

**FEDERAL EMERGENCY MANAGEMENT AGENCY
FINDING OF NO SIGNIFICANT IMPACT
SOCORRO VALLEY WILDFIRE HAZARD MITIGATION PROJECT
SOCORRO COUNTY, NEW MEXICO
HMGP-DR-4152-NM PROJECT #13**

BACKGROUND

In accordance with the Federal Emergency Management Agency's (FEMA) Instruction 108-1-1, an Environmental Assessment (EA) has been prepared pursuant to Section 102 of the National Environmental Policy Act (NEPA) of 1969, as implemented by the regulations promulgated by the President's Council on Environmental Quality (CEQ; 40 CFR Parts 1500-1508). The purpose of the proposed project is to protect small and large communities in Socorro County (County) from wildfire threats, including numerous natural gas, electric, and fiber optics lines; bridges; state highways; and the Rio Grande that traverse the Socorro Valley. This EA informed FEMA's decision on whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Socorro County has applied for Hazard Mitigation Grant Program (HMGP) funding through the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM) under HMGP-DR-4152-NM Project #13. Through HMGP, FEMA provides grants to states and local governments to implement long-term hazard mitigation measures, including wildfire mitigation. The purpose of HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Two project alternatives were considered in this EA: 1) No Action; and 2) Conduct defensible space and hazardous fuels reduction within 1,350 acres of a 1,650 acre project area in the Socorro Valley (Proposed Action). Under the No Action alternative, Socorro County would not conduct fuel reduction activities within the riparian habitat in Socorro County. The current level of fire danger would persist. Non-native vegetation would continue to thrive in the current condition.

Under the Proposed Action, Socorro County proposes to reduce hazardous fuels within the Project areas by removing dead and burned material (if present due to recent fires) as well as non-native salt cedar and Russian olive across approximately 1,350 acres of 1,650 acres analyzed within the County. A total of 25 parcels are located along the Rio Grande in central Socorro County. Parcels range from four to 352 acres in size and are located in discontinuous areas adjacent to county roads and existing developments. The fuels reduction would mitigate the effects of a wildfire moving across the wildland-urban interface into developed areas. The Proposed Action would include removal of surface fuels and "ladder" fuels that have accumulated and reduce the canopy bulk density to diminish the chance of a fire transitioning into a crown fire or sustaining as a crown fire. The fuels reduction would start at private yards

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within residential properties, and would minimize the volume of combustibles near homes. The fuels reduction would also include the greater forest ecosystem adjacent to communities. Native vegetation and habitat would not be disturbed during Project implementation. Work is proposed to begin as early as September 2018 and continue for approximately one year, excluding the migratory bird nesting season of May 1 through August 31.

A public notice was posted in the local newspaper of record and on FEMA's and Socorro County's websites. The draft EA was made available for public comment at the Socorro County Manager's Office, the Socorro Public Library, and on FEMA's and Socorro County's websites. In addition, the draft EA was emailed to interested parties and Socorro County held a public meeting regarding the project on September 18 at the Socorro County Board of Commissioners Chambers. No comments were received from the public during the comment period.

FINDINGS

The Proposed Action as described in the EA will not impact or adversely affect geology, prime and unique farmlands, hydrology, water depletions, wetlands, floodplains, cultural resources, land use, recreational resources, hazardous materials, and minority and low-income populations. During vegetation management activities, short-term adverse impacts to soils, noise, air quality, water quality, vegetation communities, fish and wildlife, critical habitat, and threatened and endangered species are anticipated. Long term positive impacts to climate, vegetation communities, fish and wildlife, and socioeconomics are expected. No long-term adverse impacts are anticipated. All adverse impacts require conditions to minimize and mitigate impacts to the proposed project site and surrounding areas.

CONDITIONS

The following conditions must be met as part of this project. Failure to comply with these conditions may jeopardize the receipt of federal funding.

1. Any change to the approved scope of work will require re-evaluation for compliance with NEPA and other Laws and Executive Orders.
2. This review does not address all federal, state, and local requirements. Acceptance of federal funding requires recipient to comply with all federal, state and local laws. Failure to obtain all appropriate federal, state and local environmental permits and clearances may jeopardize federal funding.
3. Socorro County and its contractors must adhere to all OSHA and local municipality requirements regulating noise.

4. Socorro County and its contractors will implement best management practices (BMPs) to minimize air quality impacts, including covering trucks to avoid fugitive dust violations, and wetting down work areas. Vehicles on levee roads will be limited to 15 mph. All vehicles involved in construction at the Project site are required to have passed a current New Mexico emissions test and have required emission control equipment. Construction practices during the implementation phase will be consistent with the Socorro County Public Nuisance Ordinance.
5. Socorro County and/or its contractor must prepare Storm Water Pollution Prevention Plan (SWPPP), including a spill control plan, for the Proposed Action and file a Notice of Intent (NOI) with the EPA.
6. Socorro County is required to coordinate with the local floodplain administrator and obtain any required permits prior to initiating work. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.
7. The Project Manager, project inspectors, and/or work crews will remain vigilant for the Pecos sunflower during work at the Rhodes property. If any sunflower have migrated into the proposed work area, those areas must be avoided.
8. No work will be performed within the river.
9. All necessary permits for access points, staging areas, and study sites will be acquired prior to commencing construction activities. Access to treatment and mitigation areas will be via internal (unimproved) roadways or by designated access routes when established roads are not present. Pre-authorized access from private property owners will be obtained for workers to access the treatment areas on foot and to bring equipment to the treatment areas. Access routes will be designated on Action Area (or may be referred to as "Project Area" by FEMA) maps and flagged on site prior to work start.
10. Coordination with work crews will occur prior to the start of work and throughout project implementation. This will include preconstruction coordination meetings with work crews to go over the project implementation plans, including avoidance and minimization measures intended to protect species. A Project Manager will be provided to oversee implementation of the project and ensure compliance with the avoidance and minimization measures. Two project inspectors will be assigned to each treatment area to assure continual communication with contractors during work.
11. Best management practices (BMPs) will be implemented to prevent erosion and sedimentation to nearby or adjacent waters. These will include equipment storage and staging practices to minimize erosion and sedimentation, and avoiding soil or water contamination. Equipment will be inspected for spillage. Equipment will also be cleaned prior to original arrival at treatment site, and when moving from treatment area to treatment area to assure no transport of invasive vegetation.

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12. Staging areas will be located at least 30 m (100 feet) away from any surface or shallow ground water source or live fuels. Staging sites will be flagged appropriately and the project proponents will develop written protocol to address spills or contamination of soil. This protocol will go in to each contractual agreement for on-the-ground work.
13. In general, equipment operation will take place in previously cleared areas or where vegetation is particularly sparse, and all efforts would be made to minimize damage to native riparian vegetation. No native vegetation will be removed in HFR (hazardous fuels reduction) treatment areas. Native vegetation removal is likely in DS (defensible space) treatment areas but none of these areas have flycatcher or cuckoo suitable habitat.
14. Fuel reduction activities will take place outside of nesting season (from September 1 through April 15). The exception to this will be limited work when hand crews work from April 15 to April 30. During this time, crews will work only in areas that are greater than 100 meters (300 feet) from the center of river, where past wildfires has limited vegetation, or adjacent to flycatcher and cuckoo territory buffers.
15. A 150 m (500 feet) "no treatment zone" buffer will be implemented around occupied flycatchers and cuckoos territories. The buffer area will be flagged/taped prior to the commencement of work and flag/tape must be promptly removed once work is complete.
16. Contractors will be supervised when work is being implemented within 30 m (100 feet) of any buffer to assure contractors do not enter into 150 m (500 feet) "no treatment zone" buffers. When not within this distance, staff will provide supervision as needed.
17. Herbicide use will be specified in treatment plans for use during implementation and maintenance of DS and HFR areas. All application requirements for safety and environmental control will be followed. Only approved herbicides at recommended concentrations will be utilized and only licensed applicators will accomplish this work. Applicators will be licensed in the state of New Mexico, and the Socorro Soil and Water Conservation District will review chemical application plans to assure compliance with state requirements.
18. Slash piles of downed vegetation will be located at least 300 meters (900 feet) from the center of the river channel.
19. Native plant restoration focus will include: 1) seeding in areas where non-native plants are removed in open forest or grassland habitats to provide forage for cuckoos and 2) native understory planting in areas where non-native plants are removed under gallery forest cottonwood trees. Where possible, cottonwoods will be established to provide structural diversity to planting patches.

20. Prescriptions for planting native vegetation will be developed following site hazardous fuels control. Best management practices included in these prescriptions include: Conducting soil surveys to determine areas suitable for cottonwood or willow pole plantings, planting poles from December through March 15th (if poles show any signs of bud elongation, they should not be planted), planting poles in random manner, drilling/digging holes to a depth of at least 1 foot below water table, filling holes and packing soil so that there are not air pockets, drilling shrub holes to moist soil and back filling so shrub root crown is at soil surface, planting shrubs in groups of 30 with random spacing (determined by shrub growth pattern), watering shrubs within 48 to 72 hours after planting and following up with subsequent watering (two weeks later if no rain events and throughout the first two growing seasons as needed), and planting grasses and forbs from seed or small containers near planted shrubs (to help facilitate with shrub watering schedule).
21. Socorro County will comply with the following reasonable and prudent measures and terms and conditions issued in the USFWS's Biological Opinion:
 1. Socorro County will monitor and report on the populations of the flycatcher, cuckoo and their habitats in the Action Area;
 - 1.1. Socorro County shall conduct flycatcher and cuckoo protocol surveys annually throughout the Action Area (if not already being completed by other entities).
 - 1.2. Socorro County shall ensure flycatcher and cuckoo protocol surveys are performed by biologists that possess a Section 10(a)(1)(A) permit (if not already being completed by other entities).
 2. Socorro County will standardize and implement all BMPs that minimize effects to listed species;
 - 2.1. Socorro County shall standardize and implement all BMPs that pertain to equipment and operations, staging and access, project timing, water quality, dust abatement, exclusion, silt fence installation, and others for their Proposed Action.
 - 2.2. Socorro County shall seek to minimize their activities, noise, and disturbances within the seasonal and geographic buffer areas associated with flycatcher and cuckoo nesting/territorial/feeding behaviors. Specifically, all parties shall adhere to the seasonal and geographic avoidance of vegetation clearing activities during the breeding season (April 15-September 1), or coordinate with the Service (NMESFO) when seasonal or geographic restrictions cannot be implemented as proposed.
 - 2.3. Habitat restoration and maintenance projects shall minimize native plant disturbance to the extent possible or replace native plants with cottonwood or coyote willow poles at a 10:1 ratio. Invasive species removed shall be replaced with native species.

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- 2.4. FEMA and Socorro County shall ensure that all Conservation Measures described in the BA and the BO are implemented.
3. Socorro County will minimize take of flycatchers and cuckoos due to treatment and habitat restoration activities;
 - 3.1. Socorro County shall coordinate with the NMESFO to avoid any flycatcher or cuckoo nests found in treatment areas (if not already being completed by other entities).
 - 3.2. Long term (10 years) maintenance operation programs will include requirements that ensure the contractor's compliance with all pertinent terms and conditions of the Service's Incidental Take Statement; pertinent information on the presence or locations of flycatcher or cuckoos; and requisite work restrictions. As needed, Socorro County will formally update pertinent information and requirements throughout the duration of the contract.
4. FEMA or Socorro County will annually report to the Service on implementation of the Proposed Action, the annual ITS summary, the RPMs, and their implementing terms and conditions.
 - 4.1. Socorro County shall coordinate the appropriate reporting of the listed species and their habitat monitoring data and all associated management actions that affect these species or their habitats on an annual basis (if not already being completed by other entities).
 - 4.2. Socorro County shall report to the Service in accordance with 10(a)(1)(A) permits (if not already being completed by other entities).
 - 4.3. Socorro County shall report by March 1st, of each year, and provide electronic copies of reports and plans to the Service on implementation of all RPMs and their associated Terms and Conditions.
 - 4.4. Socorro County shall report to the Service any spills of hazardous chemicals including fuels, hydraulic fluids, and other hazardous materials in toxic amounts associated with the Proposed Action activities that occur in the floodplain.
 - 4.5. Annual reports shall reference the appropriate Consultation Number 02ENNM00-2018-F-0260, and should be delivered electronically to email address nmesfo@fws.gov and to FEMA at FEMA-R6-EHP@fema.dhs.gov.
 - 4.6. Annual reports shall be provided to Bureau of Reclamation (Middle Rio Grande Program Area, Environment and Lands Division, Albuquerque Area Office, Lori Walton, lwalton@usbr.gov) to assist with efforts to track nonnative vegetation treatment areas and available SWFL suitable habitat.

22. If unmarked graves or human remains are present on private or state land, compliance with the New Mexico Cultural Properties Act (Article 18, Section 6, Subsection 11.2 (18-6-11.2), NMSA 1978, also known as the Unmarked Burial Statute is required. NMDHSEM will require the applicant to stop work immediately in the vicinity of the discovery. NMDHSEM will immediately notify FEMA and law enforcement agencies of the discovery, which shall notify the Office of the Medical Investigator (OMI) and the SHPO. OMI shall evaluate the remains for medicolegal significance with minimal disturbance of the remains. OMI will terminate the discovery of any non-medicolegal human remains to the SHPO, who shall proceed pursuant to the Unmarked Burial Statute and its implementing regulations found at 4.10.11 NMAC. For any questions for human remains on state or private land, contact State Archeologist, Bob Estes, (505) 827-4225, Fax (505) 827-6338, bob.estes@state.nm.us.
23. The following Project activities would be avoided within the boundaries and buffers surrounding LA 755, LA 8870, LA 31718, LA 150501
- Driving and/or parking of vehicles and heavy equipment;
 - Staging activities;
 - Chipping of vegetation;
 - Tilling of vegetation chips into the ground;
 - Heavy/mechanical vegetation treatment; and
 - Burning.
24. Buffers of 100 ft. would be flagged around the boundaries of LA 755, LA 8870, and LA 31718/SR 1233 in the APE prior to fuel reduction activities to ensure resources are avoided. A buffer of 50 feet (15 m) will be flagged around LA 150501. Buffers will be marked on the ground immediately prior to all surface-disturbing actions within the APE by a qualified archaeologist using either wooden lath and flagging tape or snow fencing to ensure site protection. Personnel conducting treatment activities be briefed concerning prohibited activities within site boundaries. All flagging will be removed following completion of the Project.
25. A qualified archaeologist will update the documentation for sites LA 31718 /SR 1233 and LA 150501 at the time that avoidance buffers are placed at these sites. For sites LA 31718/SR 1233, documentation, including photography, GPS mapping, and LA site form updates, will be limited to portions of the site and buffer on state land within the APE. Any standing structures found within the APE or buffer on state land will be documented using the New Mexico Historic Cultural Properties Inventory form.


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26. If previously unknown cultural resources are encountered during treatment activities, all work within 100 feet around the discovery should be halted, the discovery protected, and the discovery reported within 24 hours to the New Mexico HPD for assessment and NRHP evaluation. Socorro County, FEMA, NMDGF, and HPD shall discuss appropriate procedures to respond to the discovery within two working days. Work may proceed following evaluation and concurrence from New Mexico HPD. If the find is found to be NRHP-eligible, additional mitigation measures may be required to avoid significant impacts.
27. Socorro County or its contractor will prepare site documentation updates as an addendum to the original survey report. The addendum report will also include a discussion of how and where avoidance measures were implemented. This addendum report will be submitted to Socorro County, FEMA, and HPD for review and comment no more than 30 days following the completion of Project treatment activities. The site updates and the addendum report must meet the standards described in the NMCRIS guidelines and § 4.10.8.18 New Mexico Administrative Code (NMAC).
28. Unusable equipment, debris and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project, applicant shall handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies.

CONCLUSION

Based on the findings of the EA, coordination with the appropriate agencies, comments from the public, and adherence to the project conditions set forth in this FONSI, FEMA has determined that the proposed project qualifies as a major federal action that will not significantly affect the quality of the natural and human environment, nor does it have the potential for significant cumulative effects. As a result of this FONSI, an EIS will not be prepared (FEMA Instruction 108-1-1) and the proposed project as described in the attached EA may proceed.

APPROVAL



Kevin Jaynes
Regional Environmental Officer
FEMA Region 6

Date 10/1/18

Draft Environmental Assessment

Socorro County
Socorro Valley Wildfire Hazard Mitigation
Project

HMGP-DR- 4152-NM

Socorro County, New Mexico

Hazard Mitigation Grant Program

Project Number 13

August 2018



FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency
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DRAFT

**Socorro Valley Wildfire Hazard Mitigation Project
Environmental Assessment**



August 2018

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LIST OF ACRONYMS

APE	area of potential effects
AQB	Air Quality Bureau
AQCR	Air Quality Control Region
ARMS	Archaeological Records Management Service
BA	biological assessment
BLM	Bureau of Land Management
BO	biological opinion
BMP	best management practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
dB	decibel
DEA	Draft Environmental Assessment
DS	defensible space
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HFR	hazardous fuels reduction
HMGP	Hazard Mitigation Grant Program
HPD	Historic Preservation Division
IPAC	Information for Planning and Consultation
ISR	Interstate Stream Commission
LRR	Land Resource Region
LTER	Long-Term Ecological Research
MBTA	Migratory Bird Treaty Act
MRG	Middle Rio Grande
NEPA	National Environmental Policy Act
NHNM	Natural Heritage New Mexico

NHPA	National Historic Preservation Act
NMCRIS	New Mexico
NMDGF	New Mexico Department of Game and Fish
NMDHSEM	New Mexico Department of Homeland Security and Emergency Management
NMED	New Mexico Environment Department
NMEMNRD	New Mexico Energy, Minerals, and Natural Resources Department
NMRPTC	New Mexico Rare Plant Technical Council
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
OSE	Office of the State Engineer
OSHA	Occupational Safety and Health Administration
SHPO	State Historic Preservation Officer
SOBTF	Save Our Bosque Task Force
SSWCD	Socorro Soil and Water Conservation District
SWPPP	storm water pollution prevention plan
TCP	traditional cultural property
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

1 - Introduction

1.1 Purpose and Need

Socorro County, using Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) funds administered by the New Mexico Department of Homeland Security and Emergency Management (NMDHSEM), is proposing the Socorro Valley Wildfire Hazard Mitigation Project (Project).

The FEMA HMGP allows representatives to implement hazard mitigation measures in their communities (<https://www.fema.gov/hazard-mitigation-grant-program>). The program funds projects to reduce the “risk of loss of life and property from future disasters.”

The project area is subject to wildfire threats to homes, businesses, critical infrastructure and unique and diverse natural habitat types found only in the Middle Rio Grande (MRG) Valley of New Mexico. This area is particularly prone to fire due to overgrowth of non-native invasive tree species in the Rio Grande Bosque and has experienced several severe fires in the past decade. Two large fires occurred in 2016 within the Project area. There is a need to protect small and large communities in Socorro County (County) from these wildfire threats, including numerous natural gas, electric, and fiber optics lines; bridges; state highways; and the Rio Grande that traverse the Socorro Valley.

1.2 Project Location

The Project area includes portions of the bosque (riparian habitat) adjacent to the Rio Grande in the towns of Bosquecito, Socorro, and San Antonio in Socorro County, New Mexico (see Figure 1). The Project area occurs east of the Rio Grande on private land and land owned by NMDGF and New Mexico Tech. The Proposed Action includes analysis of approximately 1,650 acres over 25 properties, with Project implementation proposed on approximately 1,350 acres, based upon Project funding. A total of 25 parcels are located along the Rio Grande in central Socorro County. Parcels range from four to 352 acres in size and are located in discontinuous areas adjacent to county roads and existing developments. Riparian bosque habitat on the east side of the of the river, east of the river bank, is included in the Project area.

Socorro Valley Wildfire Hazard Mitigation Project



Figure 1: Project Location Map

1.3 Public Scoping and Collaboration

1.3.1 Public Scoping

Scoping letters were sent to interested public agencies on September 25, 2017. Comments received are provided in Appendix A and summarized below.

- The New Mexico Department of Game and Fish (NMDGF) recommended native plantings with temporary livestock exclusion as mitigation to replace removed vegetation. They requested a management plan for removed or treated non-native biomass, so that removed vegetation does not inhibit recruitment of native vegetation. They also suggested implementation of NMDGF's *Habitat Restoration and Management of Native and Non-native trees in Southwestern Riparian Ecosystems guidelines*. Mitigation plantings, in compliance with this document and the project Biological Opinion, are described in Section 4.7.1.
- The New Mexico Interstate Stream Commission's (NMISC) concerns regarding net depletions are addressed in Section 4.6, stating that depletions have been evaluated and no increases are expected to occur.

1.3.2 Collaboration

The Proposed Action has been coordinated with the New Mexico State Forestry Division, Socorro Soil and Water Conservation District (SSWCD), Middle Rio Grande Conservancy District and U.S. Fish and Wildlife Service (USFWS). Meetings and coordination in regard to the Proposed Action were conducted with staff from these agencies throughout the Environmental Assessment development process. Cultural resource survey methodology was developed in coordination with the New Mexico Historic Preservation Division/State Historic Preservation Office (SHPO).

1.4 Regulatory Compliance

This Draft Environmental Assessment (DEA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality regulations to implement NEPA (40 Code of Federal Regulations Parts 1500-1508), and FEMA's procedures for implementing NEPA (FEMA Instruction 108-1-1). FEMA is required to consider potential environmental impacts before funding or approving actions and projects.

The purpose of this DEA is to analyze the potential environmental impacts of the Socorro Valley wildfire mitigation project. FEMA will use the findings in this DEA to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). The DEA has been prepared in compliance with all additional applicable federal statutes, regulations and Executive Orders as amended, including the following:

- National Historic Preservation Act (16 U.S.C. 470 *et seq.*)
- Archaeological Resources Protection Act (16 U.S.C. 470aa *et seq.*)
- Clean Water Act (33 U.S.C 1251 *et seq.*)

- Clean Air Act (42 U.S.C. 7401 *et seq.*)
- Endangered Species Act (16 U.S.C. 1531 *et seq.*)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations
- Executive Order 11988, Floodplain Management
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 *et seq.*)
- Executive Order 11593, Protection and Enhancement of the Cultural Environment
- Executive Order 11990, Protection of Wetlands
- U.S. Army Corps of Engineers' Procedures for Implementing NEPA (33 CFR Part 230; ER 200-2-2)
- Farmland Protection Policy Act (7 U.S.C. 4201 *et seq.*)
- Executive Order 13112, Invasive Species
- Federal Noxious Weed Act (7 U.S.C. 2814)
- Energy Independence and Security Act of 2007, P.L. 110-140, Section 438, 121 Stat. 1492, 1620 (2007)
- Migratory Bird Treaty Act, 16 U.S.C. 703, *et seq.*
- The Bald and Golden Eagle Protection Act (16 USC, Sections 668-668d).
- Fish and Wildlife Coordination Act, 48 Stat. 401; 16 USC 661 *et. seq.*
- Executive Order 13524, Federal Leadership in Environmental, Energy, and Economic Performance
- New Mexico Wildlife Conservation Act (17-2-40.1 NMSA 1978).¹

This DEA also reflects compliance with all applicable tribal, State of New Mexico and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered plants and animals, and cultural resources.

A discussion of how the Proposed Action is in compliance with each of these regulations, statutes, and Executive Orders is provided in Section 4.0.

¹ <http://www.bison-m.org/>

2 - Description of the Proposed Action and Alternatives

2.1 Proposed Action

The Proposed Action would reduce hazardous fuels within the Project areas by removing dead and burned material (if present due to recent fires) as well as non-native salt cedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*) across approximately 1,350 acres within Socorro County (see Figure 1). The Project area includes 1,650 acres which has been analyzed in this document. Based upon available funding from FEMA, approximately 1,350 of the 1,650 acres would be treated at this time.

The Proposed Action would reduce the wildfire hazard along the Action Area riparian forest and residential areas by removing surface nonnative fuels, burning or mulching the treated fuels, and following initial treatment, with spot spraying to assure effective nonnative fuels control. This work would be conducted in two zones based on residential defensible space (DS) location and hazardous fuels reduction (HFR) forest interior. This follows the Socorro County Hazard Mitigation Plan. The proposed treatment areas within the area will be approximately 1,350 acres (Figure 1). A total of 25 parcels are located along the Rio Grande in central Socorro County. Parcels range from four to 352 acres in size and are located in discontinuous areas adjacent to county roads and existing developments.

In the case of DS work, it is envisioned that removal of flammable materials, particularly vegetation, would be done in proximity to a residential or nonresidential structure. Three concentric zones would be created around each structure. In zone 1: up to 30 feet from the structure, all combustible material would be eliminated. In zone 2: 30 to 100 feet from the structure, all combustible materials would be eliminated with the exception of individual and well-spaced clumps of trees and shrubs or a few islands of vegetation that are surrounded by areas with noncombustible materials. In zone 3: greater than 100 to a maximum of 150 feet from the structure, vegetation would be thinned and pruned horizontally and vertically in a more limited manner than zone 2 to improve the health of the wildlands and help slow an approaching wildfire. Hand crews with chain saws and a mulcher/masticator will be used for DS work. In most cases, DS work is combined with HFR projects to assure protection for both structures and firefighting personnel.

The HFR Zone extends to larger blocks of Rio Grande riparian forest adjacent to DS or within the interior of the riparian forest belt along the river. Removal of Standing Biomass: An estimated 50 to 70% of standing vegetation will be removed from HFR areas. This vegetation will include tamarisk (also referred to as “saltcedar”; *Tamarisk* sp.), Russian olive (*Elaeagnus angustifolia*), Siberian elm (*Ulmus pumila*), Tree of Heaven (*Ailanthus altissima*), and 70% of standing dead or dead and down cottonwood (*Populus deltoids*) and willow (*Salix* spp.). With trees greater than 6 inches in diameter, the above ground biomass will be removed using an excavator with a hydraulic thumb attachment to minimize ground disturbance in dense vegetation with mature trees. This type of machinery has been shown to limit disturbance to grasses and forbs when access to work area is staged to 1) limit tracking over sensitive areas, 2) limit access routes to areas to be treated, and 3) limit use of this machinery to larger, denser stands where limited native and preferred plants are present. Other equipment for these dense sites will include a front-end loader (using tires, not tracks) to stack the biomass removed. Hand crews with chain saws and a mulcher/masticator will also be used on some of the HFR sites.

Once the biomass is stacked into piles, debris will be treated in one of three ways: 1) small piles (no greater than 10 feet by 10 feet at base) will be temporarily staged will be burned in place in a timely manner following prescription and under the supervision and guidance of fire personnel from Socorro County and NM State Forestry. A minimum distance of 300 feet from the center of the river will be used as a boundary for any pile burning to avoid impacts to Rio Grande silvery minnow habitat during high flows. There are licensed contractors who are now completing this prescription for private landowners with current fire qualifications, training and liability insurance. 2) Small piles will be chipped utilizing Socorro County's chipper. Staff and contractors trained to complete this work safely will be those authorized when this technique is used. 3) A masticator attached to a front-end loader will be used to masticate small piles to lessen fire danger. The mulched or masticated material will be spread to prescription less than 2 inches thick on the ground) across the treatment area. Area residents have been interested in these fuels for personal fire wood use, and wood harvesting is an option with landowner permit or permission if it can be allowed in a safe and efficient manner.

When vegetation is less than 6 inches in diameter, or in sensitive sites where excavator use is not recommended, hand clearing with chain saw and herbicide application is a preferred treatment. This applies to the same species of vegetation mentioned in Step 1. A trained hand crew with chain saws removes the woody vegetation to the base. After biomass cutting, a trained and licensed applicator applies recommended herbicide to the cut stump. This treatment has been shown to be effective and utilizes the minimal amount of chemical to a very specific area.

Applicators are licensed in the state of New Mexico, and partner organization, the SSWCD will review chemical application plans to assure compliance with state requirements. Secondary, follow up chemical treatment of resprouts may be necessary during the following growing season. This is accomplished through a technique called basal bark application. This treatment also minimizes the amount of chemical applied and targets the base of resprouts only, limiting aerial dispersal of herbicide. Starting with the next growing season, one spot treatment using approved herbicide will be completed on unwanted vegetation resprouts. These will be accomplished by cooperating agencies or by individual landowners with direct supervision from the agencies.

The fuels reduction would mitigate the effects of a wildfire moving across the wildland-urban interface into developed areas. The Proposed Action would include removal of surface fuels and "ladder" fuels that have accumulated and reduce the canopy bulk density to diminish the chance of a fire transitioning into a crown fire or sustaining as a crown fire. The fuels reduction would start at private yards within residential properties, and would minimize the volume of combustibles near homes. The fuels reduction would also include the greater forest ecosystem adjacent to communities.

Native vegetation and habitat would not be disturbed during implementation of the Proposed Action. Work is proposed to begin as early as September 2018 and continue for approximately one year, excluding the migratory bird nesting season of May 1 through August 31.

Properties were identified by Socorro County staff, project partners, and private landowners; and property owners were asked to participate in the Project by allowing restoration activities to occur on their property. Land owners were asked to sign a Participation Letter and Maintenance Commitment after accepting the proposed work on their property.

Mitigation native plant restoration would focus on: 1) seeding in areas where nonnative plants are removed in open forest or grassland habitats to provide forage for cuckoos, and 2) native understory planting in areas where nonnative plants are removed under gallery forest cottonwood trees. Where possible, cottonwoods will be established to provide structural diversity to planting patches.

Native species to be planted would include Rio Grande cottonwood, Goodding’s willow (*Salix gooddingii*), coyote willow (*Salix exigua*), New Mexico olive (*Forestiera neomexicana*), wolfberry (*Lycium pallidum*) and other native shrubs.

Methods for treatment shall include DS (light/manual treatment), HFR (heavy/mechanical treatment, combination treatment, and/or herbicide) as described above and listed in Table 1 below.

Table 1: Planned Treatment Method by Property

Property Name	Acres	Planned Treatment
FEMA-4152-PA 1.1	351.8	Heavy/Light
FEMA-4152-PA 3.4	40	Burn restoration/Light
FEMA-4152-PA 3.1	21.2	Light
FEMA-4152-PA 3.5	16.5	Light
FEMA-4152-PA 3.3	23.9	Light
FEMA-4152-PA 3.2	98.7	Heavy/Light
FEMA-4152-PA 3.2	10	Heavy/Light
FEMA-4152-PA 4.1	63.5	Heavy/Light
FEMA-4152-PA 4.2	254.8	Light/Heavy
FEMA-4152-PA 4.3	29.6	Burn restoration/Light
FEMA-4152-PA 5.2	80.9	Light
FEMA-4152-PA 5.1	35.7	Heavy
FEMA-4152-PA 6.4	12	Heavy
FEMA-4152-PA 6.2	6	Heavy
FEMA-4152-PA 6.1	56.7	Heavy
FEMA-4152-PA 6.3	4.4	Heavy
FEMA-4152-PA 7.7	10.9	Light/Heavy
FEMA-4152-PA 7.4	5.5	Light/Heavy
FEMA-4152-PA 7.2	93.7	Heavy/Light burn
FEMA-4152-PA 7.3	61.2	Heavy/Light burn
FEMA-4152-PA 7.1	141.9	Heavy/Light burn
FEMA-4152-PA 7.6	33.9	Heavy/Light burn
FEMA-4152-PA 7.2	70.8	Heavy/Light burn
FEMA-4152-PA 7.6	15.3	Heavy/Light burn

Property Name	Acres	Planned Treatment
FEMA-4152-PA 7.1	88.2	Heavy/Light burn
FEMA-4152-PA 7.9	10.8	Light
FEMA-4152-PA 8.3	13.1	Light/Heavy
Total	1650.9	

The methods described above would be prescribed on a site by site basis, many times in combination, or alternating methods, depending on site conditions on the properties and acres listed below. All of the properties are on the east side of the river and access to them would be conducted from the east. Access and staging would occur within each property. There would be no vehicles crossing the river for any portion of the Proposed Action.

To ensure the project is implemented properly and that staff working within the project areas are aware of issues related to resources such as threatened and endangered species and archaeology, the Project Manager, Socorro County, and/or partner staff will coordinate with work crews prior to the start of work and throughout project implementation. All Conservation Measures described in the Biological Opinion (USFWS, 2018) and the State Historic Preservation Office (SHPO) concurrence would be implemented and adhered to during construction. These are further described in Sections 4.7.3 and 4.8, respectively.

Socorro County will host preconstruction coordination meetings with work crews to go over the project implementation plans, including avoidance and minimization measures intended to protect species. Socorro County will provide a Project Manager that will oversee implementation of the project and ensure compliance with the avoidance and minimization measures. There will be two project inspectors assigned to each project area to assure continual communication with contractors during work.

2.2 No Action Alternative

Under the No Action Alternative, the fuel reduction activities would not be implemented within the riparian habitat in Socorro County. The current level of fire danger would persist. Non-native vegetation would continue to thrive in the current condition. Analysis of potentially occurring impacts under the No Action Alternative is provided in Section 4.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

Additional locations and treatment types were considered during the development of Project alternatives. Some properties were removed due to issues with access, site conditions preventing that particular area from meeting Project goals, or the potential to negatively affect habitat of federally listed species. Additional and heavier treatment options were also considered for the whole Project area, but a combination of treatments that would reduce potential impacts to the environment were preferred. Therefore, these alternatives have been dismissed and are not considered further in the analysis below.

3 - Description of the Affected Environment

3.1 Physiography, Geology, Soils

The Project area is located in the Southern Desertic Basins, Plains, and Mountains Major Land Resource Area within the greater Western Range and Irrigated Region Land Resource Region (LRR) (USDA-NRCS, 2006). Elevation in the Project area is approximately 4,600 feet. Physiography in the Project area comprises broad alluvial piedmont slopes and floodplains characteristic of the MRG. The Project location is in the floodplain of the MRG valley, which is characterized by fertile bottomlands and various agricultural land uses. The general soil conditions in the floodplain of the Project area are deep, nearly level, well-drained soils that are formed in recent alluvium of the Rio Grande. Water tables in the floodplain are typically four to twelve feet deep and permeability is moderate (Bowman, 2002). Fertile soils and shallow water tables support vegetation as well as a variety of resident and migratory wildlife. The MRG is a productive agricultural area that contributes to the quality of life and agriculture-based economies of Socorro County and the several small communities within the Project area, including Lemitar, Escondida, Socorro, Luis Lopez, and San Antonio.

A Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) custom soil report was generated to analyze soil characteristics within the Project area. A detailed description of soils can be found within the Custom Soil Resource Report for Socorro Valley Wildfire Hazard Mitigation Project (USDA-NRCS, 2017). Soil units in the Project area primarily consist of Typic Ustifluvents located on floodplains consisting of parent materials derived from stream alluvium derived from sandstone and shale. The other primary soil is Bluepoint loamy fine sand, which is found on stream terraces and contains parent material derived from Alluvium and/or eolian deposits. The Farmland Protection Policy Act is intended to minimize the adverse effects of Federal programs on farmland that might contribute to the unnecessary and irreversible conversion of important farmland to nonagricultural uses; and assure that Federal programs are operated in a manner that, will be compatible with State, local government, and private programs that protect farmland. No soils identified in the custom soil report are prime farmland (NRCS, 2017).

The Rio Grande graben, or rift, is a long and well-defined geologic depression, which conveys the area's only perennial watercourse. The Rio Grande graben contains several thousand feet of poorly consolidated, basin-fill sediments of the Santa Fe Group of middle Miocene to Pleistocene age. The topographically prominent Magdalena Mountains, with a peak elevation of 10,783 feet, are 20 miles west of the Project area and run north to south, parallel to the Project area. Canyons and associated alluvial features are located east of the Project area. Surface features surrounding the Project area include rugged mountains, ancestral floodplains, and the current Rio Grande floodplain (USDA, 1977).

3.2 Climate

Climate in the Project area is defined as cold semi-arid climate (type "BSk") under the Köppen-Geiger climate classification, consisting of cold, semi-arid steppe climate conditions. The mean annual temperature is 58.5 °F (14.7 °C). The average annual high temperature is 75.9 °F (24.4

°C) and the average annual minimum temperature is 40.9 °F (5 °C) (PRISM, 2004). The average frost-free season at Socorro is 200 days, from mid-April to late in October. Annual precipitation is highly variable. Average annual precipitation is 9.15 inches, with the majority of the precipitation occurring during summer rainfall events. Precipitation maximums are experienced during the North American Monsoon, when moist air is conveyed up the Rio Grande Valley from the Gulf of Mexico, causing brief but torrential precipitation events. Secondary

precipitation accumulations occur during winter when moisture from the Pacific Ocean moves eastward and brings frontal storms. Relative humidity averages less than 50 percent and generally less than 20 percent on hot sunny afternoons. Winds blow most frequently from the north in winter, and from the south along the river valley in summer. Wind speed averages nearly nine miles per hour for the year (Elliott et al, 1987).

3.2.1 Climate Change

Warming temperatures have already produced observable changes in the hydrologic cycle and sea level. Evidence of elevated temperatures include: changes in reservoir management in regions such as the mountainous west to accommodate snow pack melting earlier in the spring; and coastal design and management to mitigate impacts to cities due to rising sea levels and potentially large storm surges from larger and more intense hurricanes (USBR 2016).

Climate change models are used to survey general regional climate trends. Such models predict a general warming and drying over the US southwest (Maurer et al., 2007). Increased temperatures have been associated with reduced snowpack and increased snowline elevation as well as higher proportion of rainfall to snowfall (USBR 2016). Regional trends indicate changes in temperature and precipitation patterns in the US southwest and certain regions, particularly the US southwest is expected to become drier. Precipitation events are anticipated to be more torrential, with precipitation converting to less frequent but more intense events (Karl et al., 2009). Climate change impacts to the US southwest are expected to alter baseline temperature and precipitation patterns, which are expected to elevate the potential for severe droughts and increase flood risks (USBR 2016).

It is difficult to predict or quantify the effects of various possible climate change conditions. The best available scientific evidence based on observations from long-term monitoring networks indicates that climate change is occurring, although the effects differ regionally. While evidence exists to support the occurrence of climate change, there is limited research on how climate change might affect this region and the MRG within the Project area. A study by Hurd and Coonrod (2007) indicates the current trend of a degrading bosque ecosystem would continue. Deviations from existing baseline conditions suggest ‘[u]nder severe climate change scenarios, runoff could be reduced by 30%’ (Hurd and Coonrod, 2007).

3.3 Noise

Noise is generally defined as unwanted sound, and is represented on a logarithmic scale with a numeric unit called the decibel (dB). The Occupational Safety and Health Administration (OSHA) noise standard limits noise levels to 90 dB averaged over an eight-hour day (29 CFR 1910.95), although hearing damage can begin at levels as low as 80 dB over an eight-hour day. No worker

may be exposed to noise in excess of 115 dB without protection, which would reduce the exposure below 115 dB (AFSCME, 2004). Noise control enforcement may involve many sources of excessive noise: radios, stereos, television, live bands, machinery, equipment fans, air conditioners, construction, vehicle repairs, motor vehicles, and general noise. Sound is measured with sound level meters and monitors, similar to radar meters the police use for speed detection that, instead of detecting an object in motion, detect air pressure (sound waves) in motion and produce an output in dB.

Noise control in Socorro County is governed by the Public Nuisance Ordinance of Socorro County, which went into effect in February 2009 (Socorro County Commission, 2009). Socorro County personnel are responsible for enforcing the ordinance. The ordinance stipulates sounds from vehicular traffic shall be measured from a distance of fifty feet from the center lane of travel. The ordinance stipulates sound from a non-vehicular source shall be measured at the property line of the property where the sound is originating. Between the hours of 7 AM and 10 PM the level of permissible intrusive noise from vehicular sources is 90 dB for vehicles exceeding 10,000 lbs manufacturer's gross vehicle, and any combination of vehicles towed by such a vehicle. All other vehicles are subject to a rating 80 dB in areas with a speed limit of 35 miles per hour (mph) and 84 dB in areas with a speed limit above 35 mph. Between the hours of 7 AM and 10 PM, the level of permissible intrusive noise from non-vehicular sources is 80 dB, or 10 dB above the ambient noise level, whichever is higher. Both categories of noise require ambient and intrusive noise to be measured. Sound level meters and monitors are used to measure the sound level at a specified location, such as a property line. The Public Nuisance Ordinance of Socorro County lists exceptions to the ordinance for construction activities between the hours of 7 AM and 10 PM.

The Proposed Action is within a predominantly natural and agricultural area. Noise in the area results from the nearby NM 85/I-25 and occasionally from farm equipment operating in the area.

3.4 Air Quality

The Clean Air Act of 1970 authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources. The New Mexico Environment Department (NMED) Air Quality Bureau (AQB) and the Environmental Protection Agency (EPA) enforce air quality standards. The Proposed Action is located in New Mexico's Air Quality Control Region (AQCR) No. 156, which encompasses about 20,256 square miles in western New Mexico, including all of Catron and Socorro Counties, portions of McKinley County east of the Continental Divide, as well as western portions of Valencia County. Tribal lands are not regulated by AQB, therefore Zuni and Ramah Navajo Reservations within AQCR No. 156 are excluded from AQB jurisdiction. All areas within AQCR No. 156 are "in attainment" (i.e.: do not exceed State and Federal EPA air quality standards) for all criteria pollutants (New Mexico Administrative Code 2004; EPA 2015).

A Class I area is a wilderness area or a National Park. Class I areas in proximity of the Project area include the following: Bosque Del Apache National Wildlife Refuge (NWR), which is within the Project area; the Sevilleta NWR, located approximately 2 miles north of the Project area; the Valle de Oro NWR (approximately 55 miles from the Project area); Salinas Pueblo Missions National Monument (approximately 40 miles east of the Project area); El Malpais National Monument

(approximately 70 miles northwest of the Project area); and White Sands National Monument (approximately 75 miles south of the Project area) (NMED, 2017).

Air quality in the Project area is generally good to excellent due to the lack of urban industrial development. Although high winds are common in and around the Project area, blowing dust is generally not a problem except during extremely dry years. Airborne particulate and carbon monoxide concentrations from wood burning in the Rio Grande Valley are occasionally high during winter months when temperature inversions and wood stove use are both more prevalent (NMED, 2017).

3.5 Aesthetics

Aesthetics include the presence and appearance of landforms, water surfaces, vegetation and human created features relative to the surroundings and settings of the area. The presence of native species of plants and animals could also be evaluated as aesthetics. These features are primary characteristics of an area or project that determine visual character and the manner in which people view the setting. Aesthetics analysis considers the existing and future appearance, or perception of views, of the Project site and areas surrounding the site, as well as viewer sensitivity.

The Project area is rural and mostly undeveloped. The Project area is composed of large areas of open land and mostly unpaved roads, with few houses and agricultural lands interspersed throughout the landscape. Visual resources in the Project area include expansive views of undeveloped-desert uplands, bosque bordering the Rio Grande, and views of the Magdalena, Chupadera, and San Mateo mountains to the southwest. Some homes are interspersed within the Project area and adjacent to the bosque.

Aesthetics of the bosque may be characterized as ranging from poor to high quality. In areas where fires have occurred and burn restoration (removal of burned and dead trees) has not been implemented, the aesthetics would be considered poor as the bare, burned ground, and standing dead trees dominates the view.

In other areas, non-native vegetation has been thinned and dead material has been reduced. Some areas have been replanted with native vegetation such as cottonwood, willow, and New Mexico olive. Efforts have been made to keep non-native vegetation to a minimum, but resprouting from roots or stumps has occurred in all areas that have been treated. In these areas, the aesthetics would generally be characterized as medium to high (USACE 2008). The view is dominated by cottonwoods, with clear views of the river.

3.6 Water Resources

3.6.1 Water Quality

Regulatory agencies that control impacts to our nation's and New Mexico's water resources include the U.S. Army Corps of Engineers (USACE), the USFWS, the EPA, the NMED and Office of the State Engineer/Interstate Stream Commission (OSE/ISC). Water quality standards for the MRG from the San Acacia diversion dam to the Escondida Drain outfall has designated

uses of irrigation, marginal warm water aquatic life, livestock watering, wildlife habitat, and secondary contact (20.6.4.900 New Mexico Administrative Code).

Section 402(p) of the Clean Water Act (CWA) regulates point source discharges of pollutants into waters of the United States and specifies that storm water discharges associated with construction activity be conducted under National Pollutant Discharge Elimination System (NPDES) guidance.

Relevant to the Project area, the NMED has identified the MRG as impaired for *E. coli* and has developed a Total Maximum Daily Load management plan for the MRG (NMED 2010). The following sources are identified as contributors to water pollution in the MRG: avian sources (waterfowl and/or other), impervious surface/parking lot runoff, municipal (urbanized high-density areas), municipal point source discharges, on-site treatment systems (septic systems and similar decentralized systems), and wastes from pets (NMED 2010).

New Mexico's Water Quality Control Commission has designated stream uses and standards in the study area (NMED 2016). Designated uses for the reach from the main stem of the Rio Grande from the headwaters of Elephant Butte reservoir upstream to Alameda bridge (Corrales bridge) and intermittent water below the perennial reaches of the Rio Puerco that enters the main stem of the Rio Grande include irrigation, marginal warm water aquatic life, livestock watering, wildlife habitat and secondary contact (fishing, boating). Based on the water quality review by the NMED Surface Water Bureau, designated uses for marginal warm water aquatic life and primary contact recreation were not fully supported. The survey concluded that aluminum, copper, and *E. coli* were the probable cause of the impaired uses, with the probable sources of impairments including municipal point source discharges, waterfowl, on-site treatment systems (septic), source unknown, wastes from pets, municipal (high density area), impervious surface/parking lot runoff.

3.6.2 Hydrology

The Rio Grande in the Project area is characterized by warm summer water temperature, low velocity, high turbidity, more pools than riffles, and a lack of shade and cover over water, and therefore is classified as a warm water ecosystem (Crawford et al. 1993; Platania 1993).

Flows in the Rio Grande follow a typical snowmelt runoff pattern, with maximum flows occurring during the spring runoff in May and June, or are the result of short duration summer thunderstorm events. Sustained high volume flows are more likely to occur in the spring rather than in the summer months. Short, intense flood pulse events are more typical of summer months, resulting from the seasonal monsoon (Tetra Tech, Inc., 2004). The last major floods on the Rio Grande occurred in 1941 and 1942, with flows of about 25,000 cfs recorded at the Bernalillo and Albuquerque gages.

Seasonal low flows can occur any time of the year, depending on many variables. Prior to measurable human influence on the system, up to the 14th century, the Rio Grande was an intermittent, aggrading river with a shifting sand substrate (Biella and Chapman 1977).

Historically river drying occurred during droughts (Scurlock 1998) but is more likely to occur under the current system of water management and withdrawals (Dudley and Platania, 2003).

Channel drying is permitted in certain river reaches, under established restrictions and circumstances per the Biological Opinion (USFWS 2016a).

The dams constructed on the Rio Grande and its tributaries alter magnitude, timing and duration of peak flows. Dams also capture and store sediment over time in reservoirs, reducing the supply to downstream reaches of the MRG (Lagasse 1980). Cochiti Dam releases are restricted to the maximum non-damaging downstream channel capacity, which is typically estimated to be 7000 cfs at the Albuquerque gage. Flows from the Rio Puerco or Rio Salado are not controlled.

3.6.3 Water Depletions

The Rio Grande Compact of 1939 limits the amount of surface water that can be depleted (utilized for all purposes) annually in the MRG based on the flow of the river measured at the Otowi Gage near Los Alamos. The New Mexico State Engineer has also determined that the MRG is fully appropriated. Therefore, any increase in water use by one user must be offset by a reduction by another use or user, so that senior water rights and New Mexico's ability to meet downstream delivery obligations are not threatened. The New Mexico State Water Plan (OSE/ISC, 2003) requires that habitat restoration projects do not result in increased net water depletion, or that increases are offset by purchased or leased water rights. Work performed within the river channel within the Rio Grande Floodway is exempt from this policy (ISC, 2007). The definition of 'Floodway' in this case is a 600-foot corridor centered on the midline of the river. Therefore, water use within this 600-foot corridor is not deemed an 'increase in water use' and does not require offsetting, but increases in water depletions from any part of a habitat restoration project that falls outside of the 600-foot floodway must be offset. The New Mexico State Water Plan (OSE/ISC, 2003) further states "State Engineer permits are required for all habitat restoration activities that result in increased depletions of water."

3.6.4 Wetlands and Floodplains

Jurisdictional waters of the United States, including wetlands, are protected under several rules and regulations including federal guidelines outlined by the Clean Water Act (CWA); Sections 401 and 404, Executive Order (E.O.) 11988 (Floodplain Management), E.O. 11990 (Protection of Wetlands) and by the review process of the NMED Surface Water Quality Bureau.

Section 404 of the CWA requires analysis under the EPA's 404 (b)(1) Guidelines if the USACE proposes to discharge fill material into wetlands or other waters of the United States. EO 11990 requires federal agencies "to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative."

Wetland areas occur where the water table is at or near the surface or where land is covered by water at least part of the year. Wetlands in the MRG Valley included wet meadows, marshes, sloughs, ponds, and small lakes. Wetlands were formed in part by the meandering nature of the river and partly by the high-water table in the valley; in some areas, the water table existed at the ground surface, supporting water-loving plants. Because of changes in hydrology and climate, the wetlands have been greatly reduced. From 1935 to 1989, surface area covered by wet meadows, marshes, and ponds declined by 73% along the MRG floodplain.

The depth to ground water at most points along the Rio Grande is the result of a complex set of factors that input and extract water, including flows laterally into and out of the river, acequias, irrigation canals and the system of drains that exist in the MRG Valley, plus extraction from wells for domestic and agricultural use, irrigation inputs, evaporation, and transpiration from vegetation (Tetra Tech, Inc. 2004b; Crawford et al. 1993).

Since the depth to water table determines the type and abundance of vegetation present, several studies have been conducted on shallow water level within the MRG basin (Bartolino and Niswonger 1999; Bowman et al. 2002; Eichhorst et al. 2002). These studies found that in general the depth to the ground water table within the bosque ranges from several inches near the river bank to more than 10 feet near the riverside drains as the terrain slowly rises moving away from the channel.

Wetlands and riparian areas have been mapped by the USFWS in the National Wetland Inventory (USFWS 2017a) and are generally limited to the river edges, sand bars, and low areas adjacent to the river within the floodplain. Areas where wetlands were indicated by the National Wetlands Inventory within the Project area were inspected and it was determined that the majority of these areas were not wetlands. Marginal and intermittent wetland habitat occurs during spring and early summer higher flows on the Rio Grande which inundate the lower banks and terraces of the Project area. Wet meadows, consisting primarily of saltgrass, also occur in small pockets within the Project area.

Executive Order (EO) 11988 (Floodplain Management) requires federal agencies “to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of the floodplain and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.” The majority of the Proposed Action will be conducted within the 100-year floodplain of the Rio Grande according to the Flood Insurance Rate Maps (FIRMs) (panel numbers 35053C1050C, 35053C1410C, 35053C1430C, 35053C1440C, and 35053C1825C, dated 05/02/2016. FEMA’s implementing regulations for EO 11988 and 11990 are codified under 44 CFR Part 9, which includes an eight-step decision making process for compliance with this part. The eight-step decision making process for the Proposed Action is documented in Section 4.6.1.4 of this DEA.

3.7 Biological Resources

3.7.1 Vegetation Communities

This section summarizes existing conditions for vegetation communities. It includes consideration of vegetation communities and species occurring on privately owned land, and land owned by NMDGF and New Mexico Institute of Mining and Technology (New Mexico Tech) within the riparian areas along the Rio Grande.

3.7.1.1 Historic conditions

Historically, the dynamic Rio Grande supported a patchwork of plant communities including cottonwood and willow forests with interspersed shrublands and wetlands. The creation of the cottonwood communities depends on stream movement, and sand bars formed by the meandering river provide the conditions necessary for cottonwood establishment (Crawford et al. 1993).

Cottonwoods grow well only when roots can reach moisture provided by underground water and where seeds can germinate in bare, moist soil. Therefore, cottonwoods are limited to areas with a permanent water supply. New seedlings cannot grow in a forest with a closed canopy that prevents adequate sunlight from reaching the forest floor. However, as the river meanders, sections of the mature forest die, thus providing space to establish a new stand of cottonwoods. The result is a variety of patches, or mosaics, ranging from newly established seedlings to old, mature stands of huge trees to open areas with few trees. Overbank flooding historically supported this native plant community by providing water and nutrients to the riparian vegetation communities and limiting the accumulation of leaf litter and woody debris, thus decreasing conditions that promote fire.

3.7.1.2 Existing Conditions

The cottonwood forests that border the Rio Grande in central New Mexico are remnants of the bosque, a Spanish word for forest. Regulation of water in the Rio Grande and changes to channel geometry have reduced overbank flooding and floodplain connectivity, limiting regeneration of riparian habitat. Many cottonwood forests have also been cleared for farming, flood risk management projects, and urban development. Non-native plants and animals have spread throughout the valley, often displacing the population of native species.

Despite disturbance factors such as water regulation and fire, the MRG valley supports one of the highest value riparian ecosystems remaining in the Southwest (Crawford, et al. 1993). The major plant communities in the active floodplain of the MRG valley include woodlands, shrublands, grasslands, and emergent wetlands (Tetra Tech, 2004).

Riparian woodlands have a canopy of Rio Grande cottonwood and, less extensively, Goodding's willow (Parametrix, 2008). An understory of native shrub species [primarily coyote willow and seep-willow (*Baccharis* spp.)] occurs in only a small percentage of woodland stands. The majority (approximately 3,290 acres) of bosque has an understory of salt cedar and shrublands are dominated by salt cedar - an exotic shrub that has extensively colonized the Rio Grande floodway since its introduction in region in the early 1900s - and, secondarily, by Russian olive, another exotic tree.

Salt cedar is a prominent colonizer of exposed, bare soil sites in the riparian zone (Smith, et al., 2002). The flowering and fruiting phenology of salt cedar, and its competitive advantage during periods of water stress and elevated salinity, allows seedlings to establish on and dominate open sites wetted by runoff, rainfall, or river flows during the summer, precluding the possibility for cottonwood establishment on potentially suitable sites the following spring. Salt cedar also becomes established in the understory of mature cottonwood stands in the Project area where there is sufficient light (Crawford et al. 1996).

Salt cedar present in the Project area ranges from young new resprouts to large adult trees. The majority of shrub stands in the study area consist of moderately dense to very dense stands of 5- to 15-foot-tall salt cedar and have been affected by fire, age, drought, and/or damaged by the Tamarisk leaf beetle (*Diorhabda* spp.). All forms of older or damaged trees add to the potential fire danger in the area.

Vegetative species observed in the Project area during site visits by Tetra Tech staff from June 30, 2017 to August 15, 2017 are presented below in Figure 2.

New Mexico plant species of concern are discussed under Section 3.7.3.7 below.

Common name	Scientific Name	Common name	Scientific Name
Indian ricegrass	<i>Achnatherum hymenoides</i>	wolfberry	<i>Lycium torreyi</i>
Russian knapweed	<i>Acroptilon repens</i>	Sweetclover	<i>Melilotus alba</i>
Ragweed	<i>Ambrosia spp.</i>	Scratchgrass	<i>Muhlenbergia asperifolia</i>
False indigo bush	<i>Amorpha fruticosa</i>	Vine mesquite	<i>Panicum obtusum</i>
yerba mansa	<i>Anemopsis californica</i>	Western wheatgrass	<i>Pascopyrum smithii</i>
Indianhemp	<i>Apocynum cannabinum</i>	Gypsum phacelia (Scorpion weed)	<i>Phacelia integrifolia</i>
Purple threeawn	<i>Aristida purpurea</i>	Annual rabbitsfoot grass	<i>Polygomon monspeliensis</i>
Showy Milkweed	<i>Asclepias speciosa</i>	Cottonwood	<i>Populus deltoides</i>
Horsetail Milkweed	<i>Asclepias subverticillata</i>	Garden purslane	<i>Portulaca oleracea</i>
Seep Willow (Mule's fat)	<i>Baccharis salicifolia</i>	Honey mesquite	<i>Prosopis glandulosa</i>
Willow Baccharis	<i>Baccharis salicifolia</i>	Screwbean mesquite	<i>Prosopis pubescens</i>
Great Plains seep-willow	<i>Baccharis salicina</i>	Green prairie coneflower	<i>Ratibida tagetes</i>
Nodding plumeless thistle	<i>Carduus nutans</i>	Skunkbush sumac	<i>Rhus trilobata</i>
Lambsquarters	<i>Chenopodium album</i>	Golden currant	<i>Ribes aureum</i>
Mexican devilweed	<i>Chloracantha spinosa</i>	New Mexico locust	<i>Robinia neomexicana</i>
Spiny chloracantha	<i>Chloracantha spinosa</i>	Sand Dock	<i>Rumex hymenosepalus</i>
Field bindweed	<i>Convolvulus arvensis</i>	Coyote willow	<i>Salix exigua</i>
Canadian Horseweed	<i>Conyza canadensis</i>	Goodding's willow	<i>Salix gooddingii</i>
Prairie Clover	<i>Dalea scariosa</i>	Tumble weed	<i>Salsola tragus</i>
Western tansymustard	<i>Descurainia pinnata</i>	Common threesquare	<i>Schoenoplectus pungens</i>
Illinois bundleflower	<i>Desmanthus illinoensis</i>	streambed bristlegrass	<i>Setaria leucopila</i>
Spectaclepod	<i>Dimorphocarpa wislizenii</i>	Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Saltgrass	<i>Distichlis spicata</i>	Tall goldenrod	<i>Solidago altissima</i>
barnyardgrass	<i>Echinochloa crus-galli</i>	Copper globemallow	<i>Sphaeralcea angustifolia</i>
Russian olive	<i>Elaeagnus angustifolia</i>	Scarlet globemallow	<i>Sphaeralcea coccinea</i>
Squirreltail	<i>Elymus elymoides</i>	Wright's globemallow	<i>Sphaeralcea wrightii</i>
New Mexico Olive	<i>Forestiera neomexicana</i>	Red bladdervech	<i>Sphaerophysa salsula</i>
Scarlet beeblossom	<i>Gaura coccinea</i>	Alkali sacaton	<i>Sporobolus airoides</i>
American licorice	<i>Glycyrrhiza lepidota</i>	Mesa dropseed	<i>Sporobolus flexuosus</i>
Curlycup gumweed	<i>Grindelia squarrosa</i>	Giant dropseed	<i>Sporobolus giganteus</i>
Broom snakeweed	<i>Gutierrezia sarothrae</i>	Big sacaton	<i>Sporobolus wrightii</i>
Annual sunflower	<i>Helianthus annuus</i>	Saltcedar	<i>Tamarix spp.</i>
Blue trumpets	<i>Ipomopsis longiflora</i>	Navajo tea	<i>Thelesperma megapotamicum</i>
Rush	<i>Juncus spp.</i>	Siberian elm	<i>Ulmus pumila</i>
Oneseed juniper	<i>Juniperus monosperma</i>	Rough cocklebur	<i>Xanthium strumarium</i>
Burningbush	<i>Kochia scoparia</i>	Intermediate wheatgrass	<i>Thinopyrum intermedium</i>
Prickly lettuce	<i>Lactuca serriola</i>		

Figure 2: Existing Vegetation in Project Area

3.7.1.3 Invasive Species

Executive Order 13112, Invasive Species, requires federal agencies to identify actions that could affect the status of invasive species and prevent the introduction of invasive species. It also requires federal agencies to not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States. A list of potentially-occurring noxious weeds in the Project area was prepared using applicable state and county weed lists. The State of New Mexico, under the administration of the New Mexico Department of Agriculture (NMDA), lists certain weed species as noxious (NMDA 2009). “Noxious” in this context refers to plants that are not native to New Mexico, that are targeted for management and control, and that have a negative impact on the economy or the environment. Class C listed weeds are common, widespread species that are well established in the state; Class B weeds are considered fairly

common but are not yet widespread in certain regions of the state; and Class A weeds have limited or no distribution in the state. Preventing new infestations of Class A species and eradicating their infestations is the highest priority. Class B species are found in limited portions of the state. In severe infestation areas, containing infestation and stopping further spreading is the management goal. Class C species are widespread in the state, and their management decisions are determined at the local level, based on feasibility of control and infestation level.

The land along the banks of the river within the Project area contains many forms of current and historic disturbances, including settlement, agriculture, ranching, and commercial and transportation development, which are conducive to the spread of noxious weed species. Noxious weeds could occur in varying composition and concentration across the Project area (NMDA 2009 and USDA-NRCS 2015). Riparian areas may include Siberian elm, salt cedar, Russian olive, and Tree of Heaven. Uplands may contain Russian knapweed (*Acroptilon repens*), cheatgrass (*Bromus tectorum*), chicory (*Cichorium intybus*), noxious thistle varieties, and other noxious weeds.

A comprehensive field survey for noxious weed species has not been conducted in the Project area, however multiple species of noxious weeds were observed during site reconnaissance (listed in **bold font**). A preliminary analysis of the New Mexico State Noxious Weed List related to the Project area's vegetation and disturbance patterns suggests that five Class A species— camelthorn (*Alhagi maurorum*), diffuse knapweed (*Centaurea diffusa*), hoary cress/whiteweed (*Cardaria* spp.), purple starthistle (*C. calcitrapa*), Scotch cottonthistle (*Onopordum acanthium*), and yellow starthistle (*C. solstitialis*); five Class B species—African rue (*Peganum harmala*), Malta starthistle (*Centaurea melitensis*), **perennial pepperweed (*Lepidium latifolium*)**, **Russian knapweed (*Acroptilon repens*)**, and spiny cocklebur (*Xanthium spinosum*); six Class C species—**cheatgrass (*Bromus tectorum*)**, musk thistle (*Carduus nutans*), Parrotfeather (*Myriophyllum aquaticum*), **Russian olive, salt cedar, Siberian elm**, and Tree of Heaven occur in Socorro County.

3.7.2 Fish and Wildlife

This section summarizes existing conditions for terrestrial wildlife and special status wildlife species, including consideration of birds, mammals, reptiles, amphibians, arthropods, and gastropods occurring within the Project area. The Project area is that as described in Section 1.2. This area was the subject of the literature review and target species list developed for the Proposed Action. The affected environment for some species may extend beyond the immediate river corridor to include migration corridors, breeding or nesting sites, wintering areas, or other wildlife habitats.

3.7.2.1 Fish and Wildlife within the Project area

Riparian areas constitute less than one percent of the land area in the arid southwest, yet provide habitat to a greater number of wildlife species than any other ecological community in the region. These riparian communities provide habitat for a wide variety of plants and animals. At least 80 percent of vertebrate wildlife occurring in New Mexico use riparian areas at some stage of their lives and 50 percent are permanent residents (NMDGF 2004). Riparian areas support a greater diversity of breeding birds than all other habitats in the state combined. In addition, the MRG is a critical travel corridor for migrating birds connecting Central and South America to North America along the Rio Grande Flyway (Yong & Finch 2002).

Studies by Hink and Ohmart (1984) and Thompson et al. (1994) have characterized wildlife use of the various plant associations that make up the riparian plant community in the Project area. These characterizations conclude that the riparian community, as a whole, supports a rich assemblage of vertebrate species, particularly birds. The highest numbers of vertebrate wildlife were found in marshes; cottonwood stands with a dense understory of Russian olive or coyote willow; and Russian olive shrub stands. Open areas, early growth stands, salt cedar, and river bars support lower densities and numbers of vertebrate species.

Common reptile and amphibian species found in the bosque include eastern fence lizard (*Sceloporus undulatus*), New Mexico whiptail (*Cnemidophorus neomexicanus*), and Woodhouse's toad (*Bufo woodhousii*). Habitats that lack dense canopy cover and that were characterized by sandy soils and sparse ground cover had the greatest abundance and diversity (Hink and Ohmart, 1984). Species associated with denser vegetation cover in wetter habitats includes tiger salamander (*Ambystoma tigrinum*), western chorus frog (*Pseudocris triseriata*), bullfrog (*Rana catesbeiana*), northern leopard frog (*Rana pipiens*), Great Plains skink (*Eumeces obsoletus*), New Mexico garter snake (*Thamnophis sirtalis dorsalis*), western painted turtle (*Chrysemys picta bellii*), and spiny softshell turtle (*Trionyx spiniferus*). Western rattlesnakes (*Crotalus viridis*) have also been noted in the riparian zone.

Common small mammals in the study area are white-footed mouse (*Peromyscus leucopus*), western harvest mouse (*Reithrodontomys megalotis*), house mouse (*Mus musculus*), tawny-bellied cotton rat (*Sigmodon fulviventor*), and rock squirrel (*Spermophilus variegatus*). Small mammals are more abundant in moister and densely vegetated habitats and those with dense coyote willow than at drier sites. Other mammals likely to occur in the Project area include beaver (*Castor canadensis*), raccoon (*Procyon lotor*), and muskrat (*Ondatra zibethicus*) in aquatic and wetland habitats; and long-tailed weasel (*Mustela frenata*), striped skunk (*Mephitis*), Botta's pocket gopher (*Thomomys bottae*), coyote (*Canis latrans*), common gray fox (*Urocyon cinereoargenteus*), javelina (*Tayassu tajacu*), mule deer (*Odocoileus hemionus*), and elk (*Cervus elaphus*) in riparian woodlands. Mountain lion (*Puma concolor*) are known to occasionally frequent the river corridor near San Marcial.

Fish sampling in the San Acacia reach (Dudley et al. 2017) in 2017 confirmed the following 10 species: Rio Grande silvery minnow (*Hybognathus amarus*), red shiner (*Cyprinella lutrensis*), western mosquitofish (*Gambusia affinis*), flathead chub (*Platygobio gracilis*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*) and less commonly the blue catfish (*Ictalurus furcatus*), river carpsucker (*Carpionodes carpio*), flathead catfish (*Pylodictis olivaris*), and white crappie (*Pomoxis annularis*). Red shiners and the Rio Grande silvery minnows were the most abundant fish captured. Through several studies and examination of catalogue collections, there has been documentation of extirpation of at least six species of native fishes from the basin. Regulated water storage and delivery, changes in channel morphology, and introduction of non-native fish have greatly influenced the existing aquatic community in the Project area.

Bird species observed in the Project area between June 30-August 15, 2017 include: mourning dove (*Zenaida macroura*), black-chinned hummingbird (*Archilochus alexandri*), Gambel's quail (*Callipepla gambelii*), northern flicker (*Colaptes auratus*), ash-throated flycatcher (*Myiarchus cinerascens*), European starling (*Sturnus vulgaris*), Bewick's wren (*Thryomanes bewickii*), American robin (*Turdus migratorius*), black-headed grosbeak (*Pheucticus melanocephalus*),

lesser goldfinch (*Spinus psaltria*), spotted towhee (*Pipilo maculatus*), blue grosbeak (*Passerina caerulea*), yellow-billed cuckoo (*Coccyzus americanus*), greater roadrunner (*Geococcyx californianus*), silky flycatcher (*Phainopepla nitens*), lazuli bunting (*Passerina amoena*), indigo bunting (*Passerina cyanea*), summer tanager (*Piranga rubra*), yellow-breasted chat (*Icteria virens*), brown-headed cowbird (*Molothrus ater*), great blue heron (*Ardea herodias*) and wild turkey (*Meleagris gallopavo*). Common breeding raptors of the Rio Grande include Cooper's hawk (*Accipiter cooperii*), Swainson's hawk (*Buteo swainsoni*), western screech-owl (*Megascops kennicottii*), and great-horned owl (*Bubo virginianus*) (Crawford et al. 1996). Cooper's hawk and great-horned owl were also observed in the Project area.

Generally, the abundance of breeding birds increase with the complexity and density of vegetation structure, which is thought to be related to the increased food, cover, or nest substrate it provides (Crawford et al. 1996). Along the Rio Grande, the highest breeding densities typically have been found in marshes, cottonwood stands with a well-developed shrub understory, and in tall shrub stands (Hink and Ohmart; 1984; Hoffman 1990; Thompson et al., 1994; Stahlecker and Cox, 1997). Bosque stands with a sparse understory generally support fewer breeding birds. Salt cedar stands (with or without a cottonwood canopy) have relatively low breeding bird use. Species commonly breeding in salt cedar include mockingbird (*Mimus polyglottos*), lark sparrow (*Chondestes grammacus*), western meadowlark (*Sturnella neglecta*), black throated sparrow (*Amphispiza bilineata*), blue-gray gnatcatcher (*Polioptila caerulea*), and crissal thrasher (*Toxostoma crissale*). Some birds, such as the house wren (*Troglodytes aedon*), Virginia's warbler (*Oreothlypis virginiae*), MacGillivray's warbler (*Geothlypis tolmiei*), and Lincoln's sparrow (*Melospiza lincolnii*), are associated with salt cedar during migration and winter months (Crawford et al. 1996).

The peak nesting season for birds is May 1 through August 15 (through September 1 where Yellow-billed cuckoo is present). The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703, et seq.) is the primary legislation in the United States established to conserve migratory birds. The list of the species protected by the MBTA appears in title 50, section 10.13, of the Code of Federal Regulations (50 CFR 10.13). The MBTA prohibits taking, killing, or possessing of migratory birds unless permitted by regulations promulgated by the Secretary of the Interior. The USFWS and the Department of Interior are the federal agencies responsible for administering and enforcing the statute.

3.7.3 Special Status Species

Under the authority of the Endangered Species Act (ESA) of 1973 (16 USC, Section 1531 et seq.), as amended, the USFWS is responsible for protecting and conserving threatened and endangered plant and wildlife species. The USFWS also designates critical habitat for threatened and endangered species. Critical habitat is defined as "specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species, and that have been formally described in the *Federal Register*." The New Mexico Department of Game and Fish (NMDGF) has the responsibility for state-listed species, under the authority of the Wildlife Conservation Act of 1974; and the New Mexico Energy, Mineral and Natural Resources Department, under authority of the New Mexico Endangered Plant Species Act and Rule No. NMFRC 91-1. Each agency maintains a list of animal and or plant species that have been classified, or are candidates for classification, as endangered or threatened based on

present status and potential threat to future survival and recruitment. The online Critical Habitat Portal (USFWS 2017b) was consulted for maps showing designated critical habitat for protected species and the Information for Planning and Consultation tool for a list of special status species for the Project area (IPAC) (USFWS 2017c). The NMDGF online database for wildlife—Biota Information System of New Mexico (BISON- M)—lists federal and state threatened, endangered, and species of concern and New Mexico Natural Heritage Program sensitive species by county (NMDGF 2017) and their associated habitat and distribution. These sources were reviewed to identify special status wildlife species that inhabit the region and gather information on their habitat requirements.

For this EA, special status species are state and federally listed and proposed threatened or endangered species, candidate species, and species of concern. However, only state and federally listed threatened and endangered species are afforded legal protection; thus, only these species were evaluated. There are a total of 15 special status wildlife species with the potential to occur in Socorro County. These are listed in Table 2.

Based upon a review of this list of 15 special status species, it was determined that five federally-listed species may occur in the Proposed Action area: New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) (mouse), Southwestern willow flycatcher (*Empidonax traillii extimus*) (flycatcher), Yellow-billed cuckoo (*Coccyzus americanus*) (cuckoo), Rio Grande silvery minnow (*Hybognathus amarus*) (minnow), and Pecos sunflower (*Helianthus paradoxus*) (sunflower).

The riparian habitat along the river within the Project area is designated as Critical Habitat for the flycatcher, proposed Critical Habitat for the cuckoo, and the river is designated as Critical Habitat for the minnow under the ESA. That is, the USFWS has determined that these habitats are critical to the continued existence and recovery of these species. These species are described in more detail below.

Table 2: Federal and State threatened, endangered, and candidate species listed for Socorro County, New Mexico, with potential to occur in the Project area.

Category	Common Name	Scientific Name	Federal Status (USFWS) ²	State of New Mexico status ³
<i>Mammals</i>	New Mexico Meadow Jumping Mouse	<i>Zapus hudsonius luteus</i>	E	E
<i>Birds</i>	Least Tern	<i>Sterna antillarum</i>	E	E
<i>Birds</i>	Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	T	S
<i>Birds</i>	Northern Aplomado Falcon	<i>Falco femoralis septentrionalis</i>	EXPN	E
<i>Birds</i>	Piping Plover	<i>Charadrius melodus</i>	T	T
<i>Birds</i>	Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>	E	E
<i>Birds</i>	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	T	S
<i>Amphibians</i>	Chiricahua Leopard Frog	<i>Rana chiricahuensis</i>	T	S
<i>Fish</i>	Rio Grande Silvery Minnow	<i>Hybognathus amarus</i>	E	E
<i>Snails</i>	Alamosa Springsnail	<i>Tryonia alamosae</i>	E	E
<i>Snails</i>	Chupadera Springsnail	<i>Pyrgulopsis chupaderae</i>	E	E
<i>Snails</i>	Socorro Springsnail	<i>Pyrgulopsis neomexicana</i>	E	E
<i>Crustaceans</i>	Socorro Isopod	<i>Thermosphaeroma thermophilus</i>	E	E
<i>Flowering Plants</i>	Pecos Sunflower	<i>Helianthus paradoxus</i>	T	E
<i>Flowering Plants</i>	Wright's Marsh Thistle	<i>Cirsium wrightii</i>	C	E

3.7.3.1 New Mexico Meadow Jumping Mouse

The mouse was listed as an endangered species on June 10, 2014. The mouse is a small, nocturnal, solitary mammal and an obligate riparian subspecies. The mouse hibernates for about 8 or 9 months out of the year, which is longer than most other mammals. Conversely, it is only active 3 or 4 months during the summer. Within this short timeframe, it must breed, birth and raise young, and store up sufficient fat reserves to survive the next year's hibernation period. In addition, the mouse only lives 3 years or less, and have one small litter annually, with seven or

² **Endangered Species Act (ESA) (as prepared by U.S. Fish and Wildlife Services) status:**

- E= Endangered: any species that is in danger of extinction throughout all or a significant portion of its range.
- T = Threatened: any species that is likely to become and endangered species within the foreseeable future throughout all or a significant portion of its range.
- C = Candidate: taxa for which the Services has on file sufficient information to support proposals to list them as endangered or threatened species.
- SOC = Species of concern (included for planning purposes; not protected under ESA)
- EXPN = experimental population, non-essential

³ **State of New Mexico status:**

- E= Endangered: Animal species whose prospects of survival or recruitment within the state are in jeopardy.
- T= Threatened: Animal species whose prospects of survival or recruitment within the state are likely to become jeopardized in the foreseeable future.
- S= Sensitive Taxa (informal).
- X= Taxa considered to be Extirpated

fewer young, so the subspecies has limited capacity for high population growth rates due to this low fecundity (reproductive potential (USFWS 2014a).

The subspecies chiefly uses patches or narrow strips of riparian vegetation composed of well-developed tall (averaging at least 24 inches), dense riparian herbaceous vegetation (plants with no woody tissue) primarily composed of sedges (plants in the Cyperaceae Family that superficially resemble grasses but usually have triangular stems) and forbs (broad-leafed herbaceous plants). This suitable habitat is found only when wetland vegetation achieves full growth potential associated with saturated soils along the edge of open, perennial flowing water. This vegetation is an important resource need for the mouse because it provides vital food sources (insects and seeds), as well as the structural material for building day nests that are used for shelter from predators. In addition, individual mice also need intact upland areas (areas up gradient and beyond the floodplain of rivers and streams) adjacent to riparian wetland areas because this is where they build nests or use burrows to give birth to young in the summer and to hibernate over the winter (USFWS 2014a).

Historically, these wetland habitats would have been in large patches (movements of 650 to 2,300 feet) to disperse to other habitat patches within stream segments) located intermittently along long stretches of streams. Connectivity between patches of suitable habitat is necessary to facilitate daily and seasonal movements, and dispersal to increase the likelihood of long-term viability of jumping mouse populations (USFWS 2014b). The USFWS estimates that resilient populations of mice need connected areas of suitable habitat in the range of at least about 68 to 181 acres, along 6 to 15 miles of flowing streams, ditches, or canals. The suitable habitat patches must be relatively close together, no more than about 650 feet apart, because the mouse has limited movement and dispersal capacity for natural recolonization (USFWS 2014b, USFWS 2016b).

3.7.3.1.1 Threats

The USFWS found a significant reduction in occupied localities likely due to cumulative habitat loss and fragmentation across the range for this mouse. The primary sources of current and future habitat losses include grazing pressure (which removes the needed vegetation) and water management and use (which causes vegetation loss from mowing and drying of soils), lack of water due to drought (exacerbated by climate change), and wildfires (also exacerbated by climate change). Additional sources of habitat loss are likely to occur from scouring floods, loss of beaver, highway reconstruction, residential and commercial development, coalbed methane development, and unregulated recreation. In addition, the isolated state of existing populations makes natural recolonization of impacted areas highly unlikely or impossible in most areas (USFWS 2014a). Nearly all of the current populations are isolated and widely separated, and all of the 29 populations located since 2005 have patches of suitable habitat that are too small to support resilient populations for this mouse.

Because the species occurs only in areas that are water-saturated, populations have a high potential for extirpation when habitat dries due to ground and surface water depletion, draining of wetlands, or drought. Mouse habitat is subject to dynamic changes that result from flooding and drying of these waterways and the ensuing fluctuations (loss and regrowth) in the quantity and location of dense herbaceous riparian vegetation over time.

3.7.3.1.2 Critical habitat

In March 2016, the USFWS designated critical habitat for the mouse that the Rio Grande valley, which includes 13,973 acres along 169.3 miles of flowing streams, ditches, and canals in eight units in the States of Colorado, New Mexico, and Arizona. Critical habitat for the mouse has been designated within Bosque del Apache NWR, approximately 2.5 miles south of the Project area. The habitat within this area is in habitat believed to be occupied by the subspecies within the middle Rio Grande having the capability to support breeding and reproduction. While this is close to the south end of the Project area, there is no critical habitat designated within the Project area (USFWS 2016b).

3.7.3.1.3 Presence in Project area

Most populations of the mouse are located in montane regions, but the Rio Grande in New Mexico (Frey 2012, USFWS 2014a) is the lowest-elevation population occurring in the managed floodplain of the Rio Grande and it occurs at the Bosque del Apache National Wildlife Refuge (Wright and Frey 2014). Since 2005, researchers have documented 29 remaining populations spread across the eight geographic management areas (2 in Colorado, 15 in New Mexico, and 12 in Arizona). Populations have been documented annually at Bosque del Apache through 2016 (Megan Goyette, pers. comm.). Suitable habitat was not observed within the Project area and mice are not expected to occur (USFWS 2014b).

3.7.3.2 Southwestern Willow Flycatcher

The flycatcher was listed as endangered in February 1995 (USFWS 1995). The flycatcher is an obligate riparian species and nests in thickets associated with rivers, streams and wetlands where dense growth of willow, Russian olive, salt cedar, or other plants are present (Finch and Stoelson 2000). Nests are frequently associated with an overstory of scattered cottonwood. Throughout the flycatcher's range, these riparian habitats are now reduced, widely separated, and occur in small and/or linear patches. Flycatchers nest in thickets of trees and shrubs approximately 6 to 23 feet in height or taller, with a densely vegetated understory approximately 12 feet or more in height. Surface water or saturated soil is usually present beneath or adjacent to occupied thickets (Muiznieks et al. 1994). Habitats not selected for nesting include narrow (less than 30 feet wide) riparian strips, small willow patches, and stands with low stem density (USFWS 2002a). Areas not utilized for nesting may still be used during migration (Yong and Finch 1997).

3.7.3.2.1 Threats

The two greatest ongoing threats to flycatchers in the MRG are the decline in the quality of critical nesting habitat related to the current prolonged drought conditions and reduced annual water supply, currently thought to be due to climate change, and to the invasion of salt cedar leaf beetle, which causes loss of important nesting substrate and opens the nesting canopy habitat to produce nest failure. In some areas, nest predation by brown-headed cowbird (*Molothrus ater*) can be a third threat.

3.7.3.2.2 Critical habitat

The final rule designating critical habitat for the flycatcher was produced by the USFWS in 2013. In total, approximately 1,227 stream miles are designated as critical habitat. These areas are designated as stream segments, with the lateral extent including the riparian areas and streams that occur within the 100-year floodplain or flood-prone areas encompassing a total area

of approximately 208,973 acres. The Rio Grande Recovery Unit, which encompasses the Project area, primarily includes the Rio Grande watershed from its headwaters in southern Colorado downstream to the Pecos River confluence in Texas. The MRG Management Unit includes a 112.1 mile segment of the Rio Grande that extends from below Isleta Pueblo and the Bernalillo and Valencia County line downstream past Bosque del Apache and Sevilleta NWRs and into the upper part of Elephant Butte Reservoir ending in Socorro County about 2 miles north of the Sierra County line, New Mexico (about 9 miles of the upper part of Elephant Butte Reservoir).

3.7.3.2.3 Presence in Project area

The range of the flycatcher includes Arizona, New Mexico, southern California, extreme western Texas, southwestern Colorado, and southern portions of Nevada and Utah (USFWS 2002a). In New Mexico, flycatchers are known to breed along the Rio Grande, and in the Zuni, San Francisco, and Gila River drainages. A recovery plan for the flycatcher has been completed (USFWS 2002a).

U.S. Bureau of Reclamation (Reclamation) personnel have conducted presence/absence surveys and nest monitoring for the flycatcher during the May to July survey season within the Rio Grande Basin since 1995. Presence/absence surveys, based on established survey protocols, were conducted to determine the distribution and abundance of the endangered flycatcher during the relatively brief breeding season when they become a seasonal resident of the Southwestern United States. The 2016 presence/absence surveys for flycatchers were conducted at selected sites along the Rio Grande between Bandelier National Monument and Elephant Butte Reservoir. Surveys were performed between May 19 and July 22, 2016.

There are three flycatcher survey reaches within the Project area, which include the San Acacia, Escondida, and Bosque del Apache reaches. No flycatchers were detected in the San Acacia reach.

In the Escondida reach, small numbers of resident flycatchers have been documented since 2002. During 2016 surveys, 52 flycatchers were located including 43 migrants, one resident flycatcher of undetermined breeding status, and four breeding flycatcher pairs. Nesting was first documented in this reach during 2012 when eight pairs and six nests were located. Nest abundance has fluctuated during the past four years and no nests were located in this reach during 2016.

In the Bosque del Apache reach 62 flycatchers, including 32 migrants, 4 flycatchers of undetermined breeding status, and 13 pairs were detected. Since the first flycatcher nest was documented in this reach in 2003, territories and associated nest numbers increased until 2012, when numbers began to decline. The increase was due in large part to a drastic improvement in habitat quality and quantity stimulated by overbank flooding from the sediment plug which formed in 2008. Nest abundance increased from a single nest in 2003 to a recent high of 38 documented in 2012. Due to degrading habitat caused by the recent drought, nest abundance began to decrease in 2013, and this decrease has continued. During 2016, although 13 pairs were documented, only one nest was located (Moore and Ahlers 2017).

In 2017, migrant flycatchers were detected within the Project area. Two nests were established within the Project area along the east side of the river on the bank of the river. Both nests are greater than 500 feet from specific properties that are proposed to be worked on.

3.7.3.3 Yellow-billed cuckoo

The cuckoo was listed as a threatened species under the Endangered Species Act (ESA) by the USFWS effective November 3, 2014 (USFWS 2014c). Currently there is no recovery plan for the cuckoo. Critical habitat was also proposed and the public comment period was reopened in October 2014 (USFWS 2014d). The western population of cuckoo is considered a “distinct population segment” (DPS) as opposed to a subspecies (Service 2014a). The cuckoo is an obligate riparian species occurring in scattered locations in the western U.S. during the breeding season. The cuckoo nests almost exclusively in low to moderate elevation riparian woodlands with native, broadleaf trees and shrubs that are at least 50 acres in size and at least 325 feet (100 m) in width (USFWS 2014c). Cuckoos generally arrive at their breeding grounds in mid-June with nesting starting between late June through August. Mature cottonwood forest with well-developed willow understory appear to be important characteristics of habitat for cuckoo (Buffington et al. 1997; Gaines and Laymon 1984). While willows appear to be a preferred nest tree, the species will also nest in dense salt cedar stands. In addition, as the proportion of salt cedar increases, the suitability of the habitat for cuckoos decreases, and sites with a monoculture of salt cedar are unsuitable for breeding cuckoos (USFWS 2014c).

The cuckoo breeds in riparian habitat along low gradient (surface slope less than 3 percent) rivers and streams, and in open riverine valleys that provide wide floodplain conditions (greater than 325 feet). Within the boundaries of the distinct population segment (DPS) these riparian areas are located from southern British Columbia, Canada, to southern Sinaloa, Mexico, and may occur from sea level to 7,000 feet (or slightly higher in western Colorado, Utah, and Wyoming) in elevation.

3.7.3.3.1 Threats

Threats to the cuckoo include a decrease in habitat availability and suitability from loss and degradation of riparian habitat and habitat regeneration. Major factors contributing to habitat loss are the disruption of hydrological processes necessary to maintain a healthy riparian system, including fluctuating reservoir levels; poorly managed grazing, development activities, extractive uses, expansion of nonnative vegetation, and uncontrolled wildfire (USFWS 2014c).

Cuckoos now breed in small, isolated populations. These populations are increasingly at risk to further declines as a result of increased predation rates, lack of abundance of prey, migratory obstacles (i.e. weather events, collision with structures, etc.), conversion of habitat from native to exotic vegetation, defoliation of salt cedar caused by tamarisk leaf beetles, increased fire risk, and climate change (Thompson 1961, McGill 1975, Wilcove et al 1986).

Fire is an imminent threat to cuckoo breeding habitat (USFWS 2013). Although fires occurred to some extent in riparian habitats historically, many native riparian plants are neither fire- adapted nor fire-regenerated. Thus, fires in riparian habitats are typically catastrophic, causing immediate and drastic changes in plant density and species composition. Busch (1995) documented that the current frequency and size of fires in riparian habitats is greater than historical levels because reduced floods have allowed buildup of fuels, and because of the expansion and dominance of the highly flammable tamarisk. Tamarisk and arrowweed (*Pluchea sericea*) tend to recover more rapidly from fire than do cottonwood and willow.

3.7.3.3.2 Critical habitat

The Project area is within an area proposed as critical habitat for the cuckoo. In August 2014, the USFWS proposed designated Critical Habitat for the cuckoo which included approximately 546,335 acres in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming (USFWS, 2014). Included in this designation is the MRG unit NM-8 which is 61,959 ac (25,074 ha) in extent and is an approximate 170-mi (273-km)-long continuous segment of the lower Rio Grande from Elephant Butte Reservoir in Sierra County at approximately river mile 54, upstream through Socorro, Valencia, and Bernalillo Counties to below Cochiti Dam in Cochiti Pueblo in Sandoval County, New Mexico. This unit is consistently occupied by a large number of breeding cuckoos and currently is the largest breeding group of the species north of Mexico. The unit also provides a movement corridor for cuckoos moving farther north. Salt cedar, a nonnative species that reduces the habitat's value, is a major component of habitat in this critical habitat unit (USFWS 2014d).

3.7.3.3.3 Presence in Project area

Formal cuckoo surveys along the Rio Grande were started in 2006 from Isleta Pueblo south to Elephant Butte Reservoir. The population has ranged from a low of 73 territories in 2011 to a high of 121 territories in 2012 (Carstensen et al. 2015).

There are three cuckoo survey reaches within the Project area, which include the San Acacia, Escondida, and Bosque del Apache reaches. The San Acacia Reach was surveyed for the first time in 2009; surveys documented eight detections and one territory. Detections remained low in the subsequent two years but as with the other reaches, 2012 results showed a sizeable increase in both detections (19) and territories (4). In 2016 there were 23 detections and 8 territories in this reach.

The Escondida Reach has been surveyed wholly or in part since 2007. In 2009, surveys documented 29 detections, representing 9 breeding territories. During the 2010 and 2011 survey seasons, detections and associated territories declined markedly. However, the 2012 totals of 68 detections and 21 territories was a two-fold increase over the 2009 totals in both detections and territories. The Escondida Reach was one of only two reaches that experienced population increases during 2013. In 2013, 80 detections comprising approximately 23 territories were documented. Interestingly, a large decline was observed from 2013 to 2014. Detections decreased approximately 66 percent (n=27) and territories decreased 70 percent (n=7). However, detections and territories again increased in 2015 and 2016 and the reach ranked second after San Marcial in number of detections and territories both years. There were 58 detections and 16 territories in the Escondida reach in 2016.

The Bosque del Apache NWR Reach has also been surveyed since 2007. In 2009, a total of 47 detections comprising 11 territories were documented within the Bosque del Apache NWR. Like the Escondida Reach, detections and associated territories dramatically declined in 2010 and 2011, only to recover in 2012. The survey results since 2012 have remained relatively consistent with little fluctuation. In both 2014 and 2015, 12 territories were detected and 11 territories and 32 detections were recorded in 2016 (Dillon et al. 2017). In 2017, there were numerous detections throughout the Project area and 24 territories were established.

3.7.3.4 Rio Grande Silvery Minnow

Reduction in the range of the minnow and threats to its continued existence in the MRG were central to this species being listed as endangered (USFWS 1994). The minnow was formerly one of the most widespread and abundant species in the Rio Grande basin in New Mexico, Texas, and Mexico.

The minnow is the only surviving endemic fish species of the Rio Grande in New Mexico. The species is a pelagic spawner. Individual females may produce more than 3,000 semi-buoyant, non-adhesive eggs during a spawning event. Adults spawn during about a 1-month period in late spring-early summer (May-June) in apparent response to spring runoff. Smith (1998) collected eggs in the middle of May, late May, early June, and late June in 1997. These data suggest multiple spawning events, and it appears likely that the minnow spawns multiple times during the summer, concurrent with flow spikes. The majority of the spawning fish are 1 year old. Two-year-old fish comprise less than 10 percent of the spawning population (Tetra Tech 2013).

The minnow travels in schools and tolerates a wide range of habitats. Adults are most commonly found in shallow and braided runs over sand substrate. Young-of-year occupy shallow, low-velocity backwaters with sand-silt substrates. Dudley and Platania (1997) reported that the minnow was most commonly collected in habitats with depth less than 8 inches or between 12 and 16 inches, and were not found in habitats with water depths greater than 20 inches. More than 85 percent were collected from low-velocity habitats (less than 0.325 feet/second). Habitat for the minnow includes stream margins, side channels, and off-channel pools where water velocities are low or reduced from main-channel velocities. Areas with detritus and algal-covered substrates are preferred. Lee sides of islands and debris piles often serve as good habitat. Stream reaches dominated by straight, narrow, incised channels with rapid flows typically are not occupied by the minnow. During the winter, the minnow tends to concentrate in low-velocity areas in conjunction with vegetation and debris piles for cover (Tetra Tech 2013a).

3.7.3.4.1 Threats

The original listing of the species as endangered (58 FR 11823) cited the presence of mainstream dams; growth of agriculture and cities in the Rio Grande Valley; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation, particularly during periods of low or no flow; inadequacy of existing regulatory mechanisms including the lack of recognition that instream flows are a beneficial use of State waters; dewatering of a large percentage of its habitat, including dewatering downstream from San Acacia. A recent modelling analysis of the MRG found that very limited habitat areas exist that have conditions favoring food availability for minnows in the days, weeks, and sometimes months of higher channel flows following spawning, except when flows are sufficient to inundate floodplains; therefore, the currently observed relatively short life spans for this minnow appear to be a primarily result of disconnected floodplains during higher channel flows that largely eliminate feeding habitat for the minnow, leading to high rates of post-spawn mortality (Tetra Tech 2015).

Persistence of the minnow population remains a serious present-day risk in the MRG due to (1) channel drying and the lack of suitable perennial refugia habitat during the irrigation season and during periods of drought, leading to complete desiccation of potential habitat for minnows; (2) lack of abundant feeding habitat consisting of channel flows less than a half a foot per second. High flow velocities suspend and scour away potential benthic and other attached food supplies

for minnows, decreasing survival; and (3) floodplains habitats that fail to connect and inundate during spawn-stimulating flows, stranding minnow eggs and developing fry within the high-velocities channel flows. High velocity channel flows have long been known to produce very high to total mortality of eggs and developing fry in small-bodied fish species (Harvey 1987).

3.7.3.4.2 Critical habitat

The USFWS (2003a) designated as Critical Habitat for the minnow approximately 157 miles of the Rio Grande in New Mexico from Cochiti Dam to north of Elephant Butte Reservoir at river mile (RM) 62.1. That designation also included areas bounded by existing levees or, in areas without levees, 300 feet of riparian zone outward from each side of the river during bank full stage of the MRG (USFWS 2003a). Therefore, there is designated critical habitat within the Project area.

3.7.3.4.3 Presence in Project area

Historical populations of minnow were documented in the Rio Grande upstream from present day Cochiti Reservoir; in the downstream portions of the Chama and Jemez Rivers; throughout the Middle and Lower Rio Grande to the Gulf of Mexico; and in the main stem of the Pecos River from Sumner Reservoir downstream to the confluence with the Rio Grande assuming a range in the Rio Grande from near Espanola to the Gulf of Mexico and a range in the Pecos River from near Fort Sumner to the confluence with the Rio Grande, there was conservatively a total of approximately 2,000 miles of riverine habitat historically available. Collections of minnow in the mid-1990s found no minnow in reaches downstream of Cochiti Dam. The minnow has since been documented from Angostura to Elephant Butte Reservoir, a distance of approximately 150 miles. This is a reduction to less than 8 percent of the historic range (Tetra Tech 2013).

Population monitoring efforts in the San Acacia Reach during September 2017 yielded 2,425 individual fish and covered an area of 4,607.5 m² of water. In September 2017, there were 12 fish species collected in the San Acacia Reach. Minnow were the most abundant taxon (n = 1,015), followed by Western Mosquitofish (n = 658), and Red Shiner (n = 446). Densities minnow ranged from 0.0 to 66.7 individuals per 100 m². Rio Grande Silvery Minnow (n = 1,015) was present in 108 of the 163 seine hauls that yielded fish during September (Dudley et. al 2017).

3.7.3.5 Pecos Sunflower

The Pecos sunflower was listed as threatened in 1999 and a recovery plan was published in 2005 (USFWS 2005). The Pecos sunflower is an annual member of the sunflower family (Asteraceae). This sunflower is a wetland species that requires saturated saline soils of desert wetlands and is usually associated with desert springs (ciénegas) or the wetlands created from modifying desert springs at 3,300-6,600 feet of elevation (NMRPTC 1999).

3.7.3.5.1 Threats

Activities that degrade or destroy wetlands threaten Pecos sunflower including channel incision that reduces water tables, groundwater depletion, water diversions, filling, and salt cedar invasion (NMRPTC 1999). The lowering of water tables due to groundwater withdrawals for irrigated agriculture, municipalities, and other uses has reduced available habitat for Pecos sunflower, particularly in Texas. The introduction of non-native species, particularly salt cedar,

is a major factor in the loss and degradation of Southwestern wetlands. Salt cedar and other non-native vegetation invaded many western riverine systems from the 1890s to the 1930s and increased rapidly from the 1930s to the 1950s, by which time they occupied most of the available and suitable habitat in New Mexico and western Texas. Salt cedar will out-compete and displace native wetland vegetation, including Pecos sunflower (USFWS 1999).

Livestock will eat Pecos sunflower (especially the flower heads) when other green forage is scarce. If an area is heavily grazed for several years in succession when plants are flowering, the soil seed bank may diminish and the population will eventually decline (USFWS 1999).

Disturbance may also facilitate hybridization (NMRPTC 1999). Natural hybrids between Pecos sunflower and common sunflower can occur and are known from sites in both Texas and New Mexico. Habitat for common sunflower is increased by human activities and the two sunflowers may be in greater contact than in the past. Natural hybrids have low fertility, but are not completely sterile. A measure of isolation between the two species is provided by the different flowering times for Pecos sunflower and common sunflower. Natural droughts are common in the desert regions where Pecos sunflower occurs. These droughts combined with the effects of wetland alterations and losses could extirpate some small populations. The present distribution of Pecos sunflower coincides with areas having large reliable springs and this may in part be a response to the effects of natural droughts (USFWS 1999).

3.7.3.5.2 Critical habitat

The USFWS designated critical habitat for the Pecos Sunflower in 2008 (USFWS 2008). There is no critical habitat for the Sunflower in the Project area or in Socorro County. Critical habitat Unit 2 was proposed in Socorro County (USFWS 2007), located in the La Joya Wildlife Management Area. This unit is 854 ac (346 ha). This population is located about 7 mi (11 km) south of Bernardo within Socorro County near the confluence of the Rio Grande and the Rio Puerco. One of the largest populations of *Helianthus paradoxus* occurs adjacent to the Rio Grande at La Joya. This Rio Grande population consists of 100,000 to 1,000,000 plants and occurs on the La Joya Wildlife Management Area. It is within the La Joya Unit of the Ladd S. Gordon Waterfowl Complex. This property is owned by the New Mexico State Game Commission. It is managed by the NMDGF for migratory waterfowl habitat, which is compatible with preservation of wetlands for *H. paradoxus*.

This unit was excluded from critical habitat designation because the NMDGF finalized a habitat management plan in order to preclude the designation of critical habitat on their lands. The purpose of the management plan is to support conservation of the species on the La Joya Wildlife Management Area by: (1) Annually controlling invasive species; (2) protecting the natural spring in Unit 5 from motorized vehicles and heavy equipment; (3) monitoring core populations by digitizing these areas annually; (4) conserving the sunflower by adjusting invasive species treatment area boundaries; and (5) restoring native habitat through revegetation. The habitat management plan was developed in accordance with the recovery plan for *Helianthus paradoxus* (USFWS 2008).

3.7.3.5.3 Presence in Project area

Pecos sunflower is presently known from 25 sites that occur in 5 general areas. These areas are Pecos and Reeves counties, Texas, in the vicinity of Fort Stockton and Balmorhea; Chaves County, New Mexico, from Dexter to just north of Roswell; Guadalupe County, New Mexico, in the vicinity of Santa Rosa; Valencia County, New Mexico, along the lower part of the Rio San

Jose; and Cibola County, New Mexico, in the vicinity of Grants. There are 3 sites in the Fort Stockton- Balmorhea area, 11 in the Dexter to Roswell area, 8 in the Santa Rosa area, 1 along the lower Rio San Jose, and 2 in the Grants area. Most of the Pecos sunflower sites are limited to less than 5 acres of wetland habitat with some being only a fraction of an acre (USFWS 1999).

The Rhodes property is the only location in the Project area where the Pecos sunflower is known to occur and was observed during site visits, however treatment on this property will take place in areas outside of the known sunflower occurrence.

3.7.3.6 Other species

The remaining special status species listed in Table 2 are listed briefly below as they do not have likelihood to occur within the Project area.

Brief consideration was given for two rare migrant bird species: the endangered Interior least tern (*Sterna antillarum*) (tern) and the Piping Plover (*Charadrius melodus*) (plover). The Piping Plover has been documented in the Bosque del Apache National Wildlife Refuge in New Mexico south of the Project area (USBR 2013). There is a lack of suitable habitat for either the tern or plover in the Project area.

The Chiricahua leopard frog was listed as endangered in June of 2002 (USFWS 2002b) and the USFWS published a recovery plan for the frog in 2007. The USFWS (2012) designated as Critical Habitat for the Chiricahua Leopard Frog approximately 10,346 acres in Apache, Cochise, Gila, Graham, Greenlee, Pima, Santa Cruz, and Yavapai Counties, Arizona; and Catron, Grant, Hidalgo, Sierra, and Socorro Counties, New Mexico. The species is now limited primarily to headwater streams and springs and the nearest critical habitat unit, to the Project, is Recovery Unit 8, which includes the Alamosa Warm Springs Unit at the headwaters of Alamosa Creek, Socorro County, New Mexico. This is the closest location to the Project that is known to be occupied by the frog, and is over 25 miles from the Project area.

The Wright's marsh thistle (*Cirsium wrightii*) (thistle) grows in wet, alkaline soils in spring seeps and marshy edges of streams and ponds at elevations of 3,450-8,500 feet. Desert springs and cienegas are susceptible to drying up or being diverted. Populations in the City of Roswell, Chavez County, at Lake Valley, Sierra County, and at San Bernardino Cienega in Arizona appear to be extirpated. The thistle was not detected in the project area.

3.7.3.7 New Mexico Plant Species of Concern

A list of target special status plant species was developed based on records from the New Mexico Rare Plant Technical Council (NMRPTC), Natural Heritage New Mexico (NHNM), New Mexico Energy, Minerals, and Natural Resources Department (NMEMNRD), and the USFWS. The NMEMNRD Forestry Division maintains a list of plant species considered threatened or endangered in New Mexico (NMEMNRD 2017). Section 75-6-1 NMSA 1978 directs the Forestry Division to gather information on habitat requirements, distribution, threats, and abundance to determine the status of endangered plant species. The state list could include species not listed at the federal level. Data sources were examined to determine whether target special status plant species or their habitat or wetlands occur in the Project area.

There are 15 state and federally listed plant species in Socorro County (Table 3). There are also numerous other species listed as rare, state or federal species of concern, or ranked as global or state critically imperiled, imperiled, or vulnerable. However, only state and federally listed

threatened and endangered species are afforded legal protection; thus, only these species are evaluated. Of the 15 listed plant species known to occur in Socorro County, only the Fugate's amsonia (*Amsonia fugatei*), La Jolla prairie clover (*Dalea scarios*), Sand Prickly-pear (*Opuntia arenaria*) and Pecos sunflower (*Helianthus paradoxus*; as discussed above) are species of concern with the potential to occur in the Project area, based on habitat requirements, soil associations, and known locations. The Pecos sunflower is discussed above. The remaining three species are discussed in more detail below.

Fugate's amsonia (*Amsonia fugatei*) - The Fugate's amsonia is a federal and state Species of Concern. The distribution of this plant in New Mexico is limited to Socorro County. The Fugate's amsonia grows small and localized population in limy conglomerate ridges and is associated with outwash slopes in Chihuahuan desert scrub at 5,000-5,900 feet of elevation. This plant may be severely impacted by human activity (NMRPTC 1999).

La Jolla prairie clover (*Dalea scariosa*) - The La Jolla prairie clover is a federal and state Species of Concern. It grows in open sandy clay banks and bluffs, often along roadsides, at about 4,750-4,900 feet. This plant has a restricted area of distribution, but is often locally abundant and frequently occurs on sites disturbed just a few years earlier. The distribution of the La Jolla prairie clover no longer fits the NMRPTC definition of rare (SEINet) and was dropped from the rare plant list in 2017 (NMRPTC 1999).

Sand Prickly-pear (*Opuntia arenaria*) - The Sand Prickly-pear is a federal Species of Concern and listed as endangered with the State of New Mexico. It grows in sandy areas, particularly semi-stabilized sand dunes among open Chihuahuan desert scrub, often with honey mesquite and a sparse cover of grasses. Ranges from 3,800-4,300 feet in elevation. Much of its former habitat has been lost to urbanization and agricultural development in the Rio Grande Valley (NMRPTC 1999).

None of these three species were detected in the Project area.

3.8 Cultural Resources

Cultural resources consist of discrete areas of human activity, occupation, or use, evidenced by material remains, historical documents, or oral interviews. They include archaeological and architectural resources, as well as traditional cultural properties (TCPs). Archaeological resources are spatially finite areas containing physical traces of past human activity both on and within the ground. Architectural resources are aboveground resources, typically consisting of historic buildings and structures. TCPs are locations that derive their significance from traditional values of a cultural group such as an Indian tribe or local community. All types of cultural resources can provide information and connections to past lifeways.

The Project vicinity has long been used by humans, who left behind a large and diverse assemblage of prehistoric archaeological sites, historic archaeological sites and localities, and locations of traditional religious and cultural importance to Indian tribes and local communities. For management purposes, these remains take the form of sites, artifacts, buildings, structures, ruins, features, and natural landscapes with particular cultural importance. With a few exceptions, these remains must be at least fifty years old. In the case of TCPs, the period of traditional use of that place must also be at least fifty years old.

Numerous laws and regulations require that possible effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a

process of compliance, define the responsibilities of the federal agency proposing the actions, and prescribe the relationships among involved agencies. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act (NHPA, especially Sections 106 and 110), the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, and the Native American Graves Protection and Repatriation Act. The latter stipulates that, in the event of any inadvertent discovery of human remains, the Project would stop work in the vicinity of the find and comply with all relevant laws regarding burials.

Table 3: Special Status Plant Species that Could Occur within the Project area⁴.

Common Name	Scientific Name	Federal Status ⁵	State Status	Habitat	Likely to Occur in Action Area
Fugate's amsonia	<i>Amsonia fugatei</i>	SoC	SoC	Limy conglomerate ridges and associated outwash slopes in Chihuahuan desert scrub; 1,500-1,800 m (5,000-5,900 ft).	Yes
Wright's Marsh Thistle	<i>Cirsium wrightii</i>	FCAN	SE	Wet, alkaline soils in spring seeps	No
La Jolla prairie clover	<i>Dalea scariosa</i>	SoC	SoC	Open sandy clay banks and bluffs, often along roadsides, at about 1,450-1,500 m (4,750-4,900 ft).	Yes
Mogollon Whitlowgrass	<i>Draba mogollonica</i>	SoC	SoC	Cool, moist northern slopes of mountains, ravine and canyons on volcanic rocks and soil in montane forests; 1,500-2,900 m (5,000-9,000 ft).	No
Standley's Whitlow-grass	<i>Draba standleyi</i>	SoC	SoC	Igneous rock faces, bases of overhanging cliffs, clefts of porphyritic and andesitic rocks and soil; 1,675-1,980 m (5,500-6,500 ft).	No
Winn Falls Fleabane	<i>Erigeron scopulinus</i>	SoC	SoC	Crevices in cliff faces of rhyolitic rock in lower montane coniferous forest; 1,800-2,800 m (6,000-9,000 ft).	No
Pecos Sunflower	<i>Helianthus paradoxus</i>	FT	SE	Permanently saturated saline soils	Yes
Tall bitterweed	<i>Hymenoxys brachyactis</i>	SoC	SoC	Dry sites with coarse soils in piñon-juniper woodland and lower montane coniferous forest; 2,100-2,500 m (6,900-8,200 ft).	No
Todilto stickleaf	<i>Mentzelia todiltoensis</i>	SoC	SoC	Outcrops of gypsum in the Todilto Formation; 1,700-1,910 m (5,600-5,840 ft).	No
Sand Prickly-pear	<i>Opuntia arenaria</i>	SoC	SE	Sandy areas, particularly semi-stabilized sand dunes among open Chihuahuan desert scrub, often with honey mesquite and a sparse cover of grasses; 1,160-1,300 m (3,800-4,300 ft).	Yes
Mohave panicum	<i>Panicum mohavense</i>	SoC	SoC	Limestone terraces and cliffs in Great Basin	No
San Mateo penstemon	<i>Penstemon pseudoparvus</i>	SoC	SoC	Open ponderosa pine or spruce-fir forests and high montane meadows; 2,700-3,050 m (9,000-10,000 ft).	No
San Andres Rockdaisy	<i>Perityle staurophyllavar. homoflora</i>	SoC	SoC	Crevices in limestone cliffs, usually on protected north and east exposures at about 1,950-2,150 m (6,400-7,000 ft).	No
Sivinskis scorpionweed	<i>Phacelia sivinskii</i>	SoC	SoC	Restricted to gypsum from the Upper Jurassic Todilto Formation from the Permian Yeso Formation (Socorro and Valencia counties) in sparse juniper/desert scrub communities; 1,800-1,960 m (5,900-6,450 ft).	No
Plank's Catchfly	<i>Silene plankii</i>	SoC	SoC	Igneous cliffs and rocky outcrops; 1,500-2,800m (5,000-9,200 ft).	No

⁴ Sources: NMRPTC 2017, NMAC 2017, USFWS 2017.

⁵ Status Codes: SE—State Endangered; SoC—Species of concern; FE—Federally Endangered; FT—Federally Threatened; FCAN—Federal-listed Candidate

Federal agencies must consider whether their activities could affect historic properties that are already listed, determined eligible, or not yet evaluated using criteria for listing cultural resources on the National Register of Historic Places (NRHP). Properties that are listed on or eligible for listing on the NRHP are provided the same measure of protection under Section 106 of the National Historic Preservation Act, as are sites that are as yet undetermined under NRHP criteria. It is important to note that resources described as “determined” eligible or not eligible for listing in the NRHP have received concurrence from the State Historic Preservation Officer (SHPO) regarding their NRHP status. For those that have been “recommended” eligible or not eligible, that status is based upon evaluation by a lead federal agency or consultant.

The Area of Potential Effects (APE) for cultural resources for the Proposed Action covers 27 noncontiguous parcels ranging from approximately 4 to 350 acres in size. Most of these parcels are privately owned and are used partially for agriculture, small-scale ranching, and/or are open riparian floodplain. The APE for the Proposed Action is limited to the surfaces and depths impacted by the Project.

A records search using the New Mexico Cultural Resource Information Service (NMCRIIS) database administered by the Archaeological Records Management Service (ARMS) of the Historic Preservation Division (HPD), New Mexico Department of Cultural Affairs was conducted for the APE and surrounding areas. Approximately 40 percent of the APE has been covered by previous surveys (Table 4).

Tetra Tech submitted a sample survey design to Socorro County and the New Mexico HPD (Huntley 2017a). The sample survey was proposed for approximately 30 percent of the total area that would receive mechanical treatment, including equipment access and staging areas, within Parcels that lack previous survey coverage. The sample survey was designed to document attributes, densities, and spatial distributions of prehistoric and historic cultural resources within sampled areas, which can be extrapolated to the larger APE. This sample survey design received HPD approval on September 25, 2017. The SHPO concurred that 14 Parcels with greater than 20 percent previous survey coverage did not require additional cultural survey. Tetra Tech completed the sample survey in October, 2017 (Huntley 2017b). With the inclusion of Tetra Tech’s sample survey for the Proposed Action, 46% of the APE has been surveyed. The remaining 54% of the APE is unsurveyed. However, these areas are considered to have low potential for cultural resources based on topographic context, fluvial erosion rates, and sedimentation rates.

Table 4: Previous Surveys within APE

NMCRIS ⁶ Activity No.	Reference	Acres in APE	Parcel (s)	Resources Identified
15542	Kayser, David W. 1986. Memorandum Report: Cultural Resource Survey, Middle Rio Grande Occupancy Program Case Nos. Lot 13 T4S, R1E Section 9. US Bureau of Land Management, Las Cruces Dist.-Socorro Resource Area, Report Number CRR-NM-02-86-55.	2.4	FEMA-4152-PA 6.1 FEMA-4152-PA 6.3	None
15549	Kayser, David W. 1986 Memorandum Report: Cultural Resource Survey, Middle Rio Grande Occupancy Program, Case Nos. Lot 57 T4S R1E Sec 8 (and part of Sec 17). US Bureau of Land Management, Las Cruces Dist.-Socorro Resource Area, Report Number CRR-NM-02-86-48.	24.1	FEMA-4152-PA 6.1	None
15550	Kayser, David W. 1986 Memorandum Report: Cultural Resource Survey, Middle Rio Grande Occupancy Program, Case Nos. Lot 56, T4S, R1E, Sec 8. US Bureau of Land Management, Las Cruces Dist.-Socorro Resource Area, Report Number CRR-NM-02-86-47.	4.2	FEMA-4152-PA 6.1	None
17108	Clifton, Don. 1986. A Cultural Resources Survey of Three Direct Sales Projects and One Transfer of Title Project near Escondida, Socorro County, New Mexico. US Bureau of Land Management, Las Cruces Dist.-Socorro Resource Area, Report Number CRR-NM-02-86-140.	4.2	FEMA-4152-PA 3.3	None
21573	Carroll, Charles. 1988. A Cultural Survey of Lands Proposed for Disposal Under the Middle Rio Grande Occupancy Resolution Program South of the Town of San Antonio, Socorro County, New Mexico. US Bureau of Land Management, Las Cruces Dist.-Socorro Resource Area, Report Number CRR-NM-02-88-46.	60.3	FEMA-4152-PA 8.3	None
58373	Doleman, William H. 1997. Letter Report: Cultural Resources Survey Isleta to Belen and San Acacia to San Marcial for the Army Corps of Engineers. Report prepared for US Army Corps of Engineers Albuquerque District by University of New Mexico Office of Contract Archaeology.	101.2	FEMA-4152-PA 3.4 FEMA-4152-PA 4.1 FEMA-4152-PA 4.2 FEMA-4152-PA 4.3 FEMA-4152-PA 5.2 FEMA-4152-PA 5.1 FEMA-4152-PA 6.1 FEMA-4152-PA 6.3 FEMA-4152-PA 8.3	LA 755

⁶ NMCRIS = New Mexico Cultural Resources Information System

NMCRIS ⁶ Activity No.	Reference	Acres in APE	Parcel (s)	Resources Identified
78665	Dello-Russo, Robert. 2002. A Cultural Resources Inventory of 22.8 Acres of Rio Grande Floodplain Near Socorro, New Mexico,	1.3	FEMA-4152-PA 3.2	LA31718;
	Proposed for Vegetation Removal. Report prepared for Save Our Bosque Task Force by Escondida Research Group, LLC, Report Number 2002-06.			
95377	Reynolds, David H., and Anthony E. Martinez. 2005. Archaeological Survey, San Antonio Riparian Restoration, Socorro County, New Mexico. Report prepared for US Natural Resource Conservation Service, New Mexico State Office by Zia Engineering & Environmental Consultants, Report Number ALB-05-037.	394	FEMA-4152-PA 7.2 FEMA-4152- PA 7.3 FEMA- 4152-PA 7.1 FEMA-4152-PA 7.6 FEMA-4152- PA 7.2 FEMA- 4152-PA 7.6 FEMA-4152-PA 7.1	LA150501
109948	Young, Jack L., II. 2008. The New Mexico Department of Game and Fish Escondido Property Salt Cedar (<i>Tamarix aphylla</i>) Treatment and Remediation Cultural Resource Survey Socorro County, New Mexico. NM State Department of Game & Fish, Report Number 3/3/08.	36	FEMA-4152-PA 3.2	None
124749	Bishop, Brandon, and Roxanne Moore. 2012. Charles Muncy Brush Control - Salt Cedar and Mesquite Removal. US Natural Resource Conservation Service, New Mexico State Office.	37	FEMA-4152-PA 1.1	None
125211	Misquez, Santiago L. 2012. Bosquecito LLC - Brush Management. US Natural Resource Conservation Service, New Mexico State Office.	9.3	FEMA-4152-PA 6.4	None
129595	Misquez, Santiago L. 2014. Rhodes South Wetlands Reserve Program (WRP) Project. US Natural Resource Conservation Service, New Mexico State Office.	80.7	FEMA-4152-PA 5.2	None
139217	Huntley, Deborah L. 2017. Cultural Resources Sample Survey for Socorro Valley Wildfire Mitigation Project, Socorro County, New Mexico. Tetra Tech, Inc., Golden, Colorado. Submitted to Socorro County and New Mexico Historic Preservation Division.	205.4	FEMA-4152-PA 1.1 FEMA-4152- PA 3.4 FEMA- 4152-PA 3.1 FEMA-4152-PA 3.3 FEMA-4152- PA 3.2 FEMA- 4152-PA 5.1 FEMA-4152-PA 7.9	LA 755; LA 8870; HCPI 44151

Table 5 summarizes the five cultural resources identified within the APE. These include two multicomponent sites and three historic-era sites. Three sites (LA 755, LA 31718, and LA 15050) were identified by previous surveys. LA 8870 is a previously documented site

determined by the Tetra Tech sample survey (Huntley 2017a) to be within the APE. HCPI 44151 is a newly discovered linear resource identified by Huntley (2017a). Two of the cultural resources within the APE have been recommended eligible for listing on the NRHP and the remaining three are undetermined. Resources with undetermined NRHP eligibility are treated as eligible.

Table 5: Cultural Resources Identified within APE

Site Number	Time Period	Description	NRHP Eligibility
LA 755	Prehistoric and Historic	Las Canas Pueblo	Undetermined
LA 8870	Prehistoric and Historic	Sabino Village	Undetermined
LA 31718	Historic (A.D. 1821-1912)	Village of La Parida (SR 1233)	Eligible
LA 150501	Historic (A.D. 1960-1980)	Phil Mundt Ceramic Studio	Eligible
HCPI 44151	Historic (unknown)	Irrigation ditch	Undetermined

Note: LA = Laboratory of Anthropology Site Number; HCPI = Historic Cultural Property Inventory; SR = State Register; NRHP = National Register of Historic Places

In December 2017, FEMA conducted government-to-government consultation with the following Indian Tribes who have traditional ties to the Project area: Pueblo of Acoma, Comanche Nation, Fort Sill Apache Tribe, Hopi Tribe, Pueblo of Isleta, Kiowa Tribe, Mescalero Apache Tribe, and Navajo Nation. At the time of publication of this DEA, none of the tribes had responded to FEMA’s consultation.

3.9 Land Use

The Project area occurs east of the Rio Grande on private land and land owned by NMDGF and New Mexico Tech. The area comprises small communities within farmland along the Rio Grande, which are mostly on the west side of the Rio Grande, and sparsely developed subdivisions that fan out to the more arid prairie to the east. From north to south these towns include San Acacia, Polvadera, Lemitar, Escondida, Socorro, Luis Lopez, and San Antonio.

Socorro is the largest main city in this area with infrastructure, facilities, services, and businesses typical of any city in the United States.

There is one major interstate in the Project area. Interstate 25 runs north-south and is west of the Project area and the Rio Grande. US Highway 60 is the main east-west route to the north and US Highway 380 is the main east-west route to the south of the Project area. I-25 and US 60 intersect at Bernardo and I-25 and US 380 intersect at San Antonio. Another road, NM 408, runs east-west between US Highways 60 and 38 at Escondida. This road crosses the Rio Grande, east of Interstate 25 and intersects with Bosquecito Road. Bosquecito Road is a mostly dirt road east of the Rio Grande and runs north-south. This is the main access road to the properties included in the Proposed Action area. This road at times is inaccessible due to stormwater flows and insufficient drainage (Sites Southwest 2006).

Land use in the area is primarily agricultural and residential with the majority of agriculture occurring on the west side of the Rio Grande. Even though agricultural production has declined in Socorro County in recent years, agriculture continues to be an important industry in the County, providing eight percent of the jobs. Agricultural parcels range from a few acres to 40

acres and even up to 160 in the river valley, according to the County Assessor's Office. Those on the open prairie are much larger. Parcels are becoming smaller and smaller as growth pressures build, however.

3.10 Recreation

Socorro County offers a number of attractions for visitors and tourists. The Rio Grande and Bosque provide opportunities for fishing and wildlife viewing. Canoe launches are also feasible at the bridges on the Rio Grande. There are 15 Riverine Parks and hiking trails as well as wildlife refuges.

North of the Project area is the Sevilleta National Wildlife Refuge which is primarily as a research area which includes one of 21 Long-Term Ecological Research Project (LTER) locations. Many universities and agencies conduct research projects at the Sevilleta NWR. Sevilleta NWR is currently closed to most recreational uses. However, there is a visitor's center and, hiking trails, limited waterfowl and dove hunting is permitted, and special tours may be arranged. Finally, an annual open house with field trips to research sites, bird and plant identification field trips is being held (Sites Southwest 2006 and Sevilleta National Wildlife Refuge 2017).

The Ladd S. Gordon Waterfowl Complex is north of Socorro on Interstate 25, at Exit 175 and contains four wildlife management areas in Valencia and Socorro Counties, namely Bernardo Waterfowl Area, La Joya Waterfowl Area, Casa Colorada Waterfowl Area and Belen Waterfowl Area. Together with the Bosque del Apache National Wildlife Refuge to the south, they feed half of the waterbirds which winter in the MRG Basin. The Bernardo Waterfowl Area contains a three-mile vehicle tour loop and three elevated viewing and photography platforms. This is a great area for winter viewing of migrating birds (Visit Socorro New Mexico 2017).

The La Joya Wildlife Refuge is accessible from Exit 169 off I-25 and includes six interconnected ponds which are fed by the dammed waters of Geronimo Springs and the water diverted from the Rio Grande. Early area ranchers discovered a seepage at the base of Sand Dunes near the Rio Grande that created the original 30-acre natural wetlands. In 1948 the NM Department of Game and Fish began purchasing parcels of land in and around the springs to create the 3,500-acre La Joya Wildlife Refuge. It attracts a variety of waterfowl and hunting is permitted September through mid-January (Sites Southwest 2006).

Bosque del Apache National Wildlife Refuge is located at the southern end of the Project area. It was established as a National Wildlife Refuge in 1939 to provide critical stopover habitat for migrating waterfowl. The 57,331-acre refuge harbors a stretch of the Rio Grande, a ribbon of cottonwood and willow trees and is well known for the thousands of sandhill cranes, geese and other waterfowl that winter here each year. Today, Bosque del Apache is part of the National Wildlife Refuge System (Bosque Del Apache National Wildlife Refuge 2017).

Within the Proposed Action area, there is access to the river on the west side via the levee and a parking area at Otero Road. Vehicles have access along the west side of the river and there are recreational activities such as hiking, jogging and bird watching. On the east side of the river, access to the river is more limited since much of the property is privately owned. There is still some public use of a spoil bank levee where it exists. For the most part, access to the river is by each property owner through their private property. There is a country-maintained road

throughout the project area on the east side of the river for access to Bureau of Land Management (BLM) recreational land adjacent to the Project Area.

3.11 Hazardous or Solid Waste

A review of the 2017 EnviroSite Report, dated 25 October 2017, was recently completed which identifies locations that store hazardous materials, hazardous wastes, and petroleum products, and where there have been significant releases of these in the past, within a one mile and greater radius from the Project areas (EnviroSite 2017). No sites, within the Project area, containing hazardous materials were identified in that report as containing hazardous materials. Recent site visits to the Project areas along the corridor were completed by personnel from Tetra Tech who are trained in identifying the presence of and impacts from hazardous wastes and petroleum products. Observations by Tetra Tech personnel included surficial solid waste in small concentrations. This waste was typically plastic bottles, bags, cups, glass, and other household waste likely deposited by wind and users of nearby roads.

3.12 Socioeconomics and Environmental Justice Considerations

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. Factors that describe the socioeconomic environment represent a composite of several inter-related and non-related attributes. There are several factors that can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of families living below the poverty level, employment, and housing data. Data on employment identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which was issued by President Clinton on February 11, 1994, and, pertains to environmental justice issues and relates to various socioeconomic groups and disproportionate impacts that could be imposed on them. The EO requires that federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a proposed action. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, tribal and local programs and policies.

Also included with environmental justice are concerns pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children under the age of 18 and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. These risks are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come into contact with or ingest

3.12.1 Existing Conditions

Socioeconomics. Socorro County is considered the region of influence for socioeconomic effects of the Proposed Action. The Proposed Action is within proximity of the following Census Designated Places (CDP): Escondida; Lemitar; Luis Lopez; San Antonio; San Antonito; and Socorro. Socorro County is adjoined to the north by Valencia County and to the south by Sierra County.

New Mexico’s population totaled 2,059,179 in 2010. The population of Socorro County was 17,866 in 2010, representing 0.87 percent of the total population of the state. Based on 2000 and 2010 U.S. Census data, the population of Socorro County decreased 1.2 percent from 2000 to 2010, while during this same time period Valencia County experienced a 15.7 percent increase in population and the population of Sierra County decreased by 9.7 percent. The growth rate in Socorro County from 2000 to 2010 (-1.2 percent) was much less than the growth rate of the state of New Mexico (13.2 percent) and of the United States (9.7 percent) over the same time period. Please see Table 6 for 2000 and 2010 population data (USCB 2010).

Table 6: Population in the Region of Influence as Compared to New Mexico and the United States (2000 to 2010)

Location	2000	2010	Percent Change
United States	281,421,906	308,745,538	9.70%
New Mexico	1,819,046	2,059,179	13.20%
Socorro County	18,078	17,866	-1.2%
Sierra County	13,270	11,988	-9.7%
Valencia County	66,152	76,569	15.70%

Employment Characteristics. The four principal industries in Socorro County in terms of percentage of the workforce employed within the industry are: health care and social assistance (30 percent); accommodation and food services (20 percent); retail trade (15 percent); and professional, scientific, and technical services (7 percent) (USCB 2010).

In April 2017, the Bureau of Labor Statistics (BLS) reported a 6 percent unemployment rate in Socorro County, whereas the April 2017 unemployment rate for the state of New Mexico is slightly higher (6.7 percent) and the national unemployment rate is lower (4.4 percent) (BLS 2017). The April 2017 unemployment rate in Valencia County was 6.4 percent, which is slightly lower than the unemployment rate in Socorro County, while the unemployment rate in Sierra County is 9 percent, exceeding county-level unemployment percentages surveyed in the present report.

Environmental Justice and Protection of Children. The planning and decision-making process for actions proposed by federal agencies involves a study of other relevant environmental statutes and regulations, including Executive Order (EO) 12898. The essential purpose of EO 12898 is to ensure the fair treatment and meaningful involvement of all people. Environmental justice considerations addressed in this assessment involve both population demographics including ethnic, racial, or national origin characteristics, and persons in poverty, including children under age 18. In order to determine whether environmental impacts affect minority or low-income populations it is necessary to establish a basis of comparison, referred to

as the “region of comparison.” This area consists of the geopolitical units that include the Proposed Action. Most environmental effects from the Proposed Action in this instance would be expected to occur in Socorro and Valencia Counties, New Mexico.

To provide a baseline measurement for environmental justice, an area around the installation must be established to examine the impacts on minority and low-income populations. For the purpose of this analysis, demographic information from Socorro County was compared with demographic information from Valencia and Sierra Counties, which were evaluated to identify minority and low-income populations.

The Hispanic population in Socorro County is 48.5 percent, similar to the statewide average of 46.3 percent, which is significantly higher than the national average (16.3 percent) and higher than Sierra County, but lower than Valencia County. All counties surveyed in this analysis contain a higher than average population of Hispanic and Native American residents when compared to the entire United States (USCB 2010). The Native American population in Socorro County is 11.7 percent, which is above the statewide average of 9.4 percent and higher than Valencia and Sierra Counties. Median income in Socorro County is \$34,073, which is below the state of New Mexico median (\$43,569) and national median (\$51,222). Compared to Valencia and Sierra Counties, median income in Socorro County is greater than in Sierra County, but lower than Valencia County. The percentage of families living below the poverty line in Socorro County is 22.7 percent, which is higher than national and state averages, as well as levels of poverty documented in Valencia and Sierra Counties (see Table 7). Valencia and Sierra Counties experience similar levels of poverty, and poverty rates in those counties also exceed the national average (USCB 2010). The proportion of people above the age of 65 in Socorro County is 14.2 percent with is slightly higher than Valencia County and lower than Sierra County. Children under the age of 5 comprise 6.7 percent of the population, which is higher than Sierra County and lower than Valencia County.

Sierra County, south of Socorro County, contains a population of 11,569. The Hispanic population is 28 percent in Sierra County and Native Americans in Sierra County comprise 1.7 percent of the population, which is lower than statewide averages, and less than proportion of Native Americans in Valencia and Sierra Counties. Median income is \$29,356, lower than both Valencia and Socorro Counties. The percentage of families living below the poverty line in Sierra County (15.6 percent) is similar to rates experienced in Valencia County, but less than the proportion of families living in poverty in Socorro County (22.7 percent). Sierra County contains approximately double the proportion of persons above the age of 65 (30.6 percent) compared to Socorro and Valencia Counties and a lower percentage of children under the age of 5 (4.7 percent) than the other counties.

Valencia County is north of Socorro County and consists of 76,569 inhabitants, and therefore contains the largest population unit evaluated in the present study. The Hispanic population is 58.3 percent in Valencia County and the Native American populations consists of 3.8 percent of the County’s population. Median income in Valencia County is \$38,772 and the estimated amount of families living below poverty is 15.7 percent. The proportion of the population over the age of 65 is 12.7 percent and the percent of the population under the age of 5 is 6.9.

Table 7: Minority and Low-Income Characteristics (2010)

Race and Origin	Socorro County	Sierra County	Valencia County	New Mexico	United States
Total Population	17,866	11,988	76,569	2,059,179	308,745,538
Percent Under 5	6.7	4.7	6.9	7	6.5
Percent Over 65	14.2	30.6	12.7	13.2	13
Percent White	75.1	85.6	73.2	68.4	72.4
Percent Black or African American	1.1	0.4	1.4	2.1	12.6
Percent American Indian and Alaska Native	11.7	1.7	3.8	9.4	0.9
Percent Asian	1.2	0.4	0.5	1.4	4.8
Percent Native Hawaiian and Other Pacific Islander	0	0	0.1	0.1	0.2
Percent Other Race	8.1	8.6	17	15	6.2
Percent Two or More Races	2.8	3.3	4	3.7	2.9
Percent Hispanic or Latino	48.5	28	58.3	46.3	16.3
Estimated Median Household Income	\$34,073	\$29,356	\$38,772	\$43,569	\$51,222
Estimated Percent of Families Living Below Poverty	22.7	15.6	15.7	13.9	10.1

4 - Environmental Consequences

4.1 Physiography, Geology, Soils

4.1.1 Proposed Action

There would be temporary disturbance of soils under the Proposed Action. Soils would be expected to return to their current state or be improved after herbaceous vegetation becomes established following the Proposed Action. There would be no change to physiography or geology under the Proposed Action. Therefore, there would be a short-term adverse effect on soils due to ground disturbance during project implementation. Best management practices (BMPs) will be implemented to prevent erosion and sedimentation. There will be no impacts to prime and unique farmlands as none are present in the Project area.

4.1.2 No Action Alternative

There would be no change to physiography, geology, or soils under the No Action Alternative.

4.2 Climate

4.2.1 Proposed Action

The Rio Grande through this reach is used for conveyance of regulated flows for downstream irrigation and water deliveries to meet Rio Grande Compact requirements. Since the Proposed Action is not designed for (or dependent upon) extreme river discharge events, climate change would not be expected to affect them.

Restoration activities under the Proposed Action would improve ecosystem function by creating a more natural vegetation composition and would reduce the risk of fire. Intact forests can serve as carbon sinks removing carbon dioxide, a greenhouse gas, from the atmosphere (Bellassen and Luysaert 2014, Ryan et al. 2012). Therefore, the Proposed Action would have a positive effect on climate.

4.2.2 No Action Alternative

Under the No Action Alternative an increase in fire risk is expected. Catastrophic fires release carbon dioxide to the atmosphere which is known to be a greenhouse gas that would in turn contribute to global warming. The loss of the forested habitat would also result in the loss of a potential carbon sink. Current climate change projections indicate increasing aridity in the southwestern United States. With decreased runoff and river flows, the river and the Bosque are expected to remain disconnected, thus promoting non-native vegetation. Because climate change is unpredictable with unknown direct effects, no evidence currently exists to suggest a change in the current trend toward a Bosque of declining quality. The No Action Alternative would result in long term adverse effects to climate.

4.3 Noise

4.3.1 Proposed Action

There would be minor, short-term noise impacts from equipment used during construction, which would occur only during normal working hours (7am-5pm). Noise levels would be somewhat reduced in adjacent neighborhoods due to buffering by the bosque and levee road (where present) when work is taking place in the bosque. Travel on existing levee roads to and from work locations would also create noise during implementation of the Project. All OSHA and local municipality requirements (as described above in section 3.3) would be adhered to. No permanent changes to noise would occur under the Proposed Action. Therefore, short-term adverse noise effects would occur during the construction period only.

4.3.2 No Action Alternative

There would be no effect to noise under the No Action Alternative.

4.4 Air Quality

4.4.1 Proposed Action

Since there would be ground disturbance during project implementation , BMPs to minimize air quality disturbance would be employed. These include covering trucks to avoid fugitive dust violations, and wetting down work areas. Vehicles on levee roads would be limited to 15 mph, which would also minimize dust. All vehicles involved in construction at the Project site would be required to have passed a current New Mexico emissions test and have required emission control equipment. Construction practices during the implementation phase would be consistent with the Socorro County Public Nuisance Ordinance (2009). Therefore, short-term adverse impacts to air quality are anticipated during construction of the Proposed Action, but would be abated to the extent possible using BMPs as described above.

4.4.2 No Action Alternative

There would be no permanent changes to air quality under the No Action Alternative. However, there would be an increased risk of fire. In the event of fire there would be a temporary decrease in air quality in the vicinity of an active fire due to the presence of smoke.

4.5 Aesthetics

4.5.1 Proposed Action

The Proposed Action includes reducing fuel loads and thinning of nonnative vegetation, and revegetation with native species. In order to accomplish these goals, construction within the bosque would include machinery of varying sizes (as discussed in Section 2 above). This would cause short-term negative affects to aesthetics during construction. Post-construction, some visual effects would be noticeable depending on the level of work required, such as creation of open areas, mulch on the ground, and/or some tree stumps. Therefore, there would be negative, short-term impacts to aesthetics during construction and for a short time after construction, but these impacts would decrease over a short period of time.

The Proposed Action would have a long-term positive effect on aesthetics by removing what many may deem as ‘unsightly’ burned and/or dead material. Revegetation with native vegetation species would further increase the aesthetics of the site after a few years of maturation. There would be an increase in native plants and therefore a potential increase in wildlife.

4.5.2 No Action Alternative

Under the No Action Alternative, it can be expected that the Project area would continue to deteriorate aesthetically according to both conventional scenic vista and proposed vibrant ecology standards. In addition to failing to mitigate impacts to the aesthetic qualities of the bosque, increased cottonwood mortality and increased non-native populations would limit visibility and mobility and likely lead to an increase in the number of damaging fires. Under the No Action Alternative, points for viewing the bosque and its natural features and environs would become increasingly limited. Some efforts by local agencies and other initiatives may assist in improving aesthetics, but to a lesser degree than proposed by the Proposed Action.

4.6 Water Resources

4.6.1 Water Quality

4.6.1.1 Proposed Action

Mechanical equipment such as brush-clearing machines and excavators could leak oil, fuel, or hydraulic fluid, which could reach the Rio Grande and affect surface water quality. Spills of such materials could similarly contaminate surface water in the river or riverside drain. BMPs will be implemented to prevent erosion and sedimentation to nearby or adjacent waters. These will include equipment storage and staging practices to minimize erosion and sedimentation, and avoiding soil or water contamination. Equipment will be inspected for spillage. Equipment will also be cleaned prior to original arrival at treatment site, and when moving from treatment area to treatment area to assure no transport of invasive vegetation. Staging areas will be located at least 30 m (100 feet) away from any surface or shallow ground water source or live fuels. Staging sites will be flagged appropriately and the project proponents will develop written protocol to address spills or contamination of soil. This protocol will go in to each contractual agreement for on-the-ground work.

Section 402(p) of the CWA regulates point source discharges of pollutants into waters of the United States and specifies that storm water discharges associated with construction activity be conducted under National Pollutant Discharge Elimination System (NPDES) guidance. Some ground disturbance would take place. A Storm Water Pollution Prevention Plan (SWPPP) for the Proposed Action is required for project implementation. This would be developed by the contractor who would be required to adhere to this plan and required to file a Notice of Intent (NOI) with the EPA. Through this NOI the contractor performs all work in accordance with the Nationwide NPDES permit prior to commencement of construction activities. The SWPPP would also include a Spill Control Plan. Compliance with these requirements would ensure that the Proposed Action would have no significant effect on the water quality of the Rio Grande. All construction activities would be in compliance with all applicable federal, state and local regulations.

Therefore, there could be minor short term adverse effects on water quality during construction, but these would be prevented by implementing the requirements above.

4.6.1.2 No Action Alternative

There would be no immediate change to water quality under the No Action Alternative. However, there would be an increased risk of fire. If fires were to occur, then there is the potential for decreased water quality due to ash and sediment runoff into the Rio Grande and groundwater.

4.6.2 Hydrology

4.6.2.1 Proposed Action

Vegetation restoration performed under the Proposed Action would result in a more natural plant community and the removal of dense stands of non-native vegetation could increase groundwater infiltration and help to attenuate stormwater flows. The Proposed Action would not modify main

channel flows, the river hydrograph, or morphology of the river channel. Therefore, there would be no change to hydrology.

4.6.2.2 No Action Alternative

There would be no change to hydrology under the No Action Alternative.

4.6.3 Water Depletions

4.6.3.1 Proposed Action

All of the work described in the Proposed Action would be within the riparian floodplain. No ground disturbance work is planned within the designated 600-foot Rio Grande Floodway. Some vegetation removal and equitable or a lower quantity of replanting may occur on the outer edge of the 600-foot floodway, and therefore no additional depletions would occur. Therefore, no offsets would be required. Because no increase in water depletions from the Proposed Action would occur, there would be no effect on water depletions.

4.6.3.2 No Action Alternative

There would be no change to water depletions under the No Action Alternative.

4.6.4 Wetlands and Floodplains

4.6.4.1 Proposed Action

Section 404 of the Clean Water Act requires analysis under the EPA's 404 (b)(1) Guidelines if the USACE proposes to discharge fill material into wetlands or other waters of the United States. No work would be performed within or directly adjacent to the river. The small salt grass meadow habitat areas encountered at the south end of the Project area as well as those indicated on the USFWS National Wetlands Inventory would be avoided. Therefore, there would be no effect to wetlands by the Proposed Action.

The Proposed Action is located within the 100-year floodplain therefore FEMA has applied the eight-step decision making process as codified under 44 CFR Part 9.

Step 1. Determine if the Proposed Action is located in the Base Floodplain

The majority of the proposed work will be conducted within the 100-year floodplain of the Rio Grande according to the Flood Insurance Rate Maps (FIRMs) (panel numbers 35053C1050C, 35053C1410C, 35053C1430C, 35053C1440C, and 35053C1825C, dated 05/02/2016). The proposed project would not result in the construction of any structures within the 100-year floodplain nor would it involve any fill or excavation within the floodplain.

Step 2. Early public notice (Preliminary Notice)

Early notice for FEMA's HMGP activities were included as part of a disaster cumulative notice for DR-4152-NM provided as part of a disaster cumulative notice for severe storms, flooding, and mudslides. The notice was published in November 2013 and included FEMA funded HMGP projects in Socorro County.

Step 3. Identify and evaluate alternatives to locating the base floodplain

The No Action Alternative is described in Section 2 of the DEA. The No Action Alternative would not meet the purpose and need for the project and is not a practicable alternative. Other alternatives considered but removed from analysis are also described in Section 2.

Step 4. Identify impacts of Proposed Action associated with occupancy or modification of the floodplain

Impact on natural function of the floodplain

The Proposed Action would not affect the functions and values of the 100-year floodplain. The Proposed Action would not place any structures or fill within the floodplain that would impede or redirect flood flows nor would it result in any excavation. No structures would be constructed within the floodplain, and minor soil disturbance would occur within the floodplain during project implementation. Although the Proposed Action would reduce risk to homes adjacent to the Rio Grande, the Proposed Action would not facilitate any development within the floodplain.

The functions of the floodplain to provide flood storage and conveyance, filter nutrients and impurities from runoff, reduce flood velocities, reduce flood peaks, moderate temperature of water, reduce sedimentation, promote infiltration and aquifer recharge, and reduce frequency and duration of low surface flows will remain intact after the implementation of this project. There will be minor short-term impacts to water quality during the implementation phase of the project. Floodplains also provide services in the form of providing fish and wildlife habitat, breeding, and feeding grounds. These floodplain values will not be adversely impacted, and the overall integrity of the ecosystem will not be impacted.

FEMA has determined the project may affect, and is not likely to adversely affect the flycatcher and may affect and is likely to adversely affect the Yellow-billed Cuckoo and proposed critical habitat for the species. The project would not adversely modify or otherwise affect designated critical habitat. The Proposed Action would have negligible impacts to native species and their habitats and population levels of native species would not be affected. The potential for adverse impacts to migratory bird species would be avoided by conducting the work during the fall and winter seasons when migratory species are not breeding.

The Proposed Action will not adversely affect the societal and recreational benefits provided by the floodplain in these natural areas. Open space and recreational uses in the parks and preserves will not be affected by the Proposed Action.

The hazardous fuels reduction activities would reduce the potential for the negative effects of a major wildfire on soils if a wildfire occurs. A wildfire could alter the cycling of nutrients; the physical and chemical properties of soils; and the temperature, moisture, and biotic characteristics of the existing soils. In the event of a major wildfire, more bedrock could be exposed to direct rainfall, which would increase the rate of erosion of the formation. These primary impacts from a wildfire could also result in decreased infiltration and increased runoff, which often causes increased erosion. These potential negative effects of a major wildfire on the natural floodplain functions would be reduced through implementation of the Proposed Action.

Impact of the flood water on the proposed facilities

The Proposed Action does not include any structures or facilities within the floodplain; therefore, no facilities would be affected by flood water in the floodplain of the Rio Grande. The Proposed

Action also does not include any fill, excavation, or ground disturbance that could affect flood flows or elevations.

Debris piles would be staged in the floodplain only on a temporary, short-term basis prior to burning or being mulched. Mulch may be spread on the ground surface for erosion control. Potential floodwaters will not affect the project.

Step 5. Design or modify the Proposed Action to minimize threats to life and property and preserve its natural and beneficial floodplain values

The objective of the Proposed Action is to reduce the risk of wildfires impacting homes along the Rio Grande. No structures are or would be located in the floodplain as a result of the proposed project. The proposed hazardous fuels reduction would result in removal of dead and dying trees, thinning of small trees and underbrush, and trimming of the lower branches of large trees. The Proposed Action would have no effect on the natural and beneficial values of the floodplain. Debris piles would be staged in the floodplain only on a temporary, short-term basis prior to burning or being mulched. Mulch may be spread on the ground surface for erosion control. Many of the impacts discussed above are considered insignificant or beneficial to the floodplain. The Proposed Action to reduce fuel loads contributes to the conservation of the floodplain and its natural and beneficial values. Short-term water quality impacts will be mitigated by the implementation of BMPs.

Impacts to the federally listed species will be prevented by the avoidance and minimization measures outlined by FEMA and agreed to by the U.S. Fish and Wildlife Service in their Biological Opinion dated 7/31/2018. Impacts to migratory bird species will be minimized by seasonal restrictions such that work is conducted outside of nesting season. For any work in the floodplain, Socorro County will be required to coordinate with the local floodplain administrator and obtain any required permits prior to initiating work. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the state and FEMA for inclusion in the permanent project files.

Step 6. Determine if Proposed Action is practicable and re-evaluate alternatives.

The Proposed Action would not expose any segment of the population to flood hazards because it does not include a housing component, and will not facilitate development in the floodplain. The Proposed Action would not change the current flood hazard because it would not impede or redirect flood flows. The project would not disrupt floodplain values because it would not change water levels in the floodplain. Therefore, it is practicable to implement the Proposed Action within the floodplain. Alternatives consisting of locating the project outside of the floodplain or taking no action are not practicable because these alternatives would not reduce wildfire risks to people and homes along the Rio Grande. FEMA maintains that the Proposed Action alternative is the only practicable alternative to meet the purpose and need of the project. This section may be revised following public comment on the EA and this eight-step evaluation if significant comments are received regarding floodplain impacts.

Step 7. Findings and public explanation (Final Notification)

Step 7 requires that the public be provided with an explanation of any final decision that the floodplain is the only practicable alternative. Final floodplain public notice will be accomplished through the public comment period for this DEA. A public notice concerning the proposed

hazardous fuels reduction project will be published in the Chieftain along with the Notice of Availability of the DEA document.

Step 8. Implement the action

Step 8 is the review of the implementation and post-implementation phases of the Proposed Action to ensure that the requirements stated in 44 CFR Part 9.11 are fully implemented. The proposed hazardous fuels reduction project will be conducted in accordance with applicable floodplain development requirements.

Conditions identified in Step 5 would be implemented.

4.6.4.2 No Action Alternative

The No Action Alternative would not change existing wetlands or floodplains. The current trajectory of increasing non-native vegetation and fire risk would continue, which could result in a continued decrease in and degradation of wetlands and floodplain habitat.

4.7 Biological Resources

4.7.1 Vegetation Communities

4.7.1.1 Proposed Action

Long-term benefits proposed by the Project include reduction in fire potential, potentially decreased soil salinity, and increased wildlife habitat value over the long-term.

Fuel loads in the MRG have built up over the last 50 years or more due to the lack of flooding and disconnect between the river and bosque. Flood flows used to carry away debris and allow for quicker processing of vegetative material. Since this does not readily occur, much of the dead material has built up over that period of time and created an extreme fire danger. A reduction in these fuel loads, especially in the ladder fuels which create a ladder between the floor of the bosque and the cottonwood canopy, can greatly reduce the chance of a catastrophic fire were one to occur. This older material is also extremely dry and flammable. Removal and processing of this material is crucial to preventing future fires.

Salt cedar is a fire-adapted species and has long taproots that allows it to intercept deep water tables and interfere with natural aquatic systems. Salt cedar disrupts the structure and stability of native plant communities and degrades native wildlife habitat by out-competing and replacing native plant species, monopolizing limited sources of moisture, and increasing the frequency, intensity and effect of fires and floods. Although it provides some shelter, the foliage and flowers of salt cedar provide little food value for native wildlife species that depend on nutrient-rich native plant resources (Muzika and Swearingen, 1999). Birds prefer to nest in native vegetation that contain their preferred physical structure and food source (Yong and Finch, 2002). Overall, the possible short term adverse effects resulting from non-native vegetation removal under the Proposed Action, such as temporary loss of habitat and soil disturbance, would be strongly mitigated through the replacement of salt cedar with a younger, more diverse native riparian community which would add to biodiversity at the landscape level.

Salt cedar control in mixed salt cedar/native bosque would reduce stress to native species, which are competing with exotic vegetation, and would reduce wildfire hazards (Taylor, 1999).

Substrate for native species regeneration within these sites would also be provided as a result of salt cedar control and decreased salinity of the soil. This alternative would maximize the production of indigenous species such as salt grass, willow, Baccharis, and native wet meadow species, to potentially support greater numbers of native bird species and other wildlife.

Socorro County and its partners for this Project (Save Our Bosque Task Force (SOBTF), NM State Forestry, SSWCD, NMDGF, New Mexico Tech) and participating private landowners would work together to treat resprouts of salt cedar and Russian olive in order to ensure Project success. Individual locations within the Project area would have a varied revegetation strategy. Many of the properties have native vegetation within their existing understory and canopy that would increase once salt cedar and other non-native vegetation were removed. Replacing dead material and non-native vegetation with a variety of native vegetation should lead to a system of decreased fire danger, and increased diversity of native species for use by wildlife. Therefore, the long-term effects of replacing the non-native dominated vegetation system with native dominated species is proposed to outweigh the short-term negative effects of implementing the Proposed Action.

4.7.1.2 Invasive Species

The goal of the Proposed Action is to reduce fire threats by removing invasive species within the Project area. Noxious weeds were also noted during the biological inventory. As noted above, care would be taken to ensure that the contractor cleans equipment between Project areas to reduce the potential spread of invasive species and weed seed. Each property owner also has an agreement with Socorro County to maintain the Project area free of invasive species and weeds. Therefore, there is a decrease in invasive species due to the Proposed Action with ongoing maintenance to ensure that resprouts and weeds are kept to a minimum.

4.7.1.3 No Action Alternative

Under the No Action Alternative, there would be no change to existing vegetation communities. Therefore, invasive vegetation would continue to exist in large stands, continue to invade into adjacent areas, and continue to cause a high fire danger.

4.7.2 Fish and Wildlife

4.7.2.1 Proposed Action

The Proposed Action would have no effect on fish species other than potential long-term benefits to water quality in the Rio Grande. Work will be conducted outside of peak migratory bird nesting season in order to reduce adverse effects to migratory bird species. Wildlife would experience temporary disturbance and or displacement due to vegetation removal but this would be a short-term effect. The long-term effects of the Proposed Action would be enhancement of native plant communities and therefore enhanced habitat for wildlife. Therefore, there would be minor short term adverse effects to wildlife during construction, with potential long-term benefits.

4.7.2.2 No Action Alternative

The No Action Alternative would have no change to the current state of declining habitat value to fish and wildlife. However, the risk for wildfire would remain high which could result in adverse effects to fish and wildlife species in the Project area.

4.7.3 Special Status Species

FEMA has determined that the Proposed Action will have no effect on the Chiricahua leopard frog, Least tern, Mexican Spotted owl, Northern aplomado falcon, Piping plover, Socorro isopod, Alamosa springsnail, Chupadera springsnail, Socorro springsnail and Wright's marsh thistle because the species and/or their habitat is not present in the Project area.

4.7.3.1 New Mexico Meadow Jumping Mouse

As discussed above, there is no potential habitat for mouse within the Project area. Therefore, FEMA has determined that there would be no effect on New Mexico meadow jumping mouse as a result of the Proposed Action.

4.7.3.2 Southwestern Willow Flycatcher

As discussed above, the Proposed Action work would take place as early as September 2018. Work would stop between May 1 and August 31. Work would resume on September 1 after the nesting season. Therefore, work would not occur when flycatchers might be using the area as stopover or breeding habitat.

The locations where territories have been established over the past two years would not be disturbed during the nesting season. Only one flycatcher nest was detected in 2016 and that site is over 1000 feet south of one of the Project areas. In 2017, a nest was established in that same general area but further south and also approximately 5000 feet from the nearest Project area.

In most properties where salt cedar removal is proposed to occur, adjacent native habitat exists and would fill in areas where removal occurs. This native habitat includes coyote willow, Baccharis, Rio Grande cottonwood and Goodding's willow. Where needed, these areas would be supplemented with planting of these species to encourage potential native habitat.

The Proposed Action includes removal of non-native vegetation in the area which may currently be contributing to critical habitat for the flycatcher. But, there are only two flycatcher territories within the Proposed Action area. Those two territories are at least 100 feet from any of the Project areas and work within the Project areas would only be conducted outside of the nesting season. Therefore, FEMA has determined the Proposed Action may affect but is not likely to adversely affect the flycatcher or its critical habitat in the Project area. A Biological Assessment has been submitted to the USFWS and a Biological Opinion (BO) was issued by USFWS on 7/31/2018 (see Appendix B). Requirements listed in the BO (USFWS, 2018) are included in this document.

4.7.3.3 Yellow-Billed Cuckoo

As discussed above, the Proposed Action work would take place as early as September 2018. Work would stop during the nesting season between May 1 and August 31. Work would resume

on September 1 after the nesting season. Therefore, work would not occur when cuckoos might be using the area as stopover or breeding habitat.

The locations within the Project area that have been utilized over the past two years would not be disturbed during the migratory bird season. Locations that cuckoo have frequented would be treated with special care in terms of the treatment method. Most of these habitats contain a mix of native overstory and mixed native and non-native understory. Cuckoo use, including a 500-foot buffer, occurs on a portion of the following properties: FEMA-4152-PA 3.2, FEMA-4152-PA 4.1, FEMA-4152-PA 4.2, FEMA-4152-PA 6.3, and FEMA-4152 PA 7.7 only. Therefore, treatments within these portions of these property would include non-native understory removal outside of the nesting season and all native habitat within and surrounding that area would be left untouched.

Proposed properties where salt cedar and Russian olive removal is to occur would fill in with existing native habitat in the area including coyote willow, Baccharis, Rio Grande cottonwood and Goodding's willow. Where needed, these areas would be supplemented with planting of these species and other native understory to encourage potential native habitat. The Proposed Action includes removal of non-native vegetation in the area which may currently be contributing to potential critical habitat for the cuckoo. Therefore, FEMA has determined the Proposed Action may affect, and is likely to adversely affect proposed critical habitat.

Adverse effects will be avoided by working outside of the breeding season when birds are not present and will be minimized by conducting the work consistent with the BMPs for treating vegetation that may pose a hazardous wildfire threat and which may be associated with the cuckoo, assuming similar BMPs to flycatcher (USFWS 2013b). Throughout most of the project area, potential effects would be avoided and any affects are minimized due to the sub-optimal habitat quality since the arrival of the tamarisk leaf beetle. Recent monitoring shows the cuckoo territories within the Treatment Areas and buffers will be established to avoid their territories.

Therefore, FEMA has determined the Proposed Action may affect, and is likely to adversely affect the cuckoo in the Project area. These effects are not expected to be significant because measures to alleviate adverse effects shall be implemented throughout the Project area as described. The project would not affect active nests and would result in longer term habitat improvement. A Biological Assessment has been submitted to the USFWS and a BO (USFWS, 2018) has been issued. Conservation measure requirements listed in the Biological Opinion are included in Section 4.7.4 below. A Final Effects Statement and Take Statement are provided in the BO which is in Appendix B. In the BO, the Service determined that the level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of proposed critical habitat.

4.7.3.4 Rio Grande silvery minnow

The Proposed Action would take place within the bosque but not within any portion of the river or connected terrace habitat. Project implementation would not incur any inputs to the river and the majority of vegetative removal is well east of the river and only adjacent in a few areas. Where Project sites are adjacent to the river, work would only occur when those areas are dry and there is no connection to the river. Also, since the work would take place in the fall and winter, flows would be lower, keeping those attached bar or terrace areas dry. Therefore, FEMA

has determined there would be no effect to Rio Grande silvery minnow and no potential modification of critical habitat.

4.7.3.5 Pecos Sunflower

There is only one property where Pecos sunflower was encountered, the Rhodes property. Sunflower at this property is at the far northeast corner, while the proposed work area is at the southern end of the property. The Project Manager, project inspectors, and/or work crews will remain vigilant for the Pecos sunflower during work at the Rhodes property. If any sunflower have migrated into the proposed work area, those areas must be avoided. Therefore, FEMA has determined that the Proposed Action would have no effect on the Pecos sunflower.

4.7.4 Conservation Measures

The following conservation measures as described in the BO would be implemented during project execution:

- No work will be performed within the river.
- All necessary permits for access points, staging areas, and study sites will be acquired prior to commencing construction activities. Access to treatment and mitigation areas will be via internal (unimproved) roadways or by designated access routes when established roads are not present. Pre-authorized access from private property owners will be obtained for workers to access the treatment areas on foot and to bring equipment to the treatment areas. Access routes will be designated on Action Area (or may be referred to as “Project Area” by FEMA) maps and flagged on site prior to work start.
- Coordination with work crews will occur prior to the start of work and throughout project implementation. This will include preconstruction coordination meetings with work crews to go over the project implementation plans, including avoidance and minimization measures intended to protect species. A Project Manager will be provided to oversee implementation of the project and ensure compliance with the avoidance and minimization measures. Two project inspectors will be assigned to each treatment area to assure continual communication with contractors during work.
- Best management practices (BMPs) will be implemented to prevent erosion and sedimentation to nearby or adjacent waters. These will include equipment storage and staging practices to minimize erosion and sedimentation, and avoiding soil or water contamination. Equipment will be inspected for spillage. Equipment will also be cleaned prior to original arrival at treatment site, and when moving from treatment area to treatment area to assure no transport of invasive vegetation.
- Staging areas will be located at least 30 m (100 feet) away from any surface or shallow ground water source or live fuels. Staging sites will be flagged appropriately and the project proponents will develop written protocol to address spills or contamination of soil. This protocol will go in to each contractual agreement for on-the-ground work.
- In general, equipment operation will take place in previously cleared areas or where vegetation is particularly sparse, and all efforts would be made to minimize damage to native riparian vegetation. No native vegetation will be removed in HFR treatment areas.

Native vegetation removal is likely in DS treatment areas but none of these areas have flycatcher or cuckoo suitable habitat.

- Fuel reduction activities will take place outside of nesting season (from September 1 through April 15). The exception to this will be limited work when hand crews work from April 15 to April 30. During this time, crews will work only in areas that are greater than 100 meters (300 feet) from the center of river, where past wildfires has limited vegetation, or adjacent to flycatcher and cuckoo territory buffers.
- A 150 m (500 feet) “no treatment zone” buffer will be implemented around occupied flycatchers and cuckoos territories. The buffer area will be flagged/taped prior to the commencement of work and flag/tape must be promptly removed once work is complete. Contractors will be supervised when work is being implemented within 30 m (100 feet) of any buffer to assure contractors do not enter into the 150 m (500 feet) “no treatment zone” buffers. When not within this distance, staff will provide supervision as needed.
- Herbicide use will be specified in treatment plans for use during implementation and maintenance of DS and HFR areas. All application requirements for safety and environmental control will be followed. Only approved herbicides at recommended concentrations will be utilized and only licensed applicators will accomplish this work. Applicators will be licensed in the state of New Mexico, and the Socorro Soil and Water Conservation District will review chemical application plans to assure compliance with state requirements.
- Slash piles of downed vegetation will be located at least 300 meters (900 feet) from the center of the river channel.
- Native plant restoration focus will include: 1) seeding in areas where non-native plants are removed in open forest or grassland habitats to provide forage for cuckoos and 2) native understory planting in areas where non-native plants are removed under gallery forest cottonwood trees. Where possible, cottonwoods will be established to provide structural diversity to planting patches.
- Prescriptions for planting native vegetation will be developed following site hazardous fuels control. Best management practices included in these prescriptions include: conducting soil surveys to determine areas suitable for cottonwood or willow pole plantings, planting poles from December through March 15th (if poles show any signs of bud elongation, they should not be planted), planting poles in random manner, drilling/digging holes to a depth of at least 1 foot below water table, filling holes and packing soil so that there are not air pockets, drilling shrub holes to moist soil and back filling so shrub root crown is at soil surface, planting shrubs in groups of 30 with random spacing (determined by shrub growth pattern), watering shrubs within 48 to 72 hours after planting and following up with subsequent watering (two weeks later if no rain events and throughout the first two growing seasons as needed), and planting grasses and forbs from seed or small containers near planted shrubs (to help facilitate with shrub watering schedule).

FEMA and Socorro County will adhere to all other requirements in the BO and coordinate with USFWS on any required reporting.

4.7.4.1 No Action Alternative

Although the No Action Alternative would not have a direct effect on the mouse, flycatcher, cuckoo, minnow, or sunflower, the current trend of declining habitat value would continue to have an adverse effect on all species. Under this alternative, there would be a higher risk for a catastrophic wildfire in the Project area with adverse effects to federally listed species and critical habitat that may be present.

4.8 Cultural Resources

4.8.1 Proposed Action

Adverse effects to cultural properties under Section 106 of the NHPA are typically considered significant impacts under NEPA, but may be mitigated to lessen the degree of significance. Following this, generally impacts on historic properties (NRHP-listed resources) or potential historic properties (NRHP-eligible or unevaluated resources) would be considered significant impacts. Section 800.5(2) of 36 CFR 800 “Protection of Historic Resources” includes a discussion of potential adverse effects on historic properties. An example that would be applicable to the potential impacts of the Proposed Action is physical destruction of or damage to all or part of the property. Impacts on cultural resources are normally considered permanent as these resources are finite and disturbance of them, particularly archaeological sites, cannot be reversed. Generally, impacts on isolated finds are not considered significant. As such, the following impact analyses focus on the archaeological sites identified within the APE.

Five cultural resources have been recorded in four Project parcels proposed for fuel load reduction. All five sites are either NRHP-eligible or undetermined and treated as NRHP-eligible. There are several possible ways that these cultural resources might be impacted by Project activities, primarily through ground disturbance and burning of vegetative debris. Although light/manual removal of vegetation is not anticipated to have significant impacts on cultural resources, chipping of vegetation might have an impact on cultural resources if 1) chipping equipment encroaches into site boundaries or 2) wood chips are tilled into the ground within site boundaries. Heavy/mechanical treatment of vegetation might have an impact on cultural resources if excavators or masticators disturb the ground surface within the boundaries of a cultural resource. Similar impacts may occur from vehicles or heavy equipment being driven across the surfaces of those resources, or by using areas containing cultural resources as staging areas for Project activities. Finally, burning of slash and vegetative debris that has been removed from the Project area might have an impact on cultural resources. Burning has the potential to damage architectural features and destroy perishable artifacts or other cultural materials. The occurrence of these activities within the five NRHP-eligible and NRHP undetermined sites identified in the APE would be considered significant impacts.

Overall site density in the Project vicinity is fairly low, particularly within the APE, which lies within the present-day floodplain adjacent to the Rio Grande. Nevertheless, unidentified cultural resources may exist within unsurveyed as well as surveyed portions of the APE. These resources may be NRHP-eligible and could be impacted through direct disturbance, such as by

heavy/mechanical treatment or other ground disturbance. Such impacts could be considered significant.

FEMA consulted with the SHPO in December 2017 and made a determination of no adverse effect to historic properties with the condition of site buffering and with the condition that work be halted in the case of an unanticipated discovery. SHPO concurred with FEMA's determination in January 2018, as long as additional conditions were met, including the preparation of an avoidance plan for LA 755, LA 8870, LA 31718, and LA 150501 and some additional site updates during project implementation. In April 2018, FEMA shared the avoidance plan developed by Socorro County and Tetra Tech with SHPO and NMDGF, as some work would be taking place on their lands. SHPO and NMDGF concurred with the plan, and NMDGF requested updated shape files and site forms. Agency coordination relevant to cultural resources is available in Appendix C. Pursuant to these consultations, Socorro County and its contractors will adhere to the following mitigation measures and reporting requirements:

- The following Project activities would be avoided within the boundaries and buffers surrounding LA 755, LA 8870, LA 31718, LA 150501
 - Driving and/or parking of vehicles and heavy equipment;
 - Staging activities;
 - Chipping of vegetation;
 - Tilling of vegetation chips into the ground;
 - Heavy/mechanical vegetation treatment; and
 - Burning.
- Buffers of 100 ft. would be flagged around the boundaries of LA 755, LA 8870, and LA 31718/SR 1233 in the APE prior to fuel reduction activities to ensure resources are avoided. A buffer of 50 feet (15 m) will be flagged around LA 150501. Buffers will be marked on the ground immediately prior to all surface-disturbing actions within the APE by a qualified archaeologist using either wooden lath and flagging tape or snow fencing to ensure site protection. Personnel conducting treatment activities be briefed concerning prohibited activities within site boundaries. All flagging will be removed following completion of the Project.
- A qualified archaeologist will update the documentation for sites LA 31718/SR 1233 and LA 150501 at the time that avoidance buffers are placed at these sites. For sites LA 31718/SR 1233, documentation, including photography, GPS mapping, and LA site form updates, will be limited to portions of the site and buffer on state land within the APE. Any standing structures found within the APE or buffer on state land will be documented using the New Mexico Historic Cultural Properties Inventory form.
- If previously unknown cultural resources are encountered during treatment activities, all work within 100 feet around the discovery should be halted, the discovery protected, and the discovery reported within 24 hours to the New Mexico HPD for assessment and NRHP evaluation. Socorro County, FEMA, NMDGF, and HPD shall discuss appropriate

procedures to respond to the discovery within two working days. Work may proceed following evaluation and concurrence from New Mexico HPD. If the find is found to be NRHP-eligible, additional mitigation measures may be required to avoid significant impacts.

- Socorro County or its contractor will prepare site documentation updates as an addendum to the original survey report. The addendum report will also include a discussion of how and where avoidance measures were implemented. This addendum report will be submitted to Socorro County, FEMA, and HPD for review and comment no more than 30 days following the completion of Project treatment activities. The site updates and the addendum report must meet the standards described in the NMCRIS guidelines and § 4.10.8.18 New Mexico Administrative Code (NMAC).

In December 2017, FEMA consulted with the Pueblo of Acoma, Comanche Nation, Fort Sill Apache Tribe, Hopi Tribe, Pueblo of Isleta, Kiowa Tribe, Mescalero Apache Tribe, and Navajo Nation. None of the tribes responded to FEMA at the time of the publication of this DEA, therefore no TCPs or Native American sacred sites were identified within the Project area. If unmarked graves or human remains are present on private or state land, compliance with the New Mexico Cultural Properties Act (Article 18, Section 6, Subsection 11.2 (18-6-11.2), NMSA 1978, also known as the Unmarked Burial Statute is required. NMDHSEM will require the applicant to stop work immediately in the vicinity of the discovery. NMDHSEM will immediately notify FEMA and law enforcement agencies of the discovery, which shall notify the Office of the Medical Investigator (OMI) and the SHPO. OMI shall evaluate the remains for medicolegal significance with minimal disturbance of the remains. OMI will terminate the discovery of any non-medicolegal human remains to the SHPO, who shall proceed pursuant to the Unmarked Burial Statute and its implementing regulations found at 4.10.11 NMAC. For any questions for human remains on state or private land, contact State Archeologist, Bob Estes, (505) 827-4225, Fax (505) 827-6338, bob.estes@state.nm.us.

With incorporation of mitigation measures, the Proposed Action is not anticipated to have significant impacts on cultural resources.

4.8.2 No Action Alternative

Under the No Action Alternative, no impacts on cultural resources would occur since no fuel reduction activities would be conducted.

4.9 Land Use

4.9.1 Proposed Action

The Proposed Action would enhance land use by protecting structures from fire and increasing aesthetic and recreational value. The reduced risk of fire threat to homes, agricultural land, and wildlife habitat, would help to ensure that residential, agricultural, and recreational land use would continue. The reduced threat of fire could protect natural gas, electric, or fiber optics lines, bridges, state highways, and the Rio Grande that traverse the Socorro Valley. Therefore, the Proposed Action would have a beneficial effect on Land Use.

4.9.2 No Action Alternative

Land use would not be changed by the No Action Alternative. The increased risk of fire and continued overgrowth of non-native vegetation could potentially be prohibitive to current residential and agricultural land use resulting in long-term adverse effects.

4.10 Recreation

4.10.1 Proposed Action

The Proposed Action would remove dense overgrowth of non-native plant species. These restoration actions would improve access through the Bosque and to the Rio Grande, which would enhance walking/hiking and activities such as fishing on the river. Wildlife habitat and line of sight would also be improved, thus improving wildlife viewing. Therefore, the Proposed Action would have a beneficial effect on Recreation.

4.10.2 No Action Alternative

There would be no immediate effect to or enhancement of current recreation resources under the No Action Alternative. Under the No Action Alternative there is an increased chance of fire hazard in the long-term. If fires were to occur then there is the potential for decreased recreation quality in the Project area.

4.11 Hazardous or Solid Waste

4.11.1 Proposed Action

There would be no change to hazardous or Solid Waste under the Proposed Action. Unusable equipment, debris and material shall be disposed of in an approved manner and location. In the event significant items (or evidence thereof) are discovered during implementation of the project, applicant shall handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance to the requirements and to the satisfaction of the governing local, state and federal agencies.

4.11.2 No Action Alternative

There would be no change to hazardous or Solid Waste in the Project area under the No Action Alternative.

4.12 Socioeconomics and Environmental Justice Considerations

4.12.1 Proposed Action

The Proposed Action would decrease the risk of fire, thereby reducing the costs incurred by Socorro County for fire prevention and firefighting. The Proposed Action could also decrease insurance claims and financial burdens to property owners associated with losses due to fire. There may be local temporary jobs created by the Proposed Action. The increased aesthetics and safety of properties could increase the value of properties in the Project area. Therefore, the Proposed Action would have a beneficial effect on Socioeconomics.

The Proposed Action provides fire threat reduction services and vegetation restoration for a low income community. There is most likely insufficient State, County, or private funding for the

Project to occur without federal funding. Therefore, the Proposed Action would benefit environmental justice.

4.12.2 No Action Alternative

Under the No Action Alternative, without implementation of the Proposed Action, there would be an increased risk of fire. This would result in an increased use of resources from Socorro County for fire prevention, and in the event of a fire, resources for firefighting would be needed, which increase financial burden to the County. There would also be an increased chance that homes would be lost to fire. This would increase property insurance claims and increase the financial burden to property owners in this low-income area. Therefore, the No Action alternative would have a potentially negative effect on Socioeconomics.

There would be no long-term change to Environmental Justice under the No Action Alternative. However, there would be an increased risk of fire under the No Action Alternative and fires would create temporary health risks including inhalation of smoke and risk of injury in the event a fire occurs close to a residence.

4.13 Cumulative Impacts, Irreversible and Irretrievable Commitments of Resources

Cumulative effects are “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions “ (40 CFR §1508.7). The geographic extents for which cumulative effects are considered vary for each of the resources analyzed. Similarly, actions taken in the past, present, and reasonably foreseeable future within the Project area, when combined with the actions in the Proposed Action, could contribute to cumulative effects and may vary with the resource being considered. Environmental impacts associated with the bosque in Socorro County have been evaluated relative to the Proposed Action.

Socorro County and the SOBTF along with other partners have been working on a number of similar types of projects over the past ten years. Fuel reduction/exotic thinning projects have been performed by the Socorro SWCD, New Mexico State Forestry and SOBTF. There have also been numerous fires over the past ten years that have caused these projects to take precedence.

One of the most recent projects is the Central Socorro Bosque Restoration Project. This project is currently underway and includes the treatment and removal of non-native tree species from select Rio Grande bosque stands between Escondida Bridge and the Brown Arroyo Outflow near Socorro, New Mexico. This project is very similar to the Proposed Action in that it is intended to mechanically remove non-native tree species, treat stumps with herbicides to prevent regrowth as needed, and is followed up by planting native species where soils and water table depth is favorable. This treatment would also address wildland fire risk for the areas treated by reducing fuel loads.

Other projects performed by SWCD and SOBTF have had the same objectives and have usually taken place after large bosque fires have occurred. There are large areas that still contain dead material or non-native vegetation, which is why the Proposed Action was developed to aid in removing additional fuels to prevent future catastrophic fires.

5 - Conclusions

5.1 Summary of Effects

The Proposed Action would reduce the potential for catastrophic fire and allow for increased native habitat quality across approximately 1,350 acres of 1,650 acres analyzed in Socorro County. All applicable laws and regulations noted in Section 1.4 were considered during analysis of potential effects. A summary of the effects discussed in Section 4 are shown in Table 8 below.

Table 8: Summary of Effects from the Proposed Action

Existing Environment	Foreseeable Effects
Physiography, Geology, Soils	Short-term temporary adverse effect on soils
Climate	Positive effect
Noise	Short-term adverse effects
Air Quality	Short-term adverse effects
Aesthetics	Short-term negative effects with long-term positive effects
Water Quality	Minor, short-term adverse effects
Hydrology	No effect
Water Depletions	No effect
Wetlands and Floodplains	No effect
Vegetation Communities	Short-term negative effects with long-term positive effects
Fish and Wildlife	Short-term negative effects with long-term positive effects
Special Status Species	<p>May affect but not likely to adversely affect Southwestern willow flycatcher and critical habitat.</p> <p>May affect and likely to adversely affect Yellow-billed cuckoo and proposed critical habitat. Is not likely to jeopardize the continued existence of the cuckoo, and is not likely to destroy or adversely modify proposed critical habitat.</p> <p>No effect to Rio Grande silvery minnow, New Mexico meadow jumping mouse, Pecos Sunflower, Chiricahua leopard frog, Least tern, Mexican Spotted owl, Northern aplomado falcon, Piping plover, Socorro isopod, Alamosa springsnail, Chupadera springsnail, Socorro springsnail and Wright's marsh thistle.</p> <p>No adverse modification to Rio Grande silvery minnow critical habitat.</p>
Cultural Resources	No adverse effect
Land Use and Recreational Resources	No adverse effect
Hazardous or Solid Waste	No effect
Socioeconomic Considerations	Short-term and long-term positive effects
Environmental Justice	No adverse effect

6 - Document Preparation

6.1 Preparers

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6.2 Notification/Public Review

Socorro County will notify the public of the availability of the Draft Environmental Assessment through the publication of a public notice in the local newspaper of record, neighborhood coordination newsletters, and via e-mail to stakeholders. Letters of notification will also be mailed to the distribution list in Section 6.3. The Draft EA will be made available for public review at a physical location in the project area and on FEMA's web site (www.fema.gov).

FEMA will conduct a 30-day public comment period commencing on the initial date of publication of the public notice. FEMA will consider and respond to all public comments in the Final EA (see Appendix D). If no substantive comments are received, the Draft EA will become final and a Finding of Significant Impact (FONSI) will be issued for the project.

6.3 DEA Distribution List

Agencies and other entities contacted formally or informally in preparation of this DEA and/or that will be notified of the public review of the document include:

U.S. Bureau of Reclamation

U.S. Fish and Wildlife Service

Middle Rio Grande Conservancy District

U.S. Environmental Protection Agency

New Mexico Department of Game and Fish New Mexico State Forestry Division

New Mexico Environment Department, Surface Water Quality Bureau

New Mexico Interstate Stream Commission

Save our Bosque Task Force

Socorro County

Socorro Soil and Water Conservation District

U.S. Bureau of Land Management

Interested Pueblos and Tribes:

Pueblo of Acoma

Comanche Nation of Oklahoma

Fort Sill Apache Tribe of Oklahoma

The Hopi Tribe

Pueblo of Isleta

Kiowa Tribe of Oklahoma

Mescalero Apache Tribe

Navajo Nation

White Mountain Apache Tribe

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