining, and industrial uses of water within the planning area (fractions of an acre-foot per year per stock water right compared to thousands of acre-feet per year for an irrigation right). Water consumed by horses and cattle has not lead to an observable decrease in available water for other uses.

Past and present impacts on water resources from mineral resource management are primarily attributed to the creation of pit mines which extend below the water table and the creation of heap leach pads. Mine pits below the water table create a groundwater sink which can lead to indefinite loss of water. During operations water is pumped, which creates a cone of depression or groundwater "sink", and usually applied to some other use or allowed to percolate back down into the aquifer at some distance away from the pit. Mine pits which are allowed to fill back in still represent a ground water sink due to evaporation. In both cases nearby surface water sources can be drawn down or dried up altogether. Pit lakes can also represent a large body of low quality water because many ores related to mining can lead to acidic water. This water isn't likely to contaminate other sources because of the "sink" that is created, but these waters are still generally treated to reduce impacts on wildlife and humans through contact. Heap leach pads at mine sites use large volumes of various chemicals to leach out the element of interest. These compounds have the potential to effect ground and surface water if the heap leach pads begin to leak or if the compounds are improperly handled prior to or during use (i.e., spills from holding tanks or delivery trucks). There are currently two mines actively dewatering, four pit lakes, and six mines with active heap leach pad systems within the planning area.

Past and present impacts on water quality from lands and realty actions are wide ranging in their type, degree, and areal extent. The granting of rights of way can degrade water quality by allowing activities to cross streams which can lead to decreased riparian vegetation and increased erosion. These impacts can be caused by rights of way ranging from small unimproved access roads to cross-district, large scale pipelines. Past and present lands and realty actions have also led to impacts of water resources through acquisition of land parcels that had previously been identified for acquisition through land tenure adjustments. Lands acquired this way become subject to BLM regulations and management which, overall, provides for protection of water resources which may not have existed prior to the acquisition. While lands have also been identified for disposal, and in some cases disposed of, there are no known impacts on water resources. This is because FLPMA provides that lands with high value resources, such as water, would not be identified for disposal. The BLM is unable to quantify the impacts from lands and realty actions because they are so dispersed in space, time, and severity.

Past and present impacts on water resources from renewable energy have been negligible. While the potential for impacts exist, none have been observed within the planning area. Geothermal power production operations possess the potential to lower local water tables and contaminate potable water sources, however neither of these impacts have been caused by geothermal power production that is presently occurring. Construction of geothermal plants may also impact water resources by decreasing riparian vegetation and increasing erosion along streams. However most plants are constructed at lower elevations where surface water flow is ephemeral and generally decreases to no flow due to percolation to groundwater. There are currently six active geothermal plants in the assessment area and one under construction. There have been no impacts on water resources from projects producing power from solar or wind energy because none exist in the assessment area. Other impacts on water resources from renewable energy actions may occur due to ROWs associated with the project, these impacts are discussed above.

Past and present impacts on water resources from recreation are primarily attributed to OHV use. Where OHV users cross streams or wet meadows, there is generally a localized decrease in vegetation, an increase in disturbance of natural flow patterns (i.e., stream flow occupying a two-track instead of a natural channel), and an increase in erosion and deposition. These impacts can be short term or persistent depending on the frequency of use. OHV use, camping, and hunting may also lead to discrete, short term decreases in water quality due to the introduction of pollutants including petroleum products, nutrients, and soaps. Impacts from these pollutants are likely short lived and spatially uncommon when the entirety of the planning area is considered. Because of the dispersed nature of these uses over time and space, it is impossible to quantify these impacts. However, persistent impacts on streams and meadows would likely be represented in the riparian functionality assessments and therefore the impacts would be qualitatively included in Table 3-8.

An additional, acute impact occurs at hot springs due to concentrated recreational use at these sites. These activities can lead to the introduction of pollutants into these systems such as excess nutrients or soaps and other cosmetic or hygienic materials. This impact has not been observed to result in noticeable or lasting effects. Concentrated use around hot springs does impact water resources when recreationists create unauthorized modifications to the natural flow of water. This does not necessarily cause a decrease in water quality; however it can alter the niche habitats that these waters create. The BLM is unable to determine to what degree this type of modification has occurred at hot springs throughout the district because of the unauthorized nature of the changes.

Past and present impacts on water resources from the management of wildlife and special status species leads to the preservation or improvement of water quality and quantity. The number of species requiring special management and the area of habitat over which that special management needed to be applied increased during the time period considered for past actions. This led to an increased number of water resources protected because of their proximity or inclusion in areas managed for wildlife and special status species. These protections include the limiting or increased mitigation of other activities which decreases or eliminates factors which cause erosion of introduction of pollutants. In particular, 3,120 miles of stream receive special management for LCT either due to occupancy or potential use in recovery. More recently, 1910 miles of stream and 821 number of springs have received increased protection consideration because of their occurrence in the 75 percent bird breeding density area for sage-grouse.

Past and present impacts on water resources from the suppression, fuels management, and ES&R activities of wildland fire management occur on two time scales; concurrent with the activity and long term. All three activity types can lead to increased erosion if surface water or wetland areas are traversed by emergency or non-emergency vehicles. These impacts are generally short term because of the one time or very infrequent nature of the disturbance. Fuels management has a greater potential to impact water resources through disturbance of riparian vegetation because this activity generally occurs in areas where fire has not had a recent impact on existing vegetation. Fire suppression and fuels management activities use BMPs and SOPs during the application of compounds like fire retardants and herbicides to minimize or eliminate the introduction of these compounds to water sources, but complete elimination of these impacts is not possible in all conditions. Upland fuels management has also had the potential to lead to short term increases of sedimentation due to erosion of upland soils. Longer term impacts from these activities generally lead to an increase in quality of water resources. Fire suppression and fuels management help limit the number and size of severe fires which often lead to excessive erosion and sedimentation due to loss of both riparian and upland vegetation. ES&R activities have sought to accelerate the re-vegetation (through seedings, plantings, restriction of cattle use, etc.) of burned areas as well as minimize erosional processes during the time of re-vegetation (through installation of physical barriers, mulching of hillsides, etc.). The BLM is unable to quantify the impacts from the combination of these activities partially because of the nature of emergency actions and partially because they are dispersed in space, time, and severity.

Reasonably Foreseeable Future Actions

Future impacts on water resources from cattle grazing and WHB management would be identical in type and distribution, with the exception of the No Grazing Alternative, but not in severity as those described under the past and present activities. The severity of impacts under Alternative A are expected to be identical as those currently observed. Alternative B would likely increase impacts that would decrease the quality of surface water compared to those currently observed due to the focus on resource use. Alternative C Option 1 would likely decrease impacts that decrease surface water quality compared to those currently observed due to the focus on conservation of resources. Under Alternative C Option 2, cattle grazing would be eliminated. This would eliminate use by cattle on 96 percent of the streams in the planning area, however WHB impacts would still occur on 25 percent of the streams. Alternative C option 2 would likely have the greatest impact on increasing water quality within the planning area. Alternative D would likely result in impacts that lead to continued, however slightly expedited, improvements in water quality as were qualitatively observed during the life of the present LUP.

Future impacts on water resources from mineral resource management are expected to remain the same or increase slightly and would likely be identical under all alternatives. The current understanding of mining activity trends indicates that the number active mines within the planning area is likely to remain stable as older mines discontinue operations and new mines begin operations. In this scenario, the number of pit lakes could continue to increase, leading to continued increase of demand on ground water due to evaporation. This demand may be mitigated in cases where pit mining activity is proposed that would result in the back filling of a mine pit. Additionally, a scenario with a stable number of active, large scale mines would not likely change the amount of heap leach activity that is occurring within the planning area. Each additional mine site constructed, however, would increase the potential for impacts on surface water resources through disruption of surface flow patterns or removal of riparian vegetation.

Future impacts on water resources from land and realty actions are likely to be identical under all alternatives. These impacts would likely be identical in severity and type as those currently observed, however the number of impacts would increase. Large portions of the planning area are expected to be designated as exclusion or avoidance areas due to the presence of priority habitat. This designation would provide restrictions on lands and realty actions that can occur in these areas. This would, overall, provide for the preservation of water resources. Currently proposed land tenure adjustments do not include areas with high value resources, including important water resources; therefore, the disposal of these lands would not lead to impacts on water resources.

Future impacts on water resources from renewable energy projects are expected to be identical under all alternatives. These impacts would be identical in type of impact as those currently observed, identical to or lesser in severity than impacts currently observed, and greater in number than impacts currently observed. The number of geothermal plants would increase which would increase the potential for impacts on water resources. As geothermal resource understanding increases and development and production technologies improve, each new plant would likely present a lesser potential for impacts on water resources. Each new plant would, though, have the same potential to disrupt surface water flows or riparian vegetation, leading to a potential decrease in water quality due to erosion and deposition, depending on the plant's location.

Future impacts on water resources from recreation are expected to be identical under all alternatives. These impacts would be identical in type, distribution, and severity (on a per impact event level) as those observed under the current LUP. The frequency of impacts is likely to increase as population increases and therefore would likely lead to a greater severity of impacts when assessed as a whole.

Future impacts on water resources from wildlife and special status species management are likely to be similar in type as those observed under the current LUP. It is expected, however, that increased awareness or concern over habitats of special status species would lead to increased protection of water sources which would lead to improvement of or continued high water quality. Increased protection of water sources, however, may lead to a decrease in water available for other uses. This water availability decrease would be caused by the BLMs limitation of activities which would use water or restriction of access to water.

Future impacts on water quality from wildland fire management under Alternative A would be identical to those observed under the current LUP. Fires are naturally unpredictable in size, location, timing, and frequency however, the impacts on water resources as a whole within the planning area over the life of the proposed RMP would likely average out to be identical. Longer term climate trends could cause an increase or decrease in fire activity, but this cannot be accurately predicted for the foreseeable future. Impacts under Alternative B would be identical to those observed under the current LUP except in the 110,167 acres identified as priority areas where fire may be used to provide resource benefit. In these areas, naturally caused fires would result in fewer impacts from fire suppression activities; however impacts from fire itself may be greater. Human caused fires in these areas would result in identical impacts as observed under the current LUP. Under Alternative B, 40 miles of the perennial, intermittent, and ephemeral streams and 110 springs in the planning area would be subject to the priority area management. Impacts under Alternative C would be identical to those observed under the current LUP with the exception that chemical treatments would not be used for fuels treatments which would reduce the likelihood of introduction of pollutants to water sources. Impacts under Alternative D would be identical to those described for Alternative B. Under Alternative D, 0.2 miles of the perennial, intermittent, and ephemeral streams and 10 springs in the planning area would be subject to the priority area management.

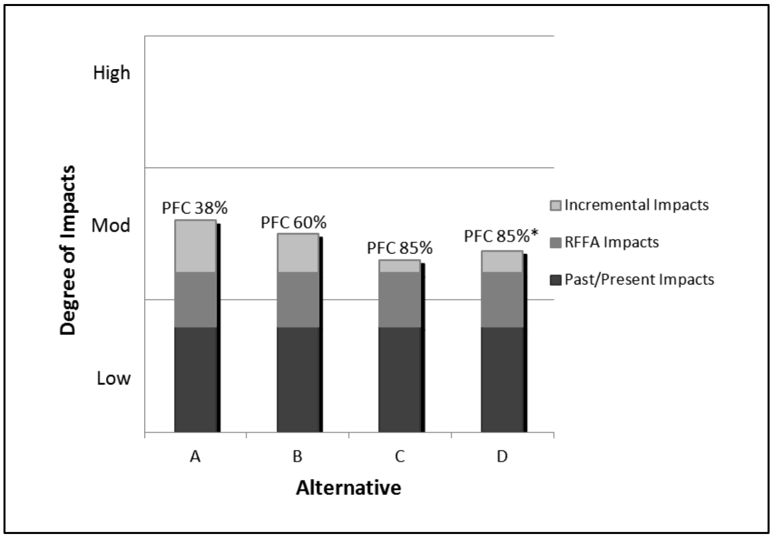
Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Future Actions – All Alternatives

The management proposed in the RMP in conjunction with the past and present activities as well as reasonably foreseeable future actions would have varying impacts on water resources and are summarized by action/ RFFA group below:

- Livestock grazing and WHB management would result in little change to the current state of water resources with any change in being in benefit of water resources. The greatest impact which would reduce degradation of or preserve water quality would occur under the no grazing option.
- Mineral resource management would not likely cause any change to the current state of water quality. An increase in number of open pit lakes could have an additive effect on the volume of water lost each year due to evaporation.
- Lands and realty actions would continue to add to impacts on water resources as more rights of way which cross water resources are granted. Mitigation would, in general, reduce or negate these impacts on a case by case basis.
- Renewable energy exploration and development would not likely impact the current state of ground water resources or surface water quantity assuming a disconnection between the geothermal resource and other aquifers is maintained. The addition of geothermal plants in the planning area would have an additive effect on the potential to decrease surface water quality either during construction or through disruption of surface flow patterns. Project design requirements and mitigation would, in general, reduce or eliminate these impacts.
- Recreational use is expected to increase based on increasing populations which would have an additive effect on reducing surface water quality.
- Priority wildlife habitat areas and special status species management would have a compounding effect on surface water resource by providing for greater protection or preservation of 3,312 miles of streams as well as the surrounding landscapes.
- Wildland fire management would not likely lead to a measurable change in the current state of water resources.

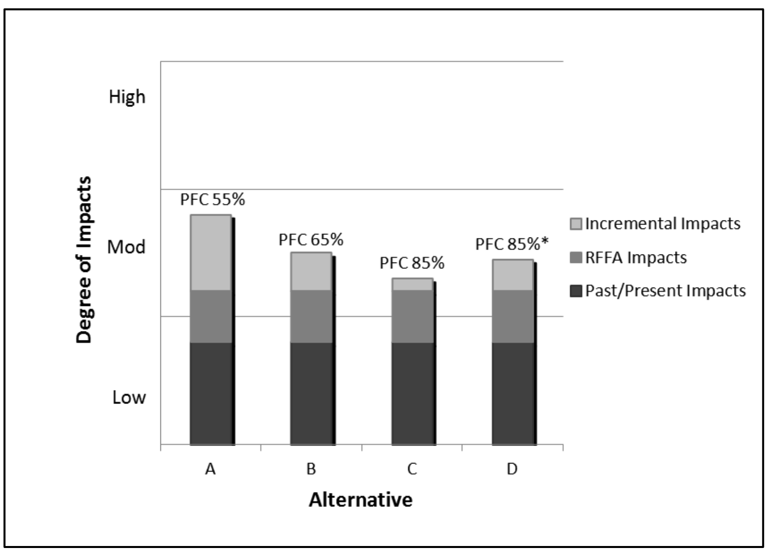
Incremental impacts on water quality would range from low to moderate and would depend on uses being in compliance with State of Nevada water law, quality standards and permit requirements. Other factors include continued grazing management to meet land health standards, the size and degree of use restrictions and mitigation measures, the location and number of project developments, and OHV travel management designations. Figures 4-3 and 4-4 visually depict qualitative cumulative impacts on water and riparian resources from management actions by alternative.

Figure 4-3. Cumulative Impacts on Lentic Water/Riparian Resources by Alternative



Degree of Impact Assumptions: Improving PFC would improve water resources/riparian vegetation. * PFC 85% or progressing towards attaining PFC. Note: PFC % is reported to support degree of impact. Height of bars on the graph are not directly related to PFC.

Figure 4-4. Cumulative Impacts on Lotic Water/Riparian Resources by Alternative



Degree of Impact Assumptions: Improving PFC would improve water resources/riparian vegetation. * PFC 85% or progressing towards attaining PFC. Note: PFC % is reported to support degree of impact. Height of bars on the graph are not directly related to PFC.

4.2.5 Vegetation—Forest/Woodland Products

Summary

Forested vegetation would be directly affected most by fire management and forest vegetation management. Restrictions on management activities for the protection of other resources, primarily cultural, visual, and special status species, would indirectly affect the level, location, and effectiveness of forest management actions to improve forest health. Effects from other resources could be limited and localized, considering the extent of forests and woodlands within the WD.

From the standpoint of managing forest stands to maintain or improve wildlife habitat, Alternative C would provide the greatest benefit, followed by Alternatives D, A, and then B. All alternatives would allow for managing forest stands for stand health and vigor. Multiple uses would be emphasized the most in Alternative B, followed by Alternatives D, A, and C.

Methods of Analysis

Methods and Assumptions

Impacts are determined by assessing which actions, if any, would change vegetation structure or composition, would decrease the extent of forested vegetation, would allow for increased dominance of invasive weeds, would affect habitat value for wildlife species, or would decrease the potential for multiple use.

Some impacts are direct, while others are indirect and affect vegetation through a change in another resource. Direct impacts on forest and woodland vegetation are considered to include disruption, trampling, or removal of rooted vegetation, resulting in a reduction in areas of native vegetation, mortality from toxic chemicals, and actions that unequivocally reduce total numbers of plant species or reduce or cause to be lost total area, diversity, vigor, structure, or function of wildlife habitat.

Potential indirect impacts include loss of habitat suitable for colonization due to surface disturbance, introduction of noxious weeds by various mechanisms or conditions that enhance the spread of weeds, increased noise, and general loss of habitat due to surface occupancy or surface compaction. Indirect impacts include those that cannot be absolutely linked to one action, such as decreased plant vigor or health from reduced air or water quality.

The effects of each action on forest and woodland vegetation resources are quantified when possible, but many impacts must be qualitatively assessed when suitable data are not available. The following assumptions were made for this analysis:

- Current trends in plant succession and vegetation would continue;
- Noxious and invasive weeds would continue to be introduced and would spread as a result of ongoing vehicle traffic in and out of the WD, recreational activities, wildlife and livestock grazing and their movements, and surface-disturbing activities;
- Biocontrol would continue and potentially expand;

- Noxious and invasive weeds would further expand into native plant communities, and disturbances to these communities would expand opportunities for the spread of nonnative invasive plant species; and
- Many actions that would occur within the WD would be subject to BMPs. Although BMPs are designed to minimize the effects of projects, they generally cannot eliminate all impacts. This impact analysis assumes that BMPs would minimize but not eliminate possible effects.

Vegetation—Forest/Woodland Products: Effects from Air Quality Management

Effects Common to All Alternatives

Restrictions on prescribed fire and wildfire use to protect air quality may reduce opportunities to burn in any given year. This may indirectly hinder the achievement of stand health and woodland composition goals by preventing certain forest treatments from being implemented. However, it is not expected that these restrictions would completely prevent implementation and accomplishment over the long term.

Vegetation—Forest/Woodland Products: Effects from Geology Management

Effects Common to All Alternatives

Areas with geological resources are small and localized within the WD. As a result, impacts from geology management actions on forests and woodlands, which are similarly small and localized in the planning area, would be limited.

Vegetation—Forest/Woodland Products: Effects from Soil Resources Management

Effects Common to All Alternatives

Soil erosion reduction measures, involving seeding and improving vegetative cover, would reduce compaction and increase infiltration, which would indirectly improve forest health and habitat value over the short term. These impacts could become long term due to increased vegetative productivity and improved wildlife habitat and connectivity.

Effects under Alternative A

Land reclamation in Alternative A would be pursued, although not required, in disturbed areas. Impacts on forests would vary depending on how and if reclamation was achieved, including whether native or nonnative seeds were used in revegetating lands. Since this alternative places the fewest requirements on land reclamation, it could cause the greatest impact on forest and woodland vegetation. Impacts would be direct and long term.

There would be no soil compaction prevention measures under Alternative A. This would indirectly impact forest and woodland vegetation, as soil compaction prevents water infiltration and therefore may affect forest health and vigor. However, there would be no restrictions on forest treatments, which would directly facilitate forest and woodland health and habitat goals. Effects would be long term.

Effects under Alternative B

Impacts from land reclamation activities relating to soil resources management under Alternative B would be the same as those for Alternative A.

Soil compaction prevention measures under Alternative B would be used to mitigate adverse effects without seasonal closures. As such, forest vegetation would be indirectly impacted year-round, even during times when soils would be most susceptible to compaction. However, forest treatments could occur year-round, directly facilitating forest and woodland health and habitat goals. Effects would be long term.

Effects under Alternative C

Land reclamation actions under Alternative C would have the greatest direct benefit to forest and woodland vegetation by requiring reclamation of all surface-disturbing activities. This would allow for native vegetation reestablishment and would help to achieve forest health and habitat goals in the long term.

Soil compaction prevention measures are the most stringent under Alternative C, providing for seasonal use restrictions. This would indirectly benefit forest and woodland health by preventing compaction but would limit when forest treatments could occur to achieve forest health and habitat goals. Impacts would be long term.

Effects under Alternative D

Land reclamation actions under Alternative D would provide the most flexible approach to land reclamation. Impacts on forests would vary depending on how and if reclamation was achieved, including whether native or nonnative seeds were used in revegetating lands. Impacts would be direct and long term.

Soil compaction prevention measures would include seasonal use restrictions on a case-by-case basis. Indirect impacts on forest and woodland resources include improved health and vigor from decreased soil compaction and increased infiltration. Further, such objectives as forest health and wildlife habitat could be achieved in the long term because seasonal restrictions could be less limiting to forest treatments.

Vegetation—Forest/Woodland Products: Effects from Water Resources Management

Effects Common to All Alternatives

Water resource management would generally serve to improve conditions for forest stands based on implementation of BMPs and SOPs that would reduce water erosion.

Effects under Alternative A

Under this alternative, impacts on woodland resource would be reduced by complying with water quality regulations and by implementing BMPs and land health standards. This would indirectly protect forest and woodland vegetation by limiting disturbance or mitigating disturbance impacts.

Effects under Alternative B

Priority watershed management may limit the types of development or disturbance within wellhead protection zones, which would indirectly protect any forest or woodland vegetation. Under this alternative, multiple uses would be allowed, which would enable forest treatments to achieve forest and woodland objectives. Impacts would be indirect, localized, and limited by the relatively small acreage of the priority watersheds.

Effects under Alternative C

Priority watershed actions under Alternative C would provide the greatest protection of all alternatives to forests and woodlands within those areas by imposing the most restrictions. Priority watersheds would be managed as exclusion zones for discretionary actions that are not compatible with the watershed's primary use. Development may be precluded for discretionary actions or locations of facilities may be affected. These actions would protect any forestry resources. Increased costs would be realized by proponents. Impacts would be localized to watershed boundaries defined.

Effects under Alternative D

Priority watershed actions would protect woodlands and forests in the long term due to use restriction within priority watersheds, as described under Alternative B. Management of priority watersheds would include use restrictions that would limit development. Woodlands within these watersheds would be protected by use restricts. Impacts would be indirect, localized, and limited by the relatively small acreage of the priority watersheds.

Vegetation—Forest/Woodland Products: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

In all alternatives, forest products management actions, including monitoring, establishing early warning systems for insect or disease outbreaks, and using stand treatments, would be tools to directly and indirectly improve forest health, including increased diversity in age classes and species composition, over the long term. Some forest treatments, such as mechanical control measures, would directly disturb wildlife habitat in the short term but would indirectly foster a healthier ecosystem in the long term by helping to achieve desirable stand characteristics.

Implementing SOPs (Appendix B) and mitigation measures would minimize or reduce direct and indirect impacts on woodland habitats over the long term.

Consideration of aspen, cottonwood, and mountain mahogany in implementation plans would reduce direct and indirect impacts on these species. Further, managing pinyon pine and juniper would improve stand health in these woodlands by removing unhealthy or diseased trees. These effects would be direct and long term.

Effects under Alternative A

Forest management actions, including use of fire, wood product harvest, fencing, thinning, and herbicides, would efficiently achieve desirable stand characteristics and structure, thus directly enhancing forest health and wildlife habitat value in the long term. In the short term, such actions would directly disturb wildlife habitat and would also reduce the fuel load in forests, preventing catastrophic fires that would have long-term direct effects.

Forest management for aspen, cottonwood, and mountain mahogany would help to achieve desirable stand characteristics and diversity, which ultimately would directly enhance forest health and wildlife habitat value in the long term.

Under Alternative A, pinyon and juniper woodlands would be managed for the greatest number of uses, which would help to directly achieve the multiple use objectives for forest and woodland products.

No old growth forest would be designated, but management under Alternative A would designate other stands as appropriate and would manage those actively. Management actions would be used to promote old growth characteristics, including large tree retention. Management actions to promote recruitment of large trees include mechanical or chemical treatments or use of prescribed fire. Other actions would promote old growth characteristics specific to stands, based on stand composition, structure, and function. These actions would help to directly achieve forest health goals and create higher quality wildlife habitat.

Effects under Alternative B

Compared with Alternative A, Alternative B calls for more aggressive stand treatments, including fire, wood product harvest, fencing, mechanical, biological, or chemical treatments, and planting and seeding. The variety and breadth of treatment types would provide a more flexible adaptable approach to stand management. As such, Alternative B has a high likelihood to directly and efficiently achieve stand health and structure objectives.

Forest management for aspen, cottonwood, and mountain mahogany would have the same impacts as those described under Alternative A.

Pinyon and juniper woodlands would be managed for fewer uses than under Alternative A, with an emphasis on sustainable yield. Harvesting would be more intensive under Alternative B, with the potential for overharvest to directly reduce stand vigor, health, and reproductive ability.

Old growth would not be designated under Alternative B, and none would be designated in the future. Adverse impacts on stands with old growth characteristics would be avoided, but these areas would not be managed to provide old growth characteristics in the future. Alternative B is the least likely alternative to directly promote undisturbed vegetation and wildlife habitat since it does not designate old growth stands.

Effects under Alternative C

Under Alternative C, fewer treatments would be allowed in forests and woodlands, with only mechanical and biological treatments allowed. Prescribed fire, wood product harvest, chemical treatments, and planting and seeding would not be used to manage stands under this alternative. As a result, Alternative C could prove to be the least effective alternative in directly achieving stand health, structure, and habitat goals. However, it also would not directly disturb wildlife habitat in the short term. In addition, fuel load accumulation could present a fire danger and could increase the chance for a catastrophic fire.

Pinyon and juniper stands would be managed only for landscape value and Native American uses. Alternative C emphasizes natural processes and little active management, indirectly preventing multiple use and sustainable yield. With less harvesting allowed in pinyon and juniper stands, there would be less direct human disturbance to wildlife habitat.

Under this alternative, 27,605 acres of old growth forest in the Pine Forest Mountains would be designated, as appropriate. This old growth designation area encompasses intermixed stands of whitebark and limber pine, mountain mahogany, and aspen. Other stands, including mountain mahogany and pinyon and juniper, would be inventoried to assess possible designation and management as old growth or to promote old growth characteristics in stands, as appropriate. This would preserve and maintain these forests and their wildlife habitat. However, under Alternative C, stands would not be managed for old growth characteristics, which may be less effective in directly achieving forest health and stand structure goals.

Effects under Alternative D

Forest treatments, and the impacts associated with them, would be similar to those described under Alternative B. However, fire management would be more adaptive because it would prioritize stands for management. As such, Alternative D would most directly and effectively achieve forest health, structure, and wildlife habitat goals.

A greater number of species would be prioritized for management, as in Alternative C. Impacts would be the same as those described under Alternative C.

As under Alternative A, Alternative D includes the greatest number of uses, emphasizing multiple use and sustainable yield of forest products. Expanding wood product harvest areas, including burned stands following site stabilization, would help to directly manage stands by reducing fuel loads and stand densities and would also meet public demand for wood products. Impacts would be the same as those described under Alternative A.

This alternative would designate 27,605 acres of old growth forest in the Pine Forest Mountains. This old growth designation area encompasses intermixed stands of whitebark and limber pine, mountain mahogany, and aspen. Other stands, including stands of mountain mahogany and pinyon and juniper, would be inventoried to assess possible designation and management as old growth or to promote old growth characteristics in individual stands, as appropriate. Management actions would be used to promote old growth characteristics, including large tree retention. Management actions to promote recruitment of large trees include mechanical, chemical, or biological treatments, or use of prescribed fire. Other actions would promote old growth characteristics specific to stands based on stand composition, structure, and function. As a result, forest health, structure, composition, and wildlife habitat goals in these areas would be most directly and efficiently achieved under Alternative D.

Vegetation—Forest/Woodland Products: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Actions to decrease weeds on BLM-administered lands would indirectly improve forest health and habitat values by increasing native species and decreasing the risk of catastrophic wildfire in both the short term and long term. Such a fire could directly damage or kill stands, indirectly allow for spread of weeds, and directly destroy wildlife habitat. Further coordination with agencies and implementation of BMPs would reduce the introduction and spread of weeds during activities. This would indirectly help achieve the goal of multiple use for forests and woodlands in the long term.

Effects under Alternative A

Controlling weeds with prescribed fire would directly disturb wildlife habitat in the short term by destroying vegetation, increasing human presence, and increasing smoke. In the long term, prescribed fire use would indirectly achieve stand health, structure, composition, and wildlife habitat goals more quickly by facilitating the establishment of native vegetation. Prescribed fire is not used to control weeds over large areas, so impacts would be localized and small scale. Chemical applications would also be designed to avoid effects on nontarget species, which would be short term but would lead to long term indirect improvement in vegetation composition.

Effects under Alternative B

Impacts from weeds management actions would be the same as those described under Alternative A.

Effects under Alternative C

Mechanical, cultural, and biological weed treatments would be used under Alternative C, which would help to indirectly achieve forest health, composition, and wildlife habitat objectives in the long term by facilitating the establishment of native vegetation. Alternative C does not include prescribed fire as a weed management tool, which could indirectly limit effective control of saltcedar invasion in riparian woodlands because prescribed fire is one of the few effective controls of saltcedar invasion. Biological control methods could directly impact nontarget species through decreased vigor or mortality in the long term.

Effects under Alternative D

Impacts from weeds management actions would be the same as those described under Alternative A.

Vegetation—Forest/Woodland Products: Effects from Chemical and Biological Control

Effects Common to All Alternatives

There would be no effects common to all alternatives from chemical and biological control actions.

Effects under Alternative A

Alternative A would not use IPM techniques, BMPs, and cooperation and coordination with other groups and agencies to help reduce forest pests. This could directly reduce forest health and habitat value over the short term and long term if forest pest outbreaks were to occur because pest outbreaks would decrease plant vigor or kill them.

Effects under Alternative B

Use of IPM techniques, BMPs, and cooperation and coordination with other groups and agencies would help reduce forest pests and their impacts, such as stand deterioration or death. This would directly improve forest health and habitat value over the short term and long term. Using chemical and biological controls would have similar impacts on the weed management described under Alternative A.

Effects under Alternative C

Use of IPM techniques, BMPs, and cooperation and coordination with other groups and agencies would help reduce forest pests and their impacts, such as stand deterioration or death. This would directly improve forest health and habitat value over the short term and long term.

Biological control methods could have impacts similar to those under Alternative A. Restriction of chemical control methods could limit the effectiveness of pest control in certain cases. No chemical control methods would be used under Alternative C. This would slow, but is not likely to completely prevent, achievement of forest health and wildlife habitat goals in the long term. However, chemical control limitations would minimize direct impacts on nontarget species, preventing inadvertent increases in stand deterioration or mortality over the long term.

Effects under Alternative D

Impacts from using chemical and biological control methods would be the same as those described under Alternative B.

Vegetation—Forest/Woodland Products: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Impacts from grazing would affect woodland stands as young saplings or shoots may be grazed. Woodland stands may be affected as a diverse range of age classes may not occur. Stand health objectives may not be achieved. Vegetation treatments for rangeland improvement projects may reduce the prevalence of invasive species and would directly improve ecological conditions throughout a large portion of the WD. Such projects would reestablish an understory of forbs and perennial bunchgrasses that are less susceptible to fire than invasive annuals, such as cheatgrass. This would reduce the risk of catastrophic wildfire on rangelands, which might otherwise spread into woodlands, causing direct impacts.

Effects under Alternative A

FRCC would not be improved under this alternative, which would increase the fire return cycle and would maintain existing fire risk, which could directly destroy adjacent woodlands.

Effects under Alternative B

Improving FRCC would have the greatest impact in diversifying fuels and could indirectly protect adjacent woodlands from catastrophic fire in the long term. Restoring condition class to Class 2 levels on 70,000 acres would reduce fuel loads on these lands and would indirectly protect adjacent forests and woodlands from catastrophic fire. This would allow forest health and wildlife habitat objectives to be achieved in this area by maintaining established native vegetation.

Effects under Alternative C

Options 1 and 2

Impacts on forests and woodlands from rangeland management actions would be the same as those described under Alternative B.

Effects under Alternative D

Impacts on forests and woodlands from rangeland management actions would be the same as those described under Alternative B.

Vegetation—Forest/Woodland Products: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Improving and maintaining meadows and riparian areas could limit the type of forest treatments that could be used to achieve forest and woodland health and habitat goals. This could indirectly prevent health and habitat goals from being attained. However, these restrictions are not expected to completely prevent the attainment of these goals over the long term. The extent of riparian and wetland areas within the WD is limited, making up less than one percent of the total land area. As such, impacts on forests and woodlands from riparian and wetland management actions would be indirect, limited and localized.

Effects under Alternative A

Restoring PFC under this alternative would directly improve aspen, cottonwood, willow, alder, and chokecherry stands in riparian areas, providing for wildlife habitat in the long term. Alternative A does not quantify the amount of PFC to be achieved, so impacts would vary, depending on the extent of restoration in these communities.

Removing juniper trees from around riparian areas would directly impact multiple use and sustainable yield objectives for forests and woodlands by preventing use of juniper trees for those objectives. However, this would indirectly provide for healthier aspen, cottonwood, and other riparian woodlands by improving stand composition and diversity. This would improve stand health, composition, and wildlife habitat value in the long term.

Effects under Alternative B

Restoring PFC to 60 percent under this alternative would directly improve the composition and structure of aspen, cottonwood, willow, alder, and chokecherry stands in riparian areas, providing for healthier stands and wildlife habitat in the long term.

The impacts of juniper removal would be similar to those described under Alternative A.

Effects under Alternative C

The greatest amount of riparian areas and wetlands (a minimum of 85 percent) would be restored to PFC under Alternative C. As a result, direct impacts on cottonwood and aspen stands would be greatest, as described under Alternative B, and stand health and habitat value objectives likely would be achieved in the long term.

Not removing juniper from around riparian areas under Alternative C would indirectly prevent stand characteristics and structure goals from being attained. However, it would increase the extent of juniper within the WD, allowing for increased harvest, multiple use, and sustainable yield.

Option 1

Grazing management would be used under this option to minimize impacts on forests and woodlands and riparian areas. This would directly impact aspen, cottonwood, and other riparian woodlands where livestock would be managed. Stand health and regeneration would be indirectly improved in the long term through less soil compaction and weed introduction and spread, which would compete with native vegetation. Direct improvements would occur from less vegetation utilization and trampling by livestock.

Option 2

Removing grazing from lands in the WD would have the greatest benefit on forest and woodlands and riparian areas, as there would be no direct or indirect impacts from soil compaction, weed introduction or spread, and vegetation utilization and trampling by livestock. This would help achieve forest health and wildlife habitat objectives by eliminating grazing impacts on stand regeneration and immature trees.

Effects under Alternative D

Similar to Alternative C, the greatest amount of riparian areas and wetlands (85 percent) would be progressing toward or attaining PFC. Impacts would be similar to, but slightly less than, Alternative C since Alternative D would not require achieving PFC as long as areas were progressing toward PFC.

Vegetation—Forest/Woodland Products: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Modifying actions to avoid impacts on species or their habitat could directly alter forest management treatments. In some cases, this could preclude reaching management goals, such as reducing stand density or improving forest health.

Maintaining and improving lentic and lotic habitats may impact actions to cottonwood and aspen stands adjacent to these habitats. In some cases, it may allow for forest stand improvement via riparian restoration actions, but in others it may limit certain treatment options that may impact water quality (e.g., chemical). These impacts would likely be direct and short term.

Implementing vegetation treatments to improve habitat would involve removing plants and altering species composition and vegetation structure. This would directly improve forest habitat, while potentially indirectly limiting multiple use goals over the long term. Some forest treatments, such as mechanical control measures, would directly disturb wildlife habitat in the short term but would foster a healthier ecosystem in the long term by improving stand diversity and structure. Mitigation measures would be required for actions near nesting migratory birds, which would allow for direct forest and woodland management and would protect migratory bird species in the long term.

Effects under Alternative A

Under this alternative, actions would not prioritize habitats for protection. Lack of such protections could lead to increased soil and human disturbance, which could result in indirect impacts on woodland and forest health.

Effects under Alternative B

Under this alternative, 716,528 acres of priority 2 habitat would be designated, but no priority 1 acreage would be designated. This would prioritize woodland and forest treatment areas as well, indirectly allowing for forest health and multiple use goals to be achieved in those areas in the long term.

Effects under Alternative C

Under Alternative C, 1,279,481 acres of priority 1 habitat and 869,645 acres of priority 2 habitat would be designated, which would have the greatest impact of all alternatives. Impacts would be similar to, but greater than, those under Alternative B because, under Alternative C, more acreage of priority habitat would be designated.

Effects under Alternative D

Under this alternative, 1,199,539 acres of priority wildlife habitat would be designated, restricting saleable, solid minerals, fluid minerals, and ROW development. These use restrictions would serve to protect woodland stands located within these priority wildlife habitat areas. Impacts would be greater than those under Alternative B because under Alternative D more acreage of priority habitat would be designated, but would be less than those under Alternative C.

Vegetation—Forest/Woodland Products: Effects from Special Status Species Management

Effects Common to All Alternatives

Special status species management across all alternatives would restrict or prevent certain activities within special status species habitat. Such actions would include actions to protect or enhance forest health and wildlife habitat. Additional permitting requirements such as plant inventories, sage-grouse, pygmy rabbit, bat, and raptor inventories would be required. Actions to avoid or lower impacts on listed or sensitive species or their habitat could directly alter implementation or time of vegetation management treatments or prevent meaningful actions to protect or enhance habitat. As a result, certain management goals may be precluded, such as reducing stand density, constructing fuel breaks and improving forest health in specific areas. Impacts would vary with the type of treatment proposed and the nature and extent of the restrictions. Management of LCT habitat could directly restrict certain vegetation treatments that would occur in adjacent riparian woodlands, such as soil disturbance or use of chemicals. Impacts would vary with the type of treatment proposed and the nature and extent of the restrictions.

Maintaining and improving special status species habitat would directly impact woodlands and forests by helping to achieve forest health and wildlife habitat goals in these areas.

Impacts from special status species plant management would increase the need to monitor areas containing sensitive plants especially whitebark pine stands to determine health, disease, unauthorized harvesting, invasive noxious plants, recreation use and impacts associated with livestock grazing and climate change. Additional measures to protect sensitive plants and whitebark pine stands would be necessary to reduce fuels or remove competitor species. More public awareness and signage may be necessary to educate the public and protects areas.

Effects under Alternative A

Restrictions on actions near nesting migratory birds, raptors, such as ferruginous hawks and goshawks, and bat habitat could directly impact forest and woodland management by limiting the type, timing, and location of stand treatments. This would limit stand health, structure, and composition goals from being achieved in localized areas. Such restrictions would also indirectly limit multiple use and sustainable yield in certain areas near special status species. However, special status species protections would help create a lower level of disturbance in forests and woodlands, providing for more desirable wildlife habitat in these areas.

Effects under Alternative B

Alternative B places the least stringent restrictions on actions near nesting migratory birds, raptors, such as ferruginous hawks and goshawks, and bat habitat. However, these restrictions could still directly impact forest and woodland management by limiting the type, timing, and location of stand treatments. This would prevent stand health, structure, and composition goals from being achieved. Such restrictions would indirectly limit multiple use and sustainable yield in certain areas near special status species. However, special status species protections would help create a lower level of disturbance in forests and woodlands, providing for more desirable wildlife habitat in these areas.

Effects under Alternative C

Alternative C places the greatest amount of restrictions on activities that could occur near special status species and their habitats. Of all alternatives, Alternative C would have the greatest impact on forest treatments, wildlife habitat, multiple use, and sustainable yield. Forest health and stand protection treatments such as construction of fuel breaks would be restricted due to special status species buffer zones or habitats within PMUs.

Effects under Alternative D

Forestry resources would be protected due to use restrictions for those resources located within priority sage-grouse habitat areas. Mitigation measures would also be implemented to reduce impacts on sage-grouse with in general sage-grouse habitat areas which would also reduce impacts on any woodland stands located within these areas.

Vegetation—Forest/Woodland Products: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Management of wild horses and burros within HMAs that cover all or portions of identified HAs that can sustain WHB management could directly impact forest and woodlands by concentrating soil compaction and browsing into HMA areas. In particular, forest and woodland species, such as aspen, willow, mahogany, and alder, could be browsed and broken, especially impacting young age classes. Further, WHB concentrate under canopies for shade and compact soils in these areas. Direct impacts on vegetation include the removal of forage, which alters the amount, condition, production, and vigor of vegetation in grazed areas. Direct impacts from WHB management occur from year-long use, resulting in lower vigor of desired plant species and a change in plant species composition. Overuse of vegetation next to water sources, troughs, and stock reservoirs results in a loss of plant cover. This allows localized areas to become dominated by invasive plants. Vegetation recovery and regeneration of woodlands on burned areas could be slowed or reduced by wild horses and burros.

Effects under Alternative A

Maintaining established AMLs as a population range, using gathers when AML is exceeded, and using fertility control agents would be most effective in maintaining WHB numbers within AML. This would reduce direct impacts from trampling and indirect impacts, such as soil compaction and weed spread or introduction. Impacts on forest health, stand composition, and wildlife habitat would be long term.

Converting AML between wild horse use and burro use would spread direct impacts, such as vegetation utilization, and indirect impacts, such as soil compaction, on forests and woodlands through time, as the species have different habitat and forage preferences. Maintaining the free-roaming nature of WHB would spread direct and indirect impacts geographically through the HMAs. Both actions would benefit forest health by minimizing WHB direct impacts from trampling and indirect impacts from compaction and weed spread in any given area at a certain time.

WHB protections would limit disturbance and would prevent direct and indirect forest impacts due to human use, such as trampling and litter.

Effects under Alternative B

Impacts from population control measures would be similar to those described under Alternative A.

Under Alternative B, AML would not be converted between wild horse use and burro use, and WHB would not be managed primarily as free-roaming species. Both actions would impact forest health by concentrating WHB direct impacts, such as trampling, and indirect impacts, such as compaction and weed spread, within HMAs.

Protection measures for WHB would have impacts similar to those described under Alternative A.

Effects under Alternative C

Alternative C would control WHB populations by maintaining AML as a single number, using four-year (or longer) gather cycles, and would not allow use of fertility control agents. This would cause the greatest direct and indirect impacts from WHB on woodlands and forests, but actions would still decrease the risk of soil compaction, trampling, and weed spread or introduction. Forest health, stand composition, and wildlife habitat would be impacted. However, AML reduction in response to decreased water availability for WHB would decrease direct and indirect impacts of WHB on woodlands and forests.

Impacts from converting AML between wild horse use and burro use and from maintaining the free-roaming nature of WHB would be similar to those described under Alternative A.

Protection measures for WHB would be the greatest under Alternative C and would prohibit certain activities in HMAs, unless impacts were determined to be minimal. This would limit disturbance and would prevent direct and indirect forest impacts due to human use, such as trampling and litter.

Effects under Alternative D

Management of contiguous HMAs, where possible, would have impacts similar to those described under Alternative C.

Impacts from population control measures and development of alternative water sources would be similar to those described under Alternative A.

Impacts from converting AML between wild horse use and burro use and from maintaining the free-roaming nature of WHB would be similar to those described under Alternative A.

Impacts from WHB protection measures would be similar to those described under Alternative A.

Vegetation—Forest/Woodland Products: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildfire suppression and creation of fuel breaks would prevent catastrophic destruction of woodlands and forests in these areas over the long term, which would be a direct impact. Minimum impact suppression tactics would minimize unanticipated direct effects on forest and woodland resources during fire suppression activities. In addition, emergency stabilization and rehabilitation treatments, such as seeding with native perennial species, would deter the spread of weeds and invasive species, directly and indirectly improving the composition of forests and woodlands. This helps to maintain native vegetation in woodlands and forests.

Because fire retardants are composed largely of nitrogen and phosphorus fertilizers, they may encourage growth of some species at the expense of others, resulting in direct changes in community composition and species diversity. Differential growth may also influence herbivorous behavior; both insect and vertebrate herbivores tend to favor new, rapidly growing shoots.

Fuels management actions would result in a short-term, direct loss of vegetation on a small scale. In the long term, fuel reduction projects would have direct impacts by reestablishing native vegetative communities, providing for healthy forests. These actions would allow fire to play its natural role more frequently and would reduce the likelihood of catastrophic wildfire, which would protect forest and woodland vegetation from direct destruction in the long term and over large areas.

Implementing a response to wildfires based on social, legal, and ecological consequences of the fire would protect forest resources from catastrophic fire, which would allow for forest and woodland product management objectives to be achieved.

Effects under Alternative A

No additional impacts on woodlands and forests would occur as a result of wildland fire management actions under Alternative A.

Effects under Alternative B

Under this alternative, 57,940 acres of forest and woodland would be designated as suitable for conditional fire suppression management for a benefit. These areas could be more vulnerable to weed establishment and spread, having an indirect effect. However, many of these areas for conditional fire suppression management for a benefit are higher elevation woodland areas that have lower potential for noxious weed invasion after burning. Conditional fire suppression management for a benefit would be used to achieve resource goals, based on specific prescriptions under appropriate burning conditions. Further, overall woodland and forest health would benefit from conditional fire suppression management for a benefit. The acreage designated as suitable for conditional fire suppression management for a benefit under this alternative is large, relative to the remainder of forested vegetation in the WD. Impacts could be long term.

Effects under Alternative C

No additional impacts on woodlands and forests would occur as a result of wildland fire management actions under Alternative C.

Effects under Alternative D

Impacts under Alternative D would be the same as those described for Alternative B.

Vegetation—Forest/Woodland Products: Vegetation—Forest/Woodland Products: Effects from Cultural Resources Management

Effects Common to All Alternatives

WD Protections to cultural resources, such as aspen art trees and groves, would prevent direct disturbance and fragmentation of forests and woodlands. These areas are small relative to the remainder of forested vegetation in the WD; therefore, impacts would be localized.

Site monitoring, conservation measures, use restrictions, and law enforcement actions would prevent direct and indirect disturbance to and degradation of forest and woodland habitat, while potentially impacting the ability to reach other forest and woodland vegetation goals over the long term in certain areas.

Actions to maintain and protect pinyon and juniper stands in the Stillwater Range would improve forest health, stand composition, wildlife habitat, and sustainable yield, while potentially limiting multiple use opportunities over the long term. Some forest treatments, such as mechanical control measures, would directly disturb wildlife habitat in the short term but would indirectly foster a healthier ecosystem in the long term.

Effects under Alternative A

Protection of pinyon trees in the Stillwater Range would directly impact the woodland and forest multiple use goal, as Native American use would be emphasized and other uses, such as harvesting, would be restricted or prohibited in the long term. These actions would prevent disturbance and would maintain the extent of pinyon woodland in the short term but would result in poor stand health over the long term, reducing multiple uses.

Effects under Alternative B

Alternative B would afford the least amount of protection to pinyon trees in the Stillwater Range, as some harvest would be permitted. This would allow for some multiple use of woodlands and forests, although Native American use would be emphasized in the long term. These actions would also allow some disturbance and would slightly reduce the extent of pinyon woodland in the short term. Depending on how these management actions were implemented, they could indirectly or directly provide for improved forest health, composition, and structure in the long term.

Effects under Alternative C

Impacts from protection of pinyon trees in the Stillwater Range would be the similar as those described under Alternative A. Not allowing prescribed fire or herbicides to maintain stand health or provide fuel breaks would result in declining stand health over the long term and may pose a threat to the entire stand from wildfire.

Effects under Alternative D

Impacts from pinyon tree management in the Stillwater Range would be the same as those described under Alternative A, except Alternative D includes adaptive management to allow for pinyon tree harvest. This would have a slightly greater impact on multiple use and potentially on stand health objectives.

Vegetation—Forest/Woodland Products: Effects from Tribal Consultation

Effects Common to All Alternatives

Consulting with tribes to identify culturally significant plants, important habitats, and traditional use locations would emphasize protection of natural resources, including forests and woodlands. This would limit direct disturbance and foster suitable wildlife habitat over the long term in certain areas.

Consultation could place higher treatment priority in areas not previously identified or limit actions in planned treatment areas. Impacts would vary on a case-by-case basis and are likely to be direct and localized.

Vegetation—Forest/Woodland Products: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Physical conservation measures and law enforcement actions would prevent direct disturbance to and degradation of forest and woodland habitat, while potentially impacting the ability to implement vegetation treatments over the long term in certain areas. These areas are small relative to the remainder of forested vegetation in the WD; therefore, impacts would be direct and localized.

Vegetation—Forest/Woodland Products: Effects from Visual Resources Management

Effects Common to All Alternatives

Complying with VRM guidelines and objectives may restrict the size and location of woodland health management treatments. Impacts would vary based on what VRM management class the project is located within. Forest health may be affected and woodlands may be more vulnerable to wildfire.

Effects under Alternative A

Under Alternative A, 420,271 acres and 346,302 acres of forest and woodland would be managed to VRM Class I and II guidelines, respectively. These actions would limit the scope of stand treatments or prescribed burning and would prohibit treatments and prescriptions that would change the visual character. Overall, meeting VRM Class I and II guidelines would directly increase the difficulty of accomplishing forest and woodland management actions and would indirectly limit the extent or effectiveness of the management goals. This alternative would have the fewest impacts since it would be the least restrictive to forest treatment implementation.

Effects under Alternative B

Under Alternative B, 417,605 acres and 391,203 acres of forest and woodland would be managed to VRM Class I and II guidelines, respectively. Impacts would be similar to but greater than those described under Alternative A.

Effects under Alternative C

Under Alternative C, 417,605 acres of forest and woodland would be managed to VRM Class I and 3,083,211 acres would be managed to VRM Class II guidelines. Impacts would be similar, although greater in magnitude, than those under Alternative A.

Effects under Alternative D

Under Alternative D, 417,605 acres of forest and woodland would be managed to VRM Class I and 2,780,416 acres would be managed to VRM Class II guidelines. Alternative D would have the greatest direct impact since it would be the most restrictive to forest treatment implementation. Impacts would be similar to though greater than those under Alternative A.

Vegetation—Forest/Woodland Products: Effects from Cave and Karst Resources Management

Effects Common to All Alternatives

There would be no impacts on forest and woodlands from cave and karst resource management since these areas do not overlap within the WD.

Vegetation—Forest/Woodland Products: Effects from Livestock Grazing Management

Effects Common to All Alternatives

Collecting monitoring data would reveal problems with grazing. Adaptive management methods would address resource problems so that forest and woodland health would be maintained.

Effects under Alternative A

Proper grazing management and range improvement actions would improve forest health including that various age classes of vegetation are maintained, sensitive areas are protected, and reduce the spread of weeds. Under Alternative A, 388,124 acres of forest and woodland would be open to grazing.

Forest woodlands would be subject to grazing of young trees shoots and trampling as well as indirect impacts such as soil compactions and higher weed spread potential. Woodland stand health may be jeopardized due to lack of diversity.

Effects under Alternative B

Impacts under Alternative B would be similar to those described under Alternative A.

Effects under Alternative C

Option 1

Impacts under Alternative C, Option 1 would be similar to those described under Alternative A, but livestock grazing would be open on 388,071 acres of forest and woodland under this alternative.

Greater protection would be given to woodlands, requiring the restoration and maintenance of biological integrity in these areas. This would have the greatest direct and indirect impacts in preventing effects through trampling, soil compaction, and weed spread or introduction and would maintain plant vigor, stand composition, and fire regimes.

Option 2

The no grazing option would eliminate a potential source of direct and indirect impacts on forest and woodland resources.

Effects under Alternative D

Alternative D would have 386,130 acres of forest and woodland open to grazing. Impacts would be similar to those described under Alternative A, except that fewer acres of land would be open to grazing.

Vegetation—Forest/Woodland Products: Effects from Minerals Management

Effects Common to All Alternatives

General

Impacts on forest and woodland vegetation could result from fluid, leasable, and locatable mineral development and mineral material sales or disposal. Direct impacts associated with these actions would include loss of or injury to plants due to excavation or trampling, toxic responses from use of chemicals in mineral extraction, and increased exposure to dust and other contaminants associated with construction and use of access roads. In the worst-case scenario, all vegetation would be removed from a parcel of land, and the site would be permanently altered so as to prevent future forest growth. However, most mineral development would occur in the sagebrush and salt desert scrub communities, so impacts on forests and woodlands would be limited.

Under all alternatives, BMPs would be implemented, and revegetation would be required to be concurrent with the operation, thus minimizing and mitigating impacts. Unnecessary roads would be closed to reduce fragmentation and to restore habitat. In addition, special status species habitat would be avoided, thus protecting some forest and woodland areas.

RFDs

In a reasonably foreseeable development scenario, exploration and development operations would continue and could increase impacts on forests and woodlands within the WD.

Effects under Alternative A

Alternative A would open the greatest acreage (Table 4-8) and would close the least acreage (Table 4-9) of forest and woodland to mineral development, thus having the greatest likelihood to impact forest and woodland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Table 4-8
Forest and Woodland Acreage Open to Mineral Development

Mineral	Alternative A	Alternative B	Alternative C	Alternative D
Solid	338,446	296,671	6,119	199,172
Saleable	338,312	338,321	295,131	305,844
Locatable	408,942	408,932	361,879	410,879
Fluid	332,773	296,566	6,119	199,172

Source: Based on Alternatives presented in Chapter 2

Table 4-9
Forest and Woodland Acreage Closed to Mineral Development

Mineral	Alternative A	Alternative B	Alternative C	Alternative D
Solid	73,013	114,819	405,346	214,198
Saleable	73,142	73,164	116,333	107,535
Locatable (withdrawn)	2,534	2,534	49,577	2,540
Fluid	78,702	114,909	405,337	214,198

Source: Based on Alternatives presented in Chapter 2

Effects under Alternative B

Compared with Alternative A, Alternative B would open fewer acres (Table 4-8) and would close more acres (Table 4-9) of forest and woodland to mineral development, thus having a lower likelihood to impact forest and woodland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative C

Alternative C would open the fewest acres (Table 4-8) and would close the most acres (Table 4-9) of forest and woodland to mineral development, thus having the lowest likelihood to impact forest and woodland vegetation of all alternatives. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative D

Compared with Alternatives A and B, Alternative D would open fewer acres (Table 4-8) and would close more acres (Table 4-9) of forest and woodland to mineral development, thus having a lower likelihood to impact forest and woodland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Vegetation—Forest/Woodland Products: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

Managing BLM-administered lands to provide dispersed recreation could impact forests and woodlands throughout the WD through direct means, such as trampling, or indirect means, such as human disturbance, soil compaction, weed introduction or spread, and increased dust. Together, these would reduce forest and woodland health and vigor, would alter stand composition, and would lower the habitat value in these areas. Impacts would vary depending on the type of activities allowed in the area and could be short term and long term.

To manage OHV use, the Transportation Plan would be updated and would account for wildlife habitat, including forest and woodland vegetation. Site-specific NEPA analysis would be done on an implementation level to minimize impacts on forest and woodland vegetation.

Vegetation treatments may be restricted on some lands used for recreation, which would indirectly prevent the WD from reaching its forest and woodland management goals. This could put forests and woodlands at greater susceptibility to damage from catastrophic fires. Associated impacts would be long term in certain areas.

Effects under Alternative A

Under Alternative A, there would be no camping limitations or prohibitions throughout the WD. In addition, the Pine Forest SRMA would be maintained, and issuance of special recreation permits would be the least restricted. The greatest acreage of forest and woodland (343,612 acres) would be open to OHVs under Alternative A, with the least amount of land limited (70,922 acres), and with 10,845 acres closed. Combined, these actions could have the greatest direct and indirect impacts by degrading forests and woodlands due to increased human presence, OHV use, and trail creation, which could compact soils, trample vegetation, introduce or spread weeds, disturb wildlife, and increase dust. These effects could decrease plant vigor, alter stand composition, and lower habitat value of areas throughout the WD.

Effects under Alternative B

Camping limitations and prohibitions throughout the ERMA would minimize impacts on forests and woodlands on these lands. In addition, designating four SRMAs would impact forest vegetation to varying degrees, depending on the recreation market identified for the SRMA. For example, the Nightingale SRMA would be targeted for undeveloped recreation-tourism, which would have less of an impact than Winnemucca and Pine Forest SRMAs, which allow for increased motorized vehicle access. The Granite Range SRMA is not forested. Under Alternative B, 26,096 acres of forest and woodland would be open to OHVs, with 10,845 acres closed and with 327,674 acres limited. Together, the direct impact from these actions would be trampling of vegetation, while indirect impacts would be soil compaction, wildlife disturbance, and increased dust. These impacts could decrease plant vigor, would alter stand composition, and would lower habitat value of areas throughout the ERMA, SRMAs, and OHV routes. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed.

Similar to Alternative A, issuance of special recreation permits would be the least restrictive under this alternative, which could cause some direct and indirect impacts on forests and woodlands through increased human use, trampling, weed spread, and noise disturbance. These impacts could decrease plant vigor, alter stand composition, and lower habitat value in areas.

Effects under Alternative C

Camping limitations and prohibitions throughout the ERMA would minimize impacts on forests and woodlands on these lands. In addition, designation of two SRMAs would have impacts on forest vegetation similar to those described under Alternative B. Under Alternative C, no acres of forest and woodland would be open to OHVs, 9,735 acres would be closed, and 405,199 acres would be limited. In addition, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed. As such, impacts from recreation actions would be fewest under this alternative, because it is the most restrictive and prohibitive. However, impacts would occur, and they would be similar to those described under Alternative B.

Issuance of special recreation permits would be the most restrictive under Alternative C and would cause the fewest impacts on forests and woodlands through increased human use, trampling, litter, and noise disturbance, as described under Alternative B.

Effects under Alternative D

Camping limitations and prohibitions throughout the ERMA would minimize impacts on forests and woodlands on these lands. In addition, designation of four SRMAs would have the same impacts on forest vegetation as those described under Alternative B. Under Alternative D, 180 acres of forest and woodland would be open to OHVs, 10,844 acres would be closed, and the greatest amount of land (405,298 acres) would be limited. The BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed. Together, impacts from these actions would be similar to those described under Alternative B.

Issuing special recreation permits would cause some direct and indirect impacts on forests and woodlands through increased human use, trampling, litter, and noise disturbance, as described under Alternative B.

Vegetation—Forest/Woodland Products: Effects from Renewable Energy Management

Effects Common to All Alternatives

Direct impacts on forest and woodland vegetation could occur with issuance of new ROWs, which require vegetation clearing and access roads and would disturb or destroy forests and woodlands. Weed spread or introduction could be an indirect effect from ROWs, reducing forest health. However, BMPs, stipulations, and mitigation measures would be implemented, which would minimize direct and indirect impacts on forest vegetation.

Effects under Alternative A

Maintaining existing exclusion areas within the WD would protect and limit direct disturbance to forests and woodlands and would prevent indirect effects, such as noxious weed invasion or spread caused by development.

Effects under Alternative B

Designating avoidance areas within the WD would protect and limit direct disturbance to forests and woodlands and would prevent indirect effects, such as noxious weed invasion or spread caused by development.

Effects under Alternative C

Designating avoidance areas and exclusion zones within the WD would have the greatest impact on forests and woodlands by protecting and limiting direct disturbance to forests and woodlands and by preventing indirect effects, such as noxious weed invasion or spread.

Effects under Alternative D

Designating avoidance areas and exclusion zones within the WD would impact forests and woodlands by protecting and limiting direct disturbance to vegetation and habitat and by preventing indirect effects, such as noxious weed invasion or spread.

Vegetation—Forest/Woodland Products: Effects from Transportation and Access Management

Effects Common to All Alternatives

Maintaining roads would allow access to forests and woodlands. This would indirectly help achieve forest and woodland vegetation management goals in the long term.

Noxious weed control measures would prevent the spread of weeds into forests and woodlands, would prevent competition with native species, and would indirectly help improve forest health and stand composition in the long term.

Effects under Alternative A

Alternative A would have the greatest direct and indirect impact on forests and woodlands due to road and trail construction, which would cause vegetation removal, soil compaction, and increased dust. These activities would decrease forest and woodland health and vigor, would alter stand composition, and would lower habitat value in areas. Improved and increased access to stands would indirectly facilitate implementation of forest treatments and would allow for multiple uses.

Effects under Alternative B

Transportation actions to minimize effects would limit direct disturbance to forests and woodlands and would prevent indirect effects, such as noxious weed invasion or spread from road or trail construction. In the long term, this would minimize impacts on forest and woodland health and vigor, stand composition, and habitat value. However, these actions could limit access to stands for harvest management and could prevent multiple uses in certain areas.

Effects under Alternative C

Transportation actions to minimize effects on forests and woodlands would have impacts similar to those under Alternative B.

Effects under Alternative D

Transportation actions to minimize effects on forests and woodlands would have impacts similar to those under Alternative B.

Vegetation—Forest/Woodland Products: Effects from Lands and Realty Management

Effects Common to All Alternatives

Vegetation and wildlife habitat value would be given consideration when the WD makes disposal and acquisition decisions. Impacts on forest and woodland vegetation would vary on a case-by-case basis, but impacts would be minimized since only lands with little resource values would be identified for disposal, and further NEPA documentation would minimize potential impacts on forests and woodlands. Acquisition of forests and woodlands would provide additional opportunities to achieve forest and woodland objectives.

ROWs alter habitat with their footprint for the facilities that are authorized. Most of the footprints are localized and cover a small area, but ROWs tend to be linear and may stretch for miles. Impacts from ROWs include permanent removal of forest and woodland vegetation, introduction and spread of weeds over large areas, and fragmentation of plant community and habitat. Many of the impacts associated with ROWs can be mitigated on a case-by-case basis.

Effects under Alternative A

Issuance of ROWs would not be limited, and avoidance areas or exclusion zones for lands and realty management actions would not be designated under Alternative A. This could have the greatest direct and indirect impact on forests and woodlands from vegetation removal, soil compaction, habitat disturbance and fragmentation, and increased dust. In the long term, this would lower forest and woodland health and vigor, would alter stand composition, and would lower habitat value in areas. No restrictions would be placed on stand treatments, thus allowing for implementation of forest improvement projects.

Effects under Alternative B

Designation of avoidance areas would have impacts similar to the renewable energy management actions under Alternative B. Issuance of ROWs would have impacts similar to those described under Alternative A.

Effects under Alternative C

Designating avoidance areas and exclusion zones would have similar impacts as those described under Alternative C for renewable energy management actions.

Restricting ROW issuance could have the least direct and indirect impacts on forests by limiting vegetation disturbance and noxious weed invasion or spread from ROW development. This would limit impacts on forest and woodland health and vigor, stand composition, and habitat value.

Effects under Alternative D

Designating avoidance areas and exclusion zones would have impacts similar to those described under Alternative D for renewable energy management actions.

Issuing ROWs would have impacts similar to those described under Alternative A.

Vegetation—Forest/Woodland Products: Effects from ACEC/ RNA Management

Effects Common to All Alternatives

There would be no effects common to all alternatives for ACEC/RNA management.

Effects under Alternative A

No impacts on forests or woodlands would occur under Alternative A because there are no forests within the Osgood Mountains ACEC, which is the only ACEC that would be maintained under this alternative.

Effects under Alternative B

Effects from ACEC/RNA Management under Alternative B would be the same as those described under Alternative A.

Effects under Alternative C

Designating the Pine Forest and Stillwater ACECs would provide the greatest protection of forests and woodlands and would prevent direct disturbance and fragmentation of 46,581 acres of forested areas within these ACECs. This action could also limit multiple uses in these ACECs over the long term. The acreage of impacted forest and woodland is small relative to the remainder of forested vegetation in the WD, so impacts would be localized.

Effects under Alternative D

Effects from ACEC/RNA Management under Alternative D would be the same as those described under Alternative C.

Vegetation—Forest/Woodland Products: Effects from Backcountry Byways Management

Effects Common to All Alternatives

Backcountry byways may attract more tourism to areas they access and could increase human use and degradation of nearby forests and woodlands. Currently, the only BCB is the Lovelock Cave BCB, which does not access large forested areas. However, expanding BCBs could have a greater impact on forests and woodlands. Impacts would vary depending on the locations of new BCBs and areas they would access.

Vegetation—Forest/Woodland Products: Effects from National Historic Trails Management

Effects Common to All Alternatives

There likely would be no impacts from national historic trails management, as these actions would not affect forest or woodland product management objectives.

Vegetation—Forest/Woodland Products: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures within the 13,583 acres of WSR corridor that would preserve the values supporting segment eligibility. This could include restrictions on harvesting or vegetation treatments in the 1,304 acres of mapped forest/woodland communities within the NWSRS eligible corridors. Restrictions from protective management would allow native woodland communities within the corridor to potentially expand or progress toward apex communities where community potential is not currently attained.

Effects under Alternative B

There would be no impacts on forest/woodland products resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on forest/woodland products resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would not likely be impacts on forest/woodland products from WSR management so long as WSA, priority habitat, and priority watershed management, as outlined in the remainder of the RMP, are implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented within the 13,583 acres of eligible WSR corridors, which would cause effects identical to those described under Alternatives A and C until a new determination of NWSRS suitability is made.

Vegetation—Forest/Woodland Products: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

WSAs would provide relatively undisturbed wildlife habitat in 73,879 acres of forest and woodland areas within the WD. Vegetation treatments would need to be evaluated for their impacts on wilderness characteristics prior to implementation. Limber pine and whitebark pine stands would be most impacted by these restrictions. Wilderness and WSAs are small areas relative to the remainder of forested vegetation in the WD; therefore, impacts would be localized.

Effects under Alternative A

Wilderness characteristic areas would not be designated under Alternative A, and, as a result, there would no restrictions on forest or woodland product activities. This would indirectly allow management objectives to be achieved over the long term.

Effects under Alternative B

Alternative B would manage eight areas containing wilderness characteristics to meet multiple use and sustained yield objectives. This would allow management objectives to be achieved over the long term.

Effects under Alternative C

As in Alternative B, Alternative C would also manage eight areas containing wilderness characteristics. However, Alternative C would be the most restrictive to forest and woodland product activities within these areas, by implementing restrictions and stipulations.

Effects under Alternative D

Alternative D would also manage six areas containing wilderness characteristics. Depending on the restrictions implemented, some forest and woodland uses could be limited, but restrictions are unlikely to prevent management objectives from being achieved over the long term.

Vegetation—Forest/Woodland Products: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

WWV sites could impact forest and woodland vegetation by allowing for more human disturbance to the sites over the long term. Direct impacts include trampling, and indirect impacts include soil compaction, litter and noise. This could impact forest and woodland health and vigor, stand composition, and habitat value in the long term. These areas are small relative to the remainder of forested vegetation in the WD; therefore, impacts would be localized.

Effects under Alternative A

An unspecified number and location of WWV sites would be developed and maintained under this alternative. The magnitude of impacts would vary depending on the amount of WWV sites developed. Impacts would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative B

Six WWV sites would be maintained under Alternative B. Impacts would occur in these areas and would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative C

Impacts on forest and woodland would be the least under this Alternative since new routes through or near sensitive area, and increased traffic to remote areas would be avoided. This would reduce human disturbance described under Effects Common to All Alternatives. However, impacts would still occur and would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative D

Impacts would be the same as those described under Alternative B.

Vegetation—Forest/Woodland Products: Effects from Public Health and Safety Management

Effects Common to All Alternatives

There likely would be no impact from public health and safety management action since there are no actions that relate to forest or woodland product management objectives.

Vegetation—Forest/Woodland Products: Effects from Sustainable Development Management

Effects Common to All Alternatives

Sustainable development management actions apply to areas that have already been developed and likely do not have forests and woodland vegetation. Because sustainable development management actions would involve facility reuse, new operations would not create new disturbance. As a result, there would be few impacts on forests and woodland from sustainable development actions.

Effects under Alternative A

There are no actions under Alternative A that relate to sustainable development. This could directly impact forests and woodlands by allowing degradation of vegetation or loss of lands from disposal, ROWs, or mineral operations.

Effects under Alternative B

Sustainable development actions would protect sensitive habitat from disposal. This could help maintain the extent of forests and woodlands in the WD. ROW and mineral operation actions could directly impact forests and woodlands by allowing some degradation of vegetation and lands during development. This could fragment and disturb wildlife habitat and impact forest health through soil compaction, trampling, and vegetation removal.

Effects under Alternative C

Impacts would be similar to those described under Alternative B.

Effects under Alternative D

Impacts would be similar to those described under Alternative B.

Vegetation – Forest/Woodland Products: Cumulative Effects

Past and Present Actions

Few impacts have occurred to forest woodland product areas from livestock and WHB grazing, minerals, renewable energy, or lands and realty actions, recreation, and special status species management. A number of woodland stands within the Pine Forest range are located within existing WSAs, which has protected stands from uses that would remove trees. A large pinyon/juniper stand is located in the Stillwater Range. Impacts on forest stands include; the removal of trees for woodland products such as fence posts, fire wood, and Christmas tree harvesting. These impacts have been mitigated through restrictions outlined in the District Forestry Plan which includes no harvesting of green pinyon for firewood and no commercial harvesting of woodland products. Wildfire has burned pockets of woodland stands throughout the District.

Reasonably Foreseeable Actions

Impacts would be similar to past and present actions. Woodland stands located within WSAs or within the Stillwater ACEC, if so designated, would be subject to use restrictions, which would protect and reduce impacts on forest/woodland stands. Potential increases in minerals, renewable energy, and lands and realty actions would disturb forest stands. Impacts would vary based on the size and location of disturbance. Impacts from these uses would be reduced based on implementation of permit stipulations, BMPs, SOPs, and mitigation measures. Priority wildlife habitat designation and watershed management would reduce impacts on stands due to use restrictions in those areas. Implementation of fuel treatments and allowing fire for resource benefit should reduce the potential for a stand replacing fire. Areas proposed for ACEC designation would also be prioritized for fire suppression response, reducing the potential for wildfire spread. Impacts would vary based on the number of ACECs designated.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

Combining past, present and foreseeable impacts from livestock grazing, lands and realty actions, renewable energy actions, recreation, Wildlife and special status species management, and WHB management would have few impacts on forest/woodland products in those areas due to location within WSAs and proposed and use plan designations. Forest stands located within proposed priority wildlife habitat, priority watersheds, and ACEC designated areas would see fewer impacts based on proposed management strategies to restrict uses in those areas. Priority wildlife habitat areas, priority watersheds and sensitive species habitat would be prioritized for suppression. Incremental impacts on forests would remain low.

4.2.6 Vegetation—Invasive and Noxious Species

Summary

The potential for weed spread would be affected most by management of fire, OHV, and other areas of disturbance. Restrictions on management activities for the protection of other resources, primarily cultural, visual, and special status species, would affect the level, location, and effectiveness of weed management actions to reduce the potential for weed spread. Effects from other resources could be limited and localized.

The factors that most differentiate one alternative from another in terms of their potential for weed infestation are the degree to which areas are open to OHV use, the type of treatments that would be allowed within the WD, the amount of acreage available for grazing and ground-disturbing activities. Alternative C would provide a slower response to effective treatment to stop or slow the establishment and spread of weeds as herbicides would not be used. Alternative D would provide the greatest flexibility in treating infestations. Alternatives A and B would allow for more surface-disturbing activities. These alternatives have a higher potential for weed spread throughout the district.

Methods of Analysis

Methods and Assumptions

Effects would be conditions that change the potential for weed infestation or spread. Effect determinations are based on reasonably predictable responses of weed species to a variety of conditions. Reasonably predictable responses include the following:

- Weeds often exploit disturbed areas and are adept at outcompeting many native species;
- Most actions that disturb soils or vegetation would increase the potential for weed infestation;
- Weed infestation would often follow transportation routes, making transmission corridors, roadsides, and trails prime habitat for weeds and making vehicles prime mechanisms for the spread of weeds;
- Degraded or unhealthy rangelands are particularly prone to weed infestation due to disturbances from grazing livestock; and
- Weeds thrive in ecosystems that are out of balance, either from a hydrological or vegetative perspective.

Some impacts would be direct, while others would be indirect and affect vegetation through a change in another resource. Direct impacts on weeds would include direct removal and actions that unequivocally introduce or spread weeds.

Potential indirect impacts would result from actions that would expose or compact the soil, alter hydrologic regime or water availability, remove native vegetation, reduce the health or vigor of native vegetation (thus making it less able to compete with weeds), or create conditions that would enhance the introduction or spread of weeds.

Although many specific populations of weed species are known in the WD, the entire area has not been inventoried. Therefore, it is difficult to predict which species, if any, may arise in a given area or to calculate the exact degree to which the WD is affected. The analysis below focuses on explaining how existing or proposed management actions may contribute to the spread or management of weed populations. This analysis is based on the following assumptions:

- Weeds are most likely to thrive in disturbed areas, including burned areas, along road cuts or in staging areas, and where soils have been disturbed;
- Current trends in plant succession and vegetation would continue;
- Vegetation communities would be maintained with a mix of species composition, cover, and age classes;
- Changes in the potential for weed spread would occur commensurate with changes in forest management actions that contribute to extensive soil disturbance;;
- Noxious and invasive weeds would continue to be introduced and spread as a result of ongoing vehicle traffic in and out of the WD, recreational activities, wildlife and livestock grazing and their movements, and surface-disturbing activities;

- Noxious and invasive weeds would further expand into native plant communities, and disturbances to these communities would expand opportunities for the spread of nonnative invasive plant species;
- As use of BLM lands increases over the life of this RMP, levels of funding for weed control would also increase;
- Total control of the spread of noxious weeds is unlikely under any alternative;
- The BLM would continue to treat noxious and invasive weeds and pests on public land, as stipulated within other BLM permits and authorizations; and
- Weed and pest control would be carried out in coordination with the appropriate county, weed and pest control district, and owners of adjacent property.

Vegetation—Invasive and Noxious Species: Effects from Air Quality Management

Effects Common to All Alternatives

Restrictions on prescribed fire and wildfire use to protect air quality may reduce opportunities to burn in any given year. This may prevent certain weed treatments from being implemented and may indirectly facilitate the introduction or spread of weeds. However, these restrictions are not expected to completely prevent implementation and accomplishment over the long term.

Vegetation—Invasive and Noxious Species: Effects from Geology Management

Effects Common to All Alternatives

Areas with geological resources are small and localized within the WD. As a result, impacts from geology management actions on the potential for weed or invasive plant spread would be small and localized. Areas in close proximity to geologic resources would most likely not be disturbed so establishment and spread of weeds and invasive plants would be limited. Implementing mitigation measures to avoid unique features may increase disturbance in order to reroute or relocate facilities. These impacts would be dependent on the size and location of disturbance where noxious and invasive plants would establish and spread.

Vegetation—Invasive and Noxious Species: Effects from Soil Resources Management

Effects Common to All Alternatives

Soil erosion reduction measures, including seeding and improving vegetative cover, would indirectly prevent the introduction or spread of weed species by helping to establish native plant species in areas that are highly susceptible to noxious weed invasion.

Effects under Alternative A

Impacts under Alternative A would be similar to Effects Common to All Alternatives.

Effects under Alternative B

Soil management actions would not include applying soil amendments to improve soils. Re-vegetation in areas containing poor soils would have lower potential for success and a higher potential for establishment and spread of weeds. Impacts from land reclamation activities relating to soil resources management under Alternative B would be the same as for Alternative A. However, soil erosion reduction measures would use introduced species only, which would indirectly increase the potential for weed spread in these areas in the long term.

Soil compaction prevention measures under Alternative B would seek to mitigate adverse effects without seasonal closures. As such, native vegetation would be impacted year-round, even when soils would be most susceptible to compaction and disturbance. This could indirectly impede efforts to establish native vegetation in certain areas, as well as facilitate noxious weed invasion or spread in the long term. However, weed treatments could also occur year-round, allowing for effective direct control of weed-infested areas in the long term.

Effects under Alternative C

Land reclamation actions under Alternative C would require reclamation of all surface-disturbing activities. Soil erosion reduction measures would allow for use of native species only. This would facilitate native vegetation reestablishment and would have the greatest indirect impact in helping to prevent noxious weed invasion or spread in the long term.

Soil compaction prevention measures are the most stringent under Alternative C, providing for seasonal use restrictions. This would benefit weed management actions indirectly by preventing soil disturbance when soils would be most susceptible, but would directly limit the timing of weed treatments in infested areas. Impacts would be long term.

Effects under Alternative D

Land reclamation actions under Alternative D would provide the most flexible approach to land reclamation, and native or introduced species could be used for soil erosion reduction measures. Impacts on weed management would vary depending on how and if reclamation was achieved, including whether native or nonnative seeds were used in revegetating lands. Impacts would be indirect and long term.

Soil compaction prevention measures would implement seasonal use restrictions, which would occur on a case-by-case basis. This would indirectly benefit weed management actions by preventing soil disturbance when soils would be most susceptible, but would directly limit the timing of weed treatments in infested areas. Impacts would be long term.

Vegetation—Invasive and Noxious Species: Effects from Water Resources Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from water resources management.

Effects under Alternative A

Under this alternative, water management strategies would mitigate erosion potential and reduce the potential of invasive species and noxious weeds to establish and spread. However, impacts on water resources would be reduced by complying with water quality regulations and implementing BMPs and land health standards. . Lands would be protected from weed infestation throughout the WD, but would provide the fewest action- and location-specific protections of all alternatives.

Effects under Alternative B

Priority watershed actions would indirectly protect lands from weed infestation in the long term, within wellhead protection zones that restrict uses. Potential for weed establishment and spread would be reduced in these areas. Under this alternative, multiple uses would be allowed, which could increase or decrease the potential for weed spread depending on the use. Soil-disturbing activities could indirectly or directly increase weed spread or introduction through humans and machinery and could expose soil, allowing seeds to invade and outcompete native vegetation. Weed treatments could directly remove weeds and reestablish native vegetation, thus lowering the potential for weed spread. Impacts would be localized and limited by the relatively small acreage of the priority watersheds.

Effects under Alternative C

Because this alternative in general restricts certain uses, land disturbance would be limited and the potential for weed spread would also be lower. Priority watershed actions under Alternative C would provide indirect protection from weed spread or introduction in the long term as more development restrictions and fewer acres of disturbance associated with development would occur. Weeds would not establish and spread as readily. Specific impacts would vary on a case-by-case basis and would be dependent on the size of the disturbance. Under this alternative, no herbicides would be used; weeds would have a better opportunity to spread in the short term.

Effects under Alternative D

Priority watersheds managements would impact weeds management through implementation of use restrictions which would reduce the potential for surface disturbance. Management of existing infestations would be more efficient as this alternative allows use of herbicides.

Vegetation—Invasive and Noxious Species: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

In all alternatives, forest products management actions, including monitoring, establishing early warning systems for insect or disease outbreaks, and implementing stand treatments, are tools to monitor weed outbreaks, which would indirectly prevent weed spread or invasion over the long term.

Implementing SOPs (Appendix B) and mitigation measures would indirectly minimize or reduce weed introduction or spread over the long term by minimizing unnecessary disturbance to native vegetation.

Effects under Alternative A

Actions using fire as a management tool could help to control the number and extent of weed populations in forests where weeds have invaded. Other treatments would facilitate this enhancement, including fencing, mechanical control, and herbicides. Such actions would directly reduce the spread or introduction of weeds in the long term.

No old growth forest would be designated, but management under Alternative A would designate other stands as appropriate and manage those actively. This would directly help to prevent and control weeds within these areas in the long term through early detection of weeds and prioritizing these areas for weed removal.

Effects under Alternative B

Effects from forest and woodland management on vegetation would be the same as those described for Alternative A. However, Alternative B calls for more aggressive stand treatments, including use of fencing, mechanical, biological, or chemical treatments, and planting and seeding. The variety and breadth of treatment types would provide a more flexible adaptable approach to stand management, including eradication of noxious and invasive species. As such, Alternative B has a high likelihood to directly and efficiently remove and prevent weed spread.

Old growth would not be designated under Alternative B, and none would be designated in the future. Adverse impacts on stands with old growth characteristics would be avoided, but these areas would not be managed to provide old growth characteristics in the future. As a result, these areas would not be given high priority for weed removal. Indirect impacts on the potential for weed spread from this action would be greatest under this alternative.

Effects under Alternative C

Under Alternative C, prescribed fire and herbicides would not be used to manage stands, which could prove to be the least effective at directly controlling or preventing weed infestations in the long term. In addition, fuel load accumulation could present a fire danger and increase the likelihood that native vegetation would be destroyed in a catastrophic fire. This would create conditions that favor noxious weed invasion, causing indirect impacts. Fewer treatments would be allowed on these lands, with only mechanical and biological treatments allowed. These, too, may be less effective in lowering the potential for weed spread in the long term.

Alternative C would designate 27,605 acres of old growth forest and other stands, as appropriate. However, Alternative C would not actively manage stands for old growth characteristics, which may limit weed treatments in infested areas and thus would be less effective in directly lowering the potential for weed spread in these areas.

Effects under Alternative D

Effects from forest and woodland management of vegetation would be the same as those described under Alternative A. However, forest and woodland management would be more adaptive because it would prioritize stands for management. Further, the variety and breadth of treatment types would provide a more flexible, adaptable approach to stand management, including eradication of noxious and invasive species. As such, Alternative D has a high likelihood to efficiently remove noxious and invasive species and prevent their spread.

This alternative would designate 27,605 acres of old growth forest and would designate other stands as appropriate in the future. In addition, old growth stands would be managed to facilitate old growth characteristics. As a result, weed control in these areas would be prioritized and implemented most effectively under Alternative D.

Vegetation—Invasive and Noxious Species: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Implementing weeds management actions would directly reduce the introduction and spread of noxious and invasive weeds throughout the WD. By increasing the amount of native vegetation, the risk of catastrophic wildfire would be decreased in both the short term and long term. Such a fire could damage or kill native vegetation, which would allow for the continued spread of weeds, causing indirect impacts.

Effects under Alternative A

Using a variety of control methods would be the most direct, effective, and adaptable approach in controlling the introduction and spread of noxious weeds. However, lack of education programs, implementation plans, SOPs (Appendix B), BMPs (Appendix B), mitigation measures, or new techniques could indirectly limit the effectiveness of weed management actions in the long term.

Effects under Alternative B

Using a variety of control methods would have the same effects as those under Alternative A. In addition, education programs, implementation plans, SOPs (Appendix B), BMPs (Appendix B), mitigation measures, and use of new techniques would indirectly supplement the effectiveness of weed management actions in the long term by providing a more comprehensive approach to weed control.

Effects under Alternative C

Alternative C would use the fewest control methods, which would limit the effectiveness of direct weed management in the long term. No prescribed fire or herbicides would allow more opportunities for weeds and invasive species to establish and spread. These impacts would be reduced as more restrictions on development would occur. Restrictions would reduce the amount of surface disturbance where weeds are more likely to establish. Education programs, implementation plans, SOPs (Appendix B), BMPs (Appendix B), mitigation measures, and use of new techniques would indirectly supplement the effectiveness of weed management actions in the long term by providing a more comprehensive approach to weed control.

Effects under Alternative D

Using a variety of control methods would have the same direct effects as those described under Alternative A. Similar to Alternative B, education programs, implementation plans, SOPs (Appendix B), BMPs (Appendix B), mitigation measures, and use of new techniques would indirectly supplement the effectiveness of weed management actions in the long term by providing a more comprehensive approach to weed control.

Vegetation—Invasive and Noxious Species: Effects from Chemical and Biological Control

Effects Common to All Alternatives

There would be no effects common to all. Alternative C prohibits chemical control.

Effects under Alternative A

Using integrated weed management control techniques would provide an effective approach to weed management. Under this alternative no weed control measures using herbicide would be applied directly to surface water. Some aquatic weeds may not be effectively treated in areas.

Lack of regulation regarding the types of biological and chemical control and how to implement control methods, could lead to ineffective and unsafe weed management practices.

Effects under Alternative B

Using both biological and chemical control methods, as well as IPM techniques, would provide a direct, adaptive, and effective approach to weed management in the long term. Preparing pesticide and biological use proposals, in addition to cooperating with agencies, would ensure that only safe and effective treatments would be used within the WD.

Effects under Alternative C

The focus on biological control methods would limit the effectiveness of direct weed management in the long term under Alternative C. However, use of IPM techniques would provide a direct, adaptive, and effective approach to weed management in the long term. Preparing pesticide and biological use proposals, in addition to cooperating with agencies, would ensure that only safe and effective treatments would be used within the WD.

Effects under Alternative D

Effects from chemical and biological control would be the same as those described under Alternative B.

Vegetation—Invasive and Noxious Species: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Vegetation treatments for range improvement projects would directly cause a short-term increase in the prevalence of invasive species during construction but would lead to a long-term reduction by helping to achieve an improved ecological condition throughout a large portion of the WD. Such projects would have indirect effects by reestablishing an understory of forbs and perennial bunchgrasses that are less susceptible to fire than invasive annuals, such as cheatgrass. This would reduce the risk of catastrophic wildfire on rangelands, which would prevent the continued spread of weeds.

Vegetation—Invasive and Noxious Species: Alternative Effects from Vegetation—Rangeland Management

Effects under Alternative A

Direct and indirect impacts would be similar to those described as common to all alternatives.

Effects under Alternative B

Land treatments to restore or rehabilitate vegetation communities and condition classes would improve rangeland health and make it more difficult for weeds to establish. A short-term effect would occur in the form of increased potential for weed spread in treated areas due to increased soil disturbance and increased use of vehicles that could introduce or spread weed seeds. A long-term indirect impact would occur in the form of decreased potential for weed spread in treated areas due to less frequent or less intense fires and an increased prevalence of native vegetation. Restoring condition class to Class 2 levels on 70,000 acres would have indirect effects by increasing the fire return cycle. This would reduce the frequency of catastrophic fire, and would prevent noxious weed invasion in the native vegetation in the long term.

Effects under Alternative C

Option 1

Potential for weed spread from rangeland management actions would increase in the short term as native species would be used to rehabilitate areas. These species may not readily establish to meet short term objectives, allowing for weeds to establish and spread. Not allowing herbicides use would increase the potential for weeds to establish and spread more readily. However, in the long term use of native species would re-establish native communities sooner.

Restoring condition class to Class 2 levels on 70,000 acres would have impacts similar to those described under Alternative B.

Option 2

The no grazing option could indirectly reduce the potential for weed spread by removing livestock, which are weed seed sources, and allowing native vegetation to reestablish throughout the WD in the long term. Not allowing grazing in areas may increase fuel loads and increase the potential of fire spread. Weeds would more readily establish in burned areas following a fire.

Restoring FRCC to Class II 2 levels on 70,000 acres would have impacts similar to those described under Alternative B.

Effects under Alternative D

Impacts on the potential for weed spread from rangeland management actions would be similar to those described under Alternative B.

Vegetation—Invasive and Noxious Species: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Improving and maintaining meadows and riparian areas would involve weed removal, causing a direct effect. However, riparian and wetlands protection could limit the type of weed treatments (e.g., chemical) that could be used to contain and eliminate weeds in riparian areas. These restrictions are not expected to completely prevent weed removal over the long term.

Riparian and wetland areas within the WD cover less than one percent of the total land area. As such, impacts on weed infestation from riparian and wetland management would be limited and localized.

Effects under Alternative A

Weed infestation can be sufficient to cause poor function in riparian zones, by reducing vegetative and canopy diversity and structure and by altering fire regimes and water retention rates. Thus, restoring PFC under this alternative would require reducing the extent of weeds in infested riparian and wetland areas, causing a direct effect in the long term.

Effects under Alternative B

Restoration of PFC to 60 percent under this alternative would require reducing the extent of weeds in infested riparian and wetland areas, causing a direct effect in the long term, which is similar to Alternative A.

Effects under Alternative C

The greatest amount of riparian areas and wetlands (a minimum of 85 percent) would be restored to PFC under Alternative C. As a result, the number and extent of weed populations would be reduced in the long term, having a direct effect.

Option 1

Grazing management would be used in this option to minimize impacts on riparian areas and wetlands. Impacts include less soil disturbance, an indirect effect, and less weed spread or introduction, which would be a direct effect in the long term.

Option 2

Removing grazing from lands in the WD would have the greatest benefit on riparian areas and wetlands because there would be no direct or indirect impacts from soil disturbance, weed spread or introduction, and trampling of native vegetation by livestock. This would be most effective in lowering the potential for weed spread in the long term.

Effects under Alternative D

Restoring PFC under this alternative would have impacts similar to but slightly less than those described under Alternative C. This is because Alternative D would not require restoration of PFC, as long as areas were progressing toward PFC. As such, it could take longer to achieve sustainable vegetation communities that effectively competes with weeds and invasive species.

Vegetation—Invasive and Noxious Species: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Modifying actions to avoid impacts on species or their habitat could alter the location and timing of weed treatments, possibly precluding weed control or eradication in localized areas, causing a direct effect over the long term.

In some cases, maintaining and improving lentic and lotic habitats would allow for habitat improvement by control of weeds to meet Land Health standards and improving lentic and lotic habitats would improve vegetative health thereby competing with and helping to control weeds. In other cases, these actions may limit certain treatment options that could impact water quality (e.g., chemical). These impacts would likely be direct and short term.

Implementing vegetation treatments to improve habitat would involve directly removing weed species. Mitigation measures would be required for actions near nesting migratory birds, which would allow for weed management and would protect migratory bird species in the long term. Implementing use restrictions within priority habitat areas would reduce disturbance and limit the introduction and spread of weeds.

Vegetation—Invasive and Noxious Species: Effects from Special Status Species Management

Effects Common to All Alternatives

Special status species management across all alternatives would prevent activities that would lead to listing of species and would require additional permitting actions such as plant, sage-grouse, pygmy rabbit, bat, and raptor inventories and implementation of mitigation measures and monitoring. Actions to avoid or minimize impacts on listed or sensitive species or their habitats could alter the implementation, location, or timing of weed management treatments. This could indirectly preclude effective weed control or eradication over the long term. Impacts would vary with the type of treatment proposed and the nature and extent of the restrictions.

Management of LCT habitat could restrict certain weed treatments that would occur in adjacent riparian areas, such as those involving soil disturbance or use of chemicals. Impacts would be direct and would vary with the type of treatment proposed and with the nature and extent of the restrictions.

Maintaining and improving special status species habitat would increase native plant vegetation, which would be an indirect effect. Increases in and improvement of native vegetation would make the habitat more resilient to infestation by invasive nonnative species in the long term. However, habitat improvement projects may be less effective if weed control is restricted by no disturbance of buffer zones, especially within PMUs.

Effects under Alternative A

Restrictions on actions near special status plants, sage-grouse habitat and sage-grouse leks, pygmy rabbits, bat habitat, and raptors could impact weed management by limiting the type, timing, and location of vegetation manipulation or chemical application actions used in the treatment of weeds. This could indirectly prevent effective control of noxious and invasive weeds. However, special status species protections would help create a lower level of disturbance in certain areas, providing for less human use and soil disturbance and lower the potential for weed spread in the long term, which would be an indirect effect.

Effects under Alternative B

Alternative B places the least stringent restrictions on actions near special status plants, sage-grouse habitat and sage-grouse leks, pygmy rabbits, bat habitat, and raptors. However, these restrictions could still impact weed management by limiting the type, timing, and location of weed treatments in weed-infested areas. However, special status species protections would also prevent impacts from soil disturbance and human use, thus lowering the potential for weed spread in certain areas. Impacts would be indirect and would vary on a case-by-case basis, depending on the level of weed infestation and the potential for weed spread.

Effects under Alternative C

Alternative C places the greatest amount of restrictions on activities that could occur near special status species and their habitats. Of all the alternatives, Alternative C would have the greatest impact on weed treatments in infested areas but also would limit the potential for weed spread in undisturbed areas, causing indirect effects. Weed treatments would not occur within 2 miles of active sage-grouse leks or within certain known habitats identified in population management plans. Existing infestations of weeds within these areas would be more prone to spread as weed treatments would be limited by these restrictions. Use restriction within all sage-grouse PMUs would limit the establishment and spread of weeds.

Effects under Alternative D

Use restrictions within priority sage-grouse habitat areas would reduce the potential for establishment and spread of weeds as surface disturbance would be restricted to certain uses. General sage-grouse habitat areas would include implementation of mitigation measures to minimize impacts from surface disturbance which would deter establishment of invasive species or noxious weeds. Impacts from these actions would be similar to those described under Alternative A.

Vegetation—Invasive and Noxious Species: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Wild horses and burros are sources that can increase the potential for weed spread in an area. As such, management of wild horses and burros within HMAs that cover all or portions of identified HAs that can sustain WHB management could directly increase the potential for weed spread in the HMAs. Browsing and trampling by WHB impacts vegetation by removing native species. Trampling leads to soil compaction, which indirectly affects the vigor of desired plant species. The result is a landscape dominated by invasive species. Overuse of vegetation adjacent to water sources, troughs, and stock reservoirs results in a loss of plant cover. This indirectly allows localized areas to become dominated by invasive plants. Native vegetation recovery on burned areas could be slowed or reduced by wild horses and burros, thus indirectly allowing for noxious weed invasion.

Effects under Alternative A

Continuing established AMLs as a population range, using gathers when AML is exceeded, and using fertility control agents would be the most effective methods of maintaining WHB numbers within AML. This would indirectly reduce the impact of WHB on weed management by keeping WHB within sustainable population numbers. However, developing alternate waters for WHB would concentrate WHB use in an area and could indirectly increase the spread of weeds in places that may not have been frequented by WHB in the past through soil compaction and disturbance of native vegetation.

WHB protections, such as limitations on motor vehicle racing, would directly prevent weed spread due to human use.

Effects under Alternative B

Impacts from population control measures would be similar to those described under Alternative A.

Protection measures for WHB would have similar impacts as those under Alternative A.

Effects under Alternative C

Alternative C allows AML to be set and referenced as a single number, which would not account for the desired gather cycle, based on the population growth over time. Further, fertility control agents would not be allowed. Thus, populations under this alternative would likely exceed AML more frequently than under the other alternatives, and it could increase weeds, especially over the long term, due to additional hoof impacts on soils and utilization of desired vegetation. However, AML reduction in response to decreased water availability for WHB would decrease potential weed impacts from WHB. Impacts would be indirect.

Protection measures for WHB would be the greatest under Alternative C and could prohibit or limit certain ground-disturbing activities in HMAs. This may be effective in directly preventing weed spread caused by ground disturbance and weed seed transport.

Effects under Alternative D

Impacts from population control and development of alternative water sources would be similar to those described under Alternative A.

Impacts of converting the land between wild horse use and burro use would be similar to those described under Alternative A.

Impacts from WHB protection measures would be similar to those described under Alternative A.

Vegetation—Invasive and Noxious Species: Effects from Wildland Fire Management

Effects Common to All Alternatives

Under any wildfire control scenario, suppression activities and fuels treatment actions could spread weed seeds or create conditions, such as soil disturbance, that favor weeds. Striving for control status in one operational period would require an aggressive suppression response that may result in greater soil disturbance or use of vehicles than other less aggressive methods. This higher level of disturbance and higher number of vehicles would lead to greater potential for weed spread, an indirect effect. Areas that are already affected by species that thrive in post-burn conditions, such as cheatgrass, may experience a long-term increase in the potential for weed spread as a result of allowing conditional fire suppression management for a benefit.

However, wildfire suppression and creation of fuel breaks would prevent catastrophic destruction of native vegetation, which would indirectly prevent noxious weed invasion in these areas over the long term. Minimum impact suppression tactics would minimize unanticipated effects on native vegetation during fire suppression activities. In addition, emergency stabilization and rehabilitation treatments, such as seeding with native perennial plant species, indirectly deter the spread of weeds and invasive species.

Because fire retardants are composed largely of nitrogen and phosphorus fertilizers, they may encourage growth of some species, particularly weeds, at the expense of others, indirectly resulting in changes in community composition and species diversity. Differential growth may also influence herbivorous behavior; both insect and vertebrate herbivores tend to favor new rapidly growing shoots.

Fuels management actions would result in a direct, short-term loss of vegetation, both native and invasive, on a small scale. In the long term, fuel reduction projects would reestablish native vegetative communities, thus indirectly lowering the potential for weed spread. These actions would allow fire to play its natural role more frequently and would reduce the likelihood of catastrophic wildfire, which would protect native vegetation in the long term and over large areas, having an indirect effect on weed management.

Implementing a response to wildfires based on social, legal, and ecological consequences of the fire would protect areas susceptible to invasion, which would be an indirect effect, and would treat weed-infested areas, which would be a direct effect. This would reduce the potential for weed spread in certain areas over the long term.

Effects under Alternative A

No additional impacts would occur from wildland fire management actions under Alternative A.

Effects under Alternative B

Under this alternative, 110,167 acres of land would be designated as conditional fire suppression areas where fire may be managed for a benefit. These areas could be more vulnerable to weed establishment and spread, as described under Effects Common to All Alternatives. However, these areas where conditional fire suppression management for a benefit would be allowed are generally higher elevation woodland areas that have lower potential for noxious weed invasion after burning.

As a result, and considering the small acreage of land affected, impacts would be indirect and limited.

Effects under Alternative C

Alternative C would not allow prescribed fire or chemical fuel treatments, and as a result, weed control and fuel break maintenance would be more difficult and less effective under this alternative. This would indirectly increase the potential for weed spread in the short term.

Effects under Alternative D

Under Alternative D, 110,167 acres of land would be designated as suitable for conditional fire suppression areas where fire may be managed for a benefit. Impacts would be the same as those under Alternative B.

Vegetation—Invasive and Noxious Species: Effects from Cultural Resources Management

Effects Common to All Alternatives

Protecting cultural resources, such as aspen art trees and groves, would prevent disturbance and fragmentation of native vegetation, thus indirectly lowering the potential for weed spread. These areas are small relative to the remainder of forested vegetation in the WD, so impacts would be localized.

Site monitoring, conservation measures, use restrictions, and law enforcement would prevent disturbance to and degradation of native vegetation, while potentially directly impacting the ability to implement weed treatments over the long term in certain areas.

Effects under Alternative A

Protecting pinyon trees in the Stillwater Range could directly prohibit certain weed management treatments such as chemical control in that area, which may have adverse effects on nontarget species. However, these actions also would minimize soil-disturbing activities, which would indirectly lower the potential for weed spread in the long term.

Effects under Alternative B

Alternative B allows some pinyon trees in the Stillwater Range to be harvested. This would allow more soil disturbance and human use of the area, which could directly introduce and spread weeds and would indirectly increase the potential for weed spread in the long term. However, this action would place the fewest restrictions on weed treatments in infested areas, facilitating direct, efficient, and effective control and eradication.

Effects under Alternative C

Impacts from protecting pinyon trees in the Stillwater Range would be the same as those described under Alternative A.

Effects under Alternative D

Impacts from protecting pinyon trees in the Stillwater Range would be the same as those described under Alternative A, except Alternative D includes adaptive management to allow for some pinyon tree harvest. This would have slightly greater direct and indirect impacts on the potential for weed spread by introducing soil-disturbing activity and increased human use, as described under Alternative B.

Vegetation—Invasive and Noxious Species: Effects from Tribal Consultation

Effects Common to All Alternatives

Consulting with tribes to identify culturally significant plants, important habitats, and traditional use locations emphasizes protection of natural resources, including reestablishing native vegetation and eradicating weeds, which would have both indirect and direct effects. This also would limit soil-disturbing activities in certain areas, thereby indirectly preventing weed introduction. Consultation could place higher treatment priority on areas not previously identified or could limit actions in planned treatment areas. Impacts would vary on a case-by-case basis and are likely to be localized.

Vegetation—Invasive and Noxious Species: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Physical conservation measures and law enforcement actions would prevent disturbance to and degradation of lands, which would indirectly deter the spread or introduction of weeds into these areas. These actions also could impact the ability to implement weed treatments over the long term in certain areas, which would be a direct effect. These areas are small relative to the size of the WD, so impacts would be localized.

Vegetation—Invasive and Noxious Species: Effects from Visual Resources Management

Effects Common to All Alternatives

Weed expansion can be seen partially as a function of the amount of acreage in various VRM categories. In general, alternatives that have more acres in VRM Classes I and II have lower potential for weed spread than those that have more acres in VRM Classes III and IV. This is because soil surface disturbance is minimized in Class I and II areas. As such, implementing VRM guidelines, particularly managing WSAs as Class I areas, would directly lower the potential for weed spread within the WD.

VRM management would affect the size, shape, type, location, and timing of weed treatments in areas. These restrictions would have more emphasis in VRM class I and II areas. Consequently, weed treatments in VRM I and II areas may be smaller and less effective in controlling weeds in the long run. Treating weeds within reclaimed or rehabilitated areas would help achieve VRM objectives for all classes.

Vegetation—Invasive and Noxious Species: Effects from Cave and Karst Resources Management

Effects Common to All Alternatives

There likely would be no impacts on weed management from cave and karst resource management.

Vegetation—Invasive and Noxious Species: Effects from Livestock Grazing Management

Effects Common to All Alternatives

Collecting monitoring data would allow problems to be detected so that corrective action could be taken to improve rangelands and lower weed spread. Healthy rangelands have a lower abundance of cheatgrass and noxious weeds, which promote fire spread. This would, in turn, reduce the likelihood of catastrophic fire that may destroy native vegetation, making large areas more susceptible to noxious weed invasion. As such, native vegetation and wildlife habitat would be protected, which would indirectly prevent noxious weed invasion.

Effects under Alternative A

Livestock grazing would be open on 8,232,727 acres of land under this alternative, which would have the greatest impact on weed management. Improper grazing would directly and indirectly facilitate weed spread and introduction, as seeds are transported on livestock and degraded rangeland that is grazed yearly lacks substantial native vegetation to outcompete invaders.

The potential for weeds would be lower on lands closed to grazing on the remainder of the land within the WD. This is because livestock would not be a mechanism for seed dispersal.

Grazing on riparian areas would be reduced or excluded, thereby preventing direct impacts through weed introduction, or indirect impacts, such as soil compaction and trampling of native vegetation.

Effects under Alternative B

Similar to Alternative A, livestock grazing would be open on 8,232,727 acres of land under this alternative. Grazing, including grazing on acquired lands, allowing temporary nonrenewable use, and allowing continuous season-long use would directly and indirectly facilitate weed spread and introduction to the greatest extent. This is because seeds are transported on livestock, and degraded rangeland that is grazed continuously lacks substantial native vegetation to outcompete invaders.

Range improvement actions and prescribed grazing have impacts similar as those described under Alternative A.

The potential for weeds would be lower on lands closed to grazing on the remainder of the land within the WD. This is because livestock would not be a mechanism for seed dispersal, and the land could recover from impacts with native vegetation.

Effects under Alternative C

Option 1

Livestock grazing would be open on 8,038,084 acres of land under this alternative. Grazing would directly and indirectly facilitate weed spread and introduction, and the effects would be similar to those described under Alternative A, although fewer acres are open under Alternative C, Option 1. However, Alternative C, Option 1 would not allow grazing on acquired lands or temporary nonrenewable use and would allow only two years of consecutive grazing during the critical growth period. This would minimize the potential for weed spread by reducing the amount of land subject to grazing and the grazing intensity.

Lands closed to grazing on the remainder of land within the WD would lower the potential for weed spread in these areas because livestock would not be a mechanism for seed dispersal, and land could recover from impacts with native vegetation.

Range improvements would be somewhat more restricted compared to the other alternatives and could limit the type, timing, and location of weed treatments, causing direct effects. Prescribed grazing would be used to lower the potential for weed spread, as described under Alternative A.

Greater protection would be given to riparian areas, causing improvement in functionality or changes in plant communities to meet the riparian standards. This would prevent direct impacts through trampling and indirect impacts from soil compaction and weed spread or introduction and would maintain plant vigor, stand composition, and natural fire regimes.

Option 2

Livestock grazing would be closed on all lands within the WD, which would have the greatest direct and indirect impact on reducing the spread of weeds due to livestock on BLM-administered lands.

Impacts from range and riparian improvement actions would be similar to those described under Alternative C, Option 1.

Effects under Alternative D

Under Alternative D, 8,016,754 acres of land would be open to grazing. Impacts would be similar to those described under Alternative A, except that the fewest acres of land would be open to grazing compared to the other alternatives.

Impacts from range improvements would be similar to those described under Alternative B.

Protection would be given to riparian woodlands, preventing direct impacts through weed introduction and indirect impacts, such as soil compaction and trampling of native vegetation.

Vegetation—Invasive and Noxious Species: Effects from Minerals Management

Effects Common to All Alternatives

General

Exploration and development operations associated with fluid, leasable, and locatable mineral development, mineral material sales, and mineral disposal typically disturb some level of vegetation. These disturbances directly result in increased potential for weed spread, including import and export of weed seeds. The degree of weed establishment and spread is based on the level and degree of disturbance to vegetation and soils. Under all alternatives, BMPs would be implemented and revegetation concurrent with the operation would be required, reestablishing native vegetation and indirectly preventing weed spread. Permit requirements to treat weeds by public land users also helps control establishment and spread of weeds and invasive species.

RFDs

In a reasonably foreseeable development scenario, exploration and development operations would continue and could increase the potential for weed spread throughout the WD. These developments would also have indirect effects by fragmenting native vegetative communities, making them increasingly susceptible to noxious weed invasion.

Effects under Alternative A

Alternative A would open the greatest acreage and would close the least acreage to mineral development, thus having the greatest likelihood of disturbance which would impact the potential for weed spread. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative B

Compared with Alternative A, Alternative B would open fewer acres and would close more acres to mineral development, thus having a lower likelihood to impact the potential for weed spread. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative C

Alternative C would open the fewest acres and would close the most acres to mineral development, thus having the least likelihood to impact the potential for weed spread of all alternatives. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative D

Compared with Alternatives A and B, Alternative D would open fewer acres and would close more acres to mineral development, thus having a lower likelihood to impact the potential for weed spread. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Vegetation—Invasive and Noxious Species: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

Recreational activities can introduce and spread noxious and invasive weed seeds from vehicles, shoes, clothing, and recreational equipment. As recreation use increases, visitors from outside the area could bring in noxious and invasive weeds, including new invasive species. Recreation activities that occur in undisturbed and remote areas could distribute weed seeds into weed-free areas. Impacts could be direct and long term and could take place over a large area.

To manage OHV use, the Transportation Plan would be updated and would account for weed spread. Site-specific NEPA analysis would be done on an implementation level to minimize impacts from weeds.

Vegetation—Invasive and Noxious Species: Effects from Renewable Energy Management

Effects Common to All Alternatives

Developing renewable energy projects could directly introduce weed seeds or produce soil disturbance that indirectly favors weeds. Developing such projects may include issuing ROWs, constructing staging areas for chippers or other heavy equipment, and constructing access roads that could disturb soils and vegetation. As a result, the potential for weed spread would increase in these areas. BMPs, stipulations, and mitigation measures would be implemented, which would minimize the spread or introduction of weeds from renewable energy projects.

Effects under Alternative A

Implementing permit stipulations and mitigation measures to reduce adverse impacts on resources would reduce the potential for establishment and spread of invasive plants and weeds.

Effects under Alternative B

Managing avoidance areas would ensure mitigation measures and special stipulations are in place to protect sensitive resource values. These measures would also provide indirect benefits by reducing disturbed areas or requiring weed control to reduce the potential for establishments and spread so invasive plants and weeds.

Effects under Alternative C

Avoidance and exclusion areas would further reduce surface disturbance or uses which would reduce the potential for establishment and spread of weeds.

Effects under Alternative D

Avoidance and exclusion areas would further reduce surface disturbance or uses which would reduce the potential for establishment and spread of weeds.

Vegetation—Invasive and Noxious Species: Effects from Transportation and Access Management

Effects Common to All Alternatives

OHV users would directly introduce and spread noxious and invasive weed seeds from their vehicles, shoes, clothing, and recreational equipment. As OHV use increases, visitors from outside the area could bring in noxious and invasive weeds, including new invasive species. OHV activities in undisturbed and remote areas could distribute weed seeds into weed-free areas.

Other types of travel, including by foot, horse, or bike, cause fewer impacts, although all could disturb soils, causing indirect effects, or allow for weed seed transport, which would be a direct effect. Horses in particular have a high capacity for introducing weed seeds from manure into previously unaffected areas. Groups of horses may also create soil and vegetation disturbance in areas where they are tethered overnight, increasing the potential for weed spread in confined areas.

Noxious weed control measures would directly prevent the spread and introduction of weeds along roads, as well as prevent weed competition with native species.

Effects under Alternative A

The potential for weed spread could increase from road and trail construction via indirect means, such as vegetation removal and soil compaction, as well as direct means, such as seeds being transported by vehicles.

Effects under Alternative B

Transportation actions that minimize effects and limit disturbance to native vegetation and soils and would directly prevent noxious weed invasion or spread from road or trail construction or from transport on vehicles.

Effects under Alternative C

Transportation actions that minimize effects would have impacts similar to those described under Alternative B.

Effects under Alternative D

Transportation actions that minimize effects would be similar to those described under Alternative B.

Vegetation—Invasive and Noxious Species: Effects from Lands and Realty Management

Effects Common to All Alternatives

Noxious and invasive weeds would be given consideration when the WD makes disposal and acquisition decisions, though the presence of invasive species would not considerably affect these decisions. As a result, weed spread or introduction to BLM-administered lands would vary on a case-by-case basis, but impacts would be minimized since lands with little resource values would be identified for disposal, and further NEPA documentation would consider the potential for weed spread resulting from proposed actions.

ROWs alter habitat with their footprint for the facilities that are authorized. Most of the footprints are localized and cover a small area, but ROWs tend to be linear and may stretch for miles. Impacts from the issuance of ROWs include permanent vegetation removal and soil disturbance and could introduce the spread of weeds over large areas, and fragmentation of plant communities and habitats. Many of the impacts associated with ROWs can be mitigates on a case-by-case basis.

Effects under Alternative A

Issuance of ROWs would not be limited, and avoidance areas or exclusion zones for lands and realty management actions would not be designated under Alternative A. This would increase the potential for weed spread by allowing for increased soil disturbance and vegetation removal, access to previously inaccessible areas, and weed transport on vehicles.

Effects under Alternative B

Designating avoidance areas has impacts similar to the renewable energy management actions under Alternative B.

The impacts from issuing ROWs would be similar to those described under Alternative A.

Effects under Alternative C

Impacts from designating avoidance areas and exclusion zones would be similar to the renewable energy management actions under Alternative C.

Restricting ROW issuance would decrease the potential for weed spread by limiting soil disturbance and vegetation removal, access to previously inaccessible areas, and weed transport on vehicles.

Effects under Alternative D

The impacts from designating avoidance areas and exclusion zones would be similar to the renewable energy management actions under Alternative D.

The impacts from issuing ROWs would be similar to those described under Alternative A.

Vegetation—Invasive and Noxious Species: Effects from ACEC/ RNA Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from ACEC/RNA management.

Effects under Alternative A

Maintaining the Osgood Mountains ACEC would protect native vegetation and would prevent disturbance of areas within the ACEC. This action would limit the potential for weed spread because habitat improvement for the species consists of weed eradication. However, implementation of certain weed treatments could be limited in areas, depending on habitat sensitivity. This ACEC is small relative to the total area of the WD, so impacts would be localized.

Effects under Alternative B

The effects from ACEC/RNA Management under Alternative B would be the same as those under Alternative A.

Effects under Alternative C

Designating four ACECs within the WD would provide the greatest protection to native vegetation and would prevent certain mineral activities and associated disturbance of these areas. This action would limit the potential for weed spread in these areas. However, implementing certain weed treatments could be limited in areas, depending on habitat sensitivity. The acreage of the four ACECs (97,584 acres) is small relative to the total area of the WD, so impacts would be localized.

Effects under Alternative D

The effects from ACEC/RNA Management under Alternative D would be the same as those described under Alternative C.

Vegetation—Invasive and Noxious Species: Effects from Backcountry Byways Management

Effects Common to All Alternatives

Backcountry byways may attract more tourists to previously less accessible areas and could introduce or spread noxious and invasive weed seeds from vehicles, shoes, and clothing.

Vegetation—Invasive and Noxious Species: Effects from National Historic Trails Management.

Effects Common to All Alternatives

There likely would be no impacts from national historic trails management because these actions would not affect weed management objectives.

Vegetation—Invasive and Noxious Species: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures within the 13,583 acres of WSR corridor that would preserve the values supporting segment eligibility. This could include restrictions on vegetation treatments. However, it may also lead to increased management of invasive species to preserve native vegetative communities. Additionally, it could be argued that increased visitation may follow designation. If this were the case, the potential for introduction of noxious weed seeds could increase.

Effects under Alternative B

There would be no impacts on invasive and noxious species resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on invasive and noxious species resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would likely be no impacts on invasive and noxious species from WSR management so long as WSA, priority habitat, and priority watershed management, as outlined in the remainder of the RMP, are implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented within the 13,583 acres of eligible WSR corridors, which would cause effects identical to those described under Alternatives A and C until a new determination of NWSRS suitability is made.

Vegetation—Invasive and Noxious Species: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

Weed control actions would be subject to management defined in the Interim Management Plan. Restrictions as to the type of equipment that can be used to apply herbicides or to implement other treatments, could allow weeds to establish and spread in a shorter period of time. These impacts would be expected to be minimal as WSAs generally do not contain large areas of surface disturbance where weeds can establish.

Effects under Alternative A

Wilderness characteristic areas would not be designated under Alternative A. As a result, there would be no restrictions on weed treatments. This would indirectly allow management objectives to be achieved over the long term.

Effects under Alternative B

Under Alternative B, the BLM would manage eight areas containing wilderness characteristics to meet multiple use and sustained yield objectives. By allowing multiple uses, Alternative B would indirectly allow management objectives to be achieved over the long term.

Effects under Alternative C

Under Alternative C, the BLM also would manage eight areas containing wilderness characteristics. However, Alternative C would be the most restrictive of all alternatives by implementing restrictions and stipulations in these areas, including closing mineral leasing and ROW exclusion zones. These restrictions could prevent effective weed control in certain areas by restricting access.

Effects under Alternative D

Under Alternative D, the BLM also would manage eight areas containing wilderness characteristics. Depending on the restrictions implemented, some weed treatments could be limited, but restrictions are unlikely to prevent management objectives from being achieved over the long term.

Vegetation—Invasive and Noxious Species: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

WWV sites could introduce or spread noxious and invasive weeds by allowing for more human disturbance to certain areas over the long term. People from outside the area could bring in noxious and invasive weeds, including new invasive species. People visiting WWV sites in undisturbed and remote areas could distribute weed seeds into weed-free areas. These areas are small relative to the size of the WD, so impacts would be localized.

Effects under Alternative A

An unspecified number and location of WWV sites would be developed and maintained under this alternative, the magnitude of which would vary depending on the number of WWV sites developed. Impacts would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative B

Six WWV sites would be maintained under Alternative B. Impacts would occur in these areas and would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative C

Impacts from weed spread would be the fewest under this Alternative since new routes through or near sensitive areas and increased traffic to remote areas would be avoided. This would reduce human disturbance and the associated weed spread described under Effects Common to All Alternatives. However, impacts would still occur and would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative D

Impacts would be the same as those described under Alternative B.

Vegetation—Invasive and Noxious Species: Effects from Public Health and Safety Management

Effects Common to All Alternatives

There likely would be no impact from public health and safety management because there are no actions that relate to weed management objectives.

Vegetation—Invasive and Noxious Species: Effects from Sustainable Development Management

Effects Common to All Alternatives

Sustainable development management actions apply to areas that have already been developed and are likely unvegetated. Because sustainable development management actions would involve facility reuse, new operations would not create new disturbance. As a result, there would be few impacts on weed management from sustainable development actions.

Effects under Alternative A

There are no actions under Alternative A that relate to sustainable development. This would have the greatest impact on weed management by allowing degradation or loss of lands from disposal, ROWs, or mineral operations. This could allow for soil disturbance, native vegetation removal, and weed introduction or spread.

Effects under Alternative B

ROW and mineral operation actions could increase the potential for weed spread by allowing some degradation during development, including soil disturbance, native vegetation removal, and weed introduction or spread.

Effects under Alternative C

ROW and mineral operation actions would have the greatest effect under Alternative C in lowering the potential for weed spread in developed areas by preventing degradation during and after development. This could prevent such effects as soil disturbance, native vegetation removal, and weed introduction or spread.

Effects under Alternative D

Impacts from sustainable development actions would be the same under Alternative D as those described under Alternative B.

Invasive and Noxious Species: Cumulative Effects

Past and Present Actions

Past and present livestock grazing has increased invasive and noxious species in areas of concentrated grazing. From 1982 to the present, current land use plans have employed management actions to reduce concentrated grazing and have improved conditions based on progressing towards or meeting standards for rangeland health. Minerals, lands and realty, renewable energy, and recreation activities have disturbed soils and removed native vegetation. These disturbed areas are more vulnerable to the establishment and spread of noxious weeds and invasive plants. Weed seeds are also spread by vehicular travel through areas from commercial and recreation uses. Wildfire exposes large areas where vegetation has burned increasing the likelihood of establishment and spread of weeds. Post-fire seeding has deterred establishment of weeds and invasive plants in areas. Habitat restoration actions applicable to wildlife and special status species management have improved areas containing weeds or invasive plants by planting native and non-native seeds to improve habitat conditions. WHB management actions, including gathering WHB, has had few impacts on weeds and invasive plants. Impacts are generally limited to holding facilities where soils are disturbed by concentrations of WHB and vehicular travel, making these areas more prone to establishment and/or spread of weeds and invasive plants. BMPs, SOPs, project specific mitigation measures, permit stipulations, and post fire emergency stabilization and rehabilitation, combined with integrated weed management treatments, have reduced the potential for weed and invasive plant establishment and spread from land acquisitions.

Reasonably Foreseeable Actions

Impacts would be similar to the past and present actions. Implementation of livestock grazing and WHB management in order to achieve land health standards would result in fewer opportunities for weeds and invasive plants to establish. Removal of livestock would limit the spread of invasive plants in areas.

Increasing mineral, lands and realty, and renewable energy actions would increase potential for disturbing soils and consequently increasing the potential for weeds and invasive plants to establish and spread. These impacts would be reduced by implementing BMPs, SOPs, required mitigation measures and permit stipulations that would include integrated weed management actions to control weeds. Recreation management with respect to OHV use would limit the spread of invasive plants depending on the number of acres designated as open, limited, or closed by alternative. Habitat restoration and management of priority wildlife habitat and priority watersheds would include use restrictions, reducing disturbance in important habitat areas. Construction of fuel breaks with emphasis at a landscape scale would reduce fire spread potential, thereby reducing the size of burned areas vulnerable to weed establishment and spread. Proactive integrated weed management actions combined with collaboration with partners would further identify and prioritize treatment of weeds and invasive plants. Land tenure actions could impact the spread of invasive species allowing for multiple uses and increasing the potential for weeds to establish and spread.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

Incremental cumulative impacts of the past, present and RFFAs coupled with proposed management actions would vary little between alternatives as all alternatives include integrated weed management and requirements to meet standards for rangeland health. Incremental effects would be lower from no grazing of livestock. Overall incremental impacts from weeds and invasive species would be dependent on the size of surface disturbances. Proactive integrated weed management treatments, implementing BMPs, SOPs, development of permit stipulations, implementing mitigation measures, and use restrictions applicable to priority wildlife and watersheds and would reduce the potential for spread of weeds and invasive plants. Incremental impacts on weeds and invasive plants would slowly stabilize the establishment and spread over time.

4.2.7 Vegetation—Rangelands

Summary

This vegetative analysis is qualitative, as specific impacts of resource activities on district wide vegetation values cannot be quantified. A more detailed analysis would follow at the implementation stage, such as an allotment evaluation or a permit renewal EA to comply with NEPA. Rangeland vegetation, WHB, wildland fire, livestock grazing, and cultural resources actions would have the greatest impact on rangeland vegetation within the WD. Fewer impacts on rangeland vegetation would come from air quality, soils, water, forest and woodland vegetation, weeds, chemical and biological control, fish and wildlife, special status species, tribal consultation, visual resources, wilderness characteristics, mineral resources, recreation, renewable energy, transportation and access, lands and realty, ACECs/RNAs, BCBs, wilderness study areas, watchable wildlife viewing sites, and sustainable development. However, it is BLM's judgment that several of the resources areas listed below would not be likely to impact rangeland vegetation resources. These areas are geological resources, riparian and wetland vegetation, paleontological resources, cave and karst resources, national historic trails, WSRs, and public health and safety.

Surface-disturbing activities on public land that covers less than one acre would cause short-term disturbance to vegetation by removal or trampling, which would allow weeds to become established. Such activities include monitoring; small construction, implementation, and maintenance activities; fence building; road maintenance; WHB gathers; livestock impoundments; trap sites; recreational activities, such as camping, hiking, and backpacking; vegetation mowing; seed collection; and soil pit and cultural and paleontology site excavations for data recovery. Impacts would be limited and localized, due to the small area covered by these activities.

Alternative C, Option 2 would have the greatest impact on rangelands, as grazing would be prohibited. Alternatives A and B would be the least prohibitive toward use of rangelands, while Alternative C, Option 1, and Alternative D would allow for the most resource protection.

Methods of Analysis

Methods and Assumptions

Impacts are determined by assessing which actions, if any, would change vegetation structure or composition, decrease the extent of rangeland vegetation, allow for increased dominance of invasive weeds, affect habitat value for wildlife species, or decrease grazing potential.

Some impacts would be direct, while others would be indirect, and affect vegetation through a change in another resource. Direct impacts on rangeland vegetation are disrupting, trampling, or removing rooted vegetation, thereby reducing areas of native vegetation. Other direct impacts on rangeland vegetation are mortality from toxic chemicals and actions that unequivocally reduce total numbers of plant species or reduce or cause the loss of total area, diversity, vigor, structure, or function of wildlife habitat.

Potential indirect impacts would be loss of habitat suitable for colonization due to surface disturbance, introduction of noxious weeds by various mechanisms or conditions that enhance the spread of weeds, increased noise, and general loss of habitat due to surface occupancy or surface compaction. Indirect impacts are those that cannot be absolutely linked to one action, such as decreased plant vigor or health from reduced air or water quality.

The effects of each action on vegetation resources are quantified when possible; however, many impacts must be qualitatively assessed when suitable data are not available. The following assumptions were made for the purpose of this analysis:

- Noxious and invasive weeds would continue to be introduced and spread as a result of ongoing vehicle traffic in and out of the WD, recreational activities, wildlife, WHB, and livestock grazing and their movements, and surface-disturbing activities;
- Biocontrol would continue and potentially would expand;
- Noxious and invasive weeds would further expand into native plant communities, and disturbances to these communities would expand opportunities for the spread of nonnative invasive plant species;
- Many actions that would occur within the WD would be subject to BMPs. Although BMPs are designed to minimize the effects of projects, they generally cannot eliminate all impacts. This impact analysis assumes that BMPs would minimize but not eliminate possible effects;
- Wildfire acreages are expected to increase over the life of the plan;
- Appropriate vegetative management includes maintaining and improving leaf area and, by extension, photosynthetic potential for perennial plants. This is accomplished by providing periodic rest during the growing season, especially the critical growth period, from early seed formation through mature seed formation. Leaf areas are reduced by spring grazing if periodic rest is not provided or if sufficient regrowth does not occur during the critical growth period, leading to a decline in plant health. Leaf areas are further depleted by double grazing the same perennial plants in both spring and fall of the same year. This slowly leads to a decrease in plant size and vigor and the eventual loss of the plants; and
- Appropriate vegetative management would also maintain or improve native plant communities to protect soil and water resources while providing habitat. Adequate seedling establishment and young plant recruitment is essential to maintaining or increasing native species in a plant community. Development of sufficient seedling root growth is necessary for seedlings to develop vigor and produce viable seed.

Vegetation—Rangelands: Effects from Air Quality Management

Effects Common to All Alternatives

Restrictions on prescribed fire and wildfire use to protect air quality may reduce opportunities to burn in any given year. This may prevent certain rangeland treatments from being implemented and indirectly hinder the achievement of healthy rangeland conditions. However, it is not expected that these restrictions would completely prevent implementation and accomplishment over the long term.

Vegetation—Rangelands: Effects from Geology Management

Effects Common to All Alternatives

Impacts from geology management actions on rangelands would be limited and, thus, negligible.

Vegetation—Rangelands: Effects from Soil Resources Management

Effects Common to All Alternatives

Soil erosion reduction measures involving seeding and improving vegetative cover would reduce compaction and increase infiltration, which would indirectly improve rangeland health over the short term. As a result, vegetative productivity and diversity would be increased, which would increase litter, soil fertility, infiltration, and nutrient cycling in the long term, which would be a direct effect.

Effects under Alternative A

Impacts on rangelands would vary depending on implementation of SOPs/BMPs to reduce soil erosion, reclamation and rehabilitation treatments, and success or failure of the treatments to re-establish rangeland vegetation in the long term. Impacts would be long term.

Effects under Alternative B

Impacts from land reclamation activities relating to soils management under Alternative B would be the same as those described under Alternative A.

Soil compaction prevention measures under Alternative B would seek to mitigate adverse effects without seasonal closures. As such, range vegetation would be directly impacted year-round, even when soils would be most susceptible to compaction. However, treatments to rangeland vegetation could occur year-round, indirectly facilitating rangeland health and multiple use objectives in the long term.

Effects under Alternative C

Land reclamation actions under Alternative C would have the greatest benefit to rangeland vegetation by requiring reclamation of all surface-disturbing activities. This would allow native vegetation to reestablish and would directly help to achieve rangeland health, diversity, and productivity goals in the long term.

Soil compaction prevention measures are the most stringent under Alternative C, providing for seasonal use restrictions. This would indirectly benefit rangeland health by preventing compaction when the soil is most susceptible to disturbance, but would limit multiple uses and the timing of range improvement treatments in the long term.

Effects under Alternative D

Land reclamation actions under Alternative D would provide the most flexible approach to land reclamation. Impacts on rangeland vegetation would vary, depending on how and if reclamation was achieved, including whether native or nonnative seeds were used in revegetating lands. Impacts would be long term.

Soil compaction prevention measures would implement seasonal use restrictions on a case-by-case basis. Impacts on rangeland vegetation include improved health and vigor from decreased soil compaction and increased infiltration. Further, multiple use objectives could be achieved in the long term because restrictions would allow for more flexibility than those under Alternative C.

Vegetation—Rangelands: Effects from Water Resources Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from water resources management.

Effects under Alternative A

Under this alternative, priority watersheds would not be managed. However, impacts on water resources would be reduced by complying with water quality regulations and implementing BMPs and land health standards. This would indirectly protect rangeland vegetation throughout the WD. However, Alternative A would provide the fewest action- and location-specific protections of all alternatives.

Effects under Alternative B

Priority watershed actions would indirectly protect rangeland vegetation within wellhead protection areas in the long term by restricting certain activities. Under this alternative, multiple uses would be allowed, which would allow for range treatments to directly achieve health and multiple use objectives. Impacts would be localized and limited by the relatively small acreage of the priority watersheds. Promotion of large scale water importation/exportation projects would limit water availability for other uses including stock watering. This may prevent cattle distribution efforts. Differing degrees of water right acquisition for cattle/WHB distribution would impact rangeland vegetation utilization.

Effects under Alternative C

Priority watershed actions under Alternative C would provide the greatest indirect protection to rangelands within those areas since they would be the most restrictive of all alternatives. However, as exclusion zones, they also would prevent direct range improvement treatments that are incompatible with the watershed's primary use. Impacts would vary on a case-by-case basis and would be localized and limited by the relatively small acreage of the priority watersheds.

Effects under Alternative D

Priority watershed actions would indirectly protect rangelands in the long term due to use restrictions within priority watersheds. Management of priority watersheds would include use restrictions that would limit development; therefore rangelands within these watersheds would be protected by use restrictions. Mitigation measures would be implemented when avoidance is not possible, which would allow for some flexibility in achieving healthy rangeland conditions. Impacts would be localized and limited by the relatively small acreage of the priority watersheds.

Vegetation—Rangelands: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from forest and woodland product management.

Effects under Alternative A

Actions using fire as a management tool would efficiently reduce the fuel load in forests, preventing catastrophic fires that could spread to adjacent rangelands and destroy native vegetation. This would have long-term indirect effects in localized areas.

Effects under Alternative B

Impacts from forest and woodland product management would be similar to those described under Alternative A.

Effects under Alternative C

Prescribed fire would not be used as a management tool under Alternative C, which would be least effective in reducing the fuel load in forests. As a result, catastrophic fires could occur that could spread to adjacent rangelands and destroy native vegetation in the long term in localized areas.

Effects under Alternative D

Actions using fire as a management tool would have impacts similar to those described under Alternative A. However, the variety and breadth of treatment types would provide a more flexible adaptable approach to stand management, including eradication of noxious and invasive species. As such, Alternative D has a high likelihood to efficiently reduce the fuel load in forests, preventing catastrophic fires that could spread to adjacent rangelands and destroy native vegetation. This would have long-term indirect effects in localized areas. Delineation of 110,167 acres as suitable for conditional fire suppression for a benefit would improve rangeland vegetation for those species tolerant to wildfire.

Vegetation—Rangelands: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Actions to decrease weeds on BLM-administered lands would indirectly improve rangeland health and community composition by increasing native species, restoring a more natural fire regime, and decreasing the risk of catastrophic wildfire in both the short and long term.

Effects under Alternative A

Weeds actions using prescribed fire and herbicides would disturb or destroy rangeland vegetation in the short term, while in the long term would achieve improved range health and composition more quickly. Prescribed fire is not used to control weeds over large areas, so impacts would be direct, localized, and small scale. Approved biological controls are specific to target species, so there would be no direct impact on nontarget species. To minimize harmful effects, chemical treatments would be applied according to label directions and following established guidelines, best management practices, and standard operating procedures for application. Chemical applications would also be designed to avoid effects on nontarget species, which would be short term but would lead to long-term indirect improvement in vegetation composition. Using Integrated Pest Management (IPM) practices would make use of one, several, or all available management practices, such as chemical, biological, mechanical, or prescribed fire, and would provide an adaptive and effective approach to weed management on rangelands in the long term.

Preparing pesticide and biological use proposals, in addition to cooperating with outside agencies, would ensure that only safe and effective treatments would be used within the WD. This would prevent impacts on nontarget species, such as sagebrush and salt desert scrub species.

Effects under Alternative B

Impacts from weed management actions would be similar to those described under Alternative A.

Effects under Alternative C

Mechanical and biological weed treatments would be used under Alternative C, which would remove weeds, thus indirectly help to achieve rangeland health and composition objectives in the long term. Alternative C would not use prescribed fire or herbicides as weed management tools, which could limit effective control of some invasive species thereby reducing rangeland health in some areas. Approved biological controls are specific to target species, so there would be no impact on nontarget species. Further, preparing biological use proposals, in addition to cooperating with outside agencies, would ensure that only safe and effective treatments would be used within the WD.

Using IPM practices would make use of one or both available management practices, such as biological or mechanical control, to provide an adaptive and effective approach to control pest species and weeds in the long term.

Effects under Alternative D

Impacts from weeds management actions would be similar to those described under Alternative A.

Vegetation—Rangelands: Effects from Chemical and Biological Control

Effects Common to All Alternatives

Using chemical control methods would help control and reduce weed outbreaks. Effects would be similar to those described under weeds management.

Effects under Alternative A

Using both biological and chemical control methods, as well as IPM techniques, would provide an adaptive and effective approach to weed management on rangelands, causing an indirect effect in the long term by removing weeds. Preparing pesticide and biological use proposals, in addition to cooperation with outside agencies, would ensure that only safe and effective treatments would be used within the WD. This would prevent impacts on nontarget species, such as sagebrush and salt desert scrub species.

Effects under Alternative B

Effects from chemical and biological control would be the same as those described under Alternative A.

Effects under Alternative C

The focus on biological control methods would remove some weeds but would limit the effectiveness of weed management on rangelands in the long term under Alternative C, causing an indirect effect. However, use of IPM techniques would provide an adaptive and effective approach to weed management in the long term. Preparing biological use proposals, in addition to cooperating with agencies, would ensure that only safe and effective treatments would be used within the WD.

Effects under Alternative D

Effects from chemical and biological control would be the same as those described under Alternative A.

Vegetation—Rangelands: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Vegetation treatments for range improvement projects would continue to occur at current rates to reach rangeland improvement goals. Projects would vary from year to year based on resource needs and priorities. All range improvements would result in direct, minor, and short-term disturbances to vegetation, including loss of vegetation cover and changes in plant composition adjacent to each project. Indirect effects include increased susceptibility to infestations by noxious and invasive weeds transported by livestock, WHB, wildlife, recreational activities, and other disturbance activities. The use of range improvement projects are intended to maintain and improve vegetation conditions, while making progress toward or meeting rangeland standards for upland plant communities in the long term.

Post-fire rehabilitation efforts, including temporary grazing closures, would reduce the ability for weeds to invade and would support native species growth. This would indirectly help to achieve healthy rangeland conditions in the long term.

Effects under Alternative A

Grazing management systems and practices would decrease fuel loads and would reduce the likelihood of catastrophic fire over large areas, which would destroy native vegetation. Prescriptive grazing would be used, and if applied correctly, this could have direct effects by increasing native vegetative cover, and indirect effects by decreasing weeds on rangelands, which would help to restore a natural fire regime.

Vegetation cover in Alternative A would be directly improved by using a diversity of native and introduced grass, forb, and shrub seeds and seedlings when rehabilitating rangelands. This improvement in vegetative cover would indirectly prevent the invasion of weeds and would reduce the likelihood of catastrophic fire.

A variety of rangeland treatments would be implemented to achieve healthy rangeland conditions throughout the WD. This variety would provide flexibility in BLM’s approach to rangeland rehabilitation and would provide a direct and effective means of achieving rangeland health goals. These treatments would focus on improving the understory of sagebrush communities.

Effects under Alternative B

Grazing management systems and practices would have impacts similar to those described under Alternative A.

Introduced grass and forb seeds would be used under Alternative B when rehabilitating rangelands. This could directly impact rangeland health, productivity, and diversity, depending on which species are chosen for rehabilitation efforts. Impacts would vary on a case-by-case basis.

Crested wheatgrass seedings would be used to provide livestock forage on rangelands, with an emphasis on productivity. Although not a native species, crested wheatgrass would provide vegetative cover and would prevent noxious weed invasion on rangelands. However, this species would not improve rangeland diversity or ecological health and function.

Restoring FRCC to Class 2 levels on 70,000 acres would increase fire return cycles on these lands and would indirectly reduce fire frequency over time. This would prevent noxious weed invasion and indirectly would promote healthy, productive, native vegetation in this area in the long term.

Effects under Alternative C

Option 1

Grazing management systems and practices would have impacts similar to those described under Alternative A.

Rehabilitation efforts would be limited by using only native seeds because in most years seed supplies are exhausted because of demand. As a result, large areas would be untreated, which would allow for noxious weed invasion. This could change the fire regime by increasing wildland fires on these lands, and that would indirectly cause a decline in vegetation condition in the long term.

Fewer treatments would be implemented to rehabilitate rangelands throughout the WD. This would directly limit the effectiveness of rangeland rehabilitation because additional treatments could provide more flexibility towards achieving this goal. These treatments would focus on improving the understory in both sagebrush and salt desert scrub communities, which would impact a larger portion of the WD. In addition, fragmentation of sagebrush would be avoided, and SOPs (Appendix B), BMPs (Appendix B), and mitigation measures would be employed to minimize impacts on sagebrush communities.

Restoring FRCC to Class 2 levels on 70,000 acres would have impacts similar to those described under Alternative B.

Option 2

Grazing would not be permitted under this option. This would have the greatest reduction in impacts on rangelands of all alternatives.

Native seeds would be used when rehabilitating rangelands and the impacts would be similar to those under Alternative C, Option 1.

The impacts from restoring condition class to Class 2 levels on 70,000 acres would be similar to those described under Alternative B.

Effects under Alternative D

The impacts from grazing management systems and practices would be similar to those described under Alternative A. Proper use of prescribed grazing with infrastructure in place would reduce fin fuels in areas containing invasive annual species.

The impacts from using both native and introduced seeds and seedlings to rehabilitate burned areas would be similar to those under Alternative A.

A variety of rangeland treatments would be implemented to achieve healthy rangeland conditions throughout the WD and the impacts would be similar to those described under Alternative A.

Restoring condition class to Class 2 levels on 70,000 acres would increase the fire return cycles on these lands and would indirectly protect native vegetation from catastrophic fire. Impacts would be similar to those described under Alternative B.

Vegetation—Rangelands: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

There likely would be no impacts on rangeland vegetation from riparian and wetland vegetation management actions. Management actions implement to improve PFC in riparian areas may also improve adjacent rangeland health.

Vegetation—Rangelands: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Implementing HMPs that specify vegetation treatments to improve habitat would involve altering species composition and vegetation structure. This would cause a short-term direct disturbance to rangeland vegetation, while improving range condition over the long term.

Mitigation measures would be implemented for actions near nesting migratory birds. This would allow for rangeland management actions to proceed and would protect nesting migratory birds.

Effects under Alternative A

Under this alternative, actions would not prioritize habitats for protection. Lack of such protections could cause impacts from human use and access, including indirect effects from soil disturbance or direct effects from vegetation disturbance. These effects could cause reduced plant vigor and productivity and increased competition from weeds.

Effects under Alternative B

Under this alternative, 716,528 acres of wildlife habitat would be managed as avoidance areas. Mitigation measures including avoidance would be implemented within certain PMUs which would benefit rangelands.

Effects under Alternative C

Under Alternative C 1,279,481 acres of priority wildlife habitat would be delineated. Rangeland vegetation within these areas would be protected due to implementation of use restrictions. Rangeland health would be maintained and improved.

Effects under Alternative D

Under this alternative, 1,199,539 acres of priority wildlife habitat would be delineated. Rangelands within these priority habitat areas would be protected due to use restrictions limiting surface disturbance. Fewer acres with use restrictions would be applicable under this alternative compared to Alternative C.

Vegetation—Rangelands: Effects from Special Status Species Management

Effects Common to All Alternatives

Actions to avoid impacts on listed or sensitive species or their habitat could directly alter implementation or timing of vegetation management treatments. This could indirectly preclude reaching certain management goals, such as having productive and healthy rangelands. Impacts would vary with the type of treatment proposed and the nature and extent of the restrictions.

However, maintenance and improvement of special status species habitat, particularly sagebrush obligates, would directly help to improve rangeland health and diversity throughout the WD.

Effects under Alternative A

Developing site-specific mitigation measures to protect and reduce adverse impacts on special status plants, sage-grouse and sage-grouse leks, pygmy rabbits, bat habitat, and raptors, would improve rangeland health and habitat.

Effects under Alternative B

Alternative B places the least stringent restrictions on actions near special status plants, sage-grouse and sage-grouse leks, pygmy rabbits, bat habitat, and raptors. However, these restrictions could still directly impact rangeland vegetation management by limiting the type, timing, and location of stand treatments. This would indirectly prevent range health, composition, diversity, and productivity goals from being achieved. Such restrictions would limit multiple uses in certain areas near special status species. However, special status species protections would help create a lower level of disturbance on rangelands, causing an indirect effect by providing for lower potential for weed spread and soil disturbance in these areas. Impacts would vary depending on the location and rangeland management actions proposed.

Effects under Alternative C

Alternative C places the greatest amount of restrictions on uses that could occur within special status species' habitats. This alternative has the greatest number of acres subject to use restrictions and the highest potential to improve rangeland health. Rangeland with all PMUs would improve as these areas would be closed to saleable minerals, solid minerals, fluid minerals, and ROWs.

Effects under Alternative D

Impacts from these actions would be similar to those described under Alternative A. Use restrictions within delineated priority sage-grouse habitat areas would limit disturbance and improve rangeland health. Management of general sage-grouse habitat areas would include implementation of mitigation measures for habitat, which would also health improve rangeland conditions.

Vegetation—Rangelands: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Impacts on vegetation resulting from WHB management actions include direct effects, such as removing forage, and indirect effects, such as compacting soil, which alter the amount, condition, production, and vigor of vegetation in grazed areas. Impacts from WHB management may occur from yearlong use, indirectly resulting in lower vigor of desired plant species and a change in plant species composition. Overuse of vegetation adjacent to water sources, troughs, and livestock reservoirs results in a loss of plant cover. This allows localized areas to become dominated by invasive plants. Vegetation recovery on a burned area could be slowed or reduced by wild horses and burros.

Effects under Alternative A

Maintaining established AMLs as a population range, using gathers when AML is exceeded, and using fertility control agents would be the most effective in maintaining WHB numbers within AML. This would indirectly result in improved vegetation conditions by reducing the impact of WHB on rangeland vegetation.

Converting AML between wild horse use and burro use would spread impacts on rangelands through time, as the species have different habitat and forage preferences. Managing for the proper species (horse vs. burro) based on vegetation type and terrain will be better for the habitat and the animals due to the fact that each one generally is more adjusted to a particular habitat, and each uses vegetation differently. For example, burros in a desert shrub-dominated HMA will do much better than horses. Maintaining the free-roaming nature of WHB would spread impacts geographically through the HMAs. Both actions would indirectly benefit rangeland health by minimizing WHB impacts on vegetation.

WHB protections, such as limitations to certain proposed activities, such as motor vehicle racing, would protect desirable vegetation from disturbance and would indirectly prevent rangeland impacts from soil compaction and weed spread in the long term.

Effects under Alternative B

Impacts from population control measures under Alternative B would be similar to those under Alternative A.

AML reduction in response to decreased WHB private water supply would improve vegetation conditions by reducing the impact of WHB on rangeland vegetation.

Under Alternative B, AML would not be converted between wild horse use and burro use, which would impact rangeland health by concentrating direct WHB impacts, such as trampling, and indirect impacts, such as compaction and weed spread, within the HMAs.

Protection measures for WHB would have impacts similar to those described under Alternative A.

Effects under Alternative C

Alternative C would control WHB populations by maintaining AML as a single number, using four-year (or longer) gather cycles, and would not allow use of fertility control agents. This would have the greatest indirect impact from WHB on rangelands by ineffectively managing WHB populations to reduce impacts on rangeland vegetation. However, actions would still decrease the risk of soil compaction, trampling, and weed spread or introduction. Range health, plant community composition, and plant productivity would be directly and indirectly impacted. However, AML reduction in response to decreased water availability for WHB would decrease impacts of WHB on rangeland vegetation.

Impacts from conversion of AML between wild horse use and burro use, as well as from maintaining the free-roaming nature of WHB within HMAs, would be similar to those described under Alternative A.

Protection measures for WHB would be the greatest under Alternative C and would prohibit or limit certain activities, such as motor vehicle racing, in HMAs unless impacts were determined to be minimal. This would protect soils and vegetation from disturbance and would prevent destruction of rangelands from human use, including direct effects from trampling and indirect effects from dust and litter.

Effects under Alternative D

Impacts from population control measures and development of alternative water sources would be similar to those described under Alternative A.

Managing for the proper species (horse vs. burro) based on vegetation type and terrain will be better for the habitat and the animals due to the fact that each one generally is more adjusted to a particular habitat, and each uses vegetation differently. For example, burros in a desert shrub-dominated HMA will do much better than horses. Impacts from conversion of AML between wild horse use and burro use, as well as from maintaining the free-roaming nature of WHB within HMAs, would be similar to those described under Alternative A.

Impacts from WHB protection measures would be similar to those described under Alternative A.

Vegetation—Rangelands: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildland fires result in short-term direct loss of vegetation and a long-term change of community composition. The vegetation response to fire depends on the size, location, intensity, season, timing, and amount of annual precipitation, the preexisting plant community condition, and the abundance of noxious and invasive weeds in the area. Fires have direct effects by changing the composition of the plant community, altering plant succession, and removing woody vegetation and plant litter. Wildland fires might burn with sufficient heat to kill soil organisms and root systems, resulting in diminished plant recruitment and growth rates, particularly for fire-sensitive species. Emergency stabilization and burned area rehabilitation treatments, such as seeding with native perennial plant species, would be implemented to rehabilitate impacted rangelands and improve rangeland health in the long term.

Indirectly, wildland fires impact rangelands by creating an opportunity for the establishment or spread of noxious and invasive weeds. This is because fires remove aboveground vegetation, leaving burned areas with bare soil that is more susceptible to noxious and invasive weed establishment. Some species of noxious and invasive weeds respond well to post-fire conditions and outcompete native species. In areas where noxious and invasive weeds occur or are in close proximity, wildland fire increases the opportunity for weed expansion. Firefighters and their equipment might also introduce or spread noxious and invasive weeds. Some mechanical control activities, such as dozer lines, disturb the soil surface and remove vegetation, creating an opportunity for the establishment or spread of noxious and invasive weeds.

Wildfire suppression and the creation of fuel breaks would prevent catastrophic destruction of rangelands, which would indirectly preserve native vegetation and diversity in these areas over the long term. Surface disturbance resulting from fire line construction, use of heavy equipment, and other fire suppression activities would directly damage vegetation and would have indirect effects by accelerating soil erosion in localized areas. However, these areas would be rehabilitated to minimize long-term impacts.

Because fire retardants are composed largely of nitrogen and phosphorus fertilizers, they may encourage growth of some species at the expense of others, resulting in changes in community composition and species diversity. Differential growth may also influence herbivorous behavior; behavior, in particular, invertebrate and vertebrate herbivores tend to favor new growth following disturbances.

Fuels management actions would result in short-term direct loss of vegetation on a small scale. Projects would reestablish native vegetative communities, providing for healthy, diverse rangelands over the long term. These actions would allow fire to play its natural role more frequently and would reduce the likelihood of catastrophic wildfire, which would indirectly protect native rangeland vegetation in the long term and over large areas.

Implementing a response to wildfires based on social, legal, and ecological consequences of the fire would indirectly protect rangelands from catastrophic fire, which would protect native vegetation, prevent noxious weed invasion, and maintain rangeland productivity and health.

Effects under Alternative A

No additional impacts would occur from wildland fire management actions under Alternative A. Post fire rehabilitation would re-establish pre-fire ecosystem structure and function.

Effects under Alternative B

Under this alternative, 110,167 acres of land would be designated as suitable for conditional fire suppression management for a benefit. These areas would be more vulnerable to noxious weed invasion, which would indirectly degrade rangelands and prevent the establishment of native vegetation. However, because many of the areas contain vegetation that is adaptive to the fire cycle, burning impacts on these areas would be minimized. Improved vegetation structure, age classes, and species composition would occur after burning.

Effects under Alternative C

No additional impacts would occur from wildland fire management actions under Alternative C.

Effects under Alternative D

Under Alternative D, 110,167 acres would be designated as suitable for conditional fire suppression management for a benefit. Impacts would be the same as those described under Alternative B.

Vegetation—Rangelands: Effects from Cultural Resources Management

Effects Common to All Alternatives

Protections to cultural resources would indirectly prevent disturbance and fragmentation of rangelands, providing for a more healthy and resilient community. These areas are small relative to the total area of the WD, so impacts would be localized.

Site monitoring, conservation measures, use restrictions, and law enforcement actions would indirectly prevent disturbance to and degradation of rangelands, while potentially impacting the ability to reach other rangeland vegetation goals over the long term in certain areas.

Vegetation—Rangelands: Effects from Tribal Consultation

Effects Common to All Alternatives

Consulting with tribes to identify culturally significant plants, important habitats, and traditional use locations would emphasize protection of natural resources, including rangelands. This would limit disturbance and indirectly foster vegetation health over the long term in certain areas. Consultation could place higher treatment priority in areas not previously identified or could limit actions in planned treatment areas. Impacts would vary on a case-by-case basis and are likely to be localized.

Vegetation—Rangelands: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Areas with paleontological resources are small and localized within the WD. As a result, impacts from paleontological management actions on rangelands would be limited.

Vegetation—Rangelands: Effects from Visual Resources Management

Effects Common to All Alternatives

Implementing VRM guidelines, particularly managing WSAs as Class I, would increase the difficulty of accomplishing vegetation management actions and may affect the dimensions and locations of rangeland treatments. Designing and implementing vegetation treatments could be affected by achieving VRM objectives. Objectives could restrict the location, shape, or number of acres treated, making vegetation treatments less effective in certain areas.

Effects under Alternative A

Under Alternative A, 420,271 acres and 346,302 acres would be managed to VRM Class I and II guidelines, respectively. Achieving VRM objectives may limit the scope of vegetation management treatments. Overall, meeting VRM Class I and II guidelines would increase the difficulty of accomplishing vegetation management actions and would limit the extent or effectiveness of treatments.

Effects under Alternative B

Under Alternative B, 417,605 acres and 391,203 acres would be managed to VRM Class I and II guidelines, respectively. This alternative is the least restrictive to rangeland treatment implementation. Impacts would be similar to those described under Alternative A.

Effects under Alternative C

Under Alternative C, 417,605 acres and 3,083,211 acres would be managed to VRM Class I and II guidelines, respectively. This alternative would be the most restrictive to rangeland treatment implementation. Impacts would be similar, although greater in magnitude, than under Alternative A.

Effects under Alternative D

Under Alternative D, 417,605 acres and 2,780,416 acres would be managed to VRM Class I and II guidelines, respectively. Impacts would be most similar in nature and magnitude to Alternative C.

Vegetation—Rangelands: Effects from Cave and Karst Resource Management

Effects Common to All Alternatives

There likely would be no impacts on rangeland vegetation from cave and karst resource management actions.

Vegetation—Rangelands: Effects from Livestock Grazing Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from livestock grazing management.

Effects under Alternative A

Direct impacts on vegetation resulting from livestock grazing management actions include removing forage, which alters the amount, condition, production, and vigor of vegetation in grazed areas. Impacts from livestock grazing are usually related to a long duration of use during the growing season, resulting in lower vigor of desired species and a change in species composition. Often, the vegetation is disturbed around salting areas, bed grounds, troughs, and stock reservoirs, and there is a loss of plant cover, which usually results in localized areas dominated by invasive plants. Further, degraded rangeland that is grazed yearly lacks substantial native vegetation to outcompete invaders.

Livestock grazing would be open on 8,232,727 acres of land under this alternative, which would have the greatest impact on rangeland management. Impacts could occur as described above, but actions under Alternative A must maintain and improve rangeland in accordance with the Standards for Rangeland Health.

To minimize impacts on rangelands, grazing management strategies, such as rotation, deferment, rest from use, season of use and grazing intensity, would be implemented. These strategies would help to manage vegetation composition, cover, and would provide rest periods for individual plant growth and vigor along with seed production to maintain plant vegetation community health. The goal of these strategies is to maintain and improve vegetation conditions while making progress toward or meeting rangeland health standards for upland plant communities. The response of vegetation to these strategies would be monitored, and adjustments would be made accordingly to achieve the desired response. Range improvement actions would also be implemented to help increase native vegetation and to decrease the number and extent of noxious and invasive weed infestations in the long term.

Lands closed to grazing on the remainder of land in the WD would experience reduced impacts on rangeland vegetation, as livestock would not be compacting soils or acting as mechanisms for noxious and invasive weed seed dispersal.

Effects under Alternative B

Livestock grazing would be open on 8,232,727 acres of land under this alternative. Grazing, including that on acquired lands, allowed temporary nonrenewable use, and allowed continuous season-long use, would facilitate the most intensive land use. Impacts would be similar to those described under Alternative A.

Range improvement actions would directly help to increase native vegetation and subsequently decrease the number and extent of weed populations in the long term. However, these actions would be difficult to implement successfully and efficiently under Alternative B, due to the large acreage that would be open to grazing.

Those lands closed to grazing in the WD would have lower indirect impacts on rangeland vegetation in these areas, as livestock would not be compacting soils, disturbing native vegetation, or acting as a mechanism for noxious and invasive weed seed dispersal.

Effects under Alternative C

Option 1

Livestock grazing would be open on 8,038,084 acres of land under this alternative. Grazing would facilitate noxious and invasive weed spread and introduction similar to impacts described under Alternative A. However, Alternative C, Option 1 would not allow grazing on acquired lands or temporary nonrenewable use and would only allow for two years of consecutive grazing during the critical growth period. This would minimize the intensity of land use and impacts from livestock and would foster improved rangeland health and productivity.

Lands closed to grazing in the WD would experience lower indirect impacts on rangeland vegetation, as livestock would not be compacting soils or acting as a mechanism for noxious and invasive seed dispersal.

Range improvement actions would be somewhat more restricted and potentially limiting the type, timing, and location of rangeland treatments.

Option 2

Livestock grazing would be closed on all lands within the WD. This alternative would be the most effective at reducing impacts on rangeland vegetation caused by livestock on BLM-administered lands.

Effects under Alternative D

Alternative D would have 8,016,754 acres of land open to grazing. Impacts would be similar to those described under Alternative A, except with fewer acres of BLM-administered lands open to grazing.

Impacts from range improvements would be similar to those described under Alternative B.

Vegetation—Rangelands: Effects from Minerals Management

Effects Common to All Alternatives

General

Impacts on rangeland vegetation could result from fluid, leasable, and locatable mineral development and mineral material sales and disposal. Most minerals management impacts on vegetation are on the sagebrush and saltbush scrub communities. Direct impacts associated with these actions include loss or injury of plants due to excavation and toxic responses from chemical use in mineral extraction. Indirect impacts include increased exposure to dust and other contaminants associated with construction of infrastructure and use of access roads. In the worst-case scenario, all vegetation would be removed from a parcel of land, and the site would be permanently altered. Regulations, although they might differ among the mineral categories, are in place to protect existing vegetative communities or to ensure the reestablishment of desirable vegetation following completion of the mineral and fluid management actions. Overall, rangeland vegetation could be altered by minerals management actions, but mitigation measures would be implemented to lessen the impact on vegetation resources.

RFDs

Under the reasonably foreseeable development scenario, impacts on rangeland vegetation would continue. Vegetation would be fragmented, which would increase the susceptibility of the community to noxious and invasive weed invasion in the long term.

Effects under Alternative A

Alternative A would open the greatest acreage and would close the least acreage to mineral development, thus having the greatest likelihood of impacting rangeland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative B

Compared with Alternative A, Alternative B would open fewer acres and would close more acres to mineral development, thus having less likelihood of impacts on rangeland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative C

Alternative C would open the fewest acres and would close the most acres to mineral development, thus having the least likelihood of impacts on rangeland vegetation of all the alternatives. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative D

Compared with Alternatives A and B, Alternative D would open fewer acres and would close more acres to mineral development, thus having less likelihood of impacts on rangeland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Vegetation—Rangelands: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

Managing BLM-administered lands to provide dispersed recreation could impact rangelands throughout the WD through direct means, such as human disturbance to vegetation, and indirect means, such as noxious and invasive introduction or spread.

OHV use would result in direct impacts on vegetation, such as reduced vegetative cover and density, as well as indirect effects, such as soil compaction and increased dust. OHV users would introduce and spread noxious and invasive weed seeds from their vehicles, shoes, clothing, and recreation equipment. OHV activities in undisturbed and remote areas could distribute noxious and invasive weed seeds into weed-free areas. These indirect effects could decrease plant vigor and productivity, alter community plant composition, and cause plant mortality on rangelands.

To manage OHV use, the Transportation Plan would be updated and would account for impacts on rangeland vegetation. Site-specific NEPA analysis would be done on an implementation level to minimize impacts on rangeland vegetation.

Effects under Alternative A

Under Alternative A, there would be no camping limitations or prohibitions throughout the WD. In addition, the Pine Forest SRMA would be maintained, and issuance of special recreation permits would be the least restrictive of all the Alternatives. The greatest acreage would be open to OHVs under Alternative A (6,789,612 acres), the least amount of land would be limited (423,786 acres), and 17,698 acres would be closed. Combined, these actions could degrade rangelands throughout the WD as described under Effects Common to All Alternatives.

Effects under Alternative B

Camping limitations and prohibitions throughout the ERMA would minimize impacts on rangeland vegetation on these lands. In addition, designating four SRMAs would impact range vegetation to varying degrees, depending on the recreation market identified for the SRMA. For example, the Nightingale SRMA would be targeted for undeveloped recreation-tourism, which would have less of an impact than the Winnemucca and Pine Forest SRMAs, which allow for increased motorized vehicle access. The Granite Range SRMA would promote self-directed recreational activities, which would be mostly on foot and thus have limited impacts on rangelands. Under Alternative B, 1,460,200 acres would be open to OHVs, with the least amount of land closed (17,698 acres) and with 5,743,198 acres limited. These actions could degrade rangelands throughout the WD. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed.

Issuance of special recreation permits would be the least restricted under this alternative, which could cause some direct impacts on rangelands through increased human use and trampling, and indirect impacts through soil compaction, increased litter, and noxious weed invasion.

Effects under Alternative C

Camping limitations and prohibitions throughout the ERMA would have similar impacts on rangelands as Alternative B. In addition, the designation of two SRMAs would have impacts on rangeland vegetation similar to those described under Alternative B. Under Alternative C, no acres would be open to OHVs, 43,521 acres would be closed, and 7,187,575 acres would be limited. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed. As such, impacts on rangeland vegetation from recreation actions would be fewest under this alternative, as it is the most restrictive and prohibitive. However, impacts would occur, and they would be similar to those described under Effects Common to All Alternatives.

Issuance of special recreation permits would be the most restrictive under Alternative C and would cause the fewest direct impacts on rangeland vegetation through increased human use and trampling and indirect impacts through soil compaction, increased litter, and noxious and invasive weed infestation.

Effects under Alternative D

Camping limitations and prohibitions throughout the ERMA would have impacts similar to those described under Alternative B. In addition, designating four SRMAs would have the same impacts on rangeland vegetation as those described under Alternative B. Under Alternative D, 288,105 acres would be open to OHVs, 17,577 acres would be closed, and 6,925,414 acres would be limited. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed. Together, impacts from these actions would be similar to those described under Effects Common to All Alternatives.

Issuance of special recreation permits would cause impacts similar to those described under Alternative A.

Vegetation—Rangelands: Effects from Renewable Energy Management

Effects Common to All Alternatives

Direct impacts on rangeland vegetation could occur with issuance of new ROWs, which require access roads and would disturb or destroy vegetation. ROWs may spread or introduce noxious and invasive weeds, indirectly reducing rangeland health and diversity. However, BMPs, stipulations, and mitigation measures would be implemented, which would minimize impacts on rangeland vegetation.

Effects under Alternative A

Maintaining existing exclusion areas within the WD could limit the type and timing of treatments and multiple use activities on rangelands. However, this action would protect and limit disturbance to native vegetation and would prevent noxious and invasive weed establishment or spread.

Effects under Alternative B

Designating avoidance areas within the WD would limit certain ROWs. By limiting or avoiding ROWs in these areas rangeland vegetation would be better protected, .

Effects under Alternative C

Under Alternative C, the BLM would designate the largest acreage of avoidance areas and exclusion zones of all the alternatives. This would have the greatest impact on rangelands by limiting the disturbance to vegetation and soils. Limiting disturbance also helps prevent noxious and invasive weed spread from ROW development. Designating avoidance areas and exclusion zones within the WD under Alternative C would maintain and improve rangeland health in those areas.

Effects under Alternative D

Designating avoidance areas and exclusion zones within the WD would have impacts on noxious and invasive weed management similar to those described under Alternative C.

Vegetation—Rangelands: Effects from Transportation and Access Management

Effects Common to All Alternatives

Maintaining roads necessary for fire suppression would provide access to rangelands and would allow for suppression of wildfires when necessary. This would indirectly help to protect rangeland vegetation and would effectively manage fire on these lands in the long term.

Noxious and invasive weed control measures would prevent the spread of weeds onto rangelands, preventing competition with native species, and would indirectly help to achieve healthy rangeland conditions.

Effects under Alternative A

Transportation actions under Alternative A would not protect wildlife, sensitive species, or their habitat. As a result, rangelands could be directly impacted by road and trail construction through vegetation removal. Rangelands could be indirectly affected by soil compaction, noxious and invasive weed establishment, and increased dust. However, improved and increased access to rangelands would facilitate implementation of range treatments and would allow for multiple uses.

Effects under Alternative B

Transportation actions to minimize effects on wildlife, sensitive species, and habitat would protect and limit disturbance to vegetation and soils and would prevent noxious and invasive weed establishment or expansion from road or trail construction or transport on vehicles. However, these actions could limit access to certain rangelands for management and would prevent multiple uses in certain areas.

Effects under Alternative C

Transportation actions to minimize effects on wildlife, sensitive species, and habitat would have impacts similar to those described under Alternative B.

Effects under Alternative D

Transportation actions to minimize effects on wildlife, sensitive species, and habitat would be similar to those described under Alternative B.

Vegetation—Rangelands: Effects from Lands and Realty Management

Effects Common to All Alternatives

Land and realty management actions would result in direct effects, such as short-term surface disturbance and vegetation removal, and indirect effects such as increased susceptibility to noxious weed invasion or spread of existing weed patches. Disturbed areas would be reclaimed and seeded. Land sales could affect vegetation resources by changing the vegetative cover through urbanization or agricultural or industrial development.

Vegetation and wildlife habitat value would be given consideration when the WD makes disposal and acquisition decisions. Impacts on rangeland vegetation would vary on a case-by-case basis, but impacts would be minimized because only lands with little resource values would be identified for disposal, and further NEPA documentation would minimize potential impacts on rangelands. Acquisition of rangelands would provide additional opportunities to achieve rangeland objectives.

ROWs cause habitat alteration from their footprint for the facilities that are authorized and could have direct effects by causing removal of vegetation. Indirect effects include soil compaction, noxious weed invasion, and increased dust in these areas. Most of the footprints are localized and cover a small area, but ROWs tend to be linear and may stretch for miles. Many of the impacts associated with ROWs can be mitigated on a case-by-case basis.

Effects under Alternative A

Issuance of ROWs would not be limited, and avoidance areas or exclusion zones for lands and realty management actions would not be designated under Alternative A. Impacts would be similar to those described under Effects Common to All Alternatives. However, no restrictions would be placed on range treatments, thus increasing the potential that a healthy range condition could be achieved throughout, or in portions of, the WD.

Effects under Alternative B

The impacts from designating avoidance areas would be similar to those described under renewable energy management actions under Alternative B. More mitigation measures would be applicable including avoidance of ROW development. Rangeland health would be maintained and improve over time.

The impacts from issuing ROWs would be similar to those described under Alternative A.

Effects under Alternative C

The impacts from designating avoidance areas and exclusion zones would be similar to renewable energy management actions under Alternative C.

ROW exclusion areas would protect and limit vegetation disturbance, fragmentation, and noxious weed invasion or spread from ROW development. This would help to maintain healthy rangeland vegetation over the long term.

Effects under Alternative D

The impacts from designating avoidance areas and exclusion zones would be similar to renewable energy management actions under Alternative D.

The impacts from issuing ROWs would be similar to those described under Alternative C. However the number of acres delineated as exclusion areas are fewer.

Vegetation—Rangelands: Effects from ACEC/ RNA Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from ACEC/RNA management.

Effects under Alternative A

Maintaining the Osgood Mountains ACEC would protect vegetation and habitat and would indirectly prevent disturbance and fragmentation of rangeland within the ACEC by limiting human uses, such as recreation and development.

Effects under Alternative B

Effects from ACEC/RNA management under Alternative B would be the same as those described under Alternative A.

Effects under Alternative C

Designating four ACECs within the WD would limit human uses in these areas and would provide the greatest protection to native vegetation and would indirectly prevent disturbance and fragmentation of rangeland within these ACECs. However, implementing certain range rehabilitation treatments could be limited in areas, depending on habitat sensitivity.

Effects under Alternative D

Effects from ACEC/RNA management under Alternative D would be the same as those described under Alternative C.

Vegetation—Rangelands: Effects from Backcountry Byways Management

Effects Common to All Alternatives

Backcountry byways may attract more tourism to areas they access and could increase human use and degradation of nearby rangelands. The only BCB is the Lovelock Cave, but expanding BCBs could cause greater impact on rangelands. Impacts would vary depending on the locations of new BCBs and the areas they would access.

Vegetation—Rangelands: Effects from National Historic Trails Management

Effects Common to All Alternatives

There likely would be no impacts from national historic trails management because these actions would not affect rangeland vegetation management.

Vegetation—Rangelands: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures within the 13,583 acres of WSR corridor that would preserve the values supporting segment eligibility. This would include measures to promote the maintenance of upland vegetative communities within the eligible river segment corridors. However, it is not expected that the condition of these portions of rangelands would be degraded under the new RMP, which would preclude the need for additional protective actions under WSR management.

Effects under Alternative B

There would be no impacts on rangelands resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on rangelands resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would likely be no impacts on rangelands from WSR management so long as WSA, priority habitat, and priority watershed management, as outlined in the remainder of the RMP, is implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented within the 13,583 acres of eligible WSR corridors, which would cause effects identical to those described under Alternatives A and C until a new determination of NWSRS suitability is made.

Vegetation—Rangelands: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

WSAs are protected areas and would prevent disturbance to native vegetation in certain rangeland areas within the WD. Maintaining, and/or improving, natural conditions is a high priority in wilderness areas. Biological, chemical, and mechanical control all have been and continue to be used in wilderness to control invasive species. Rangeland vegetation treatments would need to be evaluated for their impacts on wilderness characteristics.

Effects under Alternative A

Wilderness characteristic areas would not be designated under Alternative A. As a result, there would be no restrictions on rangeland management actions. This would indirectly allow management objectives to be achieved over the long term.

Effects under Alternative B

Under Alternative B, the BLM would manage eight areas containing wilderness characteristics to meet multiple use and sustained yield objectives. As a result, rangeland management actions would not be restricted, which would benefit rangeland vegetation. Allowing multiple uses could allow some impacts on rangeland vegetation from trampling, weed introduction, or other human disturbances.

Effects under Alternative C

Under Alternative C, as under Alternative B, the BLM would manage eight areas containing wilderness characteristics. However, Alternative C would impose restrictions and stipulations in these areas, including closing mineral leasing and ROW exclusion zones, which would benefit rangeland vegetation. However, rangeland management actions would be restricted within lands with wilderness characteristics.

Effects Alternative D

Under Alternative D, the BLM also would manage eight areas containing wilderness characteristics. Mitigation measures to protect wilderness characteristics would be developed on a case by case basis. Implementation of these measures would improve rangelands.

Vegetation—Rangelands: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

WWV sites could impact rangeland vegetation by allowing for more human disturbance of the sites over the long term. Direct impacts include trampling or destruction of vegetation, and indirect effects include soil compaction. This could result in reduced plant vigor or productivity.

Effects under Alternative A

An unspecified number and location of WWV sites would be developed and maintained under this alternative. The magnitude of impacts would vary depending on the amount of WWV sites developed. Impacts would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative B

Six WWV sites would be maintained under Alternative B. Impacts would occur in these areas and would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative C

Impacts on rangeland vegetation are the fewest under this alternative since new routes through or near sensitive areas and increased traffic to remote areas would be avoided. This would reduce human disturbance, described under Effects Common to All Alternatives. However, impacts would still occur and would be similar to those described under Effects Common to All Alternatives.

Effects under Alternative D

Impacts would be the same as those described under Alternative B.

Vegetation—Rangelands: Effects from Public Health and Safety Management

Effects Common to All Alternatives

There likely would be no impacts on rangeland vegetation from public health and safety management actions.

Vegetation—Rangelands: Effects from Sustainable Development Management

Effects Common to All Alternatives

Sustainable development management actions apply to areas that have already been developed and likely do not have rangeland vegetation. Because sustainable development management actions would involve facility reuse, new operations would not create new disturbance. As a result, there would be few impacts on rangelands from sustainable development actions.

Effects under Alternative A

There are no actions under Alternative A that relate to sustainable development.

Effects under Alternative B

Sustainable development actions, including management actions for disposal and reuse, would Rangeland health would be maintained and improved as fewer new disturbance footprints would be necessary for new development.

Effects under Alternative C

Impacts related to reuse of public lands would be similar to Alternative B. Having a no net loss of public lands from disposal actions might limit sustainable development opportunities and more public lands may be subject to new development and disturbance to rangeland vegetation.

Effects under Alternative D

Impacts from sustainable development actions would be the same under Alternative D as those described under Alternative B.

Vegetation – Rangeland: Cumulative Effects

Past and Present Actions

Past and present impacts resulting from livestock and WHB grazing include removal of native vegetation increasing erosion potential and the spread potential for noxious weeds and invasive plants in areas of concentrated grazing. From 1982 to the present, current land use plans have employed management actions to reduce concentrated grazing and have improved conditions in areas based on progressing towards or meeting standards for rangeland health. Minerals, lands and realty, renewable energy, and recreation activities and wildfires have removed vegetation. With native species removed or damaged, noxious weed and invasive plants have readily established and has resulted in increased difficulty in re-establishing native or non-noxious species. Seeding disturbed areas has deterred establishment of weeds and invasive plants in areas. Habitat restoration actions applicable to special status species management have improved vegetation health and diversity through seeding or planting. Impacts on rangeland vegetation within HMAs have occurred where excess horses have exceeded AML rendering rangeland vulnerable to weed establishment and spread. Gathering excess WHB above AML has improved rangeland vegetation diversity and health. Implementing BMPs, SOPs, project specific mitigation measures, permit stipulations, integrated weed management techniques, post fire emergency stabilization and rehabilitation and designation of areas with use restrictions have reduced the potential for weed and invasive plant establishment and spread and have increased rangeland health and diversity. Implementing fuel breaks has reduced the potential for fire spread and have protected rangelands.

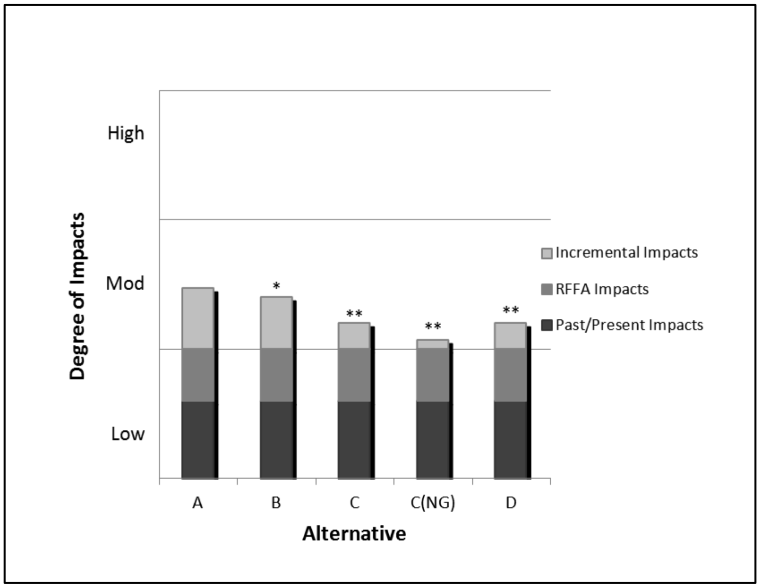
Reasonably Foreseeable Actions

Management efforts designed to achieve land health standards or no grazing of livestock would reduce the size and number of areas where concentrated livestock and WHB grazing would occur, resulting in fewer areas vulnerable to erosion, or where weeds and invasive plants would establish. Increases in mineral, lands and realty, and renewable energy actions and increases in recreational use would generate more potential for removal of vegetation. These impacts would be reduced by implementing BMPs, SOPs, and required mitigation measures and permit stipulations that would include requirements to rehabilitation or restore rangelands after disturbance. Increasing OHV use would have restrictions due to OHV travel management designations. Impacts would vary based on the number of acres designated for open, closed, and limited travel. Maintaining WHB populations at AML would reduce impacts on native vegetation communities. Emergency fire and rehabilitation efforts, including seeding would stabilize and deter establishment of weeds and invasive plants in the long term. Construction of fuel breaks with emphasis at a landscape scale would reduce fire spread potential, thereby reducing the size of burned areas and associated impacts on plant communities. Habitat restoration or improvement projects would improve health and diversity of vegetation. Vegetation in areas protected through priority wildlife habitat or priority watershed designations and ACECs would receive further protection due to use restrictions. Land tenure actions could impact plant species by increasing the ability to apply management tools to lands previously privately owned. Conversely, once an area is no longer managed as public lands, these management actions may no longer be applied.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

Requirements to meet standards for rangeland health or removal of livestock would stabilize grazing impacts allowing for healthier, diverse and resilient vegetation communities within District management areas. Other strategies include implementation of BMPs, SOPs, mitigation measures, and permit stipulations applicable to minerals, lands and realty, and renewable energy developments to reduce impacts also reclaimed disturbed areas would improve conditions over time. The degree and intensity of impacts would vary by alternative. OHV travel management would reduce impacts on range vegetation depending on the number of acres designated as open, closed or limited. Use restrictions in priority wildlife and watersheds would protect native plant communities by limiting disturbance in those areas. These impacts would vary based on the number of acres designated as no disturbance or no surface occupancy, which vary by alternative. Overall incremental impacts on rangeland vegetation would be moderate and would vary based on the size and number of areas disturbed or protected through special designations that restrict uses (Figure 4-5).

Figure 4-5. Cumulative Impacts on Rangeland Vegetation by Alternative



Degree of Impact Assumptions: * Proposed ROW avoidance areas.
** Proposed priority watersheds, priority wildlife habitat, special status species management, and ACEC management would include use restrictions, reducing potential for disturbance to vegetation. ROW exclusion areas also apply under Alternatives C and D. Alternative C proposes more areas with use restrictions. C(NG) = no-grazing option of Alternative C. Note: Degree of impacts is qualitative in nature.

4.2.8 Vegetation—Riparian Habitat and Wetlands

Summary

This vegetative analysis is qualitative because specific impacts of resource activities on vegetation cannot be quantified. A more detailed analysis would follow at the implementation stage, such as an allotment evaluation and EA or a permit renewal EA to comply with NEPA. The greatest impact on riparian or wetland habitat within the WD would be from livestock grazing, WHB, water resources, special status species, soils, and wildland fire actions. There would be fewer impacts on riparian or wetland habitat from other resources including forest and woodland vegetation, weeds, chemical and biological control, rangeland vegetation, fish and wildlife, tribal consultation, visual resources, wilderness characteristics, mineral resources, recreation, renewable energy, transportation and access, lands and realty, ACECs/RNAs, BCBs, WSRs, wilderness study areas, watchable wildlife viewing sites, and sustainable development. However, it is the BLM's judgment that several of the resources listed below are not likely to impact riparian or wetland habitat resources. These areas are air, cultural resources, geological resources, paleontological resources, caves and karsts, national historic trails, and public health and safety.

Alternative C would provide the most protection to riparian and wetland vegetation by restricting treatments, activities, and OHV use in these areas. Alternative D would provide a more flexible approach by protecting these areas while allowing for multiple uses. Alternatives A and B would provide less protection for riparian and wetland areas.

Methods of Analysis

Methods and Assumptions

Impacts were identified using best professional judgment and were assessed according to the following methods and assumptions:

- Activities generally affect vegetation by changing plant composition, seral condition, structure, production, ground or canopy cover, and soil resources;
- Restoring riparian and wetland vegetation is assumed to include an improvement in species composition and structure, including stand density and age, where appropriate;
- Vegetation communities would be maintained with a mix of species composition, cover, and age classes within the site potential;
- Noxious and invasive weeds would continue to be introduced and spread as a result of ongoing vehicle traffic in and out of the WD, recreational activities, wildlife and livestock grazing and their movements, and surface-disturbing activities;
- Noxious and invasive weeds would further expand into native plant communities, and disturbances to these communities would expand opportunities for the spread of nonnative invasive plant species; and
- The BLM would continue to treat noxious and invasive weeds and pests on public land and grazing allotments. Livestock permit holders, ROW holders, mineral lease claim, and permit holders would continue to treat noxious and invasive weeds and pests on public land, as stipulated within their permits and authorizations.

Some impacts would be direct, while others would be indirect and affect vegetation through a change in another resource. Direct impacts on riparian vegetation are disruption, trampling, or removal of rooted vegetation, resulting in a reduction in areas of native vegetation; mortality resulting from toxic chemicals; and actions that unequivocally reduce total numbers of plant species or reduce or cause the loss of total area, diversity, vigor, structure, or function of wildlife habitat.

Potential indirect impacts include loss of habitat suitable for colonization due to surface disturbance; introduction of noxious and invasive weeds by various mechanisms or conditions that enhance the spread of weeds; and general loss of habitat due to surface occupancy or surface compaction. Indirect impacts include those that cannot be absolutely linked to one action, such as decreased plant vigor or health from reduced water quality. Public uses that affect groundwater tables such as from mineral development or water importation or exportation projects would also cause indirect affects to riparian areas. Impacts include loss of or reduced size of riparian areas or reduced plant vigor due to loss of or reduction of surface water flows as a result of groundwater pumping.

Vegetation—Riparian Habitat and Wetlands: Effects from Air Quality Management

Effects Common to All Alternatives

There likely would be no impacts on riparian and wetland vegetation from air quality management.

Vegetation—Riparian Habitat and Wetlands: Effects from Geology Management

Effects Common to All Alternatives

There are no likely impacts on riparian and wetland vegetation from geology resource management unless unique features are located within or near riparian areas. Avoiding features would reduce impacts from disturbing riparian areas immediately adjacent to geologic resources. Rerouting roads or relocating facilities to avoid features may increase the potential for disturbance of riparian areas depending on the location and size of disturbance proposed. In general impacts on riparian areas would be minor.

Vegetation—Riparian Habitat and Wetlands: Effects from Soil Resources Management

Effects Common to All Alternatives

Soil erosion reduction measures, involving seeding and improving vegetative cover, would reduce compaction and increase infiltration, which would indirectly improve riparian and wetland health over the short term. As a result, vegetative productivity and diversity would be increased, which would increase litter, soil fertility, infiltration, and nutrient cycling in the long term.

Effects under Alternative A

Impacts on riparian and wetland vegetation vary depending on the grazing management system, reclamation and rehabilitation treatments, and success or failure of the treatments. Impacts would be long term.

Effects under Alternative B

Soil compaction prevention measures under Alternative B would seek to mitigate adverse effects without seasonal closures. As such, riparian and wetland vegetation would be impacted year-round, even during times when soils would be most susceptible to compaction. Vegetation improvement treatments would facilitate riparian and wetland rehabilitation and improvement and multiple uses in the long term.

Effects under Alternative C

Land reclamation actions under Alternative C would have the greatest benefit to riparian and wetland areas by requiring reclamation of all surface-disturbing activities. This would allow for native vegetation reestablishment and would directly help to achieve riparian and wetland health goals in the long term.

Soil compaction prevention measures are the most stringent under Alternative C, providing for seasonal use restrictions. This would indirectly benefit riparian and wetland vegetation health by improving filtration and protecting soils when they are most susceptible to disturbance. In addition, riparian vegetation would improve through natural recovery; no structural improvements would be implemented under Alternative C.

Effects under Alternative D

Land reclamation actions under Alternative D would provide the most flexible approach to land reclamation. Impacts on riparian and wetland vegetation would vary depending on how and if reclamation was achieved, including whether native or nonnative seeds were used in revegetating lands. Impacts would be long term.

Soil compaction prevention measures would implement seasonal use restrictions, which would occur on a case-by-case basis. Indirect impacts on riparian and wetland resources include improved health and vigor from decreased soil compaction and increased infiltration. Further, objectives such as restoration of PFC and multiple use could be achieved in the long term, as seasonal restrictions could be less limiting to riparian and wetland improvements.

Vegetation—Riparian Habitat and Wetlands: Effects from Water Resources Management

Effects Common to All Alternatives

Action CA-WR 1.1 would, in general, include provisions which would promote increased health of riparian and wetland areas to reduce water quality degradation. Additionally, Action CA-WR1.2 specifically includes provisions which promote riparian and wetland area monitoring and rehabilitation, though the extent of restoration would vary among the alternatives. The remaining CA-WR Actions pertain to the obtaining, development, and use of water sources. Many water sources (excluding underground) in the WD are associated with riparian and wetland areas, the protection of which would be assessed when obtaining, using, or developing these water sources.

Effects under Alternative A

Under this alternative, priority watersheds would not be established. However, impacts on water resources would be reduced by compliance with water quality regulations and implementation of BMPs and land health standards. This would indirectly protect riparian and wetland vegetation throughout the WD, but would provide the fewest actions- and location-specific protections of all the alternatives.

Effects under Alternative B

Priority watershed actions would limit disturbance within wellhead protection areas, indirectly protecting riparian and wetland vegetation in those areas in the long term. Riparian and wetland areas within priority watersheds would be prioritized for fire suppression, and direct impacts on vegetation from wildfire, as described under Wildland Fire Management, would be minimized. Impacts would be localized and limited by the relatively small acreage of the priority watersheds.

Under Alternative B, the promotion of large scale water importation/ exportation projects could lead to altered groundwater levels. While it is a responsibility of the Division of Water Resources to ensure that water use does not exceed perennial yield, this is not always the case. Projects that lead to greater water use than recharge could lead to a lowering of water table aquifers. This is unlikely to impact high elevation, snowmelt-fed riparian areas, however bajada and valley bottom spring sources as well as lower elevation perennial streams could be impacted.

Effects under Alternative C

Priority watershed actions under Alternative C would provide the greatest indirect protection to riparian and wetland vegetation within those areas by imposing the most restrictions. Exclusion of uses in these areas would allow natural processes to occur, thus improving riparian and wetland conditions. Impacts would be localized and limited by the relatively small acreage of the priority watersheds.

Due to their restrictions, water resources actions may prevent multiple uses of riparian and wetland vegetation within priority watersheds.

Effects under Alternative D

Priority watershed management would protect riparian and wetland vegetation in the long term as use restrictions within these areas would limit surface disturbance. Implementation of mitigation measures would be applied to uses proposed within municipal watersheds. These measures would reduce any adverse impacts and benefit riparian habitat located in municipal watersheds.

Vegetation—Riparian Habitat and Wetlands: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

All alternatives seek to manage for healthy stands of curlleaf mountain mahogany, aspen, cottonwood, limber pine, whitebark pine, willow, alder and chokecherry. These species are often associated with headwater riparian areas, though some can span nearly the entire length of stream system riparian areas, in the WD. Managing for the health of these stands would have a localized, but direct and positive impacts on riparian and wetland vegetation. The methods to manage for healthy forest/ woodland stands and their degree of impact vary among the alternatives.

Effects under Alternative A

Forest treatments to promote stand health would reduce the fuel load in forests and would have indirect impacts by preventing catastrophic fires that could spread to adjacent riparian and wetland areas and would also limit large scale erosional surfaces decreasing sediment loading in riparian areas and streams. Other treatments would facilitate this enhancement, including fencing, mechanical control, and herbicides. Effects would be long term and localized.

Forest management for aspen and cottonwood, two riparian tree species, would directly help to achieve PFC and diversity, which ultimately would enhance riparian health in the long term. Providing a sustainable woodland products for public use would have few *impacts on* riparian vegetation as harvest of woodland product is not allow within defined buffer zones near riparian areas.

Effects under Alternative B

Impacts would be the same as those described under Alternative A.

Effects under Alternative C

Forest management for aspen, cottonwood, willow, and alder would have greater impacts than under Alternative A, as more riparian species would be given specific management consideration. The 27,605 acres of designated old growth forest include many lentic and lotic riparian and wetland areas. While a portion of these areas are already afforded protection due to the Blue Lakes Wilderness Study Area, designation of the area as an old growth forest would likely have additional long term positive impacts on riparian and wetland areas. Providing tree harvesting buffers from springs would maintain soils stability and reduce erosion potential around springs. Transport of sediments would be minimized and water quality maintained.

Effects under Alternative D

Use of forest treatments would reduce the fuel load in forests, preventing catastrophic fires that could spread to adjacent riparian and wetland areas. Impacts would be similar to those described under Alternative B. Providing tree harvesting buffers would protect water resources as described under Alternative C.

Forest management for aspen, cottonwood, willow, and alder would have impacts similar to those described under Alternative C. Alternative D would designate the same 27,605 acres described in Alternative C as old growth forests. Impacts of this designation would be the same as those described for Alternative C.

Vegetation—Riparian Habitat and Wetlands: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Actions to decrease weeds on BLM-administered lands would indirectly improve riparian and wetland health and habitat values by increasing native species and decreasing the risk of catastrophic wildfire in both the short term and long term. Such a fire could damage or kill native vegetation, could allow weeds to spread, and could destroy wildlife habitat.

Effects under Alternative A

Controlling weeds would maintain or improve riparian and wetland health in the short term, while in the long term achieving riparian and wetland health, structure, composition, and wildlife habitat goals more quickly. Approved biological controls are specific to target species, so there would be no impact on nontarget species. Chemical treatments would be applied according to label directions and following established guidelines, best management practices and standard operating procedures for application. Chemical applications would also be designed to avoid effects on nontarget species, which would be short term but would lead to long-term improvement in vegetation composition. Using Integrated Pest Management practices would make use of one, several, or all available management practices, such as chemical, biological, mechanical, or prescribed fire, and would provide an adaptive and effective approach to weed management in riparian and wetland areas in the long term.

Preparing pesticide and biological use proposals, in addition to cooperation with outside agencies, would ensure that only safe and effective treatments would be used within the WD. This would prevent impacts on nontarget species, including riparian vegetation.

Effects under Alternative B

The impacts on wetland and riparian vegetation would likely be very similar to those described under Alternative A. Alternative B, however, specifies greater cooperation with non-BLM entities as well as improvement of education/ outreach relating to weed eradication. This has the potential to lead to increased partner efforts and improved land stewardship by the public, both of which would likely have beneficial impacts on riparian and wetland areas. These impacts would be identical in Alternative C and D.

Effects under Alternative C

Mechanical and biological weed treatments would only be used under Alternative C, which would limit opportunities to achieve riparian and wetland health, composition, and wildlife habitat objectives in the long term as these treatments may not be as effective in certain areas. Potential residual effects from use of herbicides and potential herbicide drift affecting non-target species would not occur. Approved biological controls are specific to target species, so there would be few known impacts on non-target species.

Using IPM practices would make use of one or both available management practices, such as biological or mechanical control to provide an adaptive and effective approach to control pest species and weeds in the long term.

Effects under Alternative D

Impacts from weeds management actions would be the same as those described under Alternative A.

Vegetation—Riparian Habitat and Wetlands: Effects from Chemical and Biological Control

Effects Common to all Alternatives

Biological control, as detailed in Alternatives C and D and as would not be restricted under Alternative A, would serve as one tool to reduce or eliminate the presence of invasive species. Effects would be indirect and are similar to those described under weeds management.

Effects under Alternative A

Alternative A contains no actions related to determining severity or acceptability of environmental impacts related to chemical and biological control methods. Objective A-PE 1 is, in general, more restrictive than its counterparts in Alternatives B-D, however it tends to be a little more subjective without accompanying actions. Effects from BLM and BLM-permitted activities riparian and wetland vegetation would likely be positive inasmuch as they would promote native biological communities and decrease impacts on surface water bodies and the vegetation immediately adjacent to them.

Effects under Alternative B

Effects from chemical and biological control under Alternative B have the potential to be less beneficial than those under any other alternative. Alternative B promotes a cost-benefit analysis of chemical and biological controls. There is no guidance for assessing the outcome of the cost-benefit analysis. This could lead to the use of less effective or more environmentally damaging treatments because of a lower cost.

Effects under Alternative C

The focus on biological control methods would limit the effectiveness of weed management in riparian and wetland areas and would have an indirect effect in the long term under Alternative C. However, use of IPM techniques would also provide an adaptive and effective approach to weed management in the long term. Preparation of pesticide and biological use proposals, in addition to cooperation with agencies, would ensure that only safe and effective treatments would be used within the WD. This would limit impacts on nontarget, native vegetation.

Effects under Alternative D

Effects from chemical and biological control are similar to those described under Alternative A with the exception that control options would be limited to those previously approved for use on public land. This has the potential to reduce the use of potentially harmful or un-tested control options which could be more or less effective than those previously approved. As with the other Alternatives, the effectiveness of pest control treatments would be a limiting factor on the positive or negative effects on riparian and wetland areas.

Vegetation—Riparian Habitat and Wetlands: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Vegetation treatments for rangeland improvement projects would reduce the prevalence of invasive species and would improve ecological conditions throughout a large portion of the WD. Such projects would reestablish an understory of forbs and perennial bunchgrasses that are less susceptible to fire than invasive annuals, such as cheatgrass. This would reduce the risk of catastrophic wildfire on rangelands, which might otherwise spread into riparian and wetland areas. Effects would be indirect. Actions CA-VR 1.1-3.1 promote the management of healthy upland vegetative communities within the WD. Appropriate levels of forage production in uplands can reduce the need for cattle to concentrate in the more productive riparian and wetland areas for sustenance.

The promotion of upland plant community health can help promote the distribution of livestock which can decrease pressure and use of riparian areas. Additionally, upland plant community health can help reduce erosion, leading to decreased sediment loading in riparian areas.

Effects under Alternative A

Effects on wetland and riparian vegetation would likely be the least positive under Alternative A. Action A-VR 1.2 does not call for restoration of rangelands as is the case in the remaining alternatives. Without the direction to restore rangelands, riparian and wetland areas can remain under greater pressure from cattle and WHB use. Fire regime condition class (FRCC) would not be restored under this alternative, which would keep fuel loads high and would increase the risk for catastrophic fire, which could destroy adjacent riparian and wetland areas.

Effects under Alternative B

Effects would be similar to those under Alternative A except that Action B-VR 1.2 calls for the restoration of rangelands, which can reduce cattle and WHB utilization pressure on nearby wetland and riparian areas. Riparian and wetland areas may suffer negative effects after fire because rest from grazing would be based on a timeline only with no concessions for rehabilitation goals. Improving FRCC would increase fire return intervals and would reduce fire frequency. Adjacent riparian and wetland areas would be less vulnerable to wildfire.

Effects under Alternative C

Option 1

Effects would, in general, be similar to those described under Alternative B. Riparian and wetland vegetation would benefit from an increased length of rest from grazing after fire.

Effects from prescriptive grazing in enclosures closed to livestock grazing would be similar to those described in Effects under Alternative B.

Option 2

The removal of livestock grazing would have greater impact to riparian and wetland vegetation than any of the other alternatives. Where cattle use is currently the greatest negative impact to degraded wetland and riparian areas (i.e., outside HMAs or areas of high recreational use), potentially rapid and long term benefits would be observed. Vegetative communities would benefit from reduced utilization as well as a decrease or elimination of compaction, shearing, and other soil disturbing activities. Natural processes would begin to restore wetland functions, potentially leading to increased flood water retention and groundwater recharge which would further increase the potential extent of riparian and wetland vegetation.

Increased riparian and wetland vegetation have the potential to locally promote more intense fire activities, which may have greater short term negative impacts on riparian and wetland communities than less intense fires. Riparian and wetland areas would benefit, however, from the removal of livestock use which may lead to more complete rehabilitation after fire. Restoring FRCC to Class II levels would reduce fuel loads on these lands and would protect adjacent riparian and wetland areas from catastrophic fire. This would indirectly allow vegetative health and wildlife habitat objectives to be achieved in these areas by maintaining established native vegetation.

Grazing would not be permitted under this option and would eliminate effects from livestock as described in 4.2.4 Water Resources, Effects from Livestock Grazing Management, Effects Common to All Alternatives.

Effects under Alternative D

Effects would, in general, be similar to those under Alternative B. Rest from grazing after fire, however, would be determined by monitoring for resource objectives in place of a general timeline of any length. The regaining of vigor in native plants would be one criterion by which the ability to reintroduce grazing or to prescribe grazing would be judged. This would include riparian and wetland vegetation, indicating that riparian and wetland areas would have the ability to fully recover prior to reintroduction of cattle use.

Vegetation—Riparian Habitat and Wetlands: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Specific objectives for meadows and riparian areas in implementation plans would prioritize restoration of these communities, making restoration efforts more effective and efficient. Riparian and wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows. This would result in the following (note that these benefits only apply where applicable based on a wetland area's capability and potential):

- Reduce erosion and improve water quality;
- Filter sediment and capture bedload;
- Aid floodplain development;
- Improve floodwater retention and groundwater recharge;
- Develop root masses that stabilize stream banks against cutting (erosive) action;
- Develop diverse ponding;
- Channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and
- Support greater biodiversity.

Effects under Alternative A

Alternative A would improve riparian and wetland habitat at the slowest rate since the PFC percentage goal would not be stated and the BLM would make progress toward PFC through a combination of grazing system changes and structures. Structural improvements would be maintained by grazing permittees, the WD, and interest groups. Impacts would be direct and would vary depending on what percentage of these communities is restored.

Effects under Alternative B

Alternative B would make progress toward PFC on 60 percent of the riparian and wetland habitat, primarily through structural improvements, such as fencing, water developments, and erosion control structures. Structural improvements would be maintained by the WD and interest groups.

Adaptive management would be emphasized through consultation, cooperation, and coordination with the affected interest groups. Impacts would be direct.

Effects under Alternative C

Option 1

This option would achieve PFC on a minimum of 85 percent of the riparian and wetland habitat through natural processes, limiting livestock by season of use (which is particularly important in the hot season), limiting utilization of vegetation, and reduction in livestock numbers. No structural improvements would be built. Impacts would be indirect.

Option 2

This option would achieve PFC on a minimum of 85 percent of the riparian and wetland habitat through natural processes and by eliminating livestock grazing within the WD. This would have the greatest improvement in riparian and wetland habitat by eliminating impacts from livestock, such as soil compaction, vegetation utilization and trampling, and weed introduction or spread.

Effects under Alternative D

Alternative D would achieve or make progress toward PFC on 85 percent of the riparian and wetland habitat through natural processes and minor structural improvements. The direct impacts would be similar to those under Alternative A. Structural improvements would be maintained by grazing permittees, the WD, and interest groups. Adaptive management would be emphasized through consultation, cooperation, and coordination with the affected interest groups.

Vegetation—Riparian Habitat and Wetlands: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Improving aquatic habitats involves rehabilitating wetland and riparian vegetation in order to foster healthy aquatic communities by decreasing sedimentation and providing structural complexity, suitable water temperatures, canopy cover, and bank stabilization. Monitoring conditions and cooperating with agencies would ensure that habitat goals were met.

Actions to minimize erosion and sedimentation along access routes would indirectly benefit riparian and wetland vegetation by reducing soil disturbance and increasing infiltration. This would lead to improved plant vigor and productivity.

Effects under Alternative A

Implementing an HMP would identify and prioritize areas for rehabilitation, providing a more direct, effective, and efficient riparian and wetland restoration and improvement strategy.

The FMUD process would identify mitigation measures that would minimize impacts on riparian and wetland vegetation.

Effects under Alternative B

Coordination with agencies would identify and prioritize areas for rehabilitation, providing a more direct, effective, and efficient riparian and wetland restoration and improvement strategy.

Using Land Health Standards would identify mitigation measures that would minimize impacts on riparian and wetland vegetation.

Effects under Alternative C

Coordination with agencies would have impacts similar to those described under Alternative B.

Using Land Health Standards would have impacts similar to those described under Alternative B. Riparian habitat and wetlands would be protected based on no surface disturbance/no surface occupancy use restrictions for those riparian habitats located within delineated priority wildlife habitat areas.

Effects under Alternative D

Coordination with agencies would have impacts similar to those described under Alternative B.

Use of Land Health Standards would have impacts similar to those described under Alternative B. Riparian habitat located within priority wildlife areas would be protected due to use restrictions. This alternative differs from Alternative C, as there are fewer acres delineated with use restrictions.

Vegetation—Riparian Habitat and Wetlands: Effects from Special Status Species Management

Effects Common to All Alternatives

Special status species management across all alternatives would restrict or prevent certain activities within special status species habitat. Additional permitting requirements such as plant inventories, sage-grouse, pygmy rabbit, bat, and raptor inventories would be required. These restrictions may also lead to difficulties in completing vegetation treatments in these areas.

Such actions to avoid impacts on listed or sensitive species or their habitat could directly affect implementation, effective placement, or timing of vegetation management treatments. As a result, certain management goals may be precluded, but wildlife habitat would be protected. Impacts would vary with the type of treatment proposed and the nature and extent of the restrictions.

Management of occupied and potential LCT habitat, as described in Chapter 3, could restrict certain vegetation treatments that would occur in adjacent riparian areas, such as soil disturbance or use of chemicals. Impacts would vary with the type of treatment proposed and the nature and extent of the restrictions. In addition to potential vegetation treatment limitations, restrictions based on special status species habitats may preclude delay, or alter plans for other types of projects intended to improve riparian and wetland vegetation (i.e., the relocation of roads or cattle troughs, installation of check dams, etc.).

Maintaining and improving special status species habitat would improve riparian and wetland areas.

Effects under Alternative A

Restrictions on actions near special status plants, sage-grouse and sage-grouse leks, pygmy rabbits, bat habitat, and raptors could directly impact management of riparian and wetland vegetation by limiting the type, timing, and location of treatments. However, special status species protections would also help create a lower level of disturbance in riparian and wetland areas, preventing indirect effects, such as additional soil disturbance and noxious weed invasion, or direct disturbance to vegetation. Protections to special status species would be particularly effective, as many sensitive species are associated with wetland and riparian areas.

Effects under Alternative B

Alternative B places the least stringent restrictions on actions near special status plants, sage-grouse and sage-grouse leks, pygmy rabbits, bat habitat, and raptors. However, special status species protections would still apply to riparian and wetland areas, as described under Alternative A.

Prescriptive grazing would be permitted in riparian and wetland areas. This could be used as a tool to stimulate native vegetation growth and aid in weed control, while minimizing impacts on soils. The resulting improved health of these riparian areas would be of long-term benefit to sage-grouse and other special status species that may use the areas.

Effects under Alternative C

Under Alternative C, actions related to special status species could result in the preservation of that wetland riparian vegetation which is related to habitats of special status species (e.g. sage-grouse, LCT, etc.) due to surface occupancy restrictions. These restrictions may also lead to difficulties in completing vegetation treatments in these areas.

Effects under Alternative D

Riparian areas would be protected due to use restrictions for areas located within priority sage-grouse habitat areas. Management of general sage-grouse habitat would implement mitigations measured to reduce adverse impacts on riparian areas located within general sage-grouse habitat boundaries.

Prescriptive grazing would have impacts similar to those described under Alternative B.

Vegetation—Riparian Habitat and Wetlands: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Direct impacts on riparian and wetland vegetation resulting from WHB management actions include browsing and trampling of riparian vegetation, which alters the amount, condition, production, and vigor of riparian vegetation in grazed areas. Overuse of riparian vegetation next to water sources, troughs, and stock reservoirs causes indirect effects, such as soil disturbance and compaction, and direct effects, such as a loss of plant cover, which usually results in localized areas being dominated by invasive plants. Wild horses and burros directly impact riparian vegetation around watering locations by trampling and grazing plants, which reduces riparian species cover and diversity.

Protection and development of seeps and development of alternative water sources mitigate impacts of wild horses on riparian and wetland habitat. Vegetation recovery on burned areas could be slowed or reduced by wild horses and burros.

Wild horses and burros contribute to weed spread and introduction similar to impacts described under Effects Common to All Alternatives from Fish and Wildlife Management.

Effects under Alternative A

Maintaining established AMLs as a population range, using gathers when AML is exceeded, and using fertility control agents would be the most effective methods in maintaining WHB numbers within AML. This would reduce the impact of WHB on riparian and wetland vegetation by decreasing the risk of soil compaction, trampling, and weed spread or introduction.

WHB protections, such as limitations on such proposed activities as motor vehicle racing, would protect riparian and wetland vegetation and soils from disturbance and would prevent impacts due to human use, such as trampling and noxious weed invasion.

Effects under Alternative B

Impacts from population control measures under Alternative B would be similar to those under Alternative A. AML reduction in response to decreased WHB private water supply would intensify these impacts. Movement of HMA boundaries may change the access of WHB to certain water sources and their associated riparian vegetation, increasing use in some areas and decreasing the use in others. The net effect would likely be negligible.

Protection measures for WHB would have similar impacts on those described under Alternative A.

Effects under Alternative C

Maintaining AML as a single number, using four-year (or longer) gather cycles, and not allowing use of fertility control agents under Alternative C would cause the greatest impact from WHB on riparian and wetland areas by using less effective modes of WHB population control. However, AML reduction in response to decreased water availability for WHB would decrease impacts of WHB on riparian and wetland areas, since there would be fewer animals to cause impacts.

Protection measures for WHB would be the greatest under Alternative C and would prohibit or limit such activities as motor vehicle racing in HMAs, unless impacts were determined to be minimal. This would be most effective in protecting riparian and wetland vegetation and soils from disturbance and in preventing impacts due to human use, such as trampling, noxious weed invasion, and litter.

Effects under Alternative D

Impacts from population control measures and development of alternative water sources would be similar to those described under Alternative A. Movement of HMA boundaries may change the access of WHB to certain water sources and their associated riparian vegetation, increasing use in some areas and decreasing the use in others. The net effect would likely be negligible.

Vegetation—Riparian Habitat and Wetlands: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildland fires result in short-term loss of riparian and wetland vegetation and a long-term change of community composition. The vegetation response to fire depends on the size, location, intensity, season, timing, and amount of precipitation, preexisting plant community condition, and the abundance of noxious and invasive weeds in the area. Fires have direct effects by changing the composition of the plant community, delaying plant succession, and removing woody vegetation and plant litter. Wildland fires might burn with enough heat to kill soil organisms and root systems, resulting in diminished plant recruitment and growth rates, particularly for fire-sensitive species. Emergency stabilization and burned area rehabilitation treatments, such as seeding with native perennial species, would be implemented to restore degraded riparian and wetland vegetation and directly improve riparian and wetland health in the long term. Burn areas lacking perennial plant species for natural recovery could be seeded.

Wildland fires create an opportunity for noxious and invasive weeds to become established or spread by removing aboveground vegetation, leaving burned areas more susceptible to noxious and invasive weeds. Some species of noxious and invasive weeds respond well to post-fire conditions and out compete native species. In areas where noxious and invasive weeds occur or are in close proximity, wildland fire increases the likelihood of weed expansion. Firefighters and their equipment might also introduce or spread noxious and invasive weeds. Some mechanical controls disturb the soil surface and remove vegetation, creating an opportunity for noxious and invasive weeds to become established or to spread.

Suppressing wildfire and creating fuel breaks would prevent catastrophic destruction of riparian and wetland areas and would preserve native vegetation and diversity in these areas over the long term. Surface disturbance resulting from fire line construction, use of heavy equipment, and other fire suppression activities would have direct effects by damaging vegetation and indirect effects by accelerating soil erosion in localized areas. However, these areas would be rehabilitated to minimize long-term impacts.

Because fire retardants are composed largely of nitrogen and phosphorus fertilizers, they may encourage growth of some species at the expense of others, resulting in changes in community composition and species diversity. Differential growth may also influence herbivorous behavior; both invertebrate and vertebrate herbivores tend to favor post-fire regrowth.

Fuels management actions would result in short-term direct loss of vegetation on a small scale. Projects would reestablish desirable vegetative communities, providing for healthy, diverse riparian and wetland areas over the long term. These actions would allow fire to play its natural role more frequently and would reduce the likelihood of catastrophic wildfire, which would protect native riparian and wetland vegetation in the long term and over large areas.

Implementing a response to wildfires based on social, legal, and ecological consequences of the fire would indirectly protect riparian and wetland resources from catastrophic fire, which would protect vegetation and foster rehabilitation and improvement of riparian and wetland areas.

Effects under Alternative A

No additional impacts would occur from wildland fire management actions under Alternative A.

Effects under Alternative B

Under this alternative, 110,167 acres would be designated as conditional fire suppression areas for benefit. These areas have vegetation characteristics that benefit from the fire cycle. Some effects of allowing fire may include degradation of riparian and wetland areas. However, many of these areas are located at high elevations limiting fire spread and intensity and impacts would be localized. Managing fire for multiple objectives would allow flexible suppression tactics and strategies to protect riparian areas while allowing fire to burn in other areas for a benefit.

Effects under Alternative C

Effects would be similar to the other alternatives except that Alternative C would not use prescribed burns or chemical treatments to reduce fuels. Fewer options for fuels management may lead to increased fuel loading, thereby increasing potential for wildfires that could destroy riparian habitat.

Effects under Alternative D

Under Alternative D, 110,167 acres of land would be designated as suitable for conditional fire suppression management for a benefit. Impacts would be similar to those described for Alternative B. Fire suppression would be prioritized for riparian areas located within priority wildlife habitat areas, priority sage-grouse habitat areas and within priority watersheds.

Vegetation—Riparian Habitat and Wetlands: Effects from Cultural Resources Management

Effects Common to All Alternatives

Effects on riparian and wetland vegetation would be similar to the effects on water resources. In general, cultural resource management may place use restrictions or specific protection measures on areas containing riparian and wetland vegetation. Specifically, all Alternatives include actions which would protect the health of pinyon and juniper stands in the Stillwater range; effects from this would be similar to positive effects from Vegetation – Forest and Woodland Product Management. All Alternatives also contain actions which would protect aspen art trees and groves. This would be a direct positive effect as these areas often represent the riparian vegetation communities in high elevation habitats.

Vegetation—Riparian Habitat and Wetlands: Effects from Tribal Consultation

Effects Common to All Alternatives

Consulting with tribes to identify culturally significant plants, important habitats, and traditional use locations would emphasize protection of natural resources, including riparian and wetland areas. This would indirectly limit disturbance to soils and riparian vegetation over the long term in certain areas. Consultation could place higher treatment priority in areas not previously identified or could limit actions in planned treatment areas. Impacts would vary on a case-by-case basis and are likely to be localized.

Vegetation—Riparian Habitat and Wetlands: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Effects on riparian and wetland vegetation would be nearly identical to those described as effects from paleontological resources management on water resources.

Vegetation—Riparian Habitat and Wetlands: Effects from Visual Resources Management

Effects Common to All Alternatives

Implementing VRM guidelines, particularly managing WSAs as Class I, would increase the difficulty of accomplishing vegetation management actions and may affect the dimensions and locations of riparian and wetland treatments. This is because such vegetation treatments could change the visual character of riparian and wetland areas. However, because most of the vegetation management is through natural processes to improve riparian conditions, VRM would improve. Projects which are limited or prevented due to VRM concerns may have an indirect benefit on riparian areas if the proposed project had been located on or near a riparian or wetland habitat.

Effects under Alternative A

Under Alternative A, 420,271 acres and 346,302 acres would be managed to VRM Class I and II guidelines, respectively. These actions would limit the scope of activities in riparian and wetland areas and would prohibit treatments and prescriptions that would change the visual character. Overall, meeting VRM Class I and II guidelines would increase the difficulty of rehabilitating and improving riparian and wetland areas within these areas over the long term.

Effects under Alternative B

Under Alternative B, 417,605 acres and 391,203 acres would be managed to VRM Class I and II guidelines, respectively. This alternative is the least restrictive to implementation of riparian and wetland rehabilitation efforts. Impacts would be similar to those described under Alternative A.

Effects under Alternative C

Under Alternative C, 417,605 acres and 3,083,211 acres would be managed to VRM Class I and II guidelines, respectively. This alternative would have the greatest overall benefit to riparian and wetland habitats by improving riparian and wetland conditions through natural processes.

Effects under Alternative D

Under Alternative D, 417,605 acres and 2,780,416 acres would be managed to VRM Class I and II guidelines, respectively. Impacts would be most similar in nature and magnitude to those described under Alternative C.

Vegetation—Riparian Habitat and Wetlands: Effects from Cave and Karst Resource Management

Effects Common to All Alternatives

Surface expressions of cave and karst features which have flowing water are often associated with riparian and wetland vegetation. While the number of these areas in the WD may not be currently known, they would be expected to be sparse compared to other regions with cave and karst features. Protection of these features, however, has the potential to provide indirect protection of associated riparian and wetland vegetation.

Vegetation—Riparian Habitat and Wetlands: Effects from Livestock Grazing Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from livestock grazing management. Negative impacts on riparian and wetland vegetation can result from ineffective livestock grazing management, which alters the amount, condition, production, and vigor of riparian vegetation in grazed areas. Impacts from grazing are usually related to a long duration of use during the growing season, especially hot season use, resulting in lower vigor of grazed species and a change in species composition. Overuse of riparian and wetland vegetation next to water sources, troughs, and stock reservoirs often cause soil disturbance and a loss of plant cover. Livestock directly impact riparian vegetation around watering locations by trampling and grazing plants, which reduces riparian species cover and diversity. Livestock contribute to the spread of weeds as described under Effects Common to All Alternatives from Fish and Wildlife.

Livestock grazing management can be used to provide positive impacts by applying a shortened season of use during the hot season, no hot season use, or fall or winter use.

Action CA-LG 1.2 specifically identifies that newly developed riparian and wetland areas would be fenced to exclude livestock and WHB from having adverse impacts on the riparian and wetland vegetation and soils. This would tend to improve these riparian and wetland areas.

Effects under Alternative A

Under Alternative A, 8,232,727 acres of land would be open to grazing, which would have the high potential for adverse impacts on riparian and wetland areas. Grazing, including grazing on acquired lands, allowing temporary nonrenewable use, and allowing for three consecutive years of grazing would facilitate intensive land use. This would cause riparian and wetland vegetation to become less healthy, diverse, productive, and resilient in the long term.

To minimize impacts, grazing management strategies, such as rotation, deferment, rest from use, and the manipulation of season of use and grazing intensity, would be implemented. These strategies would help to manage composition, cover, and the vigor of riparian vegetation. The objective of these strategies is to maintain or reach rangeland standards for wetland and riparian areas. The response of riparian and wetland vegetation to these strategies would be monitored, and adjustments would be made accordingly to achieve the desired response. The use of riparian pastures and exclosures increases the density, age class, and cover of desirable riparian plants, including willow, cottonwood, and herbaceous wetland and riparian plants.

Lands closed to grazing on the remainder of land in the WD would lower impacts on riparian and wetland vegetation in these areas, as livestock would not be compacting soils, disturbing native vegetation, or acting as a mechanism for invasive and noxious seed dispersal.

Effects under Alternative B

Under Alternative B, 8,232,727 acres of land would be open to grazing, which would have the high potential for adverse impacts on riparian and wetland areas, similar to Alternative A . Grazing, including grazing on acquired lands, allowing temporary nonrenewable use, and allowing continuous season-long use would facilitate intensive land use.

Grazing management strategies would have impacts similar to those described under Alternative A.

Lands closed to grazing on the remainder of land in the WD would lower impacts on riparian and wetland vegetation in these areas, as livestock would not be compacting soils, disturbing native vegetation, or acting as a mechanism for invasive and noxious seed dispersal.

Effects under Alternative C

Option 1

Livestock grazing would be open on 8,038,084 acres of land, which would have impacts similar in nature to those in Alternative A. However, Alternative C, Option 1 would not allow grazing on acquired lands or temporary nonrenewable use and would only allow for two years of consecutive grazing during the critical growth period. This would cause fewer impacts on riparian and wetland vegetation.

Lands closed to grazing on the remainder of land in the WD would lower impacts on riparian and wetland vegetation in these areas, compared with Alternatives A and B.

Grazing management strategies would have impacts similar to those described under Alternative A.

Option 2

Livestock grazing would be closed on all lands within the WD, which would have the greatest positive impact in reducing adverse effects on riparian and wetland vegetation on BLM-administered lands.

Effects under Alternative D

Alternative D would have 8,016,754 acres of land open to grazing. Impacts would be similar to those described under Alternative A, except with fewer acres of land open to grazing. Implementation of mitigation measures to address stream bank trampling from livestock grazing would improve riparian conditions.

Vegetation—Riparian Habitat and Wetlands: Effects from Minerals Management

Effects Common to All Alternatives

General

Impacts on riparian and wetland vegetation could result from fluid, leasable, and locatable mineral development and mineral material sales and disposal. Most minerals management impacts on vegetation are on the sagebrush and saltbush scrub communities, so impacts on riparian and wetland vegetation are minimized. Direct impacts associated with these actions include loss or injury of plants due to excavation and toxic responses from chemical use in mineral extraction; indirect effects include increased exposure to dust and other contaminants associated with construction of infrastructure and use of access roads. In the worst-case scenario, all vegetation would be removed from a parcel of land and the site would be permanently altered. Regulations, although they might differ among the mineral categories, are in place to protect vegetative communities and to ensure reestablishment of riparian and wetland vegetation following completion of the mineral and fluid management actions. Overall, riparian and wetland vegetation could be altered by minerals management actions, but mitigation measures would be implemented to lessen the impact on vegetation resources.

Fluid

Fluid minerals impacts within the District center on geothermal development and exploration. Most of these impacts relate to reduction of surface flows where there are surface expressions of springs. These springs generally discharge under a low hydraulic head and are therefore easily impacted by reductions in reservoir pressures. Springs are monitored for effect from geothermal water production. If water supply for these habitats is diminished, the health of the riparian vegetation will suffer and upland plant communities will encroach.

Effects under Alternative A

Alternative A would open the greatest acreage and would close the least acreage to mineral development, thus having the greatest likelihood to impact riparian and wetland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative B

Compared with Alternative A, Alternative B would open fewer acres and would close more acres to mineral development, thus having a lower likelihood to impact riparian and wetland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative C

Alternative C would open the fewest acres and would close the most acres to mineral development, thus having the lowest likelihood to impact riparian and wetland vegetation of all alternatives. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Effects under Alternative D

Compared with Alternatives A and B, Alternative D would open fewer acres and would close more acres to mineral development, thus having a lower likelihood to impact riparian and wetland vegetation. Impacts would be similar to those described under Effects Common to All Alternatives from Minerals Management.

Vegetation—Riparian Habitat and Wetlands: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

Managing BLM-administered lands to provide dispersed recreation could impact riparian and wetland vegetation throughout the WD directly through human trampling or removal of vegetation and indirectly through weed introduction or spread.

OHV use would result in direct impacts on vegetation, such as reduced vegetative cover and density, as well as indirect effects, such as soil compaction and increased dust. OHV users would introduce and spread noxious and invasive weed seeds from their vehicles, shoes, clothing, and recreation equipment. OHV activities in undisturbed and remote areas could distribute weed seeds into weed-free areas. These effects could decrease plant vigor and productivity and alter community plant composition.

To manage OHV use, the Transportation Plan would be updated and would account for wildlife habitat and riparian and wetland areas. Camping limitations or prohibitions within 100 yards of water would minimize impacts on riparian areas caused by camping, vehicle use, and trampling disturbances to wetland vegetation. BLM has enforcement capabilities per the NRS for enforcing these restrictions. NEPA analysis would be done on specific sites to minimize impacts on riparian and wetland vegetation.

Effects under Alternative A

The Pine Forest SRMA would be maintained, and issuance of special recreation permits would be the least restricted. The greatest acreage (6,789,612 acres) would be open to OHVs under Alternative A, with the least amount of land (423,786 acres) limited, and with 17,698 acres closed. Combined, these actions could degrade riparian and wetland vegetation throughout the WD through human overuse, vegetation trampling, soil compaction, and weed introduction or spread.

Effects under Alternative B

Designation of four SRMAs would impact riparian and wetland vegetation to varying degrees depending on the recreation market identified for the SRMA. For example, the Nightingale and Granite Range SRMAs would be targeted for undeveloped recreation-tourism and self-directed, respectively, which would have less of an impact than Winnemucca and Pine Forest SRMAs, which allow for increased motorized vehicle access. Under Alternative B, 1,460,200 acres would be open to OHVs, with the least amount of land (17,698 acres) closed, and with 5,743,198 acres limited. Together, effects from these actions could impact riparian and wetland areas throughout the ERMA, SRMAs, and OHV routes, as described under Alternative A. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed.

Issuance of special recreation permits would be the least restricted under this alternative, which could cause some impacts on riparian and wetland vegetation through increased human use, vegetation trampling, litter, and weed introduction.

Effects under Alternative C

Designation of two SRMAs would have impacts on riparian and wetland vegetation similar to those described under Alternative B. Under Alternative C, 0 acres would be open to OHVs, with 43,521 acres closed and 7,187,575 acres limited. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed. As such, impacts from recreation actions would be fewest under Alternative C, as it is the most restrictive and prohibitive. However, impacts would occur, and they would be similar to those described under Alternative A.

Issuance of special recreation permits would be the most restrictive under Alternative C and would cause the fewest impacts on riparian and wetland areas through increased human use, vegetation trampling, litter, and noxious weed invasion.

Effects under Alternative D

Designating four SRMAs would have the same impacts on riparian and wetland vegetation as those described under Alternative B. Under Alternative D, 288,105 acres would be open to OHVs, with 17,577 acres closed and 6,925,414 acres limited. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan is updated and site-specific NEPA analysis is completed. Together, impacts from these actions would be similar to those described under Alternative A.

Issuance of special recreation permits would cause some impacts on riparian and wetland areas through increased human use, vegetation trampling, litter, and noxious weed invasion.

Vegetation—Riparian Habitat and Wetlands: Effects from Renewable Energy Management

Effects Common to All Alternatives

Direct impacts on riparian vegetation could occur with issuance of ROWs, which require vegetation clearing and would disturb or destroy vegetation. Indirectly, ROWs may spread or introduce invasive and noxious weeds, thereby reducing riparian habitat health and diversity. However, BMPs, stipulations, and mitigation measures would be implemented, which would minimize impacts on riparian vegetation.

Effects under Alternative A

Maintaining existing exclusion areas within the WD (WSAs, ACEC, TCP and areas of critical habitat) would continue to exclude renewable energy ROWs within these areas However, this action would protect and limit disturbance to vegetation and soils and would prevent noxious weed invasion or spread caused by development.

Effects under Alternative B

Designating avoidance areas within the WD could limit ROW development within riparian and wetland areas. However, this action would protect and limit disturbance to vegetation and soils and prevent noxious weed invasion or spread caused by development requiring special stipulations for mitigation.

Managing delineated areas as avoidance and exclusion areas would protect riparian areas by limiting disturbance or uses or would intensify requirements to mitigate impacts. Riparian areas located within avoidance or exclusion areas be protected from some from disturbance associated with Rights of Ways or renewable energy. Under Alternative B, 716,528 acres would be designated avoidance areas.

Effects under Alternative C

Alternative C would designate the greatest number of acres as avoidance areas and exclusion zones within the WD which would have the greatest effect on riparian and wetland areas by protecting and limiting disturbance of vegetation and soils. Managing delineated areas as avoidance and exclusion areas would protect riparian areas by limiting disturbance or uses or would intensify requirements to mitigate impacts. Riparian areas located within avoidance or exclusion areas would be protected from some disturbance associated with Right of Ways or renewable energy. Under Alternative C, 869,645 acres would be designated avoidance areas.

Effects under Alternative D

Designating avoidance areas and exclusion zones within the WD would impact riparian and wetland areas by protecting and limiting disturbance to vegetation and soils. Managing delineated areas as avoidance and exclusion areas would protect riparian areas by limiting disturbance or uses or would intensify requirements to mitigate impacts. Riparian areas located within avoidance or exclusion areas would be protected from disturbance associated with Rights of Ways or renewable energy. Under Alternative D, 1,773,199 acres would be designated avoidance areas and 1,199,539 acres would be designated exclusion areas.

Vegetation—Riparian Habitat and Wetlands: Effects from Transportation and Access Management

Effects Common to All Alternatives

Maintaining roads would allow access to riparian and wetland areas for wildfire management and suppression, when necessary. This would protect native vegetation and would help achieve riparian and wetland rehabilitation goals in the long term.

Road and trail construction could directly impact riparian and wetland areas through vegetation removal and could cause indirect impacts through soil compaction, invasive and noxious weed spread, and dust proliferation. This could reduce plant diversity and vigor in the long term.

Invasive and noxious weed control measures would prevent weeds spreading into riparian and wetland areas, would prevent competition with native species, and would indirectly help rehabilitate and improve riparian and wetland communities. Construction of new roads and trails through riparian areas can alter hydrologic function which may lead to channelization, incision, and lateral erosion. This can result in loss of riparian vegetation due to erosion of bank as well as water table lowering. Maintenance of existing roads may also promote the continued degradation of riparian areas where road crossings were improperly constructed. Maintenance of existing roads can also benefit riparian areas by ensuring that vehicular use remains concentrated on previously disturbed routes.

Effects under Alternative A

Riparian and wetland areas could be impacted by road and trail construction. However, improved access to certain areas would facilitate restoration and improvement of riparian and wetland vegetation and would allow for multiple uses.

Effects under Alternative B

Riparian and wetland areas could be impacted from road or trail construction. However, these actions could limit access to certain riparian and wetland areas for rehabilitation efforts and would prevent multiple uses in certain areas. Action B-TA 1.4 provide for the use of seasonal road closures to reduce or eliminate the impacts of traffic to soils and hydrologic function when soils are saturated or surface water is present (i.e., during the wet season). Some areas where this is a concern are ephemeral washes and riparian and wetland vegetation would not be impacted. Other seasonally saturated locations, however, comprise riparian and wetland vegetative communities. Restrictions on vehicular traffic would decrease compaction, erosion, rutting, and the impacts on hydrologic function as whole. This would result in positive effects on riparian and wetland vegetation in these areas. This action is carried forward to Alternatives C and D where the effects would be the same.

Effects under Alternative C

Transportation actions could limit access to riparian and wetland areas for management and could prevent multiple uses in certain areas.

Effects under Alternative D

Impacts from transportation actions would be similar to those described under Alternative C.

Vegetation—Riparian Habitat and Wetlands: Effects from Lands and Realty Management

Effects Common to All Alternatives

Disturbed areas would be reclaimed and seeded. Direct effects from location of ROW include surface disturbance and removal of vegetation to construct facilities such as power transmission lines, pipelines, roads and communication facilities. Implementation of mitigation measures including requirements to reclaim and seed disturbed areas would reduce surface disturbance impacts. Land disposals could affect riparian vegetation by changes in vegetative cover through urbanization or agricultural or industrial development.

Vegetation and wildlife habitat value would be given consideration when the WD makes disposal and acquisition decisions. Impacts on riparian and wetland vegetation would vary on a case-by-case basis, but impacts would be minimized since only lands with low resource values would be identified for disposal, and further NEPA documentation would minimize potential impacts on riparian and wetland vegetation. Acquisition of riparian and wetland areas would provide additional opportunities to achieve riparian and wetland vegetation objectives.

ROWs alter habitat with the footprint for the facilities that they authorize. ROWs could have direct effects by removing vegetation and indirect effects by compacting soil, causing noxious weed invasions, and increasing dust in these areas. Most of the footprints are localized and cover a small area, but ROWs tend to be linear and may stretch for miles. Many of the impacts associated with ROWs can be mitigated on a case-by-case basis.

Effects under Alternative A

Issuance of ROWs would not be limited, and avoidance areas or exclusion zones for lands and realty management actions would not be designated under Alternative A. This could have the greatest direct and indirect impact on riparian and wetland vegetation from vegetation removal, soil compaction, habitat disturbance, fragmentation, and increased dust. No restrictions would be placed on land treatments, thus allowing for rehabilitation and improvement actions and subsequent achievement of PFC and multiple use goals.

Effects under Alternative B

Designating avoidance areas would have similar impacts as renewable energy management actions under Alternative B.

Issuance of ROWs would have impacts similar to those described under Alternative A.

Effects under Alternative C

Designating avoidance areas and exclusion zones would have similar impacts as renewable energy management actions under Alternative C.

Restriction on ROW issuance could impact riparian and wetland areas by protecting and limiting vegetation disturbance, fragmentation, and noxious weed invasion or spread from ROW development.

Effects under Alternative D

Designation of avoidance areas and exclusion zones would have similar impacts as renewable energy management actions under Alternative D.

Issuance of ROWs would have impacts similar to those described under Alternative A.

Vegetation—Riparian Habitat and Wetlands: Effects from ACEC/ RNA Management

Effects Common to All Alternatives

The effects of ACEC/RNA management on riparian habitat and wetlands would be beneficial because they are intended to protect fragile resources from irreparable damage. The alternatives differ in the amount of land they would protect. All of the alternatives include the 60-acre Osgood Mountains ACEC.

Effects under Alternative A

Maintaining the Osgood Mountains ACEC would have no effect on riparian and wetland areas.

Effects under Alternative B

Effects from ACEC management under Alternative B would be the same as those described under Alternative A.

Effects under Alternative C

Alternative C includes three additional ACECs compared to Alternatives A and B. The additional designations would provide indirect beneficial impacts by protecting riparian habitat and wetlands within approximately 97,500 acres. This alternative would provide the greatest protection to native vegetation and would prevent disturbance and fragmentation of riparian and wetland areas within these ACECs by limiting human uses in these areas.

Effects under Alternative D

Effects from ACEC management under Alternative D would be the same as those described under Alternative C.

Vegetation—Riparian Habitat and Wetlands: Effects from Backcountry Byways Management

Effects Common to All Alternatives

Backcountry byways may attract more tourism to areas they access and could increase human use and degradation of nearby riparian and wetland areas. The only BCB is the Lovelock Cave BCB, but expanding BCBs could have a greater impact on riparian and wetland areas. Impacts would vary, depending on the locations of new BCBs and the areas they would access.

Vegetation—Riparian Habitat and Wetlands: Effects from National Historic Trails Management

Effects Common to All Alternatives

There likely would be no impacts from national historic trails management because these actions would not affect riparian and wetland vegetation management.

Vegetation—Riparian Habitat and Wetlands: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures within the 13,583 acres of WSR corridors that would promote riparian habitat and wetland health and functionality. Additionally, activities that would result in direct loss or degradation of these habitats would be restricted to maintain the ORVs of the eligible segments.

Effects under Alternative B

There would be no impacts on riparian habitat and wetlands resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on riparian habitat and wetlands resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would likely be no impacts on riparian habitat and wetlands from WSR management so long as WSA, priority habitat, and priority watershed management, as outlined in the remainder of the RMP, is implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented within the 13,583 acres of eligible WSR corridors, which would cause effects identical to those described under Alternatives A and C until a new determination of NWSRS suitability is made.

Vegetation—Riparian Habitat and Wetlands: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

As protected areas, WSAs would prevent disturbance to native vegetation in certain riparian and wetland areas within the WD. Vegetation treatments would need to be evaluated for their impacts on wilderness characteristics.

Effects under Alternative A

Alternative A would be the least restrictive to structural improvements within lands with wilderness characteristics. In addition, grazing management and progress toward or maintaining PFC would improve riparian areas within WSAs.

Effects under Alternative B

Requirements for non-impairment of WSAs would minimize impacts on riparian areas within WSAs.

Under Alternative B, the BLM would manage eight areas containing wilderness characteristics to meet multiple use and sustained yield objectives. This would allow management objectives to be achieved over the long term but could allow some impacts on riparian and wetland vegetation by allowing multiple uses.

Effects under Alternative C

Under Alternative C, as under Alternative B, the BLM would manage eight areas containing wilderness characteristics. However, this alternative would impose restrictions and stipulations in these areas, including closure to mineral leasing and ROW exclusion zones. This could limit riparian improvement projects in certain areas, but such restrictions would have the greatest improvement in riparian condition by minimizing disturbance caused by human use, recreation, and development.

Effects under Alternative D

Alternative D would also manage eight areas containing wilderness characteristics. Depending on the mitigation measures implemented to reduce impacts on lands with wilderness characteristics, some riparian areas would improve.

Vegetation—Riparian Habitat and Wetlands: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

There likely would be no impacts on riparian and wetland vegetation from watchable wildlife viewing sites management.

Vegetation—Riparian Habitat and Wetlands: Effects from Public Health and Safety Management

Effects Common to All Alternatives

The alternatives are nearly equivalent in how they would manage environmental hazards, except that Alternative A is slightly less specific about the particular hazards that the BLM would manage.

The differences among alternatives are not consequential to the impacts on riparian habitat and wetlands. Existing solid and hazardous waste sites and illegal dump sites would be identified and remediated. Remediation methods would depend on the nature of the sites. In general, these actions would be beneficial to riparian habitat and wetlands water resources.

Effects under Alternative A

Action A-PS 5.2 would restrict the use of poisons on public land that could impact the overall health of riparian habitat and wetlands.

Effects under Alternative B

Action B-PS 5.2 under Alternatives B, C, and D does not call out a restriction on poisons that result in secondary killing effect since use of such poisons would be limited under the pest management program. Instead, Action B-PS 5.2 calls for maintenance of the Orovada pesticide disposal area. These actions are unrelated. Neither is expected to result in impacts on riparian habitat and wetlands.

Effects under Alternative C

Impacts would be similar to those under Alternative B.

Effects under Alternative D

Impacts would be similar to those under Alternative B. Alternative D would provide additional law enforcement compared to the other alternatives, which may help in preventing and investigating illegal dumping, with associated potential beneficial impacts on riparian habitat and wetlands to the extent that pollution sources are reduced or responsible parties are identified.

Vegetation—Riparian Habitat and Wetlands: Effects from Sustainable Development Management

Effects Common to All Alternatives

Sustainable development management actions apply to areas that have already been developed. Because sustainable development management actions would involve facility reuse, new operations would not create new disturbance. As a result, there would be few impacts on riparian and wetland areas from sustainable development actions. Disposal of public lands under the sustainable development scenario would limit lands available for disposal if they contain high resource values or riparian areas.

Vegetation – Riparian Habitat and Wetlands: Cumulative Effects

Because riparian vegetation is a controlling factor in the natural rates of erosion and deposition, many of the impacts on riparian habitat and wetlands have been addressed in the discussion of impacts on water resources. Any additional impacts not described previously are addressed below. Most of the discussion below is related to wet meadow habitats where surface water may not be present and therefore impacts would not have been described above.

Past and Present Actions

Past and present impacts on riparian habitat and wetlands from livestock grazing and WHB management not described above are primarily caused by over utilization of meadows. In some areas this has resulted in poor plant community assemblages as some species are preferentially grazed over others. Additionally, overutilization has led, in some areas, to hummocking of previously “smooth” meadow surfaces. Severely hummocked meadows have lost the ability to support riparian vegetation on the tops of hummocks. Data are not available to describe the exact current state of functionality of riparian habitat in wet meadows which has developed under the current LUP, however Table 4-1 includes a qualitative assessment of the overall condition of lentic habitats within the WD.

Past and present impacts on riparian habitat and wetlands from recreation not described above are primarily caused by camping and OHV use. Wet meadows and other riparian habitats with broad level ground have been favored by recreationists for many reasons. It has been common for camp sites to become well established in areas that were once pristine. Camping activities in some areas have led to compaction and/or rutting of riparian soils which decrease suitability for growth of riparian vegetation. Camp sites often serve as central location for OHV use which has led to concentrated use of and impacts on riparian soils and vegetation. Fire rings are also common at many campsites which has led to very localized, but severe impacts on the vegetation and soils below and immediately adjacent to fire rings. Continued visitation to meadows and other riparian areas has also added to the increase of non-native plant species at these locations. The dispersed and unauthorized nature of the development of campsites as well as the irregular timing of use of campsites makes it impossible for the BLM to quantify the impacts from campsites and OHV activities to riparian habitat and wetlands.

Past and present impacts on riparian habitat and wetlands from wildland fire management due to suppression and fuels management activities not mentioned above have included the traversing of riparian vegetation and application of fire retardants and herbicides in meadows. In general these activities have been brief in duration or severity and have not led to long term impacts on riparian habitat and wetlands. Herbicide use has generally been applied to benefit the native riparian plant communities which, when successful, has had longer term impacts on riparian habitat and wetlands. Because of the dispersed and/ or short term nature of these activities, the impacts are unable to be quantified.

Past and present impacts resulting from livestock and WHB grazing includes removal of riparian vegetation, stream bank trampling, and concentrated grazing within riparian areas resulting in increased potential for soil erosion and stream bank instability. From 1982 to the present, current land use plans have employed management actions to reduce concentrated grazing and have improved conditions in areas that are progressing towards or meeting standards for rangeland health. Gathering excess horses above AML has improved and stabilized conditions in riparian and wetland areas. Minerals, lands and realty, and renewable energy developments have impacted riparian vegetation by removing vegetation to construct facilities. BMPs, SOPs, project specific mitigation measures, and permit stipulations have reduced environmental impacts on riparian areas. Unrestricted OHV use within riparian areas have removed vegetation and increased erosion potential in areas where new routes have been established. Wildfires have burned riparian areas, removing vegetation, increasing the likelihood of soil erosion, and have increased the potential for establishment and spread of weeds. Riparian and habitat restoration and ES&R treatments have improve areas over time.

Reasonably Foreseeable Actions

Future impacts on riparian habitat and wetlands from cattle grazing and WHB management not described above would vary among alternatives, but would have, with the exception of Alternative C Option 2, impacts that are identical in type and distribution as those observed under the current LUP. Cattle grazing impacts under Alternative A and Alternative B would be likely be identical to those observed under the current LUP. Livestock grazing impacts under Alternative C Option 1 would likely be lower than Alts A and B because a greater number of acres are closed to grazing. Impacts under Alternative D would likely be lower still due to a greater number of acres closed to grazing than under Alternative C Option 1. The greatest impact to riparian habitat and wetlands would be experienced under Alternative C option 2, the no grazing option. In all cases where a change of impact would be expected the change would be for the benefit to riparian habitat and wetlands.

Future impacts on riparian habitat and wetlands from wildland fire management under Alts A, B, and D would likely be identical to those observed under the current LUP. Impacts from Alternative

B would be slightly different in that no chemical treatments would be used for fuels management. Fuels management under Alternative B would still be likely to occur where needed in or near meadows, however the effectiveness of that management may be different than chemical treatment alternatives. This may lead to similar long term fire severity reduction impacts without the short term impacts from chemicals or it may lead to less effective fire severity reduction which would allow for greater riparian habitat and wetlands impacts from a given fire.

Achieving land health standards would continue to reduce the size and number of areas of concentrated grazing, as would no grazing, resulting in fewer impacts on riparian areas. Increasing mineral, lands and realty, renewable energy and recreation activities would generate more potential for removal of vegetation. Impacts would be dependent on the size and location of disturbance. These impacts would be reduced by implementing BMPs, SOPs, required mitigation measures, and permit stipulations. OHV use designations would limit OHV travel providing additional protection to riparian areas. Impacts would vary based on the number of acres designated as open, closed, or limited. Management of priority wildlife habitat areas and special status species habitat management would include use restrictions reducing disturbance in important habitat areas. Construction of fuel breaks with emphasis at a landscape scale would reduce fire spread potential, thereby protecting or reducing the size of burned areas. Land tenure actions could impact riparian areas by increasing the ability to apply management tools to previously privately owned lands. Conversely, once an area is no longer managed as public lands, these management actions may no longer be applied.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

The management proposed in the RMP in conjunction with the past and present activities as well as reasonably foreseeable future actions would have varying impacts on riparian habitat and wetlands and are summarized by action/ RFFA group below:

- Livestock grazing and WHB management would result in little change to the current state of riparian habitat and wetlands, with any change being a benefit to water resources. The greatest impact which would reduce degradation of or preserve meadows would occur under the no grazing option.
- Wildland fire management would not likely lead to a measurable change to the current state of riparian habitat and wetlands.

Requirements to meet standards for rangeland health or remove livestock grazing would stabilize grazing impacts allowing for healthier, diverse and resilient vegetation within riparian/wetland areas. Other strategies including implementation of BMPs, SOPs, mitigation measures and permit stipulations applicable to minerals, lands and realty, and renewable energy developments to reclaim disturbed areas would also improve conditions over time. The degree and intensity of impacts would vary by alternative. OHV travel management would reduce impacts depending on the number of acres designated as open, closed or limited. Use restrictions in priority wildlife and watersheds would protect native plant communities by limiting disturbance in those areas. These impacts would vary based on the number of acres designated as no disturbance or no surface occupancy, which vary by alternative. Overall incremental impacts on riparian/wetlands would be moderate and would vary based on the size and number of areas disturbed or that restrict uses.

4.2.9 Fish and Wildlife

Summary

Impacts on fish and wildlife resources in the WD from other management programs include loss or alteration of native habitats, decreased food and water availability and quality, increased habitat fragmentation, changes in habitat and species composition, interruption of travel corridors, and disruption of species behavior, leading to reduced reproductive fitness or increased susceptibility to predation, and direct mortality. Surface-disturbing actions that alter vegetation characteristics (e.g., structure, composition, and production) can affect habitat suitability for fish and wildlife, particularly where the disturbance removes or reduces cover and food resources. Even minor changes to vegetation communities can affect resident wildlife populations.

The direct and indirect impacts of management actions on fish and wildlife resources may vary widely, depending on a variety of factors, such as the dynamics of the habitat (e.g., community type, size, shape, complexity, seral state, and condition), season, intensity, duration, frequency, and extent of the disturbance, rate and composition of vegetation recovery, change in vegetation structure, type of soils, topography and microsites, animal species present, and the ability of fish or wildlife species to leave or recolonize a site after a disturbance.

Proposed management practices can mitigate many of the effects from these actions. Alternative C would best manage habitat to maintain biological diversity of wildlife, followed by Alternatives D, B, and then A. Although Alternative B is the resource use alternative, it includes more proactive resource management and conservation measures for fish and wildlife than under the No Action Alternative (Alternative A).

Methods of Analysis

Methods and Assumptions

Fish and wildlife health within the WD is directly related to the overall ecosystem health, habitat abundance, habitat fragmentation, and wildlife security provided, and thus most resource management actions have at least an indirect effect on fish and wildlife. Impact analysis on fish and wildlife resources included an assessment of whether each action would result in the possible destruction, degradation, or modification of habitat, as well as impacts that could improve wildlife and aquatic habitat. Most of the actions are mitigation and protective measures intended to improve health or habitat of wildlife populations. The degree of impact attributed to any one management action or series of actions is influenced by the watershed, time, and degree of action, existing vegetation, and precipitation. Quantifying these impacts is difficult due to the lack of monitoring data for most species. In absence of quantitative data, best professional judgment was used, according to the following assumptions:

- Success of mitigation is dependent on proper implementation and can be predicted by past results of similar mitigation;
- Implementation-level actions would be further assessed at an appropriate spatial and temporal scale and level of detail;

- Additional field inventories could be needed to support implementation-level decisions, which may be subject to further analysis under NEPA;
- The BLM would continue to manage fish and wildlife habitats in coordination with the Nevada Department of Wildlife; and
- The health of fisheries within the WD is directly related to the overall health and functional capabilities of riparian and wetland resources, which in turn are a reflection of watershed health. Any activities that affect the ecological condition of the watershed and its vegetative cover would directly or indirectly affect the aquatic environment. The degree of impact attributed to any one disturbance or series of disturbances is influenced by location within the watershed, time and degree of disturbance, existing vegetation, and precipitation. As riparian systems adjust in response to the removal of vegetation or changes in hydrologic conditions, the availability of habitats required to fulfill the life history requirements of fish populations might be affected.

This impact analysis identifies both enhancing and improving effects on a resource from a management action as well as those that could degrade a resource. However, the evaluations are confined to those actions that have direct, immediate, and more important effects on the planning area, instead of identifying and evaluating all possible interactions, including those that are minor, and cause-effect relationships.

Because some species of fish and wildlife are also considered special status species, only impacts on fish and wildlife that do not have special status are discussed in this section. Impacts on federally listed, proposed, candidate, state threatened or endangered, or BLM sensitive species are addressed in the Impacts on Special Status Species section.

Fish and Wildlife: Effects from Air Quality Management

Effects on All Alternatives

Air quality has limited direct and indirect effects on wildlife. The scope of these effects would be limited to dust, smoke or other air pollution and the impacts of these on the health of the animals. Since all the Alternatives are designed to meet air quality standards, the impacts on wildlife is expected to be minimal from bureau authorized activities.

Fish and Wildlife: Effects from Geology Management

Effects Common to All Alternatives

All alternatives would provide some level of protection to wildlife, indirectly, through the NEPA analysis process. Species that may use unique geologic resources would benefit from management actions designed to prevent undue adverse impacts on the geologic resources. Varying levels of protection would occur and are discussed below under each alternative.

Effects under Alternative A

Under Alternative A, current management, proposed actions that may impact unique geologic resources would be assessed through the NEPA process and avoided, minimized or mitigated, indirectly benefiting wildlife. OHV use would not be restricted and would impact wildlife through soil and vegetation disturbance. Noise from OHVs would also affect wildlife behavior to varying degrees, depending on the species.

Effects under Alternative B

Management under Alternative B would analyze proposed actions similarly to Alternative A and would apply necessary stipulations and mitigation. Impacts from OHV use would be fewer since this alternative would limit OHV travel to existing roads and trails. This would benefit wildlife as it would reduce surface and noise disturbance. This alternative identifies fewer unique geologic resources and, therefore, would indirectly protect wildlife in fewer areas. Unlike Alternative A, this alternative would attempt to promote visitation and protection of unique geologic resources. This could result in increased impacts on wildlife at these areas but also to areas traveled through to reach the geologic resources.

Effects under Alternative C

Management under Alternative C would result in greater protection to wildlife through exclusion of most activities, including OHV use, in areas identified as having unique geologic resources. More areas are identified as having unique geologic resources under this alternative and would indirectly protect more wildlife. This alternative would also attempt to promote protection of these resources and may result in the same impacts as was described in Effects under Alternative B.

Effects under Alternative D

Similar to Alternative A, protecting unique geologic features through avoidance would avoid impacts on wildlife habitat near these features. Relocating disturbance to avoid unique features may impact wildlife habitat. The degree of impacts is dependent on the type of habitat affected and the size and location of disturbance. Generally areas containing unique geologic features are relatively small and impacts on habitat limited. Protecting unique features would also maintain habitat for those wildlife species, especially raptors, which might rely on these features for perching and nesting.

Fish and Wildlife: Effects from Soil Resources Management

Effects Common to All Alternatives

Under all alternatives, wildlife habitat would be indirectly conserved via conservation measures to prevent erosion and other degradations to soil, which in turn diminishes impacts on vegetative cover and thus wildlife habitats. Preventing sedimentation in water courses also can improve the health of fish and other aquatic species populations. Maintaining soil processes and their components, such as litter, appropriate vegetation, and good infiltration, is important to land health which is directly related to habitat quality. Implementation of BMPs and RAC Standards and Guidelines for soil-disturbing activities and application of reclamation measures to mitigate adverse impacts on soils and water add additional actions that could benefit wildlife and their habitats. The BMPs and RAC Standards and Guidelines could prevent additional soil-disturbing activities that could encourage healthy vegetation communities, which are the foundation of wildlife habitats. Reclamation measures further restore wildlife habitats that have already been impacted.

Effects under Alternative A

There are no effects unique to management actions under this Alternative A.

Effects under Alternative B

This alternative differs from the others by disallowing the use of soil amendments. It would likely limit success, in some cases, of plant growth and establishment during reclamation efforts. This could result in increased soil erosion and invasion of undesirable plant species, having a negative impact on wildlife habitat.

Effects under Alternative C

This alternative differs from the other alternatives in that it would provide greater protection to soils from compaction and disturbance to biological crusts by implementing seasonal restrictions. These seasonal restrictions would be expected to result in less soil erosion and more successful establishment of desirable vegetation and establishment of less invasive plant species. This alternative would also allow the use of only natural or organic soil amendments and the importation of soil medium. This would be expected to give better opportunity for plant growth and vigor, while avoiding the potential of negative impacts from chemical fertilizers. The importation of soil medium may provide better opportunity for plant growth but may also inadvertently import undesirable plant seeds, leading to the establishment of invasive plant species.

Effects under Alternative D

This alternative allows for flexibility in the use of soil amendment, based on the situation. This would be expected to result in the best opportunity for plant growth and establishment while reducing the potential for soil erosion and invasion of undesirable species, while having the greatest benefit to wildlife habitat.

Fish and Wildlife: Effects from Water Resources Management

Effects Common to All Alternatives

Effective watershed management, which minimizes erosion, maintains hydrologic flow, and indirectly maintains vegetative community health, would result in healthy and diverse plant communities, which in turn provide wildlife habitats.

Developing water sources for other uses (springs and wells), while ensuring that water is available to wildlife, may lead to an increase in size and number of wildlife populations. Increases in populations may be beneficial to some species and detrimental to others. For instance, insect numbers may increase and provide a greater abundance of food for avians and bats but may also increase the incidence of disease (e.g., West Nile virus) transmission to some species of wildlife. The development of water sources would require a construction phase and as with all construction, short term disturbance to wildlife and their habitat would occur. Small, less mobile or subsurface wildlife may be injured or killed.

The importation and exportation of water would be allowed under each alternative with differing restrictions. These differences are discussed under Effects under Alternatives A, B, C and D.

Realty actions designed to increase BLM access to water sources for wildlife and habitat improvement would likely result in more stable or increased wildlife populations.

Effects under Alternative A

Under this alternative, priority watersheds and well head protection zones would not be designated. Watershed management would continue to be addressed through the use of BMPs, SOPs and NEPA analysis. Decisions that may impact water resources would be assessed on a case-by-case basis. Impacts on wildlife and their habitats from multiple use activities would be avoided or mitigated as much as practicable. The intent would be to maintain the health and sustainability of these watersheds while allowing multiple uses. All these measures would help reduce impacts on wildlife while maintaining desirable habitat.

Effects under Alternative B

This alternative would designate priority watershed that would be managed for multiple uses. These watersheds would be identified as priority watersheds based on threatened and endangered species habitat and municipal water supply collection. It would also regard well head protection zones as avoidance areas. Impacts on wildlife and their habitats from multiple use activities would be avoided or mitigated as much as practicable. All these measures would help reduce impacts on wildlife while maintaining desirable habitat.

Management actions under this alternative would encourage and promote commercial development and filings for private water rights. Water importation and exportation would be allowed with the least restrictions of all alternatives. Movement of large quantities of water can result in reduced abundance of surface water which could impact wildlife and vegetation.

An increase in commercial development is rarely a benefit to wildlife or its habitat due to disturbance, habitat loss and fragmentation; therefore, if commercial development is greater under this alternative, more associated negative impacts on wildlife would be expected as compared to the other alternatives. If more filings for private water rights (for multiple uses) and water development occurs as a result of management actions under this alternative, impacts from water developments (as described under Effects Common to all Alternatives) would be expected to occur to a greater extent than with the other alternatives.

Effects under Alternative C

Alternative C establishes priority watersheds and well head protection zones as exclusion areas for discretionary actions that are determined to be incompatible with the resources they were designated to protect. This would preclude impacts on wildlife and their habitat that could occur under multiple use activities and would be the most effective at reducing impacts on wildlife while maintaining desirable habitat.

Water importation and exportation would be allowed but restricted to those instances where the source basin perennial yield (as determined by the NV State Engineer) is not exceeded, where impacts can be fully mitigated, or where the project does not compromise multiple use opportunities. These restrictions would further reduce possible impacts on wildlife and their habitats as described under Effects under Alternative B.

Effects under Alternative D

Wildlife habitat located within priority watershed areas would be protected due to use restrictions that include no surface disturbance and no surface occupancy that would be applied to saleable minerals, solid minerals, fluid minerals and ROWs. Water importation and exportation would be allowed but restricted to those instances where the source basin perennial yield (as determined by the NV State Engineer) is not exceeded, where impacts can be mitigated, or where the project does not compromise multiple use opportunities. The impacts these restrictions would have on wildlife and habitat is similar to that discussed under Effects under Alternative C except with Alternative D's lesser requirement for mitigation, impacts would be expected to be greater.

Fish and Wildlife: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

The following impacts could result from the use and management of healthy forests. Management actions such as prescribed fire, vegetation manipulation (mechanical, biological, chemical treatments), seeding, fencing and use restrictions could cause short-term negative impacts on wildlife habitat. However, habitat would be improved in the long term. Harvesting of forest products would also impact wildlife and wildlife habitat due to noise, surface disturbance and loss or alteration of habitat. These types of activities are relatively limited in the planning area.

Effects under Alternative A

Management actions under this alternative give special consideration to curlleaf mountain mahogany, aspen, cottonwood, limber pine, whitebark pine, willow, alder and chokecherry stands.

Management tools including prescribed fire, fencing, clear cutting (except in aspen or cottonwoods) and herbicides may be used to enhance deteriorated stands of aspen and cottonwood. These tools would help to maintain the long-term health and sustainability of these stands for wildlife by limiting fuels buildup, encouraging new growth, creating habitat mosaics, protecting from ungulate impacts and controlling invasive weed species. These actions could also result in negative short-term impacts that may displace, injure or kill some wildlife species. Long-term negative impacts from fences could result in injuries or death from entanglement or alteration of wildlife movement.

Wildland fires would be responded to quickly in woodland communities for suppression but fires may be used as a management tool in these areas if determined to be of benefit to the community. The exception would be in the Stillwater Range, where the policy would be for full suppression of fire. Short-term impacts from fire would be similar to those discussed in the paragraph above. The benefits of fire use, such as limiting fuels buildup, encouraging new growth and creating habitat mosaics would occur to a lesser degree with full suppression of fire in the Stillwater Range.

Aspen, cottonwood and mahogany would be considered as critical management species when designing grazing systems and plans for wild horse use plans. With special consideration for these habitats, ungulate impacts would be minimized. This would likely result in better habitat conditions for wildlife.

Thinning and pesticide use would be used to manage the health of pinyon and juniper stands. These actions would be conducted with appropriate stipulations as applied through a NEPA analysis on a site-specific basis to avoid or mitigate impacts on wildlife.

Harvest areas for pinyon and juniper would not be expanded and would be limited to designated areas in the Stillwater and East Ranges and would not allow harvest of trees within 100 feet of springs and riparian areas. Noncommercial Christmas tree cutting by permit would be allowed in portions of the Stillwater Range. Commercial harvest of Christmas trees or other woodland products would be prohibited. Some firewood harvest would be allowed in selected areas. Harvest of woodland products would create short-term disturbance to wildlife from human presence but are expected to be minimal in size and scale.

No area is currently managed as old growth forest. This alternative would designate other stands or portions of stands if characteristics warrant designation and would manage to enhance old growth characteristics using tools such as prescribed fire, vegetation manipulation, seeding, fencing and use restrictions. Management and preservation of these limited and unique habitats is important to wildlife that depend on them. Some of these actions would have short-term impacts injurious to wildlife as was discussed earlier in this section (Effects under Alternative A).

Effects under Alternative B

Removal of pinyon pine and juniper from invaded sites may facilitate reestablishment of sagebrush communities, benefiting wildlife that depend on these communities. Additionally, controlling pinyon pine and juniper on invaded sites would prevent further encroachment on sagebrush communities.

Using various forest health treatments such as prescribed fire, planting, or mechanical treatments would cause short term direct impacts on wildlife habitat. These impacts would include removal of habitat due to crushing or removing vegetation. Some wildlife species would be forced to relocate to adjacent suitable habitat, if available. Impacts would be dependent on the size of areas treated. Long term impacts would include benefits to habitat by improving habitat conditions making habitat more sustainable, healthy and diverse.

Impacts resulting from commercial harvest of pinyon nuts, firewood and posts, and Christmas trees could lead to long-term or permanent loss of habitat, nest abandonment, emigration, and mortality of individuals, depending on the species. Salvage harvesting could result in localized minor direct impacts on wildlife from disturbance, loss of food or cover resources, and short-term disturbance of breeding, feeding, or sheltering. Harvesting activities under this alternative would also have the most impact on fish and aquatic resources because they would be allowed within 100 feet of springs and riparian habitat and therefore would result in increased impacts.

Effects under Alternative C

Encroachment by pinyon pine and juniper stands would not be managed under Alternative C. Loss of sagebrush communities due to encroachment would be detrimental to species that depend on sagebrush habitat; however, juniper encroachment within the WD is usually localized with few stands encroaching on sagebrush and therefore has limited impact. Alternative C would result in the least impacts on wildlife and aquatic resources from harvesting since it places the most restrictions on these activities. Management of old growth forest would benefit species that use these areas, particularly migratory birds.

Effects under Alternative D

Implementation of management actions to ensure healthy forests would also help ensure healthy habitat for wildlife. Harvesting juniper and pinyon pine trees would be prohibited within 100 feet of springs and riparian areas, unless harvesting would achieve resource objectives.

Fish and Wildlife: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Spread of noxious and invasive weeds affects habitat quality for wildlife by decreasing vegetative diversity and production, which can have a negative impact on wildlife populations. By reducing the quantity of invasive plant species, competition would be decreased, allowing better opportunity for native species to thrive. Although weed treatments would generally improve wildlife habitats in the long-term, short-term disturbances to wildlife would occur. Weed treatment actions could remove forage and cover in areas dominated by weeds, resulting in short-term impacts on wildlife that are using weed infested areas. Short-term impacts would vary by type of application. Treatments, especially mechanical treatments, would cause some species to temporarily avoid treated areas. Noxious weed control measures would help prevent conditions that reduce riparian habitat health and water quality. Directly or indirectly, invasive plants can affect stream bank stability, sediment, turbidity, shade and stream temperature, dissolved oxygen, and pH (USFS 2005). Reduction of total acres impacted by invasive plants would positively affect riparian habitat, water quality and aquatic resources. Mechanical treatments would include crushing or removal of vegetation and disturbance of soils. These impacts would accelerate soil erosion potential of areas treated and would allow transporting of sediments into water sources, affecting water quality and fish habitat.

Effects under Alternative A

Treatments to control pests (including invasive animals and insects) would improve habitat conditions for wildlife as animals and insects may feed on vegetation necessary to sustain wildlife as food and cover. Alternative A includes the use of chemical treatments and prescribed burning for weeds management. These measures may be more effective for weed management in some cases. Assuming chemical treatments would be applied with all applicable guidelines (including stream buffers), effects on wildlife at the population level are not expected. Prescribed fires are usually conducted during the spring or fall and are generally "cooler" than summer wildland fires. Temporary direct effects of prescribed fire and other weed treatments are the alteration of habitats and displacement of wildlife. Some injury and death could occur especially for small, less mobile species. However, these treatments would improve the vegetative diversity, age class, production and overall habitat quality. Although prescribed fire is a weeds management option under this alternative, present use of prescribed fire within the WD is limited; currently it is used for controlling saltcedar in small localized applications.

Effects under Alternative B

Effects are the same as those described under Effects Common to All Alternatives and Effects under Alternative A.

Effects under Alternative C

Under Alternative C, chemical treatments and prescribed fires would not be used for weeds management; therefore, effects resulting from these treatments, as described in Effects Common to All Alternatives and Effects under Alternative A, would not occur. Weed control treatments would be limited to maintaining habitat for wildlife. Wildlife habitat would be more vulnerable to weed establishment and spread.

Effects under Alternative D

Effects are the same as those described under Effects Common to All Alternatives and Effects under Alternative A.

Fish and Wildlife: Effects from Chemical and Biological Control

Effects Common to All Alternatives

There would be no identified effects common to all alternatives from chemical and biological control management.

Effects under Alternative A

Under Alternative A, no pesticides or herbicides would be applied to streams, lakes, or reservoirs unless adverse impacts could be adequately mitigated. This would likely reduce impacts on fish and other aquatic wildlife that result from exposure to these substances, as well as wildlife that forage on these species and aquatic vegetation. No additional actions related to use of pesticides and herbicides are included in Alternative A. There are no management actions pertaining to biological control under this alternative.

Effects under Alternative B

Mechanical treatments would include crushing or removal of vegetation and disturbance of soils. Short term impacts would accelerate soil erosion potential of areas treated and may allow transporting of sediments into water sources, affecting water quality and fish habitat.

Effects under Alternative C

Effects would be similar to those described under Alternative B, except the use of biological treatments over chemical treatments would be emphasized, reducing impacts on wildlife and aquatic resources from pesticide use. Not allowing chemical treatments or prescribed fire would make wildlife habitat more vulnerable to wildfire as implementation of fuel breaks would be restricted to smaller areas or not available for placement in strategic areas containing slopes where mechanical treatments may not be feasible. Potential for large wildfire could increase.

Pinyon/Juniper encroachment would also accelerate into sagebrush areas reducing habitat for sagebrush obligate species.

Effects under Alternative D

Effects would be the same as those described under Alternative B.

Fish and Wildlife: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

Management to achieve land health standards would result in healthy ecological conditions, including healthy habitats for wildlife. Actions, such as seedings and land treatments, are designed to improve the health and diversity of native vegetation communities and to rehabilitate disturbed areas. Species that use sagebrush and grassland habitats would be the most affected. These habitats are important within the WD. Actions that maintain or improve these communities would benefit the host of wildlife species that use them. Special emphasis on the management of mountain browse species would help ensure the health of these habitats for mule deer and other species. Land treatments would facilitate the maintenance of habitats in various stages of shrub or understory condition, particularly sagebrush steppe. Closing burned areas to livestock grazing would facilitate the recovery of these vegetative communities. Short-term disturbances to wildlife, similar to those described in the preceding weeds management section, could occur with these management actions.

Effects under Alternative A

Effects from chemical treatments and prescribed burning are similar to those described under Alternative A, Effects from Vegetation—Weeds Management. Effects from biological treatments are similar to those described under Alternative B, Effects from Vegetation—Weeds Management. Restoring crested wheatgrass seedings could result in long-term benefits to wildlife species that use such areas and short-term impacts on wildlife from disturbance and loss of food or cover from implementing the action. Areas within the WD where crested wheatgrass restoration would occur are limited, so impacts on fish and wildlife would be limited and localized. Livestock grazing can have both beneficial and detrimental impacts, as discussed under Effects from Livestock Grazing Management—Effects Common to All Alternatives. Site-specific, short-term prescriptive grazing could stimulate growth of some plant species and control weeds. Managing grazing activities on rangelands to achieve reduction of hot season grazing use of wetland and riparian areas would decrease impacts in these important wildlife habitats.

Effects under Alternative B

Effects are generally the same as those described under Alternative A. Biological treatments would reduce impacts; however, in some cases biological treatments spread to other plants or animals not intended for treatment, damaging wildlife habitat. Actions to maintain or improve salt desert scrub habitats, as with all habitats, would be beneficial to wildlife.

Effects under Alternative C

Alternative C would limit the use of chemical treatment to control invasive plants and weeds. Fish and wildlife habitat would be vulnerable to the establishment and spread of invasive plants and weeds. Habitat conditions would decline, especially in areas dominated by invasive plants. These areas would not provide sufficient cover or food sources for numerous wildlife species. Monocultures of cheatgrass would make remaining habitat vulnerable to fire re-occurrence and spread. Effects from management of salt desert scrub habitat are the same as those under Alternative B.

Alternative C includes grazing and no grazing options. Under Alternative C, Option 1, the effects from rangeland management are similar to those described in the Effects Common to All Alternatives section, with the addition of emphasis of using native seed stock in management. The establishment of native communities over nonnative communities in disturbed areas is preferable for wildlife but due to considerations such as habitat type, seed availability and cost, native seed may not result in quick stabilization of soil; therefore, a greater risk of soil loss and spread of invasive species would exist.

Eliminating grazing (Alternative C, Option 2) would likely result in improved ecological conditions in native habitats. As the ecological condition improves, the health, vigor, and abundance of vegetative species would likely increase benefitting big game as well as other species.

Effects under Alternative D

Effects would be similar to those described under Alternative A, with the addition that restoration efforts would be focused on important wildlife habitats, thereby increasing potential benefits to wildlife. Effects from management of salt desert scrub habitat would be the same as those under Alternative B.

Fish and Wildlife: Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Actions that would improve riparian and wetland PFC would in turn improve habitats for riparian- and wetland-dependent wildlife species, especially via increases in quantity and quality of riparian vegetation. In addition to their importance to fish and aquatic species, riparian areas are critical to wildlife in the WD (WAPT 2006).

Effects under Alternative A

Under Alternative A, riparian management actions would continue to reduce the potential for degradation of riparian wildlife habitat. The implementation of BMPs that address nongrazing impacts, such as water diversions, roads, and recreation, would avoid and mitigate many surface disturbances and erosion. This also would protect and enhance riparian vegetation, which could reduce impacts on riparian-dependent wildlife.

Effects under Alternative B

This alternative would be expected to achieve the least toward improvement or maintenance of riparian and wetland areas of all alternative. The objective of improving the number of riparian-wetland areas that are at PFC or improving from 46 percent to 60 percent is less ambitious than the other alternatives. Impacts on these areas from livestock use would be addressed through the use of fencing, water developments and vegetative manipulation. No adjustment to livestock grazing would be used such as change in season-of-use or AUM reduction. Fewer riparian-wetland areas would be restored to PFC and would not be as beneficial to wildlife as the other alternatives. Methods such as fencing, water development and vegetative manipulation would help to achieve healthier riparian-wetland areas but can also have impacts associated with them that are harmful to wildlife as discussed in Effects From Vegetation-Forest and Woodland Products Management, Individual Effects under Alternative A and Effects from Water Resources Management, Effects Common to all Alternatives. Adjustment of AML in order to address riparian-wetland restoration is not an option under this alternative, and would limit the success of restoration efforts in some areas.

Effects under Alternative C

Under Alternative C, Option 1, impacts on riparian and wetland habitats from grazing, such as competition for water and forage and habitat alteration and loss, would be minimized, as compared to the other alternatives, by establishing specific grazing management objectives that would reduce the impacts of grazing on riparian and wetland systems that affect wildlife use. The objective for riparian-wetland improvement under this alternative is the same as Alternative D and C, Option 2 to improve from 48 percent of riparian-wetland areas at PFC or improving, to 85 percent of them at PFC. Improvement to more of these areas would have greater beneficial impacts for wildlife. The management actions are limited to adjustment of grazing systems, season and duration of use, AMLs or AUM allocation, when addressing livestock and WHB impacts on wetland-riparian areas. These actions would benefit wildlife by making necessary adjustments to livestock and WHB use without the use of fences and water developments and vegetative manipulation. Additional water sources can be beneficial to wildlife but they can also have harmful impacts as discussed in Individual Effects under Alternative B. The negative impacts from fencing, as discussed in Individual Effects under Alternative B, would be avoided. Without the option of vegetative manipulation under this alternative, restoration efforts may be slower or less successful.

Alternative C, Option 2 would eliminate impacts from grazing to wetland and riparian areas, resulting in improved habitat for wildlife. This alternative would address riparian-wetland restoration by removing livestock from public land. This management action would result in improvement to these areas and would benefit wildlife. In areas where livestock are the primary causal factor to nonattainment of PFC, restoration would be more rapid than under the other alternatives. In areas where other primary causal factors exist, livestock removal would have little benefit to riparian-wetland health. In those instances, this alternative would provide no additional management actions to address restoration.

Effects under Alternative D

Effects from improving riparian wetland areas would be similar to but slightly less than those under Alternative C since Alternative D would not require achieving 85 percent PFC, as long as areas are progressing toward PFC. This alternative's management actions are a combination of Alternatives B and C, Option 1, with preference toward Alternative C, Option 1, as natural processes would be the primary actions used to restore riparian areas and the use of structures and vegetative manipulation would be used secondarily. Impacts would be the same as was discussed in Individual Effects under Alternatives B and Individual Effects under Alternatives C, Option 1. But overall benefit to riparian areas would be expected to be greatest under this alternative because of the wider range of management options to choose from when addressing different situational needs.

Fish and Wildlife: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Fish and wildlife resources would benefit from development of specific objectives and actions to protect and enhance habitat conditions. Restrictions on uses within sensitive or priority wildlife habitats would mitigate or eliminate impacts on wildlife resources.

Avoidance and mitigation measures to limit the impact of surface-disturbing and other disruptive activities during the breeding season of migratory birds would give better opportunity for reproductive success during crucial breeding periods. Implementing management actions to restore or improve wildlife habitat would ensure wildlife habitat is sustainable, healthy, and diverse.

Management actions to maintain and enhance waterfowl habitats would help to maintain habitats suitable to meet the life cycle and habitat requirements of these species.

The management of streams, banks, and shorelines to improve their PFC rating and limit stream bank alteration would improve habitat conditions for various fish and wildlife species.

Implementing management actions to restore or improve wildlife habitat would ensure wildlife habitat is sustainable, healthy, and diverse.

Effects under Alternative A

Reintroducing bighorn sheep could help reestablish a native species to the ecosystem, adding to the wildlife diversity of the WD. Although management actions would attempt to resolve all conflicts with domestic sheep prior to reintroduction, risk of disease transmission that could be detrimental to bighorn sheep populations would still exist.

The establishment of pioneering elk would also add to the diversity of the WD. The elk would compete, at some level, with other wildlife species for resources and would impact riparian and upland habitats.

When feasible, fencing to keep livestock, wild horses and burros from reservoirs on public land that supports fisheries would benefit fish and aquatic resources by removing these ungulates' impacts on water quality.

Effects under Alternative B

Wildlife would benefit by the designation of 716,528 acres of Priority 2 wildlife habitat. Priority 2 wildlife habitat areas would be managed as avoidance areas for construction of facilities, such as power lines and communication sites. Priority 2 wildlife habitat areas would also be closed to salable mineral materials (except for government use) and fluid and solid mineral leasing (see Minerals—Leasable, Locatable, and Saleable, Effects from Fish and Wildlife Management), which would protect habitats and benefit fish and wildlife in these areas.

Supplementing the big game populations in the WD would increase population levels for those species and would provide additional food resources for predators. Transplants of big game wildlife species would not likely result in competition with local wildlife species for food, water, and habitat cover because, although many game species have overlapping habitat ranges within the WD, individual species, for the most part, occupy distinct habitat niches.

The effects from reintroducing bighorn sheep are the same as those described under Alternative A. Pioneering elk populations would not be permitted to become established under Alternative B, precluding their impacts on riparian and upland habitats.

New wildlife water developments (guzzlers) benefit most game and nongame species in the area by allowing them to colonize new areas that were previously lacking adequate water sources. Construction of guzzlers could displace, injure or kill small, less mobile species depending on the level of surface disturbance required. During construction, wildlife within the local area could be disturbed from breeding, feeding, and sheltering.

Reservoirs on public land that supports fisheries would not be fenced, in order to allow livestock, wild horses and burros access. Their use of these areas would contribute to diminished water quality which could impact the health of fisheries.

Providing artificial water sources would help sustain wildlife populations and would allow for expansion of wildlife use areas which were not previously viable due to lack of water. Potential for increased wildlife population growth would occur.

Effects under Alternative C

Designation of 1,279,481 acres as Priority 1 wildlife habitat areas and 869,645 acres as Priority 2 wildlife habitat areas would preserve habitat for sage-grouse and sagebrush obligate species. Priority 1 wildlife habitat areas would be managed as exclusion zones and Priority 2 wildlife habitat would be managed as avoidance areas for projects, protecting these valuable habitat areas. Priority 1 and Priority 2 wildlife habitat areas would also be closed to saleable mineral materials (except for government use) and fluid and solid mineral leasing(see Minerals—Leasable, Locatable, and Saleable, Effects from Fish and Wildlife Management), which would protect habitats and benefit fish and wildlife in these areas.

Effects from transplanting big game wildlife species would be the same as those described under Alternative B. Effects from the establishing pioneering elk would be the same as those described under Alternative A.

Under Alternative C, wildlife water developments would not be constructed, and existing wildlife water developments would be removed. This could lead to mortality of individuals and loss of the population in areas where species have become dependent on these sources.

Under Alternative C, waterfowl habitats at Gridley Lake and Continental Lake would be further protected by the use of fencing to exclude livestock and burros and closure to OHVs. Under Alternative C, nesting restriction would protect bird nests and cover necessary for nesting from uses.

Fencing to keep livestock, wild horses and burros from reservoirs on public land that support fisheries would benefit fish and aquatic resources by removing these ungulates' impacts on water quality. Impacts on wildlife related to fencing include injury or direct mortality from wildlife colliding with fencing. Fences may also serve as raptor perching sites making some wildlife species more vulnerable to predation.

Fishery streams, spring brooks, and lentic fishery resources would have the greatest potential for improvement and benefit to fish and aquatic species by limiting annual stream bank alteration to 10 percent or less of linear bank length, as compared to 20 percent alteration under Alternatives B and D. In addition, alteration of areas with sensitive channel types would be limited to five percent under Alternative C, as compared to 20 percent under Alternative B and 10 percent under Alternative D. Numerical percentages pertaining to stream bank alteration limitations are not provided under Alternative A.

Not providing artificial water sources for wildlife would limit potential for expansion of habitat into areas not previously used by wildlife. Improving or restoring existing natural water sources would maintain and improve habitat conditions for wildlife. Wildlife populations would be maintained.

Effects under Alternative D

Allowing for development of artificial water sources would improve potential for wildlife population growth. Impacts would be similar to Alternative B. Alternative D would protect 1,199,539 acres of priority wildlife habitat by implementing use restrictions and no surface disturbance no surface occupancy stipulations, unless the action met the management criteria identified under D-FW 1.2 or D-SSS 1.2.1.

Effects from transplanting big game wildlife species would be the same as those described under Alternative B. Effects from reintroducing bighorn sheep and establishing pioneering elk would be the same as those described under Alternative A. Constructing wildlife water developments has effects similar to those described under Alternative B.

Designating priority wildlife habitat areas would protect wildlife habitat by implementing no surface disturbance/no surface occupancy use restrictions applicable to certain uses. Managing for healthy wildlife habitat would include implementation of mitigation measures that would reduce adverse impacts on wildlife.

Fish and Wildlife: Effects from Special Status Species Management

Effects Common to All Alternatives

All alternatives provide management actions to protect sage-grouse habitat to varying degrees. Fish and wildlife habitat in those areas would be protected from disturbance. Maintaining or improving habitat for special status species would also benefit other wildlife dependent on similar habitat. The more restrictive of disturbance management actions are under each alternative, the more protection they would provide for fish and wildlife populations and their habitats.

Impacts on fish and wildlife habitat would be similar under all alternatives. Prescriptive grazing within exclosures would range from no grazing (Alternative C) to allowing grazing to meet resource objectives. Impacts on wildlife habitat would vary depending on habitat needs of wildlife species. Those species requiring more cover would benefit from no grazing. However other species may need more habitat interspace.

Effects under Alternative A

Special status species management would protect wildlife habitat through development of site specific mitigation measures to reduce impacts.

Effects under Alternative B

Similar to Alternative A, this alternative also provides buffer zones that restrict uses near sage-grouse leks. Associated habitat for other wildlife would also be protected.

Effects under Alternative C

Alternative C would include use restrictions within all PMUs. Wildlife habitat within those areas would be protected.

Effects under Alternative D

Alternative D would include use restrictions within five PMUs identified as priority sage-grouse habitat. Implementation of use restrictions would also protect habitat for other wildlife species. Managements of general sage-grouse habitat would include implementation of mitigation measures to reduce adverse impacts on sage-grouse. These mitigation measures would also reduce impacts on other wildlife habitat located within general sage-grouse management areas.

Fish and Wildlife: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Wild horses and burros and their management result in several impacts on wildlife and habitat. Wild horses and burros compete with wildlife for forage, water and cover. As large herbivores (horses, in particular), they consume relatively large amounts of vegetation and water. Similar to livestock, they can also cause substantial impacts on riparian areas (as described in Effects from Livestock Grazing Management, Effects Common to All Alternatives).

All alternatives identify the need to maintain AMLs within HMAs and would use the gather process as a tool to meet that need. Gathering would help prevent excess impacts from overpopulation of WHB herds and help ensure adequate forage, water and overall habitat condition for wildlife. Gathers can also cause short-term stress and displacement of wildlife resulting in disruption of life-cycle behaviors. Each alternative also identifies the need to address the issue of WHB on checkerboard lands but propose differing solutions. Those differences would be discussed in Effects under Alternatives A, B, C and D. Habitat monitoring, for sustainability, would be an ongoing process that may result in adjustment of AML. If unacceptable adverse impacts occur from WHB (and livestock) use, corrective management actions would be taken. This action is important in ensuring healthy habitat for wildlife. Alternate waters would be developed when existing water sources become unavailable to WHB. By providing alternate water, additional use and impacts at remaining water sources would be prevented. Development of alternate water sources may involve construction activities that could displace wildlife and injure or kill some small, less mobile or subsurface species.

Effects under Alternative A

Under this alternative, the following management actions would affect wildlife and habitat: Current HMA and HA status would be maintained; Horses or burros would be removed from checkerboard areas unless a cooperative agreement could be reached with the private land owner for the WHB protection; Fertility agents would be used in combination with four-year (or longer) gather cycles to maintain AML; Monitoring data would be used to assess AMLs when developing multiple-use plans; HMAs with both horses and burros may be converted to horses only or vice versa. New fences would only be constructed if they do not impair WHB free-roaming nature; Existing fences should allow for WHB movement with gates and let-down fences; Water rights for WHB would be acquired; If private water sources become unavailable to WHB, alternative sources would be developed only when water is the limiting habitat component.

The following effects on wildlife and habitat would be expected under this alternative's management actions. The removal of WHB from checkerboard land would benefit wildlife in those areas due to reduced competition and impacts. The use of gathers to maintain AML and fertility agents to reduce the need for gathers, would help ensure maintenance of healthy habitat for wildlife while limiting the frequency of negative impacts from gathers (as discussed under Effects Common to all Alternatives). The review of data to determine appropriate AML and the need for changes to multiple-use planning, would help prevent overutilization of vegetation and water sources and the subsequent negative impacts on wildlife. Conversion of wild horses to burros would result in more animals utilizing the habitat as the conversion ratio is 1:2. Therefore, although, the burros tend to eat less you would have more competition with wildlife for cover, water and space. The opposite would be true for conversion of burros to horses. The use of fencing can help reduce adverse impacts on habitat from WHB, livestock and human use. They can also allow implementation of livestock grazing systems which have a beneficial impact to wildlife habitat by providing periodic rest from grazing. During construction, short-term impacts would occur that may displace wildlife and may injure or kill some small, less mobile or subsurface species. Long-term impacts from fences could result in injuries or death of wildlife from entanglement or alteration of wildlife movement. In these instances, the benefits to wildlife through the elimination of WHB' impacts would not be realized. Wildlife may also be impacted by additional water sources as discussed in Effects from Water Resources Management, Effects Common to all Alternatives. Stipulations and mitigation that would be applied to avoid or lessen impacts on WHB from recreational activities would also benefit wildlife.

Effects under Alternative B

Under this alternative, the following management actions would affect wildlife and habitat: Horses would be removed from areas of HMAs that contain checkerboard land and the HMA boundary would then be redefined to exclude the checkerboard portions. The checkerboard portions would then become HAs; As with Alternative A, fertility agents and four-year (or longer) gather cycles would be used to maintain AML; AMLs would also be assessed similar to Alternative A; HMAs with both horses and burros may not be converted to horses only or vice versa; If monitoring data shows adverse impacts due to livestock and WHB, preference would be given to livestock while taking corrective actions primarily against WHB; New fencing would be constructed based on multiple-use needs and would accommodate WHB movement with gates and let-down fences; Existing fences would be modified or reconstructed to allow for WHB movement with gates and let-down fences;

Water rights for WHB would not be acquired; If private water sources become unavailable to WHB, and water is the limiting habitat component, AML would be decreased as necessary.

The following effects on wildlife and habitat would be expected under this alternative's management actions. By permanently removing WHB from the checkerboard portions of HMAs, impacts on wildlife and habitat from WHB would be eliminated and would benefit wildlife in those areas to a greater degree than Alternative A since Alternative A would only remove WHB from checkerboard areas; the non-checkerboard portion of the HMA would remain. The use of gathers and fertility agents would have the same impacts as was discussed in Effects under Alternative A. Impacts from data review for AML assessment would be similar to those described in Effects under Alternative A. Without conversion of horses to burros and vice versa, the impacts (as discussed in Effects under Alternative A) would not occur. Removal of WHB from HMAs that do not provide adequate habitat to support healthy viable herds would be of benefit to wildlife by eliminating WHB competition with wildlife. Corrective actions taken against WHB primarily and livestock secondarily, may be of greater benefit to wildlife and habitat than if corrective actions were taken primarily against livestock if the impacts are primarily due to WHB use. Such corrective actions may also be of little benefit to wildlife and habitat if the impacts are primarily due to livestock. WHB impacts are often greater than those of livestock since WHB are managed to allow for their free-roaming access within HMAs, a grazing rotation for WHB cannot be implemented to provide rest to the habitat; therefore, impacts can occur year-round and every year. However, depending on the situation, impacts from livestock may outweigh those of WHB. More fence construction could occur under this alternative and therefore more impacts on wildlife (As described in Effects under Alternative A) than other alternatives are likely. Water rights would not be acquired for WHB under this alternative; therefore, the associated impacts would be opposite of those discussed in Effects under Alternative A. If private water sources become unavailable to WHB, the appropriate reduction of AML would prevent concentration of WHB and their impacts at remaining water sources. Impacts relating to recreational activities would be the same as discussed in Effects under Alternative A.

Effects under Alternative C

Under this alternative, the following management actions would affect wildlife and habitat: Current HMA and HA status would be maintained; Horses would be removed from areas of HMAs that contain checkerboard land and the HMA boundary would then be redefined to exclude the checkerboard portions. The checkerboard portions would then become HAs; Gathers would be used to maintain AML but would be done no more frequently than every four years; Fertility agents would not be used. HMAs with both horses and burros may be converted to horses only or vice versa; Reevaluation or adjustment of AML would be based primarily on T&E species' habitat needs within priority watersheds; If monitoring data shows adverse impacts due to livestock and WHB, preference would be given to WHB while taking corrective actions primarily against livestock; Fence construction would not be allowed; Fences that impair the free-roaming of WHB would be removed; Water rights for WHB would be acquired; If private water sources become unavailable to WHB, and water is the limiting habitat component, AML would be decreased as necessary; or the WHB would be removed and the HMA would be returned to HA status and not managed for WHB.

The following effects on wildlife and habitat would be expected under this alternative's management actions. The removal of WHB from checkerboard land would benefit wildlife in those areas due to reduced competition and impacts. The use of gathers to maintain AML would help ensure maintenance of healthy habitat for wildlife but less effectively than if combined with fertility agents. Without the use of fertility agents, the WHB populations would increase faster between gathers resulting in more impacts each year and the need for more frequent gathers. Negative impacts (as discussed under Effects Common to all Alternatives) from more frequent gathers would be greater. The review of data to determine appropriate AML with an emphasis on T&E habitat would result in beneficial impacts on wildlife within HMAs similar to the other alternatives. In addition, it would give preference to T&E species (over WHB) within priority watersheds, resulting in more beneficial impacts on wildlife than the other alternatives. Conversion of horses to burros and vice versa would result in impacts similar to those discussed in Effects under Alternative A. The opposite would be true for conversion of burros to horses. The success of corrective actions taken against livestock primarily and WHB secondarily, would depend on the situation and would result in similar impacts on those discussed in Effects under Alternative B. The least impacts from fencing (as described in Effects under Alternative A) would occur under this alternative as compared to the other alternatives. The impacts from acquisition of water rights for WHB would be similar to those discussed in Effects under Alternative A. The appropriate reduction of AML if private water sources become unavailable to WHB, would help prevent concentration of WHB and their impacts at remaining water sources.

Effects under Alternative D

Under this alternative, the following management actions would affect wildlife and their habitat: Actions with HMAs comprised of checkerboard land would be the same as Alternative C; As with Alternative A, fertility agents and four-year (or longer) gather cycles would be used to maintain AML; Horses would be removed from HMAs that do not provide adequate suitable habitat for WHB and the HMAs' status would then become HAs; AMLs would be assessed similar to Alternative A; HMAs with both horses and burros may be converted to horses only or vice versa; If monitoring data shows adverse impacts due to livestock and WHB, corrective action would be taken against the class of use causing the impacts; New fences would only be constructed if they do not impair WHB free-roaming nature; Existing fences should allow for WHB movement by modification, reconstruction or possible removal; Water rights for WHB would be acquired; If private water sources become unavailable to WHB, the actions would be the same as with Alternative A; Actions relating to recreational activities would be the same as discussed in Effects under Alternative A.

The following effects on wildlife and habitat would be expected under this alternative's management actions. Impacts from the removal of WHB from checkerboard land would be similar to those discuss in Effects under Alterative C. The use of gathers and fertility agents would have the same impacts as was discussed in Effects under Alternative A. Impacts from data review for AML assessment would be similar to those described in Effects under Alternative A. Conversion of horses to burros and vice versa would result in impacts similar to those discussed in Effects under Alternative A. The opposite would be true for conversion of burros to horses. Impacts from the removal of WHB from HMAs determined to provide inadequate habitat to support healthy viable herds would be the same as was discussed in Effects under Alternative B. Corrective actions taken against the class of use causing impacts would benefit wildlife by effectively eliminating or reducing the source of negative impact as quickly as possible. Fewer new fences would likely be built under this alternative than Alternatives A and B and therefore, less associated impacts (as described in

Effects under Alternative A) would occur. The impacts from acquisition of water rights for WHB would be similar to those discussed in Effects under Alternative A. Impacts relating to the loss of private water sources use by WHB and recreational activities would be similar to those discussed in Effects under Alternative A. Impacts on wildlife from reducing AML or removing horses from the HMA when a healthy population is unsupportable and returning the HMA to HA status would be beneficial to wildlife as it would reduce the competition for water.

Fish and Wildlife: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildland fire could be beneficial or detrimental to wildlife and their habitats. For example, fire acts as a rejuvenator by returning nutrients to the soil. Fire also reduces dense understory that has mixed values for various species of wildlife. In late-successional vegetation communities, fire would return the vegetative community to an earlier stage of succession. This conversion provides diversity in habitat, forage and cover, although species that prefer late-seral communities could be affected by the alteration of their habitat. However, adverse impacts on habitat can also occur from fire, as in the conversion of burned sagebrush habitat to cheatgrass and wild mustard, which results in a loss of forage and cover for sagebrush dependent species.

Fuel treatments can aid in limiting the size of wild fires, thereby reducing the extent of impacts from potentially catastrophic fires. Emergency Stabilization and Rehabilitation activities, such as erosion control measures and reseeding, performed following fires would facilitate restoration of burned sagebrush and grassland habitat, benefiting species that use these areas.

Wildfires can directly impact fish and wildlife by altering or reducing suitable habitat, and by affecting air quality due to smoke and ash. Immediate post-fire conditions raise light penetration and temperatures on and immediately above and below soil surfaces and can reduce soil moisture, affecting ground-dwelling species (Lyon et al. 1978). Mortality of wildlife can also occur.

Depending on species mobility, wildlife would experience impacts from death or displacement, disturbance from fire suppression, and reduction of air quality from smoke and ash. While small mammals, reptiles, and amphibians are most at risk of death because of their limited mobility, occasionally large mammals are killed by severe fast-moving wildfires, typically from smoke inhalation (Smith 2000).

Wildfires may also cause large-scale or intense alterations of habitat components for many fish and wildlife species, which would favor some species and would displace others.

Burning cover and destroying trees, shrubs, and forage modify habitat structure. The loss of small ground cover and charring of larger branches and logs would affect small animals and birds that use these components for nesting, thermal or escape cover, or foraging.

Alterations in terrestrial or riparian habitats would also affect water quality and habitat components for fish and other aquatic species. Wildfires may leave the surrounding soil and accumulated ash vulnerable to erosion and remove shading streamside vegetation, which would increase sedimentation and water temperature. Aquatic species could also be subjected to the direct impacts of increased sedimentation and water temperatures from removal of upland vegetation. The duration, intensity, and scope of these direct impacts depend on the species and the characteristics of the fire.

Fire suppression also has direct and indirect impacts on fish and wildlife species and their habitats. The use of heavy equipment or hand tools for fireline construction removes or crushes vegetation and disturbs soil. This disturbance can increase the risk of invasive species introduction, soil erosion and may cause injury or death to small wildlife species. Hand line construction would remove and disturb soil and vegetation, possibly affecting animals such as small mammals, invertebrates, and ground-nesting birds. Retardant drops and fire line construction may affect wildlife habitat in linear strips. However, the benefit of line construction would contribute to fire containment ultimately reducing the size and potential spread of fire into large habitat areas. Direct and indirect impacts from most suppression techniques would be short-term, temporary, and localized, particularly if sensitive habitats are mitigated or avoided. The obvious benefits that may be realized from fire suppression are the minimization of fire size and disturbance to wildlife and habitat.

Hand line construction would remove and disturb soil and vegetation, possibly affecting animals such as small mammals, invertebrates, and ground-nesting birds. The presence of hand line crews in remote locations could directly disturb some wildlife. Removal of live vegetation can also lead to soil erosion and increased siltation in adjacent lakes and streams. Direct and indirect impacts from most suppression techniques would be short-term, temporary, and localized, particularly if sensitive habitats are mitigated or avoided.

Effects under Alternative A

Alternative A does not identify areas that would potentially benefit from allowing conditional fire suppression management for a benefit. By not prioritizing suitable areas for allowing conditional fire suppression management for a benefit, habitat improvement and restoration actions may not be implemented in the most effective areas.

Effects under Alternative B

Managing 110,167 acres for conditional fire suppression management could benefit wildlife through long-term improvements in habitat. This is because lands most in need of fire treatments would be prioritized, allowing for more efficient and effective treatment application. Wildlife and their habitats could be disturbed in the short term, but their habitats would be improved in the long term. These areas represent a small portion of the total WD, so impacts would likely be localized. Of the 110,167 acres designated suitable for conditional fire suppression management for a benefit, 3,361 acres are managed as Priority 2 wildlife habitat areas under Alternative B. These lands are in the Granite Range (Gerlach) and include habitat for mule deer and pronghorn. Because this area is less than one percent of the 716,528 acres of designated Priority 2 wildlife habitat areas under Alternative B, impacts from conditional fire suppression management for a benefit in priority wildlife habitat areas would likely be limited and localized.

Effects under Alternative C

Fire would be managed for multiple objectives. No conditional fire suppression areas would be defined, and benefits to improve wildlife habitat would not occur.

Effects under Alternative D

Managing 110,167 acres for conditional fire suppression management could benefit wildlife through long-term improvements in habitat. Wildlife and habitat could be disturbed in the short term, but habitats would be improved in the long term. None of the identified areas for conditional fire suppression are in proposed priority wildlife habitat areas under this alternative.

Fish and Wildlife: Effects from Cultural Resources Management

Effects Common to All Alternatives

Conducting cultural inventories and avoiding or mitigating adverse impacts on cultural resources would benefit wildlife habitat areas that contain identified cultural resources.

Fish and Wildlife: Effects from Tribal Consultation

Effects Common to All Alternatives

Tribal consultation is not likely to adversely impact fish and wildlife resources. Implementing management actions that protect Native American traditional use areas for religious practices would help to protect and sustain fish and wildlife habitat.

Fish and Wildlife: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Management actions for paleontological resources would provide various degrees of wildlife and fish protection through habitat preservation that minimizes vegetation loss and erosion by restricting disruptive activities, including those that disturb the surface. Developing interpretive brochures, kits, or promoting public visitation to areas of paleontological interest or importance would impact wildlife habitat, depending on the numbers of visitors to areas. Wildlife habitat may be trampled or wildlife populations disturbed. Wildlife may be prone to relocate should high visitation occurs.

Fish and Wildlife: Effects from Visual Resources Management

Effects Common to All Alternatives

Impacts on fish and wildlife would vary depending on the number of acres identified by VRM class. In general Class I or II VRM designated areas would have fewer impacts on wildlife habitat as fewer intrusions to the landscape would occur or mitigation measures to reduce VRM impacts implemented.

Fish and Wildlife: Effects from Cave and Karst Resource Management

Effects Common to All Alternatives

Implementation of mitigation measures or use restrictions to protect cave and karst resources and provide for public safety would also serve to protect wildlife habitat and disruption of species that use caves for habitat (bats). Use restrictions would help prevent the spread of white-nose syndrome (WNS) in bats. Currently WNS or the fungus that causes WNS has not been observed on western public lands but may in the future. Efforts to inform or educate the public about caves and karsts could increase visitation and adversely impact wildlife or their habitat. However, education would also discourage visitation during periods when wildlife is vulnerable (hibernation). Installation of bat gates may disrupt air flows to caves. Some bat species may relocate if habitat needs are altered by changes in air flow. Bat gates would also preclude access to caves by other species, removing habitat and forcing some species to relocate.

Fish and Wildlife: Effects from Livestock Grazing Management

Effects Common to All Alternatives

Several of the proposed livestock grazing management actions are common to all alternatives. Allotments would continue to be broadly categorized, based on management goals, as "I" (improve), "M" (maintain), or "C" (custodial). Each alternative also recognizes that each allotment is a complex mix of resources values and circumstances, best addressed through an adaptive management approach. Examples of circumstances that would continue to be addressed with adaptive management are drought, insect infestation and fire. Livestock grazing may be restricted partially or completely for such reasons. Range betterment funds would be used to improve rangeland conditions. Monitoring data would be used to ensure that resource objectives were being achieved. Monitoring data would also be used to determine if adjustments to AUMs or forage allocation between livestock and WHB were needed in order to achieve objectives. These actions would result in habitat conditions conducive to healthy fish and wildlife populations, which is extremely important during times when additional stressors (drought, insect infestation and fire) impact habitat.

When appropriate, cooperative agreements would be used to maintain existing range improvement projects that are consistent with resource objectives. Those that no longer meet resource objectives would be removed. The conversion of cow/calf permits to yearling cow permits would be allowed. The maintenance of range improvement projects and the removal of them can have positive and negative impacts on fish and wildlife. See Effects From Vegetation-Forest and Woodland Products Management, Individual Effects under Alternative A and Effects from Water Resources Management, Effects Common to all Alternatives for discussion of those impacts.

Impacts on wetland and riparian areas would be minimized by implementing seasonal and duration of use grazing restrictions (LG 1.2)

Effects under Alternative A

The consideration of TNR authorizations would be made on a case-by-case basis which is important in determining if forage is available in amounts sufficient to provide for all livestock and wildlife while still adhering to utilization criteria. Adherence to the TNR criteria outlined in Action D-LG 1.11 and conformance to short term monitoring criteria would negate any impacts on wildlife. Management that limits consecutive critical growth use by livestock would help maintain the diversity and abundance of forage species since repeated critical growth grazing can result in a decrease of some species over time if sufficient rest is not provided.

The conversion of livestock class from cattle to sheep would be permitted if impacts on bighorn sheep can be mitigated. Mitigation would greatly reduce the likelihood of domestic sheep and bighorn interaction but the chance would still exist. Interaction could result in transmission of a life threatening disease to bighorn sheep. The dietary overlap between domestic sheep and wildlife, such as pronghorn, mule deer, sage-grouse (especially forbs) and some other wildlife species is greater than the dietary overlap with cattle. Therefore, there would be more competition for forage. There would likely be fewer impacts on riparian areas with sheep, since they are more closely managed and supervised than cattle. Sheep are tended by herders and can be moved to and from water as needed. Cattle tend to linger near or on the water source causing greater impact to the area.

The conversion of livestock class from sheep to cattle would be permitted case-by-case based on the suitability of the rangeland and the ability to adequately control/manage the cattle. The risk of disease transmission from sheep to bighorns would be reduced and would likely benefit bighorns in the long run. The dietary overlap and impacts on riparian areas would be the opposite of that discussed in the preceding paragraph. The heavy reliance of cattle on grass species for forage could result in less cover for those wildlife species that rely on interspace grasses for cover or those that forage on grass seeds.

The relinquishment of grazing permits and the conversion of these areas to forage banks would likely benefit wildlife because of the probable increase in diversity and density of upland and riparian vegetation. Acquired lands, that are outside allotments with grazing systems, and exclosures would have no grazing by livestock except when used as a management tool to stimulate growth when needed and maintain the vegetative health.

New range improvements would be allowed when they are in conformance with land health standards and multiple uses. They can help to minimize and manage impacts from livestock grazing by encouraging better distribution of livestock in some areas or by discouraging use in other areas.

Water projects, under this alternative, would improve the amount and distribution of water for wildlife when livestock are authorized in the area. Spring developments would be installed without an overflow pond and in such a way that they maintain the biotic integrity of the source. This is very important for wildlife since spring sources are relatively scarce in the WD and play such an important role in the survival of wildlife. Well developments would be installed with overflow ponds, to allow small wildlife access to water. The water flow to the troughs would be shut off when livestock leave the area. This could have a negative impact to wildlife if the water at the trough is the only available water at that site (well water and some springs) and they had become dependent on it. This could be especially difficult if the loss of water occurred during summer months. Some individuals (e.g., young and inexperienced) may have trouble finding alternate water sources. All trough locations would experience concentrated impacts from livestock and vehicular disturbance (roads) created by maintenance of water developments, having a negative impact to wildlife and their habitat.

Projects, such as fences, can be used to protect areas from livestock impacts or to create pastures for more effective grazing rotation. Vegetation would be maintained in better condition benefiting wildlife. Fences can also cause injury or death to wildlife or may tend to discourage some species' natural movement patterns. Their habitats can become fragmented leading to disadvantages to them in immediate survival or long-term survival of the population.

Existing range improvements would be maintained or modified for multiple uses under this alternative. If it is determined that the improvement is no longer needed, it would be removed. The removal of such improvements would eliminate any negative impacts associated with them.

Effects under Alternative B

Management actions under Alternative B that are similar to Alternative A are those that address the maintenance and authorization of range improvements. Like Alternative A, this alternative would provide water to wildlife at new water developments when livestock are using the water. Alternative B is also similar to Alternative A in allowing change/conversion of livestock class on allotments, and consideration of TNR on a case-by-case basis. These management actions have similar impacts on Alternative A and were discussed in Individual Effects under Alternative A.

Overflow ponds on surface water developments may negatively impact the biotic integrity of the spring source by depleting water quantity. This could result in negative impacts on wildlife species that are dependent on the unaltered spring source or associated vegetation to meet their lifecycle requirements.

Unlike Alternative A, this alternative would allow continuous, season-long grazing as long as land health standards are achieved. This management would be expected to allow for maintenance or improvement to wildlife habitat overall but improvement would likely be slower. Some areas would be more heavily impacted by continuous season-long grazing (e.g. riparian areas), resulting in condition maintenance rather than improvement.

This alternative would not allow retirement of grazing permits or establishment of forage banks. Acquired lands would be open to livestock grazing. By foregoing the retirement of grazing permits, the extent and speed of wildlife habitat improvement in these areas would be reduced.

Livestock grazing would be allowed in exclosures unless terms and conditions, objectives and land health standards are not met. This action would be contrary to the purpose of exclosures, as they have been constructed to protect areas that are more susceptible to grazing impacts and have been identified as areas not meeting resource objectives under the existing grazing system. This alternative would be expected to result in impacts from livestock grazing within exclosures as it did prior to construction of exclosures and would negatively impact wildlife habitat.

Effects under Alternative C

Alternative C includes a grazing and a no grazing option. Management actions under Alternative, Option 1, that are similar to Alternative A are those that would allow relinquishment of grazing permits, establishment of seed banks and no more than two (2) consecutive years of grazing during critical growth. Impacts from these actions would be the same as those discussed in Individual Effects under Alternative A.

Most actions in this alternative would address livestock grazing authorizations and related decisions in a way that would result in overall reduced impacts from livestock grazing to land health. The authorization and maintenance of range improvements would be approved when beneficial to land health. Exclosures would be closed to livestock grazing and no new spring developments for livestock would be approved. An attempt to restore biotic integrity to existing spring developments would occur. Water projects for livestock would be required to provide water to wildlife from June 1 – September 30 whether or not livestock are using the area. New water developments would not have overflow ponds, TNR would not be considered and acquired land would be closed to livestock grazing. The conversion of class of livestock would be approved only when beneficial to land health. Conversion from cattle to sheep would not be allowed in potential bighorn sheep habitat and the conversion of sheep to cattle in such habitats would be promoted.

All of these actions are designed to benefit land health which would, in turn, benefit wildlife overall. The permanent absence of livestock grazing in meadow areas may benefit some wildlife species but may have a negative impact to some species (i.e., sage-grouse) over time. It has been shown selection for meadows which had been grazed was consistently higher for hens and juveniles (Evans 1986). The disallowance of new spring developments and overflow ponds would have opposite impacts on those that were discussed about water developments in Effects from Water Resources Management, Effects Common to all Alternatives.

Option 1

Under Alternative C, Option 1, potential effects from livestock grazing management are similar to those described in the Effects Common to All Alternatives section, Use of adaptive management principles, which include wildlife habitat objectives, could help mitigate livestock grazing impacts on wildlife habitats. Effects from provision of forage banks are the same as those described under Alternative A. TNR use would not be permitted under Alternative C, Option 1, and acquired lands would be closed to grazing, providing some additional protection of habitat. Detrimental impacts on fish and wildlife resources from grazing would be minimized under Alternative C, Option 1, due to numerous use restrictions

Option 2

Alternative C, Option 2 would result in improved ecological condition. This no grazing option would eliminate adverse impacts from grazing to wetland and riparian areas as well as upland habitats, resulting in improved habitat for wildlife. This option has the greatest potential to minimize impacts from grazing and to facilitate healthy ecological conditions that would benefit terrestrial and aquatic species. Exceptions are areas that are already dominated by cheatgrass and areas where closure to livestock grazing releases existing cheatgrass populations.

Alternative C, Option 2 should result in improved ecological condition in some areas. This no grazing option would eliminate impacts from livestock grazing to wetland and riparian areas as well as upland habitats, resulting in improved habitat for most wildlife. This option has the greatest potential to minimize impact from grazing and to facilitate healthy ecological conditions that would benefit terrestrial and aquatic species. Exceptions are areas that are already dominated by cheatgrass and areas where closure to livestock grazing releases existing cheatgrass populations.

Effects under Alternative D

Of the grazing alternatives, Alternative D closes the most total acreage to grazing, resulting in fewer livestock grazing impacts on wildlife overall. Impacts from the management actions would be essentially the same as those described under Effects under Alternative A with the following exceptions.

The authorization of TNR would be subject to defined case-by-case criteria. These criteria would likely result in less TNR authorizations and therefore less of the impacts as described under Effects under Alternative A.

The conversion from cows to sheep in occupied bighorn sheep habitat would not be allowed. This would further reduce the likelihood of domestic sheep and bighorn interaction and better avoidance of disease transmission to bighorn sheep.

Effects from new water developments would be similar to those discussed under Effects under Alternative C, Option 1.

Effects Common to Alternatives A, B, C (Option 1) and D

Impacts on wetland and riparian areas would be minimized by implementing seasonal and duration of use grazing restrictions (LG 1.2)

Fish and Wildlife: Effects from Minerals Management

Effects Common to All Alternatives

Impacts on wildlife and habitat from minerals exploration and development generally occur from surface disturbance and thus loss and fragmentation of habitat, as well as disturbances from noise and activity associated with construction, and operation of facilities and roads. In some situations, depending on the mineral operation, surface water amount and quality may also be affected. Some species (both plant and animal) tolerate these kinds of disturbances more successfully than others and may even benefit, but usually at the expense of others. For instance, some species of plants thrive in areas of soil disturbance while others cannot. Identifying lands open, closed, or with standards stipulations and or with special stipulations would protect wildlife by either restricting mineral uses in areas or by providing requirements to mitigate adverse impacts. Impacts would vary based on the number of acres opened or closed or based on special or standard stipulations or mitigation measures. Management actions listed in Chapter 2 define where, how much, and what type of mineral exploration and extraction can occur. In addition, the types of restrictions, such as those on siting and operation, that can be applied vary by the type of mineral activity and whether or not they are saleable, leasable, or locatable resources. For example, due to law/regulation, the WD has limited discretion over locatables. Differences between the restrictions for each mineral resource are described in detail under the mineral resources environmental consequences (Section 4.3.2). Generally, the greater the restrictions on disturbance, the fewer the impacts on wildlife and habitat.

All alternatives would make mineral resources (leasable, locatable, saleable) available for extraction or development but with differing open acres, stipulations and conditions of approval. New sites and associated impacts on wildlife would be analyzed under NEPA requirements. Necessary mitigation and stipulations would be applied to reasonably protect affected resources. Proposed use and occupancy applications would be reviewed prior to approval to ensure that these activities are in compliance with law, regulation and policy. Reclamation or rehabilitation of mineral operations would include recontouring, stabilization, revegetation and removal of facilities before closure. Compliance inspections involving all mineral use activities would be conducted. Differences between management actions are discussed under Effects under Alternatives A, B, C and D.

Saleable Minerals

Effects under Alternative A

Under this alternative, 6,786,059 acres would be open to mineral material disposal. Additional material sites would be developed if need be. New proposed sites would be analyzed under NEPA requirements. Impacts on wildlife and habitat would be avoided or mitigated as necessary with applied terms or stipulations. Compliance inspections would be conducted as needed to ensure appropriate protection of natural resources.

Mineral material sites would result in loss of habitat for wildlife and long term disturbance (surface, noise and activity) in the vicinity of the sites as long as they remain open and active. These disturbed areas can increase the risk of invasive weed introduction and spread, while decreasing habitat quality. Sites that may require new access roads would also result in loss and fragmentation of habitat, affecting some wildlife species more than others.

Effects under Alternative B

The same number of acres would be open to mineral material disposal as Alternative A with 4,473,691 acres open with only standard authorization terms and stipulations. New sites proposed in the remainder of open acres could have additional terms or stipulations applied if it is determined to be necessary based on NEPA analysis. This alternative would seek to maximize and promote the availability of mineral materials to the public. Unlike the other alternatives, reclamation and rehabilitation could be deferred for up to five years after cessation of active use at sites that have a reasonable prospect for economic use. Native or introduced seeds may be used that are readily available and ordinarily inexpensive. Compliance inspections would be conducted at a minimum frequency required by law, policy or regulation to impose as little burden on the permittee as possible.

Wildlife and habitat would receive greater impacts (as discussed above in Effects under Alternative A) due to the maximization of material sites and the option to postpone reclamation and rehabilitation. This alternative would require the least amount of money and effort in the rehabilitation and reclamation process and would therefore likely result in less suitable habitat for wildlife after reclamation. Less frequent compliance inspections may result in accidental or intentional noncompliance and avoidable impacts on wildlife and habitat.

Effects under Alternative C

Under this alternative, 6,367,789 acres would be open to mineral material disposal with 2,746,668 acres open with only standard authorization terms and stipulations. New sites proposed in the remainder of open acres could have additional terms or stipulations applied if it is determined to be necessary based on NEPA analysis. This alternative would seek to minimize the number of new material sites while meeting demands. Compliance inspections would be conducted as needed, similar to Alternative A.

Wildlife and habitat would receive fewer impacts (as discussed in Effects under Alternative A) due to fewer acres open to mineral material disposal, and fewer acres open with only standard authorization terms and stipulations. The minimization of new material sites would also result in fewer impacts.

This alternative would require greater effort and expense in rehabilitation and reclamation in an attempt to return the site to native vegetation and predisturbance topography as much as possible.

Effects under Alternative D

Under this alternative, 6,539,184 acres would be open to mineral material disposal with 2,871,026 acres open with only standard authorization terms and stipulations. Like Alternative C, this alternative would seek to minimize the number of new material sites. Compliance inspections would be conducted as needed, similar to Alternative A.

Impacts on wildlife and habitat are expected to be similar to those discussed in Effects under Alternative C with the exception of more acres being open with only standard authorization terms and stipulations than Alternative C.

Fluid Minerals

Effects under Alternative A

Under this alternative, 6,745,878 acres would be open to leasing with zero acres being open with only standard lease terms and stipulations and 29,582 acres would be open to leasing but with a No Surface Occupancy stipulation. Stipulations and conditions of approval would be applied on a case-by-case basis through interdisciplinary review and as described in the MFP and Decision Records for Geothermal leasing and Oil and Gas leasing (BLM 1982a, b, 2002a, BLM and Forest Service 2008) in order to reasonably protect other resources. Inspections would be conducted as needed to ensure compliance with laws, regulation or policy.

Fluid mineral exploration and development would have impacts on wildlife and habitat similar to those discussed in Saleable Minerals, Effects under Alternative A. In addition to those impacts, the presence of structures such as buildings or transmission lines can impact some wildlife species that are sensitive to visual changes to the landscape. Transmission lines can cause injury or death to avian species as well as providing artificial perching/hunting and nesting opportunity for raptors and ravens. Therefore, predation is unnaturally increased along these lines as is predator density.

Effects under Alternative B

Under this alternative, 6,068,969 acres would be open to leasing with 4,472,814 acres being open with only standard lease terms and stipulations and 221,724 acres would be open to leasing but with a No Surface Occupancy stipulation. Terms and stipulations and conditions of approval would be applied in the same manner as described above in Effects under Alternative A except only to the minimum extent required by law or regulation. Compliance inspections would be conducted only as frequent as would be allowed by law, regulation or policy in order to impose the least possible burden on the permittee.

Impacts on wildlife and habitat would be as discussed in Effects under Alternative A but on less acreage. Although terms and stipulations, conditions of approval, and compliance inspections may be fewer, it is expected that this alternative would result in less impacts overall than Alternative A.

Effects under Alternative C

Under this alternative, 2,749,810 acres would be open to leasing with all 2,749,810 acres being open with only standard lease terms and stipulations and zero acres would be open to leasing with a No Surface Occupancy stipulation. Terms and stipulations and conditions of approval would be applied on a case-by-case basis through interdisciplinary review and as described in this RMP and in the Decision Record for the Geothermal Leasing in the Western United States (BLM and Forest Service 2008) in order to reasonably protect other resources. Compliance inspections would be conducted as needed to ensure appropriate protection of the public interest in production and maximize protection of resource values.

Impacts on wildlife and habitat, as discussed in Effects under Alternative A, would be greatly reduced under this alternative with less than half the acreage of Alternatives A and B being open to leasing. More frequent compliance inspections may further reduce impacts.

Effects under Alternative D

Under this alternative, 5,429,707 acres would be open to leasing with 2,851,895 being open with only standard lease terms and stipulations and 205,485 acres would be open to leasing with a No Surface Occupancy stipulation. Terms and stipulations and conditions of approval would be applied on a case-by-case basis through interdisciplinary review and as described in this RMP and in the Decision Record for the Geothermal Leasing in the Western United States (BLM and Forest Service 2008) in order to reasonably protect other resources. Compliance inspections would be conducted as needed to ensure appropriate protection of the public interest in production and maximize protection of resource values.

Impacts on wildlife and habitat, as discussed in Effects under Alternative A, would be at a level commensurate to acres open to leasing. As with Alternative C, more frequent compliance inspections may further reduce impacts.

Solid

Effects under Alternative A

As discussed in Section 3.3.2 under Minerals – Leasable, Locatable, and Saleable, no significant production of solid leasable minerals is currently ongoing or anticipated within the planning area. If a significant amount of production were to occur, impacts would be substantially the same as those discussed above in Fluid Minerals, Effects under Alternative A. Impacts would be commensurate to acres open to leasing.

Effects under Alternative B

Impacts under this alternative and Effects under Alternatives C and D would be similar to those discussed above in Solid Mineral Leasing, Effects under Alternative A.

Surface Occupancy

Effects under Alternative A

Use and occupancy applications would be reviewed as described in Effects Common to all Alternatives. Compliance inspections would be conducted as needed to ensure conformance with approved occupancy and appropriate protection of other resources.

These management actions would help to minimize impacts on wildlife and habitat as described in Effects Common to all Alternatives.

Effects under Alternative B

This alternative would allow more lenient approval of use and occupancy applications with compliance inspections conducted at the minimum allowed by law, regulation, or policy.

These management actions would help to minimize impacts on wildlife and habitat but to a lesser degree than Alternative A.

Effects under Alternative C and D

Effects under this alternative would be the same as Effects under Alternative A.

Locatable

Effects under Alternative A

Under this alternative, 7,198,294 acres would be open to locatable mineral development with some areas (currently 4,299,889 acres) as identified in Table 2-1, Proposed Goals, Objectives and Actions per Alternative, that may have additional limitations or stipulations applied to authorizations. Off-site mitigation would be pursued when on-site mitigation options are not available. Compliance inspections would be conducted as needed to ensure conformance with the notice of approved plan, but in any case no less frequently than required by regulations or policy.

Impacts on wildlife and habitat would be as described in Effects from Minerals Management, Effects Common to all Alternatives commensurate to acres open to mining and those subject to additional limitations or stipulations. Mitigation and compliance inspections would further reduce impacts.

Effects under Alternative B

As with Alternative A, this alternative would have 7,198,294 acres open to locatable mineral development and 4,299,889 acres that may have additional limitations or stipulations applied to authorizations. Restrictions to approved operations would be to a minimum extent as required by law or regulation. Off-site mitigation would be pursued only as required by law or regulation. Compliance inspections would be conducted only as frequent as is allowed by law, regulation, or policy in order to impose the least possible burden on the permittee.

With the same acreage open to mining as in Alternative A, equal acreage may be impacted but with fewer restrictions, less off-site mitigation and minimal compliance inspections, greater impacts would be expected at mining sites.

Effects under Alternative C

Under this alternative, 6,922,945 acres would be open to locatable mineral development and 3,507,622 acres that may have additional limitations or stipulations applied to authorizations. Protection of other resources would be emphasized when applying stipulations and off-site mitigation would be pursued at every opportunity. Compliance inspections would be of sufficient frequency and detail to ensure conformance with the notice or approved plan and maximize protection of other resources.

This alternative would result in impacts on fewer acres. Due to more off-site mitigation and actions aimed at greater protection of other resources, impacts at mining sites would be to a lesser degree.

Effects under Alternative D

Under this alternative, 7,249,045 acres would be open to locatable mineral claims and 4,556,626 acres that may have additional limitations or stipulations applied to authorizations. Stipulations would be applied as deemed necessary through interdisciplinary review. Off-site mitigation would be pursued when on-site mitigation options are not available. Compliance inspections would be conducted as needed to ensure conformance with the notice of approved plan.

Impacts on wildlife and habitat would be similar to those discussed under Locatable Minerals, Effects under Alternative A.

Fish and Wildlife: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

Direct impacts from recreation management actions include loss or modification of habitat from constructing recreational facilities, including roads. Recreation management activities that result in increased human presence would have short-term localized impacts on wildlife and fish species. These activities include hiking, biking, camping, fishing, hunting, and sightseeing. Promoting scientific research, educational outreach, and evaluation of RMZs or SRMAs would increase public awareness and consequently increase visitation. Impacts would include disruption of wildlife species, interference with life cycle needs and habitat damage. Impacts are dependent on the number of visitors. Larger scale visitation, such as commercial, competitive, and group activities, could have greater impacts, but effects would be minimized through use restrictions and mitigation measures. Increased human-wildlife interaction could cause animals to alter behaviors, home ranges, and habitat use and to become physiologically stressed. Development of new water-based recreation sites would increase impacts on fish and aquatic habitats through increased visitor use.

In general, OHV management activities that result in increased human presence would have localized impacts on wildlife and fish species. Impacts would vary by frequency of motorized travel in a particular area and could include increased displacement of wildlife, increased stress during critical periods, and degraded habitats. OHV use can alter the seasonal use patterns of many wildlife species. The effects from OHV use on fish and wildlife within the WD could be reduced by updating the Transportation Plan and giving consideration to wildlife habitat, including wetland and riparian habitat, when designating existing routes and establishing new routes.

Effects under Alternative A

Under this alternative the BLM would continue to manage 37,259 acres as the Pine Forest SRMA. Managing lands as SRMAs could encourage additional use of these lands and thus increase the level of disturbances to wildlife; however, by designating SRMAs, visitation and consequential disruption of other wildlife areas may be reduced. Under SRMAs, management actions can reduce the impacts of recreational activities, and adverse impacts can be closely monitored and addressed.

OHV use would be the most detrimental under Alternative A. Most of the WD (6,789,612 acres) would be open to OHV use with minimal limited (423,786 acres) and closed (17,698 acres) designated areas.

Effects under Alternative B

Under Alternative B, 6,065,008 acres would be designated as ERMAs. The Pine Forest SRMA would be maintained, but its size would be increased by approximately 60,000 acres, and three RMZs would be established in this SRMA. In addition, three new SRMAs would be designated, identifying recreation as the principal use of these lands.

Managing lands as SRMAs rather than ERMAs could encourage additional use of these lands and thus increase the level of disturbances to wildlife.

The Nightingale and Granite Range SRMAs would target more undeveloped or backcountry uses and the level of effects on fish and wildlife could be slightly intensified in these areas due to concentrated recreational use. Motorized use within these SRMAs would be relatively low.

Impacts on wildlife would be greatest from the Winnemucca SRMA, primarily from noise disturbance and overall increased visitation. Motorized use would be greatest in this SRMA. Main recreation activities in the Winnemucca SRMA would include OHV use, motorcycle and ATV riding, mountain biking, and competitive and community-sponsored events. This SRMA would see the most visitor use because of its accessibility and range of tourism-based activities.

Under Alternative B, 1,460,200 acres would be open to OHV use, with 5,743,198 acres limited and 17,698 acres closed to OHV use. None of the area open to OHV use would be within Priority 2 wildlife habitat areas under Alternative B. Approximately 709,117 acres of the 716,528 acres of Priority 2 wildlife habitat areas under Alternative B would be designated as limited to OHV use, which is approximately 99 percent of the priority wildlife habitat areas designated under this alternative. Areas that would be closed to OHV use include 4,504 acres of Priority 2 wildlife habitat areas. Of the RMP alternatives, this alternative would allow the most OHV travel and therefore would have the most impact on wildlife resources from OHV use.

Effects under Alternative C

Under Alternative C, 7,168,451 acres would be designated as ERMA, which is an increase of 1,154,504 acres over Alternatives B and D. The Pine Forest SRMA would be maintained and expanded as under Alternative B. Only one new SRMA, the Winnemucca SRMA, would be designated under Alternative C, and they would contain one less RMZ than under Alternative B. Alternative C places the most limitations on commercial, competitive, and group activities. OHV use would be the most restricted under this alternative, with 43,521 acres closed, 7,187,575 acres limited, and zero acres open to OHV use. Under this alternative, 1,228,804 acres of Priority 1 wildlife habitat areas and 866,835 acres of Priority 2 wildlife habitat areas would be designated as limited to OHV use, which is approximately 98 percent of the total designated priority wildlife habitat areas. Areas that would be closed permanently to OHV use include 39,135 acres of Priority 1 wildlife habitat area. In addition, 3,657 acres of Priority 1 wildlife habitat areas and 2,579 acres of Priority 2 wildlife habitat areas would be closed seasonally. Alternative C would have the fewest impacts on wildlife resources because it minimizes development of recreational facilities that would attract visitors and place the most limitations on OHV use, thereby minimizing impacts from recreational use.

Effects under Alternative D

Effects would be similar to those described under Alternative B, but Alternative D would be more effective at reducing impacts from OHV use by further restricting OHV permitted use areas, including use in important habitat areas. None of the area open to OHV use would be within Priority wildlife habitat areas. Under this alternative, 17,577 acres would be closed, 6,925,414 would be limited (including priority wildlife habitat areas), and 288,105 acres would be open.

Fish and Wildlife: Effects from Renewable Energy Management

Effects Common to All Alternatives

Authorized renewable energy development could have impacts on wildlife by removing vegetation for construction activities. ROWs located to support renewable energy projects would remove vegetation necessary to sustain wildlife habitat. Construction of power lines, roads, and communication sites and other facilities would fragment wildlife habitat affecting certain species. Human disturbances from construction and operation of facilities, such as noise, movement, and vibrations, would alter wildlife behavioral use patterns in the vicinity of the project. Impacts would vary by species, type of development, topography, and habitat type. Development of wind turbines would kill or injure bats, raptors, and other migratory birds that collide with them. However, BMPs, stipulations, and mitigation measures would be implemented, which would minimize impacts.

Effects under Alternative A

Effects would be the same as those under Effects Common to All Alternatives.

Effects under Alternative B

Adverse effects from renewable energy developments, as described under Effects Common to All Alternatives, would be reduced by designating 716,528 acres as avoidance areas.

Effects under Alternative C

Renewable energy would have the least impact on fish and wildlife under Alternative C due to the designation of 1,297,481 acres as exclusion zones and 869,645 acres as avoidance zones. No overhead transmission lines or ROWs for energy projects would be allowed in exclusion zones.

Effects under Alternative D

The impacts on wildlife under Alternative D would be the same as Alternative C, only at a higher rate as less acreage is designated as exclusion or avoidance zones under this alternative. The total acreage that would be designated as avoidance zones for renewable energy is 903,554 acres more under Alternative C, and the area that would be designated as exclusion zones is 79,942 acres less than under Alternative C.

Fish and Wildlife: Effects from Transportation and Access Management

Effects Common to All Alternatives

Roads and trails can fragment habitats, reduce wildlife security areas, increase road kill, and alter home range and migration corridors of wildlife. On a broad general scale, roads decrease habitat quality and impair populations. The magnitude of impacts varies by species, habitat types, size and traffic volume of roads, and seasonal use. Species that have large home ranges, follow distinct migration patterns, or are wary of humans are affected the most by roads. Roads and trails increase human-wildlife interactions. Vehicles can degrade wildlife habitats from surface disturbance and can displace and stress animals. Motorized vehicle use and associated human uses that impact critical habitat niches for wildlife, such as den sites, nest sites, critical foraging areas, travel corridors, and security areas, are particularly vulnerable to wildlife disturbances and displacement. Flood and sediment damage from improperly maintained roads and trails can degrade surrounding habitats, especially aquatic habitats.

Effects under Alternative A

Under Alternative A, temporary closure of roads would occur if public access interferes with bighorn sheep lambing. Subject to closures, conditions for sheep would improve during lambing and fewer mortalities would be anticipated. Decommissioning roads that present problems to the environment would reduce wildlife and habitat impacts in select locations.

Effects under Alternative B

Under Alternative B, roads that present problems to the environment would be decommissioned only if alternative access were provided. The same condition would apply to removing, rerouting, and rehabilitating roads that adversely affect wildlife and habitat. Creating alternative access could result in additional impacts on resources, but Alternative B would require that roads be constructed to avoid creating fragmented resource tracts. Impacts would further be reduced by temporary road closures during the wet season that would minimize sediment and erosion impacts.

Effects under Alternative C

Effects would be similar to those described for Alternative B, but alternative access would not be a stipulation for decommissioning, removing, rerouting, or rehabilitating roads that are adversely impacting wildlife. Of all the alternatives, Alternative C provides the most assertive approach for minimizing and avoiding wildlife impacts from transportation management.

Effects under Alternative D

Effects would be similar to those described for Alternative C, but Alternative D would be less effective than Alternative C because it contains fewer specific actions for minimizing and avoiding wildlife impacts.

Fish and Wildlife: Effects from Lands and Realty Management

Effects Common to All Alternatives

Impacts on fish and wildlife from lands and realty management includes habitat loss, habitat fragmentation, degradation of habitat, species displacement and potential loss of diversity from ROW development (e.g., power lines, roads, and pipelines) and other permitted facilities. Increased road density and human presence would act to increase stress levels of wildlife during sensitive periods, such as breeding, migration, and wintering. Many of the impacts associated with ROWs can be mitigated on a case-by-case basis. Benefits to fish and wildlife resources could also occur from lands and realty management by acquiring sensitive habitat. Habitat fragmentation could be reduced via land acquisition and adjustment that reduces the checkerboard pattern of public lands ownership and increases the size of publicly owned blocks of land. Larger blocks of contiguous lands allow for consistent management of wildlife habitats without unregulated private land activities interspersed. Degraded habitat on acquired lands could be improved.

Effects under Alternative A

Alternative A does not delineate or manage ROW avoidance or exclusion areas. Use restrictions would not occur within important wildlife habitat areas. Wildlife habitat would be impacted from development. Impacts would vary based on the type, size, and location of disturbance. Habitat fragmentation would continue affecting certain species that need large areas of un-fragmented areas to meet their habitat needs.

Effects under Alternative B

Potential adverse effects from lands and realty management would be similar to those described under Effects Common to All Alternatives. Delineation of 716,528 acres as avoidance areas would include implementation of mitigation measure to avoid or reduce impacts on wildlife habitat.

Effects under Alternative C

Lands and realty management would have the least impact on fish and wildlife under Alternative C due to the designation of 1,279,481 acres as exclusion zones and 869,645 acres as avoidance zones. No corridors, ROWs, or energy projects would be allowed in exclusion zones.

Effects under Alternative D

The impacts on wildlife under Alternative D would be similar to Alternative C except fewer exclusion zone acres would be designated. Acres of avoidance zones would increase under this alternative. Wildlife habitat located within exclusion or avoidance areas would benefit from managing these areas.

Pursuing acquisitions of private lands within priority wildlife habitat areas could have a positive impact on the habitat by providing wildlife management of the lands.

Fish and Wildlife: Effects from ACEC/RNA Management

Effects Common to All Alternatives

Generally special management areas such as ACECs and RNAs result in protection of wildlife from human activities and long-term improvement or at least maintenance of habitat quality because of numerous use restrictions. All alternatives would maintain the existing Osgood Mountains ACEC.

Effects under Alternative A

Maintaining the Osgood Mountains ACEC would provide use restrictions that would protect roughly 60 acres of wildlife of wildlife habitat from certain uses.

Effects under Alternative B

Impacts would be similar to Alternative A.

Effects under Alternative C

Under this alternative four ACECs would be designated. ACEC management would include use restrictions that would provide no surface disturbance/no surface occupancy applicable to certain uses. Wildlife habitat located within these ACEC boundaries would be protected as these areas would be closed to saleable, solid minerals, and fluid minerals and portions would be managed as exclusion or avoidance areas for ROWs.

Effects under Alternative D

Alternative D would have similar impacts as Alternative C. However, only the Osgood Mountain. Vetch ACEC would be proposed for mineral withdrawal.

Fish and Wildlife: Effects from Backcountry Byways Management

Effects Common to All Alternatives

Impacts on fish and wildlife resources from developing BCBs may displace and alter immediate environments. Wildlife could be disturbed by increased human presence during sensitive seasonal periods, such as breeding, nesting, and migration. Adverse impacts from BCBs are expected to be limited to relatively small areas.

Effects under Alternative A

Effects would be the same as those under Effects Common to All Alternatives. Maintaining the Osgood Mountains ACEC would provide use restrictions that would protect 60 acres of wildlife of wildlife habitat from certain uses.

Effects under Alternative B

The potential for adverse effects on wildlife resources from BCB management is greatest under Alternative B because it emphasizes economic development, which may occur at the expense of resource protection.

Effects under Alternative C

The potential for adverse effects on wildlife resources from BCB management is least under Alternative C because it would emphasize resource protection in its management actions.

Effects under Alternative D

Effects would be the same as those under Effects Common to All Alternatives.

Fish and Wildlife: Effects from National Historic Trails Management

Effects Common to All Alternatives

Management actions for preserving national historic trails would provide various degrees of wildlife and fish protection through habitat preservation by restricting surface-disturbing and other disruptive activities within the protected zone of the trail. However, preserving national historic trails may limit or prohibit land treatments and habitat restoration projects that would benefit wildlife.

Fish and Wildlife: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Under this alternative, eligible river corridors would be given protection either through continued interim protective management or the development of comprehensive river management plans. This would provide additional measures along the 43.4 miles of WSR segments that would promote fish and wildlife habitat health and functionality. Both Washburn Creek and Crowley Creek were identified as having a fisheries ORV. With this, these segments would receive protective management specific to the protection of fish habitat.

Effects under Alternative B

There would be no impacts on fish and wildlife resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on fish and wildlife resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Under this alternative, there would likely be no impacts on fish and wildlife from WSR management so long as WSA, priority habitat, and priority watershed management, as outlined in the remainder of the RMP, are implemented. In the case that these management actions are not implemented or are removed after implementation, interim protective management measures would be implemented along the 43.4 miles of eligible WSR corridors, which would cause effects identical to those described under Alternatives A and C until a new determination of NWSRS suitability is made.

Fish and Wildlife: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

Lands with Wilderness Characteristics

Actions to preserve wilderness characteristics on lands outside of WSAs would help to create more desirable wildlife habitat, but indirect adverse impacts may occur if habitat projects that would benefit other wildlife are restricted to maintain wilderness characteristics. Lands with wilderness characteristics are small, relative to the overall WD, so impacts would be localized.

Wilderness Study Areas

Management of designated WSAs would comply with Manual #6330 Management of Wilderness Study Areas (BLM 2012e) and Guidelines for Lands under Wilderness Review (IMP, BLM Manual Handbook H-8550-1) (BLM 1995). WSAs provide relatively undisturbed wildlife habitat in areas within the WD. However, WSAs would increase the difficulty of accomplishing habitat improvement treatments. This is because protections to WSAs would limit the extent or effectiveness of vegetation treatments, such as weed treatments, since any type of mechanized work would be limited on these lands. Such protections would also prevent disturbances to wildlife and their habitats but also would prevent certain lands from being treated effectively to improve habitat value. WSAs are defined and distinct within the WD, so impacts would be localized.

Effects under Alternative A

WSAs would be managed in accordance with the IMP. Use restrictions and application of site specific mitigation measures would protect wildlife habitat and reduce potential impacts. Management of Lands with Wilderness Characteristics include site specific development of mitigation measures to reduce or avoid impacts on lands with wilderness characteristics while allowing for multiple uses. Development of mitigation measures would also serve to reduce impacts on associated wildlife habitat.

Effects under Alternative B

Alternative B would include management of WSAs in accordance with the IMP. Under Alternative B, the BLM would manage 416,652 acres containing wilderness characteristics to meet multiple use and sustained yield objectives. This would protect wildlife resources but could allow some impacts from allowing multiple uses.

Effects under Alternative C

Under Alternative C, as under Alternative B, the BLM would manage 416,652 acres containing wilderness characteristics, but under Alternative C the management would emphasize protection of wilderness characteristics. Under Alternative C, the BLM would impose restrictions and stipulations, including closing mineral leasing and ROW exclusion zones, which would benefit wildlife resources.

Effects under Alternative D

Under Alternative D, the BLM would also manage 416,652 acres containing wilderness characteristics impacts would be the same as alternative B.

Fish and Wildlife: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

Impacts on fish and wildlife resources from development of watchable wildlife viewing sites may displace and alter immediate environments. Wildlife could be disturbed by increased human presence during sensitive seasonal periods, such as breeding, nesting, and migration. Adverse impacts from watchable wildlife viewing areas are expected to be limited to relatively small areas. By designating these areas, visitation and consequential disruption of other wildlife areas may be reduced.

Effects under Alternative A

Effects would be the same as those under Effects Common to All Alternatives.

Effects under Alternative B

Effects would be the same as those under Effects Common to All Alternatives.

Effects under Alternative C

Under Alternative C, new routes through or near sensitive areas and attracting increased traffic to remote areas would be avoided, minimizing potential adverse effects of developing wildlife viewing sites, as compared to the other alternatives.

Effects under Alternative D

Effects would be the same as those under Effects Common to All Alternatives.

Fish and Wildlife: Effects from Public Health and Safety Management

Effects Common to All Alternatives

Generally, actions to remediate contaminated sites to safeguard human health would also affect wildlife habitats and populations, especially those that depend on riparian and wetland habitats. Reducing contaminants in the environment reduces the potential for animals to ingest them. It also reduces biomagnification because contaminants are concentrated as they pass up through the food chain.

Closing abandoned mines could affect bats. However, if the mines are closed in a manner to allow access to bats, then these bat populations would be preserved. Management actions to provide for public safety would also protect wildlife habitat. Installing fences and bat gates would prevent injury to the public as well as reduce disturbance to wildlife species especially during critical life cycle stages such as hibernation. Bat gates would also preclude other species from entering abandoned mine features limiting or removing habitat. However, fencing may reduce the potential for wildlife mortality by keeping wildlife away from dangerous shafts.

Fish and Wildlife: Effects from Sustainable Development Management

Effects Common to All Alternatives

There would be no identified effects common to all alternatives from sustainable development management.

Effects under Alternative A

Impacts on fish and wildlife would not be likely to occur under Alternative A.

Effects under Alternative B

Under sustainable development management actions, impacts on fish and wildlife from new operations would be reduced because existing facilities would be reused in place of creating new disturbances.

Reuse of sites could have detrimental impacts on fish and wildlife, but the effects would vary depending on the type of reuse and management of the use. Provisions to protect natural resources, including important habitats, would minimize potential impacts from sustainable development.

Effects under Alternative C

Effects would be the same as those described under Alternative B.

Effects under Alternative D

Effects would be the same as those described under Alternative B.

Fish & Wildlife: Cumulative Effects

Past and Present Actions

Past and present impacts on wildlife habitat from livestock and WHB grazing includes consumption of or damage to vegetation that provides food and cover for wildlife. Livestock and WHB also compete with wildlife for water. They often linger at riparian areas causing concentrated impacts on vegetation, soil and water quality. Wind and water erosion, as a result of these impacts, has increased sedimentation of streams affecting fisheries. From 1982 to the present, existing land use plans and subsequent policy and guidance have implemented management actions to reduce impacts from livestock and WHB while making progress towards or meeting Standards for Rangeland Health. Gathering WHB that are in excess of AML has improved habitat conditions overall, by leaving more water, food and cover available for wildlife use. Short-term impacts from such gather efforts causes disruption of some species' normal behavior.

Range improvement projects, such as fences, pipelines & troughs, water catchments and access roads, that are associated with the management of livestock have impacted and currently impact wildlife habitat. Fences help to manage and lessen impacts on habitat caused by livestock and WHB but can also fragment habitat and cause injury or death to wildlife that collide with fences or become entangled in them. The installation of artificial water sources for livestock also increases available water for wildlife and WHB but provides additional breeding grounds for insects that may carry and transmit disease (e.g., West Nile Virus). Range improvement projects may provide perches for avian predators, which can increase predation on some species.

Minerals exploration and extraction, lands and realty actions, renewable energy development, OHV use and recreational activities have also impacted wildlife habitat by removing or damaging vegetation. These activities have also fragmented habitats with additional noise, roads, structures and human presence. Project specific mitigation measures, permit stipulations, BMPs and SOPs have reduced impacts.

Wildfires have burned habitat causing wildlife to relocate to new areas, or perish if nearby suitable habitat was not available. Many of these areas have been altered by the establishment and spread of weeds. Emergency stabilization and rehabilitation efforts have reduced wildfire impacts.

Management actions that regulate the use and maintenance of forest/woodland and other vegetative communities have also impacted wildlife habitat. Actions such as fire suppression, prescribed fire, vegetation manipulation, seeding, fencing and use restrictions have had short-term negative impacts on wildlife and habitat. The goal of such actions has been to preserve these communities which benefits wildlife in the long-term.

An effort has been made to maintain or increase T&E, big game and game bird populations through reintroduction and augmentation projects. Numerous artificial water sources (guzzlers) have been constructed to help support these populations. Unintended species also use and benefit from such water projects.

Reasonably Foreseeable Actions

The future management of livestock and WHB impacts would vary by alternative as would the degree of impacts on wildlife habitat. All alternatives (except Alternative C, Option 2, no livestock grazing) would implement livestock grazing management to achieve land health standards. The discontinued authorization of livestock grazing within the planning area could occur with the management actions in Alternative C, Option 2. Fences associated with livestock grazing management may be removed if it is determined that they no longer meet land management objectives. The conversion of one type of permitted livestock to another type (e.g., from cows to sheep) could occur under all alternatives (with varying degrees of precautions) to help avoid interaction between bighorn sheep and domestic sheep or goats. Maintaining WHB populations at AML would continue to improve habitat conditions.

As the human population increases, it is anticipated that minerals exploration and extraction, lands and realty actions, renewable energy development, OHV use and recreational activities would also increase. Some of these land uses would be prohibited or restricted, to varying degrees, in priority habitat and priority watersheds based on the alternatives selected; however, all alternatives would implement BMPs, SOPs, and required mitigation measures and permit stipulations to minimize impacts on wildlife and its habitat. Recreation management and OHV travel management would reduce impacts based on the number of acres designated as open limited, or closed to OHV travel. Actions to educate the public and promote visitation of unique areas may result in increased impacts on wildlife and habitat.

Management of priority watersheds, special or priority wildlife habitat, and special status species habitat would include reduced disturbance, habitat restoration, and use restrictions. Construction of fuel breaks, designed at a landscape scale, would reduce fire size, the associated short-term impacts and the long-term establishment and spread of weeds.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

Incremental cumulative impacts would be similar to past, present and RFFAs as a result of livestock grazing. Requirements to meet standards for rangeland health would continue to manage impacts from livestock grazing to wildlife habitat. The elimination of authorized livestock grazing would reduce grazing impacts and competition for food, water and cover.

Other management strategies, including BMPs, SOPs, mitigation measures, and permit requirements or stipulations would reduce impacts, reclaim disturbed areas and restore wildlife habitat.

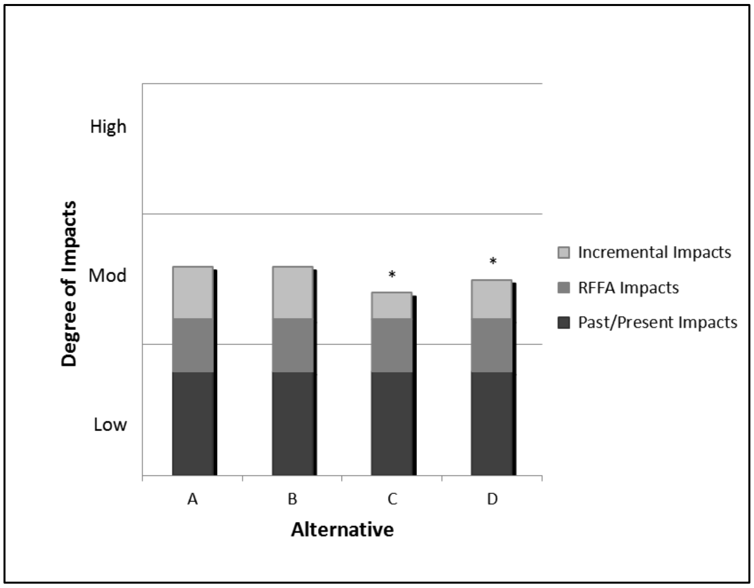
Recreation management and OHV travel management would reduce impacts on wildlife habitat based on the number of acres of open, limited, or closed to OHV travel. The intensity of impacts would vary by alternative and by acres designated with restrictions.

Use restrictions in designated priority wildlife habitat and special status species habitat would continue to limit disturbance in those areas. The level of impacts would vary based on the number of acres designated as no disturbance or no surface occupancy areas.

Emphasis of landscape scale planning to construct fuel breaks and restore habitat would protect and enhance wildlife habitat. Emergency fire and rehabilitation efforts, including seeding to restore habitat and deter establishment of weeds and invasive plants would maintain or improve wildlife habitat in the long-term.

Overall incremental impacts on wildlife habitat would vary based on all management actions that impact fish and wildlife. Those actions that prevent or avoid disturbance of wildlife and their habitat to the greatest extent would contribute the most to beneficial incremental impacts on fish and wildlife. Conversely, actions that prevent or avoid disturbance to the least extent would contribute the most to detrimental incremental impacts on fish and wildlife. The incremental impacts from implementing the RMP on fish and wildlife (both beneficial and adverse) are expected to be moderate (Figure 4-6).

Figure 4-6. Cumulative Impacts on Fish and Wildlife by Alternative



* Degree of Disturbance Assumptions: Proposed management of priority wildlife habitat, priority watersheds, special status species management, and ACECs would include use restrictions that would limit disturbance of wildlife habitat. Alternative C proposes more areas with use restrictions. Note: degree of impacts are qualitative in nature.

4.2.10 Special Status Species

Summary

Impacts on special status fish, wildlife, and plant resources in the WD include loss or alteration of native habitats, increased habitat fragmentation, changes in habitat and species composition, disruption of species behavior leading to reduced reproductive fitness, and direct mortality. Surface-disturbing actions that alter vegetation characteristics (e.g., structure, composition, or production) have the potential to affect habitat suitability for special status fish, wildlife, and plants, particularly where the disturbance removes or reduces cover or food resources. Even minor changes to vegetation communities have the potential to affect resident special status populations.

The direct and indirect impacts of management actions on fish, wildlife, and plant resources may vary widely, depending on a variety of factors such as the dynamics of the habitat (e.g., community type, size, shape, complexity, seral state, and condition); season, intensity, duration, frequency, and extent of the disturbance; rate and composition of vegetation recovery; change in vegetation structure; type of soils; topography and microsites; animal species present; and the mobility of fish or wildlife species (i.e., the ability to leave a site or recolonize a site after a disturbance).

Proposed management practices can mitigate many of the effects from these actions. Alternative C would best protect habitat to maintain biological diversity of wildlife, while Alternatives A and B allow for some compromise to special status species and their habitat conditions. Alternative D combines aspects of the other alternatives to provide a flexible approach to achieving other management objectives while protecting special status species and their habitat.

Methods of Analysis

Methods and Assumptions

The health of special status species is directly related to the overall health and abundance of their habitat within the WD. Special status plant health is also directly related to an abundance of individual plants as well as the condition and abundance of their habitat. Many resource management actions have an effect on special status species. Impact analysis on special status species included an assessment of whether each action would result in the possible destruction, degradation, or modification of habitat, as well as impacts that could improve wildlife, plant, and aquatic habitat. The evaluations are confined to the actions that have direct, immediate, and more important effects on the planning area, instead of identifying and evaluating all possible interactions and cause-effect relationships, even those that are minor.

Some impacts would be direct, while others would be indirect and affect special status species and their habitats through a change in another resource. Some impacts may be direct for special status plants but indirect for special status wildlife that use the area. Direct impacts on special status species habitat are considered to include disruption, potential trampling; direct mortality of special status species; and actions that reduce total numbers of a special status species.

Indirect impacts include loss of habitat suitable for colonization due to surface disturbance; introduction of noxious weeds by various mechanisms or conditions that enhance the spread of weeds; increased noise; and general loss of habitat due to surface occupancy or surface compaction. Potential indirect impacts include those that cannot be absolutely linked to one action, such as decreased plant vigor or health from reduced air or water quality.

Most of the actions are mitigation and protective measures intended to improve health or habitat of special status plant and wildlife populations. The degree of impact for special status species attributed to any one management action or series of actions is influenced by the watershed, time, and degree of action, existing vegetation, and precipitation. For special status plants, the degree of impact also relates to the rarity and current condition of the plant population. Quantifying these impacts is difficult due to the lack of monitoring data for most species. In absence of quantitative data, best professional judgment was used, according to the following assumptions:

- Success of mitigation is dependent on proper implementation and can be predicted by past results of similar mitigation;
- Implementation-level actions would be further assessed at an appropriate spatial and temporal scale and level of detail;
- Inventory and monitoring of special status plants could be needed to support implementation level decisions;
- Additional field inventories could be needed to support implementation-level decisions, which may be subject to further analysis under NEPA;
- BLM would continue to manage fish and wildlife habitats in coordination with the Nevada Department of Wildlife;

- The health of fisheries within the WD is directly related to the overall health and functional capabilities of riparian and wetland resources, which in turn are a reflection of watershed health. Any activities that affect the ecological condition of the watershed and its vegetative cover would directly or indirectly affect the aquatic environment. The degree of impact attributed to any one disturbance or series of disturbances is influenced by location within the watershed, time and degree of disturbance, existing vegetation, and precipitation. As riparian systems adjust in response to the removal of vegetation or changes in hydrologic conditions, the availability of habitats required to fulfill the life history requirements of fish populations might be affected; and
- Most management actions related to wildlife from public safety management would improve health of habitat or protect wildlife habitat.

Only impacts on federally listed, proposed, or candidate, state threatened or endangered, or BLM sensitive species are discussed in this section.

Special Status Species: Effects from Air Quality Management

Effects Common to All Alternatives

Air quality has limited direct and indirect effects on special status species. The scope of these effects would be limited to dust, smoke or other air pollution and the impacts of these on the health of the plants and animals. Since all of the alternatives are designed to meet air quality standards, the impacts on special status species is expected to be minimal from BLM authorized activities.

Special Status Species: Effects from Geology Management

Effects Common to All Alternatives

Protecting areas containing unique geologic resources through implementation of site specific mitigation measures or use restrictions would also provide protection of special status species habitat in areas where habitat and areas containing unique geologic features overlap. In areas where habitat overlaps, protecting unique geologic features would likely also protect nearby habitat. Relocating roads and infrastructure to avoid features may impact special status species habitat. These impacts would be dependent on the size and location of disturbance. Additional mitigation measures would be implemented to reduce impacts on special status species habitat.

Effects under Alternative A

Developing site specific mitigation measures to protect unique geologic features could provide protection of special status species habitat depending on the size and location of the proposed disturbance.

Effects under Alternative B

OHV travel restrictions under Alternative B would further protect special status species' habitat.

Effects under Alternative C

Under this Alternative, protection measures for geologic resources would be the greatest and would provide associated benefits by protecting special status species habitat. Implementation of mitigation measures, use restrictions, and OHV closures would protect habitat and reduce the potential of the public interfering with or disturbing special status species.

Effects under Alternative D

Impacts would be similar to those described under Alternative A.

Special Status Species: Effects from Soil Resources Management

Effects Common to All Alternatives

Implementing Land Health Standards and Guidelines would help to maintain soil processes and their components, including appropriate vegetation and soil stability in the long term. These are important to land health, which is directly related to habitat quality. In addition, seeding and maintaining adequate vegetative cover within the WD would have implications for special status wildlife, which rely on adequate cover as habitat for protection from predators and the elements. Vegetative cover would also prevent sedimentation in water courses, which would indirectly improve the health of special status fish populations. Implementing BMPs and RAC Standards and Guidelines for soil-disturbing activities and applying reclamation measures to mitigate adverse impacts on soils and water add additional actions that could indirectly benefit plants, wildlife, and their habitats. The BMPs could prevent additional soil-disturbing activities that could indirectly encourage healthy vegetation communities, which are the foundation of special status species habitats. Reclamation measures directly restore special status species habitats that have already been impacted.

Effects under Alternative A

There are no effects unique to management actions under this alternative. Implementation of SOPs and BMPs would help control wind and water erosion which would maintain vegetation health and vigor and habitat for special status species.

Effects under Alternative B

This alternative differs from the others by disallowing the use of soil amendments. It would likely limit success, in some cases, of plant growth and establishment during reclamation efforts. This could result in increased soil erosion and invasion of undesirable plant species, having a negative impact on wildlife habitat.

Effects under Alternative C

This alternative differs from the other alternatives in that it would provide greater protection to soils from compaction and disturbance to biological crusts by implementing seasonal restrictions. These seasonal restrictions would be expected to result in less soil erosion and more successful establishment of desirable vegetation and establishment of less invasive plant species. This alternative would also allow the use of only natural or organic soil amendments and the importation of soil medium. This would be expected to give better opportunity for plant growth and vigor, while avoiding the potential of negative impacts from chemical fertilizers. The importation of soil medium may provide better opportunity for plant growth but may also inadvertently import undesirable plant seeds, leading to the establishment of invasive plant species. Implementation of management actions, SOPs, BMPs, and RAC Standards and Guidelines, would reduce soil erosion and help maintain special status species habitat.

Effects under Alternative D

This alternative allows for flexibility in the use of soil amendment, based on the situation. This would be expected to result in the best opportunity for plant growth and establishment while reducing the potential for soil erosion and invasion of undesirable species.

Special Status Species: Effects from Water Resources Management

Special Status Species: Effects Common to All Alternatives

Effective watershed management, which minimizes erosion and maintains hydrologic flow, would result in healthy habitat for special status species, especially in riparian areas. Healthy watersheds improve fish habitat and promote healthy fish populations. Healthy habitats would allow greater potential for establishment of plants and therefore any special status plant species population would thrive as they recruit more individuals.

Acquiring water rights that provide water to wildlife and acquiring water rights associated with instream flows would indirectly benefit special status wildlife species because water is a crucial habitat component for all wildlife.

Developing water sources for other uses, while ensuring that water is available to wildlife, would be crucial to maintaining habitat for special status wildlife species.

Effects under Alternative A

Under this alternative, implementation of SOPs and BMPs would help control erosion which would maintain vegetation health and special status species habitat loss.

Effects under Alternative B

Protecting priority watersheds implies that habitats within these areas would be in good ecological condition since disturbance would be reduced. This would indirectly benefit special status species in the long term, as maintaining water quality is an important component of habitat quality.

Implementing Standards for Rangeland Health, BMPs, SOPs to protect priority watersheds would also protect special status species habitat.

Effects under Alternative C

Management of priority watersheds would include use restrictions which would also protect special status species habitat located within these watersheds.

Effects under Alternative D

Impacts under Alternative D would be similar to Alternative C. Use restrictions such as no surface disturbance or no surface occupancy, management of avoidance areas, and development of mitigation measures and permit stipulations would protect about 781,109 acres of watersheds. Many of these areas contain special status species habitat which would also be protected.

Special Status Species: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to All Alternatives

In all alternatives, forest products management actions could impact special status species that use forest and woodland areas, particularly migratory birds and pinyon-juniper obligates. Actions, including monitoring, establishing early warning systems for insect or disease outbreaks, prioritizing various tree stands for fire suppression, and stand treatments, could improve habitat conditions, including diversity in age classes and species composition, over the long term. Managing stand health and providing various age classes within a stand is very important to wildlife species, as woodlands within the WD provide habitat diversity in a predominantly sagebrush landscape.

Some forest treatments, such as mechanical control measures, would directly disturb special status species habitat in the short term but would foster a healthier ecosystem in the long term.

Potential direct impacts on special status species fish and aquatic habitat associated with forest management include increased sedimentation from surface-disturbing activities and changes in water temperatures. Water temperature can increase where streamside vegetation is removed or altered flow regimes exist, increasing the amount of sunlight reaching the water or reducing summer base flow conditions. As water temperature increases, the amount of available dissolved oxygen for fish and aquatic invertebrates decreases. These impacts would be low based on implementation of mitigation measures to include restricting harvest of trees near water sources. Considering aspen, cottonwood, and mountain mahogany in implementation plans would reduce impacts on these species and the species that depend on them. Managing for these species would also benefit riparian areas, which would have beneficial impacts on special status wildlife species, including LCT. These effects would be long term.

The extent of woodland areas within the WD is limited, comprising less than one percent of the total land area. As such, impacts on special status species from forest and woodland product management actions would be limited and localized. Forest product management could negatively impact special status plants; however requirements to inventory prior to disturbance and implementing mitigation measures would reduce adverse impacts. Possible mitigation measures may include avoidance, no surface occupancy, and buffer zones.

Effects under Alternative A

Actions using fire as a management tool would directly and efficiently achieve desirable special status species habitat in the long term. In the short term, fire would directly disturb special status species and their habitats. Fire would also reduce the fuel load in woodlands, reducing the chances of catastrophic fires that would result in the loss of life and/or habitat for special status species. Other treatments would facilitate this habitat enhancement, including fencing, mechanical control, and herbicides. Such actions would directly enhance woodland health and special status species habitat value in the long term and in localized areas.

Implementing other forest health actions such as mechanical treatments and use of herbicides would remove special status species or their habitat if located within treated areas. Impacts on wildlife species would be short term and would result in wildlife relocating to nearby suitable habitat. Impacts on special status plants would vary on the needs of the plants. Depending on the plant species, fire may be needed to maintain the habitat for some and may be detrimental to others. Treatments would also protect large areas of special status species habitat from the potential of wildfire spread. Fencing in woodland areas would manage or reduce impacts from grazing. This would also result in reducing impacts on special status species habitat. However, fencing may affect some wildlife species by providing perching locations for raptors or cause direct mortality to species from collisions with fences. Management of key species would ensure monitoring and associated management actions are in place to ensure forest health with associated habitat health for special status species.

Effects under Alternative B

Effects from fire management of vegetation would be the same as those described under Alternative A. However, Alternative B calls for more aggressive stand treatments, including fencing, mechanical, biological, or chemical treatments, and planting and seeding. The variety and breadth of treatment types would provide a more flexible, adaptable approach to stand management. These could directly disturb special status species in the short term, but Alternative B has a high likelihood to efficiently restore special status species habitat in the long term and in localized areas.

Pinyon and juniper woodlands would be managed for fewer uses than Alternative A, with an emphasis on sustainable yield. Harvesting would be more intensive under Alternative B, with the potential for overharvest to reduce plant vigor and habitat value.

Old growth would not be designated under Alternative B, and none would be designated in the future. Adverse impacts on stands with old growth characteristics would be avoided, but these areas would not be managed to provide old growth characteristics in the future. This would impact the potential for these areas to provide suitable habitat for special status species. Impacts would be localized and long-term.

Effects under Alternative C

Under Alternative C, fire would not be used to manage stands, which could prove less effective in achieving special status species habitat goals in the long term. However, it also would not disturb special status species or their habitat in the short term. In addition, fuel load accumulation could present a fire danger and increase the chance for a catastrophic fire event, resulting in direct effects on special status species and their habitat. Fewer treatments would be allowed within forests and woodlands, with only mechanical and biological treatments allowed. These, too, may be less effective in directly achieving habitat objectives. Impacts would be localized.

Pinyon and juniper stands would be managed only for landscape value and Native American uses. With less harvesting allowed in pinyon and juniper stands, there would be less human disturbance to special status species or their habitat. Impacts would be localized and long term.

Alternative C would designate 27,605 acres of old growth forest and other stands as appropriate. This would preserve and maintain these forests and their special status species habitat value. However, Alternative C would not actively manage stands for old growth characteristics, which may be less effective in improving habitat value for special status species. Impacts would be localized and long term.

Effects under Alternative D

Actions under this alternative would use fire as a management tool, similar to Alternatives A and B. However, fire management would be more adaptive because it would prioritize stands for management. This would improve special status species habitat more effectively. Fire management also would reduce fuel loads as in Alternatives A and B. Other treatments, and the impacts associated with them, would be the same as those described under Alternative B.

As in Alternative A, Alternative D would manage for the greatest number of uses and emphasizes multiple use. Impacts would be similar to those described under Alternative A.

This alternative would designate 27,605 acres of old growth forest and would designate other stands as appropriate in the future. In addition, old growth stands would be actively managed to facilitate old growth characteristics. As a result, special status species habitat improvement goals would be most likely to be efficiently achieved in Alternative D.

Special Status Species: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Noxious and invasive weeds tend to homogenize plant communities and therefore directly affect special status plant species. As a result, generalist species often are favored, but species with narrower niches suffer reduced populations or do not persist. Treatment actions would not be sufficient to control the spread of weeds into all special status species habitats but would reduce impacts in treated areas. Although weed treatments would generally directly improve special status species habitats in the long term, short-term disturbances to wildlife would occur. Weed treatment actions could remove forage and cover in areas dominated by weeds, resulting in short-term impacts on special status wildlife that are using weed infested areas. Short-term impacts would vary by type of application. Treatments, especially mechanical treatments, would cause some species to temporarily avoid treated areas.

Invasive and noxious weeds can also create or exacerbate conditions that reduce water quality. Directly or indirectly, weeds can affect stream bank stability, sedimentation, turbidity, shade and stream temperature, dissolved oxygen, and pH (USFS 2005). Reduction of total acres impacted by weeds would positively affect water quality and therefore special status wildlife, particularly fish and birds. Vegetation treatments could also negatively impact special status plants; however inventory requirements and implementing mitigation measures and adhering to SOPs/BMPs would reduce adverse impacts.

Effects under Alternative A

Using a variety of control methods, including chemical treatments and prescribed fire, would be the most direct, effective, and adaptable approach in controlling the introduction and spread of invasive and noxious plants into special status species habitats.

Effects under Alternative B

Impacts from weeds management actions would be similar to those described under Alternative A.

Effects under Alternative C

Mechanical, cultural, and biological weed treatments would be used under Alternative C, which would help to improve special status species habitat in the long term. However, chemical control and prescribed fire would not be used under Alternative C. This would limit the effectiveness of control efforts throughout the WD making special status species habitat more vulnerable to weed establishment and spread.

Effects under Alternative D

Impacts from weeds management actions would be the same as those described under Alternative A.

Special Status Species: Effects from Chemical and Biological Control

Effects Common to All Alternatives

Using chemical and biological control methods would help control and reduce weed outbreaks. The effects would be similar to those described under weeds management.

Effects under Alternative A

Chemical and biological control methods to control invasive and noxious plants could also negatively impact special status plants as control methods could cause direct mortality. Implementing mitigation measures and adhering to SOPs/BMPs would reduce the potential for adverse impacts. Possible mitigation measures may include avoidance and buffer zones.

Restricting herbicide use near water sources would reduce the possibility that chemicals would get into water sources and impacts on special status plant and wildlife species would be mitigated. This is especially restrictive, as current noxious weed outbreaks often occur near water sources and are treated with chemicals. This could lower habitat value for special status species, but it also would prevent impacts on nontarget species, particularly LCT and species that prey on LCT.

Approved biological controls are specific to target species, so there would be no impact on nontarget species. Chemical treatments would be applied according to label directions and following established guidelines, BMPs (Appendix B), and SOPs (Appendix B) for application. Chemical applications would also be designed to avoid effects on nontarget species.

Effects under Alternative B

Using IPM techniques, BMPs, and cooperation and coordination with other groups and agencies would help reduce pests within the WD. This would improve habitat health and value for special status species over the short and long term.

Using chemical and biological control methods would have similar impacts as those described for weeds management actions under Alternative A.

Effects under Alternative C

Using IPM techniques, BMPs, and cooperation and coordination with other groups and agencies would help reduce pests. This would improve special status species habitat value over the short and long term.

Biological control methods could have impacts similar to those described under Alternative A. Restricting chemical control methods could limit the effectiveness of pest control in certain cases if other actions to minimize vegetation controls or non-chemical controls are not feasible. Improvement of special status species habitat in the long-term would likely occur as residual effects from use of chemical herbicides would not occur.

Effects under Alternative D

Impacts from using chemical and biological control methods would be the same as those described under Alternative B.

Special Status Species: Effects from Vegetation—Rangeland Management

Effects Common to All Alternatives

All of the alternatives have some actions that would provide for healthier rangeland habitats throughout the WD. SOPs (Appendix B), BMPs (Appendix B), and mitigation measures would be used to reduce adverse impacts on special status species from rangeland management.

Actions designed to promote the health of native vegetation communities and to rehabilitate areas with weedy and nonnative vegetation would generally directly improve special status species habitat quality by increasing quantity and quality of native perennials in the long term. Species that use sagebrush and grassland habitat, such as sage-grouse, would be the most affected. Sagebrush habitats are considered to be the most important habitats within the WD, and measures to maintain or improve these communities would benefit the host of special status species that use them. There would be short-term disturbances to wildlife, similar to those described in the preceding weeds management section.

Effects under Alternative A

If applied correctly, prescriptive grazing would reduce non-native annuals and improve native plant vigor on localized rangelands. This would allow native vegetative cover to increase, which would reduce the likelihood of a catastrophic fire. Although fires would still occur, this action would minimize direct mortality to special status species and large-scale destruction of their habitats.

A variety of rangeland treatments would be implemented to achieve healthy rangeland conditions throughout the WD. This variety would provide flexibility in BLM's approach to rangeland restoration and likely would provide the most effective means of achieving rangeland health goals. This would provide suitable habitat for rangeland-dependent special status species. However, these treatments would focus on sagebrush and would not be implemented in salt desert scrub communities. Further, fragmentation of sagebrush would not be given a high priority in rangeland management. This would limit the connectivity of habitats for special status species, potentially separating and preventing populations from reproducing.

Restoring crested wheatgrass seedings could result in localized minor impacts on special status species from disturbance or loss of food or cover. Areas within the WD where crested wheatgrass restoration would occur are limited, so impacts on special status species would be limited and localized.

Compared with other alternatives, there would not be a reduction of FRCC from 3 to 2 on 70,000 acres under Alterative A. Class 3 areas would remain significantly altered from historical ranges and a high risk of losing key ecosystem components from fire would remain. Fire frequencies would have multiple return intervals affecting size, frequency, and intensity of fires. The likelihood of fire destroying special status species, if present, would be higher in FRCC 3 areas.

Effects under Alternative B

Prescriptive grazing would have impacts similar to those described under Alternative A.

A variety of rangeland treatments would be implemented to achieve healthy rangeland conditions throughout the WD and would have impacts similar to those described under Alternative A. These treatments would focus on both sagebrush and salt desert scrub communities, which would impact a larger area of suitable special status species habitat. In addition, fragmentation of sagebrush would be avoided, and SOPs (Appendix B), BMPs (Appendix B), and mitigation measures would be employed to minimize impacts on sagebrush communities. This would reduce impacts on special status species that rely on sagebrush communities for habitat. Rangeland treatments could also negatively impact sensitive status plants; however implementing mitigation measures would reduce adverse impacts. Mitigation measures include avoidance, no surface occupancy, buffer zones, seasonal restrictions, on site and off site mitigation, use restrictions, rehabilitation or other protective measures.

Restoring crested wheatgrass seedings could result in localized impacts on special status species from disturbance or fragmented habitat in the case of wildlife. Impacts would vary based on the location and size of disturbance. Implementation of mitigation measures would reduce adverse impacts. Seedings may reduce livestock grazing pressure on adjacent rangeland.

Restoring FRCC to Class 2 levels on 70,000 acres would reduce fuel loads on these lands and would protect native vegetation from catastrophic fire. This would prevent noxious weed invasion and promote healthy, productive, native vegetation in this area in the long term. As a result, special status wildlife species would be protected from direct mortality, and habitat would be protected from destruction.

Effects under Alternative C

Option 1

Prescriptive grazing would have impacts similar to those described under Alternative A.

Fewer rangeland treatments would be implemented to restore rangelands throughout the WD. This would limit the effectiveness of rangeland restoration, as additional treatments could provide more flexibility towards achieving this goal. As a result, special status species habitat value may be decreased on these lands. Rangeland treatments would focus on both sagebrush and salt desert scrub communities, which would impact a larger portion of the WD and could impact a larger number of special status species. In addition, fragmentation of sagebrush would be avoided, and SOPs (Appendix B), BMPs (Appendix B), and mitigation measures would be employed to minimize impacts on sagebrush communities.

Restoring FRCC to Class 2 levels on 70,000 acres would have similar impacts on those described under Alternative B.

Option 2

Eliminating livestock grazing would improve ecological conditions and increase the health, vigor, and abundance of forage species. The probable increase in grass and forb availability would enhance habitat quality for special status wildlife species that rely on sagebrush habitats.

Prescriptive grazing would not be used under this option as livestock grazing would not be a tool for vegetative treatments and other methods of treatment would have to be implemented. Eliminating livestock grazing would improve ecological conditions and increase the health, vigor, and abundance of forage species and would remove direct sources of impacts on special status plants.

Under this alternative only biological and mechanical rangeland treatments would be implemented to restore rangelands throughout the WD. This would limit the effectiveness of rangeland habitat restoration, as certain treatment types could provide more flexibility towards achieving this goal. Impacts on sagebrush and salt desert scrub communities would be similar to those under Alternative C, Option 1.

Restoring FRCC to Class 2 levels on 70,000 acres would have similar impacts on those described under Alternative B. Methods such as prescribed fire, prescribed grazing or chemical treatment would not be used. In general, these treatment methods would allow for treatment of larger areas. Other treatment methods would be employed which might not provide needed flexibility towards achieving restoration goals.

Effects under Alternative D

Prescriptive grazing would have impacts similar to those described under Alternative A.

A variety of rangeland treatments would be implemented to achieve healthy rangeland conditions throughout the WD and would have impacts similar to those described under Alternative A. Impacts on sagebrush and salt desert scrub communities would be similar to those described under Alternative B.

Restoring crested wheatgrass seedings would have impacts similar to those under Alternative A.

Restoring FRCC to Class 2 levels would increase fire return interval cycles on these lands and would reduce fire frequency to rangeland and associated special status species habitat Special Status Species:

Effects from Vegetation—Riparian and Wetlands Management

Effects Common to All Alternatives

Actions that would improve riparian and wetland condition would directly improve habitats for riparian- and wetland-dependent special status species. This would be attained for special status wildlife species by increasing quantity and quality of riparian vegetation and by providing structure and cover for species. Affected species include numerous migratory bird species, LCT, and other riparian- and wetland-dependent wildlife. Meadows are particularly important to sage-grouse as brooding areas, so improvements to springs and associated meadows would benefit this species. Improvement of riparian and wetland condition would also provide more stable and (where appropriate) narrower, deeper stream channels which serve for better cold water fisheries.

The extent of riparian and wetland areas within the WD is limited, comprising less than one percent of the total land area. However, these areas are important for special status species, including migratory birds and LCT. In addition to their importance to fish and aquatic species, riparian areas are crucial to wildlife in the WD (WAPT 2006). As such, impacts on special status species from riparian and wetland management actions would be localized but considerable.

Effects under Alternative A

Restoring PFC would improve the health and diversity of aspen, cottonwood, willow, alder, and chokecherry stands in riparian areas throughout the WD, which would create suitable habitat for special status species. Alternative A does not quantify the amount of PFC to be achieved, so impacts would vary depending on how much of these communities are restored.

Effects under Alternative B

Restoring PFC to 60 percent under this alternative would improve aspen, cottonwood, willow, alder, and chokecherry stands in riparian areas, providing for healthier stands and special status species habitat in the long term.

Effects under Alternative C

The greatest amount of riparian areas and wetlands would be restored to PFC under Alternative C (a minimum of 85 percent). As a result, improvement of special status species habitat would be greatest in the long term.

Option 1

Adjustment of livestock grazing systems, season and duration or use, and adjustment of AMLs or permitted AUMs would be used in this option to minimize impacts on riparian areas and wetlands. Habitat value for special status species would be indirectly improved through less soil compaction and weed spread or introduction. Direct effects include trampling of vegetation. Effects would be long term.

Option 2

Removing grazing from lands in the WD would have the greatest benefit on riparian areas and wetlands, as there would be no impacts from livestock on soil compaction, weed spread and introduction, and trampling of vegetation. This would cause the greatest improvement in special status species habitat in the long term.

Effects under Alternative D

Similar to Alternative C, the greatest amount of riparian areas and wetlands (85 percent) would be progressing toward or attaining PFC. Impacts would be similar to but slightly less than those under Alternative C since Alternative D would not require achieving PFC, as long as areas are progressing toward PFC.

Special Status Species: Effects from Fish and Wildlife Management

Effects Common to All Alternatives

Modifying actions to avoid impacts on special status species or their habitat would protect these species from disturbance in the short term. Mitigation measures would be developed for implementation of land management treatments that would occur on these lands, which would help achieve suitable habitat conditions for special status species while protecting the special status species themselves.

Maintaining and improving lentic and lotic habitats would improve habitat for some special status species in the long term because these areas are a source of water and provide forage for species. Certain treatments could directly disturb special status species, such as sage-grouse, in the short term.

Implementing HMPs that specify vegetation treatments to improve habitat involves altering species composition and vegetation structure. This could directly disturb special status species in the short term but would improve habitat value over the long term. Mitigation measures would be required for actions near special status plant populations and nesting migratory birds, which would allow for habitat improvement treatments and would protect the special status species in the long term.

Effects under Alternative A

Under this alternative, actions would not prioritize habitats for protection and would not emphasize coordination with NDOW. Lack of such protections could make it more likely that habitat value for these species would not be improved in the long term.

Reintroducing bighorn sheep could help reestablish this historically present species in the ecosystem, adding to the diversity of the WD. Although management actions would be used to resolve all conflicts with domestic sheep before bighorn sheep are reintroduced, the risk of disease transmission that could be detrimental to bighorn sheep populations would still exist.

Establishing pioneering elk could impact some species by increasing competition for habitat and forage.

Restricting stream bank alterations would protect aquatic, as well as riparian- and wetland-dependent special status species, particularly LCT. Alteration percentages are not specified under Alternative A, so impacts would vary depending on how these restrictions are defined in implementation plans.

Effects under Alternative B

Under this alternative, no acres of priority 1 habitat and 716,528 acres of priority 2 habitat would be designated. Wildlife habitat would be protected through implementation of buffer zones and development of mitigation measures, including avoidance to reduce adverse impacts. These management strategies would also benefit special status species habitat.

The effects from reintroducing bighorn sheep would be the same as those described under Alternative A. Establishment of pioneering elk populations would be avoided under Alternative B, which would minimize potential impacts resulting from their presence within the WD.

Constructing artificial water sources would benefit special status species by providing water where habitat was previously unsuitable. These artificial water sources would exclude wild horses and livestock, which would minimize impacts on habitat from these species. The effects would be long term.

Restrictions on stream bank alterations would protect aquatic, as well as riparian- and wetland-dependent special status species, particularly LCT. Impacts would be limited to 20 percent of the linear bank length.

Effects under Alternative C

Under this alternative, 1,279,481 acres of priority 1 and 869,645 acres of priority 2 habitat would be designated. These designations would provide the greatest protection to special status species and their habitats in the long term. Designation of priority habitats would be especially beneficial to sagebrush-obligates, including sage-grouse, as sagebrush composes most of the habitat within the priority habitat areas.

Reintroducing and transplanting big game species could impact special status species in ways that would be similar to Alternative B. The effects from establishing pioneering elk would be similar to those described under Alternative A.

The greatest amount of restrictions on stream bank alterations would be implemented and would protect aquatic and riparian- and wetland-dependent special status species, particularly LCT. Impacts would be limited to ten percent of the linear bank length on streams, and five percent of the linear bank length on streams with sensitive channel types.

Effects under Alternative D

Under this alternative, 1,199,539 acres of priority wildlife habitat areas would be designated. Designation would implement use restrictions that include no surface disturbance and no surface occupancy. Special status species habitat situated within priority wildlife habitat areas would be protected from certain uses.

Effects on special status species and their habitats from transplanting big game wildlife, reintroducing bighorn sheep, and establishing pioneering elk would be similar to those described under Alternative A.

Restrictions on stream bank alterations would protect aquatic and riparian- and wetland-dependent special status species, particularly LCT. Impacts would be limited to 20 percent of the linear bank length on streams and 10 percent of the linear bank length on streams with sensitive channel types.

Special Status Species: Effects from Special Status Species Management

Effects Common to All Alternatives

Special status fish, wildlife, and plant management actions would protect and work toward recovering listed species and would prevent listing species. Actions common to all alternatives that would protect special status species include the following:

- Activities that lead to listing species would not be authorized;
- No surface disturbance would be authorized before a special status species inventory of the project area is completed by a qualified botanist or biologist;
- Any actions would require mitigation and monitoring for special status plants and suitable nearby habitat;
- Site-specific habitat plans would be implemented for sage-grouse by local planning groups;
- Cave habitats would be protected;
- Impacts on sensitive raptors would be mitigated;
- Special status species habitats would be improved;
- Recovery and management plans would be implemented, recovery and conservation teams would be formed, and USFWS conservation recommendations would be implemented; and
- The Osgood Mountains ACEC would be maintained to protect the Osgood Mountains milkvetch, and a mineral withdrawal would be pursued for these lands. The Osgood Mountains milkvetch population would be protected with these actions.
- Exceptions to management actions concerning sage-grouse may be granted based on site-specific conditions.
- Management actions that prohibit or reduce disturbance to a particular habitat would likely effect other species that may use the same habitat.

Effects under Alternative A

Special status plant inventories would be required if surface disturbance or surface occupancy is proposed on a site within a two-mile radius of known occurrences or with similar habitat characteristics. In addition, any habitats within the proposed disturbance area determined to be suitable habitat for other sensitive plants would be inventoried. Inventories for pygmy rabbits and other sensitive wildlife species would also be completed in proposed disturbance areas if suitable habitat exists. Mitigation to avoid or minimize impacts on special status species would be required. Inventories would provide necessary information about sensitive species in order for impacts, to be avoided or minimized. Impacts, depending on the proposed activity, may include injury, death, displacement, habitat reduction or alteration.

The management of sage-grouse habitats under this alternative would continue to rely upon guidelines as set forth by WAFWA and the Greater Sage-grouse Conservation Plan for Nevada and Eastern California. This alternative does not establish a buffer requirement to avoid or mitigate impacts from surface disturbance or surface occupancy to occupied leks and would rely on the above mentioned guidelines and site-specific circumstances when establishing appropriate buffer distances. The use of these guidelines would help to maintain or improve sage-grouse habitats and would help to avoid or mitigate impacts such as habitat loss, alteration and fragmentation from multiple-use activities. Surface disturbance or occupancy would not be allowed within 3.3 kilometers (2.0 miles) of the perimeter of active leks from March 15 to June 1 in order to lessen impacts on breeding and nesting activities. High profile structures would be permitted 0.25 mile to 2-miles from active leks on a case-by-case basis. Such structures can be perceived by sage-grouse as threats, causing them to avoid areas with tall structures by substantial distances, resulting in fragmentation or reduction in usable habitat and eventual decline in population size. High-profile structures also provide unnatural perching and nesting opportunities for predators that not only prey on sage-grouse but also their eggs.

Disturbance proposed within 200 yards of adits or caves would be inventoried. Bats are very sensitive to disturbance and especially vulnerable during hibernation and while caring for offspring. If displaced by disturbance, bats may not have adequate alternative habitat available in the area which could result in their death or diminished health or reproductive capabilities. Hibernating bats are dependent on fat reserves; therefore, disturbance can cause a depletion of limited energy resulting in weakening or death. Disturbance to maternity colonies can result in the displacement of lactating bats and a disruption of necessary care to the offspring that may not yet have the ability to fly. Disturbance to bats and habitat would be avoided or mitigated. Large-scale disturbance due to discretionary actions within 200 yards of occupied bat habitat would not be allowed. Activities related to mining such as drilling or blasting would be discouraged within 200 yards of occupied habitat. When avoidance cannot be accomplished, on or off-site mitigation would be developed to lessen impacts from the disturbance or off-set impacts by benefiting bats or their habitats off-site.

Prescribed grazing in riparian exclosures under this alternative would continue to be permitted on a case-by-case basis based on BMPs. In some instances, grazing of these areas can result in overall beneficial impacts on habitats used by special status species. Grazing stimulates new growth in some plant species and through removal of decadent foliage, can provide better opportunity for increased vegetative density and/or diversity. Impacts may also include trampling of aquatic species, disturbance to soils resulting in increased sedimentation, diminished water quality, and introduction of invasive plant species. Livestock may also use plants species that do not benefit from grazing.

Transplanting LCT into suitable habitat would directly promote recovery of the species.

Effects under Alternative B

Inventory requirements for special status species and potential impacts on them from surface disturbance or surface occupancy would be the same under this alternative as was discussed under Effects under Alternative A.

Surface-disturbing activities and surface occupancy would be prohibited near occupied sage-grouse leks unless mitigation measures would prevent or reduce impacts. Surface disturbance or surface occupancy would be prohibited within a 2-mile radius of active leks from March 15 to June 1. Mitigation measures, to reduce impacts, would be required for high-profile structures near active sage-grouse leks.

Sage-grouse management actions under this alternative would not establish buffer distances for surface disturbance and occupancy from occupied leks. There would also be no distance buffers from active leks established for high-profile structures. Mitigation would avoid or minimize impacts but without buffers, this alternative would likely result in more impacts on sage-grouse. Potential impacts would be the same as those discussed in Effects under Alternative A. Impacts from prohibition of surface disturbance or surface occupancy within a 2-mile radius of active leks from March 15 to June 1 would also be the same as described in Effects under Alternative A.

Impacts from restrictions on surface-disturbing activities to active sage-grouse leks would be the same as described for Alternative A.

Management actions pertaining to bats and their habitat would be the same as Alternative A except in the case of surface-disturbing discretionary actions. No buffer distances from occupied habitats would be established, allowing surface-disturbing activities near these habitats. Mitigation would avoid impacts if practicable but in some instances would only minimize impacts on bats. Potential impacts from disturbance would be the same as those discussed in Effects under Alternative A.

Impacts from prescriptive grazing would be the same as those discussed in Effects under Alternative A.

LCT habitat would be managed to facilitate recovery of the species. This would indirectly help the species but would not directly increase the species' numbers.

Effects under Alternative C

Protections to special status species would be greatest under Alternative C, as habitat- and species-disturbing activities would be the most restricted or prohibited.

Inventory requirements for special status species and potential impacts on them from surface disturbance or surface occupancy would be the same under this alternative as was discussed under Effects under Alternative A. Mitigation to avoid or minimize impacts on special status species would also be required. Surface disturbance to active pygmy rabbit burrows would be prohibited.

Surface disturbance and surface occupancy would be prohibited within known nesting, summer or winter habitats identified within PMUs. Human activity would be prohibited between 6:00 pm and 9:00 am March 1 through May 20 within a quarter mile of occupied leks. In addition, high-profile structures would be prohibited within two (2) miles of active leks. These management actions would provide greater protection from the impacts discussed in Effects under Alternative A than management actions under Alternatives A and B.

This alternative would require greater buffer distances from disturbance and would provide more protection for bats from impacts (as discussed in Effects under Alternative A) than Alternatives A and B.

Actions and impacts on LCT would be similar to those described under Alternative B.

Prescriptive grazing within exclosures with wet meadows or riparian areas would not be permitted, which would prevent impacts, as discussed in Effects under Alternative A, on special status species. Based on lek buffers and surface disturbance restrictions within PMUs, habitat protection and improvement projects would be limited. Special status species habitat would be more vulnerable to wildfire and habitat improvements would not occur.

Effects under Alternative D

Implementation of management actions, SOPs, and BMPs, would reduce soil erosion and help maintain special status species habitat.

Inventory requirements for special status species and potential impacts on them from surface disturbance or surface occupancy would be the same under this alternative as was discussed under Effects under Alternative A. Mitigation to avoid or minimize impacts on special status species would also be required.

Management of priority sage-grouse habitat would prohibit surface disturbance and surface occupancy protecting sage-grouse and other special statues species habitat. Management of general sage-grouse habitat would include development of mitigation measures with would reduce impacts on sage-grouse habitat and to other sensitive species habitat. Management actions and potential impacts pertaining to high-profile structures and active leks would be similar to those discussed in Effects under Alternative A.

Management actions and potential impacts pertaining to bats and their habitat would be the same as was discussed in Effects under Alternative A.

Impacts from prescriptive grazing within enclosures with wet meadows or riparian areas are the same as those described in Effects under Alternative B.

Impacts from LCT transplant would be the same as those described under Alternative A.

Special Status Species: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Ensuring that wild horses and burros have access to water sources may directly and indirectly adversely impact special status fish, wildlife, and plants. Wild horses tend to dominate water sources, alter their habitats, and drive away wildlife. Wild horse use of riparian and wetland areas would decrease the value of these areas for special status fish, wildlife, and plants by affecting habitat complexity and stability. As a result, habitat value could be impacted through direct destruction of vegetation or reduced vegetative vigor.

Effects under Alternative A

Maintaining established AMLs as a population range, using gathers when AML is exceeded, and using fertility control agents would reduce the direct and indirect impacts of WHB on special status species habitat by decreasing the risk of soil compaction, trampling, and weed spread or introduction. In addition, use of perennial bunch grasses would be reduced. However, developing alternate water sources for WHB could increase impacts of WHB on special status species habitat by increasing the risk of soil compaction, trampling, and weed spread or by introducing weeds in areas that may not have been impacted by WHB in the past. Further, it could increase direct competition for forage between WHB and special status species by concentrating WHB in areas they may not have used in the past due to limited or lack of available water.

WHB protections, such as limiting proposed motor vehicle racing, would protect special status species from surface-disturbing activities and direct noise disturbance and would prevent direct and indirect habitat impacts due to human use, such as trampling and soil compaction.

Effects under Alternative B

Impacts from population control measures would be similar to those described under Alternative A. Use of perennial bunch grasses would be reduced to the greatest extent under this alternative. This has impacts on plant community composition and habitat value. AML reduction in response to decreased WHB private water supply would further intensify these impacts.

Protection measures for WHB would have impacts similar to those described under Alternative A.

Effects under Alternative C

Alternative C would control WHB populations by maintaining AML as a single number, using four-year or longer gather cycles, and would not allow fertility control agents to be used. This would cause the greatest impact from WHB on special status species habitat, but actions would still decrease the risk of soil compaction, trampling, and weed spread or introduction. Use of perennial bunch grasses would also be reduced. Special status species habitat value would be consequently impacted. However, AML reduction in response to decreased water availability for WHB would decrease impacts of WHB on special status species habitat.

Protection measures for WHB would be the greatest under Alternative C and would prohibit or limit such activities as motor vehicle racing in HMAs unless impacts were determined to be minimal. This would protect special status species and their habitat from disturbance and would prevent impacts from human use, such as noise, trampling, and soil compaction.

Effects under Alternative D

Impacts from population control measures and development of alternative water sources would be similar to those described under Alternative A.

Impacts from WHB protection measures would be similar to those described under Alternative A.

Special Status Species: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildfires could alter terrestrial or riparian habitats, which would also affect water quality and habitat components for special status wildlife and fish, such as LCT. Wildfires may leave the surrounding soil and accumulated ash vulnerable to erosion and remove shading streamside vegetation, which would increase sedimentation and water temperature. Special status aquatic species could also be subjected to the direct impacts of increased sedimentation and water temperatures from removal of upland vegetation. The duration, intensity, and scope of these direct impacts depend on the species and the characteristics of the fire.

Implementing a response to wildfires based on social, legal, and ecological consequences of the fire would prioritize special status species habitats for fire suppression. This would limit the size and spread of wildfire and limit the number of acres burned within special status species habitats.

Fuels management actions would reestablish native vegetative communities, providing for healthy, diverse habitats over the long term. Implementing a response to wildfires based on social, legal, and ecological consequences of the fire and using fuel breaks would also prevent special status species habitat from catastrophic wildfire, which would have long-term effects.

Effects under Alternative A

Strategic placement of fuel breaks would help protect special status species habitat by removing hazardous fuels. Wildfire intensity and spread would be lower.

Effects under Alternative B

Under this alternative, 110,167 acres of land would be designated as allowing conditional fire suppression areas for a benefit. Special status species and their habitats could be directly disturbed in the short term, but their habitats would be improved and protected from catastrophic fire in the long term. Much of this land is sagebrush and higher elevation woodlands, so sagebrush obligate species, such as sage-grouse, and forest obligate species, such as northern goshawk, are most likely to be impacted by designating lands as suitable for conditional fire suppression management for a benefit. Acreage of habitat for bighorn sheep and sage-grouse that could be directly impacted by conditional fire suppression management for a benefit under Alternative B are shown in Table 4-10. These areas represent a small portion of the habitat for these species, so impacts would likely be localized.

Effects under Alternative C

Placement of fuel breaks to protect special status species habitat would be restricted within 2 miles of a lek or within PMUs. Special status species habitat would be more vulnerable to loss from wildfire.

Effects under Alternative D

Under this alternative, 110,167 acres of land would be designated as allowing conditional fire suppression areas for a benefit. This would protect special status species and their habitats from catastrophic fire in the long term. Conditional fire suppression management for a benefit would directly disturb special status species and their habitat in the short term. Impacted species would be similar to those described under Alternative B. In addition, cliffs and canyons also make up a large portion of the land designated as suitable for conditional fire suppression management for a benefit under this alternative. As a result, special status bird and bat species that use this habitat type are most likely to be impacted under this alternative. Acreage of habitat for bighorn sheep and sage-grouse that could be directly impacted by conditional fire suppression management for a benefit under Alternative D are shown in Table 4-10.

Table 4-10
Special Status Species Habitat Designated as Suitable for Conditional Fire Suppression Management for a Benefit

Habitat	Alternative B (acres)	Alternative D (acres)	Total Habitat in WD (acres)
Desert bighorn sheep potential or occupied habitat	91,352	7,306	2,205,867
Sage-grouse Population Management Units habitat	49,423	6,851	3,147,932
Sage-grouse nesting habitat	38,490	1,742	2,209,502
Sage-grouse summer habitat	36,503	1,834	1,786,693
Sage-grouse winter habitat	49,640	5,050	2,992,488

Source: Based on Alternatives presented in Chapter 2

Special Status Species: Effects from Cultural Resources Management

Effects Common to All Alternatives

Protecting cultural resources would prevent disturbance and fragmentation of habitat, providing for a more healthy and resilient community. However, these protections may limit the type and timing of treatments that could be implemented to improve habitat value in certain areas. These areas are small relative to the overall WD, so impacts would be localized.

Actions to maintain and protect pinyon and juniper stands in the Stillwater Range would improve special status species habitat over the long term, particularly for migratory birds. Some forest treatments, such as mechanical control measures, would directly disturb wildlife habitat in the short term but would indirectly foster a healthier ecosystem in the long term.

Effects under Alternative A

Protecting pinyon trees in the Stillwater Range would prevent disturbance to special status species and their habitat and would maintain the extent of pinyon woodland in the short term.

Effects under Alternative B

Alternative B would allow pinyon trees to be harvested in the Stillwater Range. These actions also would allow some special status species habitat disturbance and would slightly reduce the abundance of pinyon woodland in the short and long term. Depending on how these management actions were implemented, they could provide for improved special status species habitat in the long term.

Effects under Alternative C

Impacts from protection of pinyon trees in the Stillwater Range would be the same as those described under Alternative A.

Effects under Alternative D

Impacts from protecting pinyon trees in the Stillwater Range would be the same as in Alternative A, except Alternative D includes adaptive management to allow for some pinyon tree harvest. This would have a slightly greater impact on disturbance to special status species and their habitats in the short term.

Special Status Species: Effects from Tribal Consultation

Effects Common to All Alternatives

Consulting with tribes to identify culturally significant plants, important habitats, and traditional use locations would emphasize protection of natural resource through mitigation of impacts, avoidance of areas and seasonal closures. This would indirectly limit disturbances to special status species and would foster suitable wildlife habitat over the long term in certain areas. Consultation could place higher treatment priority in areas not previously identified or could limit actions in planned treatment areas. Impacts would vary on a case-by-case basis and are likely to be localized.

Special Status Species: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Physical conservation measures and law enforcement actions would prevent habitat degradation and disturbance to special status species, while potentially impacting the ability to implement habitat improvement treatments over the long term in certain areas. These areas are small relative to the total area of the WD, so impacts would be localized.

Special Status Species: Effects from Visual Resources Management

Effects Common to All Alternatives

Implementing VRM guidelines, particularly managing WSAs as Class I, would increase the difficulty of accomplishing habitat improvement actions and may affect the dimensions and locations of habitat treatments. These VRM guidelines would limit the extent or effectiveness of vegetation treatments, such as weed treatments, because such treatments could change the visual character of vegetative communities. VRM Class I and II areas would prevent disturbances to special status species and their habitats but also would prevent certain lands from being treated effectively to improve habitat value.

Effects under Alternative A

Under Alternative A, 420,271 acres and 346,302 acres would be managed to VRM Class I and II guidelines, respectively. These actions would limit the scope of habitat improvement activities and would prohibit treatments and prescriptions that would change the visual character. Overall, meeting VRM Class I and II guidelines would increase the difficulty of improving special status species habitat and would limit the extent and the effectiveness of the management goals. However, these areas would also limit direct disturbance to special status species.

Effects under Alternative B

Under Alternative B, 417,605 acres and 391,203 acres would be managed to VRM Class I and II guidelines, respectively. This alternative is the least restrictive to habitat improvement treatments but these treatments could disturb special status species and their habitats in the short term. Impacts would be similar in nature to those described under Alternative A.

Effects under Alternative C

Under Alternative C, 417,605 acres and 3,083,211 acres would be managed to VRM Class I and II guidelines, respectively. This alternative would be the most restrictive to implementation of habitat improvement projects. Impacts would be similar in nature, although greater in magnitude, than under Alternative A.

Effects under Alternative D

Under Alternative D, 417,605 acres and 2,780,416 acres would be managed to VRM Class I and II guidelines, respectively. Impacts would be most similar in nature and magnitude to Alternative C.

Special Status Species: Effects from Cave and Karst Resource Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from cave and karst resource management.

Effects under Alternative A

Alternative A would provide no protection to cave and karst resources. This could disturb special status bat species that use these areas and would allow for habitat degradation in the long term.

Effects under Alternative B

Actions under Alternative B would identify and protect habitat for special status bat species in the long term. Education programs and mitigation measures would help minimize human impacts on these species and their habitat.

Effects under Alternative C

Actions under Alternative C would identify and protect habitat for special status bat species in the long term. Education programs, prohibitions to disturbing activities, and measures to reduce visitation of cave and karst resources would be the most effective of all alternatives in minimizing human impacts on these species and their habitat.

Effects under Alternative D

Implementation of mitigation measures including use restrictions to protect caves and karsts would help prevent the potential to spread WNS in sensitive bat species.

Special Status Species: Effects from Livestock Grazing Management

Effects Common to All Alternatives

Collecting monitoring data may help to improve rangelands and lower weed spread by targeting areas most in need of rehabilitation and tracking the progress of restoration efforts. This would improve special status species habitat in these areas.

Protections given to newly developed spring sources and wetland-riparian areas could benefit special status species by protecting potential habitat from degradation and by providing additional sources of water for wildlife.

Effects under Alternative A

Livestock grazing would be open on 8,232,727 acres under this alternative, which would have the greatest impact on special status species. Grazing, including grazing on acquired lands, allowing temporary nonrenewable use, and allowing for three consecutive years of grazing, would facilitate intensive land use. This would cause the most soil compaction, an indirect effect, and trampling of native vegetation, a direct effect, of all of the four alternatives. This alternative would also result in the most opportunity for weed seeds to be spread and new species of weeds to be introduced. The effects on perennial bunchgrasses would be the greatest under this alternative as well, but the Standards for Rangeland Health would still be expected to be met. However, any overuse would result in annuals or other less desirable species being able to invade these lands and dominate the understory. As a result rangeland vegetation would be less healthy, diverse, productive, and resilient. Overall, these actions would result in the slowest recovery rate of any impacted habitat for special status species. Any overuse could reduce habitat value for special status species that use rangeland. Doing so could have a direct impact on these species. In addition, grazing may impact special status fish species, such as LCT, through increased sedimentation, stream bank trampling, vegetation removal, and habitat loss. However, actions would be implemented to mitigate livestock grazing impacts on special status species habitats. These include protecting riparian areas, using adaptive management principles (such as wildlife habitat objectives), allowing grazing permits to be relinquished, and establishing forage banks.

Lands closed to grazing on the remainder of land within the WD would lower direct and indirect impacts on special status species and their habitats in these areas, as livestock would not be using vegetation, compacting soils, or acting as a mechanism for seed dispersal.

Allowing a change in livestock from cattle to sheep within the WD could cause impacts on bighorn sheep, as disease transmission between domestic and wild sheep is a major threat to bighorn sheep populations. Impacts would be long term.

Developing springs for livestock would expand and enhance special status wildlife habitat. Proper installation of these features would minimize impacts on wetland and riparian areas from their construction and would reduce long-term impacts on these areas by providing an alternate water source for livestock and for special status species, creating suitable habitat where there previously was none. In addition, protecting riparian areas would benefit special status fish species, such as LCT.

Effects under Alternative B

Livestock grazing would be open on 8,232,727 acres of land under this alternative. Grazing, including grazing on acquired lands, allowing temporary nonrenewable use, and allowing for continuous season-long use would facilitate the most intensive land use. Impacts would be similar in nature to those described under Alternative A.

Adaptive management principles, which include wildlife habitat objectives, as well as protection of riparian areas, would be implemented to mitigate livestock grazing impacts on special status species habitats. These actions would be difficult to implement successfully and efficiently under Alternative B, due to the large acreage that would be open to grazing.

Lands closed to grazing on the remainder of land within the WD would reduce direct and indirect impacts on special status species and their habitat in these areas, as livestock would not be using vegetation, compacting soils, or acting as a mechanism for seed dispersal.

Allowing a change in livestock from cattle to sheep in areas occupied, or potentially occupied, by bighorn sheep could cause impacts on this species, even with buffer zones. Disease transmission between domestic and wild sheep is a major threat to bighorn sheep populations, and impacts would be long term.

Developing springs for livestock would have impacts similar to those described under Alternative A.

Effects under Alternative C

Option 1

Livestock grazing would be open on 8,038,084 acres of land under this alternative. Grazing would facilitate weed spread and introduction similar to impacts described under Alternative B. However, Alternative C would not allow grazing on acquired lands or temporary nonrenewable use and would only allow for two years of consecutive grazing during the critical growth period. This would minimize the intensity of land use and would foster improved habitat value for special status species.

Lands closed to grazing on the remainder of land in the WD would reduce impacts on rangeland vegetation in these areas, as livestock would not be using vegetation, compacting soils, or acting as a mechanism for seed dispersal. In addition, actions would be implemented to mitigate livestock grazing impacts on special status species habitats. These include protecting riparian areas, using adaptive management principles that include wildlife habitat objectives, allowing grazing permits to be relinquished, and establishing forage banks.

Allowing a change in livestock from cattle to sheep within the WD, excluding potential and occupied bighorn sheep habitat, would minimize impacts on bighorn sheep because disease transmission between domestic and wild sheep would be limited. Impacts would be long term.

Existing water developments would be required to provide water for wildlife from June 1 to September 30, regardless of whether livestock are present, which would provide additional water resources for special status wildlife during the drought season.

Option 2

Livestock grazing would be closed on all lands within the WD, and grazing permits would be relinquished, which would have the greatest impact in achieving healthy ecological condition, resulting in the greatest improvement in both upland and riparian habitats for special status species on BLM-administered lands.

Impacts from riparian improvement actions would be similar to those described under Alternative C, Option 1.

Developing springs for livestock would not occur, which would have the greatest impact by reducing impacts on special status species habitat since livestock and wildlife would not concentrate in these areas. This action would also not supply additional water to special status wildlife, further limiting their distribution.

Effects under Alternative D

Alternative D would have 8,016,754 acres of land open to grazing. Impacts would be similar to those described under Alternative A, except fewer acres would be open to grazing.

The greatest number of actions would be implemented to mitigate livestock grazing impacts on special status species habitats. These include protecting riparian areas, using adaptive management principles (such as wildlife habitat objectives), issuing grazing permits subject to land health standards and guidelines and other appropriate conditions, allowing grazing permits to be relinquished, establishing forage banks, and implementing strict requirements for authorizing TNR.

Impacts from conversion of livestock from cattle to sheep within potential and occupied bighorn sheep habitat would be similar to those described under Alternative B.

Use of existing water developments would have impacts similar to those described under Alternative C, Option 1.

Special Status Species: Effects from Minerals Management

Effects Common to All Alternatives

General

Minerals management impacts on special status plants and wildlife generally occur from surface disturbance and thus loss and fragmentation of habitat, as well as disturbances from noise and movement from the exploration, construction, and operation of facilities and roads. Management actions, as listed in Chapter 2, spell out where, how much, and what type of mineral exploration and extraction can occur. In addition, the types of restrictions, such as those on siting and operation, that can be applied vary by the type of mineral activity, whether they are saleable, leasable, or locatable resources; for example, the WD has the least discretion over locatables. Differences between the restrictions for each mineral resource are described in detail under the mineral resources environmental consequences (Section 4.3.2). Generally, the tighter the restriction, the fewer impacts on special status plants and wildlife.

Special status species habitat would be avoided in pursuing fluid and leasable mineral development and mineral material sales or disposal. As a result, impacts on special status species would be minimized. However, direct impacts on adjacent habitats could occur, including loss or injury of plants due to excavation or trampling or toxic responses from using chemicals in mineral extraction. Indirect effects include increased exposure to dust and other contaminants associated with constructing and using access roads. This would reduce ecosystem health and habitat value in these areas and could impact habitat connectivity throughout the WD.

In instances where conservation measures are not successful or where the identified buffers are inadequate the actions associated with mining could impact special status fish populations and aquatic habitats. The potential impacts on special status fish and aquatic habitats from mining include the following:

- *Increased sedimentation on fish-bearing streams.* Excess sediment generation can be the direct result of surface disturbances for mineral extraction, drilling, and facilities construction and also for road construction, maintenance, and use. Increased sedimentation in streams can affect special status fish populations in a variety of ways, including direct mortality, reduction in suitable spawning gravels, egg death, and individual fish displacement. Increased sedimentation resulting from mining could occur even if the mining activities are outside the buffer zones.
- *Introducing hazardous materials to fish-bearing rivers, streams, and lakes.* Hazardous materials from mining activities and from equipment use and maintenance could be released into fish-bearing water bodies. Associated with locatable minerals extraction are mine tailings, which can introduce heavy metals into aquatic ecosystems, impacting the health of special status fish and aquatic species and, consequently, other species due to biomagnification. Examples of this are the releases associated with well-flow testing for geothermal power development. Spills can also occur from equipment that uses hazardous fluids, such as gasoline and oil. The impact on special status fish populations depends on the type of hazardous material released and the quantity of the release. If severe enough, deaths can occur and habitat can become unsuitable for aquatic life.
- *Altered stream flow regimes.* Water yield increase resulting from vegetation removal and alteration of natural drainage could result in scouring stream channel bottoms and decreasing fish habitat and food sources.
- *Changes in water temperatures.* Water temperature can increase in areas where streamside vegetation is removed, increasing the amount of sunlight reaching the water. The default buffers and management constraints would minimize the amount of mining that would occur in these sensitive areas. If mining were to occur in riparian areas, increased water temperatures could reduce suitable habitat for special status cold-water fish species. As water temperature increases, the amount of available dissolved oxygen for fish and aquatic invertebrates decreases.

Designation of areas as open to leasing but subject to terms and stipulations and conditions of approval forms would limit the BLM's ability to assign major or moderate stipulations (such as NSO) in those areas. Consequently, there could be an increased impact on aquatic habitats in these areas. The standard lease stipulations include compliance with established acts, laws, and regulations governing BLM land management, which would protect special status fish species. Areas designated as open to leasing with NSO stipulations would provide some protection to aquatic habitats by limiting the amount of surface disturbance. Protection would be realized where NSO stipulations are applied to riparian areas and areas upslope of fish-bearing streams.

Impacts from saleable minerals, typically gravel, tend to be small scale and localized. Impacts occur primarily from surface disturbance, but use restrictions and closures would minimize many impacts.

Impacts from fluid and solid leasables are also typically small scale and localized, but cumulative effects can occur where there are numerous oil and gas wells over the landscape. Impacts within the WD would be minimized by use restrictions and closures.

Development of locatable mineral resources results in alteration of habitat from surface clearing performed for exploration purposes. Reclamation of disturbed areas using proper seed mix can help mitigate habitat alteration. Special stipulations would minimize impacts on special status wildlife habitats.

The reasonably foreseeable development scenario would continue to avoid sensitive habitats and could continue to fragment adjacent habitats and wildlife corridors. This could create reproductively isolated populations, which would lower genetic diversity in species with already low numbers. This would make species less fit and potentially more susceptible to disease and predation.

Effects under Alternative A

Under Alternative A, the greatest amount of acreage would be open to leasable fluid and solid minerals activities and the fewest acres would be closed. Areas open to saleable mineral materials disposal would be subject to stipulations only on a case-by-case basis, which would likely result in less wildlife resource protection. Alternative A maintains the greatest amount of acreage to locatable minerals, with only minimal closed, segregated or withdrawn areas. Approximately 60 percent of the area open to locatable minerals would be subject to requirements for special handling and additional stipulations for wildlife resource protection. Alternative A would result in the greatest impacts from minerals management because it places the fewest restrictions on areas available for mineral development and the fewest restrictions on operations that could impact special status plants, wildlife, and fish.

Effects under Alternative B

Under Alternative B, fewer acres would be open to leasable fluid and solid minerals activities, and more acres would be closed than under Alternative A. Acreage open to saleable mineral materials disposal would be similar to Alternative A, but most of the area would be subject to standard authorization lease terms, which would likely result in greater special status species resource protection than under Alternative A. Impacts from saleable minerals management would be the same as those under Alternative A.

Effects under Alternative C

Under Alternative C, the fewest acres would be maintained for locatable minerals and leasable fluid and solid minerals activities, and the greatest number of acres would be closed, segregated or withdrawn areas. Acreage open to saleable mineral materials disposal would be less than under Alternatives A and B, and most of the area would be acres open solely to permitted government agencies. This would likely result in increased resource protection from proper management and resource consideration in pursuing mineral interests. Overall, Alternative C would result in the least amount of impacts on special status plants, wildlife, and aquatic resources from minerals management. This is because Alternative C would close the most area to mineral development and would place the most restrictions to protect wildlife resources in areas available for mineral development.

Effects under Alternative D

Effects would be similar to those described under Alternative B, except more acres would be closed to mineral development and more acres of the public lands open to leasing would be subject to NSO stipulations and seasonal closures to protect resources, including special status wildlife. Alternative D would have the fewest acres open to saleable mineral materials disposal. Standard authorization terms and seasonal closures would be applied in some areas and would reduce impacts on special status wildlife and their habitats.

Special Status Species: Effects from Recreation, Visitor Outreach, and Services Management

Effects Common to All Alternatives

There are numerous special status species in the WD requiring differing habitats. Effects from recreation would impact these species either directly or indirectly throughout the majority of the district. Effects on Special Status Species would be essentially the same as those discussed in Section 4.2.9 Fish and Wildlife Effects from Recreation, Visitor Outreach, and Services Management.

Effects under Alternative A

Under Alternative A, there would be no camping limitations or prohibitions throughout the WD. As a result, dispersed recreation would occur, causing localized and short-term impacts, including those caused by increased road use in remote areas and camping. Guidelines recommended to the public could help to reduce impacts associated with dispersed recreation.

In addition, the Pine Forest SRMA would be maintained, and issuance of special recreation permits would be the least restricted.

The greatest acreage (6,789,612 acres) would be open to OHVs under Alternative A, with the least amount of land (423,786 acres) limited, and with 17,698 acres closed. Combined, these actions could disturb special status species and degrade their habitats through increased human presence, OHV use, and trail creation, which could compact soils, trample vegetation, and increase noise and dust. These effects could decrease special status species habitat value and drive special status species out of certain areas throughout the WD. Areas limited and closed to OHV use would have fewer impacts than areas open to OHV use because vehicles would be restricted to roads and trails that already have minimal habitat value.

Effects under Alternative B

In addition, designating four SRMAs would impact special status species and their habitat to varying degrees depending on the recreation market identified for the SRMA. For example, the Nightingale and Granite Range SRMAs would be targeted for undeveloped recreation-tourism and self-directed, respectively, which would have less of an impact than Winnemucca and Pine Forest SRMAs, which allow for increased motorized vehicle access. Impacts would be localized and associated with human disturbance, such as increased noise causing certain species to avoid heavily used areas.

Under Alternative B, 1,460,200 acres would be open to OHVs, with the least amount of land (17,698 acres) closed, and with 5,743,198 acres limited. Together, impacts from these actions include soil compaction, noise, trampling of vegetation, wildlife disturbance, and increased dust. These impacts could decrease plant vigor, alter stand composition, and lower habitat value of areas throughout the ERMA, SRMAs, and OHV routes. Areas limited and closed to OHV use would have fewer impacts than areas open to OHV use because vehicles would be restricted to roads and trails that already have minimal habitat value. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan were updated and site-specific NEPA analysis were completed.

Issuance of special recreation permits would be the least restricted under this alternative, which could cause some impacts on special status species and their habitats through increased human use, trampling, soil compaction, and noise disturbance.

Effects under Alternative C

Camping limitations and prohibitions throughout the ERMA would minimize impacts from dispersed recreation on special status species habitat on these lands. In addition, designating two SRMAs would have similar impacts on habitat and special status species as those described under Alternative B. However, the Winnemucca Sand Dunes RMZ would not be designated under Alternative C, so impacts on the Humboldt serican scarab beetle would not be a concern.

Under Alternative C, zero acres would be open to OHVs, with 43,521 acres closed and 7,187,575 acres limited. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan were updated and site-specific NEPA analysis was completed. As such, impacts from recreation actions would be fewest under this alternative, as it would be the most restrictive and prohibitive. Impacts would occur, however, and they would be similar in nature to Alternative B.

Issuance of special recreation permits would be the most restrictive under Alternative C and would cause the fewest impacts on special status species and their habitat through increased human use, trampling, soil compaction, and noise disturbance.

Effects under Alternative D

Camping limitations and prohibitions throughout the ERMA would minimize impacts from dispersed recreation on special status species and their habitat on these lands. In addition, designating four SRMAs would have the same impacts on special status species as Alternative B.

Under Alternative D, 288,105 acres would be open to OHVs, with 17,577 acres closed and 6,925,414 acres limited. Areas limited and closed to OHV use would have fewer impacts than areas open to OHV use because vehicles would be restricted to roads and trails that already have minimal habitat value. Open areas under Alternative D were identified to avoid important wildlife habitats that would reduce impacts from open OHV use. To minimize impacts, the BLM would limit OHV use to existing roads and trails until the Transportation Plan were updated and site-specific NEPA analysis was completed. Impacts from OHV use would be similar to those described under Alternative B.

Issuance of special recreation permits would cause some impacts on special status species and their habitat through increased human use, trampling, soil compaction, and noise disturbance.

Special Status Species: Effects from Renewable Energy Management

Effects Common to All Alternatives

Impacts on special status species habitat could occur with the issuance of renewable energy ROWs, which may require vegetation clearing, access roads, power lines, and infrastructure and would disturb or destroy vegetation and wildlife habitat in localized areas. ROWs may spread or introduce weeds, reducing habitat value. However, BMPs, stipulations, and mitigation measures would be implemented to minimize impacts on suitable habitat.

Wind turbines could impact special status species. Impacts would vary, depending on the number and type of turbines erected and the overall size of a project.

Effects under Alternative A

Implementing mitigation measures, BMPs, and SOPs for wind energy projects would reduce impacts from wind energy projects. Alternative A would be less of a benefit to special status species than Alternatives B, C, and D.

Effects under Alternative B

Under Alternative B, designating 716,528 acres of designated avoidance areas could reduce the impacts on special status species more than Alternative A, which has no avoidance area designation. Projects within an avoidance area would have required BMPs, stipulations, mitigation measures implemented to minimize impacts on suitable habitat.

Effects under Alternative C

Renewable energy developments would have the least impact on special status fish, plants, and wildlife under Alternative C due to the designation of 1,279,481 acres as exclusion zones and 869,645 acres as avoidance zones. No overhead transmission lines, ROWs, or nonrenewable energy projects would be allowed in exclusion zones. Any project within an avoidance area would have the required BMPs, stipulations, and mitigation measures implemented to minimize impacts on suitable habitat.

Effects under Alternative D

Alternative D would be less effective at protecting special status species than Alternative C. The total acreage designated as avoidance zones for renewable energy projects is 903,554 acres more under Alternative C, and the area designated as exclusion zones is 79,942 acres less than under Alternative C.

This alternative would benefit special status species more that Alternative B, but less than Alternative C and D that have designated exclusion zones. Any project within an avoidance area would have the required BMPs, stipulations, and mitigation measures implemented to minimize impacts on suitable habitat.

Special Status Species: Effects from Transportation and Access Management

Effects Common to All Alternatives

Maintaining or improving existing roads would be beneficial to special status species and their habitat because these actions would reduce erosion, runoff, and noxious weed introduction and spread. However, roads and trails can alter habitats, reduce wildlife security areas, increase road kill, and alter wildlife home ranges and migration corridors. In addition, roads near or crossing streams and other aquatic habitats could impact special status fish species through sedimentation, polluted runoff, and habitat degradation or loss. The magnitude of these impacts varies by species, habitat types, size and traffic volume of roads, and seasonal use. Vehicles can degrade wildlife habitats from surface disturbance and can displace and stress animals.

Maintaining roads necessary for fire suppression would allow access to special status species habitat and would allow for suppression of wildfires when necessary. This would help achieve suitable habitat conditions and would protect special status species from direct mortality in the long term.

Noxious weed control measures would prevent the spread of weeds into special status species habitat, would prevent competition with native species, and would help achieve suitable habitat conditions in the long term.

Effects under Alternative A

Decommissioning roads that present problems to the environment would reduce impacts on special status wildlife and habitat in select locations.

Effects under Alternative B

Under Alternative B, roads that present problems to the environment would be decommissioned only if alternative access were provided. The same condition would apply to removing, rerouting, and rehabilitating roads that adversely affect special status wildlife and habitat. Creating alternative access could result in additional impacts on resources, but Alternative B would require that roads be constructed to avoid creating fragment resource tracts. Impacts would further be reduced by temporary road closures during the wet season, which would minimize sediment and erosion impacts.

Effects under Alternative C

Effects would be similar to those described for Alternative B, but alternative access would not be a stipulation for decommissioning, removing, rerouting, or rehabilitating roads that are adversely impacting special status wildlife. Of all the alternatives, Alternative C provides the most assertive approach for minimizing and avoiding impacts on special status wildlife or habitat from transportation management.

Effects under Alternative D

Effects would be similar to those described for Alternative C, but Alternative D would be less effective than would Alternative C because it contains fewer specific actions for minimizing and avoiding impacts on special status wildlife and habitat.

Special Status Species: Effects from Lands and Realty Management

Effects Common to All Alternatives

Special status species habitats would be given consideration when the WD makes disposal and acquisition decisions. Impacts on special status species would be minimized since only lands with little resource values would be identified for disposal and further analysis through NEPA documentation would minimize potential impacts on habitat. Acquisitions would provide additional opportunities to acquire special status species and their habitats by placing them in public ownership under BLM management, thereby making them subject to the laws and regulations that would guide management of them. Effects would be long term.

ROW development cause habitat fragmentation for special status plants and small wildlife but are unlikely to cause considerable fragmentation for larger wildlife. These areas are usually localized and small, although impacts could cause a cumulative impact on the landscape scale over the long term. Further, protection for special status species would preclude ROW placement in sensitive habitat and would prevent impacts on special status species. For example, sage-grouse protection would prevent large transmission lines in sensitive areas near leks.

Designation of proposed utility corridors could initially cause large areas of habitat fragmentation but would reduce the proliferation of separate ROWs. The designation of the proposed corridors includes existing utility transportation ROWs and infrastructure.

BMPs, SOPs, IOPs and special stipulation and mitigation measures would be implemented to minimize impacts.

Effects under Alternative A

Issuance of ROWs would not be limited, and avoidance areas or exclusion zones for lands and realty management actions would not be designated under Alternative A. Special status species and their habitats could be impacted by vegetation removal, soil compaction, habitat disturbance and fragmentation, noise, noxious weed invasion, and increased dust. Identifying utility corridors as needed would require a plan amendment prolonging project development. Once a corridor was identified, they could reduce the proliferation of ROWs, decreasing habitat loss and fragmentation.

Under Alternative A, 2,989,030 acres are identified as available for disposal. Impacts would be minimized since only lands with little resource values would be disposed of after further NEPA analysis.

Effects under Alternative B

Designating 716,528 acres as avoidance may be more beneficial to special status species than under Alternative A, which has no avoidance or exclusion designations. Not designating exclusion zones could allow ROW development impacting special status species and their habitats.

Lack of restriction on ROW issuance could impact special status species and their habitats through vegetation removal, soil compaction, habitat disturbance and fragmentation, noise, and increased dust.

Effects under Alternative C

Alternative C identifies 869,645 acres as avoidance areas and 1,279,481 acres as exclusion zones. Alternative C would benefit special status species the most, reducing the potential for discretionary actions.

Restriction on ROW issuance could impact special status species and their habitat by protecting and limiting vegetation disturbance, habitat fragmentation, and noxious weed invasion or spread from project construction.

New transmission lines above 100kV would be placed in designated corridors reducing the proliferation of ROWs, therefore, reducing habitat fragmentation. The identification of new corridors would require a plan amendment possibly postponing projects.

Transferring lands to BIA or Fort McDermitt Paiute and Shoshone Tribe would result in a loss of public lands, removing protection and management of the resource from the BLM. If the lands would be transferred to the BIA some federal protection could occur.

Construction of importation and exportation projects that would not exceed the perennial yield of the source basis may fragment the habitat and would temporarily disrupt wildlife.

Restrictions on ROW issuance could impact special status species and their habitat by protecting and limiting vegetation disturbance, habitat fragmentation, and noxious weed invasion or spread from road construction.

Effects under Alternative D

Managing 1,773,199 acres as avoidance areas and 1,199,539 acres as exclusion zones would be less effective at protecting special status species than under Alternative C. The total acreage designated as avoidance zones for renewable energy projects is 903,554 more acres than under Alternative C, and the area designated as exclusion zones is 79,942 fewer acres than under Alternative C.

In addition, any adverse impacts would be reduced through development of lease stipulations and mitigation measures. ROW issuance could impact special status species and their habitat through vegetation removal, soil compaction, habitat disturbance and fragmentation, and increased dust.

New transmission lines above 100kV should be placed with in designated corridors reducing the proliferation of ROWs, therefore, reducing habitat fragmentation. The identification of new corridors would require a plan amendment possibly postponing projects.

Transferring lands to BIA or Fort McDermitt Paiute and Shoshone Tribe would result in a loss of public lands, removing protection and management of the resource from the BLM. If transferred to the BIA some federal protection could occur.

Construction of importation and exportation projects that would not exceed the perennial yield of the source basis may fragment the habitat and could temporarily disrupt wildlife.

Special Status Species: Effects from ACEC/RNA Management

Effects Common to All Alternatives

Actions within ACECs could impact special status species habitat, but mitigation measures would be developed to prevent impacts on special status species habitat within ACECs over the long term.

Effects under Alternative A

Maintaining the Osgood Mountains ACEC would protect vegetation and habitat and would prevent disturbance and fragmentation of suitable habitat for this species within the ACEC. This ACEC is small relative to the total area of the WD, so impacts would be localized.

Effects under Alternative B

Effects from ACEC/RNA management under Alternative B would be the same as those described under Alternative A.

Effects under Alternative C

Designating four ACECs within the WD would provide protection to special status species and their habitat and would prevent disturbance and fragmentation of habitat within these ACECs. The Pine Forest ACEC, in particular, was proposed to protect habitat for several wildlife species, some of which are sensitive, including American pika, Humboldt yellow-pine chipmunk, northern goshawk, sage-grouse, California bighorn sheep, pygmy rabbit, and an array of sagebrush obligate species.

Effects under Alternative D

Effects from ACEC/RNA management under Alternative D would be the same as those described under Alternative C.

Special Status Species: Effects from Backcountry Byways Management

Effects Common to All Alternatives

Backcountry byways may attract more tourism to areas they access and could increase human use and degradation of special status species habitat. They also could increase direct noise disturbance to special status species. Adverse impacts from BCBs are expected to be limited to relatively small areas.

Special Status Species: Effects from National Historic Trails Management

Effects Common to All Alternatives

Beneficial impacts on special status species and habitat would result from national historic trails management actions since habitat disturbance would be reduced in the protected zone of the trail. However, habitat improvement projects may be prevented within this zone, which would have small-scale localized impacts.

Special Status Species: Effects from Wild and Scenic Rivers Management

Effects Common to All Alternatives

There would be no effects common to all alternatives from WSR management.

Effects under Alternative A

Effects would be identical to those described for Fish and Wildlife under Alternatives A and C with the additional protections afforded to any sensitive plant species that may be found to occur within the 13,583 acres of eligible corridors.

Effects under Alternative B

There would be no impacts on special status species resulting from WSR management objectives under Alternative B.

Effects under Alternative C

Under Alternative C, the effects on special status species resulting from WSR management objectives would be the same as those described under Alternative A.

Effects under Alternative D

Effects would be identical to those described for Fish and Wildlife under Alternative D with the additional protections afforded to any sensitive plant species that may be found to occur within the 13,583 acres of eligible corridors.

Special Status Species: Effects from Wilderness Study Areas and Lands with Wilderness Characteristics Management

Effects Common to All Alternatives

Lands with Wilderness Characteristics

There would be no effects common to all alternatives from wilderness characteristics management.

Wilderness Study Areas

The WD has limited discretion regarding management of designated WSAs because they are managed under BLM Manual 6330, Management of WSAs (BLM 2012e). WSAs would provide relatively undisturbed special status species habitat in areas in the WD. However WSAs would increase the difficulty of accomplishing habitat improvement treatments due to treatment restrictions under Manual 6330 such as mechanical treatments.

Effects under Alternative A

Alternative A would be the least restrictive of activities on lands outside of WSAs with wilderness characteristics. This could degrade special status species habitat by increased noise, trampling, disturbance, and soil compaction. Lands with wilderness characteristics are small, relative to the total area of land in the WD, so impacts would be localized and would require additional site specific analysis prior to implementation. WSA protections would also prevent disturbances of special status species and their habitats and also would prevent certain lands from being treated effectively to improve habitat value. WSAs are defined and distinct within the WD, so impacts would be localized.

Effects under Alternative B

Under Alternative B, the BLM would manage eight areas containing wilderness characteristics to meet multiple use and sustained yield objectives. This would protect special status species habitat but could allow some impacts from allowing multiple uses.

Effects under Alternative C

Under Alternative C, as under Alternative B, the BLM would manage eight areas containing wilderness characteristics. This alternative would impose restrictions and stipulations in these areas, including closure to mineral leasing and ROW exclusion zones, which would benefit special status species resources.

Effects under Alternative D

Under Alternative D, the BLM also would manage eight areas containing wilderness characteristics. Depending on the restrictions implemented, some impacts on special status species habitat could occur. However, these same restrictions would protect special status species habitat in the long term.

Special Status Species: Effects from Watchable Wildlife Viewing Sites Management

Effects Common to All Alternatives

WWV sites are unlikely to impact special status species or their habitats because WWV sites and special status species are highly localized and the total impacted area would be small, relative to the overall size of the WD.

Special Status Species: Effects from Public Health and Safety Management

Effects Common to All Alternatives

Closure of dangerous, accessible mine shafts and adits could impact special status bat species if they were to occupy these areas. To minimize potential impacts on bat species, the shafts and adits would be closed in consultation with NDOW and properly constructed bat gates would be used to close adits that are important bat habitat.

Special Status Species: Effects from Sustainable Development Management

Effects Common to All Alternatives

Sustainable development management actions apply to areas that have already been developed and likely have little habitat value for special status species. Because sustainable development management actions would involve facility reuse, new operations would not create new disturbance. As a result, there would be few impacts on special status species from sustainable development management actions.

Effects under Alternative A

Impacts on special status species would not be likely to occur under Alternative A.

Effects under Alternative B

Reuse of sites could have detrimental impacts on special status species, but the effects would vary depending on the type of reuse and management of the use. Provisions to protect natural resources, including important habitats, would minimize potential impacts from sustainable development.

Effects under Alternative C

Impacts would be similar to those described under Alternative B, except Alternative C stresses no net loss of public lands. This would provide more protection to special status species and their habitat in the long term.

Effects under Alternative D

Impacts would be similar to those described under Alternative B, except Alternative D details criteria for reuse, which would focus sustainable development only in the most suitable areas.

Special Status Species: Cumulative Effects

Past and Present Actions

Special status species and fish and wildlife have habitat in common within the planning area; therefore, the discussion for past and present actions would be the same as that in Fish and Wildlife: Cumulative Effects, Past and Present Actions.

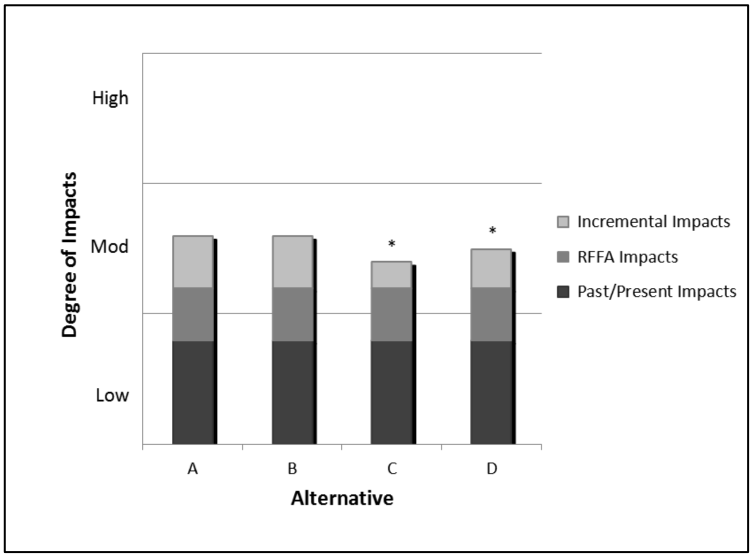
Reasonably Foreseeable Actions

Future management actions that would affect special status species are the same as those discussed in Cumulative Effects-Fish and Wildlife, RFFAs. Because special consideration is given to the management of special status species, some of the priority habitats and management actions are specific to these species in order to reduce impacts on them and their habitat. Construction of fuel breaks with emphasis at a landscape scale would reduce fire spread potential, thereby reducing the size of burned areas containing sensitive species habitat. Continued management of WHB at AML would stabilize impacts on habitat.

Incremental Cumulative Impact – Combined Past, Present, Reasonably Foreseeable Actions – All Alternatives

Incremental cumulative impacts on special status species would be nearly the same as those discussed in Cumulative Effects –Fish and wildlife, Incremental Cumulative Impacts but to a greater extent where these species are within priority habitat areas or when management actions, specifically developed for the protection of special status species, apply (Figure 4-7). In these instances, beneficial impacts would be greater.

Figure 4-7. Cumulative Impacts on Special Status Species Habitat by Alternative



*Degree of Disturbance Assumptions: Proposed management of priority wildlife habitat, priority watersheds, special status species, and ACECs would include use restrictions that would limit disturbance of special status species habitat. Alternative C proposes more areas with use restrictions. Note: degree of impacts are qualitative in nature.

4.2.11 Wild Horses and Burros

Summary

The Wild and Free-Roaming Horses and Burros Act of 1971 and BLM policy state that wild horse and burro (WHB) populations will be managed as populations of healthy animals in balance with other uses and the productive capacity of their habitat. The goal is to protect, manage, and control healthy WHB populations within established herd management areas (HMAs) at appropriate management levels (AMLs) in a manner designed to achieve and maintain a thriving natural ecological balance and multiple-use relationship on public lands. Healthy WHB populations in the HMAs depend on three main components: (1) Maintenance of herd numbers sufficient to provide for genetic diversity (2) Establishing and maintaining AML commensurate with the production and sustainability of the range resources to provide necessary water and forage and (3) limited disturbance from people, vehicles, and industrial activity.

Each alternative has a different emphasis, which is expected to result in different management actions for resource development, with varying impacts on WHB populations and habitat resources. Alternative A represents current management under guidance of the 1982 Sonoma-Gerlach and Paradise-Denio Management Framework Plans and the amendments of 1999. Alternative A also represents current management actions based on BLM policy and guidance.

Alternative B generally prioritizes development of resources for economic return while relying on mitigation to reduce, rather than prevent, adverse impacts. Alternative B would likely have greater impacts on WHB than would Alternative C and Alternative D.

Alternative C is the most protective of natural resources because it involves the least new development, excludes potentially impacting uses, and prioritizes protection and restoration of resources when conflicts among uses occur. Option 1 emphasizes protection of wildlife habitat over WHB and allows for minimal development of WHB habitat.

Alternative D represents a compromise between preservation and development. It attempts to balance appropriate multiple uses and manages for a healthy environment. It allows the greatest flexibility of potential management tools.

Methods and Assumptions

This analysis is based on the following methods and assumptions being generally beneficial to wild horses and burros.

A thriving natural ecological balance exists when the cumulative effect of approved multiple uses in an HMA do not cause unacceptable impacts on or deterioration of the rangeland resources. Balance among multiple uses exists when approved uses are compatible and no one use threatens or impairs the viability and sustainability of another use. The following conditions all contribute to the health and wellbeing of wild horses and burros:

- Maintaining healthy native plant communities, particularly grasses;
- Increasing forage opportunities;
- Reducing competition from domestic livestock;
- Preventing wild and domestic horses and burros from mixing;
- Improving range conditions;
- Maintaining or improving water sources;
- Eliminating barriers to movement; and

Managing and adjusting herd numbers based on monitoring grazing use, trends in rangeland conditions, climatic conditions, actual use, and rangeland carrying capacity, in balance with other uses, is beneficial to wild horses and burros. These actions prevent overpopulation, which could lead to overgrazing and rangeland deterioration, which in turn could lead to impaired herd health.

The section identifying effects common to all resources delineates the management activities that promote, aid, enhance wild horses and burros. Management of the following would have little to no effect on wild horses and burros: air quality, geology, cultural resources, tribal consultation, paleontological resources, visual resources, cave and karst resources, areas of critical environmental concern, and public safety.

Wild Horses and Burros: Effects from Air Quality Management

Effects Common to All Alternatives

Air quality has limited direct and indirect effects on wild horses and burros. The scope of these effects would be limited to dust, smoke or other air pollution and the impacts of these on the health of the wild horses and burros. Since all the Alternatives are designed to meet air quality standards, the impacts on wild horses and burros is expected to be minimal from bureau authorized activities.

Wild Horses and Burros: Effects from Geology Management

Effects Common to All Alternatives

Protection of geologic features would not pertain to wild horses and burros and would not impact the grazing of these areas by wild horses and burros under any of the alternatives.

Proposed discretionary and non-discretionary actions in areas with unique geologic features may impact wild horses if they are located within an HMA. Impacts would be disclosed during the implementation level NEPA and would have appropriate mitigation measures applied as needed.

Rock-hounding and casual observations of geological structures or collecting geologic materials are not expected to have any direct or indirect effects on wild horses and burros.

Effects under Alternative A

Under Alternative A there would be no restriction of OHVs in areas with unique geologic features including those within HMAs, Therefore, Alternative A would likely impact wild horses and burros the most by not imposing any restrictions OHV riders in these areas, as there may be a temptation to harass them.

Effects under Alternatives B

The limiting of OHVs to existing roads and trails within HMAs, such as the Columnar Basalt in the Lava Beds would likely have a positive impact on wild horses and burros. Alternatives B would offer wild horses and burros more protection from the temptation of harassment from OHV riders than Alternative A, but less than Alternative C which would totally exclude OHVs.

Individual Effects under Alternative C

The closure of areas to OHVs in proposed exclusion zones within HMAs, such as the Columnar Basalt in the Lava Beds, may have a positive impact on wild horses and burros as it would limit the opportunity for wild horses and burros to be harassed in these areas by riders on OHVs.

Individual Effects under Alternative D

Effects under Alternative D would be similar to those described under Alternative A.

Wild Horses and Burros: Effects from Soil Resources Management

Effects Common to All Alternatives

Implementing management actions to improve or protect soils and maintain existing vegetation cover would also serve to improve range conditions for WHB.

In the long term, reclamation of surface disturbance, soil resource management and application of BMPs would generally result in enhanced vegetative conditions through actions designed to reduce erosion, which would indirectly increase forage as the Standards for Rangeland Health are attained.

In addition to the impacts identified under Effects Common to All Alternatives, the following individual effects would impact WHB.

Effects under Alternative A

Under Alternative A, there are approximately 275,764 acres that occur within HMAs that have high potential for biological crust occurrence. Any Bureau authorized actions would be mitigated as opposed to implementing seasonal restrictions which would result in a higher chance of human disturbance to WHB on a year round basis.

Effects under Alternative B

Choosing not to use soil amendments under Alternative B in reclamation of surface disturbance within HMAs may increase the time necessary to restore the habitat which may allow for cheatgrass to invade the area therefore limiting the forage and habitat quality for WHB.

Alternative B would be the least beneficial to WHB. There are approximately 259,758 acres that occur within HMAs that have high potential for biological crust occurrence. Any Bureau authorized actions would be mitigated as opposed to implementing seasonal restrictions which would result in a higher chance of human disturbance to WHB on a year round basis.

Effects under Alternative C

Under Alternative C natural or organic soil amendments would be allowed in reclamation of surface disturbance within HMAs and would likely result in an increase in vegetation, therefore increasing the forage base for WHB.

Alternative C is the most restrictive in managing biological crusts by reducing and/or eliminating activities that would impact or damage biological crusts when crusts are dry and more susceptible.

Seasonally eliminating surface disturbance within high potential biological crust areas would benefit wild horses as 271,176 acres with high potential for biological crusts occur within HMAs under Alternative C. Implementing seasonal restrictions would decrease the chance of WHB interactions with humans during the winter and spring months.

Effects under Alternative D

Soil amendments would be allowed in reclamation of surface disturbance within HMAs and would likely result in an increase in vegetation, therefore increasing the forage base for WHB.

Seasonally eliminating surface disturbance, within high potential biological crust areas, on a case-by-case basis would benefit wild horses as 259,758 acres with high potential for biological crusts occur within HMAs under Alternative D. It would limit human interaction with WHB during seasonal closures. Alternative D is a little less restrictive than Alternative C as it proposes elimination on a case-by-case basis and has a lower amount of acreage with high potential for biological crusts that would require seasonal restrictions.

Wild Horses and Burros: Effects from Water Resources Management

Effects Common to All Alternatives

WHB populations would be directly affected by the need to adjust or modify current AML to achieve Sierra Front-Northwestern Great Basin RAC Standards and Guidelines for Rangeland Health under all of the alternatives. Acquisition and development of new sources and protection of watersheds and existing sources, quantity, quality, and access would generally directly benefit wild horses and burros. More dispersed water sources would prevent WHB from concentrating around current water sources and would allow for changes in utilization patterns, which may result in an increase in available forage.

Managing the wellhead protection zones as exclusion areas would have little impact on wild horses and burros. The only town that is in close proximity to an HMA is Empire, Nevada which is immediately adjacent to the Fox and Lake HMA but there are no wellhead protection zones located within the HMA. Management of wellhead protection zones would limit uses and disturbance in the areas and would help maintain rangeland conditions for WHB.

Approximately 11,822 acres of HMAs lie within designated municipal water supply areas under Alternatives A, B, C and D. WHB generally do not conflict with groundwater supplies; therefore, it would not be impacted by any of the municipal water supply actions identified under any of the alternatives.

In addition to the impacts identified under Effects Common to Alternatives A, B, C and D, the following effects would impact WHB.

Effects under Alternative A

See Effects Common to All Alternatives above.

Effects under Alternative B

Specifying long-term sustainable water and promoting commercial development with unrestricted water importation and exportation under Alternative B would be least beneficial to wild horses and burros if the exported water came from a critical water source for the herd.

Effects under Alternative C

Under Alternative C, requiring full mitigation, providing long-term sustainable water, acquiring water rights, and managing the watershed to benefit the resources would be beneficial to wild horses and burros if it occurs in areas within HMAs.

Effects under Alternative D

Providing long-term sustainable water and acquiring water rights would directly benefit wild horses and burros. Alternative D would be beneficial for wild horses and burros because it proposes to use more avenues for water rights acquisitions than the other alternatives would. It would use the state permitting process, land acquisitions, and other realty actions to acquire minimum pool, instream flows or to gain access to water sources and developments for other resources.

Wild Horses and Burros: Effects from Vegetation—Forest and Woodland Products Management

Effects Common to Alternatives A, B and D

Stand health treatments would improve the ecological condition of vegetation in forested areas, thereby increasing forage available for grazing.

Using an array of treatments would allow for greater success in achieving stand health and allowing the landscape an opportunity to improve and maintain resilience within HMAs. Chemicals would be used according to label directions and therefore should result in little impacts on WHB.

If fencing occurs within an HMA it may have the potential to impact the free-roaming behavior of WHB. Fencing would be considered on a site specific basis and mitigation measures would be applied as necessary.

Allowing for commercial harvest of pinyon nuts, firewood and posts and Christmas tree harvesting on the Stillwater range may impact wild horses in the North Stillwater HMA by temporarily displacing them, during November and December. This impact is considered minimal since the harvesting is seasonal and limited to non-commercial harvesting.

Effects under Alternative A

See Effects Common to All Alternatives above.

Effects under Alternative B

See Effects Common to All Alternatives above.

Effects under Alternative C

Alternative C, specifying no harvest and no prescribed fire would indirectly be less beneficial to WHB by providing fewer opportunities for improvement to stand health. Since there would be no prescribed burning under Alternative C, there would be no impacts on WHB from smoke, ash or dust that is normally associated with fire.

Since Christmas tree harvesting on the Stillwaters would not be permitted under Alternative C, there would be no impact to the wild horses in the Stillwater HMA from this action.

Designation of 27,605 acres as an old growth forests would not have any impacts on WHB as the area nominated for designation is not located within an HMA.

Effects under Alternative D

Designation of 27,605 acres as an old growth forests would not have any impacts on WHB as the area nominated for designation is not located within an HMA.

Wild Horses and Burros: Effects from Vegetation—Invasive and Noxious Species Management

Effects Common to All Alternatives

Encroachment of weeds into HMAs reduces the availability of preferred forage for WHB. Actions to prevent and control invasive and noxious weeds using integrated weed management techniques could directly affect WHB grazing in the short term if WHB are excluded in the treatment areas until revegetation has taken place. Control, reduction and eradication of noxious weeds would provide the native plant community an opportunity to improve and maintain resilience. WHB would benefit from healthy plant communities as they are more diverse and productive, and would provide more forage and sustainability. In addition to the impacts identified under Effects Common to All Alternatives, the following individual effects would impact WHB.

Effects under Alternative A

See Effects Common to All Alternatives above.

Effects under Alternative B

Alternative B, which specifies cooperating with other entities, developing new programs, and promoting public education in weed control, would promote healthy plant communities that would be more beneficial to wild horses and burros in the long term.

Using an array of treatments would allow for greater success in treating invasive species and allowing the native plant community an opportunity to improve and maintain resilience within HMAs. Chemicals would be used according to label directions and therefore should result in little impacts on WHB. Prescribed burning could have an effect on the air quality within the HMA due to the smoke, ash and dust associated with the burn.

Effects under Alternative C

Alternative C does not allow for chemical or prescribed burning, just mechanical, cultural, and biological. Since there would be no prescribed burning under Alternative C, there would be no impacts on WHB from smoke, ash or dust that is normally associated with fire.

Eliminating chemicals to control noxious weeds could result in a greater rate of weed spread, as most alternate controls are not as effective or rapid enough to control the spread of weeds. Vegetation sites converted to noxious weeds in HMAs would be lost to grazing for WHB and may result in a lower AML.

Effects under Alternative D

Alternative D, which specifies cooperating with other entities, developing new programs, and promoting public education in weed control, would promote healthy plant communities that would be more beneficial to wild horses and burros in the long term.

Integrated weed management would allow more treatment options to effectively control weeds. Using an array of treatments would allow for greater success in treating invasive species and allowing the native plant community an opportunity to improve and maintain resilience within HMAs and available forage for WHB would be maintained or increased. Chemicals would be used according to label directions and therefore should result in little impacts on WHB. Prescribed burning could have an effect on the air quality within the HMA due to the smoke, ash and dust associated with the burn.

Wild Horses and Burros: Effects from Chemical and Biological Control

Effects Common to Alternatives B, C and D

Implementing chemical and biological control methods under all alternatives to control pests could indirectly impact WHB by improving the rangeland health environment within HMAs. For example, reducing the populations of Mormon Crickets would reduce the amount of degradation to the vegetative resource available for grazing. Actions to prevent and control pests using pesticides and biological techniques could directly affect WHB in the short term if livestock, including WHB, are excluded in the treatment areas until revegetation has taken place. Foraging opportunities for WHB would improve over the long term as the ecological condition of vegetation in HMAs improves following restoration.

Chemicals and methods of application would be evaluated prior to implementation, (with BMPs, SOPs and mitigation measures applied) to ensure there are no adverse impacts on WHB.

In addition to the impacts identified under Effects Common to Alternatives A, B, C (Option 1) and D, the following individual effects would impact WHB.

Effects under Alternative A

Eliminating the use of chemicals to control pests may result in a greater rate of infestation, as most alternate controls are not as effective or rapid enough to control the spread. Vegetation, in HMAs, exposed to uncontrolled infestations could be lost to WHB grazing which could result in a change in the AML.

Effects under Alternative B

Impacts would be the same as under Common to B, C, and D

Effects under Alternative C

By focusing on biological controls first, the impacts of Alternative C would be the same as the impacts disclosed under Alternative A.

Effects under Alternative D

Impacts would be the same as under Common to B, C, and D.

Wild Horses and Burros: Effects from Vegetation—Rangeland Management

Effects Common to Alternatives A, B, C (Option 1) and D

Healthy, productive, diverse, and resilient plant communities throughout their range would provide good forage opportunities for wild horses and burros. Healthier rangelands would also result in healthier watersheds, both of which would be beneficial to wild horses and burros by increasing forage and water availability. Seeding native or introduced plants may be beneficial to WHB foraging.

Depending on the size and type of rehabilitation treatment conducted, WHB may be excluded from a portion of the HMA or be removed from the HMA, until revegetation has taken place. Resting areas from grazing after fires would allow seeded forage plants to become well established without the stress from over-trampling and grazing by WHB. Fencing of the areas during a rehab closure, where WHB are not removed from the HMA, could interfere with the free roaming nature of WHB. These are considered to be short term impacts on WHB.

The shortest minimum rest time under the alternatives is two years, and the longest minimum rest time is five years. In the long term, resting treated areas would enhance vegetation by allowing seedlings to establish, resulting in a sustained forage base.

In addition to the impacts identified under Effects Common to Alternatives A, B, C (Option 1) and D, the following individual effects would impact WHB.

Effects under Alternative A

Impacts would be the same as identified under Effects Common to Alternatives A, B, C (Option 1), and D, except that they would be limited to at least two years or until monitoring objectives established in the Emergency Stabilization or Burned Area Rehabilitation Plans are achieved or until rehabilitation efforts are determined to be failures.

Effects under Alternative B

Impacts are the same as those under Effects Common to Alternatives A, B, C (Option 1), and D, except that livestock would be allowed to graze cheatgrass during April to control it for two years, before full livestock/WHB numbers return. This alternative does not provide the same opportunity for WHB as they cannot be used prescriptively due to their wild and free roaming nature.

Maintaining and restoring crested wheatgrass, fenced seedings could benefit WHB on allotments containing HMAs, as the livestock could potentially spend more time in the fenced seedings than in the areas that are used by WHB thereby reducing conflicts with livestock and allowing for more forage for WHB.

Effects under Alternative C

Option 1

Impacts are the same as under Effects Common to Alternatives A, B, C (Option 1), and D, except that they would be for a minimum of five years.

Crested wheatgrass seedings would be allowed to convert back to native plant communities, which could reduce the amount of AUMs available for livestock consumption. This would have an indirect impact on WHB on allotments containing HMAs as there may be less forage available for livestock and therefore the AML for WHB may also have to be adjusted.

Option 2

Under option 2, no livestock grazing would be beneficial to wild horses and burros by reducing competition with livestock allowing for more forage to be available for WHB and the AML would likely have to be adjusted.

Effects under Alternative D

Impacts are the same as under Effects Common to Alternatives A, B, C (Option 1), and D, except that they would depend on various factors such as whether or not emergency stabilization and rehabilitation plan objectives are achieved, waiting until previously vegetated areas have regained vigor, or determining that rehabilitation efforts are a failure.

Monitoring range conditions for ES&R, could lead to managing for reductions in the number of WHB numbers, which could be beneficial in that the range could better accommodate the remaining animals.

Maintaining and restoring crested wheatgrass, fenced seedings could benefit WHB on allotments containing HMAs, as the livestock could potentially spend more time in the fenced seedings than in the areas that are used by WHB thereby reducing conflicts with livestock and allowing for more forage for WHB in areas outside of these seedings.

Wild Horses and Burros: Effects from Vegetation—Riparian and Wetlands Management

In general, preservation, reclamation, and improvement of wetland and riparian areas and meadows would be beneficial to wild horses and burros by providing the potential for additional forage areas and preservation of potential water sources. However, projects intended to protect, preserve, and/or restore wetland riparian areas by the use of fences would reduce forage areas.

Effects Common to Alternatives A, B, C (Option 1), and D

WHB populations would be directly affected by the need to adjust or modify current AML to achieve Sierra Front-Northwestern Great Basin RAC Standards and Guidelines for Rangeland Health under all of the alternatives. Preservation, reclamation, and improvement of wetland and riparian areas and meadows would be beneficial to wild horses and burros by providing the potential for additional forage areas and preservation of potential water sources.

WHB that congregate in riparian areas can affect proper functioning condition by increasing erosion and adding turbidity to water sources and increase fecal coliform and nitrate levels. Protecting riparian areas (bank trampling limitations or temporary exclosures) from grazing animals could allow riparian habitat to maintain or improve and indirectly provide cleaner and more dependable water sources for WHB.

Wetland riparian areas and meadow habitats are also examples of key management areas for developing stocking levels (used to establish AMLs) during implementation level planning. BLM Technical Reference 4400-7, on page 54 "Desired Stocking Level," states, "The calculation of a desired stocking level also depends on the identification of a key management area. A key management area is an area of land that influences or limits the use of the land surrounding it." Examples of key management areas could be riparian, wetland or meadow areas surrounded by uplands. Maintaining proper use on the meadow could cause low use on the uplands. A key management area is the key area that overrides the indicators of the other key areas within the management unit. Management actions are based on the key management areas

In the meadow and upland example, the meadow and upland may each have a key area. Since the meadow is the key management area, if use exceeds the limits on the meadow but not on the uplands, the stocking level and consequently the AML for WHB could be reduced to meet the riparian objectives. If a riparian area is healthy the correlation is that the uplands are usually healthy.

In addition to the impacts identified under Effects Common to Alternatives A, B, C (Option 1), and D, the following individual effects would impact livestock grazing.

Effects under Alternative A

Riparian and wetland restoration has the potential to directly impact the wild and free roaming nature of WHB by requiring exclosures to be constructed or AMLs to be reduced.

Off-site water developments could be proposed as a mitigation measure to provide water for or to keep WHB from spending as much time at the springs and creeks for the purpose of watering

Effects under Alternative B

Impacts would be the same as those described under Alternative A.

Effects under Alternative C

Option 1

Under this alternative, there would be no fence construction to protect the riparian areas from hot season livestock grazing. Protection of the riparian areas would occur by reducing livestock seasons of use, altering AUMs, and closing areas to livestock grazing. Using natural processes instead of structural projects would ensure that the wild and free roaming nature of WHB is maintained. Reducing the season of use by livestock and closing areas to livestock grazing in the areas within HMAs would be beneficial to WHB as it would reduce the competition for forage and water between the two classes of livestock in the short term. Long term impacts would be the same as those identified under common to all alternatives.

Option 2

Removing livestock as specified in Alternative C, Option 2, would be beneficial to wild horses and burros by reducing competition for available forage and water and improving range conditions and water availability.

Effects under Alternative D

BLM would look at using natural processes to improve riparian health, as described under Alternative C, Option 1 as the primary way to protect riparian health. The secondary means would be using structural improvements therefore impacts would be the same as under Alternative A. Therefore, this alternative would be more beneficial to WHB than Alternatives A and B but less beneficial to WHB than Alternative C, Option 1 and 2.

Wild Horses and Burros: Effects from Fish and Wildlife Management

WHB populations would be directly affected by the need to adjust or modify current AML to achieve Sierra Front-Northwestern Great Basin RAC Standards and Guidelines for Rangeland Health under all of the alternatives.

Healthy, productive, diverse, and resilient plant communities throughout their range would provide good forage opportunities for wild horses and burros. Preservation, reclamation, and improvement of wetland and riparian areas and meadows would be beneficial to wild horses and burros by providing the potential for additional forage areas and preservation of potential water sources.

All alternatives include fencing of some sort, whether it is at spring sources or around areas that have had restoration work completed on them. Fencing can impair the wild and free roaming nature of WHB and should be used on a case by case basis.

Removal of access routes that are affecting aquatic resource or riparian values would be beneficial to WHB. The water quality and habitat would be given a chance to improve and if the roads are removed instead of re-routed, the potential for human and WHB would be reduced.

Guzzlers are beneficial to wild horses and burros as they provide an alternate source of water for wildlife to drink, therefore decreasing the potential for competition for water from springs and creek or waters developed for livestock and WHB use.

Allowing for introduction of wildlife species may increase hunting through additional permits or additional game species and could increase the amount of time that herds are disturbed by hunters.

Wildlife species have the potential to compete with WHB for forage, water, and cover when they occupy the same area. Big game species such as elk and deer compete for similar forage as cattle, sheep, and horses. All alternatives entertain the introduction of bighorn sheep. The impacts on WHB would be competition mainly be during the winter months, when WHB and bighorn sheep may occupy the same habitat.

In addition to the impacts identified under Effects Common to Alternatives A, B, C and D, the following individual effects would impact WHB.

Effects under Alternative A

No Priority Habitats would be designated under Alternative A. The implications from this lack of designation would be the potential for development of ROWs and communication sites within HMAs that would increase the potential for conflict between humans and WHB.

Introducing wildlife in potential habitats could indirectly impact WHB by increasing disturbance from recreational activities such as hunting and wildlife viewing. In order to achieve stream bank alteration percentages under Alternative A, implementation measures such as season of use, exclusion, reducing livestock numbers and rotational grazing practices could be applied. This would be beneficial to WHB in two ways, first it would improve the existing riparian habitat and provide a more constant source of water and second, it would decrease the competition between WHB and livestock during certain times of the year and most importantly during the summer months.

Under Alternative A, BLM would coordinate with NDOW to establish pioneering elk populations in potential habitat. Elk and horse diets overlap, but they may use the forage at different times of the year. Elk and WHB could compete for forage, water, and cover if these needs are in short supply.

Alternative A would protect and improve wildlife habitat by initiating land treatments by any means available to BLM (including the use of chemicals). Vegetation treatment areas would be rested, which would result in short-term limited WHB management impacts such as potential temporary decreases in AML and exclusion from the treated area. In the long term, resting treated areas would enhance vegetation by allowing seedlings to establish, perennial plants to recover, and a sustained forage base to develop.

Protection of shorebird habitat would occur without precluding multiple uses; therefore, no impacts on WHB grazing would occur. Under this alternative, Gridley Lake would not be fenced and the wild, free roaming nature of the burros on the McGee Mountain HMA would not be impaired.

Nesting bird surveys would be conducted prior to any surface disturbing activities during the peak migratory bird breeding season. This alternative would be the more beneficial to WHB than Alternative B, as there would be seasonal restrictions for surface disturbance if no nesting bird surveys are conducted. Enforcement of seasonal restrictions would afford WHB less chance of interactions with humans.

Allowing for the development of guzzlers throughout HMAs would be beneficial to WHB as wildlife would then have more sources of water that are developed specifically for them and therefore they would be less dependent on the natural waters that the WHB use decreasing the potential for competition of a limited resource. There would be no mitigation measures (buffers) to protect wildlife waters in HMAs under Alternative A, and this is less beneficial for WHB than Alternative B and D.

Fencing out WHB from reservoirs that support fisheries would directly impact WHB by reducing the amount of water available to them if the reservoirs are located within an HMA. This impact could be mitigated by piping water off-site for WHB use.

New irrigation reservoirs on public land would have a minimum pool requirement under Alternative A. This would be the beneficial for WHB as there would be the assurance that water is maintained at the source for WHB consumption.

Providing additional water sources for wildlife under Alternative A could directly impact WHB by reducing competition for water and making available additional water sources. Fencing of the spring may have a short term impact on WHB until they get used to the fence and find the new water source outside of the riparian area.

Effects under Alternative B

Alternative B would be the more beneficial to WHB regarding the designation of priority wildlife habitat than Alternative A, but less than Alternatives C and D. Under this alternative no designations would be made for Priority 1 and 716, 528 acres would be designated as Priority 2 habitat. Of the 716,528 acres designated as Priority 2, 286,373 acres are within HMAs.

Priority 2 areas for wildlife within HMAs would reduce the potential for development within these areas, therefore reducing the probability of structures being constructed that may impair the wild free-roaming nature of the WHB and decreasing disturbance of WHB by human activity.

Introducing wildlife under this alternative would not interfere with other multiple uses; therefore, WHB would not be greatly affected by this action. Eliminating pioneering elk populations under Alternative B would be beneficial to wild horses and burros by eliminating competition for forage, cover, and water between elk and WHB.

Alternative B would protect and improve wildlife habitat by initiating land treatments by any means available to BLM (including the use of chemicals). Vegetation treatment areas would be allowed to rest, which would result in short-term limited WHB management impacts such as potential temporary decreases in AML and exclusion from the treated area. In the long term, resting treated areas would enhance vegetation by allowing seedlings to establish, perennial plants to recover, and a sustained forage base to develop.

Shorebird habitat would be protected under Alternative B without precluding multiple uses, including WHB grazing. No impacts on WHB would occur from this alternative at the RMP level. Burros on the McGee Mountain HMA would benefit from habitat improvement on Gridley Lake.

Surface disturbance would be allowed during the peak migratory bird breeding season, with mitigation to avoid active nests. This alternative would be the least beneficial to WHB as there would be no seasonal restrictions for surface disturbance within an HMA.

Allowing for the development of guzzlers throughout HMAs would be beneficial to WHB as wildlife would then have more sources of water that are developed specifically for them and therefore they would be less dependent on the natural waters that the WHB use decreasing the potential for competition of a limited resource. Removal of guzzlers would have the opposite effect on WHB and wildlife. Development of mitigation measures (i.e. no disturbance within .25 mile) to protect wildlife waters on a case by case basis may also provide and additional benefit to the habitat associated with the waters and indirectly WHB.

Reservoirs that support fisheries would not be required to be fenced therefore the direct impact to WHB would be a greater amount of water available for WHB and support of their wild and free roaming nature.

New irrigation reservoirs on public land would not have a minimum pool requirement under Alternative B. This would be the least beneficial of the alternatives for WHB as there would be no assurance that water is maintained at the source for WHB consumption.

Alternative B would implement a 20 percent bank alteration limit for streams, banks and shorelines not making significant progress towards meeting PFC. In order to achieve stream bank alteration percentages of 20 percent or less of linear bank length on fishery streams, spring brooks, and lentic fishery resources and on those with sensitive channel types under Alternative B, implementation measures such as season of use, exclusion, reducing livestock numbers and rotational grazing practices could be applied. This would be beneficial to WHB in two ways, first it would improve the existing riparian habitat and provide a more constant source of water; and second, it would decrease the competition between WHB and livestock during certain times of the year and most importantly during the summer months.

Providing additional water sources for livestock and wild horses and burros under Alternative B would impact WHB the same as under Alternative A. Developing spring sources that may be fenced on a case-by-case basis under Alternative B would directly impact WHB by providing and maintaining a more permanent water source for WHB herds.

Effects under Alternative C

Alternative C would be more beneficial to WHB regarding the designation of priority wildlife habitat than Alternative A, B or D. Under this alternative 1,279,481 acres would be designated as Priority 1 and 869,645 acres would be designated as Priority 2 habitat. Of the 1,279,481 acres designated as Priority 1and the 869,645 acres Priority 2, 486,077 and 324,866 acres respectively are within HMAs.

Salable mineral material, fluid and solid mineral leasing, and ROW actions would not be permitted in Priority 1 habitats therefore protecting and enhancing habitat for wild horses and burros. Priority 2 areas for wildlife within HMAs would reduce the potential for development within these areas, therefore reducing the probability of structures being constructed that may impair the wild free-roaming nature of the WHB and decreasing disturbance of WHB by human activity.

Introducing wildlife in potential habitats could indirectly impact WHB by increasing disturbance from recreational activities such as hunting and wildlife viewing. Under Alternative C, BLM would coordinate with NDOW to establish pioneering elk populations, the impacts on WHB would be the same as those described under Alternative A.

Alternative C would protect and improve wildlife habitat by initiating land treatments without the use of chemicals, which might not be as successful in reducing invasive species. Vegetation treatment areas would be afforded rest, which would result in short-term limited indirect WHB impacts such as decreases in AML or temporary fencing to exclude WHB from the treated area. In the long term, resting treated areas would enhance vegetation by allowing seedlings to establish, perennial plants to recover, and a sustained forage base to develop.

Implementation of use restrictions for livestock grazing and natural rehabilitation measures to improve shorebird habitat would be beneficial to WHB. It would reduce the competition between the WHB and livestock and it would allow for an improved habitat that would allow the vegetation to recover and provide a sustained forage base. Fencing of the public portions of Gridley Lake to manage it strictly for shorebirds, would impact the burros that reside on the McGee Mountain HMA by interfering with their wild and free roaming behavior and it may restrict their access to water which is limited in quantity.

Surface disturbance would not be allowed during the peak migratory bird breeding season. This alternative would be the most beneficial to WHB as there would be no surface disturbance authorized within an HMA during the migratory bird breeding season from March 1 to August 31 (as determined by species).

Not providing artificial water sources for wildlife under Alternative C, would directly impact WHB during droughts by increasing competition between wildlife and WHB. Requiring removal of artificial water sources that were constructed for wildlife is less beneficial than the other alternatives since the wildlife and WHB would be competing for water on a continual basis.

Fencing out WHB from reservoirs that support fisheries would directly impact WHB by reducing the amount of water available to them if the reservoirs are located within an HMA. This impact could be mitigated by piping water off-site for WHB use.

New irrigation reservoirs on public land would have a minimum pool requirement under Alternative C. This would be the beneficial for WHB as there would be the assurance that water is maintained at the source for WHB consumption.

In order to achieve stream bank alteration percentages of 10 percent or less of linear bank length on fishery streams, spring brooks, and lentic fishery resources and five percent or less on those with sensitive channel types, implementation measures such as season of use, exclusion, reducing livestock numbers, and rotational grazing practices could be applied. The aforementioned goals would limit the amount of time cattle could spend in the riparian area. This would be beneficial to WHB in two ways, first it would improve the existing riparian habitat and provide a more constant source of water; and second, it would decrease the competition between WHB and livestock during certain times of the year and most importantly during the summer months.

Springs would not be developed and fenced under Alternative C for use by WHB and livestock. In order to protect springs, increased livestock management such as a change in season of use would be applied. Limiting the amount of water available for WHB would not be beneficial for them. Changing the season of use or reducing AUMs for livestock grazing would be a beneficial impact to WHB as it would reduce the amount of time and/or season of competition among the two species.

Effects under Alternative D

Alternative D would be more beneficial to WHB regarding the designation of priority wildlife habitat than Alternative A, B or C. Under this alternative 1,199,539 acres would be designated as priority wildlife habitat. Of the 1,199,539 acres designated as priority wildlife habitat, 287,236 acres are within HMAs.

Discretionary bureau actions would not be permitted in Priority Wildlife Habitats / Exclusion areas therefore protecting and enhancing habitat for wild horses and burros. Avoidance areas for wildlife within HMAs would reduce the potential for development within these areas, therefore reducing the probability of structures being constructed that may impair the wild free-roaming nature of the WHB and decreasing disturbance of WHB by human activity.

Introducing wildlife in potential habitats could indirectly impact WHB by increasing disturbance from recreational activities such as hunting and wildlife viewing. Under Alternative D, BLM would coordinate with NDOW to establish pioneering elk populations in potential habitat. Impacts would be the same to WHB as those described under Alternative A and C.

Alternative D would protect and improve wildlife habitat by initiating land treatments by any means available to BLM. Use of management tools such as prescribed fire and allowing fire for resource benefit, vegetation manipulation (mechanical, biological, and chemical treatments), seeding, and use restrictions, would be beneficial to wild horses and burros by increasing the likelihood of healthy range conditions and increased forage opportunities in the long term. Vegetation treatment areas would be allowed to rest, which would result in short-term limited WHB management impacts such as potential temporary decreases in AML and exclusion from the treated area.

In general, protection of shorebird habitat would occur without precluding multiple uses; therefore, no impacts on WHB grazing would be expected to occur. Fencing of the public portions of Gridley Lake to manage it strictly for shorebirds, would impact the burros that reside on the McGee Mountain HMA by interfering with their wild and free roaming behavior and it may restrict their access to water which is limited in quantity.

Nesting bird surveys would be conducted prior to any surface disturbing activities during the peak migratory bird breeding season. Seasonal restrictions for surface disturbance if no nesting bird surveys are conducted, would afford WHB less chance of interactions with humans. This action would be more beneficial to WHB than Alternative B but less than the action in Alternative C.

Allowing for the development of guzzlers throughout HMAs would be beneficial to WHB as wildlife would then have more sources of water that are developed specifically for them and therefore they would be less dependent on the natural waters that the WHB use decreasing the potential for competition of a limited resource. Fencing of the spring sources may have a short term impact on WHB until they get used to the fence and find the new water source outside of the riparian area.

Fencing out WHB from reservoirs that support fisheries would directly impact WHB by reducing the amount of water available to them if the reservoirs are located within an HMA. This impact could be mitigated by piping water off-site for WHB use.

New irrigation reservoirs on public land would have a minimum pool requirement under Alternative D. This would be the beneficial for WHB as there would be the assurance that water is maintained at the source for WHB consumption.

In order to achieve stream bank alteration percentages of 20 percent or less of linear bank length on fishery streams, spring brooks, and lentic fishery resources and 10 percent or less on those with sensitive channel types under Alternative D, implementation measures such as season of use, exclusion, reducing livestock numbers, and rotational grazing practices could be applied. The 10 percent or less sensitive channel type goal would limit the amount of time cattle could spend in the riparian area, creating a greater impact on livestock grazing management. This would be beneficial to WHB in two ways, first it would improve the existing riparian habitat and provide a more constant source of water; and second, it would decrease the competition between WHB and livestock during certain times of the year and most importantly during the summer months.

Providing additional water sources for livestock and WHB would impact WHB the same as under Alternative A and B. Developing spring sources that may be fenced on a case-by-case basis under Alternative D would directly impact WHB by providing and maintaining a more permanent water source. Fencing of the spring may have a short term impact on WHB until they get used to the fence and find the new water source outside of the riparian area for WHB herds.

Wild Horses and Burros: Effects from Special Status Species Management

Effects Common to All Alternatives

Zones of no surface occupancy, buffer zones, human activity restrictions, and areas of no surface disturbance could be beneficial to wild horses and burros by limiting the opportunity for disturbance. Any actions, such as fencing or restricting WHB access to special status species habitat, could be detrimental by restricting access to forage and water or by limiting their free-roaming nature.

Wild Horses and Burros: Effects from Wild Horse and Burro Management

Effects Common to All Alternatives

Maintaining the HA boundaries established in 1971 would ensure that the WD is in conformance with BLM Handbook, H-4700-Wild Free-Roaming Horses and Burros Management, which states, "Consider wild horses and burros in the areas where they were found in 1971 (Herd Areas or HAs) as an integral part of the national system of public lands. Maintain a permanent record of the HAs that existed in 1971." Compliance with the Act would maintain the habitat for the WHB and allow them to maintain their wild and free roaming behavior.

An area may lose its designation as an HMA when WHB cause unacceptable impacts on other resource values, or conditions change and one or more of the four essential habitat components (forage, water, cover and space) are not present in sufficient quantities to sustain WHB use over the long term. Similarly, if conditions change, all or part of an HA may be reconsidered for designation as an HMA through the land use planning process.

Maintaining current MOUs and developing interagency and interoffice MOUs would standardize management to prevent individual management plans that are at odds with one another and reduce any possible interagency conflicts regarding proper management. This would also facilitate the dissemination of information and innovative management practices among agencies.

Protection from harm, harassment, and illegal capture would help preserve the herds and enhance the wild and free roaming nature of these animals.

Management of WHB would help ensure healthier herds by preventing overpopulation that could lead to overgrazing ranges, damage to riparian areas, and increased competition with domestic stock and other wildlife. Flexibility and numerical ranges in management options, and allowing adjustments based on observed conditions would generally be better than rigidity because WHB herds are dynamic units.

Allowing unencumbered access to water within HMAs would be beneficial to herds and assists with distribution of animals throughout the habitat.

Licensing domestic horses only where they would not be expected to mix with WHB would be beneficial to WHB populations as domestic horses may carry disease to which the WHB are susceptible.

Effects under Alternative A

HMA boundaries may be changed within HAs through the LUP process to facilitate WHB management or mitigate unacceptable impacts on other resources.

Alternative A would maintain the current boundaries of the HMAs within the HAs. Currently some of the HMAs have fences and geographical features that keep the animals from occupying a portion of the HMA. There are also HMAs that are adjacent to each other and the herds from these HMAs intermingle and travel between the HMAs. Keeping the HMA boundaries as they are may eliminate some of the management opportunities for these areas which could negatively impact WHB.

Under this alternative, Action WHB-A 1.3 states that WHB would be removed from the checkerboard lands unless a cooperative agreement has been implemented between the private land owner and BLM. The Seven Troughs and Nightingale HMAs both contain checkerboard lands. Due to the checkerboard land pattern there are numerous owners and it would likely not be possible for the BLM to acquire a cooperative agreement with every land owner.

Therefore the following HMA boundaries would be adjusted to exclude the checkerboard lands and WHB would be removed from the checkerboard areas.

- **Seven Troughs HMA** – Due to the inability to manage horses on private lands, the portion of the HMA that is within the checkerboard land pattern is being returned to HA status. The west boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fence creates a defined boundary which effectively prevents wild horses from venturing onto the checkerboard lands within the Majuba Allotment. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.
- **Shawave-Nightingale HMAs** – Due to the inability to manage horses on private lands the portion of the HMAs that is within the checkerboard land pattern would be returned to HA status. Since there are no fences or geographical boundaries, the horses would still be able to access these areas. Alternative A may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. The AUMs would be determined based on the public lands within the HMA boundary and not those that lie in the checkerboard and may result in a decrease of the AML.

Establishing an AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals (gathers).

The WHB herds are out on the range year round. They are wild animals that continually reproduce and have only one natural predator, the mountain lion. Therefore, in order to keep the herds and their habitats healthy the BLM conducts horse gathers to remove the excess animals. The AUMs that have been set aside for WHB were allocated at the high range AML, and were within the carrying capacity of the allotment and HMA. Removing the excess horses to the high range AML only would allow for the WHB to be at AML and within carrying capacity of the range until the first foal was born.

Gathering WHB before AML levels are exceeded reduces competition for food, water, and shelter in grazing HMAs and allotments and maintains or improves rangeland health. By maintaining population size within AML, rangeland resources would be sustained and protected from the deterioration associated with an overpopulation of WHB. This would ensure a thriving natural ecological balance and multiple use relationship on public lands in the area consistent with the provisions of Section 1333(a) of the WFRHBA. The action would also result in fewer WHB being placed in short or long-term holding or the adoption and sale programs over the next 5 to 10 years.

Reducing the population growth rates of horses by using population control strategies would provide for healthier herds of animals by limiting the stress of continual pregnancy on the mares. This would also hold true for any non-breeding herds where there are geldings as they would not be exerting extra energy trying to breed the mares. Sterilized mares would also be in better condition because energy would not be used raising a foal. Another benefit to the horses would be less stress from being gathered as the gathers would be scheduled farther apart due to horses remaining within the AML for a longer period of time.

The overall habitat condition for wildlife, WHB, and livestock would be given a chance to improve as the populations of horses would be maintained within the AML range for a longer period of time.

In accordance with the WHB Handbook #4700-1 and using the Final Multiple Use (FMUD) process to establish and adjust AML takes into consideration the WHB, wildlife and livestock grazing at the same time. Utilization data can be gathered pre-livestock, post-livestock and then at the end of the grazing year to determine WHB and livestock individual use. Also taken into consideration are factors based on limiting resources (e.g. water availability) within the HMA. Carrying capacities are then calculated based on this monitoring data and the AUMs are allocated using the land use plan ratios. This is normally less beneficial for WHB as the LUP WHB:livestock ratios usually means a lower amount of AUMs are available for WHB.

Converting from wild horses to burros or from burros to wild horses, would allow the manager some flexibility in managing the areas where WHB are adjacent to each other or intermingled. Having flexibility to transition from one equine type to another is also better for the animals by managing the types of animals most suited for the habitat in question. Converting AUMs for horses to burros, if needed, may be a key management action to preserve the genetic viability of the burro herd and vice versa.

Managing WHB forage on a sustained yield basis within HMAs would be beneficial to WHB as it would result in habitat improvement and maintenance of the existing AML.

Fences and cattle guards can restrict seasonal WHB movement or use of critical escape (hiding) or thermal cover, key spring-summer-fall-winter use areas, or critical water sources. Fences would be analyzed to determine whether or not there would be an impact to WHB, prior to construction. Under Alternative A, a fence must not have any adverse impacts on WHB that can't be mitigated or the fences would not be constructed. Fences that have been determined to negatively impact WHB, would be modified to reduce the impacts or the fence may be removed.

Offsite waters would be developed if springs within HMAs are fenced to protect their integrity. This would be beneficial to WHB as the spring source would be allowed to reach PFC without being impaired by WHB. Springs that are at PFC are considered healthy and sustainable and may produce more flow than those that are not meeting PFC.

Under Alternative A the BLM would file applications for water rights to be used by WHB. Waters filed upon may include developed or undeveloped sources. This would be beneficial for WHB as it would ensure that they had access to water on a permanent basis and that the source could not be fenced off to provide water for another single use.

If private waters (on private land) are fenced or otherwise made unavailable to WHB, the BLM may develop alternate water sources. This would be beneficial to WHB as it would allow for sustainability of the herds and provide a permanent access to water for the animals.

Proposals for commercial recreational use of the public lands would be evaluated through the appropriate BLM permitting process. Permits would stipulate the safeguards necessary to protect the health and welfare of WHB, particularly before, during and immediately following the peak foaling period (generally March – June). Therefore, there minimal impacts on WHB are expected from BLM authorized activities.

Effects under Alternative B

Alternative B would maintain the current boundaries of the HMAs within the HAs with the exception of those identified below. There are HMAs that are adjacent to each other and the herds from these HMAs intermingle and travel between the HMAs. Keeping the HMA boundaries as they are may eliminate some of the management opportunities for these areas which could negatively impact WHB.

- **Black Rock East HMA –** The majority of the Black Rock East HMA currently lies within the Paiute Meadows Allotment and to a lesser extent the Pine Forest Allotment to the north. The north end of the Black Rock East HMA will be adjusted to coincide with the Paiute Meadows Allotment fenced boundary. The Pine Forest FMUD issued in 2005 decided that the portion of the HMA within the Pine Forest Allotment would not be managed for wild horses and set the AML at 0. The allotment boundary fences create a defined boundary which effectively prevents wild horses from venturing onto the Pine Forest Allotment. This action would have no direct or indirect impacts on the wild horses that reside in the Black Rock East HMA as the portion of the HMA that the wild horses currently occupy would remain unchanged.
- **Black Rock West and Warm Springs HMAs** – The boundary between the Black Rock West and Warm Springs HMAs would be moved to the west, enlarging the Black Rock West HMA and decreasing the Warm Springs HMA by a minimal amount. There would not be any impacts on WHB by moving the boundary of the HMAs since the total acreage within HMAs is not being changed.
- **Buffalo Hills HMA –** A small portion of the Buffalo Hills HMA (approximately 6,293 acres) would be returned to HA status. This portion of the HMA is on the flats below the Buffalo Hills. The steep slopes along the Buffalo Hills make it an effective barrier for wild horses.

- **Calico Mountains and Warm Springs HMAs** – The Calico Mountains and the Warm Springs HMAs are adjacent to each other and a portion of the Calico Mountains HMA extends northward across Box Canyon which presents and effective barrier for wild horses. The change in the boundary would remove the portion of the Calico Mountains HMA (approximately 977 acres) that is northeast of Box Canyon and incorporate these lands into the Warms Springs HMA.

The boundary changes of these three HMAs (Buffalo Hills, Calico Mountains and Warm Springs) would have no direct effect on WHB as they currently do not have access to these areas from within the existing HMAs.

- **Fox and Lake HMA –** Approximately 5,998 acres would be returned to HA status within the Fox and Lake HMA to remove the city of Empire from within the HMA boundary. There is no impact to WHB expected from this action as the wild horses are already effectively excluded from this area.
- **Kamma Mountains HMA –** The east boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fence creates a defined boundary which effectively prevents wild horses from venturing onto the lands within the Majuba Allotment. This action would return approximately 11, 880 acres from HMA to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.
- **Lava Beds HMA** – The Selenite fence was constructed in the last 10 years and creates a defined boundary which effectively prevents wild horses from venturing onto the lands within the Selenite HA. The boundary of the Lava Beds HMA would be changed to this fenceline. This action would return approximately 18,962 acres from HMA to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.
- **McGee Mountain HMA –** Currently the McGee Mountain HMA encompasses the McGee Mountain Use Area of the Alder Creek Allotment and a small portion of both the Wilder-Quinn Allotment and the Knott Creek Allotment. The Wilder-Quinn Allotment lies to the north of the McGee Mountain HMA and the Knott Creek Allotment to the south. These allotments do not have established AMLs for burros and the allotment boundary fences create a defined boundary which effectively prevents burros from venturing onto these allotments. The McGee Mountain HMA boundary would be adjusted to the fence lines on the north and south end of the HMA returning approximately 7, 052 acres of the HMA in the Wilder Quinn and Knott Creek Allotments to HA status. Under this alternative, the McGee Mountain HMA would be returned to HA status, and the wild burros would be removed. Because water is an essential habitat component and there is no naturally occurring water within the HMA boundary, the burros move outside the HMA in order to access water.
- **Nightingale –** A portion of the Selenite fence that was mentioned previously dips into the Nightingale HMA in a “v” formation. The boundary of the HMA would be adjusted to

reflect this small portion that is inaccessible by the WHB. Since the acreage is relatively small, there would be no impacts on WHB from this action.

- **Seven Troughs HMA** – The east boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fence creates a defined boundary which effectively prevents wild horses from venturing onto the checkerboard lands within the Majuba Allotment. This action would return approximately 32, 603 acres to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.

Due to the inability to manage horses on private lands, HMAs that have a checker board land patterns within their boundaries would be returned to HA status and the WHB would be removed from the area. The HMAs that are affected by this action are the Shawave and Nightingale HMAs. The proposed boundary change due to fences within the Seven Troughs HMA sufficiently excluded the checkerboard lands from this HMA.

Establishing an AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals (gathers). It also allows the land manager to remove WHB below the initially set AML (high AML) to a lower number (low AML) of WHB so that resources progress towards attainment of a thriving ecological balance by ensuring healthy range lands within the HMA. Gathering to low AML also extends the amount of time before another gather would be needed to remove excess WHB which is a direct beneficial impact to WHB as it lessens the number of gathers needed and reduces the stress on the animals.

Gathering WHB before AML levels are exceeded reduces competition for food, water, and shelter in HMAs and grazing allotments and maintains or improves rangeland health. By maintaining population size within AML, rangeland resources would be sustained and protected from the deterioration associated with an overpopulation of WHB. This would ensure a thriving natural ecological balance and multiple use relationship on public lands in the area consistent with the provisions of Section 1333(a) of the WFRHBA.

Reducing the population growth rates of horses by using population control strategies would provide for healthier herds of animals by limiting the stress of continual pregnancy on the mares. This would also hold true for any non-breeding herds where there are geldings as they would not be exerting extra energy trying to breed the mares. Sterilized mares would also be in better condition because energy would not be used raising a foal. Another benefit to the WHB would be less stress from being gathered as the gathers would be scheduled farther apart due to horses remaining within the AML for a longer period of time. The action would also result in fewer WHB being placed in short or long-term holding or the adoption and sale programs over the next 5 to 10 years.

The overall habitat condition for wildlife, WHB, and livestock would be given a chance to improve as the populations of horses would be maintained within the AML range for a longer period of time.

Removing WHB from HMAs, which do not provide adequate suitable habitat, would benefit both the health of the animals and the habitat. If the habitat is poor, then usually the condition of the WHB is poor. Removing them and placing them in either short term or long term holding facilities until they can be adopted would likely improve the health of the animals and allow for the range to make progress towards meeting the standards for rangeland health.

Not allowing the conversion from wild horses to burros or from burros to wild horses, may preclude the manager some needed flexibilities in managing the areas where WHB are adjacent to each other or intermingled. Converting AUMs for horses to burros, if needed, may be a key management action to preserve the genetic viability of the burro herd and vice versa, if this is not an option, then the health of the herds may be impacted.

Implementing appropriate management actions primarily for WHB over livestock under conditions where allotment-specific objectives and the Standards for Rangeland Health are not being met would directly impact WHB by maintaining AUMs for livestock and by reducing AMLs for WHB. It would indirectly benefit WHB, by allowing the habitat to meet or progress towards meeting the SRH.

Fences and cattle guards can restrict seasonal WHB movement or use of critical escape (hiding) or thermal cover, key spring-summer-fall-winter use areas, or critical water sources. Fences would be analyzed to determine whether or not there would be an impact to WHB, prior to construction and mitigation measures would be employed. Fences that have been determined to negatively impact WHB, would be modified to reduce the impacts or the fence may be removed. This would be determined through coordinated activity plans.

Offsite waters would be developed if springs within HMAs are fenced to protect their integrity. This would be beneficial to WHB as the spring source would be allowed to reach PFC without being impaired by WHB. Springs that are at PFC are considered healthy and sustainable and may produce more flow than those that are not meeting PFC.

Under Alternative B the BLM would not file applications to appropriate water rights for WHB. This would be a direct impact to WHB, as water is one of the key habitat components in determining an area as suitable to manage for WHB.

If private waters (on private land) are fenced or otherwise made unavailable to WHB, the BLM would decrease the AML to account for the decrease in available water. This would be a direct impact to WHB as the AML would be decreased and the genetic viability of the herd has the potential to be affected. A long term impact to WHB would be a continual decrease in the areas managed for WHB.

Proposals for commercial recreational use of the public lands would be evaluated through the appropriate BLM permitting process. Permits would stipulate the safeguards necessary to protect the health and welfare of WHB, particularly before, during and immediately following the peak foaling period (generally March – June). Therefore, there limited impacts on WHB from BLM authorized activities.

Effects under Alternative C

With the exception of the following HMAs, Alternative C would maintain the current boundaries of the HMAs within the HAs. Currently some of the HMAs have fences and geographical features that keep the animals from occupying a portion of the HMA. There are also HMAs that are adjacent to each other and the herds from these HMAs intermingle and travel between the HMAs. Keeping the HMA boundaries as they are may eliminate some of the management opportunities for these areas which could negatively impact WHB.

Consolidation of HMAs

- **Black Rock East and West HMAs –** Wild horses move freely between the Black Rock East and West HMAs. AML was set for these two HMAs in the 1993 Paiute Meadows FMUD and the 1994 Soldier Meadows FMUD. AML was established and then split proportionately between the two HMAs based on the forage available in each. The 1993 and 1994 FMUDs decided the two HMAs would be combined and managed as one and called the Black Rock Range HMA. This action would ensure that the wild horses maintain their free roaming behavior as combining the HMAs would ensure that no fences would be constructed the two HMAs.
- **Shawave-Nightingale HMAs –** Wild horses move freely between these two adjacent HMAs as there is no geographical boundary that would deter the intermingling of the wild horses. Due to the ability of these horses to co-mingle the 1994 Bluewing/Seven Troughs Allotment set one AML for these two HMAs. This action would ensure that the wild horses maintain their free roaming behavior as combining the HMAs would ensure that no fences would be constructed the two HMAs.

Changing HMA Boundaries to Exclude Checkerboard Lands

- **Seven Troughs HMA** – Due to the inability to manage horses on private lands the portion of the HMA that is within the checkerboard land pattern is being returned to HA status. The east boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fences create a defined boundary which effectively prevents wild horses from venturing onto the checkerboard lands within the Majuba Allotment. This action would return approximately 32, 603 acres to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.
- **Shawave-Nightingale HMA** – Due to the inability to manage horses on private lands the portion of the HMA that is within the checkerboard land pattern is being returned to HA status. This action along with the proposed consolidation of HMAs above would return approximately 43, 969 acres to HA status. Although the horses would still be able to access this area, the proposed action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. The AUMs would be determined based on the public lands within the HMA boundary and not those that lie in the checkerboard and may result in a decrease of the AML.

Maintaining the AML as a single number and not a population range, would mean that when gathers are conducted, the WHB would only be taken down to the high AML. This would have the same impacts as outlined in Alternative A.

Gathering WHB to achieve AML with gathers no less than 4 years apart could be very detrimental to both the rangeland habitat and the animals themselves. If the AML is exceeded by any significant number prior to the 4 year schedule, WHB would be competing not only among themselves for food, water, and shelter, but also with livestock and wildlife.

By not using fertility control methods to maintain a four year gather cycle, WHB herds could overpopulate at an increased rate that may not be able to be sustained by the existing habitat. As a result, the need for more horse gathers would be necessary to prevent starvation and maintain healthy herds and habitat.

Under this alternative, AML would be adjusted with an emphasis on maintaining healthy threatened and endangered habitat in priority watersheds. Implementing appropriate management actions primarily for threatened and endangered species over WHB in HMAs, under conditions where allotment-specific objectives and the standards for rangeland health are not being met, would directly impact WHB by reducing AML for HMAs where threatened and endangered habitat is present.

Conversion from wild horses to burros would allow for management options, to protect the genetic viability of the burro herds. However, not allowing for conversion from burros to wild horses would limit management options in HMAs where the habitat is better suited for horses than burros.

Not allowing fence construction and removal of fences that impair WHB movement under Alternative C, would be directly beneficial to WHB. By not allowing fencing there would not be restrictions on WHB movement and therefore their wild, free roaming nature would be maintained. Under Alternative C, Option 1, livestock grazing would still be permitted. There could be indirect impacts on WHB in regards to habitat condition if there is no fencing in which to control livestock grazing or implement a grazing rotation.

Under this alternative off site waters would be developed if existing sources within HMAs are fenced to protect their integrity or otherwise encumbered.

If the sources are springs, this would be beneficial to WHB as the spring source would be allowed to reach PFC without being impaired by WHB. Springs that are at PFC are considered healthy and sustainable and may produce more flow than those that are not meeting PFC. Troughs would be relocated outside of the areas that are fenced to provide a water source for WHB and livestock.

If springs are otherwise encumbered and WHB can no longer use them, then an alternate source of water would be developed, such as drilling a well and equipping it with solar panels. This would be beneficial as the location of the well can be selected based on current resource (WHB, wildlife and livestock) needs.

Under Alternative C the BLM would file applications to appropriate water rights for WHB. Waters filed upon may include developed or undeveloped sources. This would be beneficial for WHB as it would ensure that they had access to water on a permanent basis and that it could not be fenced off to provide water for another single use.

If private waters (on private land) are fenced or otherwise made unavailable to WHB, the BLM would decrease the AML to account for the decrease in available water. This would be a direct impact to WHB as the AML would be decreased and the genetic diversity of the herd has the potential to be affected. A long term impact to WHB would be a continual decrease in the areas managed for WHB.

Proposals for commercial recreational use of the public lands would be evaluated through the appropriate BLM permitting process. Permits would stipulate the safeguards necessary to protect the health and welfare of WHB, particularly before, during and immediately following the peak foaling period (e.g., generally March – June). Therefore, there minimal impacts on WHB are expected from BLM authorized activities.

Option 1

Implementing appropriate management actions primarily to livestock before WHB under conditions where allotment-specific objectives and the Standards for Rangeland Health are not being met would directly benefit WHB by maintaining AMLs for WHB and by reducing AUMs for livestock. This would decrease the competition between WHB and livestock and would allow for the resources progress towards attainment healthy range lands within the HMA and ensuring a thriving natural ecological balance.

Option 2

Under Alternative C, Option 2, there would be no livestock grazing. This would be extremely beneficial for WHB as there would be little competition for forage, water and cover.

Effects under Alternative D

Alternative D incorporates all the current management actions for WHB and allows for new actions as they become available.

HMA Boundary Changes

- **Black Rock East HMA** – The majority of the Black Rock East HMA currently lies within the Paiute Meadows Allotment and to a lesser extent the Pine Forest Allotment to the north. The north end of the Black Rock East HMA will be adjusted to coincide with the Paiute Meadows Allotment fenced boundary. The Pine Forest FMUD issued in 2005 decided that the portion of the HMA within the Pine Forest Allotment would not be managed for wild horses and set the AML at 0. The allotment boundary fences create a defined boundary which effectively prevents wild horses from venturing onto the Pine Forest Allotment. This action would have no direct impacts on the wild horses that reside in the Black Rock East HMA as the portion of the HMA that the wild horses currently occupy would remain unchanged.
- **Black Rock West and Warm Springs HMAs** – The boundary between the BRW and WS HMA would be moved to the west in the northern portion of the HMA to coincide with the Five Mile Flat Fence enlarging the BRW HMA and decreasing the WS HMA by the same number of acres. There would not be any impacts on WHB by moving the boundary of the HMAs since the total acreage within HMAs is not being changed. (See Figure 2-10, Appendix A)
- **Buffalo Hills HMA** – A small portion of the Buffalo Hills HMA (approximately 6,293 acres) would be returned to HA status. This portion of the HMA is on the flats below the

Buffalo Hills. The steep slopes along the Buffalo Hills make it an effective barrier for wild horses along with the fenced private lands.

- **Calico Mountains and Warm Springs HMAs** – The Calico Mountains and the Warm Springs HMAs are adjacent to each other and a portion of the Calico Mountains HMA extends northward across Box Canyon which presents an effective barrier for wild horses. The change in the boundary would remove the portion of the Calico Mountains HMA (approximately 977 acres) that is northeast of Box Canyon and incorporate these lands into the Warms Springs HMA. There would not be any impacts on WHB by moving the boundary of the HMAs since the total acreage within HMAs is not being changed.

  The boundary changes of these three HMAs (Buffalo Hills, Calico Mountains and Warm Springs) would have no direct effect on WHB as they currently do not have access to these areas from within the existing HMAs.

- **Fox and Lake HMA** – Approximately 5,998 acres would be returned to HA status within the Fox and Lake HMA to remove the city of Empire from within the HMA boundary. There is no impact to WHB expected from this action as the wild horses are already effectively excluded from this area.

- **Kamma Mountains HMA** – The east boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fence creates a defined boundary which effectively prevents wild horses from venturing onto the lands within the Majuba Allotment. This action would return approximately 11, 880 acres from HMA to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.

- **Lava Beds HMA** – The Selenite fence was constructed in the last 10 years and creates a defined boundary which effectively prevents wild horses from venturing onto the lands within the Selenite HA. The boundary of the Lava Beds HMA would be changed to this fenceline. This action would return approximately 18,962 acres from HMA to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.

- **McGee Mountain HMA** – Currently the McGee Mountain HMA encompasses the McGee Mountain Use Area of the Alder Creek Allotment and a small portion of both the Wilder-Quinn Allotment and the Knott Creek Allotment. The McGee Mountain HMA boundary would be adjusted to the fence lines on the north and south end of the HMA returning approximately 7, 052 acres the small areas of the HMA in the Wilder Quinn and Knott Creek Allotments to HA status. The Wilder-Quinn Allotment lies to the north of the McGee Mountain HMA and the Knott Creek Allotment to the south. These allotments do not have established AMLs for burros and the allotment boundary fences create a defined boundary which effectively prevents burros from venturing onto these allotments. This action would have no direct impacts on the burros that reside in the McGee Mountain HMA as the portion of the HA that the burros currently occupy would remain unchanged.

- **Nightingale HMA** – A portion of the Selenite fence that was mentioned previously dips into the Nightingale HMA in a “v” formation. The boundary of the HMA would be adjusted to reflect this small portion that is inaccessible by the WHB. Since the acreage is relatively small, there would be no impacts on WHB from this action.

- **Seven Troughs HMA** – The east boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fence creates a defined boundary which effectively prevents wild horses from venturing onto the checkerboard lands within the Majuba Allotment. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.
- **Jackson Mountains HMA** – The Jackson Mountain HMA boundary would be changed to reflect the boundary fence for the Desert Valley grazing allotment which is approximately 18,800 acres. These 18,800 acres within the Desert Valley allotment would be returned to HA status and currently do not have an established AML for wild horses. The allotment boundary fences create a defined boundary which effectively prevents wild horses from venturing onto this allotment. This action would have no direct impacts on the wild horses that reside in the Jackson Mountain HMA as the portion of the HMA that they currently occupy would remain unchanged.

Changing HMA Boundaries to Exclude Checkerboard Lands

- **Seven Troughs HMA** – Due to the inability to manage horses on private lands the portion of the HMA that is within the checkerboard land pattern is being returned to HA status. The east boundary of the Bluewing Seven Troughs Allotment was fenced in the last 10 years. The allotment boundary fences create a defined boundary which effectively prevents wild horses from venturing onto the checkerboard lands within the Majuba Allotment. This action would return approximately 32, 603 acres to HA status. This action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. Future AUMs would be determined based on the public lands within the HMA boundary and may result in a decrease of the AML.
- **Shawave-Nightingale HMA** – Due to the inability to manage horses on private lands the portion of the HMA that is within the checkerboard land pattern is being returned to HA status. Although the horses would still be able to access this area, the proposed action may impact wild horses in the future when reviewing whether or not the AML is actually appropriate to achieve a TNEB. The AUMs would be determined based on the public lands within the HMA boundary and not those that lie in the checkerboard and may result in a decrease of the AML.

Consolidation of HMAs (This would happen after the above changes are made to the HMA boundaries)

- **Black Rock East and West HMAs –** Wild horses move freely between the Black Rock East and West HMAs. AML was set for these two HMAs in the 1993 Paiute Meadows FMUD and the 1994 Soldier Meadows FMUD. AML was established and then split proportionately between the two HMAs based on the forage available in each. The 1993 and 1994 FMUDs decided the two HMAs would be combined and managed as one and called the Black Rock Range HMA. This action along with the proposed boundary changes above would return approximately 43, 969 acres to HA status. This action would ensure that the wild horses maintain their free roaming behavior as combining the HMAs would ensure that no fences would be constructed the two HMAs. The combined HMA would be called the Black Rock Range HMA and would total approximately 183,520.

- **Shawave-Nightingale HMAs –** Wild horses move freely between these two adjacent HMAs as there is no geographical boundary that would deter the intermingling of the wild horses. Due to the ability of these horses to co-mingle the 1994 Bluewing/Seven Troughs Allotment set one AML for these two HMAs. This action along with the proposed boundary changes above would return approximately 43,969 acres to HA status. This action would ensure that the wild horses maintain their free roaming behavior as combining the HMAs would ensure that no fences would be constructed between the two HMAs. The combined HMA would be called the Shawave HMA and would total approximately 139,551 acres.

Under this alternative, contiguous HMAs with documented reproductive interaction would be managed as complexes to enable better management of genetic traits for the population and to improve coordination of monitoring and gathering. This would be beneficial to WHB, to preserve the genetic viability of the herds.

Converting from wild horses to burros or from burros to wild horses, would allow the manager some flexibility in managing the areas where WHB are adjacent to each other or intermingled. Converting AUMs for horses to burros, if needed, would be a key management action to preserve the genetic viability of the burro herd and vice versa.

Fences and cattle guards might restrict seasonal WHB movement or use of critical escape (hiding) or thermal cover, key spring-summer-fall-winter use areas, or critical water sources. Only allowing fence construction that does not impair WHB movement under this alternative, would be directly beneficial to WHB. Maintaining, modifying and reconstructing fences so they don't impair WHB movement would be beneficial to WHB. Removing, on a case by case basis, those fences that are not meeting resource objectives or that impair the free-roaming nature of WHB would also be beneficial to WHB. All actions would ensure normal herd distribution and movement as well as genetic interchange.

If water sources are otherwise encumbered and WHB can no longer use them, then an alternate source of water would be developed, such as drilling a well and equipping it with solar panels. This would be beneficial as the location of the well can be selected based on current resource (WHB, wildlife and livestock) needs.

Under Alternative D the BLM would file applications to appropriate water rights for WHB. Waters filed upon may include developed or undeveloped sources. This would be beneficial for WHB as it would ensure that they had access to water on a permanent basis and that it could not be fenced off to provide water for another single use.

If private waters (on private land) are fenced or otherwise made unavailable to WHB, the BLM would decrease the AML to account for the decrease in available water or consider returning the HMA to HA status. This would be a direct impact to WHB as the AML may be decreased and the genetic viability of the herd has the potential to be affected. A long term impact to WHB would be a continual decrease in the areas managed for WHB.

Proposals for commercial recreational use of the public lands would be evaluated through the appropriate BLM permitting process. Permits would stipulate the safeguards necessary to protect the health and welfare of WHB, particularly before, during and immediately following the peak foaling period (e.g., generally March – June). Therefore, there minimal impacts on WHB are expected from BLM authorized activities.

Establishing an AML as a population range allows for the periodic removal of excess animals (to the low range) and subsequent population growth (to the high range) between removals (gathers). It also allows the land manager to remove WHB below the initially set AML (high AML) to a lower number (low AML) of WHB so that resource progress towards attainment of a thriving ecological balance by ensuring healthy range lands within the HMA can be monitored. Gathering to low AML also extends the amount of time before another gather would be needed to remove excess wild horses/burros which is a direct beneficial impact to WHB as it lessens the number of gathers needed and reduces the stress on the animals.

Gathering WHB before AML levels are exceeded reduces competition for food, water, and shelter in HMAs and grazing allotments and maintains or improves rangeland health. By maintaining population size within AML, rangeland resources would be sustained and protected from the deterioration associated with an overpopulation of WHB. This would ensure a thriving natural ecological balance and multiple use relationship on public lands in the area consistent with the provisions of Section 1333(a) of the WFRHBA.

Reducing the population growth rates of horses by using population control strategies would provide for healthier herds of animals by limiting the stress of continual pregnancy on the mares. This would also hold true for any non-breeding herds where there are geldings as they would not be exerting extra energy trying to breed the mares. Another benefit to the horses would be less stress from being gathered as the gathers would be scheduled farther apart due to horses remaining within the AML for a longer period of time. The action would also result in fewer WHB being placed in short or long-term holding or the adoption and sale programs over the next 5 to 10 years.

The overall habitat condition for wildlife, WHB, and livestock would be given a chance to improve as the populations of horses would be maintained within the AML range for longer periods of time.

Under Alternative D, the Tobin HMA would be managed as a non-breeding herd. The AML for this area is currently 22-42 wild horses. This population range is below the recommended range of 50 effective breeding animals (i.e., a total population size of about 150-200 animals). Another limiting factor for the Tobin HMA is the lack of reliable water. There is currently one source that has been available year long, however this source is on private land. Managing the herd as non-breeding would benefit both the horses and the resources. Non-breeding animals are less stressed and normally found to be in better body condition than breeding animals. The stress from gathers would be less as the gather schedule would be further apart than every four years. Keeping the herd within AML would allow for the improvement of the habitat condition and would allow for a sustained resource for wild horses, wildlife and livestock.

Adjusting sex ratios in herds that have a lower AML limit of 100 animals or more, would help to slow down population growth while still maintaining genetic viability with the herd. This would help to increase the time period in between gathers which would lessen the amount of stress that the

WHB go through when captured. Maintaining the herds within the AML would allow for the habitat to be maintained or improved.

When adjusting AMLs, the multi-tiered process outlined in BLM Handbook 4700-1 would be used. This is done in three tiers: 1) determine whether the four essential habitat components (forage, water, cover and space) are present in sufficient amounts to sustain healthy WHB populations; 2) determine the amount of sustainable forage available for WHB use and 3) determine whether or not the project WHB herd size is sufficient to maintain a genetically diverse WHB population. Using this process would provide the BLM with the information needed to ensure that the WHB populations are being set within management constraints for all the resources, including WHB.

HMAs that are determined not to provide adequate habitat on a case by case basis would have WHB removed and the HMA would be returned to HA status. Although, there would not be any WHB left in the HA the impacts on the WHB removed would be beneficial. Removing them from unsuitable habitat would ensure that they have access to forage, water and cover, regardless of whether they are relocated to another HMA or sent to short or long term holding facilitates for adoption.

Implementation of appropriate management actions would occur to WHB or livestock relative to the degree to which each animal species is contributing to the attainment or non-attainment of resource objectives (if known) or proportionally (if unknown). This could directly impact WHB by reducing AMLs or by reducing the amount livestock grazing within the HMA. This would decrease the competition between WHB and livestock and would allow for the resources progress towards attainment healthy range lands within the HMA and ensuring a thriving natural ecological balance.

Wild Horses and Burros: Effects from Wildland Fire Management

Effects Common to All Alternatives

Wildland fire would have varying effects on WHB, depending on fire size and intensity, the timing of the fire, and fuel moisture content. Wildland fire would initially displace WHB, and depending on the proximity of the WHB to the fire, they could be stressed, injured, or killed.

Wildland fire would remove vegetation and forage over the short term. Over the long term, wildland fire could improve forage production, especially when post-fire management efforts are implemented. ES&R actions may require the removal or fencing out of WHB and livestock in areas burned in order to protect seeded species and ensure rehabilitation success; thereby protecting the seeded species from overgrazing in the short term and establishing a stable forage base in the long term. Fire closures may reduce the possibility for human disturbance to WHB as gathering and moving livestock would not occur during closures.

Protecting range improvements and natural resources and managing for healthy, productive, diverse, and resilient plant communities are beneficial to WHB by providing forage species diversity and improving forage opportunities. Allowing for natural fire regimes to take place would contribute to a natural healthy range condition.

Because fire retardants are composed largely of nitrogen and phosphorus fertilizers, they may influence vegetation. Fire retardants may encourage growth of some species at the expense of others, resulting in changes in community composition and species diversity. Differential growth may also influence herbivorous behavior; both insect and vertebrate herbivores tend to favor new, rapidly growing shoots.

In addition to the impacts identified under Effects Common to Alternatives A, B, C and D, the following individual effects would impact WHB.

Effects under Alternative A

Under Alternative A, zero acres of public land would be considered suitable for allowing fire for resource benefit. Enhancement of the forage base may not occur as mature and decadent stands of vegetation would not be allowed to burn. Species composition would not improve. Using natural fire for resource use would promote the establishment of forbs and grasses within communities that do not have a diversity of species or age classes. Species composition would be improved. In the long term, WHB may not have a sustained forage base in certain areas if fire is not allowed for resource benefit.

Prescribed fire would be used as a pre-treatment for weed control or to reduce or rejuvenate shrub cover and increase vegetation for habitat restoration. For instance, a prescribed fire could be used in mountain big sagebrush communities in late ecological status to provide diversity of age classes for shrubs. Prescribed fire would result in short-term deferment of WHB grazing to allow for herbaceous recovery. Increased sediment loads following prescribed fires may fill reservoirs. Prescribed fire may impact range improvements, enhance forage availability and production, and reduce the likelihood of wildland fire occurrence. Short-term impacts of prescribed fire could include an increase of cheatgrass following treatment in areas where cheatgrass is the dominant understory grass. This impact would be reduced by project planning efforts and review to ensure that the project site has not passed an ecological threshold.

Effects under Alternative B

Under Alternative B, 110,167 acres of public lands district wide would be considered suitable for allowing fire for resource benefit. Assuming these acres occur within HMAs, WHB would lose forage in burned areas in the short term. In the long term, allowing fire for resource benefit could improve forage production by restructuring the age class of shrubs and increasing the density and composition of grasses and forbs.

Impacts from prescribed fire are the same as under Alternative A.

Effects under Alternative C

Zero acres of public land would be considered suitable for allowing fire for resource benefit under Alternative C. Impacts are the same as those described under Alternative A.

Prescribed fire would not be used under Alternative C. WHB habitat may not be enhanced in the long term, and the likelihood of wildland fire occurrence could be increased without the use of prescribed fire.

Effects under Alternative D

Under Alternative D, 110,167 acres of public land district wide would be considered suitable for allowing fire for resource benefit. Impacts from allowing fire for resource benefit are the same as those under Alternative B. Impacts from prescribed fire are the same as under Alternative A.

Wild Horses and Burros: Effects from Cultural Resources Management

Effects Common to All Alternatives

In general, management actions associated with cultural resources affect relatively small localized areas and would have negligible effects on WHB. Even under the most intensive management, such as excavation, the acreage disturbed would be small.

Fencing some cultural sites could interfere with the wild and free roaming nature of WHB and cause a loss of available forage. Restrictions on surface-disturbing and other disruptive activities in HMAs near cultural sites would be a benefit to WHB as it would limit the potential for WHB interaction with humans.

Some sites could draw additional visitors, which could increase the potential for WHB to be disturbed. Issuance of free use permits for pine nut harvesting and firewood to the Lovelock and Fallon Tribes, would increase the chance of human and wild horse interaction on the North Stillwater HMA, and wild horses may be temporarily displaced.

Effects under Alternative A

The indirect short-term impact of maintaining culturally sensitive areas as open to OHV use within HMAs would be a reduction in forage and temporary displacement of WHB. The indirect long-term impacts of maintaining culturally sensitive areas as open to OHV use include loss of forage, reduced forage palatability because of dust on vegetation, and the potential for disturbance and harassment of WHB.

Effects under Alternative B

Indirect impacts on WHB by maintaining culturally sensitive areas as open to OHV use would be the same as under Alternative A.

Effects under Alternative C

Limiting OHV use in culturally sensitive areas within HMAs would indirectly affect WHB by keeping OHVs on specific routes and reducing the conflicts that can arise with WHB and OHV interactions (such as harassment).

Effects under Alternative D

Indirect impacts on WHB by limiting OHV use to designated trails in culturally sensitive areas and closing Class I segments of the National Historic Trail segments to OHV use would have the same impacts on WHB as under Alternative C.

Wild Horses and Burros: Effects from Tribal Consultation

Effects Common to All Alternatives

Tribal consultation would have little to no effect on WHB, mitigating measures implemented to protect tribal values could be beneficial to WHB by limiting the possibility for human disturbance.

Effects under Alternative A

Same as Effects Common to All.

Effects under Alternative B

Same as Effects Common to All.

Effects under Alternative C

Tribal consultation would have little to no effect on WHB, but any mitigation to protect tribal values could be beneficial to WHB by limiting the possibility for human disturbance.

Seasonal closures within HMAs would also be beneficial to WHB as it would decrease the amount of time that horses would likely be disturbed by human activity.

Effects under Alternative D

Effects would be the same as described under Alternative C.

Wild Horses and Burros: Effects from Paleontological Resources Management

Effects Common to All Alternatives

Any area closures to protect paleontological resources could be beneficial to WHB by limiting the possibility for human disturbance.

If fencing occurs within an HMA it may have the potential to impact the free-roaming behavior of WHB. Fencing would be considered on a site specific basis and mitigation measures would be applied as necessary.

Wild Horses and Burros: Effects from Visual Resources Management

Effects Common to All Alternatives

In general, VRM classes (VRM I and II) that restrict surface-disturbing activities within HMAs would indirectly impact WHB by helping to maintain forage levels by reducing activities that could eliminate vegetation, or increase the potential for noxious and invasive weeds.

VRM classes that generally allow for more surface disturbing activities (VRM III and IV) within HMAs could indirectly impact WHB by reducing the amount of forage available for WHB and increase the potential for noxious and invasive weeds.

Section 4.2.11, Wild Horses and Burros: Effects from Visual Resources Management is continued on page 4-361 in Volume 3.

Cooperating Agencies

U.S. Fish and Wildlife Service

U.S. Bureau of Reclamation

Nevada Department of Wildlife

Nevada Department of Agriculture

Humboldt County

Pershing County

Washoe County

City of Winnemucca

N-2 Grazing Board

August 2013

WINNEMUCCA DISTRICT
Nevada BLM