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INTEGRATED WEED MANAGEMENT PLAN FOR THE CONTROL AND ERADICATION OF NOXIOUS AND INVASIVE SPECIES AND PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Location: Beaver Dam Wash National Conservation Area (NCA) and Red Cliffs NCA, Washington County, Utah

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1.0 CHAPTER 1—PURPOSE AND NEED

1.1 INTRODUCTION

This Programmatic Environmental Assessment (EA) has been prepared by the Bureau of Land Management's (BLM) St. George Field Office (SGFO) to analyze and disclose the potential environmental consequences of implementing a proposed Integrated Weed Management Plan (IWMP) for the control and eradication of nonnative noxious and invasive plant species within the Beaver Dam Wash and Red Cliffs National Conservation Areas (NCAs), Utah. See **Figure 1** for the location of the NCAs in Washington County, Utah.

This EA is a programmatic analysis of impacts that could result from the implementation of the IWMP (the Proposed Action) or alternatives in the two NCAs. This analysis assists the BLM in project planning and ensuring compliance with the *National Environmental Policy Act* (NEPA) and in making a determination as to whether any "significant" impacts could result from the analyzed actions. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI), based on the considerations of "Significance" found in the *Code of Federal Regulations* (CFR) at 40 CFR 1508.27. If the decision-maker determines that either of these projects would have "significant" impacts, then an EIS would be prepared. If not, a Decision Record (DR) may be signed for the EA, approving the selected alternatives, whether the Proposed Actions or other alternatives. A DR, including a FONSI statement, documents the reasons why the decision-maker found that implementation of the selected alternatives would not result in "significant" environmental impacts (effects) beyond those already addressed in the *Draft Environmental Impact Statement* prepared for the *Draft Resource Management Plans for the Beaver Dam Wash National Conservation Area and the Red Cliffs National Conservation Area* (DOI-BLM-UT-C030-2015-1-EIS; BLM 2015), or in other NEPA analyses to which this EA is tiered.

This EA discloses the direct, indirect, and cumulative environmental effects that could result from efforts to control and eradicate weeds and exotic invasive species, as described by the IWMP, on BLM-administered public lands, as required by NEPA (40 CFR 1500–1508), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and the BLM NEPA Handbook (H-1790-1; BLM 2008). The EA is organized following guidance in the BLM NEPA Handbook with additional documentation, including more detailed analyses of project-area resources, on file at the SGFO in St. George, Utah.

The NCAs provide habitat for and support populations of federally-listed threatened or endangered animal and plant species. The Proposed Action must, therefore, comply with Section 7 of the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 et seq.). Under Section 7, Federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) when any action the agency carries out, funds, or authorizes may affect a listed endangered or threatened species. This EA serves as the Biological Assessment (BA) to document anticipated effects of the Proposed Action on ESA-listed or candidate species and to request concurrence with the effects determinations provided in the EA.

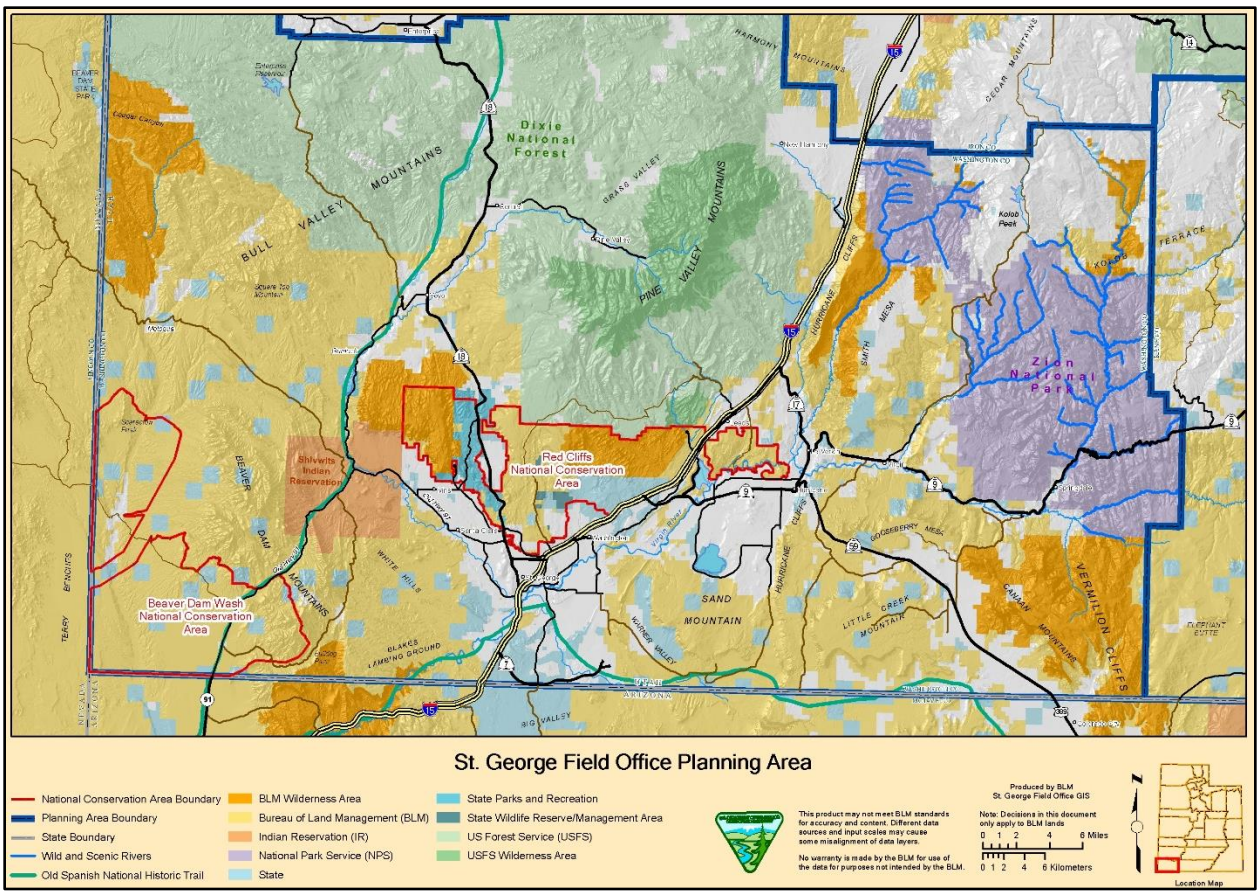

Figure 1. Map showing the location and land ownership in the Beaver Dam Wash and Red Cliffs NCAs in Washington County, Utah.

1.2 BACKGROUND

The 63,645-acre Beaver Dam Wash NCA and 45,600-acre Red Cliffs NCA are located within the administrative boundaries of the SGFO. The two NCAs were established on March 30, 2009, when President Barack Obama signed into law the *Omnibus Public Land Management Act* (OPLMA) of 2009 (16 U.S.C. 7202, Public Law 111-11). The purposes of the NCAs, as defined by the U.S. Congress through this legislation, are to "conserve, protect, and enhance…the ecological, scenic, wildlife, recreational, cultural, historical, natural, educational, and scientific resources" of the public lands (OPLMA Sections 1974 and 1975). Although there are inholdings of state and private lands within their boundaries, the NCAs are comprised only of public lands administered by the BLM; the Proposed Action analyzed in this EA would only be implemented on the public lands.

This document analyzes the control and eradication of noxious weeds and exotic invasive species. Noxious weeds and invasive species cover an estimated 35 million acres of public lands nationwide (BLM 2000) and spread to new areas at a rate of 2,300 acres per day (BLM 1996). A noxious weed is a plant not native to the United States or Utah that has been designated "noxious" by federal, state or county law due to its environmental and financial impacts (Sheley and Petroff 1999). The BLM defines a noxious weed as a nonnative plant that disrupts or has the potential to disrupt or alter the natural ecosystem function, composition, and diversity of the site it occupies.

An invasive species is defined as a nonnative to the ecosystem under consideration and whose introduction is likely to cause economic, environmental, or human health impacts. As an invasive species becomes more competitive, persistent, and pernicious, it may be designated a noxious weed (James et al. 1991). Noxious weeds and invasive species degrade wildlife habitat and forage, threaten endangered species and native plants, can increase soil erosion and groundwater loss, limit and reduce the quality of recreational opportunities, and increase wildfire frequency and intensity (Cronk 1995).

In 1994, the BLM signed a Memorandum of Understanding (MOU) with other federal agencies to coordinate on weed treatment and prevention, through the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW). The Carson-Foley Act of 1968, the Federal Noxious Weed Act of 1974 (as amended), and the Plant Protection Act of 2000 authorize the BLM to manage noxious weeds. More recently, the U.S. Department of the Interior released Secretarial Order 3336, a strategy for dealing with the proliferation of flammable, invasive grasses, and the subsequent increase in wildland fires.

The State of Utah has designated 54 species as noxious weeds and organized 40 of these species into three control classes: Class 1B: Early Detection/Rapid Response (EDRR); Class 2: Statewide Control; and Class 3: Statewide Containment (see **Section 3.3.5** and **Table 3-1** for more information). The Utah Noxious Weed Act (Rule R68-9) establishes a legal requirement to control weeds designated by the state as noxious.

The SGFO coordinates with other federal and state agencies, county and tribal governments, industry, and private citizens to control and eradicate noxious weeds in the Washington County Cooperative Weed Management Area, through the sharing of resources and information.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of and need for the Proposed Action is to control and eradicate noxious weeds and exotic invasive species in the Beaver Dam Wash and Red Cliffs NCAs, using an integrated approach. Integrated weed management strategies include prevention, cultural, chemical, and manual methods. Weeds often out-compete native vegetation, especially on recently disturbed sites. Left unchecked, they can create monocultures of nonnative vegetation that reduce soil productivity, impair water quality, reduce water volume, and negatively impact wildlife habitat (BLM 2007a). Highly invasive non-native species, such as the annual brome grasses (e.g., cheatgrass, *Bromus tectorum*, red brome, *Bromus rubens*) act as a hazardous "fine fuel", increasing wildfire frequency and intensity. In Mojave Desert shrublands, repeated wildfires, fueled by brome grasses, can create an "burn-reburn" cycle that eventually converts these native shrublands to non-native grasslands.

The Proposed Action would enable the BLM to implement an IWMP in the NCAs that employs appropriate methodologies to control and eradicate noxious weeds and exotic invasive species. Integrated weed control would protect and improve ecosystem health, reduce "fine fuels" that contribute to the severity of wildfires in ecosystems, like the Mojave Desert, that are not fire adapted, and improve the success of restoration efforts for fire-damaged lands in the NCAs.

1.4 CONFORMANCE WITH BLM LAND USE PLANS

The Proposed Action described in **Chapter 2** is in conformance with the management goals, objectives, and action decisions from the *Beaver Dam Wash National Conservation Area Record of Decision and Resource Management Plan* (Beaver Dam Wash NCA ROD/RMP, approved on December 21, 2016; BLM 2016a) and *Red Cliffs National Conservation Area Record of Decision and Resource Management Plan* (Red Cliffs NCA ROD/RMP, approved on December 21, 2016; amended 2021; BLM 2016b). The RMPs address a wide range of resource management programs and issues, including decisions on the management of noxious weeds and exotic invasive species. Specifically, the Proposed Action is in conformance with the following RMP decisions (BLM 2016a, b).

Beaver Dam Wash and Red Cliffs NCA RMP Decisions

Noxious Weeds and Invasive Species

WED-6: Authorize the use of biological controls, flaming, targeted grazing, hand removal, herbicide, mechanical methods, or a combination of methods for weed treatments, depending on target species, infestation level, site characteristics, and project scale (see Table 3 for descriptions of each method).

WED-7: Conduct monitoring and treat all weed infestations for a minimum of five years or until target species is eradicated.

WED-10: Pursue opportunities for scientific studies to test the effectiveness of herbicides approved for use on public lands in the reduction of exotic invasive annual grasses in Mojave Desert and transitional communities.

Native Vegetation Communities

VEG-1: Apply BMPs and other management techniques designed to minimize impacts on native vegetation communities for all land uses and authorized activities.

VEG-4: Implement landscape-level fuel breaks and hazard fuel reduction projects in partnership with adjacent federal and state land managing agencies.

VEG-5: Design fuel breaks and hazard fuel reduction projects to conserve and protect unburned native vegetation communities, evaluating factors such as vegetation types, seasonal wind direction, and expected fire behavior in project planning.

VEG-6: Design fuel breaks to incorporate topographic features, water courses, major ephemeral drainages, road networks, and utility corridors, to minimize new surface disturbances and the loss of native vegetation.

VEG-7: Design fuel breaks and hazard fuel reduction projects to utilize those methods that are environmentally sensitive and minimize new surface disturbances.

VEG-9: Authorize the use of biological controls, targeted grazing, flaming, hand removal, herbicides, mechanical methods, or a combination of methods to develop fuel breaks and hazard fuel reduction projects.

VEG-13: Pursue opportunities for scientific studies that evaluate the long-term effectiveness of herbicidal treatments for exotic invasive annual grasses in arid ecosystems.

Riparian Vegetation

RIP-10: Treat non-native woody species (e.g., tamarisk, Russian olive) in a phased approach using biological controls, flaming, hand removal, herbicides, mechanical methods, or a combination of methods, depending on target species, infestation level, site characteristics, and project size (see Table 3 for descriptions of each method).

RIP-11: Allow adequate time between treatments for native woody species to establish in a treated area before treating adjacent patches.

RIP-17: Collect and maintain baseline data on riparian vegetation species composition, noxious weeds, and nonnative species infestations.

Fire and Fuels Management

FIR-6: Do not authorize the use of management-ignited (prescriptive) fire in any of the ecological systems of the NCA for hazard fuel reduction or vegetation type conversions, as these are not fire-adapted communities in which fire has played an important role in ecosystem function.

Special Status Wildlife Species – Including Threatened, Endangered, Candidate, and Species Proposed for Listing under ESA

SSW-2: Continue active management programs to inventory, monitor, protect, and restore habitats for special status species, to control detrimental non-native species, and to re-establish extirpated populations, as necessary, to maintain the unique ecosystem biodiversity of the NCA.

SSW-3: Apply BMPs and other management techniques designed to minimize impacts on critical habitats and listed species populations that may result from land uses and authorized activities.

SSW-8: Prioritize habitat restoration projects and postfire ES&R treatments as follows: Designated critical habitats for federally listed threatened and endangered species. 2. Habitats for candidate and proposed species for listing under ESA.

Special Status Species: Mojave Desert Tortoise

SST-10: Prioritize conservation and protection of critical habitat through firebreaks, appropriate wildfire suppression responses, and control or eradication of noxious weeds and invasive species.

BLM Sensitive Species

BSS-2: Continue active management programs to inventory, monitor, protect, and restore habitats for sensitive species, control detrimental non-native species, and reestablish extirpated populations, as necessary, to maintain biodiversity.

Sensitive Reptile and Amphibian Species

SRA-3: Do not authorize the use of herbicides, pesticides, or poisons that are injurious or toxic to sensitive reptile or amphibian species, will damage native vegetation communities, or will reduce the quality and quantity of species that comprise their prey base.

Water Resources

WAT-1: Apply BMPs and other site-specific mitigation measures to maintain soil stability, minimize wind and water erosion, and ensure that surface disturbances do not cause accelerated sedimentation in surface water sources.

WAT-3: In planning re-vegetation projects for disturbed or fire-damaged riparian areas, identify specific resource and management objectives, desired plant communities, and methods that are ecologically sustainable, likely to achieve desired outcomes, and that minimize new surface disturbances and impacts on other resource values of the NCA.

Migratory Birds and Birds of Conservation Concern

BCC-1: Only authorize actions that would not adversely impact nesting migratory birds.

BCC-2: Minimize disturbances or adverse effects on breeding bird populations that might result from authorized activities through seasonal restrictions, special permit stipulations, or other appropriate mitigation measures.

Soils

SOL-1: Apply BMPs and other site-specific mitigation measures to maintain soil stability, minimize wind and water erosion, and ensure that surface disturbances do not cause accelerated wind or water erosion.

SOL-2: Implement post-fire ES&R actions designed to minimize soil erosion and facilitate re-vegetation of desired native plant communities.

National Historic Trails -Old Spanish National Historic Trail

NHT-11: To improve the naturalness of the setting and the visitor experience of the landscape, restore fire-damaged landscapes within [the] OST National Historic Trail Management Corridor with native vegetation.

1.5 RELATIONSHIP TO STATUTES, REGULATIONS, AND OTHER PLANS

Broad objectives for noxious weed and exotic invasive species are identified in BLM's *Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan* (WGA 2006); *Partners Against Weeds: An Action Plan for the Bureau of Land Management* (BLM 1996); and *Pulling Together: National Strategy for Invasive Plant Management* (FICMNEW 1997), while treatment actions at the local level are guided by the goals, objectives, and decisions from RMPs and other plans developed at the Field Office or NCA level.

The following laws, acts, plans, manuals, and policies provide a foundation for weed management by the BLM:

- The *Carson-Foley Act of 1968* (Public Law 90-583; 43 U.S.C. 1241 et seq.), and the *Plant Protection Act of 2000* (Public Law 106-224; 7 U.S.C. 7701 et seq.) authorize and direct the BLM to manage noxious weeds (including management of undesirable plants on federal lands) and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on federal lands.
- The *Federal Noxious Weed Act of 1974* (Public Law 93-629), *as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990*, (7 U.S.C. 2801 et seq.) authorizes the Secretary "...to cooperate with other federal and state agencies and others in carrying out operations or measures to eradicate, suppress, control, prevent, or retard the spread of any noxious weed." This Act established and funded an undesirable plant management program, implemented cooperative agreements with state agencies, and established integrated management systems to control undesirable plant species.
- The *Federal Land Policy and Management Act of 1976, as amended*, (Public Law 94-579; 43 U.S.C. 1701 et seq.) directs BLM to "...take any action necessary to prevent unnecessary and or undue degradation of the public lands."
- The *Public Rangelands Improvement Act of 1978* (Public Law 95-514; 43 U.S.C. 1901 et seq.) requires that BLM manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible.
- *BLM Manual 9015: Integrated Weed Management, 1992*, provides policy relating to the management and coordination of noxious weed activities among BLM, organizations, and individuals.
- *Department of the Interior, Departmental Manual 609: Weed Control Program, 1995*, prescribes policy to control undesirable or noxious weeds on the lands, waters, or facilities under its jurisdiction to the extent economically practicable, as needed for resource protection and accomplishment of resource management objectives.
- *Executive Order 13112, Invasive Species, 1999,* directs federal agencies to prevent the introduction of exotic invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.
- The *Noxious Weed Control and Eradication Act of 2004* (Public Law 108–412) established a program to fund states and counties to control or eradicate harmful, nonnative weeds on public and private lands.

- The *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement, 2007*, and the *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report, 2007,* analyzed the direct, indirect, and cumulative impacts to various resources from the proposed vegetation treatment alternatives.
- The *Programmatic EIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States, 2016,* analyzed the direct, indirect, and cumulative impacts to various resources from the proposed vegetation treatment alternatives.
- The *BLM St. George Field Office Programmatic Wildland Fire Emergency Stabilization and Rehabilitation Plan, 2008b,* (UT-100-05-EA-06) includes guidance for managing noxious weed populations after wildland fires to prevent the spread and proliferation of these species.
- *Utah Noxious Weed Act, 2008*, (Rule R68-9) designates three classes of noxious weeds for the State of Utah which includes 28 listed species. It also states the selling or moving of noxious weed seed through contaminated machinery or product to be unlawful.
- *Utah Seed Law, 2008*, (Rule R68-8) restricts the sale of weed contaminated seed products in the State of Utah.

The Proposed Action would comply with the following federal laws, regulations, and agency policies and with applicable state statutes, municipal ordinances, and local plans.

- OPLMA at Title 1, Subtitle O, Section 1974 and 1975
- FLPMA and regulations at 43 CFR 2800
- NEPA and the Council on Environmental Quality (CEQ) regulations at 40 CFR 1500–1508
- *Endangered Species Act* of 1973, as amended
- *Migratory Bird Treaty Act* of 1918 (MBTA)
- *Bald and Golden Eagle Protection Act* of 1962
- Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds
- Manual 6220 Management of NCAs and National Monuments (2012)
- *National Historic Preservation Act* of 1966, as amended (NHPA), and regulations at 36 CFR 800
- *Taylor Grazing Act* of 1934
- 43 CFR 4100 Grazing Administration - Exclusive of Alaska
- Utah Standards and Guidelines for Rangeland Health (1997)
- *Wilderness Act* of 1964
- *Washington County Cooperative Weed Management Area MOU* (2010) provides the framework for integrated and cooperative weed management among private, tribal, state and federal government partners in weed treatment in Washington County.
- *Washington County General Management Plan* (2010, amended 2012) as it relates to the control of noxious weeds on a county-wide basis, through cooperative integrated weed treatment efforts by Federal, state, municipal, and private landowners.
- *Washington County Habitat Conservation Plan* (HCP; 1995, amended 2009, and restated and amended 2020) was approved by the U. S. Fish and Wildlife Service (USFWS) in 1995 and a 20-year Incidental Take Permit was granted to Washington County, based primarily on the protective management of a mitigation reserve, which includes federal, state,

municipal, and private lands. The Red Cliffs NCA comprises more than 70 percent of the land base of this reserve. The HCP emphasized the protection of desert tortoise populations and its designated critical habitat in the mitigation reserve through actions that include invasive species control and fire prevention/management.

- *State Protocol Agreement Between the Bureau of Land Management and the Utah State Historic Preservation Office Regarding the Manner in which the Bureau of Land Management will meet its Responsibilities under the National Historic Preservation Act as Provided for in its National Programmatic Agreement* (2020).

1.6 TIERING

This EA implements the tiering process outlined in 40 CFR 1502.20 that encourages agencies to tier environmental documents, eliminating repetitive analyses of the same issue. This Programmatic EA is tiered to the *Draft Environmental Impact Statement* prepared for the *Draft Resource Management Plans for the Beaver Dam Wash National Conservation Area and the Red Cliffs National Conservation Area* (BLM 2015); the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS; BLM 2007a); *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report* (PER; BLM 2007b); and the *PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States* (BLM 2016c).

These EIS-level analyses were developed to disclose the environmental consequences to the human environment that could result from the use of different weed treatments and specific herbicides on public lands to control and eradicate noxious weeds and exotic invasive species. They provide a comprehensive background source of information to which subsequent, site-specific environmental analyses can be tiered, without duplicating relevant portions of these EIS-level analyses. The environmental consequences that could result from non-herbicidal weed treatment methods, including mechanical, manual, and biological controls, were disclosed in the Programmatic Environmental Report released by the BLM in 2007 (BLM 2007b). The *Programmatic EIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States* (2016c) analyzed the use of three new herbicides to help control invasive species populations, as those herbicides had been shown to have minimal environmental impacts, when properly applied.

1.7 IDENTIFICATION OF ISSUES

A BLM Interdisciplinary (ID) Team screened the Proposed Action and completed an ID Team Checklist **(Appendix A)** that identified resource values and land uses in the two NCAs that should be analyzed in this Programmatic EA. A summary of the issues and the rationale for why analysis is needed are given below.

1.7.1 Water Resources/Quality

Herbicides that are improperly applied near a surface water source have the potential to adversely affect water quality, either by direct contact or by leaching of the chemicals into the

water source over time. The removal of vegetation that holds soils in place could potentially increase surface runoff and sedimentation into surface water sources, also impacting water quality.

1.7.2 Soils

If improperly applied, herbicides have the potential to impact the physical, chemical, and biological properties of soils, and some can persist in soil horizons for long periods of time. Loss of vegetative cover after herbicide applications could accelerate wind and water erosion, particularly in highly erodible or saline soils.

1.7.3 Wetlands/Riparian Zones

Improper application of herbicides and manual removal of weeds could impact soils and non-target vegetation near wetlands and in riparian zones. Negative impacts on riparian vegetation could damage important habitats for many terrestrial and aquatic wildlife species.

1.7.4 Vegetation Excluding USFWS-Designated Species

Application of certain broad-scale herbicides and improper manual removal of weeds could damage or destroy native plants. BLM Sensitive plant species could occur in areas where weed treatments might be authorized, potentially impacting at-risk species.

1.7.5 Invasive Species/Noxious Weeds

The control and eradication of noxious weeds and exotic invasive species is vital to protect and improve ecosystem health, reduce "fine fuels" that contribute to the severity of wildfires, and improve the success of restoration efforts for fire-damaged lands in the NCAs.

1.7.6 Fish and Wildlife Excluding USFWS-Designated Species

Improper application of herbicides could impact diverse wildlife species and their habitats, including BLM Sensitive Species. Treatments could injure or kill wildlife, native vegetation, and persist in soils or water, impacting the quality of wildlife habitats.

1.7.7 Migratory Birds

If herbicides are improperly applied or manual weed removal of noxious weeds conducted during the breeding and nesting season for migratory birds, including birds that are Species of Conservation Concern by the USFWS, the treatments could disturb and displace birds and impact vegetation that provides habitat for these species.

1.7.8 Threatened, Endangered or Candidate Plant Species

If herbicides are improperly applied near federally-listed or Candidate plant species, these species could be impacted by exposure to chemicals that could possibly kill or damage the plants or persist in the soil for extended periods, impacting soil health and productivity.

1.7.9 Threatened, Endangered or Candidate Animal Species

If herbicides are improperly applied, federally-listed or Candidate avian, terrestrial, or aquatic wildlife species could be exposed to high levels of chemicals that have the potential to injure or kill wildlife or persist in the soil, water, and vegetation for extended periods, impacting the quality and productivity of wildlife habitats.

1.7.10 Wilderness

The Cottonwood Canyon Wilderness and Red Mountain Wilderness are within the Red Cliffs NCA. If herbicides or other types of weed treatments were to be improperly applied in either wilderness area, native vegetation communities, wildlife habitat, or the diverse native wildlife species that contribute to the naturalness of the wilderness areas could be impacted.

1.7.11 Lands with Wilderness Characteristics

Lands with wilderness characteristics have been identified in both NCAs (16,721 acres in the Beaver Dam Wash NCA and 1,586 acres in the Red Cliffs NCA) and are being managed to protect those values through various decisions in the NCA RMPs (BLM 2015; 2016a, b). If herbicides or manual removal weed treatments were to be improperly applied, native vegetation communities and wildlife that contribute to the naturalness of these lands could be impacted.

1.8 ISSUES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The ID Team Checklist in **Appendix A** lists the resources and land uses that were screened by the BLM ID Team and provides a rationale for their findings. Some resources and land uses were dismissed from further analysis in this EA, either because they are not present or would not be affected to a degree that requires detailed analysis.

2.0 CHAPTER 2—DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the alternatives considered to address the purpose of and need for action by the BLM to control and eradicate noxious weeds and exotic invasive species in the Beaver Dam Wash and Red Cliffs NCAs. Goals, Objectives, and Management Actions from the RODs/approved RMPs for the Beaver Dam Wash and Red Cliffs NCAs (BLM 2016a,b) would continue to guide the control and eventual eradication of noxious weeds and invasive species in the NCAs.

2.2 ALTERNATIVE DEVELOPMENT

The IWMP is the Proposed Action and is described in detail in this chapter, with the potential environmental consequences associated with its implementation analyzed in **Chapter 4**. The No Action alternative (the status quo or no change from current management) is also included as an alternative in this EA, as required by Council on Environmental Quality regulations (40 CFR §1502.14d), and the potential environmental consequences of implementing this alternative are analyzed, as a baseline for comparison of the impacts that might result from implementation of the Proposed Action.

2.3 ALTERNATIVE A – PROPOSED ACTION

The Proposed Action comprises an IWMP that describes in detail the specific methods that would be used in the prevention, control, and eradication of noxious weeds and exotic invasive species within the NCAs. It incorporates the best available science, as the methodologies were developed using the prior EIS-level analyses and the latest research concerning the effects of specific herbicides on native vegetation, soils, wildlife, and human health. The methodologies proposed for herbicide use in habitats for threatened or endangered plant and animal species include conservative resource protection measures, tailored to local conditions, and designed to ensure that treatments do not result in harm to these species. The supporting Programmatic EA discloses the potential environmental consequences to the human environment of implementing the IWMP in the two NCAs.

The Proposed Action would comply with all relevant federal laws, regulations, and agency policies, as well as applicable state statutes, county, and municipal ordinances. The treatments described under the Proposed Action would only be implemented on public lands in the NCAs and with all applicable SOPs and resource protection measures listed in the Appendices to this EA. The resource protection measures identified in the Appendices have been specifically developed to conserve, protect, and enhance the natural and cultural resource values of the NCAs.

Under the Proposed Action, weed treatments in the NCAs are expected to be small scale, affecting less than 5 acres in a single area, and would be conducted primarily using either manual removal or ground-based herbicide control methods.

Herbicides used in ground-based treatments would be limited to those currently approved for use by the BLM, and to those that will be approved by the agency in the future, based on their proven safety, efficacy, and low risk to human health.

Under the Proposed Action, only one BLM approved pre-emergent herbicide, Imazapic, would be used in aerial treatments to create fire breaks or control exotic invasive annual grasses in re-vegetation plots, because its use has been shown to cause negligible impacts on native plants, wildlife, and human health.

Weed treatments would be directed by trained and qualified BLM staff and numerous factors would be evaluated when considering which type of treatment to use, including the size and location of the infestation, natural and cultural resources within and near the proposed treatment area, use of the area by the public, potential impacts to non-target species, the efficacy of the method, and its cost. As described in **Section 2.3.1**, non-herbicidal treatments would be the preferred method to control and eradicate weeds, followed by spot treatments with herbicides. Aerial herbicide spraying would be used infrequently, and very selectively, to primarily create linear firebreaks. The herbicides would only be those that have been approved for use on public lands and analyzed in the Programmatic EIS documents listed in **Chapter 1** at **Section 1.4** or that are approved in the future by the BLM, through a NEPA process. Standard Operating Procedures (SOPs) and resource protection measures for all methods of weed treatment would be followed for every treatment (see **Appendix C**).

In the Cottonwood Canyon and Red Mountain Wilderness areas, weed treatments would be limited to manual removal methods and/or spot treatments with herbicides, using backpack sprayers. A minimum tool analysis using the interagency Minimum Requirements Decision Guide (MRDG; see **Appendix F**) would be completed prior to any treatments within designated wilderness areas.

2.3.1 Methodologies

Six methodologies are typically proposed for use in integrated weed management programs: preventive, cultural, manual, mechanical, biological, and chemical. The Proposed Action proposes to use four of those methods, discussed briefly below.

1. Preventative: Preventative weed control refers to those methods used to identify existing infestations and those that aim to prevent weeds from being established. Identification efforts include field inventory to locate and map existing infestations and prioritize them for treatment. Efforts to prevent the establishment of new infestations can include requiring the use of certified weed free products, such as mulches, for reclamation projects or the cleaning of heavy equipment prior to use on projects that will create new surface disturbances (see **Appendix C** for NCA-specific prevention measures). These requirements are generally among the terms and conditions of rights-of-way grants or other land use authorizations issued by the BLM for projects on public lands.

2. Cultural: Cultural methodologies refers to techniques that control and eradicate weeds, as well as actions to remediate surface disturbances and wildfire impacts, so that weeds are

less likely to become established or proliferate. The following are examples of cultural remediation methods that would be regularly used under the Proposed Action.

- Seeding: using NCA-approved native grass, forb, and shrub seeds from appropriate ecoregion sources. Hand broadcasting and raking, using a broadcast spreader, rangeland drill, or aerial seeding are examples of methods that would be used under the Proposed Action.
- Planting: using NCA-approved native grass, forb, and shrub plants grown from appropriate ecoregion sources, typically propagated off-site. Hand tools or small heavy equipment, such as a skid steer with an auger bit, would be used for plantings, typically following wildfires, surface disturbances, or weed treatments, where the goal is to introduce/increase desirable vegetation species to the area.
- Live Staking: Live staking treatments include staking of woody riparian species that readily produce roots from cuttings when in contact with the water table (e.g., willow - *Salix* spp., cottonwood - *Populus* spp.). These treatments would occur in riparian zones where exotic invasive species like tamarisk (*Tamarix ramosissima*) and Russian olive (*Eleagnus angustifolia*) are being controlled or where establishment of native species would prevent establishment of undesirable species. Live stakes would be pushed or hammered directly into the soil, although rockier sites may require that a hole be created using a metal bar. Woody material to be staked would be collected from vigorous, nearby riparian vegetation. No more than 30 percent of the live material from any individual plant would be cut and removed for staking material.

Prior to implementation, proposals for seedings that involve surface disturbances or out plantings would be reviewed by the NCA Archeologist, an Area of Potential Effect (APE) defined, and a literature review completed to determine if Class III level archeological inventories or re-inventories of the APE are needed. Field surveys would be conducted, as needed, and site documentation or documentation updates completed. National Register of Historic Places (NRHP) eligibility determinations would be made and potential effects to historic properties related to the proposed undertaking evaluated. Projects would be redesigned to avoid adverse effects.

Approximately 25-100 acres/year could be treated in each of the NCAs, using cultural methods, depending on funding, weed inventories, and other factors, such as wildfire activity.

<u>Cultural Methods Not Authorized under the Proposed Action</u>

The use of management ignited (prescribed) fire is considered a cultural method that would not be used as a weed control or eradication method in the NCAs, as it is not in conformance with management decision FIR 6 from the RODs and approved RMPs for both NCAs (BLM 2016a, b; refer to **Section 1.4**, page 5 of this EA for full text of the decision).

<u>Cultural Method authorized under the Proposed Action but not analyzed in detail in this Programmatic EA.</u>

The use of contracted domestic grazing animals for targeted weed control projects was authorized in Management Action VEG-9 (refer to **Section 1.4**, page 5 of this EA for the full text of the

decision) in the approved RMPs for both NCAs (BLM 2016a, b). As described in Table 3 in the RODSs (BLM 2016a, b; pp. 28), targeted grazing by contracted domestic sheep and goat herds can only be authorized in specific settings in the NCAs, such as along roadways or at trailheads, and only if other conditions are met. These conditions include containment of the herds within the target weed control area, through temporary fencing, herding, or other measures, and immediate removal of all animals upon completion of the contracted work. In the Beaver Dam Wash NCA, contracted domestic sheep and goat herds can only be used for targeted weed control projects where appropriate separation distances (as defined by Utah Division of Wildlife Resources; UDWR) from desert bighorn sheep (*Ovis canadensis nelsoni*) herds can be maintained. A similar restriction would be in place in Red Cliffs NCA, should the UDWR re-introduce desert bighorn sheep into historic habitats in the Cottonwood Canyon or Red Mountain Wilderness areas.

Given the constraints on the use of this method for weed control, while it could be employed under the Proposed Action, its use would be very infrequent and any potential impacts difficult to analyze, without project specific information. It is, therefore, not analyzed in detail in this EA. If a weed control project using targeted grazing is proposed that satisfies the conditions identified in Table 3 (BLM 2016a, b; pp. 28), a project-specific NEPA analysis would be completed, and a FONSI/DR signed to authorize its use.

3. Manual Treatment: Manual control involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Examples of treatments that would be used in the NCAs include:

    - Cutting undesired plants above ground level; pulling, grubbing, or digging out the root systems of undesired plants to prevent sprouting and regrowth; and cutting at the ground level or removing competing plants around desired species. Hand tools include a handsaw, axe, shovel, rake, machete, grubbing hoe, mattock, Pulaski, brush hook, hand clippers, motorized chainsaw (outside of designated wilderness), string trimmers, "weed whackers", and power brush saws.

Approximately 5-25 acres/year could be treated in each of the NCAs using manual methods, depending on funding, weed inventories, and other factors, such as rainfall patterns and drought conditions. The methods discussed above may be used in combination with application of herbicides for increased effectiveness or efficiency if the proper safety and environmental constraints are applied to each method.

4. Chemical: Chemical treatment refers to any technique that involves the application of an herbicide to weeds or soil to control the germination or growth of the target species. Chemicals can consist of pelletized, granular, or liquid products and would likely be applied with an adjuvant, a chemical that modifies the properties of herbicides to make them more effective, such as allowing for more coverage or increasing the "stickiness" or adherence to the plant surface. All herbicides and adjuvants would be applied in strict conformity with the manufacturer's label restrictions. Chemical treatment would be accomplished, using only BLM-approved herbicide products, through various methods, such as spray bottles, backpack sprayers, off-highway vehicle (OHV) or truck-mount sprayers, broadcasters (i.e., granular product), and aircraft, as appropriate, based on treatment objectives.

Herbicide treatment areas would generally be small and linear, focused on enhancing the effectiveness of existing roads and utility ROWs to act as firebreaks. No large landscape-level treatments of exotic invasive annual grasses are anticipated in either NCA. Approximately 50-150 acres/year could be treated and/or retreated with herbicides in each of the NCAs. The number of acres treated would be variable from year to year, and more or fewer acres might be treated, depending on funding, inventories, and other factors, such as rainfall patterns and drought conditions.

The SOPs listed in **Appendix C** would be incorporated as part of the Proposed Action, as would any new SOPs that are developed in the future, to ensure that human health is not affected by herbicide applications. The SOPs and other resource protection measures in **Appendix C** have been specifically tailored to conserve and protect the natural and cultural resources of the two NCAs. Treatment within critical and suitable habitats potentially occupied by federally listed and BLM Sensitive plant and animal species would be inventoried by a qualified biologist immediately prior to the start of treatments, and seasonal restrictions/buffers would be used (see **Appendix C**). All applicators would comply with federal and state law, as well as Department of Interior and BLM policies. They would be certified by the State of Utah as a pesticide applicator or would work under the direct supervision of a certified applicator. The BLM would implement measures to mitigate potential adverse environmental effects related to the use of herbicides and these are listed in **Table 2-1**.

Pesticide Use Proposal (PUP)

Prior to any herbicide application, an approved Pesticide Use Proposal (PUP) would be obtained. A PUP is an internal BLM document that proposes specific use of an herbicide, including the location, rates allowed on the label, the rates intended for individual applications, target species, timing, and environmental considerations (risk assessment factors) such as soils and sensitive species. In Utah, most PUPs are valid for 3 years, if there are no changed circumstances.

Within 24 hours of an herbicide application, a Pesticide Application Record (PAR) form would be completed by the Applicator. These records are kept for at least 10 years by the BLM. Information on the PAR includes applicator information, project information, weather conditions, equipment used, herbicide information, weed species treated, application rates, and the number of acreages treated.

The Proposed Action would allow the use of 19 of the 21 active ingredient herbicides currently authorized for use on public lands, and other herbicides that may be approved by the BLM in the future (see **Appendix D**). **Table 2-1** shows the active ingredients and trade names of the herbicides currently approved for use on public lands in Utah that could be used under the Proposed Action.

The final Biological Opinion issued by the USFWS for the 2007 Programmatic EIS (BLM 2007a) prohibited use of dicamba, due to its potentially unacceptable effects on California condor (*Gymnogyps californianus*) and Mojave desert tortoise (*Gopherus agassizii*). Dicamba is, therefore, not an approved herbicide for use under the Proposed Action. Tebuthiuron is included in the BLM (2007a) EIS but is generally listed and utilized as a broadleaf brush killer. Since this Proposed Action does not target brush species, it will not be analyzed in this EA.

The BLM releases lists of approved herbicides (by trade names) and names of adjuvants each year and these lists would be consulted to assure that only approved herbicides are used in the two NCAs.

Table 2-1. Active ingredients and trade names of approved herbicides for use on public lands in Utah that could be used under the Proposed Action.

Active Ingredient	Example Formulation Trade Name(s)*
Aminopyralid	Milestone
Bromacil	Bromacil 80DF, Hyvar X, Hyvar XL, Alligare Bromacil 80
Bromacil and Diuron	Alligare Bromacil/Diuron 40/40, Ceannard Diuron/Bromacil 80 DF, DiBro 2+2, DiBro 4+2, DiBro 4+4, Krovar I DF, Krovar I DF, Weed Blast 4G, Weed Blast Res. Weed Cont.
Chlorsulfuron	Alligare Chlorsulfuron 75, Chlorsulfuron E-Pro 75 WDG, Nufarm Chlorsulf SPC 75 WDG Herbicide, Telar XP
Clopyralid	Alligare Clopyralid 3, CleanSlate, Pyramid R&P, Reclaim, Spur, Stinger, Transline
Diquat	Alligare Diquat Herbicide, Diquat E-AG 2L, Diquat E-Pro 2L, Diquat SPC 2L Herbicide, Nufarm Diquat 2L Herbicide, Reward
Diuron	Alligare Diuron 4L, Alligare Diuron 80DF, Ceannard Diuron 80DF, Direx 4L, Diuron 4L, Diuron 80, Diuron 80 WDG, Diuron 80DF, Diuron 80WDG, Karmex DF, Karmex IWC, Karmex XP, Parrot 4L, Parrot DF
Fluridone	Alligare Fluridone, Avast!, Fluridone 4L, Sonar AS, Sonar Precision Release, Sonar Q, Sonar SRP
Fluroxypyr	Alligare Flagstaff, Alligare Fluroxypyr, Comet Selective, Vista XRT
Glyphosate	Accord Concentrate, Accord SP, Accord XRT, Accord XRT II, Alligare Dryphosate 75SG, Alligare Glyphosate 4 PLUS, Alligare Glyphosate 5.4, Aqua Neat, Aqua Star, Aquamaster, AquaPro Aquatic Herbicide, Buccaneer, Buccaneer Plus, Credit Xtreme, Foresters, Gly Star Gold, Gly Star Original, Gly Star Plus, Gly Star Pro, Gly-4, Gly-4 Plus, GlyphoMate 41, Glypro, Glypro Plus, Honcho, Honcho Plus, Imitator Aquatic, Imitator DA, Imitator Plus, KleenUp Pro, Mad Dog Plus, Makaze, Mirage, Mirage Herbicide, Mirage Plus, Rattler, Razor, Razor Pro, Rodeo, Roundup Custom, Roundup Original, Roundup Original II, Roundup Original II CA, Roundup PROMAX, Roundup PRO, Roundup PRO Concentrate, Roundup PRO Dry, Showdown
Hexazinone	Pronone 10G, Pronone 25G, Pronone MG, Pronone Power Pellet, Velosa, Velpar DF, Velpar DF VU, Velpar L, Velpar L VU, Velpar ULW
Imazapic	Alligare Panoramic 2SL, Nufarm Imazapic 2SL, Open Range G, Plateau
Imazapyr	Alligare Ecomazapyr 2SL, Alligare Imazapyr 4SL, Alligare Rotary 2 SL, Arsenal, Arsenal Applicators Conc., Arsenal PowerLine, Chopper, EZ-JECT Copperhead Herbicide Shells, Habitat, Habitat Herbicide, Polaris, Polaris AC, Polaris AC Complete, Polaris AQ, Polaris Herbicide, Polaris RR, Polaris SP, SSI Maxim Arsenal 0.5G, SSI Maxim Arsenal 5.0 G, Stalker
Metsulfuron methyl	Alligare MSM 60, AmTide MSM 60DF Herbicide, Cimarron MAX - Part A, Cimarron MAX - Part A, Escort XP, Patriot, PureStand, Rometsol
Picloram	Alligare Picloram 22K, Grazon PC, OutPost 22K, Tordon 22K, Tordon K, Triumph 22K, Triumph K, Trooper 22K
Rimsulfuron	Alligare Laramie 25DF, Hinge, Matrix SG
Sulfometuron methyl	Alligare SFM 75, Oust XP, Oust DF, Oust XP, Spyder
Triclopyr	Alligare Boulder 6.3, Alligare Triclopry 4, Alligare Triclopyr 3, Element 3A, Element 4, Forestry Garlon XRT, Garlon 3A, Garlon 4, Garlon 4 Ultra, Pathfinder II, Relegate, Relegate RTU, Remedy, Remedy Ultra, Renovate 3, Renovate OTF, Tahoe 3A, Tahoe 4E, Tahoe 4E Herbicide, Triclopyr RTU, Trycera, Vastlan

Active Ingredient	Example Formulation Trade Name(s)*
2, 4-D	2,4-D 4# Amine Weed Killer, 2,4-D Amine, 2,4-D Amine 4, 2,4-D Amine 4, 2,4-D LV 4, 2,4-D LV 6 Ester, 2,4-D LV4, 2,4-D LV 6, 2,4-D LV6, 2,4-D LV6, Alliagre 2,4-D Amine, Alligare 2,4-D LV 6, Aqua-Kleen, Barrage HF, Barrage LV Ester, Base Camp Amine 4, Base Camp LV6, Broadrange 55, Clean Amine, Clean Crop Amine 4, Clean Crop Low Vol 6 Ester, Clean Crop LV-4 ES, Cornbelt 4 lb. Amine, Cornbelt 4# LoVol Ester, Cornbelt 6# LoVol Ester, D-638, Esteron 99C, Five Star, Formula 40, Freelexx, HardBall, Hi-Dep, Low Vol 4 Ester Weed Killer, Low Vol 6 Ester Weed Killer, Opti-Amine, Platoon, Rugged, Saber, Salvo, Salvo LV Ester, Savage DS, Savage DS, Shredder 2,4-D LV4, Shredder Amine 4, Solution Water Soluble, Solve 2,4-D, Unison, Weedar 64, WEEDestroy AM-40, Weedone LV-4, Weedone LV-4 Solventless, Weedone LV-6, Whiteout 2,4-D

Herbicide Used for Aerial Application

Under the Proposed Action, aerial application would only involve the use of Imazapic (e.g., Plateau®) and approved adjuvants. Imazapic is the most widely used herbicide for ground-based and aerial brome grass control and would be applied as a pre-emergent. It works by stopping amino acid synthesis in cheat grass and red brome. When properly applied, it does not have a negative impact on native grasses and poses a relatively low health risk to humans and animals. Aerial applications would occur during the late fall/winter before the brome grasses germinate in response to seasonal precipitation. The application period would coincide with the desert tortoise less active season (December 1 to February 14), when tortoises are in underground burrows or dens for the winter and their above-ground activity is greatly reduced (Barrett 1990; Bulova 1994; USFWS 1990, 2011).

Herbicides Used for Ground Application

Any infestations of species identified on Utah's Designated Noxious Weed List (see **Table 3-1**) could be treated through ground-based herbicide applications, as well infestations of exotic invasive species such as cheatgrass, red brome, Russian thistle (*Salsola paulsenii*), London rocket (*Sisymbrium irio*), bull thistle (*Cirsium vulgare*), redstem storksbill/filaree (*Erodium cicutarium*), and Russian olive. Species specific treatment options under the Proposed Action are found in **Appendix E**.

Generally, ground-based weed treatments would take place prior to the plants setting seed. Species specific treatment options could be modified if a BLM ID Team determines that a new technique or program would provide more effective control of weeds and the environmental impacts have been adequately analyzed and disclosed in this EA.

Monitoring

Short-and long-term monitoring of treatment areas and evaluations of the efficacy of the approved treatment methods would be a key component of the IWMP for both NCAs. Management decision WED-7 from the approved NCA RMPs (BLM 2016a, b) directs that monitoring be conducted and treatments of weed infestations be continued, as needed, for a minimum of 5 years or until the target species is eradicated. The goals of monitoring would be to determine whether infestations have been successfully reduced in aerial extent following treatment and to evaluate which

treatment methods have proven to be the most effective and cost efficient, while creating the fewest negative environmental impacts, for a specific noxious weed or invasive species. In general, treatments would be monitored using *Guidelines for Coordinated Management of Noxious Weeds* (Free and Mullin 1998). For aerial herbicide applications, vegetation would be monitored using elements of the Assessment Inventory and Monitoring (AIM) methods (Herrick et al., 2005).

2.1 ALTERNATIVE B – NO ACTION ALTERNATIVE

The Goals, Objectives, and Management Actions from the RODs/approved RMPs for the Beaver Dam Wash and Red Cliffs NCAs (BLM 2016a, b) would continue to guide the control and eradication of noxious weeds and invasive species in the NCAs, under the No Action alternative. Any of the control methods listed under VEG-9 and Table 3 could be authorized for use in the NCAs, depending on the target species, infestation level, site characteristics, and project scale.

This alternative would differ from the Proposed Action in that no IWMP is approved, so the best available science and comprehensive direction concerning the field methods, SOPs, and resource protection measures would not be available to guide the control and eradication of noxious weeds and exotic invasive species in the two NCAs. There would be no programmatic EA analysis or Biological Opinion in place to cover proposed treatments. Each treatment would require that a project-specific NEPA analysis and Biological Assessment be prepared unless a prior EA or EIS adequately covered the proposal. Fulfilling the environmental compliance requirements for each treatment could delay implementation and increase the overall costs of the project, given the additional BLM staff time that would be required to prepare the required analyses and assessments.

Under the No Action alternative, targeted grazing by contracted domestic goat herds and manual removal by hand crews using string trimmers could be implemented as management tools along the fenced road shoulders of the Cottonwood Springs Road, as analyzed in the 2011 EA for the *Cottonwood Road Wildland Fuels Reduction Project* (BLM 2011). For this treatment method to be employed elsewhere in the NCAs, a project specific EA and Biological Assessment would need to be completed before either could be authorized. The treatment proposal would need to be in conformance with Management Action VEG-9 (refer to **Section 1.4**, page 5 of this EA). The use of targeted grazing would be limited to along roadways or at trailheads, and ONLY if specific conditions can be met. These include containment of the herds within the target area through temporary fencing or herding, and immediate removal of the animals upon completion of the contracted work. In Beaver Dam Wash NCA, contracted domestic sheep and goat herds could only be used for noxious weed or exotic invasive species control projects where appropriate separation distances from desert bighorn sheep populations could be maintained. A similar restriction would be in place in Red Cliffs NCA, should the UDWR re-introduce desert bighorn sheep into historic habitats in the Cottonwood Canyon or Red Mountain Wilderness areas.

The use of a BLM-approved pre-emergent herbicide could also continue to be used as a weed management tool along specific roadways in the Red Cliffs NCA, as analyzed in the EA entitled *Cheatgrass Control for Road Corridors in Red Cliffs National Conservation Area* and approved by the FONSI/DR signed by the BLM in 2013 (BLM 2013). The EA analyzed the environmental consequences of the localized control of cheatgrass and red brome along the Cottonwood Springs

Road, Babylon Road, and the Red Cliffs Recreation Area Road, using ground-based herbicide applications, to enhance the effectiveness of these existing roads to act as firebreaks.

Short-and long-term monitoring of treatment areas and evaluations of the efficacy of the approved treatment methods would be conducted under the No Action alternative for treatments in both NCAs. Management decision WED-7 from the approved NCA RMPs (BLM 2016a, b) directs that monitoring be conducted and treatments of weed infestations be continued, as needed, for a minimum of 5 years or until the target species is eradicated

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Other weed treatment methods were considered but were not included in the Proposed Action and were not analyzed in detail in this EA, because the potential environmental consequences were evaluated by the BLM ID Team as being uncertain and/or unacceptably high.

Biological Treatments: Biological treatments employ insects, nematodes, fungi, pathogens, and mites to control and eradicate weeds. These treatments can involve a high level of risk, in that the biological organisms can spread to areas beyond the treatment sites or shift to other plants that are not target weed species. Given the potential, but uncertain, environmental consequences that could result from biological treatments, this method was not included under the Proposed Action and not carried forward for detailed analysis in this EA.

Mechanical Control Treatments: Mechanical control refers to the use of heavy equipment, either motorized or mechanized, such as bulldozers, tractors, plows, mulching machines, brush hogs, grubbers, etc. to remove noxious weeds or invasive species. This method could kill, injure, or displace many species of terrestrial wildlife, including the threatened Mojave desert tortoise. Heavy equipment could crush or collapse dens and burrows, leave exposed soils vulnerable to increased erosion and new weed infestations, damage or destroy desirable native vegetation communities, and disturb desert pavement and biological soil crusts. The use of this equipment could also adversely affect cultural resources. The impacts on the natural and cultural resources of the NCAs that could result from the use of heavy equipment as a mechanical control treatment for noxious weeds and invasive species were considered by the ID Team, and determined to be unacceptably high, given the resource conservation and protection purposes identified by the designation legislation for both NCAs. This method was, therefore, not included under the Proposed Action and not carried forward for detailed analysis in this EA.

3.0 CHAPTER 3—AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter discusses aspects of the existing environment that may be potentially affected by implementation of the Proposed Action or the No Action alternative, as identified by the ID Team Checklist (**Appendix A**).

This EA serves as the Biological Assessment (BA) for the IWMP for the NCAs (Proposed Action) for consultations with the USFWS under Section 7 of the ESA. To assist the USFWS in its review of the EA/BA, the life history, habitat requirements, and regulatory status for all species currently listed under the protection of the ESA are described in detail in this chapter.

3.2 GENERAL SETTING

The project area is defined as the two NCAs, which combined total approximately 109,245 acres of public land in two locations in Washington County, Utah (refer to **Figure 1**). The reader is referred to Chapter 3-Affected Environment of the *Draft Resource Management Plans for the Beaver Dam Wash National Conservation Area and the Red Cliffs National Conservation Area* (BLM 2015) for more detailed information about each NCA.

Beaver Dam Wash NCA

The 63,645-acre Beaver Dam Wash NCA, located in the southwestern corner of Washington County, is bounded on the west by the Nevada state line and by the Arizona state line on the south (**Figure 2**). Old Highway 91 is the only paved roadway through the NCA. The NCA is within an ecological transition zone between the hot, arid Mojave Desert and the cooler Great Basin Desert. Desert shrubs grow at the lower elevations of the NCA and provide critical habitat for the federally listed threatened Mojave desert tortoise and other wildlife typically associated with the Mojave Desert. Joshua trees (*Yucca brevifolia*) and dense stands of blackbrush (*Coleogyne ramosissima*) cover the foothills of the Beaver Dam Mountains, the dominant landform of the eastern NCA. Surface water flows seasonally in Beaver Dam Wash and sustains riparian vegetation that provides important habitat for seasonal migratory birds and permanent wildlife residents of this NCA. The Beaver Dam Wash NCA encompasses designated critical habitat for the Mojave desert tortoise within the Northeastern Mojave Recovery Unit (USFWS 1994a, b; 2011).

Red Cliffs NCA

Located in southcentral Washington County, the approximately 45,600-acre Red Cliffs NCA is a colorful mosaic of sandstone, sand dunes, lava flows, and mesas at the base of the Pine Valley Mountains (**Figure 3**). The Red Cliffs NCA is located at the convergence of three major ecoregions: the Mojave Desert, Colorado Plateau, and Great Basin. This convergence is responsible for the geological complexity of its landscape and its rich biodiversity. Substantial areas of the Red Cliffs NCA are in the wildland-urban interface, as residential subdivisions and light industrial areas are located along all but the northern boundary of the NCA.

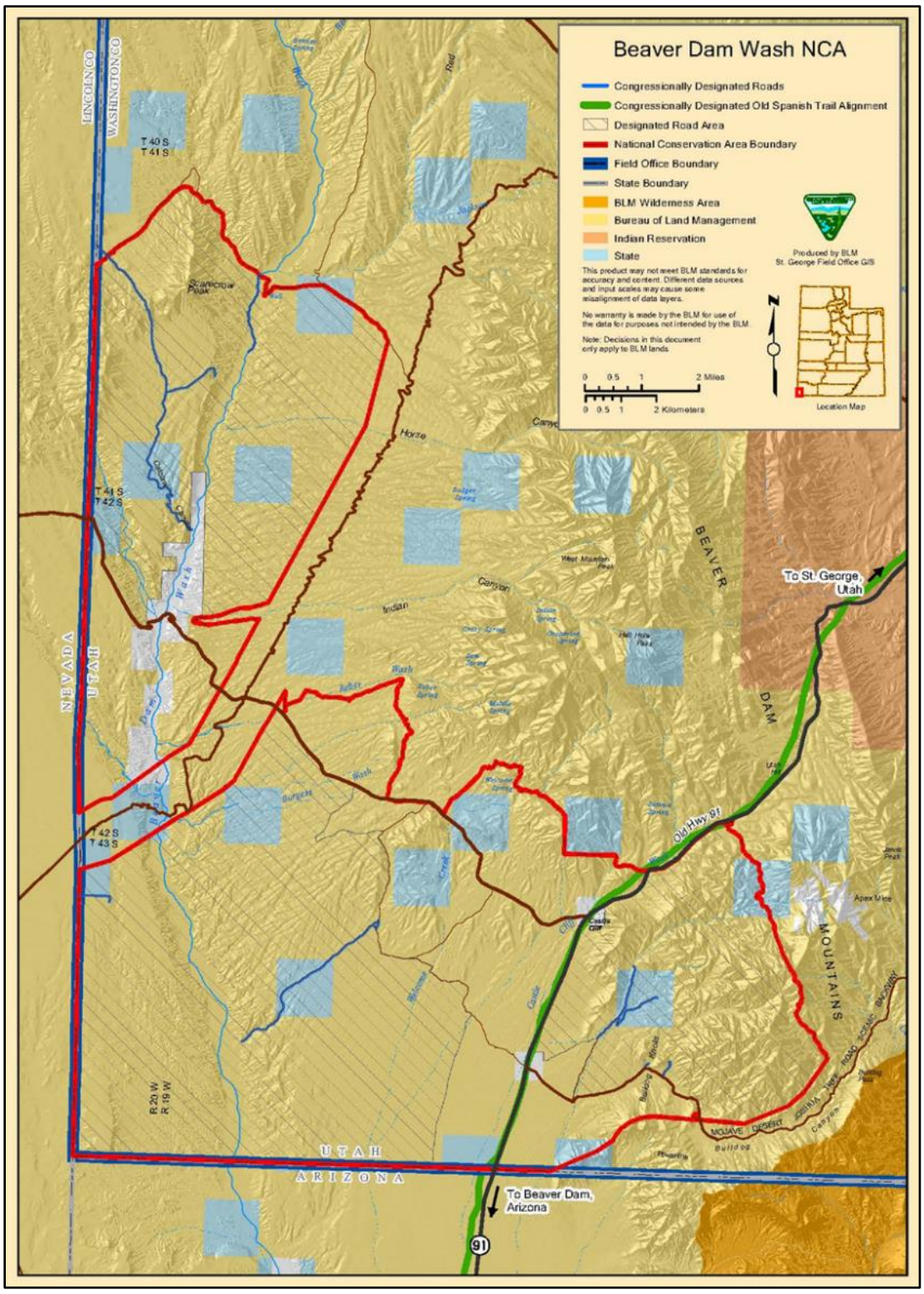

Figure 2. Map showing the location and land ownership in the Beaver Dam Wash NCA.

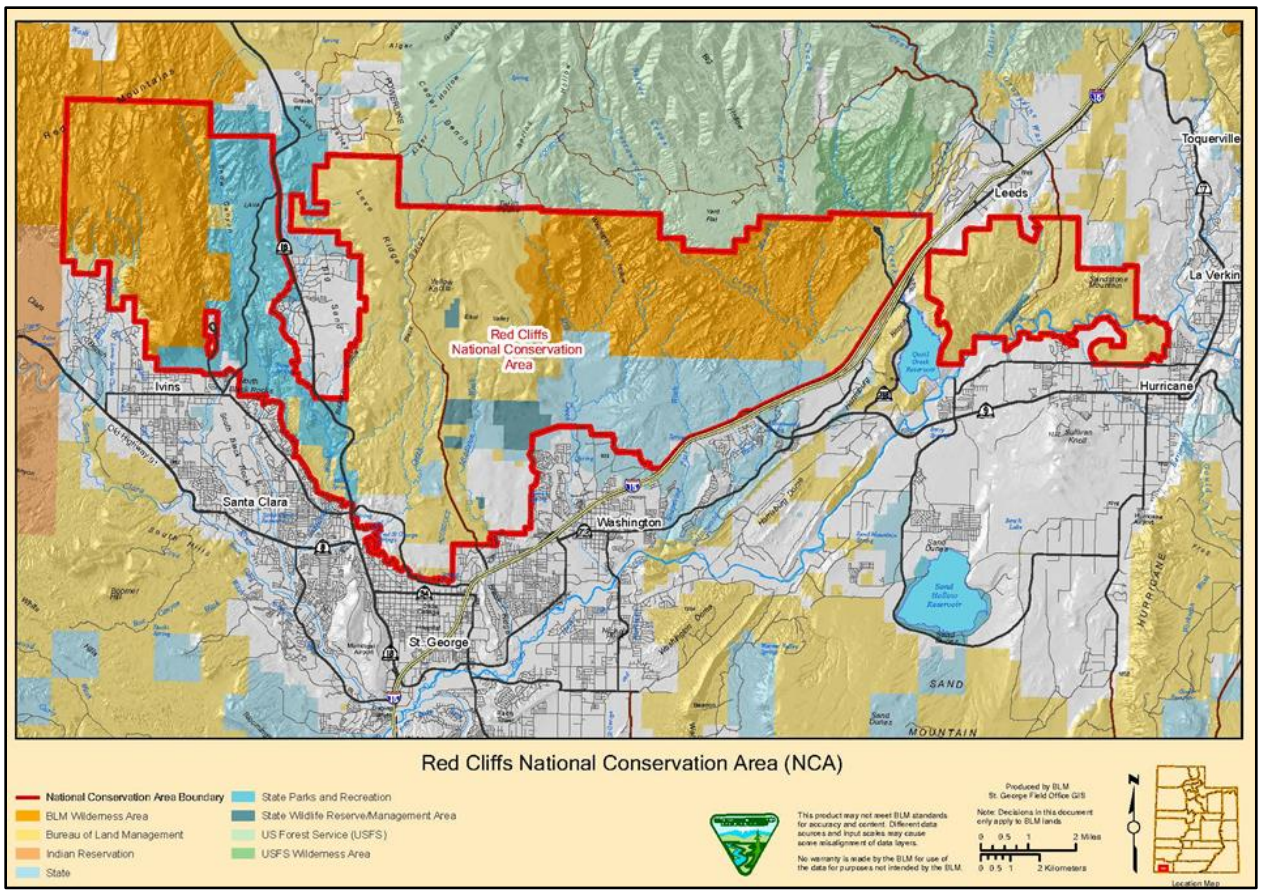

Figure 3. Map showing the location and land ownership in the Red Cliffs NCA.

Two designated Wilderness areas are within the boundaries of the Red Cliffs NCA. The 11,668-acre Cottonwood Canyon Wilderness, included in the National Wilderness Preservation System (Wilderness System) in 2009 through OPLMA, is located entirely within the Red Cliffs NCA. It shares a common boundary with a portion of the Cottonwood Forest Wilderness, managed by the Pine Valley Ranger District of the Dixie National Forest, also added to the Wilderness System by OPLMA. Approximately 8,321 acres of the 18,689-acre Red Mountain Wilderness, included in the Wilderness System in 2009, are located within the Red Cliffs NCA.

The Red Cliffs NCA encompasses designated critical habitat for the Mojave desert tortoise within the Upper Virgin River Recovery Unit. This recovery unit was identified as the smallest and most at-risk recovery unit within the Mojave desert tortoise's range by the Mojave Desert Tortoise Recovery Plan (USFWS 1994a, 2011). The Virgin River and several of its tributaries (e.g., Leeds Creek, Quail Creek) flow through portions of the Red Cliffs NCA.

3.3 RESOURCES CARRIED FORWARD FOR DETAILED ANALYSIS

The resources described below have the potential to be affected by the Proposed Action and No Action alternative; the potential impacts are analyzed in **Chapter 4**.

3.3.1 Water Resources/Quality

Beaver Dam Wash NCA

Three hydrologic units overlap the Beaver Dam Wash NCA (see Map 3-1 in BLM 2015). The Bull Valley Mountains and Beaver Dam Mountains in Utah and the Clover Valley Mountains in eastern Nevada create a massive watershed that drains into the Beaver Dam Wash and carries perennial and ephemeral flows to the Virgin River at a confluence near Beaver Dam, Arizona.

Water resources include surface and groundwater sources located within major watersheds. In accordance with Section 303(d) of the Clean Water Act (CWA), and in cooperation with the U.S. Environmental Protection Agency (EPA), the Utah Department of Environmental Quality (UDEQ) establishes water quality standards and designated uses for surface waters in the state. These standards include acceptable levels for turbidity, pH, trace metals, salinity, and other total dissolved solids (TDS), bacterial levels, and sediment loads. The UDEQ reports on streams and rivers that are not meeting water quality standards for their designated uses, identifies the cause(s) of impairment, and calculates a total maximum daily load (TMDL) for water bodies not meeting standards. Surface water resources on public lands are managed to ensure that water quality standards are not exceeded because of BLM actions or land use authorizations.

Stream flows in the Beaver Dam Wash are the only significant surface water source in the NCA. Originating in the Bull Valley Mountains of southwestern Utah, Beaver Dam Wash meanders west into Nevada, then returns to Utah, where it flows south to join the Virgin River in Arizona. The stream of the Beaver Dam Wash, with its deeply incised 200-foot-high channel, flows north-south through the NCA for approximately 17 miles. The channel ranges from approximately 1,500 feet wide at the northern boundary of the NCA to 2,500 feet wide near the Utah-Arizona state line. Tributaries to the Beaver Dam Wash include the West Fork (a perennial stream that arises in Nevada) and the East Fork (a perennial stream that originates on the Dixie National Forest and drains southwesterly into the Wash). Surface water travels through the NCA during periods of seasonal runoff and after intense monsoonal storms but is otherwise present yearlong only in the upper reaches of Beaver Dam Wash, north of the NCA.

Stream flows in the upper Beaver Dam Wash are derived from the discharge of ground water in the channel alluvium and are generally consistent in quantity and quality, varying little throughout the year. Surface flows also result from periodic precipitation events, with the duration of surface flow dependent on the type of event. For example, summer monsoonal storms are brief, high-intensity rainfall events that can produce significant amounts of short-term runoff and surface flows. In contrast, winter storms generally are longer duration events that produce runoff for several days. Ephemeral washes convey seasonal and intermittent flows, augmenting the volume of surface flows collected by the Beaver Dam Wash. DEQ has identified the beneficial use of

surface flows of the Beaver Dam Wash as being for warm water aquatic life (3B). Based on biennial assessments by UDEQ, Beaver Dam Wash meets the water quality standards for this use.

Welcome Spring is the only spring complex known to occur on public lands within and near the NCA and is located along its northwestern boundary. Seepage occurs along the base of a limestone outcrop at multiple locations in the narrow canyon of Welcome Spring Wash. A narrow zone of riparian vegetation is also sustained by seepage and seasonal runoff in Welcome Spring Wash.

As the NCA has not been systematically inventoried to identify all springs and seeps on public lands, there is some likelihood that additional surface water sources may be present. Other springs and constructed reservoirs located outside of the NCA boundaries supply water through long-distance pipe systems for domestic livestock and wildlife use within the NCA.

Red Cliffs NCA

Two hydrologic units overlap the Red Cliffs NCA (see Map 3-29 in BLM 2015). The land base east of the Cottonwood Road is within the Gould Wash-Virgin River watershed, while the remainder of the NCA is located with the Lower Santa Clara River watershed. Both watersheds drain to and recharge the Virgin River system, through its major and minor tributaries.

Leeds and Quail Creeks, the Virgin River, and numerous ephemeral washes comprise the primary surface water sources of the NCA. Leeds and Quail Creeks are shallow streams whose headwaters are springs in the Pine Valley Mountains. Snowmelt from the Pine Valley Mountains and seasonal precipitation events increase the volume of flows for each stream. Leeds Creek is perennial through the NCA, while Quail Creek is today an intermittent stream, as water is diverted for irrigation purposes upstream on private lands. The confluence of Leeds and Quail Creeks is within in the NCA, approximately 0.65 mile north of I-15 and 2 miles south of the community of Leeds, Utah. Data from a United States Geological Survey (USGS) stream flow gage on Leeds Creek indicate that flows are highly variable, from as little as 8 cfs to as much as 4,420 cfs; similar data are not available for Quail Creek.

Water quality data for Leeds Creek is collected by UDEQ at a location near the community of Leeds. According to the most recent UDEQ Water Quality Standards Exceedance Report (February 4, 2010), the levels of phosphorus detected in Leeds Creek exceeded the acceptable range for the identified beneficial use classes for this stream: Agriculture (4) and Cold-Water Species (3A). Other water quality parameters for Leeds Creek were within the acceptable limits. Stream flows from Quail Creek are seasonally diverted, leaving little or no surface water in the channel through the NCA during the late spring and summer months. Because this stream is intermittent on public lands, BLM does not currently collect water quality data for Quail Creek.

The Virgin River flows for approximately 6 miles through the NCA. The river's headwaters are located north of Zion National Park on the Dixie National Forest. The volume of water carried by the river is augmented by many large and small tributaries as it flows southwesterly through Washington County, the Arizona Strip, and southern Nevada to the Colorado River. Along its 162-mile length, the Virgin River provides habitats for unique plant and animal species, some of which are endemic to southwestern Utah and this river system.

The water quality of various reaches of the Virgin River, including the short segment through the NCA, is impaired by the naturally occurring high levels of total dissolved solids (TDS), the sources of which are primarily geologic. Reaches of the river below Pah Tempe Spring (near Hurricane, Utah) are listed on the State of Utah's Section 303(d) list of impaired waters (EPA 2010) for the identified beneficial use of Agriculture (4) (UDEQ 2004).

Thistles, knapweeds, and perennial pepperweed (*Lepidium latifolium*) degrade riparian habitats and can lead to soil erosion and sedimentation, affecting hydrological function and fish habitat. There are currently no stream or river reaches within the NCAs that are non-functioning or functioning at risk due to weed infestations.

The NCA has not been systematically inventoried to identify all springs and seeps, so data on these resources is currently incomplete. An unnamed spring near Grapevine Wash is located on public land in the NCA.

3.3.2 Soils

Soil types in the NCAs are highly variable, reflecting the interactions of geology, topography, elevation, precipitation, and erosional processes over time. In the late 1960s, soil scientists with the USDA Soils Conservation Service completed broad scale mapping of the major soil types in the county, identifying their parent materials and susceptibility to wind and water erosion. The reader is referred to the Washington County Soil Survey (Mortensen et al. 1977) and BLM (2015) for specific description and more detailed information about the soil types that have been described for public lands in the NCAs.

Parent materials for soils in the county include sedimentary rocks such as limestone, mudstone, shale, gypsum, and sandstone, igneous rocks, and metamorphic rocks. Many alluvial soils have formed from mixes of these various parent materials. Sensitive and fragile soils are those identified as having characteristics that make them extremely susceptible to erosion or more difficult to reclaim after surface disturbances. Slope steepness also increases the erosion potential of these soils, as it increases the rate at which water will transport soil particles and create gullies. Because vegetative cover is generally sparse on these soils, soil particles are often not well anchored in place, thereby increasing the potential for soil movement during precipitation events.

Saline soils occur in areas of Washington County where the Moenkopi and Kayenta Formations are exposed. The gypsiferous beds of these formations contribute to the salinity of specific soil types, like the Eroded Land Shalet complex. Erosion of these soils can contribute to the salinity of surface water sources, such as the Virgin River. Surface run-off can be closely linked to the loss of vegetative cover, which could result from poorly designed herbicide applications to treat noxious weeds or exotic invasive species.

It is possible to control rates of soil erosion by managing vegetative cover and minimizing soil disturbances. Vegetative cover is the most important factor in controlling water erosion because it intercepts precipitation, reduces raindrop impact, restricts overland flow and improves infiltration. Vegetation cover, vertical structure and arrangement are also important factors in reducing the erosive forces of wind and function by slowing wind speeds close to ground level. Weeds generally

lack the characteristics necessary to control wind and water erosion because they are often annual forbs which produce unreliable (very dependent on precipitation) and insufficient canopy and basal cover. Annual weeds tend to have either tap roots or shallow fibrous roots, which lack soil holding capability. While soil erosion is a natural process, rates of soil loss may be accelerated if human activities, including the introduction and spread of weeds, are not carefully managed.

Biological soil crusts (also known as cryptogamic, microbiotic, cryptobiotic, or microphytic crusts) are commonly found in semiarid and arid environments. They improve soil stability and reducing erosion, fixing atmospheric nitrogen, contributing nutrients to plants, and assisting with plant growth (Belnap and Gardner 1993; Evans and Ehleringer 1993; Eldridge and Greene 1994; Belnap and Giliette 1998; Harper and Belnap 2001). Crusts are composed of a highly specialized nonvascular plant community consisting of cyanobacteria, green and brown algae, mosses, and lichens, as well as liverworts, fungi, and bacteria (Belnap and Phillips 2001).

3.3.3 Wetlands/Riparian Zones

Wetlands are generally defined as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support vegetation that is typically adapted for life in saturated soil, and include bogs, marshes, and wet meadows (BLM 2007a). Wetlands are regulated under Section 404 of the Clean Water Act as a subset of Waters of the United States. Within the NCAs, wetlands are typically associated with stream and riverbanks and springs.

Riparian areas have vegetation or physical characteristics directly influenced by permanent water. Although riparian areas and wetlands cover only a small percentage of the NCAs, they are ecologically significant. Many special status species either utilize or rely on riparian habitat for their survival. Dominant riparian vegetation includes cottonwoods, willows, sedges, grasses, and forbs.

3.3.4 Vegetation Excluding USFWS-Designated Species

Native vegetative communities in the NCAs reflect the convergence of the three major ecoregions in Washington County, the Mojave Desert, the Great Basin, and the Colorado Plateau. The reader is referred to BLM (2015) for more detailed information regarding native vegetation in the NCAs.

Beaver Dam Wash NCA

The Beaver Dam Wash NCA is within an ecological transition zone between the hot, arid Mojave Desert and the cooler Great Basin Desert. The Mojave Desert ecosystem covers the NCA, at its lowest elevations. Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) dominate, with bursage more prevalent in warmer and drier sites. Other common species include the iconic Joshua tree, Mormon tea (*Ephedra nevadensis*), broom snakeweed (*Gutierrezia sarothrae*), blackbrush, rubber rabbitbrush (*Ericameria nauseosa*), and native grasses like big galleta (*Pleuraphis rigida*), and bush muhly (*Muhlenbergia porteri*). Creosote bush communities are typically very open and species-poor, with considerable amounts of bare ground. Grasses in this ecosystem are relatively rare while cacti (*Cactaceae*) are relatively common. Each of these

native species have adapted to the temperature extremes and low annual precipitation rates that characterize this arid environment.

Typical vegetation found in the Great Basin ecosystem includes singleleaf pinyon (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), big sagebrush (*Artemesia tridentata*), cliffrose (*Purshia stansburiana*), bitterbrush (*Purhsia tridentata*) and Sonoran scrub oak (*Quercus turbinella*). Grasses such as sideoats gramma (*Bouteloua curtipendula*) and purple-threeawn (*Aristida purpea*) are generally found readily throughout much of the landscape. Common forbs include penstemon (*Penstemon* spp.) and globemallow (*Sphaeralcea* spp.).

The following are the native vegetation communities identified in the Beaver Dam Wash NCA: Big Sagebrush Steppe, Blackbrush, Creosotebush-White Bursage Scrub, Mountain Shrub, Mountain Mahogany, Pinyon-Juniper, Warm Desert Riparian, and Warm Desert Riparian-Wash (Provencher et al. 2011).

Red Cliffs NCA

The Red Cliffs NCA is located at the convergence of three ecoregions—the Mojave Desert, Great Basin, and Colorado Plateau, placing it within an ecologically-rich and diverse transition zone that is generally like that of the Beaver Dam Wash NCA. While these same ecozones also overlap in the Red Cliffs NCA, there are subtle differences in the species that are found within them, illustrating the effects of species interactions and evolutionary changes that occur in transition zones, sometimes called "edge effect." As one example, Joshua trees do not grow in the blackbrush community of the Red Cliffs NCA.

Red Cliffs NCA also exhibits many characteristics of the semi-arid benchlands and canyons that typify the Colorado Plateau ecoregion, including sandstone formations, sandy soils, slightly higher levels of precipitation, and slightly cooler temperatures. The influences of the Colorado Plateau allow native vegetation communities, like the desert sand sagebrush (*Artemisia filifolia*), to grow in Red Cliffs NCA, but not in Beaver Dam Wash NCA.

Typical vegetation found in the Mojave Desert and Great Basin ecosystems are described above in the Beaver Dam Wash NCA ecosystem descriptions.

The Colorado Plateau ecosystem includes woodland species, such as pinyon pine, Utah juniper, bitterbrush, cliffrose, ephedra (*Ephedra* spp.), Utah serviceberry (*Amelanchier utahensis*) and green-leaf manzanita (*Arctostaphylos patula*). At higher elevations, ponderosa pine (*Pinus ponderosa*), aspen (*Populus tremuloides*), and Gambel's oak (*Quercus gambelii*) can be found, with a grass and forb dominant understory.

The following are the general native vegetation classes for the Red Cliffs NCA: Big Sagebrush Steppe, Blackbrush, Creosotebush-White Bursage Scrub, Desert Sand Sagebrush, Montane Riparian, Mountain Shrub, Pinyon-Juniper, Warm Desert Riparian, Warm Desert Riparian-Wash, and Warm-Season Grassland (Provencher et al. 2011).

BLM Sensitive Plant Species

This category of species includes those that are on the Utah BLM State Director's Sensitive Species list. The public lands that provide habitats for sensitive species are managed to help ensure that these species do not require future listing under the ESA. The species that have been observed in the NCAs, or that could potentially be found there, are described below.

Virgin River thistle

The Virgin River thistle (*Cirsium virginense*) grows in hanging gardens, saline seeps, and stream terraces (Cronquist 1994). This species has been documented in the Red Cliffs NCA only. The reader is referred to BLM (2015) for more detailed information regarding BLM Sensitive plant species in the NCAs. Wildfire frequency, extent, and intensity within the Red Cliffs NCA has increased because of the increase and establishment of nonnative invasive annual brome grasses. Without management intervention to control brome grasses, the Red Cliffs NCA will likely experience increases in wildfires that negatively impact Virgin River thistle populations and the habitats they depend on.

3.3.5 Invasive Species/Noxious Weeds

The BLM defines a noxious weed as a nonnative plant that disrupts or has the potential to disrupt or alter the natural ecosystem function, composition, and diversity of the site it occupies.

The State of Utah has Utah 54 species designated as noxious by state law and has organized 40 of them into three control classes: Class 1B: Early Detection/Rapid Response (EDRR); Class 2: Statewide Control; and Class 3: Statewide Containment (see **Table 3-1**). The class definitions are as follows:

- Class 1B (EDRR): Declared noxious and invasive weeds not native to the state of Utah that are known to exist in the state in very limited populations and pose a serious threat to the state and should be considered as a very high priority.
- Class2 (Control): Declared noxious and invasive weeds not native to the state of Utah, that pose a threat to the state and should be considered a high priority for control. Weeds listed in the control list are known to exist in varying populations throughout the state. The concentration of these weeds is at a level where control or eradication may be possible.
- Class 3 (Containment): Declared noxious and invasive weeds not native to the State of Utah that are widely spread. Weeds listed in the containment noxious weeds list are known to exist in various populations throughout the state. Weed control efforts may be directed at reducing or eliminating new or expanding weed populations. Known and established weed populations, as determined by the weed control authority, may be managed by any approved weed control methodology, as determined by the weed control authority.

Silverleaf nightshade (*Solanum elaeagnifolium*), whorled milkweed (*Asclepias subverticillata*), and Halogeton (*Halogeton glomeratus*) are designated as a Washington County Declared Noxious Weeds EDRR species. Although the NCAs have not been systematically inventoried for the presence of noxious weeds, Sahara/African mustard, giant reed, Scotch thistle, tamarisk, and

punctureVine are known to occur in the NCAs. BLM would treat these species, and other species listed in **Table 3-1** if infestations are observed in the future.

Table 3-1 State of Utah Designated Noxious Weeds Control List.

Class 1B: Early Detection/Rapid Response	
Camelthorn (*Alhagi maurorum*)	Japanese knotweed (*Polygonum cuspidatum*)
Garlic mustard (*Alliaria petiolate*)	Blueweed/Vipers bugloss (*Echium vulgare*)
Purple starthistle (*Centaurea calcitrapa*)	Elongated mustard (*Brassica elongate*)
Goatsrue (*Galega officinalis*)	Common St. Johnswort (*Hypericum perforatum*)
African mustard (*Brassica tournefortii*)	Oxeye daisy (*Leucanthemum vulgare*)
Giant reed (*Arundo donax*)	Cutleaf vipergrass (*Scorzonera laciniata*)
Class 2: Statewide Control	
Leafy spurge (*Euphorbia esula*)	Dyers woad (*Isatis tinctoria*)
Medusahead (*Taeniatherum caput-medusae*)	Yellow starthistle (*Centaurea solstitialis*)
Rush skeletonweed (*Chondrilla juncea*)	Yellow toadflax (*Linaria vulgaris*)
Spotted knapweed (*Centaurea stoebe*)	Diffuse knapweed (*Centaurea diffusa*)
Purple loosestrife (*Lythrum salicaria*)	Black henbane (*Hyoscyamus niger*)
Squarrose knapweed (*Centaurea virgata*)	Dalmation toadflax (*Linaria dalmatica*)
Class 3: Statewide Containment	
Russian knapweed (*Acroptilon repens*)	Musk thistle (*Carduus nutans*)
Houndstounge (*Cynoglossum officianale*)	Quackgrass (*Elymus repens*)
Perennial pepperweed (*Lepidium latifolium*)	Jointed goatgrass (*Aegilops cylindrica*)
Phragmites/Common reed (*Phragmites australis*)	Bermudagrass* (*Cynodon dactylon*)
Tamarisk/Saltcedar (*Tamarix ramosissima*)	Perennial Sorghum (*Sorghum halepense, S. almum*)
Hoary cress (*Cardaria* spp.)	Scotch thistle (*Onopordum acanthium*)
Canada thistle (*Cirsium arvense*)	Field bindweed/Wild Morning-glory (*Convolvulus* spp.)
Poison hemlock (*Conium maculatum*)	Puncturevine/Goathead (*Tribulus terrestris*)

*Bermudagrass shall not be a noxious weed in Washington County and shall not be subject to provisions of the Utah Noxious Weed Law within the boundaries of that county.

The BLM defines an invasive weed as a species that is nonnative to the ecosystem under consideration and whose introduction is likely to cause economic or environmental harm or harm to human health. Invasive weeds usually germinate under a wide variety of conditions, establish quickly, produce large amounts of seeds (often with long-term viability), and out-compete native species for light, pollinators, water, and nutrients. As an invasive weed becomes more competitive, persistent, and pernicious, the species may be designated a noxious weed (James et al. 1991).

Principal invasive weed species of concern in the NCAs are cheatgrass, red brome, Russian thistle, London rocket, bull thistle, redstem storksbill/filaree, and Russian olive. The species listed above present differing levels of threat to ecosystems within the NCAs. Highly invasive species have the potential to dominate native ecosystems and displace native species on a large scale or invade small but crucial habitats, such as riparian areas.

Nonnative invasive grasses can promote more intense and regular fire (a fire cycle) as part of their life-history (Zouhar et al. 2008). Red brome and cheatgrass display characteristic traits that include

rapid and dense growth in early season that allow them to outcompete native vegetation. Late season abrupt drying of above-ground growth then follows this growth period. When ignited, these dry, dense grass fuels result in extreme fire heat and intensity which create charred disturbance areas. Following wildfires, nonnative vegetation is likely to increase in density (BLM 2015; Brooks 1999; Brooks and Esque 2002), facilitated by their early-season, fast-growing nature. This life history contrasts with the slow-growing, sparse plants typical of the Mojave desert vegetation communities. The result is a change in the fire regime that excludes native vegetation over time and can lead to a monoculture of nonnative grasses and loss of native vegetation diversity. Wildfire frequency, extent, and intensity within the NCAs has increased because of the increase and establishment of nonnative invasive annual brome grasses.

3.3.6 Fish and Wildlife Excluding USFWS-Designated Species

General Fish/Wildlife

The ecotones created by the intersection of the Colorado Plateau, the Great Basin, and the Mojave Desert in Washington County, Utah, support a high diversity of resident native wildlife, including songbirds, raptors, small mammals, amphibians, and reptiles. Medium and large mammals include gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), desert bighorn sheep (*Ovis candanensis nelsoni*), and mountain lion (*Puma concolor*). The reader is referred to BLM (2015) for more detailed information regarding general wildlife species in the NCAs.

BLM Sensitive Animal Species

This category of species includes those that are on the Utah BLM State Director's Sensitive Species list. Based on the presence of suitable habitat and/or historical records of occurrence, the BLM Sensitive animal species that may occur in the NCAs are listed in **Table 3-2.**

Table 3-2. BLM Sensitive Animal Species in the NCAs.

Common Name	Scientific Name	NCA
Bonneville cutthroat trout	*Oncorhynchus clarkiutah*	Red Cliffs
Desert sucker	*Catostomus clarki*	Red Cliffs/Beaver Dam Wash
Flannel-mouth sucker	*Catostomus latipinnis*	Red Cliffs
Virgin spinedace	*Lepidomeda mollispinis*	Red Cliffs/Beaver Dam Wash
American white pelican	*Pelecanus erythrorhynchos*	Red Cliffs/Beaver Dam Wash
Bald eagle	*Haliaeetus leucocephalus*	Red Cliffs/Beaver Dam Wash
Black swift	*Cypseloides niger*	Red Cliffs/Beaver Dam Wash
Burrowing owl	*Athene cunicularia*	Red Cliffs/Beaver Dam Wash
Ferruginous hawk	*Buteo regalis*	Red Cliffs/Beaver Dam Wash
Lewis's woodpecker	*Melanerpes lewis*	Red Cliffs/Beaver Dam Wash
Long-billed curlew	*Numenius americanus*	Red Cliffs/Beaver Dam Wash
Northern goshawk	*Accipiter gentilis*	Red Cliffs/Beaver Dam Wash
Short-eared owl	*Asio flammeus*	Red Cliffs/Beaver Dam Wash
Three-toed woodpecker	*Picoides tridactylus*	Red Cliffs
Western burrowing owl	*Athene cunicularia hypogea*	Red Cliffs/Beaver Dam Wash

Common Name	Scientific Name	NCA
Allen's big-eared bat	*Idionycteris phyllotis*	Red Cliffs/Beaver Dam Wash
Big free-tailed bat	*Nyctinomops macrotis*	Red Cliffs/Beaver Dam Wash
Fringed myotis	*Myotis thysanodes*	Red Cliffs/Beaver Dam Wash
Kit fox	*Vulpes macrotis*	Red Cliffs/Beaver Dam Wash
Spotted bat	*Euderma maculatum*	Red Cliffs/Beaver Dam Wash
Townsend's big-eared bat	*Corynorhinus townsendii*	Red Cliffs/Beaver Dam Wash
Western red bat	*Lasiurus blossevillii*	Red Cliffs/Beaver Dam Wash
Common chuckwalla	*Sauromalus ater*	Red Cliffs/Beaver Dam Wash
Desert iguana	*Dipsosaurus dorsalis*	Beaver Dam Wash
Desert night lizard	*Xantusia vigilis*	Red Cliffs/Beaver Dam Wash
Gila monster	*Heloderma suspectum*	Red Cliffs/Beaver Dam Wash
Mojave rattlesnake	*Crotalus scutulatus*	Beaver Dam Wash
Sidewinder	*Crotalus cerastes*	Red Cliffs/Beaver Dam Wash
Speckled rattlesnake	*Crotalus mitchellii*	Beaver Dam Wash
Western banded gecko	*Coleonyx variegates*	Red Cliffs/Beaver Dam Wash
Western threadsnake	*Leptotyphlops humilis*	Red Cliffs/Beaver Dam Wash
Zebra-tailed lizard	*Callisaurus draconoides*	Red Cliffs/Beaver Dam Wash
Arizona toad	*Bufo microscaphus*	Red Cliffs/Beaver Dam Wash
Monarch Butterfly	*Danaus plexippus*	Red Cliffs/Beaver Dam Wash
Western Bumble Bee	*Bombus occidentalis*	Red Cliffs/Beaver Dam Wash

3.3.7 Migratory Birds

Migratory bird species, including raptors, songbirds, and shorebirds, are protected under the *Migratory Bird Treaty Act* of 1918 (MBTA), *Neotropical Migratory Bird Conservation Act* of 2000 (NMBCA), and Executive Order 13186. The MBTA protects against the take of migratory birds, their nests, and eggs, except as permitted. The NMBCA provides protection and management of neotropical migratory bird populations and their habitats. Eagles are also protected under the *Bald and Golden Eagle Protection Act* of 1962 (BGEPA). The BGEPA makes it illegal to take (e.g., disturb, molest), possess, sell, purchase, barter, or transport any Bald or Golden eagle, alive or dead, or any part, nest, or egg.

More than 370 species of birds have been documented using habitats within Washington County, for breeding, nesting, foraging, and migratory habitats (Fridell and Comella 2007; see **Appendix G**). The USFWS is mandated to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA (USFWS 2021). A list of 51 Birds of Conservation Concern that have been observed in the NCAs is provided in **Appendix H**.

In the arid Southwest, riparian habitats are among the most productive habitats for bird breeding, wintering, and migration, and have some of the highest densities of breeding birds in North America. Some migratory bird species use the NCAs as a "stop over" or migration habitat, as the birds move through the area in early spring (March and April) and again in the fall (September through December). The energy demands on migrating birds are extremely high, and birds rest and feed, before continuing their migration journey. Migratory birds may use the NCAs yearlong,

or for a portion of the year. In Washington County, the migratory bird nesting season can be divided into two major timeframes: (1) Early Nesting Season: January 1–March 31, for raptors (eagles, owls, falcons, and hawks); and (2) Primary Nesting Season: April 1–July 15, for songbirds, flycatchers, cuckoos, raptors, and many species. However, the maximum period for the migratory bird nesting season can extend from January 1–August 31 (USFWS 2014).

The Beaver Dam Wash, Virgin River, Leeds Creek, and Quail Creek riparian areas provide important habitats for many species of migratory birds in the NCAs. Upland areas adjacent to riparian/aquatic areas contain habitats providing cover and important forage species and are critical to migratory birds. In 2005, the Intermountain West Joint Venture partners within Utah developed a coordinated implementation plan for bird conservation in Utah that identified habitat priorities. The Beaver Dam Wash within the NCA was identified as a Bird Habitat Conservation Area, to be protected in the future for its important habitat values. The reader is referred to BLM (2015) for more detailed information regarding migratory bird species in the NCAs.

An MOU between the BLM and USFWS states that the BLM shall: "At the project level, evaluate the effects of the BLM's actions on migratory birds during the NEPA process, if any, and identify where take reasonably attributable to agency actions may have a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. In such situations, BLM will implement approaches lessening such take."

3.3.8 Threatened, Endangered or Candidate Plant Species

The only federally listed or candidate plant species known to occur is the endangered Shivwits milkvetch (*Astragalus ampullarioides*) in Red Cliffs NCA.

Shivwits Milkvetch

The Shivwits milkvetch was listed as a federally endangered species in 2001 (66 FR 49560) because of declining populations and habitat loss. It received additional protection through critical habitat designation in 2006 (71 FR 15966) and a recovery plan was developed by USFWS in 2006 (71 FR 57557).

Six populations of Shivwits milkvetch are known, all located in Washington County, Utah. Threats to this species include developments on private and state lands that provide habitat, OHV activities, and habitat alteration by invasive annual brome grasses. This milkvetch has very specific habitat requirements, growing only in isolated pockets of purple-hued, gypsum-rich clay soils in creosote-bursage and Utah juniper communities (USFWS 2006a, b). Shivwits milkvetch can be fertilized via pollinators or through self-fertilization; however, studies indicate that self-fertilized fruit bear significantly less seed than insect pollinated flowers. Several native bees have been observed pollinating Shivwits milkvetch including *Anthophora coptognatha, A. dammersi, Eucera quadricinata, Bombus morrisoni, Osmia clarescens, O. marginata,* and *O. titusi* (Tepedino 2005).

The Red Cliffs NCA supports populations of Shivwits milkvetch and 422 acres of designated critical habitat for this small native plant. The critical habitat is located on the Harrisburg Bench and along the White Reef (refer to Map 3-40 in BLM 2015). Studies of plant densities over the

past 10 years on the Harrisburg Bench indicate that populations have varied considerably from year to year (probably because of varying precipitation) but appear to be stable. Population densities at Harrisburg Bench ranged from 0.73 to 3.40 plants per square meter with an average of 1.28 plants per square meter (Searle and Yates 2010).

On July 12, 2020, the 1,414-acre Cottonwood Trail Fire burned approximately 375 acres of designated Shivwits milkvetch critical habitat in the NCA. Post fire monitoring by the BLM did not document any plants that had been damaged or killed by the fire.

3.3.9 Threatened, Endangered or Candidate Animal Species

The federally listed animal species that do occur or have the potential to occur in the NCAs are the Mojave desert tortoise, southwestern willow flycatcher, western yellow-billed cuckoo, Mexican spotted owl, California condor, Virgin River chub, and woundfin (see **Table 3-3**). Weed treatments would be expected to be conducted within designated critical habitat for the Mojave desert tortoise and possibly near habitat for the Virgin River chub, and woundfin. Brief summaries of the life histories, habitat requirements, and regulatory status of the listed species of the NCAs are presented below.

Table 3-3. ESA-listed animal species that do or may occur in the NCAs.

Common Name	Scientific Name	Status	NCA
Virgin River chub	*Gila seminude*	Endangered	Red Cliffs
Woundfin	*Plagopterus argentissimus*	Endangered	Red Cliffs
California condor	*Gymnogyps californianus*	Endangered*	Red Cliffs
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Red Cliffs/Beaver Dam Wash
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Red Cliffs/Beaver Dam Wash
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Threatened	Red Cliffs/Beaver Dam Wash
Mojave desert tortoise	*Gopherus agassizii*	Threatened	Red Cliffs/Beaver Dam Wash
*Only California condors that occur north and west of I-15; birds south and east of I-15 are 10(j) Non-Essential Experimental Population			

Mojave desert tortoise

The Mojave desert tortoise (*Gopherus agassizii*) is a burrowing reptile in the family *Testudinoidea* that occurs in the Mojave and Sonoran deserts of California, Nevada, Arizona, and southwestern Utah (USFWS 1990, 2011). The USFWS listed the desert tortoise as a threatened species in 1990 (USFWS 1990). Declines in desert tortoise populations were primarily attributed to habitat degradation and loss, disease, predation, and stochastic events, including drought and wildfires (USFWS 1990, 2011). In 1994, USFWS designated 6,446,200 acres of critical habitat throughout the species range in 6 recovery units (USFWS 1994b, 2011). There are two recovery units in Washington County, Utah: the Upper Virgin River Recovery Unit (UVRRU) which occurs east of the Beaver Dam Mountains, and the Northeastern Mojave Recovery Unit (NEMRU) located on

the west side of the Beaver Dam Mountains. The Red Cliffs NCA is located within the UVRRU, while the Beaver Dam Wash NCA is within the Beaver Dam Slope UT/AZ subunit of NEMRU.

Desert tortoises construct and maintain a series of single-opening burrows for shade and shelter, using anywhere from 7 to 12 burrows at a given time within their range (Barrett 1990; Bulova 1994). Tortoises may be active at any time of year depending on weather conditions, but the most active season for tortoises is from February 15 to November 30, with activity peaking during spring/early summer and fall seasons when temperatures and foraging conditions are typically ideal (USFWS 2011). During active periods, tortoises spend nights and the hotter portion of the day in their burrows. During their less active season (December 1 to February 14), tortoise activity is greatly reduced because they retreat to underground dens (burrows) for the winter (Barrett 1990; Bulova 1994; USFWS 2011).

Desert tortoises are "dietary specialists," foraging selectively on forbs, grasses, shrubs, and succulent plants (Grover and DeFalco 1995; Jennings 1997; Minden 1980). Plants containing essential dietary nutrients for growth and reproduction, such as water, protein, fiber, nitrogen, phosphorus, calcium, and magnesium, are selectively consumed, whereas those that contain high concentrations of potassium are generally avoided. Native forage species selected by desert tortoises include Indian ricegrass (*Achnatherum hymenoides*), bush muhly, wirelettuce (*Stephanomeria* spp.), desert globemallow (*Sphaeralcea ambigua*), locoweed (*Astragalus nuttallianus*), white bursage, brittlebush (*Encelia farinosa*), and prickly pear (*Opuntia erinacea*; Coombs 1977; Esque 1994; Minden 1980; Woodbury and Hardy 1948).

Desert tortoise will also eat nonnative species, such as red brome and cheatgrass. However, these cool-season annual grasses do not have enough water or nitrogen to help tortoise excrete excess potassium, which can cause health complications for tortoise (USFWS 2011; Drake et al. 2015). Bromus seeds can become lodged in the mouths and throats of tortoise and cause injuries (Medica and Eckert 2007). Desert tortoise reproductive success is dependent upon the abundance of preferred food resources (Henen et al. 1998; Duda et al. 1999; Freilich et al. 2000; Krzysik 2002; Jennings and Berry 2015); increases in native vegetation are positively correlated with increases in tortoise egg production (Henen 1997; Mueller et al. 1998).

Wildfire frequency, extent, and intensity within the NCAs have increased because of the proliferation invasive annual brome grasses. Impacts to desert tortoises from wildfires include fatalities, burns or other injuries, dehydration, exposure to high temperatures or smoke inhalation, and nutritional deficiencies related to the loss of forage (Esque et al. 2003). In the spring/summer of 2005/2006, wildfires burned significant portions of the NCAs. As a result, tortoise populations within the Red Cliffs NCA declined up to 50% in some areas, due primarily to mortality and habitat degradation. Subsequent biannual tortoise population monitoring between 2006 and 2019 in that NCA indicated the tortoise populations have not recovered to pre-2005 population levels (Allison and McLuckie 2018; McLuckie et al. 2020). During the summer of 2020, three wildfires burned approximately 11,410 acres within the Red Cliffs NCA, including the 1,414-acre Cottonwood Trail Fire. Kellam et al. (2020) estimated that approximately 16.3% of the local adult tortoise population within a 618-acre portion of the Cottonwood Trail Fire died directly from fire.

Southwestern willow flycatcher

The southwestern willow flycatcher (SWFL; *Empidonax traillii extimus*) was listed as an endangered species in 1995 (60 FR 10693) and received additional protection through critical habitat designation in 1997 (62 FR 39129). The NCAs do not contain lands that are within SWFL designated critical habitat. A recovery plan for SWFL was developed by USFWS, other federal and state agencies, and interest groups in 2002 (USFWS 2002).

This species prefers riparian habitats with dense growth of willows (*Salix* spp.), arrowweed (*Pluchea* spp.), buttonbush (*Cephalanthus* spp.), tamarisk, Fremont's cottonwood, and other riparian plants. Preferred trees and shrubs are generally 12-20 feet or more in height and have a high canopy cover (USFWS 1995a, 2002). SWFL eat insects, seeds, and berries (USFWS 1995a). Breeding occurs during late spring or early summer, with peak breeding activity occurring in June. Nests are generally constructed in a vertical fork of a willow or other riparian tree (USFWS 1995a). The female then lays and incubates two to four eggs: the young hatch after twelve or thirteen days. The hatchlings are tended by both parents and leave the nest after about two weeks (USFWS 1995a, 2002).

Habitat suitable for occupancy is found in the riparian zone along Beaver Dam Wash in the Beaver Dam Wash NCA and there is some potential that this habitat is suitable for nesting. One SWFL sighting was reported on private lands at Lytle Ranch in Beaver Dam Wash in 1985 (outside the NCA), but no others have been documented since (UDWR 2010a).

The birds may utilize the riparian habitat along the Virgin River, Leeds, and Quail Creeks, or in some ephemeral washes in the Red Cliffs NCA, but there have not been confirmed sightings. There are no known willow flycatcher nests within the Red Cliffs NCA, although each of the riparian zones could provide opportunities for nesting. Tamarisk, giant reed, and Russian olive have invaded the riparian areas of the NCA but are not so widespread as to measurably degrade the quality of habitat for the birds.

Western yellow-billed cuckoo

The Western yellow-billed cuckoo (WYBC; *Coccyzus americanus occidentalis*) was listed as a threatened species in 2014 (79 FR 2014) due to declining populations attributed to habitat loss, degradation, and fragmentation. The WYBC received additional protection through critical habitat designation in 2021 (86 FR 20798). There is no designated critical habitat for the WYBC in either of the NCAs.

These birds are a riparian-obligate species, which means that they require large blocks of riparian woodlands to thrive. Their habitat includes a mixture of mature cottonwood/willow galleries and tamarisk/mesquite thickets where they build their nest 4 to 30 feet above the ground (UDWR 2010b). WYBC feed almost entirely on large insects, including caterpillars, grasshoppers, cicadas, beetles, and katydids. They may also occasionally consume lizards, frogs, and eggs of other birds, and may rarely feed on berries and fruits (UDWR 2010b). WYBC nesting behavior may be closely tied to food abundance, and in years of low food abundance cuckoos may forego nesting. The birds

are migratory, arriving in Utah in late May or early June and breeding in late June through July (Parrish et al. 2002).

While nesting habitat for WYBC is present along the Beaver Dam Wash in the NCA, and one breeding record exists for this species from the Beaver Dam Wash, the location was outside of the NCA (UDWR 2010b), and no birds have been observed nesting in the NCA. Population status and trends for this bird in the Red Cliffs NCA are unknown; however, they have been observed along the Virgin River and some of its tributaries.

Mexican spotted owl

The Mexican spotted owl (MSO; *Strix occidentalis lucida*) was listed as a threatened species in 1993 (58 FR 14248) and received additional protection through critical habitat designation in 2004 (69 FR 53182). There is no MSO designated critical habitat in either NCA. A recovery plan for MSO was developed by USFWS, other federal and state agencies, and interest groups in 1995 and revised/approved in 2012 (USFWS 1995b, 2012).

In Utah, these owls use narrow, steep-walled canyons where ledges and caves provide cover from high temperatures, as well as nest sites and foraging habitat (USFWS 1995b, 2012). They feed on small mammals, particularly mice, voles, and woodrats, but will also take birds, bats, reptiles, and arthropods (USFWS 1995b, 2012). Although the Willey and Spotskey (1997, 2000) MSO models indicate potential nesting, roosting, foraging, and dispersal habitats within the NCAs, there are no records of MSO occurrence in either.

Virgin River chub & Woundfin

The Virgin River chub (*Gila seminude*) and woundfin (*Plagopterus argentissimus*) were listed as an endangered species in 1989 (54 FR 35305) and 1970 (35 FR 16047), respectively, and received additional protection through critical habitat designation in 2000 (65 FR 4140). Critical habitat for both species includes the main stem of the Virgin River and its 100-year floodplain, extending from the confluence of LaVerkin Creek in Utah to Halfway Wash, Nevada. Both fish are found in the reach of the Virgin River that flows through the Red Cliffs NCA. Recovery plans were developed by USFWS for woundfin in 1979 and Virgin River chub in 1995 (USFWS 1979, 1995c). As the two species occupy the same critical habitat, face the same threats, and are included in the same revised recovery plan prepared by the USFWS (1995c), they are discussed together here.

The Virgin River chub is a silvery, medium sized minnow that averages about 8 inches in total length but can grow to a length of 18 inches. Habitat for this chub is deep runs or pools of slow to moderate velocities with large boulders or in-stream cover, such as root snags (USFWS 1995c). Woundfin are found in the mainstem of Virgin River and the lower portion of LaVerkin Creek in Utah. This small fish is a streamlined, silvery minnow, with a flat head and a conspicuous sharp dorsal spine, from which its common name was derived. They prefer quiet pools near riffles with sand and sand/gravel substrates.

Threats to both species include competition with non-native fish and habitat degradation from diversions, dams, and other structures on the river that elevate water temperatures beyond the

tolerance of the fish. Recovery efforts for the Virgin River chub and woundfin are furthered through the Virgin River Recovery Program, a multi-agency program established in 1995 to implement recovery actions, and conserve and protect native species in the Virgin River Basin. The Virgin River through the Red Cliffs NCA provides habitat for both fish species. There are no nonnative fish in this reach, as downstream fish barriers prevent red shiner (*Cyprinella lutrensis*) and other species from entering the river. Water temperatures in the reach within the Red Cliffs NCA can be very high during the summer (peak daily temperature above 95° F, mean daily temperature greater than 84° F; Addley et al. 2005), but the fish populations do not appear to be negatively impacted at this time.

California condor

The California condor (*Gymnogyps californianus*) was listed as an endangered species in 1967 and noted to only occur in California (32 FR 4001). The California condor received additional protection through critical habitat designation in 1976 (41 FR 41914). A recovery plan for the species was developed by USFWS in 1975 and revised/approved in 1996 (USFWS 1975, 1996a). By 1987, the last wild condor was captured and taken to the San Diego Wild Animal Park (USFWS 1996a). Beginning with the first successful breeding of California condors in 1988, the population grew to 121 in 1996, including 104 in the captive flock, and 17 in the wild (USFWS 1996a, b). On October 16, 1996, the USFWS announced plans to reintroduce California condors into northern Arizona and designate these birds as non-essential experimental populations, as provided by Section 10j of the ESA (USFWS 1996b). California condors from the experimental population area (USFWS 1996b) frequently forage away from the Vermillion Cliffs of Arizona into southwestern Utah, including Washington County.

California condors are not known to nest or have special use sites in either of the NCAs. Occasional overflights by condors and possible perching along the Virgin River have been reported (The Peregrine Fund 2012; Audubon and Cornell Lab of Ornithology 2013). Most California condor use is near Zion National Park. Any California condors observed in the NCAs west of Interstate 15 would be outside the boundary of the experimental non-essential population areas, and subject to the full protection of the ESA.

3.3.10 Wilderness

The Cottonwood Canyon Wilderness and Red Mountain Wilderness (included in the National Wilderness Preservation System in 2009 through OPLMA) are totally or partially within the boundaries of the Red Cliffs NCA (BLM 2015, 2016b). The 11,668-acre Cottonwood Canyon Wilderness is located entirely within the Red Cliffs NCA. Approximately 8,321 acres of the 18,689-acre Red Mountain Wilderness are located within the Red Cliffs NCA.

Indicators of an area's naturalness include the extent of landscape modifications; the presence of native vegetation communities; and the connectivity of habitats. Outstanding opportunities for solitude or primitive and unconfined types of recreation may be experienced when the sights, sounds, and evidence of other people are rare or infrequent, in locations where visitors can be isolated, alone or secluded from others, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered.

Through a minimum tool analysis using the interagency Minimum Requirements Decision Guide (MRDG; see **Appendix F**) and the NEPA process, the BLM analyzes the potential effects of proposed actions and alternatives on designated wilderness areas, when making project-level decisions.

Data on noxious weed infestations in either of the designated wilderness areas are currently incomplete, based on limited inventories. The Biophysical Setting dataset created by The Nature Conservancy in 2011 for the Red Cliffs NCA shows a percent cover of exotic invasive annual grasses to be equal to or greater than 5% for vegetated areas of the Cottonwood Canyon and Red Mountain Wilderness units (BLM 2015; pp. 492).

3.3.11 Lands with Wilderness Characteristics

The BLM conducted inventories in 2012 to determine the presence or absence of wilderness characteristics in each NCA. The characteristics of wilderness (size, naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation) were evaluated and the inventory found that there were 48,873 acres, in three areas, within the Beaver Dam Wash NCA and 1,586 acres in Red Cliffs NCA, also in three areas, that had wilderness characteristics. The RMPs for each of the NCAs (BLM 2016a, b) identified a management goal to "conserve, protect, and restore" the values of lands with wilderness characteristics by not issuing land use authorizations or projects that would impact their wilderness characteristics. Approved actions including management as VRM Class I, as ROWs exclusion areas, as closed to commercial and non-commercial woodland product harvesting, seed and plant material collection, and as Limited to Designated Roads and Trails for OHV travel.

4.0 CHAPTER 4—ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

This section of the EA documents the potential environmental impacts which would be expected with implementation of the Proposed Action and the No Action alternatives on the resources identified in the ID Team Checklist (**Appendix A**) and presented in **Chapter 3** – Affected Environment of this EA. These include direct impacts "which are caused by the action and occur at the same time and place," and indirect impacts "which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable." 40 CFR 1508.8(a)–(b).

4.2 GENERAL ANALYSIS ASSUMPTIONS

Analysis Assumptions

The Proposed Action and the No Action alternative comply with all relevant federal laws, regulations, and agency policies, as well as applicable state statutes, county, and municipal ordinances.

The treatments described under the Proposed Action and the No Action alternative would only be implemented on public lands in the NCAs.

The treatment methods described under the Proposed Action and No Action alternative would be implemented as described in **Chapter 2**, with all applicable SOPs and resource project measures listed in that chapter and in the Appendices to this EA. The resource protection measures identified in the Appendices have been specifically developed to conserve, protect, and enhance the natural and cultural resource values of the NCAs.

Under the Proposed Action, treatments in the NCAs are expected to be small scale, would be directed by trained and qualified BLM staff, and conducted primarily using either manual removal or ground-based herbicide control methods.

Herbicides used in ground-based treatments would be limited to those currently approved for use by the BLM, and to those that will be approved by the agency in the future, based on their proven safety, efficacy, and low risk to human health.

Under the Proposed Action, only one BLM approved pre-emergent herbicide, Imazapic, would be used in aerial treatments to create fire breaks or control exotic invasive annual grasses in re-vegetation plots, because its use has been shown to cause negligible impacts on native plants, wildlife, and human health.

4.2.1 Methodology for Analysis of Impacts

Impacts are direct or indirect and measured in terms of intensity (scale and concentration) and duration (short-term or long-term). Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Impacts can be positive, seen as benefitting the

resource, or negative, seen as a detriment to the resource. Positive impacts could result from management actions that maintain or enhance any of the resource values described in the analysis. Negative impacts could result from management actions that diminish any of the resource values described in the analysis. The intensity and duration of impacts are defined as follows:

- ***Negligible:*** The impact is at the lower level of detection; there would be no measurable change.
- ***Minor:*** The impact is slight but detectable; there would be a small change.
- ***Moderate:*** The impact is readily apparent; there would be a measurable change.
- ***Major:*** The impact is severe, highly noticeable, and potentially permanent.
- ***Short-term***: The impact would last for 10 years or less.
- ***Long-term***: The impact would last for more than 10 years.

4.3 ALTERNATIVE A – PROPOSED ACTION

The following section incorporates by reference analyses from the PEIS RODs (BLM 2007a; BLM 2016c) related to various control methods for noxious weeds and exotic invasive species, including the use of herbicides with different active ingredients. Also incorporated by reference is the analysis of the SOPs that were developed to lessen the potential impacts on natural resources related to the use of chemical treatments.

4.3.1 Water Resources/Quality and Wetlands/Riparian Zones

Implementation of the Proposed Action could result in negligible to minor, short-term, negative impacts and minor to moderate, and potentially major, long-term, positive impacts on surface water resources, water quality, and riparian areas in the NCAs.

Under the Proposed Action, small-scale manual and spot treatments with herbicides would be implemented to reduce non-native woody species that impact surface water quantity, such as tamarisk or Russian olive trees. No aerial herbicide spraying would be authorized within 0.5 mile of surface water sources, helping to ensure that water quality would not be impacted by this method. Treatments would be phased to allow native woody species to establish before treating adjacent areas. This approach would help to ensure that adequate vegetation remains in place to prevent increased surface run-off and soil erosion and that shading vegetation remains to prevent water temperatures increases. The SOPs and resource protection measures described in **Appendix C** would help to ensure that herbicide use in riparian areas does not negatively affect water quality. These measures would minimize the possibility of accidental contamination of surface water from herbicide use that could directly impair water quality and impact native riparian vegetation and aquatic habitats for wildlife and other organisms.

There are currently no stream or river reaches in the NCAs that are non-functioning or functioning at risk due to weed infestations. Control treatments along Leeds and Quail Creeks, the Virgin River, and Beaver Dam Wash would result in negligible to minor impacts, given the limited number of riparian and adjacent upland acres that might need treatment with approved herbicides.

In the long term, treatments to control and eradicate noxious weeds and exotic invasive species are expected to be positive by stabilizing soils, reestablishing native vegetation communities, and reducing exotic annual grasses that fuel catastrophic wildfires that can impact riparian areas and water quality in surface water sources.

4.3.2 Soils

Implementation of the Proposed Action could result in negligible to minor and moderate, short-term, negative impacts and minor to moderate, and potentially major, long-term, positive impacts on Soils in the NCAs. It would provide increased flexibility in treatment options when compared to the No Action alternative and the benefits of removing noxious weeds and exotic invasive species would outweigh the minor impacts to soils.

Where any of the treatment methods are used, vegetative cover could be reduced in the short term, potentially increasing soil loss to wind or water erosion. These effects would be localized and small scale, generally affecting less than 5 acres in a single area, and would diminish as native vegetation re-establishes, either naturally or because of restoration projects. Treatments to control and eradicate exotic invasive brome grasses would help to reduce wildfire frequency, extent, and intensity within the NCAs, as these grasses help to fuel more frequent and catastrophic wildfires. has increased because of the increase and establishment of nonnative invasive annual brome grasses.

Biological soil crusts could also be negatively impacted in the short term, as some herbicides can decrease soil organism diversity and interrupt the functions of those organisms that can increase the rate of soil loss (Peterjohn and Schlesinger 1990; Belnap 1995; Eldridge 1996; USGS 2004). Soil productivity could also be impacted in the short term, as some herbicides can persist for periods of time in the soil. Given the small scale of the proposed treatments and infrequent use of herbicides under the Proposed Action, the potential negative short-term impacts on soils would be negligible to minor.

In the long term, treatments that control and eradicate noxious weeds and exotic invasive species, when combined with efforts to restore native vegetation communities, would protect soils, and restore soil productivity in the NCAs. The benefits would outweigh the negligible to minor negative impacts to soils and soil crusts that could result in the short term from the treatments.

4.3.3 Vegetation Excluding USFWS-Designated Species

Implementation of the Proposed Action could result in negligible to minor and moderate, short-term, negative impacts and minor to moderate, and potentially major, long-term, positive impacts on Vegetation in the NCAs.

The Proposed Action would authorize manual removal methods and the use of 19 BLM approved herbicides, as well as other herbicides that would be approved by the agency in the future, and a wide variety of adjuvants (see **Table 2-1** and **Appendix D**). The ability to use the most technologically advanced herbicides would likely reduce risks to non-target plants and increase management benefits. A broader range of herbicides would allow for continued treatments when

weed species have become resistant to specific active ingredients. Over the long term, control and eradication of noxious weeds and exotic invasive species would facilitate the reestablishment of native vegetation communities and more natural fire regimes.

Manual control and small-scale herbicide treatments of weeds could occur in all native vegetation communities of the NCAs. The effects to native vegetation within a treatment area would be minor in relation to the effects of weed infestations that continue to outcompete and replace native species. The benefits to native vegetation communities are expected to be measurable, in the short and long-term, with more options for treatments, when compared to the No Action alternative.

The Proposed Action would authorize the use of herbicides that have been shown to effectively control exotic invasive annual brome grasses, with no unacceptable environmental impacts. The ability to better suppress these aggressive invasive species would facilitate the restoration of desirable native grasses, forbs, and shrubs, particularly on fire-damaged landscapes, and reduce the risks of large wildfires that are fueled by the exotic annual brome grasses.

Wildfire frequency, extent, and intensity within the NCAs has increased because of the establishment and proliferation of exotic invasive annual brome grasses. Without management intervention to control brome grasses, the NCAs will likely continue to experience frequent and catastrophic wildfires that negatively impact all native vegetation communities.

BLM Sensitive Plant Species

Potential impacts and benefits to BLM Sensitive Species from the Proposed Action would be of similar types, intensity, and duration as those described in **Section 4.3.3** (Vegetation Excluding USFWS-Designated Species) of this EA.

The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to Virgin River thistle habitat:

- Survey all proposed action areas within potential habitat using a botanically qualified biologist, botanist, or ecologist to determine the presence/absence of the species.
- All plants would be flagged prior to weed control activities.
- Collect baseline information on the existing condition of the species and their habitats in the proposed project area. These monitoring programs would help in anticipating the future effects of vegetation treatments on the species.
- Only manual removal and ground-based herbicide treatment methods would be authorized in or near Virgin River thistle suitable habitat.
- Treatments would be conducted using hand tools, hand broadcasters, hand-held or backpack sprayers; apply herbicides in occupied habitat by hand using brushes or other method that strongly reduces impacts to non-target plants.
- Use non-chemical treatments to control weeds when possible.
- Use low-residual herbicides (e.g., glyphosate) to minimize long-term effects on potential germination.
- Provide training to weed-spraying staff on the identification of Virgin River thistle.

- When treating weeds adjacent to potential habitat, establish suitable buffer zones between treatment sites and populations (confirmed or suspected) of Virgin River thistle and take site-specific precautions to avoid negative effects from off-site drift, surface runoff, and/or wind erosion.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.
- The following would be employed, as needed, to help prevent harm to Virgin River thistle pollinators and other insects in the vicinity: (1) ensure proper identification of pollinator plants, as some native species that attract and support many pollinators may be easily misidentified as invasive/noxious weed species; (2) complete vegetation treatments seasonally before pollinator foraging plants bloom; (3) designate buffer zones around special status plants and prevent herbicide drift to nearby blooming plants; and (4) make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.

4.3.4 Invasive Species/Noxious Weeds

Implementation of the Proposed Action would result in moderate, short-term control and eradication of noxious weeds and exotic invasive species and measurable, long-term control and eradication of these undesirable species in the NCAs.

The Proposed Action would authorize manual removal methods and the use of 19 BLM approved herbicides, as well as other herbicides that would be approved by the agency in the future, and a wide variety of adjuvants (see **Table 2-1** and **Appendix D**). The ability to use the most technologically advanced herbicides would likely reduce risks to non-target plants and increase management benefits. A broader range of herbicides would allow for continued treatments when weed species have become resistant to specific active ingredients. Over the long term, control and eradication of noxious weeds and exotic invasive species would facilitate the reestablishment of native vegetation communities and more natural fire regimes.

Manual control and small-scale herbicide treatments of weeds could occur in all native vegetation communities of the NCAs. The effects to native vegetation within a treatment area would be minor in relation to the effects of weed infestations that continue to outcompete and replace native species. The benefits to native vegetation communities are expected to be measurable, in the short and long-term, with more options for treatments, when compared to the No Action alternative

Herbicide use would primarily target weeds that pose a serious ecological threat to native plant communities. These species include, but are not limited to, cheatgrass, red brome, Russian thistle, Scotch thistle, bull thistle, Sahara/African mustard, London rocket, puncturevine, silverleaf nightshade, redstem storksbill/filaree, hoary cress, knapweeds, giant reed, tamarisk, and Russian olive. Noxious and invasive weed species specific treatment options under the Proposed Action are found in **Appendix E.** Native plant species would experience reduced competition, wildlife in the NCAs would have improved habitat and forage conditions over time, and soil conditions would improve, when compared to untreated areas.

The Proposed Action would also authorize the use of herbicides that have been shown to effectively control exotic invasive annual brome grasses, with no unacceptable environmental impacts. The ability to better suppress these aggressive invasive species would facilitate the restoration of desirable native grasses, forbs, and shrubs, particularly on fire-damaged landscapes, and reduce the risks of large wildfires. The overall impacts on native vegetation or biological crusts would be minor, since only a small number of acres would be treated each year. Control of the invasive annual brome grasses would lessen the frequency and severity of wildfires in the NCAs, thereby helping to preserve native blackbrush, Joshua tree, and sagebrush communities that require decades or centuries to re-establish as mature forests and shrublands.

4.3.5 Fish and Wildlife Excluding USFWS-Designated Species

General Fish/Wildlife

Implementation of the Proposed Action could result in negligible to minor short-term negative impacts on wildlife and wildlife habitat, and measurable beneficial effects in the long term, in both NCAs. Weed treatments in the NCAs are expected to be small scale, affecting less than 5 acres in a single area, and would be conducted primarily using manual rather than herbicide control methods.

The direct impacts of the Proposed Action on wildlife would be disturbance or displacement of individuals, due to the sights and sounds of human activities. Species that reside in an area year-round and have a small home range (e.g., insects, reptiles, small mammals, territorial birds), would have a greater chance of being directly adversely impacted by short term human disturbances during manual control treatments, but would be expected to quickly return, after the treatments are completed. These same species could also be impacted if their habitats were to be within areas of herbicide spot treatments or ground-based or aerial applications, as they would have greater exposure to herbicides—either via direct contact upon application or indirect contact or ingestion of treated vegetation. Birds, mammals, or reptiles that eat grass sprayed with herbicides have relatively greater risk of harm than those that consume flowers or seeds since herbicide residue is higher on grass blades (Fletcher et al. 1994; Pfleeger et al. 1996). Weed treatments in the NCAs are expected to be small scale, affecting less than 5 acres in a single area, and it is not likely that any wildlife would receive harmful doses, as they would not be likely to exclusively forage within the treated area. Adverse effects would be minor as only a few individuals might be harmed, comprising a very small percentage of the overall population in the NCAs. The indirect risk from ingesting herbicide while foraging is anticipated to be negligible because of the low toxicity of many of the chemicals to animals.

It is expected weed treatments would provide long term benefits to wildlife by improving the quality of habitat and forage. Manual and herbicidal treatments over time could control and eradicate noxious weeds and exotic invasive species, facilitating the establishment and spread of desirable native vegetation communities that provide more suitable wildlife habitat and forage.

BLM Sensitive Animal Species

Potential impacts and benefits to BLM Sensitive Species from the Proposed Action would be of similar types, intensity, and duration as those described in **Section 4.3.5** (General Fish/Wildlife) of this EA.

The BLM Sensitive animal species within the NCAs occupy a wide variety of habitats, many of which have the potential for weed infestations. Treatment of weed infestations within these habitats poses the small risk of potential harm to these species, including the potential loss of some individual small animals after herbicide exposure. There could also be a risk of indirect impacts to these species from ingesting herbicide while feeding. As only a small number of the acres, and generally away from riparian areas, would be treated with herbicides annually in the NCAs, the impacts are expected on BLM Sensitive Species is expected to be negligible.

The control and eradication of noxious weeds and exotic invasive species removal would facilitate the reestablishment of native vegetation communities, improve the quality of wildlife foraging and breeding habitat, leading to improved overall wildlife health and productivity.

4.3.6 Migratory Birds

Implementation of the Proposed Action could result in negligible to minor and moderate, short-term, negative impacts and minor to moderate, and potentially measurable, long-term, positive impacts on Migratory Birds in the NCAs. Weed treatments in the NCAs are expected to be small scale, affecting less than 5 acres in a single area, and would be conducted primarily using manual rather than herbicide control methods.

Negligible to minor short-term impacts could occur in association with manual control treatment and would be primarily the disturbance or displacement of individuals to nearby habitats, due to the sights and sounds of human activities. Treatments would be scheduled outside of breeding periods, to reduce disturbances during this critical period. Resource protection measures would require that efforts be made to identify whether migratory birds and Species of Conservation Concern are present or could be impacted in potential treatment areas, allowing for project redesign to exclude areas where nesting or breeding birds are known to be present.

Under the Proposed Action, spot treatments or ground-based chemical applications could be authorized, using herbicides that have been found to have few impacts on wildlife species, including birds. These herbicides have also been shown to be effective in riparian areas, without impacting water quality and riparian vegetation. Many of the migratory birds utilize the riparian areas of the NCAs for nesting and breeding habitats and treatments would be scheduled outside of breeding periods, to reduce disturbances during this critical period, and avoid riparian areas.

Aerial applications of pre-emergent herbicide to control exotic invasive annual brome grasses could be scheduled during the late fall/winter (i.e., November 01–February 14). These treatments would not occur during the second half of the early nesting season (January 1–March 31; primarily raptors) or during the entire primary and late nesting season (April 1–August 31). Aerial application of herbicides would not occur within 0.5 mile of an active golden eagle nest. Reducing

the aerial extent of invasive grasses would help to prevent large and catastrophic wildfires that are fueled by these grasses and contribute to their spread.

In the long-term, the weed control and eradication methods that could be approved under the Proposed Action would be expected to improve the quality of habitat for many migratory birds and other avian species. Native vegetation could be re-established, through natural processes, seeding or out planting, providing higher quality roosting, foraging, nesting, and breeding habitats. In all migratory bird habitats, there could be short-term loss of foraging and prey habitat, but it would improve in the long term, resulting in more abundant and diverse prey base.

4.3.7 Threatened, Endangered or Candidate Plant Species

Shivwits milkvetch

The Shivwits milkvetch is the only ESA-listed plant species that could be affected by the Proposed Action, and it is only found in the Red Cliffs NCA. The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible to minor, short-term impacts and minor to moderate, and potentially measurable long-term, positive impacts on Shivwits milkvetch and its designated critical habitat. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect determination" for this endangered species and its designated critical habitat.

Under the Proposed Action, only manual removal and ground-based herbicide treatment methods would be authorized in or near Shivwits milkvetch suitable and designated critical habitat. Treatments would be conducted using hand tools, hand broadcasters, hand-held or backpack sprayers.

The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to Shivwits milkvetch habitat:

- Survey all proposed action areas within potential and designated critical habitat using a botanically qualified biologist, botanist, or ecologist to determine the presence/absence of the species.
- All plants would be flagged prior to weed control activities.
- Collect baseline information on the existing condition of the species and their habitats in the proposed project area. These monitoring programs would help in anticipating the future effects of vegetation treatments on the species.
- Only manual removal and ground-based herbicide treatment methods would be authorized in or near Shivwits milkvetch suitable and designated critical habitat.
- Treatments would be conducted using hand tools, hand broadcasters, hand-held or backpack sprayers; apply herbicides in occupied habitat by hand using brushes or other method that strongly reduces impacts to non-target plants.
- No herbicide mixing/loading would occur within 300 feet of federally-listed plant populations and potential and designated critical plant habitat.
- No aerial spraying would occur within 0.5 mile of federally-listed plant populations and suitable and designated critical plant habitat.

- Use non-chemical treatments to control weeds when possible.
- Use low-residual herbicides (e.g., glyphosate) to minimize long-term effects on potential germination.
- Provide training to weed-spraying staff on the identification of Shivwits milkvetch.
- When treating weeds adjacent to potential habitat, establish suitable buffer zones between treatment sites and populations (confirmed or suspected) of Shivwits milkvetch and take site-specific precautions to avoid negative effects from off-site drift, surface runoff, and/or wind erosion.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.
- The following would be employed, as needed, to help prevent harm to Shivwits milkvetch pollinators and other insects in the vicinity: (1) ensure proper identification of pollinator plants, as some native species that attract and support many pollinators may be easily misidentified as invasive/noxious weed species; (2) complete vegetation treatments seasonally before pollinator foraging plants bloom; (3) designate buffer zones around special status plants and prevent herbicide drift to nearby blooming plants; and (4) make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.

Design features, NCA-specific conservation measures, and the SOPs listed in **Appendix C**, would minimize risks to Shivwits milkvetch and the pollinators or other insects that benefit these plants. During the planning of weed control actions in or near Shivwits milkvetch critical habitat, the BLM would coordinate with the USFWS on project design and implementation, to ensure that proposed treatments avoid impacting plant populations or the constituent elements of its habitat.

In the short and long terms, successful weed treatments would benefit Shivwits milkvetch and its designated habitat by reducing competition from infestations of noxious weeds or exotic invasive annual species. Soil conditions would be improved and habitat for this endangered species better protected from the negative effects of the frequent and large-scale wildfires that currently burn and reburn lands within the Red Cliffs NCA.

4.3.8 Threatened, Endangered or Candidate Animal Species

Implementation of the Proposed Action could result in negligible to minor negative impacts on threatened and endangered species that occur in the NCAs in the short term, and minor to moderate, and potentially major positive impacts in the long term. Weed treatments in the NCAs are expected to be small scale, affecting less than 5 acres in a single area, and would be conducted primarily using manual rather than herbicide control methods. Where ground-based or aerially herbicide application would be planned, these would be conducted according to all SOPs, resource protection measures, and species-specific protocols identified in the Appendices to avoid, minimize, and mitigate potential impacts on listed species and their habitats.

Treatment of infestations would likely directly and indirectly benefit federally listed wildlife by reducing noxious and invasive weeds, thereby improving critical habitats that provides shelter, and forage and/or foraging areas for prey species. Treatments would be expected to help maintain the

primary constituent elements of designated critical habitats and assist recovery and delisting of threatened and endangered species.

Mojave Desert Tortoise

The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible to minor, short-term, negative impacts and minor to moderate, and potentially major, long-term, positive impacts on the Mojave desert tortoise and its critical and occupied habitats in the NCAs. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect" determination for this threatened species and its designated critical habitat.

Treatment methods proposed for use in desert tortoise habitat would be primarily manual removal, spot treatments, and ground-based herbicide applications. Under the Proposed Action, aerial application would only involve the use of Imazapic (e.g., Plateau®) and approved adjuvants. Imazapic is the most widely used herbicide for ground-based and aerial brome grass control and would be applied as a pre-emergent. It works by stopping amino acid synthesis in cheatgrass and red brome. When properly applied, it does not have a negative impact on native grasses and poses a relatively low health risk to humans and animals. Aerial applications would occur during the late fall/winter before the brome grasses germinate in response to seasonal precipitation. The application period would coincide with the desert tortoise less active season (December 1 to February 14), when tortoises are in underground burrows or dens for the winter and their above-ground activity is greatly reduced (Barrett 1990; Bulova 1994; USFWS 1990, 2011).

The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to desert tortoise habitat:

- Treatment sites within desert tortoise habitat would be inventoried by a qualified tortoise biologist immediately prior to the start of treatments.
- To the greatest extent possible, desert tortoise burrows would be avoided during herbicide treatments.
- Aerial applications would occur during the desert tortoise less active season (December 1 to February 14).
- Aerial application will involve the use of Imazapic + appropriate/approved adjuvants only.
- Whenever possible, ground-based pre-emergent herbicide treatments (using Imazapic) in desert tortoise habitat would occur during the less active season (December 1 to February 14).
- Whenever possible, ground-based post-emergent herbicide treatments in desert tortoise habitat would occur outside of the most active seasons: spring/early summer (March 15–May 15) and late summer/fall seasons (August 20–October 20).
- If desert tortoises are encountered during herbicide treatments, application shall cease and shall not resume until the tortoise moves over 300 feet from treatment area on its own accord.
- 2,4-D would not be used within 0.25 mile of occupied tortoise habitat.
- When conducting herbicide treatments in habitat occupied by desert tortoise, the following herbicides would be avoided, where feasible: clopyralid, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.

- Herbicide applications using ground equipment should use either liquid streams or relatively course sprays to minimize spray drift.
- Drift reduction agents, nozzles that create large droplets and special boom and nozzle placement would be used to reduce drift during aerial spraying (see "Aerial Application" and "Measures to Reduce Spray Drift" sections in **Appendix C** for additional SOPs).
- After treatment, seeding or planting would occur using NCA-approved native grass, forb, and shrub seeds or plants from appropriate ecoregion sources.
- All individuals working on manual or herbicide treatment projects in suitable and occupied tortoise habitat will be required to take a worker education training class, conducted by a qualified BLM tortoise biologist. The class will describe desert tortoises, and the appropriate measures to take upon discovery of a tortoise or burrow. The class will also include a discussion of manual and herbicide treatment techniques and conservation measures to minimize potential adverse impacts.
- Before manual or herbicide treatment activities begin, a pre-project meeting will be held between the workers and the BLM tortoise biologist to review all conservation measures. A handout of the conservation measures will be provided to all onsite workers.
- Anytime a vehicle or equipment is parked in desert tortoise habitat, the area around and directly under the vehicle must be inspected for tortoises before the vehicle or equipment is moved. If there is a desert tortoise observed, it will be left to move on its own – the tortoise will not be approached or handled. If this does not occur within 15 minutes, the BLM tortoise biologist (or other approved tortoise biologist) swill be contacted to remove and relocate the tortoise.
- If a desert tortoise is found in the project area during project activities, the tortoise will not be approached or handled and all project activities within 300 feet of the tortoise will be halted immediately until the tortoise leaves the area. This distance can be adjusted up or down depending on specific circumstances as coordinated with the BLM tortoise biologist.

The primary direct impacts of the Proposed Action on the desert tortoise would be short term disturbances related to the human activities associated with manual, ground-based, or aerial applications, and habitat modification. Other potential impacts could include accidental direct contact with herbicides, indirect contact with contaminated foliage, and ingestion of contaminated food/water items. These would be unlikely to occur, as the SOPs, resource protection measures, and protocols specific to the desert tortoise were designed to prevent these impacts. Where aerial herbicide applications are used to create fire breaks or treat larger areas of invasive brome grasses, tortoises may be impacted by the loss of these species as forage within the treatment areas.

Herbicide treatments would benefit desert tortoise in the long-term. Using herbicides and manual removal to reduce or eliminate invasive grasses and other wildfire fuels would lessen the risk of future catastrophic wildfire. Without management intervention to control brome grasses, the NCAs will likely experience continued increases in wildfires that negatively impact desert tortoise population resiliency and recovery efforts.

Southwestern willow flycatcher

The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible to minor, short-term, negative impacts and minor to moderate, long-term, positive impacts on the southwestern willow flycatcher (SWFL), and no effect on its critical habitat. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect" determination for this endangered species, and a "no effect" determination for its designated critical habitat.

Treatment methods proposed for use in SWFL habitat would be manual removal, spot treatments, and ground-based herbicide applications. The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to SWFL habitat:

- Conduct surveys prior to vegetation treatments within suitable habitat.
- Where surveys detect birds, do not broadcast apply herbicides.
- If SWFL presence is not detected within suitable riparian corridor habitats, assume that the species is present, and apply the appropriate species- and herbicide-specific conservation measures to the suitable riparian corridor habitat.
- Do not conduct herbicide treatment within 0.5 mile of suitable and occupied riparian corridor habitat during the SWFL nesting season (4/1-9/30).
- Do not use 2,4-D, or other herbicides rated as Class 1 or 2 in the species toxicity group for Small Avian within or near (300 feet of) suitable or occupied SWFL riparian corridor habitat.
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year.
- Following treatments, replant or reseed treated areas with native species, if needed.
- Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).

Treatment of infestations would likely indirectly benefit SWFL by reducing noxious and invasive weeds, thereby maintaining native habitat that provides cover, forage and/or foraging areas for prey species. The PEIS contains detailed analysis of impacts associated with different treatment methods on special status species (BLM 2007a; pp. 4-91 to 4-94).

Because SWFL are migratory, birds are not anticipated to be present within the project area from October to March; therefore, herbicide and manual treatments conducted within this timeframe would not directly affect SWFL. To avoid direct effects to eggs, flightless young or nesting adults, herbicide applications would not be conducted within 0.5 mile of known SWFL nesting habitat during the nesting season, in any given year.

Indirect effects to SWFL could occur if there is substantial vegetation loss, resulting in alteration of vegetative composition, habitat structure, or loss of nesting trees, which could affect the quality and suitability of a riparian corridor. Herbicide and manual treatments conducted in designated critical habitat have the potential to modify primary constituent elements of riparian vegetation,

such as the presence of tamarisk, habitat density, structure, and canopy cover (USFWS 2013). To minimize effects to suitable and critical SWFL habitats, herbicides not approved for riparian use would not be applied within 300 feet of the riparian edge. Within the riparian corridor, no broadcast applications would be used, and only selective herbicides with hand application methods would be permitted.

The removal of nonnative vegetation is expected to improve SWFL habitat by allowing recolonization of native species. Additionally, a reduction in exotic vegetation would potentially reduce the risk of future wildfires in riparian habitats which may degrade suitable and potential nesting habitat.

Western yellow-billed cuckoo

The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible to minor, short-term, negative impacts and minor to moderate, long-term, positive impacts on the western yellow-billed cuckoo (WYBC), and no effect on its critical habitat. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect" determination for this threatened species, and a "no effect" determination for its designated critical habitat.

Treatment methods proposed for use in WYBC habitat would be manual removal, spot treatments, and ground-based herbicide applications. The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to WYBC habitat:

- Conduct surveys prior to vegetation treatments within suitable habitat.
- Where surveys detect birds, do not broadcast apply herbicides.
- If WYBC presence is not detected within suitable riparian corridor habitats, assume that the species is present, and apply the appropriate species- and herbicide-specific conservation measures to the suitable riparian corridor habitat.
- Do not conduct herbicide treatment within 0.5 mile of suitable and occupied riparian corridor habitat during the WYBC nesting season (5/1-9/30).
- Do not use 2,4-D, or other herbicides rated as Class 1 or 2 in the species toxicity group for Small Avian within or near (300 feet of) suitable or occupied WYBC riparian corridor habitat.
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year.
- Following treatments, replant or reseed treated areas with native species, if needed.
- Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).

Treatment of infestations would likely indirectly benefit WYBC by reducing noxious weeds and invasive species, helping to maintain high quality habitat that provides forage and/or foraging areas for prey species. Because WYBC are migratory, birds are not anticipated to be present within the NCAs from October through April; therefore, herbicide and manual treatments conducted within

this timeframe would not directly affect this species. To avoid direct effects to eggs, flightless young, or nesting adults, a pretreatment habitat assessment would be conducted within any dense riparian habitats in the NCAs. Herbicide applications would not be conducted during the nesting season within 0.5 mile of any habitats determined suitable for WYBC nesting.

To minimize effects to suitable and critical WYBC habitats, only herbicides approved for riparian use would be within 300 feet of the riparian zone. Within the riparian zone, no broadcast applications would be used, and only selective herbicides with hand application methods would be permitted.

The removal of nonnative vegetation is expected to improve WYBC habitat by allowing recolonization of native species. Additionally, a reduction in exotic vegetation would potentially reduce the risk of future wildfires in riparian habitats

Mexican spotted owl

The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible, short-term, negative impacts and negligible, long-term, positive impacts on the Mexican spotted owl (MSO), and no effect on its critical habitat. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect" determination for this threatened species, and a "no effect" determination for its designated critical habitat.

Treatment methods proposed for use in potential MSO habitat would be primarily manual removal, spot treatments, and ground-based herbicide applications. The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to modeled potential MSO habitat:

- Survey for MSO (and their nests) on suitable proposed treatment areas, prior to developing treatment plans.
- Do not conduct herbicide treatment within 0.5 mile of modeled potential nesting, roosting, foraging, and dispersal habitat in the NCAs during the nesting season (4/15-9/1).
- Do not allow human disturbance within 0.25 mile of protected activity centers during the nesting period (as determined by a qualified biologist).
- Protect and retain the structural components of known or suspected nest sites during treatments; evaluate each nest site prior to treatment and protect it in the most appropriate manner.
- Maintain sufficient dead and down material during treatments to support MSO prey species (minimums would depend on forest types and should be determined by a wildlife biologist).
- Do not conduct treatments that alter forest structure in old-growth stands.

Although models created by Willey and Spotskey (1997, 2000) of MSO habitat indicate potential nesting, roosting, foraging, and dispersal habitats within the NCAs, there are no records of MSO occurrence in either. Mexican spotted owls are found in remote, narrow canyons that would not typically be locations where noxious weed or exotic invasive species control or eradication treatments would be authorized under the Proposed Action.

Manual removal and ground based herbicidal treatments to control exotic invasive brome species in areas of the NCAs that are adjacent to modeled potential MSO habitat could have beneficial effects on this habitat by reducing the likelihood of wildfires that could burn into potential foraging and dispersal habitats. Lessening the likelihood of wildfires would protect native vegetation communities that support the prey base for MSO.

California condor

The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible, short-term, negative impacts and negligible, long-term, positive impacts on the California condor, and no effect on its critical habitat. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect" determination for this endangered species, and a "no effect" determination for its designated critical habitat.

On October 16, 1996, the USFWS announced plans to reintroduce California condors into northern Arizona and designate these birds as non-essential experimental populations, as provided by Section 10j of the ESA (USFWS 1996b). California condors from the 10j experimental population area (USFWS 1996b) frequently forage away from the Vermillion Cliffs of Arizona into southwestern Utah, including Washington County.

California condors are not known to nest or have special use sites in either of the NCAs. Occasional overflights by condors and possible perching along the Virgin River have been reported (The Peregrine Fund 2012; Audubon and Cornell Lab of Ornithology 2013). Most California condor use occurs east of the Red Cliffs NCA in and near Zion National Park. Although a portion of the Red Cliffs NCA, east of Interstate 15 (I-15), is within the California condor 10j experimental population boundary, the implementation of SOPs and conservation measures would minimize direct exposure or contamination of forage so that adverse effects to the 10j experimental population would be inconsequential. California condors observed in the NCAs west of I-15 would be outside the boundary of the experimental non-essential population areas, and subject to the full protection of the ESA.

Treatment methods proposed for use in potential California condor habitat would be primarily manual removal and spot treatment ground-based herbicide applications. The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to potential California condor habitat:

- Restrict human activity within 1.5 miles of California condor nest sites.

Manual removal and ground based and aerial herbicidal treatments to control exotic invasive brome species in areas of the NCAs could have beneficial effects on potential California condor nesting or roosting habitat by reducing the likelihood of wildfires that could destroy roost trees and degrade foraging habitat.

Virgin River chub and Woundfin

The Proposed Action, including implementation of all SOPs and resource protection measures, could result in negligible to minor, short-term, negative impacts and minor to moderate, long-term, positive impacts on the Virgin River chub and woundfin and their critical habitat. The Proposed Action, therefore, warrants a "may affect, not likely to adversely affect" determination for these endangered fish species and their designated critical habitat.

Treatment methods proposed for use in Virgin River chub and woundfin habitat would be manual removal, spot treatments, and ground-based herbicide applications. The design features, SOPs, and NCA-specific conservation measures in **Appendix C**, and below would apply to Virgin River chub and woundfin habitat:

- Treatment methods proposed for use in Virgin River chub and Woundfin suitable and critical habitat would be manual removal, spot treatments, and ground-based herbicide applications to control and eradicate non-native woody species (e.g., tamarisk, Russian olive) only.
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- No herbicide mixing/loading would occur within 300 feet of water sources, including rivers, streams, riparian and wetlands, and caves/karst.
- Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).
- Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used and use spot rather than broadcast treatments.
- Limit the use of diquat in water bodies that have native fish and aquatic resources.
- Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing polyoxyethyleneamine (POEA) or seek to use formulations with the least amount of POEA, to reduce risks to aquatic organisms in aquatic environments.
- Ensure that trained personnel monitor weather conditions at spray times during application.
- Do not spray if precipitation is occurring or is imminent (within 24 hours).
- Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year.
- Following treatments, replant or reseed treated areas with native species, if needed.
- Consider ground-disturbing activities on a case- by-case basis and implement SOPs to ensure minimal erosion or impact to the aquatic habitat.

Improperly applied herbicide treatments could potentially impact fish and other aquatic organisms. This risk would be minimized under the Proposed Action, as the SOPs and resource conservation measures presented in **Appendix C** of this EA would be followed. Ground-based herbicide applications near the Virgin River in Red Cliffs NCA would be performed by trained individuals using backpack sprayers (which usually carry around 4 gallons of liquid). The risks of accidental spills or discharges of herbicides into surface water would be very low, as would the potential quantity of the accidentally spilled herbicide.

The potential effects to fish and fish habitat from the drift of chemicals into water are also expected to be negligible because the SOPs and resource protection measures do not allow spraying under windy conditions and establish buffers to spraying along riparian areas. Minor, short term and localized impacts could occur from the removal of small amounts of shade vegetation that helps to regulate water temperature in the treatment area. Virgin chub and woundfin could easily move to reaches of the Virgin River that have not been treated, so this would constitute a negligible to minor impact on either species or their critical habitats.

Control and eradication of non-native hydrophytic species, such as tamarisk, Russian olive, and giant reed, along the Virgin River through the Red Cliffs NCA would help to sustain water flows for both species and allow more desirable native riparian vegetation to re-establish along this reach of the river.

4.3.9 Wilderness

Implementation of the Proposed Action could result in negligible to minor, short-term, negative impacts and minor to moderate, and potentially major, long-term, positive impacts on 19,989 acres of designated wilderness in the Cottonwood Canyon and Red Mountain Wilderness areas, in the Red Cliffs NCA.

The BLM's Minimum Requirements Decision Guide (MRDG) was used to analyze the allowable weed management tools for use in Wilderness areas (see **Appendix F**). Wilderness areas are managed under guidelines for vegetation treatments that prohibit activities that degrade the quality, character, and integrity of these protected lands. Weeds may be controlled by manual removal or chemical treatments when they are spreading within the wilderness, provided the control can be effective without serious impacts on wilderness values.

Under the Proposed Action, only manual removal and ground-based herbicide treatment methods would be authorized, using hand crews on foot or with pack stock. No aerial spraying would occur within 0.5 mile of wilderness. Treatments would be implemented using a "minimum tool" concept, relying on use of hand tools, hand broadcasters, backpack pumps, hand sprayers, and pumps mounted on pack stock (BLM 2007b). All weed management actions in wilderness would require the completion of a project specific minimum tool analysis using the MRDG; see **Appendix F**).

In the short and long term, the Proposed Action is expected to benefit the naturalness of both wilderness areas, by controlling and eradicating non-native species and facilitating the reestablishment of native vegetation communities. Native vegetation communities would provide higher quality wildlife habitat and support higher quality visitor experiences. Efforts to control exotic invasive brome species could result in a measurable reduction in the frequency of wildfires in the Cottonwood Canyon and Red Mountain Wilderness areas, as these non-native grasses fuel larger and more catastrophic fires, like the Cottonwood Trail Fire in 2020.

4.3.10 Lands with Wilderness Characteristics

Implementation of the Proposed Action could result in negligible to minor, short-term, negative impacts and minor to moderate, and potentially major, long-term, positive impacts on

approximately 50,4050 acres of lands identified as having wilderness characteristics within the two NCAs.

Under the Proposed Action, manual removal, ground-based and aerial applications, using only the pre-emergent herbicide "Imazapic" (e.g., Plateau®) + appropriate/approved adjuvants, could be authorized. These treatments over time would be expected to benefit lands with wilderness characteristics by controlling and eradicating noxious weeds and exotic invasive species, thereby facilitating the reestablishment of native vegetation communities. Native vegetation communities would provide higher quality habitats for wildlife, including threatened and endangered species, and improve the naturalness and scenic qualities of the lands with wilderness characteristics.

4.4 ALTERNATIVE B – NO ACTION

This section analyzes the impacts of the No Action alternative as a baseline for the comparison of impacts that could occur under implementation of the Proposed Action.

4.4.1 Water Resources/Quality and Wetlands/Riparian Zones

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to Water Resources/Quality and Wetlands/Riparian Zones. A project specific NEPA analysis and Biological Assessments would need to be prepared for each type of treatment proposed to be conducted along the Beaver Dam Wash, Leeds and Quail Creeks, and the Virgin River. These requirements could limit the size and number of treatments completed in the short and the long term. Delays in controlling and eradicating exotic hydrophytic woody species, like tamarisk and Russian olive, could negatively affect water quality and quantity and the functioning condition of the streams and river. The quality of aquatic habitat for native fish and other organisms would be impacted by reduced water volume and increased water temperatures, potentially endangering Virgin River chub and woundfin minnow populations whose reproductive success is influenced by both factors.

Under this alternative, noxious weeds and invasive grasses would be expected to increase in the wetland and riparian vegetative communities. The spread of these undesirable species would negatively impact wetland and riparian hydrologic functions and the quality of terrestrial and aquatic wildlife habitat in these important areas. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, including within and near riparian zones. The loss of cover would increase the potential for soil erosion and sedimentation into surface water sources, negatively impacting the riparian zones and water quality.

4.4.2 Soils

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to soils. Since chemical treatment and manual methods would require project-specific NEPA analyses and possibly Biological Assessments, delays in completing the environmental compliance

requirements for treatments would result in fewer treatments being completed on an annual basis in each of the NCAs. Noxious weeds and exotic invasive annual grasses could be expected increase in aerial extent on 63,645 acres in Beaver Dam Wash NCA and on approximately 45,600 acres in the Red Cliffs NCA.

Treatments presently authorized to treat noxious weeds and invasive grasses along the Babylon, Cottonwood, and Red Cliffs Recreation Area roads in the Red Cliffs NCA (BLM 2011; 2013) could continue annually, or on an as needed basis, under the No Action alternative but would only reduce infestations in very narrow linear areas, totaling less than 100 acres. Without predictable and regular control treatments, noxious weeds and exotic annual grasses would be more likely to spread to areas that have recently been impacted by wildfires or other surface disturbances in both NCAs, thus negatively impacting soil conditions. Wildfire frequency, extent, and intensity within the NCAs would also likely increase due to the proliferation of invasive brome species, removing native vegetative cover and increasing the potential for wind and water soil erosion.

4.4.3 Vegetation Excluding USFWS-Designated Species

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to vegetation including BLM Sensitive Species. Impacts to vegetation including BLM Sensitive Species would be less in the short term, as chemical treatment and manual methods would require the completion of site-specific NEPA analysis for each project. Treatment currently authorized along specific roadways in Red Cliffs NCA (Babylon, Cottonwood Road, and Red Cliffs Recreation Area roads) could continue, as they were analyzed in prior EAs (BLM 2011; 2013), as could manual controls that qualify as Categorially Excluded action in Beaver Dam Wash NCA. Roadway treatments would only reduce infestations in very narrow linear areas, totaling less than 100 acres.

This alternative would essentially delay or reduce the number of treatments that could be conducted in both NCAs, impacting the control and eradication of noxious weeds and exotic invasive species on over 109,000 acres of public land. Noxious weeds and invasive grasses could increase in aerial extent, invade new areas, and continue to outcompete desirable native plants. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, negatively impacting the quality of cover, shade, forage, and prey base for BLM Sensitive Species.

4.4.4 Invasive Species/Noxious Weeds

The No Action alternative would likely result in little to no change to current conditions in the short-term, and moderate to potentially major, long-term, negative impacts to the control and eradication of noxious weeds and exotic invasive species.

Impacts to noxious weeds and exotic invasive species would be less in the short term under the No Action alternative, when compared to the Proposed Action, since chemical treatment and manual methods could be delayed by requirements to complete project-specific NEPA analyses and

Biological Assessments. Treatments presently authorized to treat noxious weeds and invasive grasses along the Babylon, Cottonwood, and Red Cliffs Recreation Area roads in the Red Cliffs NCA (BLM 2011; 2013) could continue annually, or on an as needed basis, under the No Action alternative but would only reduce infestations in very narrow linear areas, totaling less than 100 acres. This alternative would essentially delay or reduce the number of treatments that could be conducted in both NCAs, impacting the control and eradication of noxious weeds and exotic invasive species on over 109,000 acres of public land.

With this alternative, only a small number of treatments would be expected to occur on a regular basis. Weed infestations would be left untreated, resulting in degraded wildlife habitats, soil productivity, and vegetation community species diversity. These impacts would be long-term, until the environmental consequences of all approved treatments forms have been disclosed and analyzed through the NCA process and Biological Assessment. Noxious weeds and invasive grasses could increase in aerial extent, invade new areas, and continue to outcompete desirable native plants. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, negatively impacting the quality of cover, shade, forage, and prey base for federally-listed and BLM Sensitive Species.

4.4.5 Fish and Wildlife Excluding USFWS-Designated Species

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to habitats for/populations of fish and wildlife and BLM Sensitive Species.

This alternative would essentially reduce the number of treatments that could be conducted in both NCAs, impacting the control and eradication of noxious weeds and exotic invasive species on over 109,000 acres of public land. Chemical treatments and manual methods could be delayed by requirements to complete project-specific NEPA analyses and Biological Assessments. Treatments presently authorized to treat noxious weeds and invasive grasses the Babylon, Cottonwood, and Red Cliffs Recreation Area roads in the Red Cliffs NCA (BLM 2011; 2013) could continue annually, or on an as needed basis, under the No Action alternative but would only reduce infestations in very narrow linear areas, totaling less than 100 acres. Under this alternative, only a small number of treatments would be expected to occur on a regular basis.

Weed infestations would be left untreated, resulting in degraded wildlife habitats, soil productivity, and vegetation community species diversity. These impacts would be long-term, until the environmental consequences of all approved treatments forms have been disclosed and analyzed through the NCA process and Biological Assessments. Noxious weeds and invasive grasses could increase in aerial extent, invade new areas, and continue to outcompete desirable native plants. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, negatively impacting the quality of cover, shade, forage, and prey base for fish and wildlife and BLM Sensitive Species. Species biodiversity and richness could be lost under the No Action alternative.

4.4.6 Migratory Birds

The No Action alternative would likely result in little to no change to current conditions in the short-term , and minor to moderate, and potentially major, long-term, negative impacts to habitats for/populations of migratory birds and Species of Conservation Concern.

Chemical treatment and manual methods could be delayed by requirements to complete project-specific NEPA analyses and Biological Assessments. Treatments presently authorized to treat noxious weeds and invasive grasses along the Babylon, Cottonwood, and Red Cliffs Recreation Area roads in the Red Cliffs NCA (BLM 2011; 2013) could continue annually, or on an as needed basis under the No Action alternative but would only reduce infestations in very narrow linear areas, totaling less than 100 acres. This alternative would essentially delay or reduce the number of treatments that could be conducted in both NCAs, impacting the control and eradication of noxious weeds and exotic invasive species on over 109,000 acres of public land.

Only a small number of treatments would be expected to occur on a regular basis. Weed infestations would be left untreated, resulting in degraded wildlife habitats, soil productivity, and vegetation community species diversity. These impacts would be long-term, until the environmental consequences of all approved treatments forms have been disclosed and analyzed through the NCA process and Biological Assessment. Noxious weeds and invasive grasses could increase in aerial extent, invade new areas, and continue to outcompete desirable native plants. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, negatively impacting the quality of cover, shade, forage, and prey base for many migratory birds. Locally extensive habitat conversion could reduce the area of habitat available for nesting, roosting, or foraging, resulting in larger areas of poor-quality habitat for some species.

4.4.7 Threatened, Endangered or Candidate Plant Species

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to Shivwits milkvetch and its suitable and designated critical habitat.

Chemical treatments and manual methods could be delayed by requirements to complete project-specific NEPA analyses and Biological Assessments. Under this alternative, only a small number of treatments would be expected to occur on a regular basis. Weed infestations would be left untreated, resulting in degraded wildlife habitats, soil productivity, and vegetation community species diversity. These impacts would be long-term, until the environmental consequences of all approved treatments forms have been disclosed and analyzed through the NEPA process and Biological Assessments. Noxious weeds and invasive grasses could increase in aerial extent, invade new areas, and continue to outcompete desirable native plants. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, including areas that support populations and critical habitat for Shivwits milkvetch on the Harrisburg Bench and White Reef of Red Cliffs NCA.

This alternative would likely result in long-term negative impacts to Shivwits milkvetch, their pollinator species, and soil conditions in suitable and critical habitats, thereby, potentially reducing population size in the NCA. Without regular management intervention to control noxious weeds and invasive brome grasses, negative impacts on Shivwits milkvetch population resiliency and recovery efforts would be anticipated.

4.4.8 Threatened, Endangered or Candidate Animal Species

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to ESA-listed animal species (Mojave desert tortoise, southwestern willow flycatcher, western yellow-billed cuckoo, Mexican spotted owl, California condor, Virgin River chub, and woundfin) and designated critical habitat.

This alternative would essentially reduce the number of treatments that could be conducted in both NCAs, impacting the control and eradication of noxious weeds and exotic invasive species on over 109,000 acres of public land. Chemical treatments and manual methods could be delayed by requirements to complete project-specific NEPA analyses and Biological Assessments. Treatments presently authorized to treat noxious weeds and invasive grasses along the Babylon, Cottonwood, and Red Cliffs Recreation Area roads in the Red Cliffs NCA (BLM 2011; 2013) could continue annually or on an as needed basis under the No Action alternative but would only reduce infestations in very narrow linear areas, totaling less than 100 acres. Under this alternative, only a small number of treatments would be expected to occur on a regular basis.

Weed infestations would be left untreated, resulting in degraded wildlife terrestrial and aquatic habitats, soil productivity, and vegetation community diversity. These impacts could be long-term, until the environmental consequences of all approved treatments forms have been disclosed and analyzed through the NCA process and Biological Assessments. Noxious weeds and invasive grasses could increase in aerial extent, invade new areas, and continue to outcompete desirable native plants. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in both NCAs. The wildfires would burn or reburn the vegetative cover over large areas, negatively impacting the quality of cover, shade, forage, and prey base for ESA-listed species. Populations could decline in the NCAs, as the primary constituent elements of critical habitats for these species are impacted by noxious weeds and exotic invasive species. The loss of critical habitat would impede recovery efforts for these species and could result in the need to change their listing status, as population declines trigger the need for higher levels of protection.

4.4.9 Wilderness

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts to two designated wilderness areas that total 19,989 acres in the Red Cliffs NCA. Chemical treatments and manual methods could be delayed by requirements to complete interagency Minimum Requirements Decision Guides, project-specific NEPA analyses, Biological Assessments and

other environmental compliance requirements. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity in the Cottonwood Canyon and Red Mountain Wilderness areas. The wildfires would burn or reburn the vegetative cover over large areas of the wilderness units, compromising the naturalness of the areas and facilitating the proliferation of noxious weeds and invasive species.

4.4.10 Lands with Wilderness Characteristics

The No Action alternative would likely result in little to no change to current conditions in the short-term, and minor to moderate, and potentially major, long-term, negative impacts on a total of 18,307acres evaluated as having wilderness characteristics in the two NCAs. Chemical treatments and manual methods could be delayed by requirements to complete project-specific NEPA analyses, Biological Assessments, and other environmental compliance requirements. Without regular treatments to control and eradicate exotic brome grasses, wildfires could increase in frequency, extent, and intensity on lands with wilderness characteristics. The wildfires would burn or reburn the vegetative cover over large areas, compromising the naturalness of these lands and facilitating the proliferation of noxious weeds and invasive species.

4.5 CUMULATIVE IMPACTS

Cumulative impacts are those effects on the environment that result from the incremental effect of an action, when added to other past, present, or reasonably foreseeable actions, regardless of what agency or person undertakes such actions. The following factors were considered in the cumulative impacts assessment:

- Federal and non-federal actions;
- Potential for additive and synergistic effects or interactions among or between effects;
- Scale of cumulative impact by alternative.

Temporal and spatial boundaries are used in the cumulative analysis, based on resources of concern and actions that might contribute to an impact. The cumulative impact analysis area (CIAA) includes public lands where noxious weed and exotic invasive species control and eradication treatments could be applied, as described under the Proposed Action, in the Beaver Dam Wash and Red Cliffs NCAs, in Washington County, Utah.

Past and Present Actions

Many past and present actions on Federal, state, and private lands in Washington County have contributed to the introduction and spread of noxious weeds and exotic invasive species in the CIAA. These include the introduction of domestic livestock and nonnative agricultural crops in the mid-19th century, and the overgrazing of public rangelands during the early decades of the 20th century. The seeds of some noxious weeds and many exotic invasive species were spread by domestic livestock, through seed transfer and manure, particularly on overgrazed rangelands where native vegetation communities had been damaged or reduced in areal extent.

Other factors that contributed to the introduction of noxious weeds and exotic invasive species included surface disturbances caused by the development and expansion of cities and towns, particularly in the St. George Basin, mining and mineral materials extraction, roads and major highway construction, the installation of power transmission and other types of utilities, and diverse outdoor recreational activities, including motorized and non-motorized uses. Recent regional population growth and the expansion of residential developments in areas outside of the St. George Basin continue to require the construction of roads, power transmission lines, water conveyance systems, and recreational trails that have the potential to introduce and spread noxious weeds and exotic invasive species.

Reasonably Foreseeable Action Scenario

The following scenario identifies the reasonably foreseeable future actions that have the potential to cumulatively affect the same resources as the Proposed Action and No Action Alternative.

Reasonably foreseeable future actions include continued population growth in Washington County and the development of new residential housing units, commercial activity areas and new roads, on private, municipal, and state lands. Since both NCAs are managed as Exclusion and Avoidance areas for ROWs, few new utility and transportation ROWs will be authorized in the short and long term, lessening the potential for the introduction, or spread, of noxious weeds and exotic invasive species during construction and maintenance of this infrastructure. While amendments to existing ROWs could be authorized in both NCAs, the potential for the spread of noxious weeds and exotic invasive species would be reduced by the terms and conditions of the ROW grants that require that the holders control and eradicate these species within their ROWs. Both NCAs are segregated by OPLMA in 2009 from the operation of the mining laws, mineral leasing, mineral materials, and geothermal leasing laws, greatly lessening the potential that activities and developments under these laws would introduce noxious weeds and exotic invasive species or encourage their proliferation in the NCAs.

As the population of Washington County continues to grow, outdoor recreational uses in the CIAA, and adjacent state, and municipal lands are also expected to increase in the future. Recreational use of the NCAs has increased dramatically over the past decade, with more than 325,000 visits to Red Cliffs NCA in 2021 and 65,000 visits to Beaver Dam Wash NCA in that same year. While not all recreational activities have the potential to introduce and/or spread noxious weeds or exotic invasive species, those involving motorized vehicles and pack stock would be the most likely to contribute to their proliferation.

Domestic cattle grazing would be expected to continue as an authorized activity in the four allotments, which cover approximately 62,000 acres, in the Beaver Dam Wash NCA, and on adjacent state and private lands in the Washington County. Exotic invasive brome grasses may increase somewhat in aerial extent in Beaver Dam Wash NCA, as they are seasonally consumed by cattle. However, livestock numbers that are grazed annually during the late fall, winter, early spring Season of Use on these allotments will continue to be highly variable, due to long-term regional droughts, the impacts of wildfires, and market factors that influence the profitability of this venture. It is expected that in those years when fewer cattle graze in the NCA that the potential

for the introduction and spread of certain noxious weeds and exotic invasive species would be lessened.

The prevalence of exotic invasive brome grasses will continue to contribute to a nearly annual burn-re-burn fire regime and catastrophic wildfires in the Mojave Desert and Great Basin ecosystems of both NCAs. Immediate and full suppression of wildfires in critical habitats for ESA-listed species and in Wildland Urban Interface (WUI) areas will help reduce the loss of native vegetation communities and habitats for at-risk wildlife species. Post-fire emergency stabilization and revegetation efforts will be implemented in both NCAs, to prevent soil erosion and the proliferation of noxious weeds and exotic invasive species.

Long-term increases in ambient temperatures, changes in seasonal precipitation patterns, droughts, and higher atmospheric concentrations of carbon dioxide are expected to benefit noxious weeds and exotic invasive species, rather than native species.

Exotic invasive brome grasses, Sahara mustard, and other species that evolved in Eurasia will be more successful than native perennial grasses of the Mojave Desert, under predicted increases in ambient temperatures and changes to the timing of seasonal precipitation. Native vegetation communities of the Mojave Desert and Great Basin eco-regions will be at a competitive disadvantage, as they have evolved under different temperature/moisture regimes. Research has also shown that many noxious weeds, including Canada thistle, leafy spurge, and spotted knapweed, exhibit above average growth responses to elevated carbon dioxide levels (Ziska 2003), potentially enhancing their future competitiveness. Effective noxious weed and invasive species treatments will be one tool that can be used to assist native species to persist under changing climatic conditions.

Cumulative Impacts Related to the Proposed Action

The cumulative effects to the human environment of manual and chemical treatments to control and eradicate noxious weeds and exotic invasive species, when combined with similar treatments, particularly herbicide applications, on non-federal lands in Washington County, are expected to be minimal and primarily beneficial to ecosystem health in the long term. Only herbicides that are approved for use on public lands would be applied by BLM, following the SOPs included in the Proposed Action and shown in **Appendix C**. The potential for damage to water resources, soils, native vegetation, aquatic and terrestrial habitats, general wildlife, and ESA-listed/BLM Sensitive plant and wildlife species, as well as impacts on human health and safety, would be negligible to minor and short-term in nature. The scale of the herbicide treatments would be small, limiting the effects of the treatments to localized areas of public lands, with an average of 100-300 acres being treated annually. Monitoring data would be collected from all treatment areas for a 5-year period or until control/eradication goals are met and used to determine the effectiveness of the treatments and inform needed changes in herbicides and application methods and manual removal methods.

Implementation of the Proposed Action, in conjunction with other land management activities and integrated weed management by other Federal, state, and county agencies and private landowners, should result in fewer acres of weed infestations and a decreased need to treat noxious weeds in the future. Native vegetation communities would benefit from reduced competition with noxious

weeds and exotic invasive species, as would water resources and riparian zones. Healthy native vegetation communities, particularly riparian communities, would provide quality habitat for diverse native fish, wildlife, and avian species, including migratory birds and Species of Conservation Concern.

Cumulative Impacts Related to the No Action Alternative

The cumulative effects to human environment of herbicide applications and manual treatments presently authorized in the CIAA, when combined with other weed treatments on non-federal lands in Washington County, are expected to be negligible. The scale of the treatments would be small and the disturbances to soils minimal and highly localized to the specific treatment areas. The authorized weed treatments in the CIAA are not expected to measurably damage water resources, soils, native vegetation, aquatic and terrestrial habitats, general wildlife, and ESA-listed/BLM Sensitive plant and wildlife species, nor have negative impacts on human health and safety.

However, the No Action alternative would be expected delay the control of many weeds on public lands in the CIAA and reduce the number of treatment projects completed on an annual or predictable timeframe. As a result, wildfire burn-reburn frequency, extent, and intensity within both NCAs would likely continue to increase, in tandem with the negative impacts to the resources described and analyzed in **Chapters 3 and 4** of this EA. The No Action alternative would likely result in negligible to minor, short-term impacts and minor to moderate, and potentially major, long-term, negative cumulative impacts to all resources in the CIAA.

5.0 CHAPTER 5—CONSULTATION AND COORDINATION

5.1 INTRODUCTION

This section describes the consultation and coordination actions related to the preparation of this Programmatic EA.

5.2 PERSONS, GROUPS, AND AGENCIES CONSULTED

The entities consulted are shown in **Table 5-1**.

Table 5-1. Consultation and Coordination.

Name	Purpose and Authorities for Consultation or Coordination	Findings and Conclusions
Consultation		
U.S. Fish and Wildlife Service (USFWS)	Consultation, under Section 7 of the ESA for Mojave desert tortoise, southwestern willow flycatcher, western yellow-billed cuckoo, Mexican spotted owl, California condor, Virgin River chub, woundfin, and Shivwits milkvetch, and designated critical habitat.	BLM initiated informal consultation with the USFWS on August 05, 2022.
Paiute Indian Tribe of Utah, Shivwits Band of Paiutes, The Hopi Tribe	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	An invitation to consult letter was sent via email on August 12, 2022.
Coordination		
Utah Division of Wildlife Resources (UDWR) Washington County Field Office	Biological review of the wildlife and plant and conservation measures sections of the EA.	Review of the EA initiated on August 05, 2022.

5.3 SUMMARY OF PUBLIC PARTICIPATION

The BLM conducted internal scoping on the Proposed Action and completed an ID Team Checklist (**Appendix A**). Issues identified by the BLM ID Team were incorporated into this EA for analysis.

The public was notified of the Proposed Action through a posting of the preliminary EA on the BLM's ePlanning website (https://eplanning.blm.gov) on August 12, 2022.

The BLM provided a 30-day public review and comment period, which began on August 12, 2022, and ended on September 11, 2022.

5.4 LIST OF EA PREPARERS

The BLM resource specialists who determined the potentially affected resources for this EA are shown in the ID Team Checklist in **Appendix A**. The BLM resource specialists who contributed to the preparation of the EA are listed in **Table 5-2**.

Table 5-2. BLM Preparers.

Name	Title	Responsible for Preparation or Review of the Following Section(s) of this EA
John Kellam	Wildlife Biologist, Beaver Dam Wash and Red Cliffs NCAs.	EA Author: All Chapters, Appendix, and Resources: Water Resources/Quality, Soils, Wetlands/Riparian Zones, Vegetation, Invasive Species/Noxious Weeds, Fish and Wildlife, Migratory Birds, Threatened, Endangered or Candidate Plant and Animal Species, Wilderness, and Lands with Wilderness Characteristics.
Dawna Ferris-Rowley	NCA Manager, Beaver Dam Wash and Red Cliffs NCAs	Technical Review and Revisions: All Resources.
Katie Cleek	Archaeologist, Beaver Dam Wash and Red Cliffs NCAs.	Reviewer: Cultural Resources.
Jacob Perkins	Natural Resource Specialist, St. George Field Office	Reviewer: Invasive Species/Noxious Weeds.
Ryan Reese	Rangeland Management Specialist, St. George Field Office	Reviewer: Invasive Species/Noxious Weeds.

APPENDIX A Interdisciplinary Team Checklist

INTERDISCIPLINARY TEAM CHECKLIST

Project Title: INTEGRATED WEED MANAGEMENT PLAN FOR THE CONTROL AND ERADICATION OF NOXIOUS AND INVASIVE SPECIES ENVIRONMENTAL ASSESSMENT IN BEAVER DAM WASH AND RED CLIFFS NATIONAL CONSERVATION AREAS

NEPA Log Number: DOI-BLM-UT-C030-2022-0018-EA

File/Serial Number: N/A

Project Leader: John Kellam

Location of Proposed Action: BLM-administered public lands within the Red Cliffs and Beaver Dam Wash National Conservation Areas (NCAs), Utah. BLM and USFWS

Projection Description:

This Programmatic Environmental Assessment (EA) is being prepared to analyze and disclose the potential environmental consequences of implementing a proposed Integrated Weed Management Plan (IWMP) for the control and eradication of nonnative noxious weeds and invasive plant species within the Beaver Dam Wash and Red Cliffs NCAs.

The Proposed Action is needed to enable the NCA Manager to implement a new IWMP program in the NCAs that utilizes the full complement of methodologies available to control and eradicate noxious and invasive weeds. This EA is tiered to the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS; BLM 2007a), *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report* (PER; BLM 2007b), and the *Programmatic EIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States* (BLM 2016c).

An IWMP that utilizes Integrated Pest Management (IPM) treatment methods (i.e., prevention, cultural, herbicide use, and manual control) would be authorized under the Proposed Action. Herbicides used would be limited to those already approved by the BLM (2007a, 2016c) PER/PEIS. Standard Operating Procedures (SOPs) for herbicide application have been identified in the 2007 PEIS and would be followed. Additional conservation measures are included in Chapters 2 and 4 and APPENDIX C of the EA to further protect resources in the NCAs.

This IWMP would employ an integrated approach to control and eradicate nonnative noxious weeds and exotic invasive species within the NCAs. Non-herbicide treatments would be the preferred method, followed by spot treatments with herbicides. There are a few areas within the NCAs which may require broadcast spraying with booms from UTV's or pickup trucks along/adjacent to authorized roads and rights-of-way. Aerial spraying would be an infrequent treatment used to create linear firebreaks and/or treat priority infestation areas. Prior to ground-based and aerial treatments, the BLM ID Team would convene to review SOPs and resource protection measures to be used to treat noxious and invasive species safely and effectively. This process would occur in a timely manner to ensure priority species can be treated to limit spread. Numerous factors would be evaluated when considering which type of treatment to use, including but not limited to the effectiveness of the method, time and cost, relative ease of treatment, size of the infestation, impacts to target and non-target species, sensitive species habitat, and use of the area by the public, etc.

Approximately 100-300 acres/year could be treated and/or retreated with herbicides in the NCAs. The number of acres treated would vary from year to year, and more or fewer acres might be treated, depending on funding, inventories, and the variability in weed invasion dynamics such as rainfall patterns and drought conditions. No large landscape-level treatments of invasive species, including cheatgrass and red brome, are proposed under this EA.

Determination of Staff:

NP = not present in the area impacted by the proposed or alternative actions
NI = present, but not affected to a degree that detailed analysis is required
PI = present with potential for relevant impact that need to be analyzed in detail in the EA
NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form. The Rationale column may include NI and NP discussions.

Resources and Issues Considered (Includes Supplemental Authorities Appendix 1 H-1790-1)

Determi-nation	Resource	Rationale for Determination	Signature	Date
NI	Air Quality	The design features would not conflict with Utah's Dept. of Air Quality's (UDAQ) State Implementation Plan (SIP) and the National Ambient Air Quality Standards (NAAQS) would not be exceeded.	J. Perkins	5/19/22
NI	Greenhouse Gas Emissions	Ongoing scientific research has identified the potential impacts of anthropogenic (man-made) greenhouse gas (GHG) emissions and changes in biological carbon sequestration due to land management activities on global climate. GHG emissions associated with these activities would be	J. Perkins	5/19/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		negligible, localized, and short term. Protective measures would be applied for spraying of herbicides/pesticides or surface disturbance activities as discussed in the weeds program sections.		
NI	Wastes (hazardous or solid)	The potential exists for the application of chemicals to create hazardous wastes issues, however, if standard operating procedures and manufactures instructions are followed, these issues are negligible. Applicators would be licensed Pesticide Applicators and would be required to meet all required safety and reporting requirements.	J. Perkins	5/19/22
PI	Water Resources/Quality (drinking/surface/ground)	Herbicide applications could result in impacts on surface water sources and water quality, should chemicals drift into these sources during application or leach into the sources through soil erosion. This issue is therefore analyzed in detail in this EA.	J. Perkins	5/19/22
NP	Areas of Critical Environmental Concern	No ACECs have been designated in either of the NCAs, through land use planning.	J. Kellam	3/29/22
NI	Cultural Resources	Proposed Treatments for the control and eradication of nonnative, noxious, and invasive plant species by the BLM, utilizing IPM treatment methods including prevention, cultural controls, herbicide use, and manual controls constitute an undertaking, as defined by the National Historic Preservation Act (NHPA). Treatment proposals would be reviewed by the BLM Archeologist to determine whether the action would adversely affect Historic Properties that are listed on or eligible for inclusion in the National Register of Historic Places (NRHP), Traditional Cultural Properties (TCPs) have been identified by American Indian Tribes, and/or traditional Native American plant gathering areas, are present. Class III archeological survey may be required in areas where no previous survey has been conducted or previous survey was conducted over 10 years ago and does not provide sufficient data to allow for informed decisions. In Proposed Treatment Areas where Historic Properties that are listed on or eligible for inclusion in the NRHP, TCPs have been	K. Cleek	5/12/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		identified by American Indian Tribes, and/or traditional Native American plant gathering areas, are present and that could be adversely affected by a proposed treatment, they would be avoided through changes to the project area boundaries, treatment methods, monitoring by a qualified archeologist, or other appropriate measures. Specifically, proposed herbicide treatments may be exempted from SHPO consultation if the following factors apply. In accordance with Appendix H. II. D. 3 of the *State Protocol Agreement Between the Bureau of Land Management Utah and the Utah State Historic Preservation Office Regarding the Manner in which the Bureau of Land Management will meet its Responsibilities Under the National Historic Preservation Act as Provided for in the National Programmatic Agreement* (Protocol), "Herbicide application where it would be unlikely to affect archaeological sites and features, rock imagery, or traditional Native American plant gathering areas. Decisions will be consistent with and informed by the 2007 *Vegetative Treatments Using Herbicides on BLM Land in 17 Western States Programmatic Environmental Impact Statement*." If herbicide treatment would be likely to affect archaeological sites and features, rock imagery, or traditional Native American plant gathering areas, if it is unknown if they are present in the treatment area, or if another form of IPM treatment is planned, then Class III archeological survey may be necessary.		
NI	Native American Religious Concerns	Consultations would be conducted with culturally affiliated American Indian Tribes to ensure that Proposed Treatments would have no effect on sacred sites, areas of religious significance, or traditional Native American plant gathering areas, that have been identified by American Indian Tribes that claim cultural affiliation to southwestern Utah. The BLM Wildlife	K. Cleek	5/12/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		Biologist's participation in the Tribal Consultation process may be helpful. Impacts on sacred sites, areas of religious significance, or traditional Native American plant gathering areas, that are located within or near a treatment area would be avoided through changes to the project area boundaries, treatment methods, monitoring of treatment activities by Tribal representatives, or other appropriate measures, developed in consultation with Tribes. For Proposed Treatments in the BDWNCA, Tribal consultation may also be required to assess potential concerns about proposed Treatments in relation to the Old Spanish National Historic Trail.		
NI	Paleontology	Treatment proposals would be reviewed by a BLM specialist to determine whether the action, including the treatment methods, could adversely impact paleontological resources of scientific interest. Impacts to such resources would be avoided, through changes to the project area boundaries, treatment methods, monitoring of treatment activities by a qualified specialist, or other appropriate measures.	K. Voyles	5/10/22
NI	Geology / Mineral Resources/Energy Production	NCAs were withdrawn by OPLMA from the operation of mineral leasing, mineral materials, and geothermal leasing laws and are managed as avoidance or exclusion areas to new ROWs. The Proposed Action would have no impact on these uses.	K. Voyles	5/10/22
NI	Cave and Karst	Treatment proposals would be reviewed by a BLM specialist to determine whether the action, including the treatment methods, could adversely impact cave and karst. Impacts to such resources would be avoided, through changes to the project area boundaries, treatment methods, monitoring of treatment activities by a qualified specialist, or other appropriate measures.	K.Voyles	5/10/22
NI	Environmental Justice	According to the EPA Region VIII, State of Utah, Environmental Justice Map, the region has been categorized as a minority population area of 10-20% and a poverty	C. Goff	4/28/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		population area of 10-20%. The data shows that low income and high minority populations are generally located in the St. George/Santa Clara/Washington areas, in locations not adjacent to BLM managed lands. No disproportionately high or adverse health or environmental effects would result to minority or low-income populations as a result of implementing the Proposed Action		
NI	Socio-Economics	The effects on socio-economic resources would be beneficial in the short and long term, but not expected to result in measurable or significant economic contributions to local or regional economies. Under the Proposed Action, a small number of private, licensed Pesticide Applicators might be contracted to apply herbicides, resulting in minor economic benefits to a few individuals. If noxious weeds and exotic invasive species are controlled on public lands, adjacent landowners could benefit from reduced costs of weed management on private property.	C. Goff	4/28/22
NP	Farmlands (Prime or Unique)	Farmlands are not present in either NCA.	J. Perkins	5/19/22
PI	Soils	Herbicides have the potential to affect soil physical, chemical, and biological properties. Loss of vegetative cover after treatments could accelerate wind and water erosion, particularly in highly erodible or saline soils. This issue is therefore analyzed in detail in this EA.	J. Perkins	5/19/22
NI	Floodplains	No actions are proposed that would result in permanent fills or diversions or affect the function of floodplains or special flood hazard areas.	J. Perkins	5/19/22
PI	Wetlands/Riparian Zones	The treatment of noxious and invasive species could potentially affect wetlands/riparian zones. This issue is therefore analyzed in detail in this EA.	J. Perkins	5/19/22
PI	Fish and Wildlife Excluding USFW Designated Species	The treatment of noxious and invasive species could potentially affect general and sensitive fish and wildlife species if present in or near the treatment areas. This issue is therefore analyzed in detail in this EA.	J. Kellam	4/27/22
PI	Migratory Birds	Migratory bird habitat is present throughout the analysis area. Migratory birds and Species of Conservation Concern may be	J. Kellam	4/27/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		affected through direct means such as chemical spills or disturbance during application, or indirectly through removal of vegetation and bioaccumulation of chemical. Use of riparian and aquatic specific chemicals when near water, following labels and SOPs, and seasonal restrictions and buffers would minimize this risk. This issue is therefore analyzed in detail in this EA.		
PI	Threatened, Endangered or Candidate Plant Species	The treatment of noxious and invasive species could potentially affect listed plants if present in or near the treatment areas. This issue is therefore analyzed in detail in this EA.	J. Kellam	4/27/22
PI	Threatened, Endangered or Candidate Animal Species	The treatment of noxious and invasive species could potentially affect listed animals if present in or near the treatment areas. This issue is therefore analyzed in detail in this EA.	J. Kellam	4/27/22
PI	Vegetation Excluding USFW Designated Species	The treatment of noxious and invasive species could potentially affect vegetation, including BLM Sensitive Species, present in or near the treatment areas. This issue is therefore analyzed in detail in this EA.	J. Perkins	5/19/22
NP	Woodland / Forestry	Approximately 10% of the Red Cliffs NCA was formerly covered by a pinyon juniper woodland (PJ), prior to the fires in 2020 that reduced this acreage measurably. Beaver Dam Wash NCA prior to fires was 0.43% PJ.	J. Perkins	5/19/22
NI	Fuels/Fire Management	The Proposed Action would have no impact on any fuels management projects, nor would it affect fire management. Reductions in exotic invasive brome grasses could benefit fire suppression, as these “fine fuels” often carry wildfires in the Mojave Desert.	J. Perkins	5/19/22
PI	Invasive Species/Noxious Weeds (EO 13112)	The Proposed Action would manage (i.e., treat) noxious and non-native invasive species in two National Conservation Areas, for the purpose of reducing their spread and extent of occurrence. This issue is therefore analyzed in detail in this EA.	R. Reese	5/23/22
NI	Lands/Access	There are no potential impacts to land authorizations or access.	S. Dao	4/28/2022
NI	Livestock Grazing	Cattle grazing is only authorized in the Beaver Dam Wash NCA. The application of herbicides might require that livestock be	R. Reese	5/23/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		excluded from the treatment areas in the short term; this requirement would not be expected to have measurable effects on the licensed use or grazing management strategies of specific allotments, given the small size of weed treatment areas anticipated under the Proposed Action.		
NI	Rangeland Health Standards	The Proposed Action would positively benefit rangeland health, maintaining desired native vegetation species and soil productivity.	R. Reese	5/23/22
NI	Recreation	Treatments described under the Proposed Action are not expected to create measurable or long-term impacts to recreation, access, and opportunities. Any potential disruption to public access would be localized and short-term (e.g., temporary closures during project implementation for public health and safety).	K. Voyles	5/10/22
NI	Visual Resources	Potential treatments described under the Proposed Action are not expected to create substantial impacts to the characteristic landscape either through form, line, texture, contour, or colors. Protective measures apply to VRM Class 1 and 2 areas that would require additional ID team analysis and/or prohibit surface disturbing treatments.	K. Voyles	5/10/22
NLCS				
PI	National Conservation Areas	The Proposed Action would authorize the control and eradication of noxious weeds and invasive species in the Beaver Dam Wash and Red Cliffs NCAs.	J. Kellam	4/27/22
NI	National Historic Trails (Old Spanish Trail)	The Proposed Action could authorize the treatment of noxious and invasive species within the OSNHT Management Corridor in the Beaver Dam Wash NCA, which may help conserve and protect the visual setting and natural landscape elements that are evocative of the period of trail significance (1829-1848) and contribute to resource protection. Authorizing the Proposed Action within the OSNHT Management Corridor may require following the Protocol in Chapter 5 (Section 5.2, A-C) of the BLM Manual 6280, *Management of National Scenic and*	K. Cleek	5/12/22

Determi-nation	Resource	Rationale for Determination	Signature	Date
		Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation (2012 or its successors) if adverse impacts are possible. Notification of the BLM National Trail Administrator, the BLM Utah State Office National Trail Lead, and the Old Spanish Trail Association may be required. Tribal consultation may also be required to assess potential concerns about the Proposed Action in relation to the Old Spanish National Historic Trail.		
NP	National Recreational Trails (Gooseberry Mesa)	National Recreational Trails are not present in either of the NCAs.	K. Voyles	5/10/22
NP	Wild and Scenic Rivers	There are no designated, potential, or suitable wild and scenic river segments in either of the NCAs.	K. Voyles	5/10/22
PI	Wilderness/WSA	The Red Mountain Wilderness and Cottonwood Canyon Wilderness are located within the Red Cliffs NCA. Control of noxious and invasive weeds would benefit the naturalness of both wilderness areas by maintaining and restoring healthy native vegetative communities, which helps ensure that native species and ecological processes are protected.	K. Voyles	5/10/22
PI	Lands with Wilderness Characteristics	The Proposed Action could affect the naturalness of these lands. This issue is therefore analyzed in detail in this EA.	K. Voyles	5/10/22

Final Review:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator	LAURA GOFF Digitally signed by LAURA GOFF Date: 2022.05.31 09:09:35 -06'00'		
Authorized Officer	DAWNA FERRIS Digitally signed by DAWNA FERRIS Date: 2022.06.01 13:24:42 -06'00'		

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APPENDIX C Integrated Weed Management Plan, NCA-Specific Environmental Protection Measures, and Standard Operating Procedures.

Integrated Weed Management Plan

Implementation of the Integrated Weed Management Plan (IWMP) for the Beaver Dam Wash and Red Cliffs NCAs (the Proposed Action) would comply with all relevant federal laws, regulations, and agency policies, as well as applicable state statutes, county, and municipal ordinances. The treatments described under the Proposed Action would only be implemented on public lands in the NCAs and with all applicable SOPs and resource protection measures listed in this appendix. The resource protection measures have been specifically developed to conserve, protect, and enhance the natural and cultural resource values of the NCAs.

Under the Proposed Action, treatments in the NCAs are expected to be small scale, affecting less than 5 acres in a single area, and would be directed by trained and qualified BLM staff, and conducted primarily using either manual removal or ground-based herbicide control methods.

Herbicides used in ground-based treatments would be limited to those currently approved for use by the BLM, and to those that will be approved by the agency in the future, based on their proven safety, efficacy, and low risk to human health.

Under the Proposed Action, only one BLM approved pre-emergent herbicide, Imazapic, would be used in aerial treatments to create fire breaks or control exotic invasive annual grasses in re-vegetation plots, because its use has been shown to cause negligible impacts on native plants, wildlife, and human health.

Weed treatments would be directed by trained and qualified BLM staff and numerous factors would be evaluated when considering which type of treatment to use, including the size and location of the infestation, natural and cultural resources within and near the proposed treatment area, use of the area by the public, potential impacts to non-target species, the efficacy of the method, and its cost. Non-herbicidal treatments would be the preferred method to control and eradicate weeds, followed by spot treatments with herbicides. Aerial herbicide spraying would be used infrequently, and very selectively, to primarily create linear firebreaks. The herbicides would only be those that have been approved for use on public lands and analyzed in the Programmatic EIS documents listed in Chapter 1 at Section 1.4 of the EA or that are approved in the future by the BLM, through a NEPA process. Standard Operating Procedures (SOPs) and resource protection measures for all methods of weed treatment would be followed for every treatment.

In the Cottonwood Canyon and Red Mountain Wilderness areas, weed treatments would be limited to manual removal methods and/or spot treatments with herbicides, using backpack sprayers. A minimum tool analysis using the interagency Minimum Requirements Decision Guide (MRDG) would be completed prior to any treatments within designated wilderness areas.

Standard Operating Procedures are the management controls and performance standards intended to protect and enhance natural resources that could be affected by implementation of the Proposed Action. The BLM would follow the SOPs listed in this appendix to ensure that risks to human

health and the environment from herbicide treatment actions and other vegetation treatments are kept to a minimum.

The vegetation treatment SOPs in this appendix are sourced from the following documents cited in the EA:

- *Draft Environmental Impact Statement* prepared for the *Draft Resource Management Plans for the Beaver Dam Wash National Conservation Area and the Red Cliffs National Conservation Area* (BLM 2015).
- *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS; BLM 2007a).
- *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report* (PER; BLM 2007b).
- Biological Assessment (BA) prepared for the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS* (BLM 2007a).
- *PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States* (BLM 2016c).
- Biological Assessment prepared for the *PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States.*.
- BLM Handbook H-9011-1 (Chemical Pest Control); and manuals 1112 (Safety), 9011 (Chemical Pest Control), 9012 (Expenditure of Rangeland Insect Pest Control Funds), 9015 (Integrated Weed Management), and 9220 (Integrated Pest Management)

The BLM would comply with changes in label directions and with all state registration requirements. The active ingredients and formulations approved for use would only be applied for uses, and at application rates, specified on the label directions.

Herbicide application schedules would be designed to minimize potential impacts to non-target plants and animals, while remaining consistent with the objective of the vegetation treatment program. The application rates depend upon the target species, the presence and condition of non-target vegetation, soil type, depth to the water table, presence of other water sources, and the label requirements. The application method chosen depends upon the treatment objective (removal or reduction); accessibility, topography, and size of the treatment area; characteristics of the target species and the desired vegetation; location of sensitive areas and potential environmental impacts in the immediate vicinity; anticipated costs; equipment limitations; and meteorological and vegetative conditions of the treatment area at the time of treatment.

Where applicable, special design features and best management practices (BMPs) would be incorporated for the prevention and treatment of nonnative noxious and invasive plant species when authorizing new permitted/ authorized activities. These practices or combinations of practices are the most effective means of preventing or reducing the amount of disturbance or impact to a resource.

A list of the practices that would be implemented as part of the Proposed Action to reduce the potential for impacts to resources is presented in the SOPs (provided at the end of this appendix), and the NCA-specific resource protection measures below.

IWMP Design Features and NCA-Specific Environmental Protection Measures

The following design features and resource protection measures have been specifically developed to conserve, protect, and enhance the natural and cultural resource values of the NCAs.

Threatened, Endangered or Candidate Plant and Animal Species

The methodologies proposed for manual and herbicide treatments in habitats for threatened or endangered plant and animal species include conservative resource protection measures, tailored to local conditions in the NCAs, and designed to ensure that treatments do not result in harm to these species.

Mojave desert tortoise

- Treatments would be completed in compliance with state and federal guidelines, including those for threatened and endangered species and their habitat.
- Treatment sites within desert tortoise habitat would be inventoried by a qualified tortoise biologist immediately prior to the start of treatments.
- To the greatest extent possible, desert tortoise burrows would be avoided during herbicide treatments.
- Aerial applications would occur during the desert tortoise less active season (December 1 to February 14).
- Aerial application will involve the use of Imazapic + appropriate/approved adjuvants only.
- Whenever possible, ground-based pre-emergent herbicide treatments (using Imazapic) in desert tortoise habitat would occur during the less active season (December 1 to February 14).
- Whenever possible, ground-based post-emergent herbicide treatments in desert tortoise habitat would occur outside of the most active seasons: spring/early summer (March 15–May 15) and late summer/fall seasons (August 20–October 20).
- If desert tortoises are encountered during herbicide treatments, application shall cease and shall not resume until the tortoise moves over 300 feet from treatment area on its own accord.
- 2,4-D would not be used within 0.25 mile of occupied tortoise habitat.
- When conducting herbicide treatments in habitat occupied by desert tortoise, the following herbicides would be avoided, where feasible: clopyralid, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.
- Herbicide applications using ground equipment should use either liquid streams or relatively course sprays to minimize spray drift.
- Drift reduction agents, nozzles that create large droplets and special boom and nozzle placement would be used to reduce drift during aerial spraying (see “Aerial Application” and “Measures to Reduce Spray Drift” sections below for additional SOPs).

- After treatment, seeding or planting would occur using NCA-approved native grass, forb, and shrub seeds or plants from appropriate ecoregion sources.
- All individuals working on manual or herbicide treatment projects in suitable and occupied tortoise habitat will be required to take a worker education training class, conducted by a qualified BLM tortoise biologist. The class will describe desert tortoises, and the appropriate measures to take upon discovery of a tortoise or burrow. The class will also include a discussion of manual and herbicide treatment techniques and conservation measures to minimize potential adverse impacts.
- Before manual or herbicide treatment activities begin, a pre-project meeting will be held between the workers and the BLM tortoise biologist to review all conservation measures. A handout of the conservation measures will be provided to all onsite workers.
- Anytime a vehicle or equipment is parked in desert tortoise habitat, the area around and directly under the vehicle must be inspected for tortoises before the vehicle or equipment is moved. If there is a desert tortoise observed, it will be left to move on its own – the tortoise will not be approached or handled. If this does not occur within 15 minutes, the BLM tortoise biologist (or other approved tortoise biologist) will be contacted to remove and relocate the tortoise.
- If a desert tortoise is found in the project area during project activities, the tortoise will not be approached or handled and all project activities within 300 feet of the tortoise will be halted immediately until the tortoise leaves the area. This distance can be adjusted up or down depending on specific circumstances as coordinated with the BLM tortoise biologist.

Southwestern willow flycatcher

- Treatment methods proposed for use in SWFL suitable habitat would be manual removal, spot treatments, and ground-based herbicide applications.
- Conduct surveys prior to vegetation treatments within suitable habitat.
- Where surveys detect birds, do not broadcast apply herbicides.
- If SWFL presence is not detected within suitable riparian corridor habitats, assume that the species is present, and apply the appropriate species- and herbicide-specific conservation measures to the suitable riparian corridor habitat.
- Do not conduct herbicide treatment within 0.5 mile of suitable and occupied riparian corridor habitat during the SWFL nesting season (4/1-9/30).
- Do not use 2,4-D, or other herbicides rated as Class 1 or 2 in the species toxicity group for Small Avian within or near (300 feet of) suitable or occupied SWFL riparian corridor habitat.
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year.
- Following treatments, replant or reseed treated areas with native species, if needed.
- Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).

Western yellow-billed cuckoo

- Treatment methods proposed for use in WYBC suitable habitat would be manual removal, spot treatments, and ground-based herbicide applications.
- Conduct surveys prior to vegetation treatments within suitable habitat.
- Where surveys detect birds, do not broadcast apply herbicides.
- If WYBC presence is not detected within suitable riparian corridor habitats, assume that the species is present, and apply the appropriate species- and herbicide-specific conservation measures to the suitable riparian corridor habitat.
- Do not conduct herbicide treatment within 0.5 mile of suitable and occupied riparian corridor habitat during the WYBC nesting season (5/1-9/30).
- Do not use 2,4-D, or other herbicides rated as Class 1 or 2 in the species toxicity group for Small Avian within or near (300 feet of) suitable or occupied WYBC riparian corridor habitat.
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year.
- Following treatments, replant or reseed treated areas with native species, if needed.
- Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).

Mexican spotted owl

- Survey for MSO (and their nests) on suitable proposed treatment areas, prior to developing treatment plans.
- Do not conduct herbicide treatment within 0.5 mile of modeled potential nesting, roosting, foraging, and dispersal habitat in the NCAs during the nesting season (4/15-9/1).
- Do not allow human disturbance within 0.25 mile of protected activity centers during the nesting period (as determined by a qualified biologist).
- Protect and retain the structural components of known or suspected nest sites during treatments; evaluate each nest site prior to treatment and protect it in the most appropriate manner.
- Maintain sufficient dead and down material during treatments to support MSO prey species (minimums would depend on forest types and should be determined by a wildlife biologist).
- Do not conduct treatments that alter forest structure in old-growth stands.

California condor

- Restrict human activity within 1.5 miles of California condor nest sites.

Virgin River chub and Woundfin

- Treatment methods proposed for use in Virgin River chub and Woundfin suitable and critical habitat would be manual removal, spot treatments, and ground-based herbicide applications to control and eradicate non-native woody species (e.g., tamarisk, Russian olive) only.
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- No herbicide mixing/loading would occur within 300 feet of water sources, including rivers, streams, riparian and wetlands, and caves/karst.
- Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).
- Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used and use spot rather than broadcast treatments.
- Limit the use of diquat in water bodies that have native fish and aquatic resources.
- Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing polyoxyethyleneamine (POEA), or seek to use formulations with the least amount of POEA, to reduce risks to aquatic organisms in aquatic environments.
- Ensure that trained personnel monitor weather conditions at spray times during application.
- Do not spray if precipitation is occurring or is imminent (within 24 hours).
- Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year.
- Following treatments, replant or reseed treated areas with native species, if needed.
- Consider ground-disturbing activities on a case- by-case basis, and implement SOPs to ensure minimal erosion or impact to the aquatic habitat.

Shivwits milkvetch

- Survey all proposed action areas within potential and designated critical habitat using a botanically qualified biologist, botanist, or ecologist to determine the presence/absence of the species.
- All plants would be flagged prior to weed control activities.
- Collect baseline information on the existing condition of the species and their habitats in the proposed project area. These monitoring programs would help in anticipating the future effects of vegetation treatments on the species.
- Only manual removal and ground-based herbicide treatment methods would be authorized in or near Shivwits milkvetch suitable and designated critical habitat.
- Treatments would be conducted using hand tools, hand broadcasters, hand-held or backpack sprayers; apply herbicides in occupied habitat by hand using brushes or other method that strongly reduces impacts to non-target plants.
- No herbicide mixing/loading would occur within 300 feet of federally-listed plant populations and potential and designated critical plant habitat.
- No aerial spraying would occur within 0.5 mile of federally-listed plant populations and suitable and designated critical plant habitat.

- Use non-chemical treatments to control weeds when possible.
- Use low-residual herbicides (e.g., glyphosate) to minimize long-term effects on potential germination.
- Provide training to weed-spraying staff on the identification of Shivwits milkvetch.
- When treating weeds adjacent to potential habitat, establish suitable buffer zones between treatment sites and populations (confirmed or suspected) of Shivwits milkvetch and take site-specific precautions to avoid negative effects from off-site drift, surface runoff, and/or wind erosion.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.
- The following would be employed, as needed, to help prevent harm to Shivwits milkvetch pollinators and other insects in the vicinity: (1) ensure proper identification of pollinator plants, as some native species that attract and support many pollinators may be easily misidentified as invasive/noxious weed species; (2) complete vegetation treatments seasonally before pollinator foraging plants bloom; (3) designate buffer zones around special status plants and prevent herbicide drift to nearby blooming plants; and (4) make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.
- During the planning of weed control actions in or near Shivwits milkvetch critical habitat, the BLM would coordinate with the USFWS on project design and implementation, to ensure that proposed treatments avoid impacting plant populations or the constituent elements of its habitat.

Cultural Resources

Planting and Seeding

Prior to implementation, proposals for seedings that involve surface disturbances or out plantings would be reviewed by the NCA Archeologist, an Area of Potential Effect (APE) defined, and a literature review completed to determine if Class III level archeological inventories or re-inventories of the APE are needed. Field surveys would be conducted, as needed, and site documentation or documentation updates completed. National Register of Historic Places (NRHP) eligibility determinations would be made and potential effects to historic properties related to the proposed undertaking evaluated. Projects would be redesigned to avoid adverse effects.

Manual and Herbicide Treatments

Where traditional cultural plant gathering areas have been identified by American Indian Tribes that claim cultural affiliation to southwestern Utah, tribal consultation would be conducted to develop mitigation measures that would avoid effects on the plants of cultural importance.

No aerial spraying would occur within 0.25 mile of sites with Native American rock imagery (e.g., petroglyph, pictograph) or historic inscriptions. Prior to implementation, proposals for aerial spraying would be reviewed by the NCA Archeologist, an Area of Potential Effect (APE) defined, and a literature review completed to determine if Class III level archeological inventories or re-inventories need to be completed for areas with a high potential for Native American rock imagery

sites and/or historic inscriptions within the APE. Field surveys would be conducted, as needed, and site documentation or updates completed, National Register of Historic Places (NRHP) eligibility determinations made, and potential effects to historic properties related to the proposed undertaking evaluated. Projects would be redesigned to avoid adverse effects.

Ground-Based Application of Herbicides

- Proper storage, use, and disposal of chemicals and associated products would be conducted in accordance with product labels and the SOPs and resource protection measures in this appendix.
- Treatments would be completed in compliance with federal guidelines, including those for threatened and endangered species, BLM Sensitive Species, migratory birds, other fish and wildlife species, and their habitat.
- No herbicide mixing/loading would occur within 300 feet of water sources, including rivers, streams, riparian and wetlands, and caves/karst.
- Wilderness: treatments would be implemented using a "minimum tool" concept, relying on use of hand tools, hand broadcasters, backpack pumps, hand sprayers, and pumps mounted on pack stock. All weed management actions in wilderness would require the completion of a project specific minimum tool analysis using the MRDG.
- Where traditional cultural plant gathering areas have been identified by American Indian Tribes that claim cultural affiliation to southwestern Utah, tribal consultation would be conducted to develop mitigation measures that would avoid effects on the plants of cultural importance.

Aerial Application of Herbicides

- Where applicable, all ground-based protection measures would also apply to aerial application.
- Use of aviation resources (e.g., fixed wing, helicopter, drones) would follow the BLM's aviation policy.
- Aerial application would only involve the use of Imazapic + appropriate/approved adjuvants.
- Treatments would be completed in compliance with federal guidelines, including those for threatened and endangered species, BLM Sensitive Species, migratory birds, other fish and wildlife species, and their habitat.
- No aerial spraying would occur within 0.5 mile of federally-listed or BLM Sensitive plant species populations and suitable and designated critical plant habitat.
- No aerial spraying would occur within 0.5 mile of an active golden eagle nest during nesting season (03/1-08/15).
- No aerial spraying would occur within 0.5 mile of water sources, including rivers, streams, riparian and wetlands and caves/karst.
- No aerial spraying would occur within designated wilderness.
- No aerial spraying would occur within 0.25 mile of sites with Native American rock imagery (e.g., petroglyph, pictograph) or historic inscriptions. Prior to implementation, proposals for aerial spraying would be reviewed by the NCA Archeologist, an Area of Potential Effect (APE) defined, and a literature review completed to determine if Class III

level archeological inventories or re-inventories need to be completed for areas with a high potential for Native American rock imagery sites and/or historic inscriptions within the APE. Field surveys would be conducted, as needed, and site documentation or updates completed, National Register of Historic Places (NRHP) eligibility determinations made, and potential effects to historic properties related to the proposed undertaking evaluated. Projects would be redesigned to avoid adverse effects.

- Areas of regular public use, such as popular trails, trailheads, or developed campgrounds, would be avoided by aerial spraying to the extent possible. Where avoidance is not possible, information about the treatment, with the date(s) of the application and herbicide to be applied would be clearly posted at trailheads and in campgrounds at least two weeks in advance to notify the public.

Protection Measures to Reduce Spray Drift During Aerial Application of Herbicides

- Weather conditions (temperature, humidity, wind speed, and direction) would be monitored on site, and spot forecasts reviewed for adverse weather conditions.
- Aerial application areas would be field checked, flagged, and/or marked using global positioning system (GPS) before and after flights, to ensure that aerial treatments stay within intended treatment areas.
- Communications would be maintained between the aircraft pilot, Project Manager, and ground observers during spraying operations, with ground observers located at various locations adjacent to the treatment area to monitor wind direction and speed and to visually monitor drift and deposition of herbicide. Ground observers would communicate with the Project Manager who would relay information to the aircraft pilot.
- Applications would follow all manufacturer's label instructions.
- Drift reduction agents, nozzles that create large droplets and special boom and nozzle placement would be used to reduce drift during aerial spraying.
- Drift control agents may be used in aerial spraying, during low humidity periods, to reduce drift into non-target areas. Products would be used that reduce volatility, have been shown to keep droplet sizes larger, and are an appropriate adjuvant for the herbicide (as specified by labeling of both the herbicide and the drift agent, in consultation with the herbicide manufacturer).
- Aerial spraying would be discontinued if herbicide is drifting within the setback zone and/or wind speed exceeds those recommended on the product's label.

Inventory

Weed inventories are an invaluable tool for assessing the extent of an infestation and planning effective weed management programs. Inventory data provides necessary baseline information, such as infestation locations, infestation size and density, associated environmental conditions, and disturbance factors. Inventory data would be used to identify the location of infestations and determine whether infestations have been successfully reduced in aerial extent following treatment and to evaluate which treatment methods have proven to be the most effective and cost efficient, while creating the fewest negative environmental impacts, for a specific noxious weed or invasive species.

Management Strategies

- Conduct annual noxious and invasive weed surveys in the NCAs to collect baseline data on infestation locations, infestation size and density.
- Include noxious and invasive weed surveys and treatment funds in Wildland Fire Emergency Stabilization and Rehabilitation (ESR) Plans. Request for survey funds should be included in every ESR plan.
- Submit BLM Budget Proposal System SharePoint (BPSS) proposals for weed survey/treatment funding.
- Use a Global Positioning System (GPS) unit while conducting weed surveys. Keep an up-to-date GIS shapefile and share this data with BLM staff and any other interested entity.
- Train field-going BLM staff in weed identification and provide them with inventory field cards.

Weed Treatment

Management Strategies

- Maintain a list of priority weeds, starting with species that are not yet within the NCAs and moving down to ones that are more common. This list would help determine how to rank treatment areas.
- Determine which areas to treat based on priority of the species, the size of the infestation, and the location of the infestation (whether it is located along a major weed vector, such as a road, drainage, or riparian area).
- Cooperate with other individuals, organizations, and agencies treating weeds to ensure that management for weeds is carried out efficiently and consistently across jurisdictional and political boundaries.
- Incorporate into this plan new technologies, methods, or protocols as they are developed.
- Determine which treatment areas need native plant restoration and which have the potential to naturally regenerate and implement restoration activities accordingly. Select native plant species for seeding and outplanting that would help inhibit the establishment of noxious weeds.
- No matter what type of control type is used, follow all NCA-specific resource protection measure, and standard operating procedures (SOPs), guidelines, mitigation measures, and conservation measures in this appendix.
- Determine and implement the best combination of physical or chemical controls for the infestation and the site.

Examples of control types that would be implemented:

Cultural: Cultural methodologies refers to techniques that control and eradicate weeds, as well as actions to remediate surface disturbances and wildfire impacts, so that weeds are less likely to become established or proliferate. The following are examples of cultural remediation methods that would be regularly used under the Proposed Action.

Seeding: using NCA-approved native grass, forb, and shrub seeds from appropriate ecoregion sources. Hand broadcasting and raking, using a broadcast spreader, rangeland drill, or aerial seeding are examples of methods that would be used under the Proposed Action.

Planting: using NCA-approved native grass, forb, and shrub plants grown from appropriate ecoregion sources, typically propagated off-site. Hand tools or small heavy equipment, such as a skid steer with an auger bit, would be used for plantings, typically following wildfires, surface disturbances, or weed treatments, where the goal is to introduce/increase desirable vegetation species to the area.

Live Staking: Live staking treatments include staking of woody riparian species that readily produce roots from cuttings when in contact with the water table (e.g., willow - *Salix* spp., cottonwood - *Populus* spp.). These treatments would occur in riparian zones where exotic invasive species like tamarisk (*Tamarix ramosissima*) and Russian olive (*Eleagnus angustifolia*) are being controlled or where establishment of native species would prevent establishment of undesirable species. Live stakes would be pushed or hammered directly into the soil, although rockier sites may require that a hole be created using a metal bar. Woody material to be staked would be collected from vigorous, nearby riparian vegetation. No more than 30 percent of the live material from any individual plant would be cut and removed for staking material.

Grazing: the use of contracted domestic grazing animals for targeted weed control projects was authorized in Management Action VEG-9 (refer to **Section 1.4**, page 5 of this EA for the full text of the decision) in the approved RMPs for both NCAs (BLM 2016a, b). As described in Table 3 in the RODSs (BLM 2016a, b; pp. 28), targeted grazing by contracted domestic sheep and goat herds can only be authorized in specific settings in the NCAs, such as along roadways or at trailheads, and only if other conditions are met. These conditions include containment of the herds within the target weed control area, through temporary fencing, herding, or other measures, and immediate removal of all animals upon completion of the contracted work. In the Beaver Dam Wash NCA, contracted domestic sheep and goat herds can only be used for targeted weed control projects where appropriate separation distances (as defined by UDWR) from desert bighorn sheep (*Ovis canadensis nelsoni*) herds can be maintained. A similar restriction would be in place in Red Cliffs NCA, should the UDWR re-introduce desert bighorn sheep into historic habitats in the Cottonwood Canyon or Red Mountain Wilderness areas.

Manual Treatment: Manual control involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Examples of treatments that would be used in the NCAs include: Cutting undesired plants above ground level; pulling, grubbing, or digging out the root systems of undesired plants to prevent sprouting and regrowth; and cutting at the ground level or removing competing plants around desired species. Hand tools include a handsaw, axe, shovel, rake, machete, grubbing hoe, mattock, Pulaski, brush hook, hand clippers, motorized chainsaw (outside of designated wilderness), string trimmers, “weed whackers”, and power brush saws.

Approximately 5-25 acres/year could be treated in each of the NCAs using manual methods, depending on funding, weed inventories, and other factors, such as rainfall patterns and drought conditions. The methods discussed above may be used in combination with application of

herbicides for increased effectiveness or efficiency if the proper safety and environmental constraints are applied to each method.

Chemical: Chemical treatment refers to any technique that involves the application of an herbicide to weeds or soil to control the germination or growth of the target species. Chemicals can consist of pelletized, granular, or liquid products and would likely be applied with an adjuvant, a chemical that modifies the properties of herbicides to make them more effective, such as allowing for more coverage or increasing the "stickiness" or adherence to the plant surface. All herbicides and adjuvants would be applied in strict conformity with the manufacturer's label restrictions. Chemical treatment would be accomplished, using only BLM-approved herbicide products, through various methods, such as spray bottles, backpack sprayers, off-highway vehicle (OHV) or truck-mount sprayers, broadcasters (i.e., granular product), and aircraft, as appropriate, based on treatment objectives.

Herbicide treatment areas would generally be small and linear, focused on enhancing the effectiveness of existing roads and utility ROWs to act as firebreaks. No large landscape-level treatments of exotic invasive annual grasses are anticipated in either NCA. Approximately 50-150 acres/year could be treated and/or retreated with herbicides in each of the NCAs. The number of acres treated would be variable from year to year, and more or fewer acres might be treated, depending on funding, inventories, and other factors, such as rainfall patterns and drought conditions.

The SOPs listed in this appendix would be incorporated as part of the Proposed Action, as would any new SOPs that are developed in the future, to ensure that human health is not affected by herbicide applications. The SOPs and other resource protection measures in this appendix have been specifically tailored to conserve and protect the natural and cultural resources of the two NCAs. Treatment within critical and suitable habitats potentially occupied by federally listed and BLM Sensitive plant and animal species would be inventoried by a qualified biologist immediately prior to the start of treatments, and seasonal restrictions/buffers would be used. All applicators would comply with federal and state law, as well as Department of Interior and BLM policies. They would be certified by the State of Utah as a pesticide applicator or would work under the direct supervision of a certified applicator. The BLM would implement measures to mitigate potential adverse environmental effects related to the use of herbicides and these are listed in **Table 2-1** and **Appendix D** in this EA**.**

Monitoring

Short-and long-term monitoring of treatment areas and evaluations of the efficacy of the approved treatment methods would be a key component of the IWMP for both NCAs. Management decision WED-7 from the approved NCA RMPs (BLM 2016a, b) directs that monitoring be conducted and treatments of weed infestations be continued, as needed, for a minimum of 5 years or until the target species is eradicated. The goals of monitoring would be to determine whether infestations have been successfully reduced in aerial extent following treatment and to evaluate which treatment methods have proven to be the most effective and cost efficient, while creating the fewest negative environmental impacts, for a specific noxious weed or invasive species. In general, treatments would be monitored using *Guidelines for Coordinated Management of Noxious Weeds*

(Free and Mullin 1998). For aerial herbicide applications, vegetation would be monitored using elements of the Assessment Inventory and Monitoring (AIM) methods (Herrick et al., 2005).

Prevention

The most effective and ecologically sound approach to managing invasive plants is to prevent their invasion. It is far more cost-effective to focus on prevention of new weed infestations than to try and control the weeds once they have already infested a site. The objective is to ensure that everything possible is done up front to prevent new weed infestations from establishing.

Prevention Measures (From Table A-1, Appendix A of the 2016 PEIS)

BLM Activity	Prevention Measure
Project Planning	• Incorporate prevention measures into project layout and design, alternative evaluation, and project decisions to prevent the introduction or spread of weeds. • Determine prevention and maintenance needs, including the use of herbicides, at the onset of project planning. • Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes. • Remove sources of weed seed and propagules to prevent the spread of existing weeds and new weed infestations. • Pre-treat high-risk sites for weed establishment and spread before implementing projects. • Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and kiosks. • Coordinate project activities with nearby herbicide applications to maximize the cost effectiveness of weed treatments.
Project Development	• Minimize soil disturbance to the extent practical, consistent with project objectives. • Avoid creating soil conditions that promote weed germination and establishment. • To prevent weed germination and establishment, retain native vegetation in and around project activity areas and keep soil disturbance to a minimum, consistent with project objectives. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas or restrict travel to periods when the spread of seeds or propagules is least likely. • Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. • Inspect material sources on site and ensure that they are weed-free before use and transport. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • Survey the area where material from treated weed-infested sources is used for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled. • Prevent weed establishment by not driving through weed-infested areas. • Inspect and document weed establishment at access roads, cleaning sites, and all disturbed areas; control infestations to prevent weed spread within the project area. • Avoid acquiring water for dust abatement where access to the water is through weed-infested sites. • Identify sites where equipment can be cleaned. Clean equipment before entering public lands.

	• Clean all equipment before leaving the project site if operating in areas infested with weeds. • Inspect and treat weeds that establish at equipment cleaning sites. • Ensure that rental equipment is free of weed seed. • Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.
Revegetation	• Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans. • Retain bonds until reclamation requirements, including weed treatments, are completed, based on inspection and documentation. • To prevent conditions favoring weed establishment, reestablish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques. • Maintain stockpiled, uninfested material in a weed-free condition. • Revegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for each specific project site. For each project, define what constitutes disturbed soil and objectives for plant cover revegetation. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. • Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or landings). • Inspect seed and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) and certify that they are free of weed seed and propagules. • Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least 3 growing seasons following completion of the project. • Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. • Provide briefings that identify operational practices to reduce weed spread (for example, avoiding known weed infestation areas when locating fire lines). • Evaluate options, including closure, to regulate the flow of traffic on sites where desired established. Sites could include road and trail rights-of-way (ROW), and other areas of disturbed soils.

Management Strategies

- Continue to require noxious and invasive weed management BMPs for all projects within the NCAs.
- Ensure staff and project contractors are briefed about any SOPs, BMPs, or stipulations requiring noxious and invasive weed prevention and management.
- Keep an up-to-date shapefile of known weed infestations within the NCAs and share this interested entities.
- Ensure BLM personnel are trained in identification of noxious and non-native invasive weed species that are likely to be introduced so that early detection & rapid response procedures can be used.
- Communicate regularly, at least annually, with the county weed districts and adjacent BLM Districts to identify new weed species of concern or other potential issues.

Education & Outreach

One of the most important components of a weed management program is community involvement and public outreach. The objective is to generate internal and external awareness of and support for noxious and invasive weed prevention and management, and to work across jurisdictional boundaries to accomplish shared objectives.

Management Strategies

- Facilitate an open-door policy with the public when it comes to plant identification, questions, or information pertaining to weeds.
- Foster a sense of land stewardship with partners and publics.
- Be an active partner with local, county, and state entities on weed identification, treatment methods, priority treatment areas, etc.
- Train BLM staff and interested publics on weed identification, transportation vectors, treatment methods, etc.
- Provide noxious and invasive weed information at public gatherings.
- Have educational materials readily available to the public at the BLM front desk.
- Coordinate with recreation staff on posting invasive weed information at recreational site kiosks.

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Implementation Items

- Continue collaboration for weed management activities on NCA and other public lands.
- Organize noxious and invasive weed management and identification training for BLM staff.
- Provide the front desk area with educational materials dealing with noxious and invasive weed management and identification.
- Coordinate annually with the recreation staff to post educational material on invasive weeds at recreation sites.

References

BLM 2015. Draft Environmental Impact Statement prepared for the Draft Resource Management Plans for the Beaver Dam Wash National Conservation Area and the Red Cliffs National Conservation Area (BLM 2015).

BLM 2007a. Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS).

BLM 2007 b. Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report (PER).

Biological Assessment (BA) prepared for the Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS.

BLM 2016c. PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States.

Biological Assessment prepared for the PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States.

BLM Handbook H-9011-1 (Chemical Pest Control)
BLM Manual 1112 (Safety)
BLM Manual 9011 (Chemical Pest Control)
BLM Manual 9012 (Expenditure of Rangeland Insect Pest Control Funds)
BLM Manual 9015 (Integrated Weed Management)
BLM Manual 9220 (Integrated Pest Management)

Standard Operating Procedures (SOPs)

Standard Operating Procedures for Applying Herbicides (Table B2 in 2007 PEIS)

Guidance Documents*	Discussion
General	• Prepare operational and spill contingency plan in advance of treatment. • Conduct a pretreatment survey before applying herbicides. • Select herbicide that is least damaging to the environment while providing the desired results. • Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures. • Apply the least amount of herbicide needed to achieve the desired result. • Follow herbicide label guidance for use and storage. • Have licensed applicators apply herbicides. • Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. • Review, understand, and conform to the "Environmental Hazards" section on the herbicide product label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or the environment. • In addition to the information presented in the Environmental Hazards section, follow all additional precautions and restrictions identified on the label, paying particular attention to herbicides that require some form of soil incorporation, either mechanically or through a moisture event, to activate them. Applications to powdery, dry soil or light, sandy soil when there is little likelihood of an incorporation event may result in off-site movement when the treated soil particles area moved by wind. • Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas.

	• Consider site characteristics, current and immediate future environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Minimize the size of application area, when feasible. • Comply with herbicide-free buffer zones to ensure that drift would not affect crops or nearby residents/landowners. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners prior to treatment. • Keep a copy of Safety Data Sheets (SDSs)/Material Safety Data Sheets (MSDSs) at work sites. SDSs/MSDSs are available for review at http://www.cdms.net/. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Avoid accidental direct spray and spill conditions to minimize risks to resources. Turn off applied treatments at the completion of spray runs and during turns to start another spray run. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about30 to 45 feet above ground. • Take precautions to minimize drift by not applying herbicides when winds exceed 10 mph (6mph for aerial applications), or a heavy rainfall event is imminent. • Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas. • Use drift reduction agents, as directed by the label, and low volatile formulations to reduce the drift hazard to non-target species. • Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Do not use adjuvants that are not approved for use with the selected active ingredients. Review labels of herbicides and adjuvants proposed for use to ensure that the proposed adjuvant(s) are approved for use with the selected active ingredients and in application settings where the selected herbicides are approved for use. • Clean OHVs to remove seeds.
Air Quality [Manual 7000 (*Soil, Water, and Air Management)*]	• Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (6 mph for aerial applications), or rainfall is imminent. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., spray equipment that produces 200–800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). • Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).

Soil [Manual 7000 (*Soil, Water, and Air Management*)]	• Minimize treatments in areas where herbicide runoff is likely, such as steep slopes under conditions when heavy rainfall is expected. • Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Do not apply granular herbicides on slopes of more than 15 percent where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources [Manual 7000 (*Soil, Water, and Air Management*)]	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments. • Use local historical weather data to choose the month of treatment. Considering the phenology of the target species, schedule treatments based on the condition of the water body and existing water quality conditions. • Plan to treat between weather fronts (calms) and at the appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. • Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. • Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. • Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. • As needed, maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies. • Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment.
Wetlands and Riparian Areas	• Use a selective herbicide and a wick or backpack sprayer. • Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and10 feet for hand spray applications.
Vegetation [Manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*)]	• Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Review, understand, and incorporate application information identified in the environmental hazards section of the herbicide

	label, along with all additional precautions and restrictions identified on the label. • Use weed seed-free feed for horses and pack animals. Use weed seed-free straw and mulch for revegetation and other activities. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit to maintain desirable vegetation on the treatment site.
Pollinators	• Ensure proper identification of pollinator plants, as some native species that attract and support many pollinators may be easily misidentified as invasive/noxious weed species. • Complete vegetation treatments seasonally before pollinator foraging plants bloom. • Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. • Apply herbicides at the stage of growth when the weed is most vulnerable, when application would be most successful. • Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are treated in patches rather than in one single treatment or conduct spot treatments on individual invasive/noxious weed species, using the appropriate application equipment. • Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. • Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. • Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. • Make special note of pollinators that have single host plant species and minimize. • herbicide spraying on those plants (if invasive species) and in their habitats.
Fish and Other Aquatic Organisms [Manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)]	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used and use spot rather than broadcast or aerial treatments. • Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. • For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to achieve acceptable vegetation management, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label.
Wildlife [Manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)]	• Use herbicides of low toxicity to wildlife, where feasible. • Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area.

	• Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife.
Threatened, Endangered, and Sensitive Species [Manual 6840 (*Special Status Species*)]	• Survey for special status species before treating an area, at a time when the species can be found. Consider effects to special status species when designing herbicide treatment programs. • Where feasible, use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants. • Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated.
Livestock	• Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. • Use herbicides of low toxicity to livestock, where feasible. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.
Cultural Resources and Paleontological Resources [Handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and Manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*), and 8270 (*Paleontological Resource Management*)] [*Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Would Meet Its Responsibilities Under the National Historic Preservation Act*.]	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Would Meet Its Responsibilities Under the National Historic Preservation Act and state protocols or36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management) to determine known Condition I and Condition 2 paleontological areas or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Consult with tribes to locate any areas of vegetation that are of importance to the tribe and that might be affected by herbicide treatments. • Work with tribes to minimize impacts to these resources. • Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments.

Visual Resources {Handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and Manual 8400 (*Visual Resource Management*)]	• Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. • If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). • Lessen visual impacts by 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment. • • When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management objectives.
Wilderness and Other Special Areas [Handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual 8351 (*Wild and Scenic Rivers*)]	• Encourage backcountry pack and saddle stock users to feed their livestock only weed seed-free feed for several days before entering a wilderness area. • Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. • Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. • Use the "minimum tool" to treat noxious and invasive vegetation, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. • Give preference to herbicides that have the least impact on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Address wilderness and special areas in management plans. • Maintain adequate buffers for Wild and Scenic Rivers (¼ mile on either side of river, ½ mile in Alaska).
Recreation [Handbook H-1601-1 (*Land Use Planning Handbook, Appendix C*)]	• Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. • Adhere to entry restrictions identified on the herbicide product label for public and worker access.

	• Post signs noting exclusion areas and the duration of exclusion, if necessary. • Use herbicides during periods of low human use, where feasible.
Social and Economic Values	• Consider surrounding land use before selecting aerial spraying as a method and avoid aerial spraying near agricultural or densely-populated areas. • Post treated areas and specify reentry or rest times, if appropriate. • Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. • Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. • Observe restricted entry intervals specified by the herbicide product label. Notify local emergency personnel of proposed treatments. • Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area. • Consult with Native American tribes, Alaska Native groups, and Alaska Native Corporations to locate any areas of vegetation that are of importance to tribes, Native groups, or Alaska Native Corporations and that might be affected by herbicide treatments. • To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies, including chemicals, for herbicide treatment projects through local suppliers. • To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated pest management program for projects proposing local use of herbicides.
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas.
Human Health and Safety	• Establish a buffer between treatment areas and human residences based on guidance given in the human health risk assessment, with a minimum buffer of ¼ mile for aerial applications and100 feet for ground applications, unless a written waiver is granted. • Use protective equipment as directed by the herbicide product label. • Post treated areas with appropriate signs at common public access areas.

	• Observe restricted entry intervals specified by the herbicide product label. • Provide public notification in newspapers or other media where the potential exists for public exposure. • Have a copy of MSDSs/SDSs at work site. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport. • Follow label directions for use and storage. • Dispose of unwanted herbicides promptly and correctly.
* BLM Handbook H-9011-1 (Chemical Pest Control); and manuals 1112 (Safety), 9011 (Chemical Pest Control), 9012 (Expenditure of Rangeland Insect Pest Control Funds), 9015 (Integrated Weed Management), and 9220 (Integrated Pest Management)	

Mitigation Measures From the 2007 PEIS (Table A-3 from the 2016 PEIS)

Resource	**Mitigation Measures**
Air Quality	None made
Soil Resources	None made
Water Resources and Quality	• Establish appropriate (herbicide specific) buffer zones to downstream water bodies, habitats, and species/populations of interest.
Wetland and Riparian Areas	• Refer to mitigation for Water Resources and Quality and Vegetation.
Vegetation	• Minimize the use of terrestrial herbicides (especially bromacil, diuron, and sulfometuronmethyl) in watersheds with downgradient ponds and streams if potential impacts to aquatic plants are of concern. • Establish appropriate (herbicide specific) buffer zones around downstream water bodies, habitats, and species/populations of interest. Consult the ecological risk assessments for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios. • To protect special status plant species, implement all conservation measures for plants presented in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment.
Fish and Other Aquatic Organisms	• Limit the use of diquat in water bodies that have native fish and aquatic resources. • Limit the use of terrestrial herbicides in watersheds with characteristics suitable for potential surface runoff, that have fish-bearing streams, during periods when fish are in life stages most sensitive to the herbicide(s) used. • To protect special status fish and other aquatic organisms, implement all conservation measures for aquatic animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment*. • Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of

	interest (refer to recommendations in individual ecological risk assessments). • Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing polyoxyethyleneamine (POEA) or seek to use formulations with the least amount of POEA, to reduce risks to aquatic organisms.
Wildlife	• To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications of dicamba, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr, where feasible. • Minimize the size of application areas, where practical, when applying 2,4-D, bromacil, diuron, and Overdrive® to limit impacts to wildlife, particularly through contamination of food items. • Where practical, limit glyphosate and hexazinone to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items. • Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians.
• Do not apply bromacil or diuron in rangelands and use appropriate buffer zones (refer to Vegetation section in Chapter 4) to limit contamination of off-site vegetation, which may serve as forage for wildlife. • Do not aerially apply diquat directly to wetlands or riparian areas. • To protect special status wildlife species, implement all conservation measures for terrestrial animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17Western States Programmatic Biological Assessment*. Apply these measures to special status species (refer to conservation measures for a similar size and type of species, of the same trophic guild).	
Livestock	• Minimize potential risks to livestock by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible. • Do not apply 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, or triclopyr across large application areas, where feasible, to limit impacts to livestock, particularly through the contamination of food items. • Where feasible, limit glyphosate and hexazinone to spot applications in rangeland. • Do not aerially apply diquat directly to wetlands or riparian areas used by livestock. • Do not apply bromacil or diuron in rangelands and use appropriate buffer zones (refer to Vegetation section in Chapter 4) to limit contamination of off-site rangeland vegetation.

Wild Horses and Burros	• Minimize potential risks to wild horses and burros by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible. • Consider the size of the application area when making applications of 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, and triclopyr in order to reduce potential impacts to livestock. • Apply herbicide label grazing restrictions for livestock to herbicide treatment areas that support populations of wild horses and burros. • Where feasible, limit glyphosate and hexazinone to spot applications in rangeland. • Do not apply bromacil or diuron in grazing lands within herd management areas and use appropriate buffer zones (refer to Vegetation section in Chapter 4) to limit contamination of vegetation in off-site foraging areas. • Do not apply 2,4-D, bromacil, or diuron in herd management areas during the peak foaling season (March through June, and especially in May and June), and do not exceed the typical application rate of Overdrive® or hexazinone in herd management areas during the peak foaling season.
Paleontological and Cultural Resources	• Do not exceed the typical application rate when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr in known traditional use areas. • Avoid applying bromacil or tebuthiuron aerially in known traditional use areas. • Limit diquat applications to areas away from high residential and traditional use areas to reduce risks to Native Americans and Alaska Natives.
Visual Resources	None proposed
Wilderness and Other Special Areas	• Mitigation measures that may apply to wilderness and other special area resources are associated with human and ecological health and recreation. Please refer to the Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, Recreation, and Human Health and Safety sections of Chapter 4.
Recreation	• Mitigation measures that may apply to recreational resources are associated with human and ecological health. Please refer to the Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, and Human Health and Safety sections of Chapter 4.
Social and Economic Values	None made.
Human Health and Safety	• Use the typical application rate, where feasible, when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr to reduce risk to occupational and public receptors. • Avoid applying bromacil or diuron aerially. • Limit application of chlorsulfuron via ground broadcast applications at the maximum application rate.

	• Limit diquat application to all-terrain vehicle, truck spraying, and boat applications to reduce risks to occupational receptors; limit diquat applications to areas away from high residential and subsistence use to reduce risks to public receptors. • Evaluate diuron applications on a site-by-site basis to avoid risks to humans. There appear to be few scenarios where diuron can be applied without risk to occupational receptors. • Do not apply hexazinone with an over-the-shoulder broadcast applicator

Programmatic Conservation Measures for Herbicide Treatments with Aminopyralid, Fluroxypyr, and Rimsulfuron (including measures from 2007 BA not specific to previously approved herbicides)

Species/Species Group	Programmatic Conservation Measures
Plants	• Follow the buffer distances specified in Chapter 4 of the BA (refer to Tables 4-1 and 4-2 and pages 4-129 through 4-131). • In areas where wind erosion is likely, do not apply within 1.2 miles of TEP plant species (an alternative suitable buffer may be developed at the local level based on an analysis of site conditions). • Do not use rimsulfuron in watersheds where annual precipitation exceeds 50 inches. • In watersheds where annual precipitation exceeds 10 inches, prior to use of rimsulfuron conduct a local-level analysis of site conditions and develop suitable conservation measures for protection of threatened and endangered plant species (TEP) from surface runoff. • Survey all proposed action areas within potential habitat using a botanically qualified biologist, botanist, or ecologist to determine the presence/absence of the species. • Establish site-specific no activity buffers using a qualified botanist, biologist, or ecologist in areas of occupied habitat within the proposed project area. To protect occupied habitat do not conduct treatment activities within these buffers. • Collect baseline information on the existing condition of TEP plant species and their habitats in the proposed project area. • Establish pre-treatment monitoring programs to track the size and vigor of TEP populations and the state of their habitats. These monitoring programs would help in anticipating the future effects of vegetation treatments on TEP plant species. Assess the need for site revegetation post-treatment to minimize the opportunity for noxious weed invasion and establishment. • Include the following in management plans: - Off-highway use of motorized vehicles associated with treatments should be avoided in suitable or occupied habitat. - Post-treatment monitoring should be conducted to determine the effectiveness of the project. • Do not conduct herbicide treatments in areas where TEP plant species may be subject to direct spray by herbicides during treatments.

	• To avoid negative effects to TEP plant species from off-site drift, surface runoff, and/or wind erosion, establish suitable buffer zones between treatment sites and populations (confirmed or suspected) of TEP plant species and take site-specific precautions. • Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats that support TEP plant species. • Treated areas that are prone to downy brome or noxious weed invasions should be seeded with an appropriate seed mixture to reduce the probability of noxious weeds or other undesirable plants becoming established on the site. • In suitable habitat for TEP plant species, do not use non-native species for revegetation. • Vehicles and other equipment used during treatment activities should be washed prior to arriving at a new location to avoid the transfer of noxious weeds. • Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.
Aquatic Animals	• For treatments occurring in watersheds with TEP species or designated or undesignated critical habitat (i.e., unoccupied habitat critical to species recovery): • Where feasible, access work site only on existing roads, and limit all travel on roads when damage to the road surface would result or is occurring. • Where TEP aquatic species occur, consider ground-disturbing activities on a case-by-case basis, and implement SOPs to ensure minimal erosion or impact to the aquatic habitat. • Within riparian areas, do not use vehicle equipment off of established roads. • Outside of riparian areas, allow driving off of established roads only on slopes of 20 percent or less. • Except in emergencies, land helicopters outside of riparian areas. • Within 150 feet of wetlands or riparian areas, do not fuel/refuel equipment, store fuel, or perform equipment maintenance (locate all fueling and fuel storage areas, as well as service landings outside of protected riparian areas). • Prior to helicopter fueling operations prepare a transportation, storage, and emergency spill plan and obtain the appropriate approvals; for other heavy equipment fueling operations use a slip-tank not greater than 250 gallons. Prepare spill containment and cleanup provisions for maintenance operations. • Conservation Measures Related to Revegetation Treatments • Outside riparian areas, avoid hydro-mulching within buffer zones established at the local level. This precaution would limit adding sediments and nutrients and increasing water turbidity. • Within riparian areas, engage in consultation at the local level to ensure that revegetation activities incorporate knowledge of site-specific conditions and project design. Maintain equipment used for transportation, storage, or application of chemicals in a leak-proof condition.

	• Do not store or mix herbicides or conduct post-application cleaning within riparian areas. • Ensure that trained personnel monitor weather conditions at spray times during application. • Strictly enforce all herbicide labels. • Do not broadcast spray within 100 feet of open water when wind velocity exceeds 5 mph. • Do not broadcast spray when wind velocity exceeds 10 mph. • Do not spray if precipitation is occurring or is imminent (within 24 hours). • Do not spray if air turbulence is sufficient to affect the normal spray pattern. • Do not broadcast spray herbicides in riparian areas that provide habitat for TEP aquatic species. Determine appropriate buffer distances at the local level to ensure that overhanging vegetation that provides habitat for TEP species is not removed from the site. Buffer distances provided as conservation measures in the assessment of effects to plants (Chapter 4 of the BA) and fish and aquatic invertebrates should be consulted as guidance (Table 5-5 of the BA). • Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats.
Butterflies and Moths	• When conducting herbicide treatments in or near habitat used by TEP butterflies or moths, avoid the use of fluroxypyr, where feasible. If pre-treatment surveys determine the presence of TEP butterflies or moths, do not use fluroxypyr to treat vegetation. • Use an integrated pest management approach when designing programs for managing pest outbreaks. • Survey treatment areas for TEP butterflies/moths and their host/nectar plants (suitable habitat) at the appropriate times of year. • Minimize the disturbance area with a pre-treatment survey to determine the best access routes. Avoid areas with butterfly/moth host plants and/or nectar plants. • Minimize OHV activities on sites that support host and/or nectar plants. • Carry out vegetation removal in small areas, creating openings of 5 acres or less in size. • Wash equipment before it is brought into the treatment area. • Use a seed mix that contains host and/or nectar plant seeds for road/site reclamation. • To protect host and nectar plants from herbicide treatments, follow recommended buffer zones and other conservation measures for TEP plants species when conducting herbicide treatments in areas where populations of host and nectar plants occur. • Do not broadcast spray herbicides in habitats occupied by TEP butterflies or moths; do not broadcast spray herbicides in areas adjacent to TEP butterfly/moth habitat under conditions when spray drift onto the habitat is likely.
Amphibians and Reptiles	• Survey all areas that may support TEP amphibians and/or reptiles prior to treatments. • In habitats where aquatic herpetofauna occur, implement all conservation measures identified for aquatic organisms in Chapter 4 of the BA.

	• Do not broadcast spray herbicides in riparian areas or wetlands that provide habitat for TEP herpetofauna. In desert tortoise habitat, conduct herbicide treatments during the period when desert tortoises are least active. • To the greatest extent possible, avoid desert tortoise burrows during herbicide treatments. • When conducting herbicide treatments in upland areas adjacent to aquatic or wetland habitats that support TEP herpetofauna, do not broadcast spray during conditions under which off-site drift is likely. • Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats that support TEP herpetofauna.
Western Snowy Plover, Piping Plover, Least Tern (Interior)	• Survey for western snowy plovers, piping plovers, interior least terns, and streaked horned larks (and their nests) in suitable areas of proposed treatment areas, prior to (interior), and Streaked developing treatment plans. • Do not treat vegetation in nesting areas during the breeding season (as determined by a qualified biologist). • Do not allow human (or domestic animal) disturbance within ¼ mile of nest sites during the nesting period. • Conduct beachgrass treatments during the plant's flowering stage, during periods of active growth. • Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).
Least Bell's Vireo, And Yellow-Billed Cuckoo	• Conduct surveys prior to vegetation treatments within potential or suitable habitat. • Where surveys detect birds, do not broadcast spray herbicides. • Do not conduct vegetation treatments within ½ mile of known nest sites or surveyed suitable habitat during the breeding season (as determined by a qualified wildlife biologist). • Adjust spatial and temporal scales of treatments so that not all suitable habitat is affected in any given year. • Following treatments, replant or reseed treated areas with native species, if needed. • Closely follow all application instructions and use restrictions on herbicide labels (including aquatic and wetland habitat use restrictions).
California Condor	• Restrict human activity within 1.5 miles of California condor nest sites.
Mexican Spotted Owl	• Survey for marbled murrelets, northern spotted owls, and Mexican spotted owls (and their nests) on suitable proposed treatment areas, prior to developing treatment plans. • Do not allow human disturbance within ¼ mile of protected activity centers during the nesting period (as determined by a local biologist). • Protect and retain the structural components of known or suspected nest sites during treatments; evaluate each nest site prior to treatment and protect it in the most appropriate manner.

	• Maintain sufficient dead and down material during treatments to support spotted owl prey species (minimums would depend on forest types and should be determined by a wildlife biologist). • Do not conduct treatments that alter forest structure in old-growth stands. • Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats, particularly marine habitats where murrelets forage for prey.
Pygmy Rabbit	• Prior to treatments, survey all suitable habitat for pygmy rabbits. • Address pygmy rabbits in all management plans prepared for treatments within the range of the species' historical habitat. • Where feasible, spot treat vegetation in pygmy rabbit habitat rather than broadcast spraying.
Bighorn Sheep	• Prior to treatment activities, survey suitable habitat for evidence of use by bighorn sheep. • When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans. • Obliterate any linear openings constructed within bighorn sheep habitat in order to deter future uses by humans and competitive species. • Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep. • Do not broadcast spray herbicides in key bighorn sheep foraging habitats.

Pesticide-Specific Buffers for TEP plants

Herbicide specific buffers for TEP are outlined in the *2007 Biological Assessment for Vegetation Treatments on BLM Lands in 17 Western States (2007 BA).* Key buffers for protecting TEP habitat during ground application at the intended and maximum use rates are listed below (note some of these buffers may be reduced if using lower application rates or different method of application, please refer to 2007 BA, pages 4-130 to 4-134).

2,4-D (new guidelines shown below)

- Because the risks associated with this herbicide were not assessed, do not spray within ½ mile of terrestrial plant species or aquatic habitats where TEP aquatic plant species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- Assess local site conditions when evaluating the risks from surface water runoff to TEP plants located within ½ mile downgradient from the treatment area.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

An ERA was included in the 2016 PEIS which included the following revised buffer distances (Table ES-1 on page ES-6)

- Do not apply by plane at the maximum application rate within 2,800 feet of TEP plant species.
- Do not apply by plane at the typical application rate within 2,200 feet of TEP plant species.
- Do not apply by helicopter at the maximum application rate within 2,500 feet of TEP plant species.
- Do not apply by helicopter at the typical application rate within 2,500 feet of TEP plant species.
- If using a low boom at the typical application rate, do not apply within 1,300 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 1,600 feet of terrestrial TEP plant species.
- If using a high boom at the typical application rate, do not apply within 1,400 feet of terrestrial TEP plant species.
- If using a high boom at the maximum application rate, do not apply within 1,600 feet of terrestrial TEP plant species.

Bromacil

- Do not apply within 1,200 feet of terrestrial TEP plant species.
- If using a low boom at the typical application rate, do not apply within 100 feet of an aquatic habitat in which TEP plant species occur.
- If using a low boom at the maximum application rate or a high boom, do not apply within 900 feet of an aquatic habitat in which TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Chlorsulfuron

- Do not apply by ground methods within 1,200 feet of terrestrial TEP species.
- Do not apply by aerial methods within 1,500 feet of terrestrial TEP species.
- Do not apply by ground methods within 25 feet of aquatic habitats where TEP plant species occur.
- Do not apply by aerial methods at the maximum application rate within 300 feet of aquatic habitats where TEP plant species occur.
- Do not apply by aerial methods at the typical application rate within 100 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Clopyralid (new guidelines shown below)

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.

- Do not apply by ground methods at the typical application rate within 900 of terrestrial TEP species.
- Do not apply by ground methods at the typical application rate within ½ mile of terrestrial TEP species.
- Do not apply by aerial methods within ½ mile of terrestrial TEP species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

An ERA was included in the 2016 PEIS which included the following revised buffer distances (Table ES-2 on page ES-7)

- Do not apply by plane at the maximum application rate within 2,800 feet of TEP plant species.
- Do not apply by plane at the typical application rate within 2,500 feet of TEP plant species.
- Do not apply by helicopter at the maximum application rate within 2,500 feet of TEP plant species.
- Do not apply by helicopter at the typical application rate within 2,500 feet of TEP plant species.
- If using a low boom at the typical application rate, do not apply within 1,300 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 1,600 feet of terrestrial TEP plant species.
- If using a high boom at the typical application rate, do not apply within 1,400 feet of terrestrial TEP plant species.
- If using a high boom at the maximum application rate, do not apply within 1,600 feet of terrestrial TEP plant species.

Diuron

- Do not apply within 1,100 feet of terrestrial TEP species.
- If using a low boom at the typical application rate, do not apply within 900 feet of aquatic habitats where TEP aquatic plant species occur.
- If using a high boom, or a low boom at the maximum application rate, do not apply within 1,1000 feet of aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Fluridone

- Since effects on terrestrial TEP plant species are unknown, do not apply within ½ mile of terrestrial TEP species.

Glyphosate

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species.

- Do not apply by ground methods at the typical application rate within 50 feet of terrestrial TEP plant species.
- Do not apply by ground methods at the maximum application rate within 300 feet of terrestrial TEP plant species.
- Do not apply by aerial methods within 300 feet of terrestrial TEP plant species.

Hexazinone

- Since the risks associated with using a high boom or an aerial application are unknown, only apply this herbicide by ground methods using a low boom within ½ mile of terrestrial TEP plant species and aquatic habitats that support aquatic TEP species.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species or aquatic habitats that support aquatic TEP plant species.
- Do not apply by ground methods at the maximum application rate within 900 feet of terrestrial TEP plant species or aquatic habitats that support aquatic TEP plant species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Imazapic

- Do not apply by ground methods within 25 feet of terrestrial TEP species or aquatic habitats where TEP plant species occur.
- Do not apply by helicopter at the typical application rate within 25 feet of terrestrial TEP plant species.
- Do not apply by helicopter at the maximum application rate, or by plane at the typical application rate, within 300 feet of terrestrial TEP plant species.
- Do not apply by plane at the maximum application rate within 900 feet of terrestrial TEP species.
- Do not apply by aerial methods at the maximum application rate within 300 feet of aquatic TEP species.
- Do not apply by aerial methods at the typical application rate within 100 feet of aquatic TEP species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Imazapyr

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.

- Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Metsulfuron Methyl

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Overdrive

- If using a low boom at the typical application rate, do not apply within 100 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- If using a high boom, do not apply within 900 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Picloram

- Do not apply by ground or aerial methods, at any application rate, within ½ mile of terrestrial TEP plant species.
- Assess local site conditions when evaluating the risks from surface water runoff to TEP plants located within ½ mile downgradient from the treatment area.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Sulfometuron Methyl

- Do not apply by ground or aerial methods within 1,500 feet of terrestrial TEP species.
- Do not apply by ground methods within 900 feet of aquatic habitats where TEP plant species occur, or by aerial methods within 1,500 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Triclopyr Acid

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species.
- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications at the maximum application rate of this herbicide within ½ mile of aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species.
- Do not apply by aerial methods at the typical application rate within 500 feet of terrestrial TEP plant species.
- Do not apply by ground or aerial methods at the maximum application rate within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- If applying to aquatic habitats in which aquatic TEP plant species occur, do not exceed the targeted water concentration on the product label.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Triclopyr BEE

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by aerial methods at the typical application rate within 500 feet of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground or aerial methods at the maximum application rate within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Herbicide specific buffers for TES are outlined in the 2016 Biological Assessment for Vegetation

Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States (2016 BA). Key buffers for protecting threatened and endangered species (TES) habitat during ground application at the intended and maximum use rates are listed below (note some of these buffers may be reduced if using lower application rates or different method of application, please refer to 2016 BA, pages 4-129 to 4-131).

<u>Aminopyralid</u>
Ground
Application

- If using a low boom at the typical application rate, do not apply within 100 feet of TEP terrestrial plants[6].
- If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants.

[6] Note that buffers for terrestrial plants may be appropriate for plant species that root in water but have foliage extending above the surface of the water.

- If using a high boom at the maximum application rate, do not apply within 600 feet of TEP terrestrial plants.

<u>Fluroxypyr</u>
Ground Application

- If using a low boom at the typical application rate, do not apply within 100 feet of TEP terrestrial plants.
- If using a low boom at the maximum application rate, do not apply within 600 feet of TEP terrestrial plants.
- If using a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants.
- If using a high boom at the maximum application rate, do not apply within 700 feet of TEP terrestrial plants.

<u>Rimsulfuron</u>
Ground
Application

- If using a low boom at the typical application rate, do not apply within 200 feet of TEP terrestrial plants.
- If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants.
- If using a high boom at the maximum application rate, do not apply within 700 feet of TEP terrestrial plants.

- Do not use in watersheds where annual precipitation exceeds 50 inches. In watersheds where annual precipitation exceeds 10 inches, prior to use of rimsulfuron conduct a local-level analysis of site conditions and develop suitable conservation measures for protection of TEP plant species from surface runoff.
- If a tank mix of one of these chemicals with another approved herbicide is desired, an additional assessment of potential effects to non-target TEP species must be made with the assumption that effects of the herbicides are at a minimum additive. Larger buffers may be warranted.

- At the local level, the BLM must make determinations as to the suitability of herbicide treatments for the populations of TEP species that are managed by local offices. The following information should be considered: the timing of the treatment in relation to the phenology of the TEP plant species; the intensity of the treatment; the duration of the treatment; and the tolerance of the TEP species to the treatment. When information about species tolerance is unavailable or is inconclusive, local offices must assume an adverse effect to plant populations and protect those populations from direct or indirect exposure to the treatment in question.

References

Refer to the 2007 and 2016 PEISs for a complete list.

APPENDIX D Herbicides and Surfactants Approved for Use on BLM-Administered Lands

The Proposed Action would allow the use of 19 of the 21 active ingredient herbicides currently authorized for use on public lands, and other herbicides that may be approved by the BLM in the future. The final Biological Opinion issued by the USFWS for the 2007 Programmatic EIS (BLM 2007a) prohibited use of dicamba, due to its potentially unacceptable effects on California condor (*Gymnogyps californianus*) and Mojave desert tortoise (*Gopherus agassizii*). Dicamba is, therefore, not an approved herbicide for use under the Proposed Action. Tebuthiuron is included in the BLM (2007a) EIS but is generally listed and utilized as a broadleaf brush killer. Since this Proposed Action does not target brush species, it will not be analyzed in this EA.

Table D-1 shows the active ingredients and trade names of the 19 herbicides currently approved for use on public lands in Utah that could be used under the Proposed Action.

Table D-2 shows the active ingredients, trade names, manufacturer, and EPA registration number for the 21 herbicides currently approved for use on public lands in Utah.

Table D-3 lists currently approved additives and adjuvants (i.e., ingredients that improve herbicide effectiveness) available for use on BLM-administered lands in Utah. As other formulations of these chemicals become available and are cleared through the BLM Washington Office, they will be considered for use on public lands.

The BLM releases lists of approved herbicides (by trade names) and names of adjuvants each year and these lists would be consulted to assure that only approved herbicides are used in the two NCAs.

Table D-1. Active ingredients and trade names of approved herbicides for use on public lands in Utah that could be used under the Proposed Action.

Active Ingredient	Example Formulation Trade Name(s)*
Aminopyralid	Milestone
Bromacil	Bromacil 80DF, Hyvar X, Hyvar XL, Alligare Bromacil 80
Bromacil and Diuron	Alligare Bromacil/Diuron 40/40, Ceannard Diuron/Bromacil 80 DF, DiBro 2+2, DiBro 4+2, DiBro 4+4, Krovar I DF, Krovar I DF, Weed Blast 4G, Weed Blast Res. Weed Cont.
Chlorsulfuron	Alligare Chlorsulfuron 75, Chlorsulfuron E-Pro 75 WDG, Nufarm Chlorsulf SPC 75 WDG Herbicide, Telar XP
Clopyralid	Alligare Clopyralid 3, CleanSlate, Pyramid R&P, Reclaim, Spur, Stinger, Transline
Diquat	Alligare Diquat Herbicide, Diquat E-AG 2L, Diquat E-Pro 2L, Diquat SPC 2L Herbicide, Nufarm Diquat 2L Herbicide, Reward
Diuron	Alligare Diuron 4L, Alligare Diuron 80DF, Ceannard Diuron 80DF, Direx 4L, Diuron 4L, Diuron 80, Diuron 80 WDG, Diuron 80DF, Diuron 80WDG, Karmex DF, Karmex IWC, Karmex XP, Parrot 4L, Parrot DF
Fluridone	Alligare Fluridone, Avast!, Fluridone 4L, Sonar AS, Sonar Precision Release, Sonar Q, Sonar SRP
Fluroxypyr	Alligare Flagstaff, Alligare Fluroxypyr, Comet Selective, Vista XRT
Glyphosate	Accord Concentrate, Accord SP, Accord XRT, Accord XRT II, Alligare Dryphosate 75SG, Alligare Glyphosate 4 PLUS, Alligare Glyphosate 5.4,

Active Ingredient	Example Formulation Trade Name(s)*
	Aqua Neat, Aqua Star, Aquamaster, AquaPro Aquatic Herbicide, Buccaneer, Buccaneer Plus, Credit Xtreme, Foresters, Gly Star Gold, Gly Star Original, Gly Star Plus, Gly Star Pro, Gly-4, Gly-4 Plus, GlyphoMate 41, Glypro, Glypro Plus, Honcho, Honcho Plus, Imitator Aquatic, Imitator DA, Imitator Plus, KleenUp Pro, Mad Dog Plus, Makaze, Mirage, Mirage Herbicide, Mirage Plus, Rattler, Razor, Razor Pro, Rodeo, Roundup Custom, Roundup Original, Roundup Original II, Roundup Original II CA, Roundup PROMAX, Roundup PRO, Roundup PRO Concentrate, Roundup PRO Dry, Showdown
Hexazinone	Pronone 10G, Pronone 25G, Pronone MG, Pronone Power Pellet, Velosa, Velpar DF, Velpar DF VU, Velpar L, Velpar L VU, Velpar ULW
Imazapic	Alligare Panoramic 2SL, Nufarm Imazapic 2SL, Open Range G, Plateau
Imazapyr	Alligare Ecomazapyr 2SL, Alligare Imazapyr 4SL, Alligare Rotary 2 SL, Arsenal, Arsenal Applicators Conc., Arsenal PowerLine, Chopper, EZ-JECT Copperhead Herbicide Shells, Habitat, Habitat Herbicide, Polaris, Polaris AC, Polaris AC Complete, Polaris AQ, Polaris Herbicide, Polaris RR, Polaris SP, SSI Maxim Arsenal 0.5G, SSI Maxim Arsenal 5.0 G, Stalker
Metsulfuron methyl	Alligare MSM 60, AmTide MSM 60DF Herbicide, Cimarron MAX - Part A, Cimarron MAX - Part A, Escort XP, Patriot, PureStand, Rometsol
Picloram	Alligare Picloram 22K, Grazon PC, OutPost 22K, Tordon 22K, Tordon K, Triumph 22K, Triumph K, Trooper 22K
Rimsulfuron	Alligare Laramie 25DF, Hinge, Matrix SG
Sulfometuron methyl	Alligare SFM 75, Oust XP, Oust DF, Oust XP, Spyder
Triclopyr	Alligare Boulder 6.3, Alligare Triclopry 4, Alligare Triclopyr 3, Element 3A, Element 4, Forestry Garlon XRT, Garlon 3A, Garlon 4, Garlon 4 Ultra, Pathfinder II, Relegate, Relegate RTU, Remedy, Remedy Ultra, Renovate 3, Renovate OTF, Tahoe 3A, Tahoe 4E, Tahoe 4E Herbicide, Triclopyr RTU, Trycera, Vastlan
2, 4-D	2,4-D 4# Amine Weed Killer, 2,4-D Amine, 2,4-D Amine 4, 2,4-D Amine 4, 2,4-D LV 4, 2,4-D LV 6 Ester, 2,4-D LV4, 2,4-D LV 6, 2,4-D LV6, 2,4-D LV6, Alliagre 2,4-D Amine, Alligare 2,4-D LV 6, Aqua-Kleen, Barrage HF, Barrage LV Ester, Base Camp Amine 4, Base Camp LV6, Broadrange 55, Clean Amine, Clean Crop Amine 4, Clean Crop Low Vol 6 Ester, Clean Crop LV-4 ES, Cornbelt 4 lb. Amine, Cornbelt 4# LoVol Ester, Cornbelt 6# LoVol Ester, D-638, Esteron 99C, Five Star, Formula 40, Freelexx, HardBall, Hi-Dep, Low Vol 4 Ester Weed Killer, Low Vol 6 Ester Weed Killer, Opti-Amine, Platoon, Rugged, Saber, Salvo, Salvo LV Ester, Savage DS, Savage DS, Shredder 2,4-D LV4, Shredder Amine 4, Solution Water Soluble, Solve 2,4-D, Unison, Weedar 64, WEEDestroy AM-40, Weedone LV-4, Weedone LV-4 Solventless, Weedone LV-6, Whiteout 2,4-D

Table D-2. Active ingredients, trade names, manufacturer, and EPA registration number for the 21 herbicides currently approved for use on public lands in Utah.

	Herbicides Formulations Approved for Use on Lands		
	The BLM Administers in the 17 Western States		
			Update: April 4, 2019
Restrictions associated with existing Environmental Impact Statements and individual Environmental Assessments (EA)			
at the present time, may restrict the use of individual herbicide active ingredients allowed for a particular			
project within that state. Refer to current EAs prior to selecting the active ingredient(s) and subsequent formulation(s).			
Refer to the complete label prior to considering the use of any herbicide formulation. Just because it has a Federal registration,			
it may not be registered in a particular State, for example California. Label changes can also impact the intended use			
through, such things as, creation or elimination of Special Local Need (SLN) or 24 (C) registrations, changes in application sites,			
rates and timing of application, county restrictions, etc.			
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Aminopyralid	Milestone	Dow AgroSciences	62719-519
Aminopyralid + 2,4-D	ForeFront HL	Dow AgroSciences	62719-630
	GrazonNext HL	Dow AgroSciences	62719-628
Aminopyralid + Clopyralid	Sendero	Dow AgroSciences	62719-645
Aminopyralid + Metsulfuron methyl	Chaparral	Dow AgroSciences	62719-597
	Opensight	Dow AgroSciences	62719-597
Aminopyralid + Triclopyr	Capstone	Dow AgroSciences	62719-572
Bromacil	Alligare Bromacil 80	Alligare, LLC	81927-4
	Ceannard Bromacil 80DF	Ceannard, Inc.	58035-19
	Hyvar X	Bayer Environmental Science	432-1546
	Hyvar X	DuPont Crop Protection	352-287
	Hyvar X-L	Bayer Environmental Science	432-1548
	Hyvar X-L	DuPont Crop Protection	352-346

Bromacil + Diuron	Alligare Bromacil/Diuron 40/40	Alligare, LLC	81927-3
	Ceannard Diuron/Bromacil 80 DF	Ceannard, Inc.	58035-18
	DiBro 2+2	Nufarm Americas Inc.	228-227
	DiBro 4+2	Nufarm Americas Inc.	228-386
	DiBro 4+4	Nufarm Americas Inc.	228-235
	Krovar I DF	Bayer Environmental Science	432-1551
	Krovar I DF	DuPont Crop Protection	352-505
	Weed Blast 4G	SSI Maxim	34913-19
	Weed Blast Res. Weed Cont.	Loveland Products Inc.	34704-576
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Chlorsulfuron	Alligare Chlorsulfuron 75	Alligare, LLC	81927-43
	Chlorsulfuron E-Pro 75 WDG	Nufarm Americas Inc.	79676-72
	Nufarm Chlorsulf SPC 75 WDG Herbicide	Nufarm Americas Inc.	228-672
	Telar XP	Bayer Environmental Science	432-1561
	Telar XP	DuPont Crop Protection	352-654
Clopyralid	Alligare Clopyralid 3	Alligare, LLC	81927-14
	CleanSlate	Nufarm Americas Inc.	228-491
	Pyramid R&P	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-94
	Reclaim	Dow AgroSciences	62719-83
	Spur	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-89
	Stinger	Dow AgroSciences	62719-73
	Transline	Dow AgroSciences	62719-259
Clopyralid + 2, 4-D	Alligare Cody Herbicide	Alligare, LLC	81927-28
	Commando	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-92
	Curtail	Dow AgroSciences	62719-48
	Cutback	Nufarm Americas Inc.	71368-72
2, 4-D	2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
	2,4-D Amine	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-72
	2,4-D Amine 4	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-19
	2,4-D Amine 4	Helena Agri-Enterprises, LLC (Helena Chemical Company)	42750-19-5905
	2,4-D LV 4	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-15
	2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95

	2,4-D LV4	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-90
	2,4-D LV 6	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-20
	2,4-D LV6	Helena Agri-Enterprises, LLC (Helena Chemical Company)	42750-20-5905
	2,4-D LV6	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-93
	Alliagre 2,4-D Amine	Alligare, LLC	81927-38
	Alligare 2,4-D LV 6	Alligare, LLC	81927-39
	Aqua-Kleen	Nufarm Americas Inc.	71368-4
	Aqua-Kleen	Nufarm Americas Inc.	228-378
	Barrage HF	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-529
	Barrage LV Ester	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-504
	Base Camp Amine 4	Wilbur-Ellis Co., LLC (Wilbur-Ellis Co.)	71368-1-2935
	Base Camp LV6	Wilbur-Ellis Co., LLC (Wilbur-Ellis Co.)	2935-553
	Broadrange 55	Wilbur-Ellis Co., LLC (Wilbur-Ellis Co.)	2217-813-2935
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
2,4-D - continued	Clean Amine	Loveland Products Inc.	34704-120
	Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
	Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
	Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
	Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2
	Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
	Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
	D-638	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-36
	Esteron 99C	Nufarm Americas Inc.	62719-9-71368
	Five Star	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-49
	Formula 40	Nufarm Americas Inc.	228-357
	Freelexx	Dow AgroSciences	62719-634
	HardBall	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-549
	Hi-Dep	PBI Gordon Corp.	2217-703
	Low Vol 4 Ester Weed Killer	Loveland Products Inc.	34704-124
	Low Vol 6 Ester Weed Killer	Loveland Products Inc.	34704-125
	Opti-Amine	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-501
	Platoon	Nufarm Americas Inc.	228-145
	Rugged	WinField-United (WinField Solutions, LLC)	1381-247
	Saber	Loveland Products Inc.	34704-803

	Salvo	Loveland Products Inc.	34704-609
	Salvo LV Ester	UAP-Platte Chem. Co.	34704-609
	Savage DS	Loveland Products Inc.	34704-606
	Savage DS	UAP-Platte Chem. Co.	34704-606
	Shredder 2,4-D LV4	WinField-United (WinField Solutions, LLC)	1381-102
	Shredder Amine 4	WinField-United (WinField Solutions, LLC)	1381-103
	Solution Water Soluble	Nufarm Americas Inc.	228-260
	Solve 2,4-D	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-22
	Unison	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-542
	Weedar 64	Nufarm Americas Inc.	71368-1
	WEEDestroy AM-40	Nufarm Americas Inc.	228-145
	Weedone LV-4	Nufarm Americas Inc.	228-139-71368
	Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
	Weedone LV-6	Nufarm Americas Inc.	71368-11
	Whiteout 2,4-D	Loveland Products, Inc.	34704-1032
Dicamba	Alligare Cruise Control	Alligare, LLC	42750-40-81927
	Alligare Dicamba 4 Herbicide	Alligare, LLC	81927-55
	Banvel	Arysta LifeScience N.A. Corp.	66330-276
	Clarity	BASF Corporation	7969-137
	Diablo	Nufarm Americas Inc.	228-379
	Dicamba DMA	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-40
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Dicamba - continued	Kam-Ba	Drexel Chemical Company	19713-624
	Rifle	Loveland Products Inc.	34704-861
	Sterling Blue	WinField-United (WinField Solutions, LLC)	7969-137-1381
	Topeka	Rotam North America, Inc.	83100-34-83979
	Vanquish	Syngenta	100-884
	Vanquish Herbicide	Nufarm Americas Inc.	228-397
	Vision	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-576
Dicamba + 2, 4-D	Alligare Dicamba + 2,4-D DMA	Alligare, LLC	81927-42
	Brash	WinField-United (WinField Solutions, LLC)	1381-202
	Brush-Rhap	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-568
	Cimarron MAX - Part B	Bayer Environmental Science	432-1555
	Cimarron MAX - Part B	DuPont Crop Protection	352-615
	KambaMaster	Nufarm Americas Inc.	71368-34

	Latigo	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-564
	Outlaw	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-574
	Range Star	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-55
	Rifle-D	Loveland Products Inc.	34704-869
	Veteran 720	Nufarm Americas Inc.	228-295
	Weedmaster	Nufarm Americas Inc.	71368-34
Dicamba + Diflufenzopyr	Distinct	BASF Corporation	7969-150
	Overdrive	BASF Corporation	7969-150
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management* Lands in 17 Western *States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide* is prohibited.			
Diquat	Alligare Diquat Herbicide	Alligare, LLC	81927-43
	Diquat E-AG 2L	Nufarm Americas Inc.	79676-75
	Diquat E-Pro 2L	Nufarm Americas Inc.	79676-75
	Diquat SPC 2L Herbicide	Nufarm Americas Inc.	228-675
	Nufarm Diquat 2L Herbicide	Nufarm Americas Inc.	228-675
	Reward	Syngenta Professional Products	100-1091
Diuron	Alligare Diuron 4L	Alligare, LLC	81927-44
	Alligare Diuron 80DF	Alligare, LLC	81927-12
	Ceannard Diuron 80DF	Ceannard, Inc.	58035-16
	Direx 4L	DuPont Crop Protection	352-678
	Direx 4L	Makhteshim Agan of N. A. (ADAMA)	66222-54
	Diuron 4L	Drexel Chemical Company	19713-36
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Diuron - continued	Diuron 4L	Loveland Products Inc.	34704-854
	Diuron 4L	Makhteshim Agan of N. A. (ADAMA)	66222-54
	Diuron 80	Drexel Chemical Company	19713-274
	Diuron 80 WDG	Loveland Products Inc.	34704-648
	Diuron 80DF	WinField-United (WinField Solutions, LLC)	9779-318
	Diuron 80WDG	UAP-Platte Chem. Co.	34704-648
	Karmex DF	DuPont Crop Protection	352-692
	Karmex DF	Makhteshim Agan of N. A. (ADAMA)	66222-51
	Karmex IWC	DuPont Crop Protection	352-692
	Karmex XP	DuPont Crop Protection	352-692

	Parrot 4L	Makhteshim Agan of N. A. (ADAMA)	66222-54
	Parrot DF	Makhteshim Agan of N. A. (ADAMA)	66222-51
Fluridone	Alligare Fluridone	Alligare, LLC	81927-45
	Avast!	SePRO	67690-30
	Fluridone 4L	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-280
	Sonar AS	SePRO	67690-4
	Sonar Precision Release	SePRO	67690-12
	Sonar Q	SePRO	67690-3
	Sonar SRP	SePRO	67690-3
Fluroxypyr	Alligare Flagstaff	Alligare, LLC	81927-61
	Alligare Fluroxypyr	Alligare, LLC	66330-385-81927
	Comet Selective	Nufarm Americas Inc.	71368-87
	Vista XRT	Dow AgroSciences	62719-586
Fluroxypyr + 2,4-D + Dicamba	E-2 Herbicide	Nufarm Americas Inc.	228-442
Fluroxypyr + Clopyralid	Truslate Selective Herbicide	Nufarm Americas Inc.	71368-86
Fluroxypyr + Picloram	Alligare Triumph XTR Herbicide	Alligare , LLC	81927-64
	Surmount	Dow AgroSciences	62719-480
	Trooper Pro	Nufarm Americas Inc.	228-599
Fluroxypyr + Triclopyr	Alligare Cleargraze Pasture Herbicide	Alligare, LLC	81927-65
	PastureGard	Dow AgroSciences	62719-637
Glyphosate	Accord Concentrate	Dow AgroSciences	62719-324
	Accord SP	Dow AgroSciences	62719-322
	Accord XRT	Dow AgroSciences	62719-517
	Accord XRT II	Dow AgroSciences	62719-556
	Alligare Dryphosate 75SG	Alligare, LLC	81927-60
	Alligare Glyphosate 4 PLUS	Alligare, LLC	81927-9
	Alligare Glyphosate 5.4	Alligare, LLC	81927-8
	Aqua Neat	Nufarm Americas Inc.	228-365
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Glyphosate - continued	Aqua Star	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-59
	Aquamaster	Monsanto	524-343
	AquaPro Aquatic Herbicide	SePRO Corporation	62719-324-67690
	Buccaneer	Tenkoz	55467-10

	Buccaneer Plus	Tenkoz	55467-9
	Credit Xtreme	Nufarm Americas Inc.	71368-81
	Foresters	Nufarm Americas Inc.	228-381
	Gly Star Gold	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-61
	Gly Star Original	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-60
	Gly Star Plus	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-61
	Gly Star Pro	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-61
	Gly-4	Universal Crop Protection Alliance	42750-60-72693
	Gly-4 Plus	Universal Crop Protection Alliance	72693-1
	Gly-4 Plus	Universal Crop Protection Alliance	42750-61-72693
	GlyphoMate 41	PBI/Gordon Corporation	2217-847
	Glypro	Dow AgroSciences	62719-324
	Glypro Plus	Dow AgroSciences	62719-322
	Honcho	Monsanto	524-445
	Honcho Plus	Monsanto	524-454
	Imitator Aquatic	Drexel Chemical Company	19713-623
	Imitator DA	Drexel Chemical Company	19713-586
	Imitator Plus	Drexel Chemical Company	19713-526
	KleenUp Pro	Loveland Products, Inc.	34704-890
	Mad Dog Plus	Loveland Products, Inc.	34704-890
	Makaze	Loveland Products, Inc.	34704-890
	Mirage	Loveland Products Inc.	34704-889
	Mirage Herbicide	UAP-Platte Chem. Co.	524-445-34704
	Mirage Plus	Loveland Products Inc.	34704-890
	Rattler	Helena Agri-Enterprises, LLC (Helena Chemical Company)	524-445-5905
	Razor	Nufarm Americas Inc.	228-366
	Razor Pro	Nufarm Americas Inc.	228-366
	Rodeo	Dow AgroSciences	62719-324
	Roundup Custom	Monsanto	524-343
	Roundup Original	Monsanto	524-445
	Roundup Original II	Monsanto	524-454
	Roundup Original II CA	Monsanto	524-475
	Roundup PROMAX	Monsanto	524-579
	Roundup PRO	Monsanto	524-475
	Roundup PRO Concentrate	Monsanto	524-529
	Roundup PRO Dry	Monsanto	524-505
	Showdown	Helena Agri-Enterprises, LLC (Helena Chemical Company)	71368-25-5905

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
Glyphosate + 2, 4-D	Campaign	Monsanto	524-351
	Imitator + 2,4-D	Drexel Chemical Company	19713-635
	Landmaster BW	Albaugh, LLC (Albuagh, Inc/Agri Star)	42570-62
	Landmaster BW	Monsanto	524-351
Hexazinone	Pronone 10G	Pro-Serve	33560-21
	Pronone 25G	Pro-Serve	33560-45
	Pronone MG	Pro-Serve	33560-21
	Pronone Power Pellet	Pro-Serve	33560-41
	Velosa	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5905-579
	Velpar DF	DuPont Crop Protection	352-581
	Velpar DF VU	Bayer Environmental Science	432-1576
	Velpar L	DuPont Crop Protection	352-392
	Velpar L VU	Bayer Environmental Science	432-1573
	Velpar ULW	DuPont Crop Protection	352-450
Hexazinone + Sulfometuron methyl	Oustar	Bayer Environmental Science	432-1553
	Oustar	DuPont Crop Protection	352-603
	Westar	Bayer Environmental Science	432-1558
	Westar	DuPont Crop Protection	352-626
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management* Lands in 17 Western *States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide* is prohibited.			
Imazapic	Alligare Panoramic 2SL	Alligare, LLC	66222-141-81927
	Nufarm Imazapic 2SL	Nufarm Americas Inc.	71368-99
	Open Range G	Wilbur-Ellis Co., LLC (Wilbur-Ellis Co.)	2935-557
	Plateau	BASF Corporation	241-365
Imazapyr	Alligare Ecomazapyr 2SL	Alligare, LLC	81927-22
	Alligare Imazapyr 4SL	Alligare, LLC	81927-24
	Alligare Rotary 2 SL	Alligare, LLC	
	Arsenal	BASF Corporation	241-346
	Arsenal Applicators Conc.	BASF Corporation	241-299
	Arsenal PowerLine	BASF Corporation	241-431
	Chopper	BASF Corporation	241-296
	EZ-JECT Copperhead Herbicide Shells	EZ-JECT, Inc.	83220-2

	Habitat	BASF Corporation	241-426
	Habitat Herbicide	SePRO	241-426-67690
	Polaris	Nufarm Americas Inc.	228-534
	Polaris AC	Nufarm Americas Inc.	241-299-228
	Polaris AC	Nufarm Americas Inc.	228-480
	Polaris AC Complete	Nufarm Americas Inc.	228-570
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Imazapyr - continued	Polaris AQ	Nufarm Americas Inc.	241-426-228
	Polaris Herbicide	Nufarm Americas Inc.	241-346-228
	Polaris RR	Nufarm Americas Inc.	241-273-228
	Polaris SP	Nufarm Americas Inc.	228-536
	Polaris SP	Nufarm Americas Inc.	241-296-228
	SSI Maxim Arsenal 0.5G	SSI Maxim Co., Inc.	34913-23
	SSI Maxim Arsenal 5.0 G	SSI Maxim Co., Inc.	34913-24
	Stalker	BASF Corporation	241-398
Imazapyr + Diuron	Alligare Mojave 70 EG	Alligare, LLC	81927-25
	Imazuron	Nufarm Americas Inc.	228-654
	Sahara DG	BASF Corporation	241-372
	SSI Maxim Topsite 2.5G	SSI Maxim Co., Inc.	34913-22
Imazapyr + Metsulfuron methyl	Lineage Clearstand	Bayer Environmental Science	432-1578
	Lineage Clearstand	DuPont Crop Protection	352-766
Imazapyr + Sulfometuron methyl +	Lineage HWC	Bayer Environmental Science	432-1577
Metsulfuron methyl	Lineage HWC	DuPont Crop Protection	352-765
	Lineage Prep	Bayer Environmental Science	432-1579
	Lineage Prep	DuPont Crop Protection	352-767
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management* Lands in 17 Western *States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide* is prohibited.			
Metsulfuron methyl	Alligare MSM 60	Alligare, LLC	81927-7
	AmTide MSM 60DF Herbicide	AmTide, LLC	83851-3
	Cimarron MAX - Part A	Bayer Environmental Science	432-1555
	Cimarron MAX - Part A	DuPont Crop Protection	352-615
	Escort XP	Bayer Environmental Science	432-1549
	Escort XP	DuPont Crop Protection	352-439
	Patriot	Nufarm Americas Inc.	228-391

	PureStand	Nufarm Americas Inc.	71368-38
	Rometsol	Rotam North America, Inc.	831000-2-83979
Metsulfuron methyl + Chlorsulfuron	Cimarron Plus	Bayer Environmental Science	432-1572
	Cimarron Plus	DuPont Crop Protection	352-670
	Cimarron X-tra	DuPont Crop Protection	352-669
Picloram	Alligare Picloram 22K	Alligare, LLC	81927-18
	Grazon PC	Dow AgroSciences	62719-181
	OutPost 22K	Dow AgroSciences	62719-6
	Tordon 22K	Dow AgroSciences	62719-6
	Tordon K	Dow AgroSciences	62719-17
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Picloram - continued	Triumph 22K	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-79
	Triumph K	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-81
	Trooper 22K	Nufarm Americas Inc.	228-535
Picloram + 2, 4-D	Alligare Picloram + D	Alligare, LLC	81927-16
	Graslan L	Dow AgroSciences	62719-655
	Grazon P+D	Dow AgroSciences	62719-182
	GunSlinger	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-80
	HiredHand P+D	Dow AgroSciences	62719-182
	Pathway	Dow AgroSciences	62719-31
	Tordon 101 Mixture	Dow AgroSciences	62719-5
	Tordon RTU	Dow AgroSciences	62719-31
	Trooper P + D	Nufarm Americas Inc.	228-530
Picloram + 2, 4-D + Dicamba	Trooper Extra	Nufarm Americas Inc.	228-586
Rimsulfuron	Alligare Laramie 25DF	Alligare, LLC	81927-57
	Hinge	Rotam Borth America, Inc.	83100-40-83979
	Matrix SG	Dupont Crop Protection	352-768
Sulfometuron methyl	Alligare SFM 75	Alligare, LLC	81927-26
	Oust XP	Bayer Environmenatl Science	432-1552
	Oust DF	DuPont Crop Protection	352-401
	Oust XP	DuPont Crop Protection	352-601
	Spyder	Nufarm Americas Inc.	228-408

NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management*

Lands in 17 Western *States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide* is prohibited.			
Sulfometuron methyl + Chlorsulfuron	Landmark XP	Bayer Environmental Science	432-1560
	Landmark XP	DuPont Crop Protection	352-645
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management* Lands in 17 Western *States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide* is prohibited.			
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Sulfometuron methyl + Metsulfuron methyl	Alligare SFM Extra	Alligare, LLC	81927-5
	Oust Extra	Bayer Environmental Science	432-1557
	Oust Extra	DuPont Crop Protection	352-622
	Spyder Extra Selective	Nufarm Americas Inc.	228-690
NOTE: In accordance with the Record of Decision for the *Vegetation Treatments Using Herbicides on Bureau of Land Management* Lands in 17 Western *States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide* is prohibited.			
Tebuthiuron	Alligare Tebuthiuron 20 P	Alligare, LLC	81927-41
	Alligare Tebuthiuron 80 WG	Alligare, LLC	81927-37
	Spike 20P	Dow AgroSciences	62719-121
	Spike 80DF	Dow AgroSciences	62719-107
	SpraKil S-5 Granules	SSI Maxim Co., Inc.	34913-10
Tebuthiuron + Diuron	SpraKil SK-13 Granular	SSI Maxim Co., Inc.	34913-15
	SpraKil SK-26 Granular	SSI Maxim Co., Inc.	34913-16
Triclopyr	Alligare Boulder 6.3	Alligare, LLC	81927-54

	Alligare Triclopry 4	Alligare, LLC	81927-11
	Alligare Triclopyr 3	Alligare, LLC	81927-13
	Element 3A	Dow AgroSciences	62719-37
	Element 4	Dow AgroSciences	62719-40
	Forestry Garlon XRT	Dow AgroSciences	62719-553
	Garlon 3A	Dow AgroSciences	62719-37
	Garlon 4	Dow AgroSciences	62719-40
	Garlon 4 Ultra	Dow AgroSciences	62719-527
	Pathfinder II	Dow AgroSciences	62719-176
	Relegate	Nufarm Americas Inc.	228-521
	Relegate RTU	Nufarm Americas Inc.	228-522
	Remedy	Dow AgroSciences	62719-70
	Remedy Ultra	Dow AgroSciences	62719-552
	Renovate 3	SePRO Corporation	62719-37-67690
	Renovate OTF	SePRO Corporation	67690-42
	Tahoe 3A	Nufarm Americas Inc.	228-520
	Tahoe 4E	Nufarm Americas Inc.	228-385
	Tahoe 4E Herbicide	Nufarm Americas Inc.	228-517
	Triclopyr RTU	Albaugh, LLC (Albuagh, Inc/Agri Star)	42750-173
	Trycera	Helena Agri-Enterprises, LLC (Helena Chemical Company)	5906-580
	Vastlan	Dow AgroSciences	62719-687
ACTIVE			**EPA REG.**
INGREDIENT	**TRADE NAME**	**MANUFACTURER**	**NUMBER**
Triclopyr + 2, 4-D	Alligare Everett	Alligare, LLC	81927-29
	Aquasweep	Nufarm Americas Inc.	228-316
	Candor	Nufarm Americas Inc.	228-565
	Crossbow	Dow AgroSciences	62719-260
Triclopyr + Clopyralid	Alligare Prescott Herbicide	Alligare, LLC	81927-30
	Brazen	Nufarm Americas Inc.	228-564
	Redeem R&P	Dow AgroSciences	62719-337

Approved Additives and Adjuvants Available for use on BLM-Administered Lands.

Table D-3 lists currently approved additives and adjuvants (i.e., ingredients that improve herbicide effectiveness) available for use on BLM-administered lands in Utah. As other formulations of these chemicals become available and are cleared through the BLM Washington Office, they will be considered for use on public lands.

Table D-3. Currently Approved Additives and Adjuvants Available for use on BLM-Administered Lands.

Adjuvant	**Adjuvant**	**Trade**		
Class	Type	Name	Manufacturer	Comments
Surfactant	Non-ionic	Agrisolutions Preference	Agriliance, LLC.	WA Reg. No. 1381-50011
		A-90	Alligare, LLC	
		Aqufact	Aqumix, Inc.	
		Brewer 90-10	Brewer International	
		Baron	Crown (Estes Incorporated)	
		N.I.S. 80	Estes Incorporated	
		Inlet	Helena Chemical Company	CA Reg. No. 5905-50099-AA
		Spec 90/10	Helena Chemical Company	
		Optima	Helena Chemical Company	CA Reg. No. 5905-50075-AA
		Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
			Helena Chemical Company	CA Reg. No. 5905-50091-AA
		Activator 90	Loveland Products Inc.	CA Reg. No. 34704-50034-AA
		LI-700	Loveland Products Inc.	CA Reg. No. 34704-50035
				WA Reg. No. AW36208-70004
		Spreader 90	Loveland Products Inc.	WA Reg. No. 34704-05002-AA
		UAP Surfactant 80/20	Loveland Products Inc.	
		X-77	Loveland Products Inc.	CA Reg. No. 34704-50044
		Elite Platinum	Red River Specialties, Inc.	
		Red River 90	Red River Specialties, Inc.	
		Red River NIS	Red River Specialties, Inc.	
		Cornbelt Premier 90	Van Diest Supply Co.	
		Cornbelt Trophy Gold	Van Diest Supply Co.	

		Spray Activator 85	Van Diest Supply Co.	
		R-900	Wilbur-Ellis	
		Super Spread 90	Wilbur-Ellis	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis	CA Reg. No. 2935-50170
				WA Reg. No. AW-2935-0002
		Agrisolutions Activate Plus	Winfield Solutions, LLC	CA Reg. No. 9779-50004-AA
				WA Reg. No. 1381-09001
		Agrisolutions Preference	Winfield Solutions, LLC	WA Reg. No. 1381-50011
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Surfactant (cont.)	Spreader/Sticker	Agri-Trend Spreader	Agri-Trend	
		TopFilm	Biosorb, Inc.	
		Bind-It	Estes Incorporated	
		Surf-King PLUS	Crown (Estes Incorporated)	
		CWC 90	CWC Chemical, Inc.	
		Cohere	Helena Chemical Company	CA Reg. No. 5905-50083-A
		Attach	Loveland Products Inc.	CA Reg. No. 34704-50026
		Bond	Loveland Products Inc.	CA Reg. No. 36208-50005
		Tactic	Loveland Products Inc.	CA Reg. No. 34704-50041-AA
		Widespread Max	Loveland Products Inc.	CA Reg. No. 34704-50061
				WA Reg. No. 34704-09001
		Nu-Film-IR	Miller Chem. & Fert. Corp.	
		Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
		Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
		Lastick	Setre (Helena)	
		Insist 90	Wilbur-Ellis	
		R-56	Wilbur-Ellis	CA Reg. No. 2935-50144
	Silicone-based	SilEnergy	Brewer International	
		Silnet 200	Brewer International	

		Bind-It MAX	Estes Incorporated	
		Thoroughbred	Estes Incorporated	
		Aero Dyne-Amic	Helena Chemical Company	CA Reg. No. 5905-50080-AA
		Dyne-Amic	Helena Chemical Company	CA Reg. No. 5095-50071-AA
		Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
		Freeway	Loveland Products Inc.	CA Reg. No. 34704-50031
				WA Reg. No. 34704-04005
		Phase	Loveland Products Inc.	CA Reg. No. 34704-50037-AA
		Phase II	Loveland Products Inc.	
		Silwet L-77	Loveland Products Inc.	CA Reg. No. 34704-50043
		Elite Marvel	Red River Specialties, Inc.	
		Sun Spreader	Red River Specialties, Inc.	
		Sylgard 309	Wilbur-Ellis	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis	CA Reg. No. 2935-50167
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Oil-based	Crop Oil Concentrate	Alligare Forestry Oil	Alligare, LLC	
		Brewer 83-17	Brewer International	
		Majestic	Crown (Estes Incorporated)	
		Agri-Dex	Helena Chemical Company	CA # 5905-50094-AA
		Crop Oil Concentrate	Helena Chemical Company	CA Reg. No. 5905-50085-AA
		Power-Line Crop Oil	Land View Inc.	
		Crop Oil Concentrate	Loveland Products Inc.	
		Maximizer Crop Oil Conc.	Loveland Products Inc.	CA Reg. No. 34704-50059
				WA Reg. No. 34704-08002
		Herbimax	Loveland Products Inc.	CA Reg. No. 34704-50032-AA
				WA Reg. No. 34704-04006

		Red River Forestry Oil	Red River Specialties, Inc.	
		Red River Pacer Crop Oil	Red River Specialties, Inc.	
		Cornbelt Crop Oil Concentrate	Van Diest Supply Co.	
		Cornbelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
		R.O.C. Rigo Oil Conc.	Wilbur-Ellis	
		Mor-Act	Wilbur-Ellis	CA Reg. No. 2935-50098
		Agrisolutions Prime Oil	Winfield Solutions, LLC	CA Reg. No. 979-50002-AA
		Agrisolutions Superb HC	Winfield Solutions, LLC	WA Reg. No. 1381-06003
	Methylated Seed Oil	MSO Concentrate	Alligare, LLC	
		SunEnergy	Brewer International	
		Sun Wet	Brewer International	
		Premium MSO	Helena Chemical Company	
		Methylated Spray Oil Conc.	Helena Chemical Company	
		MSO Concentrate	Loveland Products Inc.	CA Reg. No. 34704-50029-AA
		Elite Supreme	Red River Specialties, Inc.	
		Red River Supreme	Red River Specialties, Inc.	
		Sunburn	Red River Specialties, Inc.	
		Sunset	Red River Specialties, Inc.	
		Cornbelt Base	Van Diest Supply Co.	
		Cornbelt Methylates Soy-Stik	Van Diest Supply Co.	
		Hasten	Wilbur-Ellis	CA Reg. No. 2935-50160
				WA Reg. No. 2935-02004
		Super Spread MSO	Wilbur-Ellis	
		Agrisolutions Destiny HC	Winfield Solutions, LLC	WA Reg. No. 1381-09002
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Oil-Based (cont.)	Methylated Seed Oil +	Inergy	Crown (Estes Incorporated)	
	Organosilicone			

	Vegetable Oil	Noble	Estes Incorporated	
		Amigo	Loveland Products Inc.	CA Reg. No. 34704-50028-AA
				WA Reg. No. 34704-04002
		Elite Natural	Red River Specialities	
		Competitor	Wilbur-Ellis	CA Reg. No. 2935-50173
				WA Reg. No. AW-2935-04001
Fertilizer-based	Nitrogen-based	Quest	Setre (Helena)	CA Reg. No. 5905-50076-AA
		Quest	Helena Chemical Company	CA Reg. No. 5905-50076-AA
		Actamaster Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50006
		Actamaster Soluble Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50001
		Dispatch	Loveland Products Inc.	
		Dispatch 111	Loveland Products Inc.	
		Dispatch 2N	Loveland Products Inc.	
		Dispatch AMS	Loveland Products Inc.	
		Flame	Loveland Products Inc.	
		Cornbelt Gardian	Van Diest Supply Co.	
		Cornbelt Gardian Plus	Van Diest Supply Co.	
		Bronc	Wilbur-Ellis	
		Bronc Max	Wilbur-Ellis	
		Bronc Max EDT	Wilbur-Ellis	
		Bronc Plus Dry EDT	Wilbur-Ellis	WA Reg. No.2935-03002
		Agrisolutions Alliance	Winfield Solutions, LLC	CA Reg. No. 1381-50002-AA
				WA Reg. No.1381-05005
		Agrisolutions Class Act NG	Winfield Solutions, LLC	WA Reg. No. 1381-01004
		Agrisolutions Corral AMS Liquid	Winfield Solutions, LLC	WA Reg. No. 1381-01006
		Bronc Total	Wilbur-Ellis	
		Cayuse Plus	Wilbur-Ellis	CA Reg. No. 2935-50171

Special Purpose	Buffering Agent	Buffers P.S.	Helena Chemical Company	CA Reg. No. 5905-50062-ZA
or Utility		Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
		Oblique	Red River Specialties, Inc.	
		Tri-Fol	Wilbur-Ellis	CA Reg. No. 2935-50152
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Special Purpose	Colorants	Hi-Light	Becker-Underwood	
or Utility - cont.		Hi-Light WSP	Becker-Underwood	
		Spray Indicator XL	Helena Chemical Company	
		Marker Dye	Loveland Products Inc.	
		TurfTrax	Loveland Products Inc.	
		TurfTrax Blue Spray Indicator	Loveland Products Inc.	
		BullsEye	Milliken Chemical	
		Signal	Precision	
		SPI-Max Blue Spray Marker	PROKoZ	
		Elite Splendor	Red River Specialities, Inc.	
	Compatibility/	E Z MIX	Loveland Products Inc.	CA Reg. No. 36208-50006
	Suspension	Support	Loveland Products Inc.	WA Reg. No. 34704-04011
	Agent	Blendex VHC	Setre (Helena)	
	Deposition Aid	Cygnet Plus	Brewer International	CA Reg. No. 1051114-50001
		Poly Control 2	Brewer International	
		CWC Sharpshooter	CWC Chemical, Inc.	
		Grounded	Helena Chemical Company	
		Grounded - CA	Helena Chemical Company	CA Reg. No. 5905-50096-AA
		ProMate Impel	Helena Chemical Company	
		Pointblank	Helena Chemical Company	CA Reg. No. 52467-50008-AA-5905
		Strike Zone DF	Helena Chemical Company	CA Reg. No. 5905-50084-AA

		Compadre	Loveland Products Inc.	CA Reg. No. 34704-50050
				WA Reg. No. 34704-06004
		Intac Plus	Loveland Products Inc.	
		Liberate	Loveland Products Inc.	CA Reg. No. 34704-50030-AA
				WA Reg. No. 34704-04008
		Reign	Loveland Products Inc.	CA Reg. No. 34704-50045
				WA Reg. No. 34704-05010
		Weather Gard	Loveland Products Inc.	CA Reg. No. 34704-50042-AA
		Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
		Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA
		Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
		Elite Secure Ultra	Red River Specialties, Inc.	
		Secure Ultra	Red River Specialties, Inc.	
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Special Purpose	Deposition Aid - cont.	Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA
or Utility - cont.		Agripharm Drift Control	Walco International	
		Bivert	Wilbur-Ellis	CA Reg. No. 2935-50163
		Coverage G-20	Wilbur-Ellis	
		Crosshair	Wilbur-Ellis	
		EDT Concentrate	Wilbur-Ellis	
		Agrisolutions Interlock	Winfield Solutions, LLC	
	Defoaming Agent	Defoamer	Brewer International	
		Foambuster Max	Helena Chemical Company	
		Fighter-F 10	Loveland Products Inc.	
		Fighter-F Dry	Loveland Products Inc.	
		Unfoamer	Loveland Products Inc.	CA Reg. No. 34704-50062
				WA Reg. No. 34704-09002

		Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
		Red River Defoamer	Red River Specialities, Inc.	
		Foam Buster	Setre (Helena)	CA Reg. No. 5905-50072-AA
		Cornbelt Defoamer	Van Diest Supply Co	
		No Foam	Wilbur-Ellis	CA Reg. No. 2935-50136
	Diluent/Deposition	Improved JLB Oil Plus	Brewer International	
	Agent	JLB Oil Plus	Brewer International	
		Hy-Grade I	CWC Chemical, Inc	
		Hy-Grade EC	CWC Chemical, Inc	
		Red River Basal Oil	Red River Specialties, Inc.	
		In-Place	Wilbur-Ellis	CA Reg. No. 2935-50169
		W.E.B. Oil	Wilbur-Ellis	CA Reg. No. 2935-50166
				WA Reg. No. AW 2935-70023
	Foam Marker	Align	Helena Chemical Company	
		Red River Foam Marker	Red River Specialties, Inc.	
		R-160	Wilbur-Ellis	
	Invert Emulsion Agent	Redi-vert II	Wilbur-Ellis	CA Reg. No. 2935-50168
	Tank Cleaner	Wipe Out	Helena Chemical Company	
		All Clear	Loveland Products Inc.	
Adjuvant	Adjuvant	Trade		
Class	Type	Name	Manufacturer	Comments
Special Purpose	Tank Cleaner cont.	Tank and Equipment Cleaner	Loveland Products Inc.	
or Utility - cont.		Red River Tank Cleaner	Red River Specialties, Inc.	
		Kutter	Wilbur-Ellis	
		Neutral-Clean	Wilbur-Ellis	
		Cornbelt Tank-Aid	Van Diest Supply Co.	

	Water Conditioning	Rush	Crown (Estes Incorporated)	
		AccuQuest WM	Helena Chemical Company	
		Hel-Fire	Helena Chemical Company	
		Blendmaster	Loveland Products Inc.	
		Choice	Loveland Products Inc.	CA Reg. No. 34704-50027-AA
				WA Reg. No. 34704-04004
		Choice Xtra	Loveland Products Inc.	
		Choice Weather Master	Loveland Products Inc.	CA Reg. No. 34704-50038-AA
		Elite Imperial	Red River Specialities, Inc.	
		Cornbelt N-Tense	Van Diest Supply Co.	
		Climb	Wilbur-Ellis	CA Reg. No. 2935-50181
				WA Reg. No. 2935-09001
		Cut-Rate	Wilbur-Ellis	

APPENDIX E Species Specific Treatment Options Under the Proposed Action

Cheatgrass (*Bromus tectorum*) and red brome (*Bromus rubens*)

Nonnative invasive grasses (i.e., cheatgrass, *Bromus tectorum*, and red brome, *Bromus rubens*) can promote more intense and regular fire (a fire cycle) as part of their life-history (Zouhar et al. 2008). Red brome and cheatgrass display characteristic traits that include rapid and dense growth in early season that allow them to outcompete native vegetation. Late season abrupt drying of above-ground growth then follows this growth period. When ignited, these dry, dense grass fuels result in extreme fire heat and intensity which create charred disturbance areas. Following wildfires, nonnative vegetation is likely to increase in density (BLM 2015; Brooks 1999; Brooks and Esque 2002), facilitated by their early-season, fast-growing nature. This life history contrasts with the slow-growing, sparse plants typical of the Mojave desert vegetation communities. The result is a change in the fire regime that excludes native vegetation over time and can lead to a monoculture of nonnative grasses and loss of native vegetation diversity. Wildfire frequency, extent, and intensity within the NCAs has increased because of the increase and establishment of nonnative invasive annual brome grasses.

As determined by an ID Team, monocultures of cheatgrass and other exotic annual grasses would likely be treated annually with herbicides to improve native habitat conditions.

All herbicides and adjuvants would be applied in strict conformity with the manufacturer's label restrictions. Chemical treatment would be accomplished, using only BLM-approved herbicide products, through various methods, such as spray bottles, backpack sprayers, off-highway vehicle (OHV) or truck-mount sprayers, broadcasters (i.e., granular product), and aircraft, as appropriate, based on treatment objectives.

Under the Proposed Action, aerial application would only involve the use of Imazapic (e.g., Plateau®) and approved adjuvants. Imazapic is the most widely used herbicide for ground-based and aerial brome grass control and would be applied as a pre-emergent. It works by stopping amino acid synthesis in cheatgrass and red brome. When properly applied, it does not have a negative impact on native grasses and poses a relatively low health risk to humans and animals. Aerial applications would occur during the late fall/winter before the brome grasses germinate in response to seasonal precipitation. The application period would coincide with the desert tortoise less active season (December 1 to February 14), when tortoises are in underground burrows or dens for the winter and their above-ground activity is greatly reduced (Barrett 1990; Bulova 1994; USFWS 1990, 2011).

Whenever possible, ground-based pre-emergent herbicide treatments (using Imazapic) in desert tortoise habitat would occur during the less active season (December 1 to February 14). Whenever possible, ground-based post-emergent herbicide treatments in desert tortoise habitat would occur outside of the most active seasons: spring/early summer (March 15–May 15) and late summer/fall seasons (August 20–October 20). 2,4-D would not be used within 0.25 mile of occupied tortoise habitat. When conducting herbicide treatments in habitat occupied by desert tortoise, the following

herbicides would be avoided, where feasible: clopyralid, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.

Herbicide treatment areas would generally be small and linear, focused on enhancing the effectiveness of existing roads and utility ROWs to act as firebreaks. No large landscape-level treatments of exotic invasive annual grasses are anticipated in either NCA. Approximately 50-150 acres/year could be treated and/or retreated with herbicides in each of the NCAs. The number of acres treated would be variable from year to year, and more or fewer acres might be treated, depending on funding, inventories, and other factors, such as rainfall patterns and drought conditions.

Russian thistle (*Salsola paulsenii*)

Russian thistle ((synonyms: tumbleweed, Russian thistle, tumbling thistle) was first introduced in the USA in the 1870s in Bonhomme County, South Dakota, in contaminated flax seed imported from Southwestern parts of the former Russian Empire (Ukraine or southwestern Russia; Dewey 1893, 1894). The wind tumbling seed dispersal mechanism meant that the seed could be spread for miles in a single season, with the newly completed transcontinental railroad moving it hundreds of miles. Within a few decades after introduction, it had spread nationwide in one of the fasted plant invasions in United States' history (Rilke 1999).

Russian thistle can rapidly colonize harsh environments and disturbed landscapes throughout the United States. It is specifically a problem in arid and semiarid ecosystems. The tumbling seed dispersal mechanism can spread seed for miles, which makes controlling seed sources difficult. Herbicide may be effective in controlling Russian thistle, but chemical resistance has been documented.

Manual Methods

Hand pulling is effective with small infestations.

Chemical Control

There are a wide variety of herbicides that have been effective at controlling Russian thistle (DiTomaso et al. 2013). Preemergence herbicides are best applied in late winter to early spring. Post emergence systemic and broad-spectrum herbicides tend to be most effective for young seedlings to mature plants prior to flower. Non-selective herbicides may negatively impact non-target species, which may increase the potential for Russian thistle establishment and invasion. Russian thistle is a prolific initial colonizer. It will recolonize treated sites if those sites remain unoccupied by competing vegetation. Herbicide resistance can develop if a chemical is overused. Herbicide resistant Russian thistle populations have been reported for a wide variety of chemicals.

Preemergent herbicides are applied to the soil before the weed seed germinates and usually incorporated into the soil with irrigation or rainfall. The most effective preemergent herbicides are bromacil, chlorsulfuron, hexazinone, imazapyr, and sulfometuron.

Post emergent herbicides are applied to plants, but timing is critical. For best results, these herbicides must be applied while the weed is in its early growth stages, preferably the early seedling stage, before it becomes hardened and starts producing its spiny branches. Do not use post emergent herbicides to try to control the mature seed (either on the plant or on the ground) as they are not effective for this purpose. Also, the later spiny stage of Russian thistle is not readily controlled by any post emergent herbicide. If rain or irrigation occurs after a post emergent application, additional seedlings may emerge and require future treatments. Post emergent herbicides that are effective when properly applied include 2,4-D and glyphosate.

Sahara mustard/African mustard (*Brassica tournefortii*)

Sahara mustard (synonyms: wild turnip, African or Asian mustard) is an introduced short-lived annual that is native to North Africa, the Middle East, and Mediterranean lands of southern Europe. Although it favors arid sandy soils, it occupies a wide variety of disturbed habitats. New plants are commonly seen following fall and winter precipitation and are difficult to differentiate from native mustards as they are similar in shape and form. Sahara mustard is quick growing and can complete its life cycle within a few months. In the Southwest, adult plants typically flower from February–April and then senesce by May.

Sahara mustard takes early advantage of fall and winter soil moisture and can develop dense, monotypic stands resulting in lower diversity of flora and fauna species. As the foliage and flower stalks dry up, the litter material can become a fire hazard capable of spreading fire into areas where native plants are typically fire intolerant.

Sahara mustard grows best in sites with dry, sandy soils and sparse vegetation; often infests roadsides, waste areas, washes, and desert areas.

Small infestations would be controlled with selective application of herbicide or by manual treatment. Large infestations would be controlled with selective and broadcast herbicide application. Glyphosate, 2,4-D or triclopyr would be applied to actively growing plants before flowering.

Punctureveine (*Tribulus terrestris*)

This species is a mat forming annual native to the Mediterranean. It spreads by seed and is most often found on sandy, dry, or gravely sites. This weed typically can be found on sandy soils disturbed by roadsides, trails, and waste areas where it easily spread by animals, bicycles, people, and vehicles. Punctureveine produces sharply pointed burs that puncture tires and injure feet, reducing the recreational potential of many areas. Seeds can stay dormant in the soil for 4 to 5 years, which makes eradication difficult (Whitson et al. 1996).

Tillage following germination and emergence is effective at control of punctureveine; however, tillage may bury seed that remains viable in the soil for several years. Certain herbicides have also proven to be effective at controlling punctureveine including chlorosulfuron, 2,4-D, imazapyr, and glyphosate (CDFA 2007).

Scotch thistle (*Onopordum acanthium*) and bull thistle (*Cirsium vulgare*)

These species are biennial thistles that can form dense stands that are practically impenetrable because of the spiny herbage and large stature. These thistles are a problem because they diminish wildlife and livestock forage through competition and reduces recreational opportunities by acting as an "armed fence" preventing access to areas it borders. Bull and Scotch thistle are natives of Eurasia and widely established in North America through seed contamination. They reproduce from seed, of which they are capable of producing thousands of plants, and they occur primarily in disturbed habitats such as degraded pastures and rangelands, along trails and roadsides, and in seepage areas or along streambanks.

Small infestations would be controlled with selective application of herbicide or by manual treatment. Large infestations would be controlled with selective and broadcast herbicide application. Chlorsulfuron, clopyralid, 2,4-D, glyphosate, metsulfuron, triclopyr, picloram and other approved herbicides and mixtures found to be effective at controlling biennial thistles.

Giant reed (*Arundo donax*)

Giant reed (synonyms: phragmites, carrizo, giant reed, arundo grass, donax, elephant grass, Spanish cane, wild cane, oboe cane) is a bamboo-like grass with stems that grow over 20 feet tall. It is an Asian native and was cultivated for thousands of years in southern Europe, northern Africa, and the Middle East. It was introduced into southern California as an ornamental, and was used as an erosion control species along drainage ditches. From a distance, giant reed looks like a corn plant and is similar in appearance to common reed (Phragmites australis L.), a native grass found widely across the United States.

Giant reed forms dense, monocultural stands and often crowds out native vegetation for soil moisture, nutrients, and space. When dry, it is highly flammable and becomes a fire danger in riparian habitats unaccustomed to sustaining fire. It uses far more water than native vegetation, thus disturbing the natural flood regime. One study showed giant reed to transpire 56,200 acre-feet of water over the course of a year, whereas native species only transpired 18,700 acre-feet. Giant reed provides limited shade along bank edges as compared to native willow or cottonwood, resulting in warmer stream temperatures and increased algae photosynthesis. Water quality in a waterway may be impacted when nontoxic ammonium ($NH4+$) from decaying reed materials is transformed into toxic ammonia ($NH3$). There is a sharp decline in the number and variety of wildlife associated with dense giant reed stands, which is likely due to lack of food and acceptable cover. Giant reed also has high levels of chemical defense compounds in its stems and leaves that can inhibit other vegetation.

Manual Methods

Hand removal is very difficult but digging can be used to target individual plants (usually < 6 feet tall). To improve handling, first cut the canopy near the surface by using a chain saw, machete, or pruning shears before pulling up the remaining portions of reed stems, rhizomes, and roots. Shovels, mattocks, or pick-ax are the most used tools. The root mass and associated rhizomes must

be entirely removed from the soil. Loose, rain-moistened soils are most conducive to hand pulling. Uprooted material should be removed to prevent rerooting.

Chemical Control

Herbicide application is effective for controlling giant reed, but experience has shown that 3 to 5 years of repeated management with herbicides will probably be necessary for complete, long-lasting control. The primary herbicides used on giant reed are imazapyr and/or glyphosate. These herbicides are nonselective so caution should be taken if nontarget plants, including woody species, need to be protected. Both herbicides have labels approved for aquatic use that allow plants growing near the water's edge to be sprayed. It is important to read the label carefully and follow all instructions and guidelines when mixing and applying either herbicide. Herbicides may be applied to giant reed by a cut-stump method or by foliar application. A cut-stump treatment with herbicide may be used from October through December.

Russian olive (*Elaeagnus angustifolia*)

Russian olive was widely planted throughout the United States as an ornamental and windbreak tree that has since escaped into natural areas, widespread throughout many riparian areas in the west. It is a hardy, fast-growing, deciduous tree that grows to about 30 feet in height (USDA 2014). Russian olive absorbs large amounts of water while crowding out desirable native riparian trees such as cottonwood and willow. Russian olive can alter the natural flooding regime and reduce availability of nutrients and moisture in the ecosystem.

The two most common herbicides used for treating Russian olive are imazapyr (usually with glyphosate) and tricopyr. Using the cut-stump method in which trees are cut low to the ground and then herbicide is applied to the stump are common when treating Russian olive.

Tamarisk (*Tamarix ramosissima*)

This species is native to central Asia and the Mediterranean area. This invasive riparian weed is known for its ability to absorb large amounts of water, in many cases significantly altering the functionality of riparian ecosystems. Tamarisk was deliberately released in the U.S. in 1837 to help control wind and water erosion. It varies in size, depending on local growing conditions, from a small shrub to a 30-foot-tall tree. Tamarisk has contributed to significant reductions in beneficial vegetation, such as willows, cottonwoods, and other plants crucial to the natural environment. Tamarisk degrades wildlife habitat and stream channel morphology and flow and increases soil salinity and wildfire frequency. Economic losses from tamarisk have been substantial.

A common herbicide used to treat tamarisk is imazapyr or imazapyr with glyphosate, generally by foliar application followed by cutting the plant (DeLoach 2000).

Russian knapweed (*Acroptilon repens*)

Russian knapweed is native to Eurasia and was introduced into North America in the late 1800s. It is a deep-rooted long-lived perennial that can form dense colonies in riparian areas, cultivated

fields, orchards, pastures, and roadsides. Russian knapweed is an aggressive weed that reproduces from seed and adventitious buds on a creeping root system (Fletcher and Renney 1963, Moore and Frankton 1974). Some stands have been in existence for 75 years. Russian knapweed is toxic to horses and causes chewing disease.

Manual and mechanical treatments are normally not effective at controlling Russian knapweed. Newly established, small, and large infestations would be controlled exclusively with herbicide application. Selective herbicide application would be used to eradicate newly established infestations. Selective and broadcast application of herbicide would be used on small and large infestations. Clopyralid, 2,4-D, glyphosate, picloram, triclopyr, and other approved herbicides and mixtures found to be effective at controlling Russian knapweed would be used. Applications would optimally be made at the pre-bud or bud stage.

Whitetop or Hoary cress (*Cardaria draba*)

This species is native to Eurasia and was introduced to the United States as a seed contaminant. It is an herbaceous, relatively long-lived, deep-rooted perennial with numerous stems, and spreads by seed and rhizome. It generally can be found in disturbed open, unshaded areas and grows on a variety of soils and range types and is commonly found on relatively moist alkaline and disturbed soils where it is highly competitive and forms dense monotypic stands. The deep root system and ability to reproduce vegetatively and by seed make this weed very difficult to control.

Small and large infestations may be treated with broadcast applications of herbicide. Metsulfuron, 2,4-D, and other approved herbicides and mixtures found to be effective at controlling whitetop would be available. Herbicide applications on small and large infestations would normally require an aggressive reapplication program to eliminate developing seedlings from area seed bank and root regeneration.

Musk thistle (*Carduus nutans*)

Musk thistle is a biennial thistle capable of forming dense stands that are practically impenetrable because of the spiny herbage and large stature. This thistle is a problem because it diminishes wildlife and livestock forage through competition and reduces recreational opportunities by acting as an “armed fence” preventing access to areas it borders. Musk thistle can grow under a wide range of conditions and moves into disturbed sunny areas and establishes well on bare soil. It invades rangelands, forestlands, and stream banks and has the potential to form dense stands, displacing native vegetation.

Large infestations would be controlled with selective and broadcast herbicide application. Chlorsulfuron, clopyralid, 2,4-D, glyphosate, metsulfuron, triclopyr, picloram and other approved herbicides and mixtures found to be effective at controlling biennial thistles would be used.

Spotted knapweed (*Centaurea maculosa*)

Spotted knapweed is native to Eastern Europe and may have been introduced to North America as a seed impurity in alfalfa in the late 1800s. Spotted knapweed is a nonnative, deeply tap rooted perennial forb that is a prolific seed producer. This perennial species can live up to 9 years and is capable of producing seeds each year (Boggs and Story 1987). Seeds are viable for a minimum of 7 years. Once established spotted knapweed can form monotypic stands and this species now dominates millions of acres of western rangelands. Spotted knapweed prefers rangelands, dry meadows, pastures, upland rocky areas, roadsides, and the sandy or gravelly floodplains of streams and rivers (Lass et al. 2002). Spotted knapweed establishes and dominates on dry, disturbed sites, especially along roads but is also found in riparian meadows. It also invades relatively undisturbed perennial native plant communities and can establish locally at elevations of more than 8,000 feet.

Small infestations would be controlled with selective application of herbicide. Large infestations would be controlled with selective and broadcast application of herbicide. Clopyralid, picloram, 2,4-D, and other approved herbicides and mixtures found to be effective at controlling spotted knapweed would be available. Reapplication of herbicide may be necessary to control spotted knapweed until the seed bank is eliminated through attrition.

Canada thistle (*Cirsium arvense*)

Canada thistle is native to southeastern Europe and the eastern Mediterranean area, and was probably introduced to North America in the 1600s as a contaminant of crop seed and/or ship's ballast. It is a creeping perennial that adapts to a wide range of habitats, including riparian areas. This species reproduces from vegetative buds in its root system and from seed. Canada thistle has the potential to rapidly form dense infestations through vegetative reproduction. Canada thistle is also difficult to control because its extensive root system allows it to recover from control attempts. Seed can remain viable in soil up to 20 years, and deep burial promotes survival longevity.

Newly established, small and large infestations would be controlled with herbicide application. Selective chemical application would be used to eradicate newly established infestations. Selective and broadcast herbicide application would be used on small and large infestations. Clopyralid, chlorsulfuron, and glyphosate and other approved herbicides and mixtures found to be effective at controlling Canada thistle. Where other methods are not feasible, approved herbicides (aquatic formula if necessary) may be used adjacent to wetlands. Manual and mechanical treatments are normally not effective at controlling Canada thistle but may potentially be employed adjacent to wetlands where other methods are not feasible.

Halogeton (*Halogeton glomeratus*)

Halogeton is an exotic succulent winter to summer annual forb native to Eurasia. It typically invades disturbed arid and semi-arid sites with alkaline to saline soils. Plant tissues accumulate salts from lower soil horizons and the salts leach from dead plant material, increasing topsoil salinity and favoring halogeton seed germination and establishment. Halogeton competes poorly with established perennial vegetation. Halogeton is high in oxalates and is a serious health threat to grazing animals, especially sheep (CDFA 2007).

Small infestations of halogeton may be controlled with selective application of herbicide as opportunities and funding exist. Large infestations would be controlled with selective and broadcast application of herbicide. 2,4,-D, metsulfuron and other approved herbicides and mixtures found to be effective at controlling halogeton would be available for use.

Silverleaf nightshade (*Solanum elaeagnifolium*)

Silverleaf nightshade (synonyms: Bull Nettle, Silver-leaf Nightshade, Tomato Weed, Trompillo, White Horsenettle, White Horse-nettle, White Nightshade) is a perennial subshrub native to the American Southwest, southern states, Mexico, and South America. It's a member of the Solanaceae, thus a relative of tomatoes, potatoes, tomatillos, eggplant, and tobacco, as well as weeds such as tree tobacco, black nightshade, and hairy nightshade.

Silverleaf nightshade is a deep-rooted, shrub-like, perennial plant in which the aerial growth dies back in late autumn, surviving off its rootstocks during the winter. The plants have very extensive, spreading root systems that can penetrate to depths in excess of 3 m. New shoots develop from adventitious buds on the roots, allowing very effective vegetative propagation during spring and after cultivation. The plants produce bright blue to purple flowers (although white flowers are a rare occurrence) during spring to autumn. Although the plants die back in winter, ripe fruit are retained on dead branches and may be dispersed by wind.

Single plants can produce up to 200 berries per growing season, and thus thousands of seeds. The longevity and high viability of the seeds ensure survival through long periods of unfavorable growing conditions. Seeds germinate in autumn and the young plants develop an extensive root system during the first months (De Beer, 1985). Germination is advanced by alternating temperatures and favorable moisture conditions, notably heavy rains.

Silverleaf nightshade has the potential to invade ecosystems and out-compete native flora by forming dense colonies. It reproduces both by seed and vegetatively, with rhizomes and root fragments capable of generating new plants. Silverleaf nightshade is adapted to a wide range of habitats, but appears mostly in areas of relatively low annual rainfall (300-500 mm) (Parsons, 1981; Heap et al., 1997). The weed thrives on disturbed land and, in addition to crop lands, areas particularly prone to invasion include roads, water furrows and rivers, and livestock corrals (Wassermann et al., 1988).

Mechanical control of silverleaf nightshade can be effective if seedlings are not allowed to reach maturity. Glyphosate, Picloram, Triclopyr, and 2-4D, aminopyralid, and imazapyr are effective at controlling this weed species.

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APPENDIX F Minimum Tool Analysis Using the Interagency Minimum Requirements Decision Guide

ARTHUR CARHART NATIONAL WILDERNESS TRAINING CENTER

MINIMUM REQUIREMENTS DECISION GUIDE WORKBOOK

"…except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act…"

-- The Wilderness Act of 1964

Project Title: HERBICIDAL APPLICATION PLAN FOR THE CONTROL AND ERADICATION OF NOXIOUS AND INVASIVE SPECIES

MRDG Step 1: Determination

Determine if Administrative Action is Necessary

Description of the Situation
What is the situation that may prompt administrative action?

The proposed action is to be able to treat weeds, both chemically and manual, within wilderness within the Arizona Strip District.

Options Outside of Wilderness
Can action be taken outside of wilderness that adequately addresses the situation?

☐ YES	**STOP – DO NOT TAKE ACTION IN WILDERNESS**
☒ NO	**EXPLAIN AND COMPLETE STEP 1 OF THE MRDG**

Explain:

Some noxious and invasive plant populations are located within wilderness.

Criteria for Determining Necessity
Is action necessary to meet any of the criteria below?

A. Valid Existing Rights or Special Provisions of Wilderness Legislation

*Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that **requires** action? Cite law and section.*

☐ YES ☒ NO

Explain:

B. Requirements of Other Legislation

Is action necessary to meet the requirements of other federal laws? Cite law and section.

☒ YES ☐ NO

Explain:

- The *Carson-Foley Act of 1968* (Public Law 90-583; 43 U.S.C. 1241 et seq.), and the *Plant Protection Act of 2000* (Public Law 106-224; 7 U.S.C. 7701 et seq.) authorize and direct the BLM to manage noxious weeds (including management of undesirable plants on federal lands) and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on federal lands.
- The *Federal Noxious Weed Act of 1974* (Public Law 93-629), *as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990*, (7 U.S.C. 2801 et seq.) authorizes the Secretary "...to cooperate with other federal and state agencies and others in carrying out operations or measures to eradicate, suppress, control, prevent, or retard the spread of any noxious weed." This Act established and funded an undesirable plant management program, implemented cooperative agreements with state agencies, and established integrated management systems to control undesirable plant species.

C. Wilderness Character

Is action necessary to preserve one or more of the qualities of wilderness character, including: Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value?

UNTRAMMELED

☐ YES ☒ NO

Explain:

The untrammeled nature would not be changed without this project. (Action is not necessary to maintain this character)

UNDEVELOPED

☐ YES ☒ NO

Explain:

The undeveloped nature would not be changed without this project. (Action is not necessary to maintain this character)

NATURAL

☒ YES ☐ NO

Explain:

This action is needed to preserve the natural eco-system balance. Some weeds can take over and completely change their natural environments, if not controlled.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

☐ YES ☒ NO

Explain:

The opportunities for solitude or primitive and unconfined recreation would not be changed without this project. (Action is not necessary to maintain this character)

OTHER FEATURES OF VALUE

☐ YES ☒ NO

Explain:

Other features of value would not be changed without this project. (Action is not necessary to maintain this character)

Step 1 Decision
Is administrative action necessary in wilderness?

Decision Criteria

A.	Existing Rights or Special Provisions	☐ YES	☒ NO
B.	Requirements of Other Legislation	☒ YES	☐ NO
C.	Wilderness Character		
	Untrammeled	☐ YES	☒ NO
	Undeveloped	☐ YES	☒ NO
	Natural	☒ YES	☐ NO
	Outstanding Opportunities	☐ YES	☒ NO
	Other Features of Value	☐ YES	☒ NO

Is administrative action necessary in wilderness?

☒ YES	**EXPLAIN AND PROCEED TO STEP 2 OF THE MRDG**
☐ NO	**STOP – DO NOT TAKE ACTION IN WILDERNESS**

Explain:

This action is needed to properly maintain the naturalness of the wilderness areas of the Arizona Strip District through controlling the spread of noxious and invasive plant species.

MRDG Step 2

Determine the Minimum Activity

Other Direction
*Is there "special provisions" language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?*

AND/OR

Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?

☐ YES	**DESCRIBE OTHER DIRECTION BELOW**
☒ NO	**SKIP AHEAD TO TIME CONSTRAINTS BELOW**

Describe Other Direction:

Time Constraints
What, if any, are the time constraints that may affect the action?

For effectiveness, weeds should be treated before going to seed each year.

Components of the Action
What are the discrete components or phases of the action?

Component 1:	Transportation, walking or horseback, of personnel to the project site.
Component 2:	Crews would treat chemically or manually the noxious and invasive plant species.
Component 3:	The perimeter of the plant populations would be mapped using GPS.
Component 4:	Transportation, walking or horseback, of personnel from the project site.

Proceed to the alternatives.

Refer to the **MRDG Instructions** regarding alternatives and the effects to each of the comparison criteria.

MRDG Step 2: Alternatives

Alternative 1: Treating the noxious and invasive plant species with herbicidal application or manually.

Description of the Alternative
What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

Periodic inspections / inventorying of wilderness would occur for noxious and invasive infestations. Upon discovery, the weed treatment crew would transport themselves to the wilderness boundary where they would then travel by foot or horseback to the infestations. Upon arrival, the weed crew would treat chemically or manually by hand pulling or hand tools the infestation. They would then GPS the location and return to their vehicles by foot or horseback. These recorded infestations would then be monitored in future years and treated as necessary.

Component Activities
How will each of the components of the action be performed under this alternative?

Component of the Action		Activity for this Alternative
1	Transportation of personnel to the project site.	Personnel walk or horseback to sites once in wilderness
2	Treat vegetation both chemically and manually.	Use of backpack sprayers, hand sprayers, and manually either with hand pulling or hand tools to treat noxious and invasive weeds.
3	Mapping of noxious and invasive plant populations.	Use of personnel GPS device.
4	Transportation of personnel from the project site.	Personnel walk or horseback from sites in wilderness.

Wilderness Character
What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative		Positive	Negative	No Effect
1	Personnel walk to sites once in wilderness	☐	☐	☒
2	Treat vegetation both chemical and manually either by hand pulling or hand tools.	☐	☐	☒
3	Mapping of noxious and invasive plant populations	☐	☐	☒
4	Personnel walk from sites once in wilderness	☐	☐	☒
Total Number of Effects		0	0	NE
Untrammeled Total Rating		**0**		

Explain:

Site surveys and treatments when done on foot with no permanent changes to the site or area do not affect the Untrammeled quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
1	Personnel walk to sites once in wilderness.	☐	☐	☒
2	Treat vegetation both chemical and manually either by hand pulling or hand tools.	☐	☐	☒
3	Mapping of noxious and invasive plant populations.	☐	☐	☒
4	Personnel walk from sites once in wilderness .	☐	☐	☒
Total Number of Effects				NE
Undeveloped Total Rating		**0**		

Explain:

The use of GPS devices, cameras, backpack sprayers and hand tools would be very short-term and are not considered motorized equipment per BLM (43 CFR part 6301.5), therefore they would not change the undeveloped nature of the area.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
1	Personnel walk to sites once in wilderness.	☐	☐	☒

2	Treat vegetation both chemical and manually either by hand pulling or hand tools.	☒	☐	☐
3	Mapping of noxious and invasive plant populations.	☐	☐	☒
4	Personnel walk from sites once in wilderness.	☐	☐	☒
Total Number of Effects		1	0	NE
Natural Total Rating		**1**		

Explain:

This alternative proposes to treat chemically or manually by hand pulling or hand tools noxious or invasive weed infestations. The effect of treating infestations will result in retaining the natural quality of each wilderness area.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
1	Personnel walk to sites once in wilderness	☐	☐	☒
2	Treat vegetation both chemical and manually either by hand pulling or hand tools.	☐	☐	☒
3	Mapping of noxious and invasive plant populations.	☐	☐	☒
4	Personnel walk from sites once in wilderness.	☐	☐	☒
Total Number of Effects				NE
Solitude or Primitive & Unconfined Rec. Total Rating		**0**		

Explain:

Encountering 2-4 people working at an open site for less than a day or camping in the wilderness would have essentially no effect on recreation or opportunities for solitude.

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
1	Personnel walk to sites once in wilderness	☐	☐	☒
2	Treat vegetation both chemical and manually either by hand pulling or hand tools.	☐	☐	☒
3	Mapping of noxious and invasive plant populations.	☐	☐	☒
4	Personnel walk from sites once in wilderness.	☐	☐	☒

Total Number of Effects			NE
Other Features of Value Total Rating	**0**		

Explain:

No other features of value would be affected by this alternative.

Traditional Skills
What is the effect of each component activity on traditional skills?

TRADITIONAL SKILLS

Component Activity for this Alternative		Positive	Negative	No Effect
1	Personnel walk to sites once in wilderness.	☐	☐	☒
2	Treat vegetation both chemical and manually either by hand pulling or hand tools.	☐	☐	☒
3	Mapping of noxious and invasive plant populations.	☐	☐	☒
4	Personnel walk from sites once in wilderness.	☐	☐	☒
Total Number of Effects				NE
Traditional Skills Total Rating		**0**		

Explain:

No traditional uses other than possible horseback use may occur.

Economics
What is the estimated cost of each component activity?

COST

Component Activity for this Alternative		Estimated Cost
1	Personnel walk to sites once in wilderness	Varies based on need.
2	Treat vegetation both chemical and hand pulling	Varies based on need.
3	Mapping of noxious and invasive plant populations	Varies based on need.

4	Personnel walk from sites once in wilderness	Varies based on need.
Total Estimated Cost		Varies based on need.

Explain:

The costs vary depending on need.

Safety of Visitors & Workers
What is the risk of this alternative to the safety of visitors and workers? What mitigation measures will be taken?

RISK ASSESSMENT	Probability of Accident				
Severity of Accident	Frequent	Likely	Common	Unlikely	Rare
Catastrophic: Death or permanent disability	1 ☐	1 ☐	2 ☐	2 ☐	3 ☒
Critical: Permanent partial disability or temporary total disability	1 ☐	2 ☐	2 ☐	3 ☐	4 ☒
Marginal: Compensable injury or illness, treatment, lost work	2 ☐	3 ☐	3 ☐	4 ☐	4 ☒
Negligible: Superficial injury or illness, first aid only, no lost work	3 ☐	4 ☐	4 ☐	4 ☐	4 ☒
Risk Assessment	**3.75**				

Risk Assessment Code

1 = Extremely High Risk	2 = High Risk	3 = Moderate Risk	4 = Low Risk

Explain:

The risks would increase further into wilderness that the weeds are found. Since these weeds are introduced into the wilderness they should mostly exist near the wilderness boundaries, therefore having a significantly low risk.

Summary Ratings for Alternative 1

Wilderness Character	
Untrammeled	0
Undeveloped	0

Natural	1
Solitude or Primitive & Unconfined Recreation	0
Other Features of Value	0
Wilderness Character Summary Rating	**1**

Traditional Skills	
Traditional Skills	0

Economics	
Cost	Varies based on need.

Safety	
Risk Assessment	3.75

APPENDIX G Birds of Washington County, Utah

Birds of Washington County, Utah 2007

Washington County is home to an amazing variety of bird species and provides excellent year round birdwatching opportunities. Habitat in the county are incredibly diverse, ranging from high elevation montane forest to lowland desert riparian areas. Numerous resident, wintering, and migrating bird species depend on this habitat variety for their existence.

This checklist contains 369 species documented in Washington County, Utah, through October 2006, arranged in taxonomic order and using nomenclature of the AOU Checklist of North American Birds, 7th Edition, 47th Supplement.

Compiled by Rick Fridell (Utah Division of Wildlife Resources, St. George, UT) and Kristen Comella (Utah Division of Parks and Recreation, Snow Canyon State Park, Ivins, UT).

Abundance Codes
C = COMMON – Found consistently in appropriate habitat and season
U = UNCOMMON – Present but inconsistently found in appropriate habitat and season
R = RARE – Found infrequently but annually in appropriate habitat and season
O = OCCASIONAL – Not observed annually, but may occur some years in appropriate habitat and season
A = ACCIDENTAL – Not expected and out of normal range (few records)

Status Codes
P = Permanent Resident (Found year round)
S = Summer Resident (Present during the nesting season)
W = Winter Resident (Non-breeding visitor)
T = Transient (Migrates through Washington County in spring and/or fall)

Documentation is requested for sightings of birds classified as Accidental (A) on this checklist or any bird not on the checklist. Forms and instructions can be found at www.utahbirds.org. Photographs and other documentation can be submitted by email to richardfridell@utah.gov or by mail to Rick Fridell, UDWR, 344 East Sunland Drive, Suite 8, St. George, UT, 84790.

WASHINGTON COUNTY, UTAH

Ducks, Geese, and Swans
___ Greater White-fronted Goose .....RW
___ Snow Goose ..... UT, RW
___ Ross's Goose .....RW
___ Cackling Goose.....RT
___ Canada Goose ..... RS, UW
___ Trumpeter Swan ..... A
___ Tundra Swan.....OT
___ Wood Duck.....RP
___ Gadwall..... UW
___ Eurasian Wigeon..... A
___ American Wigeon.....CW
___ Mallard..... CP
___ Blue-winged Teal .....RT
___ Cinnamon Teal..... CS, OW
___ Northern Shoveler.....CW
___ Northern Pintail ..... UW
___ Green-winged Teal ..... US, CW
___ Canvasback ..... UW
___ Redhead ..... CT, UW
___ Ring-necked Duck.....CW
___ Greater Scaup.....RW
___ Lesser Scaup ..... UW
___ Surf Scoter ..... O
___ White-winged Scoter..... O
___ Black Scoter..... A
___ Long-tailed Duck..... A
___ Bufflehead.....CW
___ Common Goldeneye .....CW
___ Barrow's Goldeneye ..... A
___ Hooded Merganser .....CW
___ Common Merganser .....CW
___ Red-breasted Merganser .....CT
___ Ruddy Duck ..... US, CW

Pheasants, Grouse, Turkey, and Quail
___ Chukar.....RP
___ Ring-necked Pheasant.....UP
___ Sooty Grouse ..... UP
___ Wild Turkey.....CP
___ Gambel's Quail..... CP

Loons
___ Red-throated Loon..... A
___ Pacific Loon.....OT
___ Common Loon ..... CT, UW
___ Yellow-billed Loon..... A

Grebes
___ Pied-billed Grebe.....UP
___ Horned Grebe.....RW
___ Red-necked Grebe ..... A
___ Eared Grebe .....CR, UW
___ Western Grebe ..... CT, UW
___ Clark's Grebe..... CT, RW

Pelicans and Cormorants
___ American White Pelican..... CT, OW
___ Double-crested Cormorant .....CS, RW

Bitterns, Egrets, and Herons
___ American Bittern .....RT
___ Least Bittern..... A
___ Great Blue Heron..... CP
___ Great Egret.....UT, OW
___ Snowy Egret.....UT
___ Reddish Egret..... A
___ Cattle Egret .....RT
___ Green Heron..... RS, OW
___ Black-crowned Night-Heron .....UP

Ibises and Storks
___ White-faced Ibis .....CT
___ Wood Stork..... A

Vultures
___ Turkey Vulture.....CS
___ California Condor ..... O

Hawks and Falcons
___ Osprey.....UT, RS
___ White-tailed Kite..... A
___ Bald Eagle..... UW
___ Northern Harrier .....RS, CW
___ Sharp-shinned Hawk.....UW, CW
___ Cooper's Hawk .....UP
___ Northern Goshawk.....RP
___ Common Black-Hawk .....RS
___ Red-shouldered Hawk ..... O
___ Broad-winged Hawk .....OT
___ Swainson's Hawk .....US
___ Zone-tailed Hawk .....OS
___ Red-tailed Hawk ..... CP
___ Ferruginous Hawk.....UP
___ Rough-legged Hawk ..... RW
___ Golden Eagle.....UP
___ American Kestrel ..... CP
___ Merlin..... UW
___ Peregrine Falcon .....UP
___ Prairie Falcon.....UP

Rails and Coots
___ Virginia Rail.....UP
___ Sora .....UP
___ Common Moorhen.....RP
___ American Coot.....CP

Cranes
___ Sandhill Crane.....OT

Plovers and Sandpipers
___ Black-bellied Plover .....RT
___ American Golden-Plover .....RT
___ Snowy Plover.....RT
___ Semipalmated Sandpiper .....UT
___ Killdeer ..... CS, UW
___ Mountain Plover ..... A
___ Black-necked Stilt.....UT
___ American Avocet .....CT
___ Spotted Sandpiper ..... US, OW
___ Solitary Sandpiper.....UT
___ Wandering Tattler ..... A
___ Greater Yellowlegs .....UT
___ Willet.....UT
___ Lesser Yellowlegs.....UT
___ Whimbrel .....OT
___ Long-billed Curlew .....UT
___ Marbled Godwit.....UT
___ Red Knot ..... A
___ Sanderling .....RT
___ Semipalmated Sandpiper .....OT
___ Western Sandpiper.....UT
___ Least Sandpiper..... CT, RW
___ Baird's Sandpiper .....UT
___ Pectoral Sandpiper .....UT
___ Dunlin .....OT
___ Stilt Sandpiper.....OT
___ Short-billed Dowitcher .....OT
___ Long-billed Dowitcher.....UT
___ Wilson's Snipe.....UP
___ Wilson's Phalarope .....UT
___ Red-necked Phalarope .....UT
___ Red Phalarope ..... A

Gulls and Terns
___ Franklin's Gull.....UT
___ Bonaparte's Gull.....UT
___ Heermann's Gull..... A
___ Ring-billed Gull ..... US, CW
___ California Gull ..... UW
___ Herring Gull..... RW
___ Sabine's Gull.....RT
___ Black-legged Kittiwake ..... A
___ Least Tern..... A
___ Caspian Tern ..... UT
___ Black Tern.....RT
___ Common Tern .....RT
___ Forster's Tern..... UT

Pigeons and Doves
___ Rock Pigeon .....CP
___ Band-tailed Pigeon.....US
___ Eurasian Collared-Dove.....UP
___ White-winged Dove.....RS, OW
___ Mourning Dove.....CP
___ Inca Dove .....RP
___ Common Ground-Dove ..... A
___ Ruddy Ground-Dove..... A

Cuckoos and Roadrunners
___ Yellow-billed Cuckoo.....OS
___ Greater Roadrunner.....UP

Owls
___ Barn Owl.....UP
___ Flammulated Owl.....RS
___ Western Screech-Owl .....UP
___ Great Horned Owl.....UP
___ Northern Pygmy-Owl.....UP
___ Elf Owl.....OS
___ Burrowing Owl .....UP
___ Spotted Owl.....RP
___ Long-eared Owl .....UP
___ Short-eared Owl..... A
___ Northern Saw-whet Owl .....RP

Goatsuckers
___ Lesser Nighthawk .....US
___ Common Nighthawk.....RS
___ Common Poorwill.....CS

Swifts
___ Black Swift.....RT
___ Chimney Swift ..... A
___ Vaux's Swift ..... OT
___ White-throated Swift.....CS

Hummingbirds
___ Broad-billed Hummingbird..... A
___ Blue-throated Hummingbird..... A
___ Magnificent Hummingbird ..... A
___ Ruby-throated Hummingbird..... A
___ Black-chinned Hummingbird .....CS
___ Anna's Hummingbird .....UP
___ Costa's Hummingbird.....US
___ Calliope Hummingbird .....RT
___ Broad-tailed Hummingbird.....CS
___ Rufous Hummingbird .....CT

Kingfishers
___ Belted Kingfisher.....UP

Woodpeckers
___ Lewis's Woodpecker .....RP
___ Red-headed Woodpecker..... A
___ Acorn Woodpecker .....O
___ Williamson's Sapsucker..... US, RW
___ Yellow-bellied Sapsucker ..... A
___ Red-naped Sapsucker.....UP
___ Red-breasted Sapsucker..... A
___ Ladder-backed Woodpecker .....UP
___ Downy Woodpecker .....UP
___ Hairy Woodpecker.....UP
___ American Three-toed Woodpecker.....O
___ Northern Flicker.....CP

Flycatchers
___ Olive-sided Flycatcher.....US
___ Western Wood-Pewee.....CS

___ Willow Flycatcher ..... UT, RS
___ Least Flycatcher ..... OT
___ Hammond's Flycatcher ..... UT, RS
___ Gray Flycatcher ..... CS
___ Dusky Flycatcher ..... CS
___ Pacific-slope Flycatcher ..... OT
___ Cordilleran Flycatcher ..... US
___ Black Phoebe ..... CP
___ Eastern Phoebe ..... A
___ Say's Phoebe ..... CP
___ Vermilion Flycatcher ..... RP
___ Ash-throated Flycatcher ..... CS
___ Brown-crested Flycatcher ..... RS
___ Cassin's Kingbird ..... RS
___ Western Kingbird ..... CS
___ Eastern Kingbird ..... OT

Shrikes
___ Loggerhead Shrike ..... UP
___ Northern Shrike ..... RW

Vireos
___ Bell's Vireo ..... US
___ Gray Vireo ..... CS
___ Plumbeous Vireo ..... CS
___ Cassin's Vireo ..... UT
___ Blue-headed Vireo ..... A
___ Warbling Vireo ..... CS
___ Philadelphia Vireo ..... A
___ Red-eyed Vireo ..... OT

Jays and Crows
___ Gray Jay ..... O
___ Steller's Jay ..... UP
___ Blue Jay ..... A
___ Western Scrub-Jay ..... CP
___ Pinyon Jay ..... UP
___ Clark's Nutcracker ..... UP
___ Black-billed Magpie ..... A
___ American Crow ..... RS, UW
___ Common Raven ..... CP

Larks
___ Horned Lark ..... US, CW

Swallows
___ Purple Martin ..... OT
___ Tree Swallow ..... CS
___ Violet-green Swallow ..... CS
___ Northern Rough-winged Swallow ..... CS
___ Bank Swallow ..... UT
___ Cliff Swallow ..... CS
___ Barn Swallow ..... CS

Chickadees, Nuthatches, and Creepers
___ Black-capped Chickadee ..... UP
___ Mountain Chickadee ..... CP
___ Juniper Titmouse ..... CP
___ Verdin ..... CP
___ Bushtit ..... CP
___ Red-breasted Nuthatch ..... UP
___ White-breasted Nuthatch ..... CP
___ Pygmy Nuthatch ..... CP
___ Brown Creeper ..... UP

Wrens
___ Cactus Wren ..... UP
___ Rock Wren ..... CP
___ Canyon Wren ..... CP
___ Bewick's Wren ..... CP
___ House Wren ..... US, RW
___ Winter Wren ..... OS, RW
___ Marsh Wren ..... RS, CW

Dippers
___ American Dipper ..... UP

Kinglets
___ Golden-crowned Kinglet ..... UP
___ Ruby-crowned Kinglet ..... CP

Gnatcatchers
___ Blue-gray Gnatcatcher ..... CS, RW
___ Black-tailed Gnatcatcher ..... UP

Thrushes
___ Eastern Bluebird ..... A
___ Western Bluebird ..... UP
___ Mountain Bluebird ..... UP
___ Townsend's Solitaire ..... CP
___ Veery ..... A
___ Swainson's Thrush ..... RT
___ Hermit Thrush ..... CS, UW
___ Rufous-backed Robin ..... A
___ American Robin ..... CP
___ Varied Thrush ..... A

Thrashers
___ Gray Catbird ..... O
___ Northern Mockingbird ..... CP
___ Sage Thrasher ..... UT, RW
___ Brown Thrasher ..... A
___ Bendire's Thrasher ..... RS
___ Curve-billed Thrasher ..... A
___ Crissal Thrasher ..... UP
___ Le Conte's Thrasher ..... A

Starlings
___ European Starling ..... CP

Pipits
___ American Pipit ..... CW

Waxwings and Phainopeplas
___ Bohemian Waxwing ..... OW
___ Cedar Waxwing ..... UP
___ Phainopepla ..... UP

Warblers
___ Tennessee Warbler ..... OT
___ Orange-crowned Warbler ..... UP
___ Nashville Warbler ..... UT
___ Virginia's Warbler ..... US
___ Lucy's Warbler ..... CS
___ Northern Parula ..... OT
___ Yellow Warbler ..... CS
___ Chestnut-sided Warbler ..... OT
___ Magnolia Warbler ..... A
___ Black-throated Blue Warbler ..... A
___ Yellow-rumped Warbler ..... US, CW
___ Black-throated Gray Warbler ..... US
___ Townsend's Warbler ..... UT
___ Hermit Warbler ..... OT
___ Yellow-throated Warbler ..... A
___ Grace's Warbler ..... US
___ Prairie Warbler ..... A
___ Palm Warbler ..... A
___ Blackpoll Warbler ..... A
___ Black-and-white Warbler ..... O
___ American Redstart ..... OT
___ Prothonotary Warbler ..... A
___ Worm-eating Warbler ..... A
___ Northern Waterthrush ..... RT
___ Louisiana Waterthrush ..... A
___ Kentucky Warbler ..... A
___ MacGillivray's Warbler ..... US
___ Common Yellowthroat ..... US, RW
___ Hooded Warbler ..... A
___ Wilson's Warbler ..... CT
___ Painted Redstart ..... OS
___ Yellow-breasted Chat ..... US

Tanagers
___ Summer Tanager ..... US
___ Scarlet Tanager ..... A
___ Western Tanager ..... CS

Sparrows
___ Green-tailed Towhee ..... CS
___ Spotted Towhee ..... CP
___ Abert's Towhee ..... UP
___ Rufous-crowned Sparrow ..... RP
___ American Tree Sparrow ..... OW
___ Chipping Sparrow ..... CS, RW
___ Clay-colored Sparrow ..... OT
___ Brewer's Sparrow ..... CT, US
___ Black-chinned Sparrow ..... US
___ Vesper Sparrow ..... CS, RW
___ Lark Sparrow ..... US
___ Black-throated Sparrow ..... CS, RW
___ Sage Sparrow ..... UP
___ Lark Bunting ..... OT
___ Savannah Sparrow ..... UP
___ Grasshopper Sparrow ..... RT
___ Fox Sparrow ..... RT
___ Song Sparrow ..... CP
___ Lincoln's Sparrow ..... UP
___ Swamp Sparrow ..... RW
___ White-throated Sparrow ..... RW
___ Harris's Sparrow ..... RW
___ White-crowned Sparrow ..... CW
___ Golden-crowned Sparrow ..... RW
___ Dark-eyed Junco ..... CP
___ McCown's Longspur ..... A
___ Lapland Longspur ..... OW
___ Chestnut-collared Longspur ..... A
___ Snow Bunting ..... A

Grosbeaks and Buntings
___ Rose-breasted Grosbeak ..... O
___ Black-headed Grosbeak ..... CS
___ Blue Grosbeak ..... CS
___ Lazuli Bunting ..... CS
___ Indigo Bunting ..... RS
___ Dickcissel ..... A

Blackbirds and Orioles
___ Bobolink ..... A
___ Red-winged Blackbird ..... CP
___ Western Meadowlark ..... CP
___ Yellow-headed Blackbird ..... US, RW
___ Rusty Blackbird ..... A
___ Brewer's Blackbird ..... CP
___ Common Grackle ..... O
___ Great-tailed Grackle ..... UP
___ Bronzed Cowbird ..... O
___ Brown-headed Cowbird ..... CS, UW
___ Orchard Oriole ..... A
___ Hooded Oriole ..... US
___ Bullock's Oriole ..... CS
___ Scott's Oriole ..... US

Finches
___ Gray-crowned Rosy-Finch ..... OW
___ Black Rosy-Finch ..... OW
___ Pine Grosbeak ..... RP
___ Cassin's Finch ..... UP
___ House Finch ..... CP
___ Red Crossbill ..... UP
___ Pine Siskin ..... UP
___ Lesser Goldfinch ..... CP
___ Lawrence's Goldfinch ..... A
___ American Goldfinch ..... UP
___ Evening Grosbeak ..... RP

Weaver Finches
___ House Sparrow ..... CP

APPENDIX H USFWS (2021) Birds of Conservation Concern Occurring in the NCAs

USFWS (2021) Birds of Conservation Concern Occurring in the NCAs		
Common Name	Scientific Name	Occurrence
American Avocet	*Recurvirostra americana*	Verified
American Kestrel	*Falco sparverius paulus*	Verified
American White Pelican	*Pelecanus erythrorhynchos*	Verified
Belted Kingfisher	*Megaceryle alcyon*	Verified
Bendire's Thrasher	*Toxostoma bendirei*	Verified
Bewick's Wren	*Thryomanes bewickii*	Verified
Black-capped Chickadee	*Poecile atricapillus practicus*	Verified
Black-chinned Sparrow	*Spizella atrogularis*	Verified
Black-throated Gray Warbler	*Setophaga nigrescens*	Verified
Broad-tailed Hummingbird	*Selasphorus platycercus*	Verified
Bullock's Oriole	*Icterus bullockii*	Verified
Burrowing Owl	*Athene cunicularia hypugaea*	Verified
Cactus Wren	*Campylorhynchus brunneicapillus guttatus*	Verified
California Gull	*Larus californicus*	Verified
Cassin's Finch	*Haemorhous cassinii*	Verified
Clark's Grebe	*Aechmophorus clarkii*	Verified
Common Nighthawk	*Chordeiles minor*	Verified
Common Yellowthroat	*Geothlypis trichas sinuosa*	Verified
Cordilleran Flycatcher	*Empidonax occidentalis*	Verified
Costa's Hummingbird	*Calypte costae*	Verified
Dunlin	*Calidris alpina hudsonia/arcticola**	Verified
Ferruginous Hawk	*Buteo regalis*	Verified
Flammulated Owl	*Psiloscops flammeolus*	Verified
Gilded Flicker	*Colaptes chrysoides*	Verified
Great Blue Heron	*Ardea herodias occidentalis*	Verified
LeConte's Thrasher	*Toxostoma lecontei*	Verified
Loggerhead Shrike	*Lanius ludovicianus mearnsi**	Verified
Long-billed Curlew	*Numenius americanus*	Verified
Long-eared Owl	*Asio otus*	Verified
Marsh Wren	*Cistothorus palustris griseus*	Verified
Northern Harrier	*Circus hudsonius*	Verified
Northern Saw-whet Owl	*Aegolius acadicus*	Verified
Olive-sided Flycatcher	*Contopus cooperi*	Verified
Phainopepla	*Phainopepla nitens lepida*	Verified

Pinyon Jay	*Gymnorhinus cyanocephalus*	Verified
Plumbeous Vireo	*Vireo plumbeus*	Verified
Prairie Falcon	*Falco mexicanus*	Verified
Rufous-crowned Sparrow	*Aimophila ruficeps eremoeca*	Verified
Sage Thrasher	*Oreoscoptes montanus*	Verified
Savannah Sparrow	*Passerculus sandwichensis beldingi*	Verified
Scott's Oriole	*Icterus parisorum*	Verified
Short-eared Owl	*Asio flammeus*	Verified
Song Sparrow	*Melospiza melodia pusillula/samuelis**	Verified
Verdin	*Auriparus flaviceps acaciarum*	Verified
Vesper Sparrow	*Pooecetes gramineus affinis*	Verified
Virginia's Warbler	*Leiothlypis virginiae*	Verified
Western Screech-Owl	*Megascops kennicottii kennicottii/cardonensis**	Verified
Williamson's Sapsucker	*Sphyrapicus thyroideus nataliae*	Verified
Woodhouse's Scrub-Jay	*Aphelocoma woodhouseii*	Verified
Yellow-breasted Chat	*Icteria virens*	Verified
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	Verified