



— BUREAU OF —
RECLAMATION

Environmental Assessment and Finding of No Significant Impact Southwest Reclamation Plant Outfall Restoration Project

Upper Colorado Basin Region; Albuquerque Area Office



Mission Statements

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

**U.S. Department of the Interior
Bureau of Reclamation
Albuquerque Area Office
Albuquerque, New Mexico**

FINDING OF NO SIGNIFICANT IMPACT

**Environmental Assessment
Southwest Reclamation Plant Outfall Restoration
Project**

Manager, Environment and Lands Division

Date

Area Manager, Albuquerque, New Mexico

Date

FONSI Number: AAO-23-003

FINDING OF NO SIGNIFICANT IMPACT

United States Department of the Interior

Bureau of Reclamation

Albuquerque Area Office

Albuquerque, New Mexico

Southwest Reclamation Plant (SWRP) Outfall Restoration Project

Introduction

In compliance with the National Environmental Policy Act of 1969, as amended (NEPA), and the Council on Environmental Quality's NEPA regulations at 40 Code of Federal Regulations (CFR) Parts 1500–1508 (2020), the Bureau of Reclamation (Reclamation) has completed an Environmental Assessment (EA) for the Proposed Action of the Southwest Reclamation Plant (SWRP) Outfall Restoration Project. Under the legislative authority of 43 CFR Chapter 1, Reclamation is the lead agency for purposes of compliance with NEPA for this Proposed Action.

The EA was prepared by Reclamation to address the potential impacts to the human environment due to implementation of the Proposed Action. The EA is attached to this Finding of No Significant Impact and is incorporated by reference.

Alternatives

The EA analyzes the No Action Alternative and the Proposed Action Alternative to implement the SWRP Outfall Restoration Project.

Decision and Finding of No Significant Impact

Reclamation's decision is to approve the joint license agreement for the Proposed Action Alternative. Based upon a review of the EA, Reclamation has determined that implementing the Proposed Action will not significantly affect the quality of the human environment. Therefore, an environmental impact statement is not required for this Proposed Action. This finding is based on consideration of the degree of effects of the Proposed Action on the potentially affected environment, as analyzed in the EA.

Potentially Affected Environment

The Proposed Action is located on lands jointly owned by Reclamation and the Middle Rio Grande Conservancy District (MRGCD) on the Rio Grande within Lot 3 and Lot 4 of Section 7 and Lot 1 of Section 18, Township 9 North, Range 3 East and Lot 7 of Section 13, Township 9 North, Range 2 East, New Mexico Principal Meridian. Also, the project area is within the Rio Grande Valley State Park, which is co-managed by MRGCD and the City of Albuquerque Open Space Division, and is north of the Pueblo of Isleta. Affected interests include Reclamation, the

Middle Rio Grande Conservancy District, and Albuquerque Bernalillo County Water Utility Authority. The EA evaluates the effects on the potentially affected environment, which includes physical, ecological, and socioeconomic factors.

Degree of the Effects

In determining the degree of effects of the Proposed Action, Reclamation has considered the following criteria as described in 40 CFR 1501.3(b)(2). These criteria were incorporated into the resource issues and analyses described in the EA.

- **Short- and Long-Term Effects.** The Proposed Action would have minor impacts on resources as described in the EA Chapter 3. Design features and environmental commitments were incorporated into the design of the Proposed Action to reduce impacts. The predicted short-term and long-term effects of the Proposed Action are fully analyzed in EA Chapter 3 and are incorporated by reference here.
- **Beneficial and Adverse Effects.** The Proposed Action would have a minor impact on resources as described and analyzed in the EA. Design features and environmental commitments were incorporated into the design of the Proposed Action to reduce adverse impacts. The Proposed Action will have beneficial impacts to native vegetation communities, wetlands, federally-listed species, and the local community. The Proposed Action is also expected to reduce non-native species and result in wildland fire mitigation. The beneficial and adverse effects of the Proposed Action are fully analyzed in Chapter 3 of the EA.
- **Effects on Public Health and Safety.** The Proposed Action will have minimal impacts on public health and safety. An analysis can be found in Table 1-2 of the EA.
- **Effects That Would Violate Federal, State, Tribal, and Local Law Protecting the Environment.** The Proposed Action does not violate any federal, state, local, or tribal law, regulation, or policy imposed for the protection of the environment. In addition, the Proposed Action is consistent with applicable land management plans, policies, and programs.

Environmental Commitments

The design features and environmental commitments located in Chapter 4 of the Final EA will be implemented to mitigate effects of the Proposed Action and are incorporated by reference.

Contents

CHAPTER 1 – INTRODUCTION	1
1.1 Project Location and Legal Description	1
1.2 Need for and Purpose of the Proposed Action.....	1
1.3 Decision to Be Made.....	2
1.4 Scoping and Issues.....	2
CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES.....	5
2.1 No Action Alternative.....	5
2.2 Proposed Action.....	5
2.2.1 Restoration Components.....	6
2.3 Construction Methods and Schedule	9
2.3.1 Temporary and Permanent Erosion Control.....	10
2.3.2 Construction Schedule.....	10
2.4 Maintenance.....	11
2.5 Permits and Authorizations.....	11
2.6 Comparison of Alternatives	12
CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	14
3.1 Reasonably Foreseeable Trends and Planned Actions.....	14
3.2 Issue 1: Potential impacts to vegetation.....	18
3.2.1 Affected Environment	18
3.2.2 Effects from the No Action Alternative	19
3.2.3 Effects from the Proposed Action	19
3.2.4 Cumulative Effects	20
3.3 Issue 2: Potential impacts to jurisdictional wetlands and waters of the U.S.	21
3.3.1 Affected Environment	21
3.3.2 Effects from the No Action Alternative	22
3.3.3 Effects from the Proposed Action	22
3.3.4 Cumulative Effects	22
3.4 Issue 3: Potential impacts to water quality and quantity.....	23
3.4.1 Affected Environment	23

3.4.2 Effects from the No Action Alternative	24
3.4.3 Effects from the Proposed Action	24
3.4.4 Cumulative Effects	25
3.5 Issue 4: Potential impacts to federally listed threatened and endangered species and candidate species.....	26
3.5.1 Affected Environment	26
3.5.2 Effects from the No Action Alternative	30
3.5.3 Effects from the Proposed Action	30
3.5.4 Cumulative Effects	38
3.6 Issue 5: Potential impacts to Indian trust assets.....	39
3.6.1 Affected Environment	39
3.6.2 Effects from the No Action Alternative	39
3.6.3 Effects from the Proposed Action	39
3.6.4 Cumulative Effects	39
CHAPTER 4 – PROJECT DESIGN FEATURES AND ENVIRONMENTAL COMMITMENTS.....	40
4.1 General Measures and Public Safety	40
4.2 Wildlife	41
4.3 Soils, Water, and Vegetation Resources.....	42
4.4 Air Quality	44
4.5 Cultural Resources.....	44
CHAPTER 5 – CONSULTATION AND COORDINATION	45
5.1 Public Involvement.....	45
5.2 Agency Coordination and Consultation.....	46
CHAPTER 6 – PREPARERS	47
CHAPTER 7 – LITERATURE CITED.....	48
CHAPTER 8 – ABBREVIATIONS AND ACRONYMS	51

Appendices

Appendix A. Project Maps

Appendix B. Project Photographs

Tables

Table 1.1. Issues Identified for Detailed Analysis.....	2
Table 1.2. Resources Eliminated from Further Analysis.....	3
Table 2.1. Surface Disturbance Quantities, Including Vegetation Removal	6
Table 2.2. Comparison of Alternatives and Summary of Effects for the No Action Alternative and Proposed Action Alternative	12
Table 3.1 Cumulative Action Scenario for the Proposed Project	14
Table 3.2. Plant Species Observed during Biological Survey	18
Table 3.3. SWCA’s Mapped Surface Water Features within the Project Area	21
Table 3.4 Average Water Quality Data, by Constituent, for the Rio Grande South of Rio Bravo Boulevard Gage (2020–2021).....	23
Table 3.5 SWRP Outfall Restoration Pollutant Loading Credit Summary	25
Table 3.6 NMOSE Depletion Calculation for Floodplain Terraces at 30% Design Phase	25
Table 3.7. Federally Listed Species with Potential to Occur in the Project Area.	26
Table 3.8. Summary of Species Effects Determinations for the Proposed Action	30
Table 5.1. Summary of Agency Coordination and Consultation.....	46

CHAPTER 1 – INTRODUCTION

This Environmental Assessment (EA) has been prepared to disclose and evaluate the potential environmental effects of the proposed Southwest Reclamation Plant (SWRP) Outfall Restoration Project (Proposed Action, or project). The federal action that requires this EA is the joint license agreement with the Middle Rio Grande Conservancy District (MRGCD) and the Bureau of Reclamation (Reclamation) to allow the habitat restoration project to be constructed around the existing SWRP outfall. The project is proposed by the Albuquerque Bernalillo County Water Utility Authority (Water Authority).

The Proposed Action is a floodplain habitat restoration and recreation enhancement project intended to benefit surface water quality and federally listed species that occur in the Middle Rio Grande (MRG) and the South Valley community. The proposed project area is approximately 15 acres and occurs on the east side of the MRG, on the north and south of the SWRP outfall (Appendix A, Figure A-1). The proposed project is a partnership with the Water Authority and the New Mexico Office of Natural Resources Trustee.

This document has been prepared in compliance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality's implementing regulations at 40 Code of Federal Regulations (CFR) Parts 1500 – 1508 (2020). An Environmental Impact Statement will be prepared if potentially significant impacts to environmental resources are identified. A Finding of No Significant Impact will be issued if no significant impacts are identified.

1.1 Project Location and Legal Description

The Proposed Action is located in Bernalillo County, New Mexico, along 4,000 linear feet of the east bank of the Rio Grande, just south of Rio Bravo Boulevard SE (see Appendix A, Figure A-1). The Proposed Action is located on lands jointly owned by Reclamation and MRGCD on the Rio Grande within Lot 3 and Lot 4 of Section 7 and Lot 1 of Section 18, Township 9 North, Range 3 East and Lot 7 of Section 13, Township 9 North, Range 2 East, New Mexico Principal Meridian (Appendix A, Figure A-2). The project area is within the Rio Grande Valley State Park, which is co-managed by MRGCD and the City of Albuquerque Open Space Division, and is north of the Pueblo of Isleta.

1.2 Need for and Purpose of the Proposed Action

The SWRP is operated by the Water Authority and discharges approximately 55 million gallons per day of treated wastewater. The SWRP's treated effluent is continuously released to the Rio Grande via an outfall channel located on the east bank of the river (SWRP outfall). The public currently utilizes designated and social trails in the area surrounding the SWRP outfall for recreational activities including hiking, biking, fishing, and occasionally swimming.

The Proposed Action is intended to improve surface water quality and floodplain habitat for the Rio Grande silvery minnow (*Hybognathus amarus*; RGSM), southwestern willow flycatcher

(*Empidonax traillii extimus*; flycatcher), and yellow-billed cuckoo (*Coccyzus americanus*; cuckoo), as well as to provide recreation enhancements for the enjoyment of the local community in the South Valley of Albuquerque.

The purpose of the project is to:

- Create and improve habitat for federally listed species upstream and downstream of the existing SWRP outfall;
- Improve water quality in the MRG at the outfall site, as well as provide seasonal water quality benefits to the connected groundwater systems in the project’s vicinity; and
- Increase public access to the Rio Grande bosque surrounding the outfall

The Proposed Action may be used to meet mitigation required by permits or authorizations issued by the U.S. Army Corps of Engineers (USACE), New Mexico Environment Department (NMED), and/or U.S. Fish and Wildlife Service (USFWS) for other Water Authority projects.

1.3 Decision to Be Made

Reclamation will decide whether to approve the joint license agreement with MRGCD to allow the Water Authority to construct the Proposed Action to benefit federally listed species and the local community.

1.4 Scoping and Issues

The Water Authority held two meetings with Reclamation prior to development of this EA. Meetings were held on September 22 and November 29, 2022. Issues considered for analysis in this EA were developed in accordance with guidelines outlined in the Reclamation NEPA Handbook (Reclamation 2012). The key issues identified are summarized in Table 1.1 and Table 1.2. The impact indicators provided are used to describe the affected environment for each issue in Chapter 3 and quantitatively assess the impacts of the alternatives. Environmental commitments that would be implemented under the Proposed Action are provided in Chapter 4.

Table 1.1. Issues Identified for Detailed Analysis

	Issue Statement	Impact Indicator
Issue 1	Potential impacts to vegetation	<ul style="list-style-type: none"> ▪ Acres of impact to vegetation ▪ Number of native trees removed
Issue 2	Potential impacts to jurisdictional wetlands and waters of the U.S.	<ul style="list-style-type: none"> ▪ Acres of wetlands impacted by the proposed project
Issue 3	Potential impacts to water quality and quantity	<ul style="list-style-type: none"> ▪ Estimated improvements to water quality ▪ Estimated depletions

	Issue Statement	Impact Indicator
Issue 4	Potential impacts to federally listed threatened and endangered species and candidate species	<ul style="list-style-type: none"> ▪ Acres of suitable habitat modified during construction ▪ During construction, changes in water quality from sediment transport or spills/leaks of industrial fluids ▪ Qualitative discussion of impacts to endangered RGSM from construction, monitoring, and entrainment
Issue 5	Potential impacts to Indian trust assets	<ul style="list-style-type: none"> ▪ Qualitative discussion of impacts to Indian Trust Assets

The following issues were determined to be insignificant or not applicable and are not analyzed in greater detail within this document.

Table 1.2. Resources Eliminated from Further Analysis

Issue Statement	Rationale for Elimination from Further Analysis
Potential air quality and visibility impacts from fugitive dust and emissions generated by ground-disturbing activities	All areas within Bernalillo County, New Mexico, are in attainment with National Ambient Air Quality Standards. During construction, air quality would be temporarily impacted by pollution from exhaust emissions and dust. Air pollution from motorized construction equipment and dust dissemination would discontinue after each construction phase. The minor increase in emissions from short-term construction activity would not be expected to exceed the ambient air quality standards for any criteria pollutants in the project area or Bernalillo County. Fugitive dust from construction activities would be controlled on the access roads and other locations, as necessary, with the application of water.
Potential impacts to hydrologic variability and climate change from construction of the Proposed Action	The Proposed Action is not expected to contribute to hydrologic variability or climate change; the minor short-term increase in greenhouse gas emissions that could result from the Proposed Action would not produce hydrologic variability impacts that differ from the No Action Alternative. The project's incremental contribution to global greenhouse gases cannot be translated into effects globally or in the region of this site-specific action.
Use and production of hazardous materials	No chemicals subject to reporting under the Superfund Amendments and Reauthorization Act Title III in an amount equal to or greater than 10,000 pounds would be used, produced, stored, or disposed of annually in association with the Proposed Action. No extremely hazardous substances, as defined in 40 CFR 355, would be used, produced, stored, transported, or disposed of in association with the Proposed Action. The environmental commitments in Chapter 4 were developed and will be implemented to minimize or avoid effects from solid and hazardous wastes.

Issue Statement	Rationale for Elimination from Further Analysis
Potential impacts to soils from equipment access and installation of in-stream features in the outfall channel	Soils in the project area are subject to ongoing disturbance for outfall maintenance and existing public access. During construction, soils would be further disturbed, mixed, and compacted. If needed, best management practices or construction/engineering actions would be taken to mitigate soil limitations in the area. Design features listed in the environmental commitments in Chapter 4 would be installed to avoid sediment transfer downstream; therefore, a detailed analysis is not warranted.
Potential impacts to migratory birds	Direct impacts on migratory birds would be avoided by conducting work activities outside the normal breeding and nesting season (April 15 to August 15). If nesting birds are detected, the Water Authority/Reclamation would coordinate and consult with the USFWS before work commences to determine appropriate next steps. Potential impacts on migratory birds would be avoided or minimized by using the environmental commitments listed in Chapter 4.
Potential impacts to the integrity of known cultural sites	The project area was surveyed for historical and archaeological resources in August 2022 (SWCA Environmental Consultants 2022a). No archaeological sites were discovered, and several isolated occurrences (jetty jacks) were observed. No adverse effects on cultural resources or historical properties are expected to occur from implementing the Proposed Action.
Potential impacts to cultural, sacred, and traditional properties	No cultural resources or traditional cultural properties have been identified in the project area. Therefore, no effects on traditional cultural properties or Native American religious concerns are expected to occur from implementing the Proposed Action.
Potential impacts to transportation and the existing road network	The Proposed Action is located on MRGCD and City of Albuquerque co-managed land, and public access is common. Equipment would be hauled to the site on the levee road from the parking area located southeast of the Rio Bravo Boulevard bridge. The Proposed Action is not expected to measurably impede traffic or increase daily traffic volumes in the project area, nor would it affect the existing road network.
Potential impacts to public health and safety	Construction of the Proposed Action would be completed per the engineered design plans, federal safety requirements, and the Water Authority’s safety requirements. In addition, public access to the project area during construction would be restricted, thereby minimizing public health and safety risks.

CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES

Two alternatives are analyzed in this EA: the No Action Alternative and the Proposed Action.

2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not sign the joint license agreement and the Proposed Action would not be constructed.

2.2 Proposed Action

The proposed restoration design described below is adapted from the *Southside Water Reclamation Plant Outfall Restoration Design Project Draft Basis of Design Report* (Hazen and Sawyer 2022) and the 30% design plans submitted to the Water Authority in December 2022. The Proposed Action would implement the restoration techniques summarized in Section 2.2.1 with the goal of restoring, and/or creating riparian habitat for the RGSM, flycatcher, and cuckoo. Up to 10.4 acres of floodplain habitat would be created for the benefit of the RGSM. In addition, approximately 6,000 feet of pedestrian trails would be improved to provide recreation and educational benefits to the local community.

Proposed restoration components (Table 2.1 and Appendix A, Figure A-3) consist of the following:

- Floodplain terraces to provide spawning and refugium habitat for the RGSM, as well as improve periodically flooded and riparian habitat for the flycatcher, and cuckoo.
- Riverbank stabilization to protect the longevity of the restoration project and improve water quality.
- Rootwad revetments to facilitate mixing of the heavy sediment-loaded water of the Rio Grande with the high-quality effluent discharged from the SWRP outfall.
- Revegetation of the project site with native species to enhance ecological uplift within the project area.
- Jetty jack removal to support the habitat restoration design and wildland fire mitigation.
- Pedestrian trails to provide safe, stable, and continuity of access by the local community to the Rio Grande floodplain ecosystem. The pedestrian trails would provide strategic connection to the existing trail network to prevent social trails, which can cause additional disturbance within restored habitats.

Maintenance activities would be conducted as needed for the life of the project (see EA section 2.4). Applicable design features described in EA Chapter 4 would be followed during

construction and maintenance of the project. The proposed project would comply with the terms and conditions contained within the project biological opinion (USFWS 2023a).

Table 2.1. Surface Disturbance Quantities, Including Vegetation Removal

Project Component	Units	Maximum Quantity
Floodplain terraces	acres	10.4
Riverbank stabilization	linear feet	4,000
Rootwad revetments	linear feet	500
Pedestrian access trails	linear feet	6,000
Total surface disturbance/vegetation clearing	acres	14.8
Total excavated volume	cubic yards	25,000
Jetty jack removal	number	approximately 195
Native live tree removal (equal to or greater than 6 inches in diameter at breast height [DBH])	trees	134

2.2.1 Restoration Components

2.2.1.1 Floodplain Terraces

Up to 10.4 acres of floodplain terraces would be constructed to flood at approximately the 900 cubic feet per second (cfs) (4.6 acres) and 1,500 cfs (5.8 acres) habitat design flows to increase the frequency and duration of inundation (see Table 2.1). The creation of terraces involves lowering the streambank and floodplain height through the removal of vegetation and the excavation and removal of soils to increase the frequency of overbank flooding. Floodplain terraces would be created by lowering the elevation of the bankline to increase inundation rates onto the floodplain.

The lowered floodplain terraces would not remain flooded for significant periods of time and would not be intended to provide mesohabitat for adult RGSMs. Instead, terraces are expected to provide additional low-velocity nursery and spawning habitat, resulting in improved egg retention and larval fish development during periods of high river flow. Based on the desired spawning habitat of the RGSM, the proposed floodplain terrace elevations were designed to flood to a depth range of 0.5 to 1 foot for the 900 and 1,500 cfs flows with velocities of less than 0.5 foot per second.

2.2.1.2 Riverbank Stabilization

The project area is located along an outside meander bend of the Rio Grande, which is generally prone to increased erosion rates. The proposed project includes riverbank stabilization by grading back from the toe of the slope to the 900 cfs or 1,500 cfs terrace at a 3:1 (horizontal to vertical) slope while incorporating coir matting and native vegetation. Coir matting would provide protection up to a velocity of 16 feet per second and shear stress up to 5 pounds per square foot from the stabilized channel toe to the edge of the floodplain terrace. The coir mattings would provide erosion protection until native vegetation consisting of herbaceous and

woody species can be sufficiently established. The Water Authority assumes responsibility for repair or rehabilitation of any bank erosion that occurs as a result of the project.

2.2.1.3 Rootwad Revetments and other Bioengineering Techniques

Rootwad revetments are structures constructed from interlocking root balls from trees, commonly called rootwads. These structures can be used in combination with rocks and bioengineered methods to construct continuous bank protection. Rootwad revetments are intended to resist erosive flows and are usually installed on the outer bends of streams.

Rootwad revetments would be installed along approximately 500 feet of the Rio Grande adjacent to the SWRP outfall channel to facilitate mixing of the heavy sediment-loaded water of the Rio Grande with the high-quality effluent discharged from the SWRP outfall. Rootwad revetments would be installed at or below base flow elevations to provide bank stability and increase instream habitat availability. Selected trees felled on-site during the construction of the floodplain terraces would be repurposed as rootwads to reduce construction costs.

Soil encapsulated lifts (SELs) with biodegradable blocks would be installed above the rootwad revetment structures up to the specified floodplain terrace elevation at a 3:1 (horizontal to vertical) slope. The SEL is a bioengineering technique that provides additional bank protection and vertical stability until vegetation becomes established. The vegetation planted on the SELs would include a native riparian seed mix, 2-inch plugs, live stakes, and/or container plantings.

2.2.1.4 Vegetation Removal and Native Revegetation

During construction, native and non-native species would be removed and replaced with native riparian species with the following goals:

- Promote the growth of native plant species.
- Enhance available riparian habitats.
- Support long-term project stability.

Vegetation removal within the project area includes removal of native and non-native trees (see Table 2.1), non-native vegetation removal, and establishing native riparian vegetation in disturbed areas. Up to 134 native, live trees (Rio Grande cottonwood [*Populus deltoides wislizenii*], willow [*Salix* sp.], and honey locust [*Gleditsia triacanthos*]) and 20 non-native, live or dead trees (saltcedar [*Tamarix* sp.], Russian olive [*Elaeagnus angustifolia*], and Siberian elm [*Ulmus pumila*]) would be removed because of their location within the floodplain terrace excavation areas and due to their proximity to the jetty jacks proposed for removal (see Table 2.1). In both cases, the root zones of these trees would be damaged during excavation and warrant removal.

Large-diameter vegetation, such as trees and large shrubs, would be removed using an excavator fitted with an extraction bucket to mechanically remove vegetation including rootwads or bulldozed over during excavation. For smaller vegetation, the expected vegetation removal method is either using mechanical means to remove all biomass or mastication where the standing biomass is ground-up and chipped. Mechanical methods may involve root-plowing/raking using a

bulldozer, mowing, chainsaw, or extraction. The root-plowing/raking method would be limited to areas where on-site sediment disposal is expected to take place.

Non-native species would be removed, hauled off-site, or mulched on-site prior to the collection and storage of selected trees for rootwad revetments to reduce the fuel load prior to any on-site storage of vegetative materials. Any vegetative material that is cut on-site (and not used for rootwad revetments) would be either (1) piled overnight and then hauled off, or (2) mulched on-site to a “fine” consistency or size. Any vegetative material cut on-site would be piled overnight at no higher than breast height (4.5 feet) and not within 2 feet of the dripline of standing trees. Mulch would not be placed within 2 feet of the drip line of native cottonwood or willow trees and would be scattered at a depth not to exceed 3 inches, where applied.

Trees selected for rootwad revetments would not be stored within 2 feet of the drip line of any trees to mitigate potential of ladder fuels. Rootwads would be placed in areas cleared of dry and flammable vegetative material. Any disturbance areas outside the excavation footprint would be revegetated.

Healthy, native, primarily cottonwoods trees, equal to or larger than 6 inches in diameter at breast height (DBH) would be replaced at a ratio of 10:1 per the revegetation plan developed as part of the final engineered design plans (see design feature Vegetation-6 in EA Chapter 4). Revegetation activities would include planting of Goodding’s willows (*Salix gooddingii*), cottonwoods (*Populus* sp.), and native shrubs within and adjacent to the newly created floodplain terraces. For cottonwoods and Goodding’s willows, pole planting would be the method used. Coyote willows (*Salix exigua*) are best planted as stem cuttings. Poles and stem cuttings are best planted during the dormant season (January–March). Cottonwood and willow species may be planted using a tractor, backhoe, front-end loader, or similar, equipped with a 3-meter (10-foot) hydraulic augur.

Disturbed areas would be revegetated to a native grass seed mix. Seeding may be done by hand; however, it is labor-intensive and, over large areas, does not usually yield satisfactory results. Planting large acreages is more efficient and effective if a mechanized planting method is used, such as an imprinter, seed drill, or broadcast seeder that are towed with a tractor. Seeding in the arid Southwest is best completed in early summer, just prior to the onset of the monsoon season. Seeding specifications include measures for mulch application, erosion control blankets, or other measures to minimize soil erosion as appropriate.

Other riparian shrubs may be planted to provide structural habitat diversity in the disturbed areas or under existing native bosque vegetation. Riparian shrub planting would occur outside the migratory bird breeding season (April 15–August 15). If any planting occurs between April 15 and August 15, the Water Authority and Reclamation would coordinate with the USFWS ahead of time to avoid any impacts to migratory birds.

The native vegetation plan would incorporate variable plant types, ranging from plugs, live stakes, container plantings, and caliper trees. Native milkweed seeds and plants would be included in the revegetation plans to improve monarch butterfly (*Danaus plexippus*) habitat. Further, the revegetation plan would be based on hydrologic zones (i.e., flood inundation frequency) and depths to groundwater.

2.2.1.5 Jetty Jack Removal

Lateral constraints, such as jetty jacks and the densely vegetated natural levees that form around them, decrease the potential for lateral migration of the channel and natural bank erosion processes, ultimately creating a narrower, more linear, and deeper river channel. Removal of jetty jacks would increase the connectivity between the river channel and floodplain by allowing for natural river processes to create wider and more diverse channel and floodplain features, yielding increased low-velocity habitat for all life stages of the RGSM. Removal of jetty jacks also provides improved conditions for wildland fire management, if a wildland fire occurs in this portion of the bosque.

An estimated 195 jetty jacks occur within the excavation limits of disturbance within the project area and are identified for removal during construction of the proposed project.

Jetty jack removal is proposed only in areas where levees would not be put at risk or where river control activities would not be affected. Jetty jacks would be removed by an excavator, and the remaining void would be filled with excavated soil to bring the elevation of the void to the level of the surrounding ground. Removed jetty jacks would be stockpiled and removed from the project site in coordination with the MRGCD.

Jetty jacks within the project area are either owned or under the authority of the USACE, Reclamation, or the MRGCD (USACE 2009). The Water Authority has initiated a conversation with the three agencies concerning jetty jack removal as part of the project, and a consensus agreement would be reached prior to removal of jetty jacks.

2.2.1.6 Pedestrian Access Trails and Maintenance Paths

The Water Authority plans to enhance the project area with improved pedestrian trails that connect the community to the river and the wetland for citizen science monitoring, community cleanup, planting days, and recreational activities such as fishing, hiking, and birdwatching. The trail network is divided into a hierarchy of two path types: (1) a primary maintenance path wide enough for vehicular circulation at 10 feet wide within the 1,500-cfs terrace and (2) a secondary, pedestrian-focused trail network at 6 feet wide predominantly within the 900-cfs terrace or remote sections of the site. While these compacted earth trails would generally follow the natural slope of the terrain, certain sections of the trail would be raised above the surrounding grade to reduce slope steepness. Both trail networks would incorporate a 1-foot clearance offset on either side. This would allow intermittent vehicular use for maintenance activities for the restoration.

2.3 Construction Methods and Schedule

In general, construction would be sequenced in the following manner: installation of temporary erosion control measures, clearing/grubbing/vegetation removal, demolition (i.e., removal of jetty jacks), excavation and storage/off-site removal of sediment, installation and establishment of permanent erosion control measures, revegetation, and monitoring until species are established. All work would be conducted outside of the Rio Grande active channel, except for construction immediately adjacent to the river channel. In these bankline areas, construction

would proceed behind a permeable barrier left in place to minimize impacts to the RGSM and water quality impacts (see Chapter 4 for silverly minnow design features Fish-1 through Fish-4).

Tracked equipment would be unloaded at the access control gate southeast of the Rio Bravo Boulevard bridge and would drive to the project area along the existing MRGCD access road.

2.3.1 Temporary and Permanent Erosion Control

Prior to construction, temporary erosion control measures would be installed to minimize the movement of sediment from the project area into the adjacent river channel. Proposed temporary erosion control measures for the project include the following:

- Designating construction ingress and egress and access road(s) with rock pads or similar measures to reduce tracking of sediment off-site
- Installing construction fencing around the project area boundary and around trees to be saved during construction
- Installation of silt fencing and turbidity curtains
- Temporary seeding of spoils and soil stockpile areas
- Dust control measures, as described in EA Chapter 4, Air-1 and Air-2

Proposed permanent erosion control measures include installation of permanent bankline stabilization materials, construction of rootwad revetments and other bioengineered techniques, revegetation with native species, and mulching of replanted areas to encourage water conservation and plant establishment (see EA Section 2.2.1).

2.3.2 Construction Schedule

Proposed project implementation, if approved, would begin in Winter 2023, as soon as all necessary permits have been obtained and Water Authority procurement of a construction contractor, and is estimated to be completed by early April 2024, thus completely avoiding the nesting season for the flycatcher, the cuckoo, and other migratory birds. If work is not completed by the April 15 time frame, work would cease until the following fall period after the August 15 limitation.

Excavation of the project area is expected to last approximately 8 months. Additional time may be required for on-site project activities to ensure site stability and permanent seed establishment. All work would be scheduled outside of the migratory bird nesting season (April 15 to August 15) (see Chapter 4 for design feature Bird-1).

Revegetation activities would be completed at the appropriate time of year to maximize the likelihood of success following completion of all earthwork activities. Pole plantings (i.e., cottonwood, Goodding's willow) and stem cuttings (i.e., coyote willow) need to be completed during the dormant season, usually between early December and mid-March. Riparian shrubs may be planted from fall through early spring. Grass seed mixes are best planted in early summer (late June/early July) at the onset of the summer monsoon season. Native milkweed seeds and plants would be included in the revegetation plans to improve monarch butterfly habitat.

2.4 Maintenance

While the floodplain improvements were designed with maintenance in mind, routine maintenance would occur after the construction of the project. The life of the project is estimated to be 50 years. The Water Authority will enter into an agreement with the City of Albuquerque Open Space Division regarding long-term maintenance of the project area. Completion of this agreement is pending completion of the 60% design and a draft maintenance plan. Maintenance activities are likely to include the following:

- Routine invasive species management
- Irrigation program until vegetation has been established
- Debris removal
- Trash cleanup efforts
- Inspection of structures
- Vegetation, structure, and trail maintenance
- Spot erosion repair

Non-native vegetation regrowth would be monitored and controlled via mechanical (e.g., mowing) or cultural (e.g., revegetation) means. No herbicides would be used for vegetation management.

2.5 Permits and Authorizations

If the Proposed Action is approved, the following permits and/or authorizations would be required prior to project implementation:

- Authorization under Clean Water Act (CWA) Section 404, using Nationwide Permit 27, as administered by the USACE
- CWA Section 401 Water Quality Certification from NMED
- CWA Section 402 National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency
- Endangered Species Act (ESA) of 1973 as amended (16 United States Code [USC] 1531-1544, 87 Stat. 884) Section 7 concurrence from USFWS
- National Historic Preservation Act of 1966 (16 USC 470 et seq.) Section 106 concurrence from the New Mexico Historic Preservation Department

Compliance with the following laws and Executive Orders is required before and during project implementation:

- Clean Air Act of 1963 (42 USC 7401)
- CWA of 1972 as amended (33 USC 1251 et seq.)

- Migratory Bird Treaty Act of 1918 (16 USC 703-712)
- Bald and Golden Eagle Protection Act of 1940 (16 USC 668-68c)
- Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 Federal Register 44716)

2.6 Comparison of Alternatives

Table 2.2 provides a comparison of alternatives analyzed in detail. Resource impacts are outlined for the No Action and the Proposed Action Alternatives.

Table 2.2. Comparison of Alternatives and Summary of Effects for the No Action Alternative and Proposed Action Alternative

Issue	No Action Alternative	Proposed Action Alternative
Issue 1: Potential impacts to vegetation	No change to existing vegetation communities, conditions such as wildland fire risk and disconnection of the floodplain to the Rio Grande would continue	Short-term adverse impacts to vegetation would occur from the Proposed Action as a result of soil compaction, trampling, and or removal within the limits of construction disturbance. Design features would minimize impacts to vegetation that could result from the proposed project. Long-term beneficial impacts would occur from the Proposed Action. Floodplain inundation would occur at increased frequency.
Issue 2: Potential impacts to jurisdictional wetlands and waters of the U.S.	No effects	Approximately 4.6 acres overlap with delineated wetlands and 10.7 acres overlap with National Wetlands Inventory Riparian areas. Short-term adverse impacts to wetlands include soil compaction, rutting, and vegetation removal. Following construction, an increased amount of substrate area would have the potential to be inundated and/or saturated periodically, which should lead to a net gain in both the area and function of wetlands.

Issue	No Action Alternative	Proposed Action Alternative
<p>Issue 3: Potential impacts to water quality and quantity</p>	<p>No effects</p>	<p>Short-term adverse impacts to water quality would occur from the Proposed Action as a result of soil disturbance, vegetation removal, and potential sediment runoff from the limits of construction disturbance to the Rio Grande. Short-term and localized adverse effects to water quality may result but are not expected to exceed applicable standards. Design features Soil-1 through Soil-4, Water-1 through Water-3, and Vegetation-1 through Vegetation-4 would minimize impacts to water quality that could result from the proposed project.</p> <p>Long-term beneficial impacts to water quality are expected to result from the Proposed Action as a result of riverbank stabilization, rootwad revetments, and the native revegetation plan. The Water Authority continues to coordinate with the New Mexico Office of the State Engineer regarding the need for depletion offsets.</p>
<p>Issue 4: Potential impacts to federally listed threatened and endangered species and candidate species</p>	<p>No adverse effects on threatened or endangered species. There would be no increase in suitable RGSM habitat in the Angostura Reach.</p>	<p>Short-term adverse impacts to species and their habitats (RGSM, flycatcher, cuckoo, and monarch butterfly) from construction activities.</p> <p>Long-term beneficial impacts to species and their habitats (RGSM, flycatcher, cuckoo, New Mexico meadow jumping mouse (NMMJM), and monarch butterfly) from improved and restored habitat conditions.</p> <p>The proposed project would comply with the terms and conditions contained within the project biological opinion (USFWS 2023a).</p>
<p>Issue 5: Potential impacts to Indian trust assets</p>	<p>No impact</p>	<p>No impact</p>

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing conditions relevant to the issues presented in Table 1.2 and discloses the impacts of the Proposed Action and No Action Alternative on those issues. Impacts can be direct, indirect, or cumulative and are characterized as either long-term (permanent) or short-term (temporary). Short-term impacts are defined as those impacts expected to occur during construction or the first year of the project. Long-term impacts are defined as those impacts expected to occur post-construction and up to the life of the project, estimated at 50 years.

3.1 Reasonably Foreseeable Trends and Planned Actions

Council on Environmental Quality NEPA implementing regulations, 40 CFR 1502.15, require that NEPA documents “succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned actions in the area(s).” This EA describes the impacts, or environmental consequences, of the Proposed Action and alternatives, and the potential impact of the reasonably foreseeable future trends and planned actions combined with the Proposed Action and alternatives in the analysis area following the requirements of 40 CFR 1502.15. The spatial analysis area is defined as a 1-mile buffer extending upstream and downstream of the proposed restoration site because this is the estimated extent of the direct and indirect impacts of the Proposed Action. The temporal analysis time frame for cumulative impacts is estimated at 50 years, which is the estimated life of the restoration project.

Table 3.1 summarizes the trends and planned actions within the spatial analysis area for cumulative impacts.

Table 3.1 Cumulative Action Scenario for the Proposed Project

Project Name	Responsible Agency/ Organization	Project Description
Recreation and environmental education enhancements at the Valle del Oro National Wildlife Refuge (NWR)	USFWS	The 570-acre Valle de Oro NWR, was designated in 2012, and it is the first urban wildlife refuge in the Southwest Region for the USFWS. Current plans for the NWR include expansion of the existing trail network and restoration of the former dairy farm into a mosaic of native habitats to enhance environmental education activities in the NWR and South Valley of Albuquerque (USFWS 2023b).

Project Name	Responsible Agency/ Organization	Project Description
Recreation activities and enhancements within the Rio Grande Valley State Park	City of Albuquerque Open Space Division	<p>Within the Rio Grande Valley State Park, the City of Albuquerque performs routine vegetation management and recreation enhancement activities, including vegetation thinning, invasive species treatments, and trail creation improvements to benefit the community.</p> <p>Ongoing recreation activities within the Rio Grande bosque, include trail running, cycling, hiking, and birdwatching along the trail network within the Rio Grande Valley State Park.</p>
Rio Bravo/Poco Loco NE Picnic Area Improvements	City of Albuquerque Open Space Division	<p>This site, commonly known as Poco Loco, is accessed on the northeast side of Rio Bravo from Broadway. The area includes a fully accessible 0.25-mile loop trail that winds under a canopy of cottonwoods, passing by the quiet flow of the Rio Grande. This is an ideal site to provide better small watercraft access for boaters, as well as emergency river access for the Bernalillo County Fire Department. Previous restoration projects have been completed in this area, including fuel reduction and invasive species management. There are a number of resprouting invasive plants including Siberian elms and Tree of Heaven (<i>Ailanthus</i> sp.). The City of Albuquerque is working with local organizations to treat this area by hand-removing smaller caliber trees.</p>
New Mexico State Land Office (SLO) bosque adjacent to Valle de Oro NWR	City of Albuquerque Open Space Division; SLO	<p>The Open Space Division is working closely with the NWR and SLO to collaborate on education and conservation activities within the 213-acre project area that is part of the larger Rio Grande Valley State Park. Proposed project activities include working with youth crews on restoration projects.</p>

Project Name	Responsible Agency/ Organization	Project Description
Bosque Ecosystem Monitoring Program (BEMP)	University of New Mexico and Bosque School	BEMP combines long-term ecological research with community outreach by involving K–12 teachers and their students in monitoring key indicators of structural and functional change in the MRG riparian forest, or “bosque.” During the 2021 reporting period, BEMP had 33 sites along 250 miles of the Rio Grande, including two sites near the proposed project area. Through the strategic location of these sites, BEMP studies the ecological drivers and effects of fire, flooding, climate change, and human alteration on the bosque ecosystem. Five groundwater wells are monitored during the week of monthly monitoring, along with the nearby ditch or drain.
Urban development within the South Valley of the City of Albuquerque	Private	Urban development activities, such as clearing land to construct buildings for residential and commercial areas, road and bridge maintenance projects, and similar activities associated with the City of Albuquerque’s urban environment that surrounds the portion of the bosque that would be treated by the Proposed Action.
SWRP Outfall Maintenance	Water Authority	The Water Authority conducts maintenance, as needed, at the existing SWRP Outfall flumes to ensure functionality, public safety, and adherence to state and federal permits. Water quality samples are taken daily to comply with the Water Authority’s NPDES permit.
Maintenance of Rio Bravo Boulevard (New Mexico State Highway 500 [NM 500]) and the Rio Bravo Bridge	New Mexico Department of Transportation (NMDOT) and City of Albuquerque	Bridge maintenance may include, and is not limited to, the following: pavement and seal repair, sand blasting and painting, and snow removal. NMDOT also regularly inspects bridges to ensure public safety. When work is conducted, disturbances such as noise and increases in fugitive dust occur in and around the bosque.

Project Name	Responsible Agency/ Organization	Project Description
Replacement of the Rio Bravo Bridge	NMDOT and Federal Highway Administration	The proposed project involves replacing the eastbound and westbound bridges on NM 500 (Rio Bravo Boulevard) spanning the Rio Grande. The project area is located on NM 500 between New Mexico State Highway 314 (Isleta Boulevard SW) and New Mexico State Highway 303 (2nd Street SW) and includes the two bridges crossing the Rio Grande and the MRGCD Albuquerque Riverside Drain. The bridge replacement is scheduled for 2025 (NMDOT 2023).
Habitat restoration activities	Members of the MRG Endangered Species Collaborative Program (Collaborative Program)	Members of the Collaborative Program have funded multiple habitat restoration projects in the Angostura (Albuquerque) reaches. RGSM augmentation funded by members of the Collaborative Program would provide positive synergistic interactions with the habitat that would be created by this project.
Rio Grande flood control levee maintenance	USACE	The USACE routinely conducts maintenance on the levees on an ad-hoc basis for the purpose of flood control. When work is conducted, disturbances such as noise and increases in fugitive dust occur in and around the bosque. No levee work is currently proposed in close proximity to the SWRP Outfall project area.
MRGCD Maintenance projects	MRGCD	The MRGCD routinely performs maintenance on irrigation canals and ditches throughout the MRG.
Climate Change	Not applicable	Climate change is a global process that is affected by the sum total of greenhouse gases (primarily carbon dioxide) in the Earth's atmosphere. The incremental contribution to global greenhouse gases from land management actions cannot be accurately translated into effects on climate change globally or in the area of any site-specific or regional action. Currently, global climate models are unable to forecast local or regional effects on resources. The United States and the Southwest continue to face concerns about social and environmental impacts from climate change.

3.2 Issue 1: Potential impacts to vegetation

3.2.1 Affected Environment

The project area is within the Arizona/New Mexico Plateau: Rio Grande Floodplain Level IV ecoregion (Griffith et al. 2006). During the biological surveys, biologists determined that the habitat is a Rio Grande bosque/riparian habitat dominated by coyote willow, Rio Grande cottonwood, Russian olive, and saltgrass (*Distichlis spicata*), which is typical of current conditions in the Rio Grande Floodplain ecoregion. Vegetative cover within the project area is approximately 60% tree, 30% shrub, and 10% herbaceous. The project area and surrounding landscape have been previously disturbed by gravel and two-track roads, wastewater and water control infrastructure, jetty jacks, power lines, recreation (e.g., fishing, hiking and biking trails), and evidence of trash dumping and homeless encampments. Table 3.2 lists plant species recorded during the general biological survey completed on August 25 and 26, 2022. Appendix B provides photographs of the general vegetative communities.

Table 3.2. Plant Species Observed during Biological Survey

Common Name	Scientific Name
Amaranth (pigweed) species	<i>Amaranthus</i> sp.
Barnyardgrass	<i>Echinochloa crus-galli</i>
Black locust	<i>Robinia pseudoacacia</i>
Coyote willow*	<i>Salix exigua</i>
False indigo bush	<i>Amorpha fruticosa</i>
Field bindweed	<i>Convolvulus arvensis</i>
Goodding's willow	<i>Salix gooddingii</i>
Horsetail milkweed	<i>Asclepias subverticillata</i>
Kochia	<i>Bassia scoparia</i>
Rio Grande cottonwood*	<i>Populus deltoides wislizenii</i>
Russian olive*	<i>Elaeagnus angustifolia</i>
Sacred datura	<i>Datura wrightii</i>
Saltcedar species	<i>Tamarix</i> sp.
Saltgrass*	<i>Distichlis spicata</i>
Sedge species	<i>Carex</i> sp.
Seepwillow species	<i>Baccharis</i> sp.
Siberian elm	<i>Ulmus pumila</i>
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Skunkbush sumac	<i>Rhus trilobata</i>
Tall evening primrose	<i>Oenothera elata</i>
Trumpet vine	<i>Campsis radicans</i>
White mulberry	<i>Morus alba</i>

Note: Nomenclature follows the PLANTS database (Natural Resources Conservation Service 2022).

* Refers to dominant species.

Historically, the annual hydrologic regime for the project area was characteristic of southwestern rivers with high flows in the spring driven by snowmelt followed by long periods of low flows in the midsummer, fall, and winter. Occasional summer thunderstorms could produce short-duration increases in flows in the Rio Grande. The river has changed drastically over the years from irrigated agriculture and climatic variations. Levees were built in the 1920s and 1930s to cope with floods and to constrain the river's floodway. Agriculture has been the primary driver of controlling the river flow. Upstream water storage reservoirs, diversion dams, and valley drainage of shallow groundwater have altered the original patterns of water and sediment distribution within the river and floodplain (Crawford et al. 1993). These measures have an impact on the vegetation distribution as well. Smaller peaks and longer duration low flows in the river have led to changes from a braided and anastomosing channel to a narrow, single-threaded sinuous one, with vegetation encroachment filling in the gaps of the patchy mosaic vegetation pattern that once stood.

During the biological surveys, three New Mexico Department of Agriculture (NMDA)–listed noxious weed species (NMDA 2020) were identified within the project area. Ravennagrass (*Saccharum ravennae*) is listed as a Class A noxious weed that is not considered widespread in New Mexico but has been increasing in prevalence in the Rio Grande bosque, particularly around the Albuquerque, New Mexico, area. Ravennagrass was not detected in the project area during the August 2022 biological surveys but was seen along the west bank across the main channel of the Rio Grande. Russian olive, Siberian elm, and saltcedar are all categorized as Class C noxious species, which are considered widespread in the state. The three Class C species were noted as being present throughout the project area during the August 2022 biological surveys. The NMDA suggests that “management decisions for these species should be determined at the local level, based on feasibility of control and level of infestation” (NMDA 2020).

The bosque's vegetation has previously been impacted by naturally occurring overbank floods and long dry periods. The last 50 years have seen wildfires begin to replace the flooding as a major force of disturbance in the bosque. The lack of spring flooding combined with increasing wildfires has influenced the bosque's vegetation organization and appearance. The effects from these fires have also been intensified by the spread of woody invasive species and the accumulation of deadwood, in addition to the increase in river regulation (Crawford et al. 2005).

3.2.2 Effects from the No Action Alternative

Under the No Action Alternative, there would be no change to the existing vegetation communities because the project would not be constructed. Vegetation would continue to establish itself based on existing soil and water conditions. Therefore, the disconnected nature of the floodplain from the Rio Grande and the succession of vegetation communities would continue. The potential wildland fire risk resulting from the jetty jacks and vegetation conditions could also continue.

3.2.3 Effects from the Proposed Action

The Proposed Action includes surface disturbance, grading and removal of the vegetation within a maximum 14.8 acres to construct the floodplain terraces, riverbank stabilization, and pedestrian access trails (see Table 2.1). Up to 134 native trees, with 6 inches or greater DBH, would be

removed from the project area. The proposed project also involves revegetating the disturbed areas with native trees, shrubs, and grasses. Short-term adverse impacts to vegetation would occur from the Proposed Action as a result of soil compaction, trampling, and/or removal within the limits of construction disturbance (see Appendix A, Figure A-2 and Figure A-3). Design features Soil-1 through Soil-4 and Vegetation-1 through Vegetation-6 would minimize impacts to vegetation that could result from the proposed project. As noted in EA Chapter 4, Vegetation-6, healthy, native, primarily cottonwoods trees, equal to or larger than 6 inches DBH would be replaced at a ratio of 10:1 per the revegetation plan developed as part of the final engineered design plans (see design feature Vegetation-6 in EA Chapter 4).

Long-term beneficial impacts would occur from the Proposed Action. Floodplain inundation would occur at increased frequency. It is anticipated that riparian and wetland vegetation would increase due to increased inundation in the floodplain. The proposed project area would be revegetated with native trees, shrubs, and forbs, and the stabilized riverbank would be more conducive to natural re-establishment of riparian vegetation. Removal of jetty jacks would improve ecological uplift by creating space for native vegetation to establish where structures previously existed and improve wildland fire mitigation in the project area. The removal of invasive species in the project area would aid in decreasing the spread of these species throughout the bosque. In addition, thinning the bosque vegetation for the Proposed Action would decrease the amount of fuel available when fires do occur.

3.2.4 Cumulative Effects

The reasonably foreseeable trends and planned actions associated with projects listed in Table 3.1 would have similar impacts to vegetation as described above for the Proposed Action. Specifically, the recreation enhancements within the Rio Grande Valley State Park, Rio Bravo/Poco Loco NE picnic area improvements, maintenance and replacement of the Rio Bravo Bridge, and other MRG habitat restoration projects are likely to have adverse impacts to vegetation. All of these projects involve construction activities, which require surface disturbance and vegetation removal. Short-term adverse impacts to vegetation include soil compaction, vegetation trampling, and vegetation removal. For those projects involving recreation enhancements and habitat restoration, it is expected that long-term beneficial impacts to vegetation would occur as a result of native revegetation of the disturbed area and the removal of noxious and non-native species, including a reduction in their seedbank in the restoration area. For infrastructure projects, such as the Rio Bravo Bridge replacement project, adverse impacts to vegetation may be permanent if the footprint of the bridge expands into current vegetated areas. It is expected that permanent vegetation impacts would be mitigated, thus reducing long-term effects. Therefore, cumulative impacts to vegetation would be both short- and long-term and both adverse and beneficial.

3.3 Issue 2: Potential impacts to jurisdictional wetlands and waters of the U.S.

3.3.1 Affected Environment

Waters of the U.S. (WOTUS) is a threshold term in the CWA and can include wetlands as well as other jurisdictional waterways. Wetlands are defined by the USACE as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE 1987:9). According to the USACE (1987), for an area to be considered a wetland, it must contain the following three parameters under normal circumstances: 1) the presence of wetland hydrology showing regular inundation, 2) a predominance of hydrophytic (water-loving) vegetation, and 3) soils characteristic of frequent saturation (i.e., hydric soils). The presence or absence of wetlands was identified in the field using routine on-site delineation methods outlined in the Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2010). Wetland classification was based on the classification system of Cowardin et al. (1979).

SWCA Environmental Consultants (SWCA) biologists conducted an aquatics resources delineation survey of the proposed project area on September 21, 23, and 26, 2022, to identify and map the boundaries of potential jurisdictional wetlands, special aquatic sites, open waters, and other surface water features considered to be WOTUS. The spatial extent of the project area was divided into two Lowland Riverine Wetland Areas (Wetland Area 1 and 2), north and south of the SWRP Outfall, respectively. These areas contain the field-collected points most immediately adjacent to the Rio Grande, containing the three indicators that define a wetland: hydrophytic vegetation, hydric soils, and hydrology (Table 3.3). These wetland areas were identified as potentially jurisdictional (SWCA 2022b).

Table 3.3. SWCA’s Mapped Surface Water Features within the Project Area

Wetland Number	Wetland Area (acres)	Coinciding Wetlands
Wetland Area 1 (Northern wetland)	2.1	PSS1A -Freshwater Forested/Shrub Wetland; R2UB2F -Riverine
Wetland Area 2 (Southern wetland)	2.5	Rp1FO6CW -Forested/Shrub Riparian

These wetlands are classified using the Cowardin system (Cowardin et al. 1979) and National Wetland Inventory (NWI) codes (USFWS 2022a):

- PSS1A– Palustrine, including all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 part per thousand.

- R2UB2F – Riverine, including all wetlands contained within a channel except wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens and habitat containing ocean-derived salts of 0.5 part per thousand or greater.
- Rp1FO6CW– Forested/Shrub Riparian, includes all riparian wetland habitat immediately adjacent to the Rio Grande.

3.3.2 Effects from the No Action Alternative

Under the No Action Alternative, there would be no impacts to wetlands or WOTUS because the project would not be constructed.

3.3.3 Effects from the Proposed Action

The Proposed Action includes surface disturbance, grading and removal of the vegetation within to construct the floodplain terraces, riverbank stabilization, and pedestrian access trails (see Table 2.1). Approximately 4.6 acres overlap with delineated wetlands (potential WOTUS) and 10.7 acres overlap with NWI Riparian areas (Appendix A, Figure A-4). Short-term adverse impacts to wetlands include soil compaction, rutting, and vegetation removal. Per design feature Water-2, the Water Authority would obtain the necessary CWA Sections 404/401 permits prior to construction and would comply with the terms of the permits.

Although construction of the proposed project would result in temporary impacts to wetlands, which are potential WOTUS, riparian and wetland habitat is expected to increase over the long term due to increased inundation in the floodplain. This inundation area in the floodplain is designed to allow the water to return to the river channel when flows subside, thus not increasing overbank flow that is trapped in the floodplain. Following construction, an increased amount of substrate area would have the potential to be inundated and/or saturated periodically (approximately 33–45 days per year), which should lead to a net gain in both the area and function of wetlands.

3.3.4 Cumulative Effects

The reasonably foreseeable trends and planned actions associated with projects listed in Table 3.1 would have similar impacts to the Proposed Action. Specifically, maintenance of Rio Bravo Boulevard and the replacement of the Rio Bravo Bridge, as well as Rio Bravo/Poco Loco NE Picnic Area Improvements, might potentially have adverse impacts to wetlands and the Rio Grande. The reasonably foreseeable recurrent maintenance associated with Rio Bravo Boulevard and maintenance of the Rio Bravo Bridge would create soil disturbance that could create sedimentation with downstream adverse impacts to soil and water. The reasonably foreseeable increased recreational use of the Rio Bravo/Poco Loco NE Picnic Area could also increase sedimentation associated with erosion. Short- and long-term adverse impacts to the Rio Grande and adjacent wetlands would be expected due to the removal of bank vegetation and the potential for sediment movement. However, while impacts to the Rio Grande and adjacent wetlands are expected, the reasonably foreseeable habitat restoration projects conducted by members of the MRG Endangered Species Collaborative Program would be beneficial to the river and associated wetlands for the reason that they might mitigate soil erosion and increase historic flows based on their restoration activities. Therefore, cumulative impacts to the Rio

Grande and adjacent wetlands would be mostly intermittent and ongoing restoration activities would be expected to mitigate these impacts.

3.4 Issue 3: Potential impacts to water quality and quantity

3.4.1 Affected Environment

3.4.1.1 Water Quality

The project area is bordered by the Rio Grande, a perennial river and jurisdictional WOTUS. Water quality data was recently collected by the U.S. Geological Survey (USGS) to support a fecal bacteria study (USGS 2021). Water quality samples were collected during both the dry season and wet season in 2020 and 2021, under a range of flow conditions. Table 3.4 summarizes the water quality data for the Rio Grande, as collected at the gage south of Rio Bravo Boulevard.

Table 3.4 Average Water Quality Data, by Constituent, for the Rio Grande South of Rio Bravo Boulevard Gage (2020–2021)

	Water Temperature (°C)	Specific conductance	Dissolved Oxygen (mg/L)	Suspended Sediment (mg/L)	Fecal Coliform (col/100mL)	Nitrate (mg/L)	Total Phosphorus (mg/L)
Mean	17.2	337.7	8.4	388.8	361.5	6.2	1.9

mg/L = milligrams per liter; °C = degrees Celsius; col/100mL = coliform per 100 milliliters.

Specific conductance is measured in microsimens per centimeter at 25 degrees Celsius.

Source for all water quality data except nitrate and total phosphorus: USGS (2022).

Source for nitrate and total phosphorous: Hazen and Sawyer (2021).

Water quality standards for the MRG from the headwaters of Elephant Butte reservoir upstream to Alameda bridge in Albuquerque, excluding waters on Isleta Pueblo, have designated uses of irrigation, marginal warmwater aquatic life, livestock watering, public water supply, wildlife habitat, and primary contact (20.6.4.105 New Mexico Administrative Code). Relevant to the proposed project area, the NMED has identified the MRG between Tijeras Arroyo and Alameda Bridge as impaired for marginal warmwater aquatic life due to dissolved oxygen, mercury, polychlorinated biphenyls, and temperature and impaired for primary contact due to *E. coli* (NMED 2022).

3.4.1.2 Water Quantity

The Rio Grande Compact (1939) limits the amount of surface water that can be depleted annually in the MRG based upon the natural flow of the river measured at the Otowi gage near Los Alamos. In addition, the New Mexico Office of the State Engineer (NMOSE) has determined that the MRG is fully appropriated. Therefore, any increase in water use in one sector must be offset by a reduction in use in another sector to ensure that neither existing water rights nor New Mexico’s ability to meet its compact delivery obligations are impaired.

Work performed by any party within the river channel within the Rio Grande Floodway is exempt from both the permitting requirement and the offsetting requirement. The definition of the river channel in this case is a 600-foot-wide corridor centered on the midline of the river. Water use within this 600-foot-wide corridor is not deemed an increase in water use and does not require permitting or offsetting.

The NMOSE requires that parties intending to construct habitat restoration projects in the MRG that involve diversion of water from the river or creation of new, open water surface, submit their project plans to the NMOSE. The NMOSE would determine whether a permit is needed and, in consultation with the New Mexico Interstate Stream Commission (NMISC), whether the project is likely to result in increased depletions and how those increased depletions would be offset.

3.4.2 Effects from the No Action Alternative

The No Action Alternative would result in no change to current water quality or water quantity conditions.

3.4.3 Effects from the Proposed Action

3.4.3.1 Water Quality

Short-term adverse impacts to water quality would occur from the Proposed Action as a result of soil disturbance, vegetation removal, and potential sediment runoff from the limits of construction disturbance to the Rio Grande (see Appendix A, Figure A-2). The Proposed Action would result in temporary and localized changes in the measures for physical constituents, particularly for turbidity and total dissolved solids, associated with ground disturbance for the restoration components and operation of equipment along the water's edge. Because the Rio Grande was historically a sediment-rich river, this temporary impact is not considered significant to the project area or the river as a whole. The increase would produce a relatively small contribution compared to the typical sediment load the river carries. Short-term and localized adverse effects to water quality may result but are not expected to exceed applicable standards. It is expected that turbidity and total dissolved solids levels would return to pre-construction levels shortly after completion of excavation work. Design features Soil-1 through Soil-4, Water-1 through Water-3, and Vegetation-1 through Vegetation-4 would minimize impacts to water quality that could result from the proposed project.

Long-term beneficial impacts to water quality are expected to result from the Proposed Action as a result of riverbank stabilization, rootwad revetments, and the native revegetation plan. These restoration components would reduce sediment input to the Rio Grande channel, thereby reducing pollutant loads (Hazen and Sawyer 2022). Estimated pollutant load reductions are presented in Table 3.5.

Table 3.5 SWRP Outfall Restoration Pollutant Loading Credit Summary

	Total Suspended Solids (tons/year)	Total Nitrogen (pounds/year)	Total Phosphorus (pounds/year)
30% design reduction	87.3	16.9	22.9

Source: Hazen and Sawyer (2022)

3.4.3.2 Water Quantity

Under the Proposed Action, the majority of the proposed restoration work would occur outside of the nominal 600-foot width of the channel (the original river channel design width for this reach to maintain flow delivery efficiency and reduce flood risk). The Water Authority performed preliminary depletion calculations using the NMOSE protocol (NMOSE 2011). Table 3.6 summarizes the estimated water depletions based on the 30% design plans.

Table 3.6 NMOSE Depletion Calculation for Floodplain Terraces at 30% Design Phase

Floodplain terrace	Terrace area (acres)	Days of inundation per year (30-year mean)	Water Evaporation Rate (inches/day)	Depletions (acre-feet/acre/year)
900 cfs	0.70	45	0.19	0.71
1,500 cfs	4.73	33	0.19	0.52

The Water Authority continues to coordinate with the NMOSE regarding the need for depletion offsets, which would be determined with completion of the final design. The Water Authority would provide any offsets required by NMOSE.

3.4.4 Cumulative Effects

The reasonably foreseeable trends and planned actions associated with projects listed in Table 3.1 would have similar impacts to water quality and water quantity as described above for the Proposed Action. Specifically, the recreation enhancements within the Rio Grande Valley State Park, Rio Bravo/Poco Loco NE picnic area improvements, maintenance and replacement of the Rio Bravo Bridge, and other MRG habitat restoration projects are likely to have adverse impacts to water quality. All of these projects involve construction activities, and short-term adverse impacts to water quality include soil disturbance, vegetation removal, and potential sedimentation to the Rio Grande. The adverse impacts to water quality are expected to be short-term, lasting the duration of construction and the time frame for permanent erosion control measures to be installed. Therefore, cumulative impacts to water quality would be short-term and adverse.

None of the projects listed in Table 3.1 are expected to result in adverse impacts to water quantity, unless they result in unmitigated depletions to the Rio Grande.

3.5 Issue 4: Potential impacts to federally listed threatened and endangered species and candidate species

3.5.1 Affected Environment

In accordance with ESA Section 7(a)(2), federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally threatened and endangered species. Three federally listed species have been recorded as occurring within or near the project area: RGSM, flycatcher, and cuckoo. One candidate species, the monarch butterfly, is also likely to occur within the project area and is considered in this EA. Table 3.7 summarizes the federally listed and candidate species likely to occur in the project area. Designated critical habitat for the RGSM is present in the project area. The project area does not currently contain suitable habitat for New Mexico meadow jumping mouse (*Zapus hudsonius luteus*; NMMJM); however, the proposed project would likely improve habitat conditions for the species. Therefore, NMMJM is addressed in this analysis. In August 2022, a habitat assessment of the project area was conducted to evaluate habitat conditions for RGSM, flycatcher, cuckoo, monarch butterfly, and NMMJM.

As part of the ESA Section 7 consultation process, Reclamation has prepared a biological assessment (BA) to address the effects of the proposed project on these federally listed species and candidate species (SWCA 2023). The USFWS issued a biological opinion for the project in June 2023 (USFWS 2023a). The information presented in this section summarizes the pertinent details presented in the BA and the biological survey report (SWCA 2022c) as well as the biological opinion (USFWS 2023a).

Table 3.7. Federally Listed and Candidate Species with Potential to Occur in the Project Area

Species	Federal Status	Designated Critical Habitat	Field-Mapped Suitable Habitat
Fishes			
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	Endangered	Designated critical habitat in the project area (USFWS 2003)	1.9 acres
Birds			
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Endangered	Not present	3.6 acres
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Threatened	Not present	0 acres

Species	Federal Status	Designated Critical Habitat	Field-Mapped Suitable Habitat
Mammals			
New Mexico meadow jumping mouse (<i>Zapus hudsonius luteus</i>)	Endangered	Not present	0 acres
Invertebrates			
Monarch butterfly (<i>Danaus plexippus</i>)	Candidate*	Not present	14.8 acres

*Reclamation requested a conference opinion from USFWS for the monarch butterfly.

3.5.1.1 Rio Grande Silvery Minnow

On August 19, 1994, the USFWS listed the RGSM as endangered (USFWS 1994). The RGSM occurs in the Rio Grande from Cochiti Dam to the headwaters of Elephant Butte Reservoir. The RGSM's current distribution is limited to a 174-mile stretch of the MRG (USFWS 2021a), which is approximately 5% of its historical 3,000-mile range (USFWS 1994). This extent coincides with the federally designated critical habitat for the species, which was designated on March 21, 2003 (USFWS 2003). In 2021, SWCA, in coordination with the Water Authority and NMISC, sampled both upstream and downstream of the SWRP outfall (SWCA 2021). Sampling was conducted near the SWRP outfall in May 2022; however, analysis and a subsequent report have not been completed.

Critical habitat for the RGSM occurs within the majority of the proposed project area, as the project would occur along the bank of the active river channel as well as upland areas in the riparian corridor. Because RGSM move or migrate throughout the river, there is the potential for this species to occur in the project area. The RGSM Population Monitoring Program reports monthly and annual presence-absence from various locations within the MRG. The nearest location is upstream of the SWRP outfall near the Rio Bravo Bridge. Results from monitoring near the Rio Bravo Bridge in 2022 (Dudley et al. 2022) captured a total of 76 RGSMs between April and October with the majority (n=54) of RGSM captured in July. Monitoring conducted by SWCA from May 10 to June 9, 2021, on behalf of the Water Authority and NMISC, resulted in one captured adult and three RGSM larvae downstream of the SWRP, and 24 RGSM larvae upstream of the SWRP (SWCA 2021). All RGSM were captured within approximately 100 meters upstream or downstream of the SWRP outfall confluence with the mainstem Rio Grande. Therefore, habitat within the active channel of the Rio Grande adjacent and within the project area is assumed to be occupied (Appendix A, Figure A-5). An estimated 1.9 acres of suitable RGSM habitat occurs within the proposed project area.

3.5.1.2 Southwestern Willow Flycatcher

The USFWS listed the flycatcher as endangered on February 27, 1995 (USFWS 1995). No nesting pairs of flycatchers have been recorded in the project area.

Habitat suitability for the flycatcher was assessed during biological surveys conducted in August 2022 (SWCA 2022c). Suitable nesting habitat was found to be present in the north portion of the project area, with some additional areas of marginally suitable habitat south of the outfall. An estimated 3.6 acres of field-mapped suitable habitat occur within the proposed project area (Appendix A, Figure A-6). Suitable habitat for this species in the project area generally consisted of large, dense stands of coyote willow directly adjacent to open water or areas where inundation is more likely to occur during high flows in the Rio Grande. Marginal habitat, estimated at 0.3 acre, consisted of smaller areas with dense stands of coyote willow that are unlikely to be inundated during very high flows.

Based on the presence of suitable and marginal habitat within 0.25 mile of the project, it is assumed that flycatcher may use habitat within the area for breeding, foraging, and stopover habitat during migration.

The flycatcher was identified as having potential to occur because:

- The project occurs within the species' range along the MRG;
- Patches of suitable habitat were recorded within the project area during a species-specific habitat assessment; and
- Vegetation communities that are known to support suitable habitat for the species are present within 0.25 mile of the project area. There are no previous recordings of flycatcher nests or territories within 0.25 mile of the project area. However, in 2022, one nest was recorded approximately 1 kilometer (0.62 mile) south (USFWS 2022b). Additionally, individuals are expected to move through the project area during migration.

3.5.1.3 Yellow-billed Cuckoo

The USFWS listed the western distinct population segment of the cuckoo as threatened on October 3, 2014 (USFWS 2014). Suitable habitat in the Southwest is limited to narrow, often widely separated patches. The species is also known to prefer patches of habitat that are at least 30 acres and greater than 100 feet wide that support both suitable nesting and foraging habitat; smaller patches are unlikely to be used for nesting habitat (USFWS 2023c).

Habitat suitability for the cuckoo was assessed within the project area during the August 2022 biological surveys (SWCA 2022c). Suitable habitat for this species was not found to occur within the project area (SWCA 2022c). However, marginally suitable habitat was found to be present south of the outfall. An estimated 6.5 acres of field-mapped marginally suitable habitat occurs within the project area (Appendix A, Figure A-7). The identified marginally suitable habitat generally consisted of large mature Rio Grande cottonwood trees and Goodding's willows but lacked the mid-canopy and understory vegetation density to be considered suitable breeding habitat for the species. Although present habitat may not be suitable for breeding and nesting activities, cuckoos may use these areas within the riparian corridor for foraging or resting during migration.

Based on the presence of marginally suitable habitat within 1 mile of the project area, it is assumed that cuckoos may use habitat within the area for breeding, foraging, and stopover habitat during migration. No cuckoos are known to occur or were recorded in the project area.

The cuckoo was identified as having potential to occur because:

- The project occurs within the species' range along the MRG;
- Patches of marginally suitable habitat were recorded within the project area during a species-specific habitat assessment; and
- Vegetation communities that are known to support suitable habitat for the species are present within 1 mile of the project area. There are no previous recordings of cuckoo nests or territories within the project area or its vicinity, but individuals may move through the area during migration.

3.5.1.4 New Mexico Meadow Jumping Mouse

The NMMJM, a subspecies of the meadow jumping mouse, is listed as endangered by the USFWS and by the State of New Mexico. It is a habitat specialist that nests in dry soils but also uses moist streamside and dense riparian vegetation.

Habitat suitability for the NMMJM was assessed during the August 2022 biological surveys. This species appears to only use two riparian community types: persistent emergent herbaceous wetlands and scrub-shrub wetlands. Marginally suitable habitat for this species may be present within the project area (SWCA 2022c). Habitat suitability for this species may change along with variable flows in the Rio Grande. Emergent herbaceous wetland habitat may be present or absent on the site depending on the impacts of river flows in areas where the river maintains some connectivity to the floodplain.

No individuals of this species were detected during the August 2022 biological surveys, and the project area is not within mapped critical habitat for this species.

3.5.1.5 Monarch Butterfly

Monarch butterfly is a candidate for listing under the ESA as of December 17, 2020 (USFWS 2020a). The species is globally distributed throughout 90 counties, islands, and island groups with the two largest migratory populations located east and west of the Rocky Mountain chain in North America (USFWS 2020b).

In both the eastern and western North American populations, monarchs begin migrating in the fall to their respective overwintering sites, flying south to the mountainous regions of central Mexico or to groves along the California coast and northern Baja California (USFWS 2020b). In early spring (February to March), monarchs begin the breeding season by mating at the overwintering sites and beginning the generational migration northward over the course of three to five generations (USFWS 2020b). Adult monarch butterflies require a diversity of blooming nectar resources on which they feed throughout their migration routes and in breeding grounds from spring to fall (USFWS 2020b). Monarchs require milkweed (*Asclepias* sp.) embedded within diverse nectary habitat for egg laying and larval feeding (USFWS 2020b). The correct phenology of monarchs, nectar plants, and milkweeds, as well as the position of these resources on the landscape, are important to monarch survival (USFWS 2020b).

Monarch butterflies and monarch caterpillars were found on stands of native milkweed plants in the project area during biological surveys completed for the proposed project (SWCA 2022c).

It is therefore inferred that the entire project area (14.8 acres) is suitable habitat for supporting both migratory and reproductive life stages of monarch butterflies (Appendix A, Figure A-8). Monarch butterflies are known to occur in riparian and wet vegetation communities. Because of that, continuous riparian corridors are likely important for continuity of suitable habitat to support the multi-generational journey from Canada to Mexico through New Mexico.

3.5.2 Effects from the No Action Alternative

There would be no impacts to RGSM, flycatcher, cuckoo, monarch butterfly, or NMMJM because the project would not be constructed. There would be no effects on RGSM critical habitat. There would be no increase in suitable RGSM habitat in the Angostura Reach.

3.5.3 Effects from the Proposed Action

Table 3.8 summarizes the effects determinations for federally listed species that have the potential to occur in the project area (SWCA 2023).

Table 3.8. Summary of Species Effects Determinations for the Proposed Action

Species	Effect Determination	Critical Habitat Determination
Rio Grande silvery minnow	May affect, and is likely to adversely affect	May affect, and is likely to adversely affect
Southwestern willow flycatcher	May affect but is not likely to adversely affect	Not present
Yellow-billed cuckoo	May affect but is not likely to adversely affect	Not present
Monarch butterfly*	May affect but is not likely to adversely affect. Direct mortality and disturbance from excavation of soils is likely discountable.	Not present
New Mexico meadow jumping mouse	No effect	Not present

*Reclamation requested a conference opinion from USFWS for the monarch butterfly.

3.5.3.1 Rio Grande Silvery Minnow, Including Critical Habitat

The Proposed Action would be constructed to benefit the riparian and aquatic ecosystems of the MRG and is anticipated to increase the quantity and quality of RGSM habitat by up to 10.4 acres within the MRG corridor. Re-establishment of native riparian vegetation would occur within the extent of the project area and includes designated critical habitat for the RGSM that would benefit the local populations. The creation of floodplain terraces and inundation areas would result in low-velocity spawning and rearing habitat that improves the species recruitment. Increased quality and quantity of habitat within the project area also increases connectivity of habitat within the MRG. This is considered a long-term indirect benefit to the species and its designated critical habitat. Aquatic habitat for the RGSM has the potential to be temporarily impacted by construction activities near the active river channel. Adverse impacts include direct

impacts to the river channel and indirect impacts such as the increased erosion in areas of surface disturbance proximal to habitat.

In its current condition, the Rio Grande channel in the vicinity of the project area does not inundate the existing floodplain due to entrenchment and undercutting of the riverbed and bank (SWCA 2022c). Because the riverbank is too high to allow for seasonal inundation, no nursery or low velocity habitat is available. Additionally, the river conditions in this area are characterized as runs, with high flow rates and few pools (NMISC 2022). Where pools exist in the southern portion of the project area, the water is clear rather than turbid, which is not typically utilized by RGSM. However, as nearby sampling has indicated that RGSM occupy the stretch of the MRG in the project vicinity, the river adjacent to the project area is assumed to be occupied. Construction impacts to RGSM and designated critical habitat include increased turbidity, noise and vibrational disturbance, decreased water quality, and temporary increase to water temperature, these impacts are unlikely to affect populations of RGSM, as is described further below. Potentially, any fish moving through the area could be subject to these conditions. These adverse impacts are considered to be indirect and temporary in nature.

Per design features Fish-1 and Fish-2 (see EA Chapter 4), it is anticipated that approximately 250 feet of linear bank would be disturbed at a time and a permeable, fine mesh material (e.g., silt fencing or block nets) would be used to exclude fish from the active construction areas along the wetted edge of the river, thereby reducing fish access during construction. The permeable exclusion would be checked and cleared for fish immediately following installation. If a breach occurs, work will stop until the exclusion can be re-checked to avoid harm to RGSM individuals during construction. All exclusion activities would be conducted by a USFWS-approved biologist(s) following an exclusion methodology approved by the USFWS. Excavation would be minimized to the greatest extent possible (Fish-4, EA Chapter 4). Direct effects of construction activities and incidental mortality would be avoided through this exclusion; however, installation of exclusion devices would temporarily reduce access to shoreline habitat and may cause harassment and behavioral changes to present RGSM. Additionally, if construction occurs within spawning season, eggs may also float into and become impinged on present netting depending on the final mesh size selected and approved by the USFWS. These adverse impacts are considered to be indirect and temporary in nature.

Vegetation removal would occur before other project activities can commence. Removal of vegetation may cause an increase in soil erosion, which subsequently causes increased sedimentation and thereby increased turbidity, which may affect fish populations. Erosion, sedimentation, and increased turbidity have the potential to negatively affect the survivability and fecundity of the RGSM as they induce changes in water quality such as temperature, pH, dissolved oxygen, hardness, alkalinity, or salinity outside of species-specific parameters for survival. The contribution of increased erosion and associated impacts is correlated to the distance of surface disturbance from aquatic habitat, as well as volume of soil disturbed and erosion control techniques used during construction activities (U.S. Environmental Protection Agency 2007). Removal of large cottonwood trees and tall woody shrubs such as saltcedar along the bank of the river may also remove shade along the bank of the Rio Grande within the project area, which would temporarily increase the direct sun and increase the water temperature in shallow water near the riverbank where RGSM individuals are most likely to occur.

Vegetation removal and use of machinery would also cause increase in noise and vibrational

disturbance within the adjacent river channel, which would result in temporary harassment of present RGSM and potential for behavioral avoidance of otherwise suitable habitat. Additionally, vegetation removal would reduce the suitability and value of designated critical habitat for the duration of construction activities and until successful revegetation is achieved. All of these impacts would be temporary in nature and would only last for the duration of earthwork and vegetation establishment. The temporary impact of vegetation removal to designated critical habitat would ultimately result in a net benefit, as invasive and non-native vegetation would be replaced by native vegetation through the completion of the project and site restoration would ultimately contribute to increased value of critical habitat in the riparian corridor.

Excavation of native soils during the creation of terraces, removal of jetty jacks, and other earthwork is required for restoration. Earthwork may cause temporarily unstable soils during construction that could lead to increased sedimentation and turbidity that would have a similar effect to water quality as listed above. Excavation of soils and resulting lowered water quality would temporarily decrease the suitability of designated critical habitat during construction. Although there would be temporary vegetation removal and earthwork, the completion of this project would restore riparian habitat and contribute to the ecological uplift of the designated critical habitat. Excavation with large equipment may also cause ground vibrations that are known to permeate aquatic systems. Any RGSM that is within vicinity of the project area during construction activities, even outside the exclusion area, may feel the vibrations through the water. Fish would likely respond to this by leaving the area, which may require energy expenditure to flee, resulting in harassment. With appropriate erosion control measures (e.g., silt fencing, waddles) in place, substantial sediment associated with increased surface disturbance is not anticipated to reach the river channel. Therefore, risk of impacts to RGSM populations related to increased sedimentation are expected to be indirect and temporary.

Re-establishment of native riparian vegetation would occur within the extent of the project area. The re-establishment of vegetation would improve shade and therefore reduce the water temperature and improve suitability for the RGSM. Additionally, vegetated soils are more stable and less prone to erosion, which would reduce the turbidity and other negative impacts to water quality by erosion as described in detail above. This is considered a long-term direct benefit to both RGSM and designated critical habitat.

Floodplain terraces would increase the inundation of overbank areas and create suitable spawning habitat for the RGSM. This portion of the Rio Grande does not currently have low-velocity spawning habitat, and generating that habitat through this project's successful completion would improve egg retention and larval fish development. This would ultimately support population growth and benefit the species overall. This is considered a long-term direct benefit to the RGSM population. Additionally, engineering floodplain terraces (inundation areas) to meet the primary constituent elements of low-velocity water and spawning areas where none previously existed would drastically increase the functionality and quality of RGSM designated critical habitat.

Riverbank stabilization would be used to reduce erosion rates of the riverbank by grading the toe of the slope and incorporating erosion control features such as coir matting and planting native vegetation. Reducing erosion would ensure that low-velocity inundated rearing habitat is protected and maintained in the long term. It would also contribute to low-velocity resting

habitat for fish at river levels of 900 cfs and above. This would contribute to creating and improving primary constituent elements of designated critical habitat where they previously were not present. It is also known that RGSMs reside mainly in low-velocity bank areas and therefore creating gradual slopes would contribute to shallow-water habitat for fish to rest and reside in. This would ultimately provide suitable habitat for the RGSM and may result in increased occupancy in the restored areas. This would be a long-term benefit to the RGSM population and designated critical habitat.

Rootwad revetments would be installed at or below the riverbank adjacent to the outfall channel. This would facilitate mixing of the high-turbidity water in the Rio Grande with the fresh low-turbidity water discharging from the outfall. This influx of clean water would increase dissolved oxygen and water clarity for the RGSM, thereby increasing the designated critical habitat value. Additionally, rootwads are a natural erosion control feature that would create natural hiding and resting refugia while contributing to water quality by reducing erosion. This would be a long-term benefit to the RGSM population and designated critical habitat.

Invasive species removal would be concentrated within the riparian corridor outside of the aquatic system, and therefore would not have a direct or indirect effect to the RGSM. Removal of invasive vegetation and the restoration of native vegetation would improve the ecological character of the RGSM designated Critical Habitat. Similarly, the removal of jetty jacks would occur outside of the aquatic environment within the riparian corridor and would not directly or indirectly affect RGSM. Removal of jetty jacks would improve ecological uplift by creating space for native vegetation to establish where structures previously existed and improve wildland fire mitigation in the project area. Removal of non-native species and structures from the riparian corridor would be a direct benefit as it would contribute to improved conditions within the designated critical habitat for the RGSM.

3.5.3.2 *Southwestern Willow Flycatcher*

The Proposed Action would be constructed to benefit the riparian and aquatic ecosystems of the MRG and is anticipated to increase the quantity and quality of flycatcher habitat within the MRG corridor. Re-establishment of native riparian vegetation would occur within the extent of the project area and include conditions suitable for flycatcher nesting, breeding, and stopover activities. The creation of floodplain terraces and inundation areas would result in more water reaching vegetation and an improvement in quantity and quality of dense willow habitat relied on by this species. Increased quality and quantity of habitat within the project area also increases connectivity of habitat within the MRG corridor. This is considered a long-term indirect benefit to the flycatcher.

As flycatchers are not known to occur or use habitat within the project area, no adverse impacts to individuals or previous breeding locations are anticipated to occur as a result of the proposed project. However, since habitat conditions suitable for foraging, stopover, and breeding activities by the flycatcher exist within 0.25 mile of the project area, project construction would occur outside of the breeding season (April 15–August 15) (Design feature Bird-1 in EA Chapter 4) to reduce impacts. With the application of this construction timing restriction, short-term effects of the action are limited to temporary reduction of approximately 3.6 acres of suitable habitat and 0.3 acre of marginal habitat due to vegetation removal and ground-disturbing activities until successful vegetation planting and habitat restoration is achieved (see Appendix A, Figure A-6).

The temporary reduction of suitable habitat is expected to be reestablished within 5 years of project implementation.

Indirect impacts within the project area related to noise, increased vehicular traffic, and general increased activity during construction habitat would occur outside of the breeding season when no flycatchers are likely to be present; therefore, these are discountable effects.

Equipment used for construction and maintenance of the project has the potential to introduce and spread invasive and noxious weeds to the project area. Invasive and noxious weeds have the potential to outcompete native vegetation that is preferred by the species and to degrade suitable habitats for native flora and fauna. Environmental commitments would prevent the introduction and spread of invasive and noxious weeds (Soil-2 and Vegetation-4 measures, Appendix B). Additionally, in consideration of the native vegetation restoration and non-native/invasive species removal design components of the Proposed Action, establishment of non-native vegetation is highly unlikely. Therefore, potential adverse impacts to flycatcher habitat related to invasive and noxious weeds are expected to be discountable. Removal of invasive vegetation and the restoration of native vegetation would improve the ecological character of flycatcher habitat within the project area.

Ground disturbance associated with restoration activities including bank stabilization activities, sediment disposal, and the creation of formalized, maintained pedestrian trails are expected to temporarily degrade the suitability of habitat for flycatcher by disturbing native soils and vegetation, particularly in the northern portion of the project area where willow habitat would be removed. However, in the southern portion of the project area, vegetation removal and restoration activities would be concentrated in areas that only contain marginally suitable habitat conditions for the flycatcher. While potential effects associated with the removal of the willow stand in the northern portion of the action may occur, these impacts would be compensated by revegetation and restoration of habitat conditions for the flycatcher within the project area. Additionally, the creation of up to 10.4 acres of floodplain terraces (inundation areas) within the northern portion of the project area would result in improved conditions for the reestablishment of a willow stand that would benefit the species. Additionally, the creation of formalized maintenance and pedestrian trails would reduce the disturbance caused by off-trail habitat use, which would result in long-term, beneficial effects to the flycatcher and its habitat.

The creation of floodplain terraces would involve lowering the bank through the removal of vegetation and the excavation of native soils to increase the potential for overbank flooding. In addition to disturbing the riparian vegetation, the building of floodplain terraces would modify the hydrology of the channel and temporarily reduce habitat for flycatcher. However, revegetation within the terraces in the northern portion of the project area, as well as additional areas in the southern portion, would restore and are expected to increase the quantity and quality of flycatcher habitat within the project area. Increased quality and quantity of habitat within the project area increases connectivity of habitat within the MRG corridor. This is considered a long-term indirect benefit to flycatcher.

The installation of rootwad revetment and jetty jack removal would occur in areas that do not overlap with field-mapped habitat for flycatcher. Therefore, no direct adverse impacts to the species habitat associated with these activities are expected to occur. Additionally, removal of

the jetty jacks from the riparian corridor would be a direct benefit to flycatcher because the jetty jacks constrain sediment and water movement and can be counterproductive to floodplain habitat creation. Riverbank stabilization and rootwad revetement would likely improve bank revegetation by decreasing bank erosion, which would also contribute to enhancing riparian habitat availability.

In summary, the Proposed Action is expected to result in long-term beneficial impacts to flycatcher habitat within the project area by increasing both quantity and quality of flycatcher habitat. Though flycatchers are not known to use habitat within the project area, project implementation would occur outside migratory bird breeding season (April 15–August 15), along with the additional environmental commitments detailed in EA Chapter 4. Adverse impacts to flycatcher would be insignificant and no take is anticipated to occur.

3.5.3.3 Yellow-billed Cuckoo

The Proposed Action would be constructed to benefit the riparian and aquatic ecosystems of the MRG and is anticipated to increase the quantity and quality of cuckoo habitat within the MRG corridor. Re-establishment of native riparian vegetation would occur within the extent of the project area, which include conditions marginally suitable for cuckoo nesting, breeding, and stopover activities. Increased quality and quantity of habitat within the project area also increases connectivity of habitat within the MRG corridor. This is considered a long-term indirect beneficial impact to the cuckoo.

As cuckoos are not known to occur or use habitat within the project area, no adverse impacts to individuals or previous breeding locations are anticipated to occur as a result of the proposed project. Additionally, per design feature Bird-1 (see EA Chapter 4), project construction would occur outside of the breeding season (April 15–August 15). With the application of this construction timing restriction, short-term effects of the action are limited to temporary reduction of an estimated 6.5 acres of marginal habitat due to vegetation removal and ground-disturbing activities until successful vegetation planting and habitat restoration are achieved. However, since no suitable habitat exists within the project area, any adverse effects to cuckoo are expected to be insignificant and discountable.

Equipment used for construction and maintenance of the project has the potential to introduce and spread invasive and noxious weeds to the project area. Invasive and noxious weeds have the potential to outcompete native vegetation that is preferred by the species and to degrade suitable habitats for native flora and fauna. Environmental commitments would prevent the introduction and spread of invasive and noxious weeds (Soil-2 and Vegetation-4 measures, EA Chapter 4). Additionally, in consideration of the native vegetation restoration and non-native/invasive species removal design components of the Proposed Action, establishment of non-native vegetation is highly unlikely. Therefore, potential adverse impacts to cuckoo habitat related to invasive and noxious weeds are expected to be discountable. Removal of invasive vegetation and the restoration of native vegetation would improve the ecological character of cuckoo habitat within the project area and is considered a long-term indirect beneficial impact.

Ground disturbance associated with restoration activities including jetty jack removal, rootwad revetment installation, bank stabilization activities, sediment disposal, the creation of floodplain terraces, and the creation of formalized, maintained pedestrian trails are expected to temporarily

degrade the suitability of habitat for cuckoo by disturbing native soils and vegetation, including large trees. However, these activities would be concentrated in areas that only contain marginally suitable habitat conditions for the cuckoo as these areas do not have the supporting understory preferred by the species. Additionally, the creation of formalized pedestrian trails would reduce the disturbance caused by off-trail habitat use, which would result in long-term, beneficial effects to the cuckoo and its habitat by concentrating foot traffic to prescribed use areas, further protecting native vegetation and reducing disturbance to avian species.

Removal of invasive species and re-establishment of native riparian vegetation would be beneficial for the cuckoo as planted species establish and contribute to increasing habitat availability and suitability. Currently there are no stands of dense riparian habitat suitable for the species within the project area, and thinly distributed saltcedar and willow stands provide marginally suitable habitat for the species. While cuckoos may nest and forage in saltcedar, they typically require a native vegetation component (USFWS 2021b). In the long term, revegetation of willow as part of the proposed project could provide more densely vegetated understory composed of native vegetation species preferred by the cuckoo. Increased quality and quantity of habitat within the project area increases connectivity of habitat within the MRG corridor. This is considered a long-term indirect benefit to cuckoo.

Floodplain terraces would lower the existing riverbank to increase the inundation of overbank areas and create suitable spawning habitat for RGSM. This would contribute to improving conditions for native riparian vegetation, in turn benefiting the cuckoo by improving potential suitable habitat. Riverbank stabilization and rootwad revetment would likely improve bank revegetation by decreasing bank erosion, which would also contribute to enhancing riparian habitat availability. Removal of invasive vegetation and the restoration of native vegetation would improve the ecological character of vegetation communities that may be used by the cuckoo after restoration. Removal of the jetty jacks from the riparian corridor would be a direct benefit as it would contribute to improving habitat quality for the cuckoo and improving access for wildland fire-fighting.

In summary, the Proposed Action is expected to result in long-term beneficial impacts to cuckoo habitat within the project area by increasing both quantity and quality of cuckoo habitat. Considering that cuckoos are not known to use habitat within the project area, project implementation would occur outside the migratory bird breeding season (April 15–August 15), and the additional environmental commitments detailed in EA Chapter 4, adverse impacts to the cuckoo would be insignificant and discountable, with no take of the species anticipated to occur.

3.5.3.4 New Mexico Meadow Jumping Mouse

No suitable habitat for the NMMJM occurs in or near the project area. The habitat enhancement project would improve the habitat for this species based on the design and type of revegetation that would occur. Increased quality and quantity of habitat within the project area increases potential connectivity of habitat within the MRG corridor. This is considered a long-term indirect benefit to NMMJM. The Proposed Action would have no direct or indirect adverse effects on the NMMJM. As the project involves restoring habitat for sensitive species, project implementation may provide a net benefit for this species.

3.5.3.5 Monarch Butterfly

Monarch butterflies and monarch caterpillars were found on stands of native milkweed plants in the project area during biological surveys completed for the proposed project (SWCA 2022c). It is therefore inferred that the project area supports both migratory and reproductive life stages of monarch butterflies (see Appendix A, Figure A-8).

The Proposed Action would benefit the riparian and aquatic ecosystems of the MRG and is anticipated to increase the quantity and quality of monarch butterfly habitat within the MRG corridor. Re-establishment of native riparian vegetation would occur within the extent of the project area and include planting milkweed that would benefit the local populations of migratory and breeding monarchs. This is considered a long-term direct benefit to the species.

The entire 14-acre project area could provide habitat for the monarch butterfly, and the entire project area would be subject to surface disturbance as described below. Vegetation removal and ground disturbance necessary to construct the project would remove known breeding and migratory habitat for monarch butterflies. Removal of milkweed has the potential to remove breeding refugia for monarch butterflies, as well as destroy any eggs that have already been laid on milkweed plants, prior to removal. Removal of riparian trees may result in reduced shade and higher ambient temperatures throughout the project area. Removal of vegetation would also result in the reduction of general migratory and nectary habitat for monarch butterflies that may not be breeding but could still be traveling through the area. The removal of native nectary plants would be avoided to the greatest extent possible (Vegetation-3, EA Chapter 4) to reduce impacts to the species. The project is expected to be constructed after August 15 and before April 15 of the following year, impacting both migratory and breeding seasons for the species. Design feature Monarch-1 (see EA Chapter 4) includes measures to avoid removing milkweed habitat during the breeding and migratory season in New Mexico. Implementation of this design feature would fully mitigate any direct impacts to monarch butterflies (Monarch-1, EA Chapter 4). Because the project would revegetate the disturbed area with native plants, including milkweed and other nectar-producing species that can mature within one growing season, the impact of vegetation removal would be insignificant and discountable. Because the project would act to restore riparian habitat and improve the composition of vegetation communities to include more diverse native species, this project would have a net benefit to the species.

Heavy equipment used during construction could directly collide with butterflies during construction activities. Equipment could also cause a visual disturbance that indirectly dissuades butterflies from traveling through the area, which could generate an energetic cost for butterflies that have to change course or move across the open Rio Grande to avoid the project area. Additionally, ground-disturbing activities during construction also increase the potential for the introduction of invasive and noxious weeds that can outcompete native vegetation, especially milkweed species, leading to increased habitat degradation. Passive competition for milkweeds and other native vegetation could be considered an indirect impact to the species. The project would implement noxious weed mitigation measures to reduce the potential for introduction of invasive species to the site, which would ultimately discount any potential impact to monarch caused by competition from non-native species (Vegetation-3, Vegetation-4). Additionally, the project goal is to restore the project area to better than pre-project conditions by improving native vegetation including milkweed. If monarch butterflies are navigating through the project

area, it is likely they would be able to avoid construction equipment, which would be moving at a slow pace while carefully removing soils and creating physical bank features. Therefore, direct mortality or disturbance from excavation of soils is likely discountable.

Lastly, the use of heavy equipment for vegetation removal, excavation of soils, earthwork, and revegetation could contribute to fugitive dust. Dust arises from mechanical disturbance of granular material exposed to the air and would likely come from vehicles and heavy equipment driving on disturbed soils. Fugitive dust has the potential to affect photosynthetic rates and decrease plant productivity and interfere with pollen-stigma interactions, which may result in alterations to plant-wildlife interactions or reductions in the quantity or quality of milkweed and other nectar plants available to monarchs (McGranahan and Poling 2021). The overall impact to vegetation from fugitive dust would be localized along access roads and areas of ground disturbance and would be reduced once construction activities were completed, occurring only occasionally during operation and maintenance activities. Impacts from fugitive dust are expected to be contained within a 500-foot buffer around the project area and would include approximately 100.84 acres of suitable riparian and wetland habitat.

Invasive species removal and re-establishment of native riparian vegetation would occur within the extent of the project area. The re-establishment of vegetation using live stakes, plugs, and seed mixes that include nectary plant and native milkweed species to support monarch butterfly. Additionally, native trees planted to support the restoration would provide shade and refugia to traveling monarchs. This is considered a long-term direct benefit to the species.

Floodplain terraces would increase the inundation of overbank areas and create suitable spawning habitat for the RGSM. Even though the direct intent is to provide spawning habitat for RGSM, this would create a seasonally inundated wetland that supports vegetation such as milkweed and flowering annuals and perennials. This would increase the area of potential breeding and egg-laying habitat for monarch butterflies, which could contribute to a more robust population. This is considered a long-term indirect benefit to the species.

Riverbank stabilization would be used to reduce erosion rates of the riverbank by grading the toe of the slope and incorporating erosion control features such as coir matting and planting native vegetation. This project component would not have a direct impact to monarch butterflies as they are not an aquatic or semi-aquatic species, but the replanting of vegetation on a gradual slope would restore and improve native riparian plants that support the species. Additionally, bank stabilization would ensure this native vegetation is not lost to bank erosion over time. This would be a long-term indirect benefit to the monarch butterfly.

3.5.4 Cumulative Effects

The reasonably foreseeable trends and planned actions associated with projects listed in Table 3.1 would have impacts to federally listed species similar to the Proposed Action. Reasonably foreseeable projects in the area include the Rio Bravo bridge replacement project, known residential improvements in the South Valley, and several maintenance or restoration activities planned by various agencies with jurisdiction in the Middle Rio Grande Watershed, as well as long-term ecological monitoring through the Bosque Ecosystem Monitoring Program (BEMP) project by Bosque School. The bridge replacement and residential development may have an adverse impact to federally listed species, but it is anticipated that these projects analyze

their potential impacts to the species and critical habitat individually and offset any potential adverse effects through project-specific mitigation. Further, ongoing maintenance and planned restoration projects for the watershed by the USACE and other local agencies would have a net benefit to the project area through improvement of water quality and riparian habitat in the MRG. The successful completion of this project would be a long-term benefit to the MRG riparian corridor. There would be no long-term adverse effects to federally listed species that would contribute to a potential cumulative impact. The outcome of this project would contribute to ecological uplift within the whole of the MRG riparian corridor including an increase in riparian vegetation to support the listed species analyzed in this EA.

3.6 Issue 5: Potential impacts to Indian trust assets

3.6.1 Affected Environment

Indian trust assets are legal interest in property held in trust by the United States for Native American tribes or individuals. Examples of Indian trust assets are lands, minerals, water rights, other natural resources, money, or claims. Secretarial Order 3175 and Reclamation policy requires the assessment of effects on Indian trust assets.

The project area is within the Rio Grande Valley State Park, which is co-managed by MRGCD and the City of Albuquerque Open Space Division, and is north of the Pueblo of Isleta. The Water Authority has held meetings with Reclamation, MRGCD, the City of Albuquerque, and other agencies to discuss the proposed project. No Indian trust assets have been identified through these discussions. Therefore, no Indian trust assets are known to occur in the project area.

3.6.2 Effects from the No Action Alternative

There would be no impacts to Indian trust assets because the project would not be constructed, and no Indian trust assets have been identified in the proposed project area.

3.6.3 Effects from the Proposed Action

There would be no impacts to Indian trust assets because none have been identified in the proposed project area.

3.6.4 Cumulative Effects

No impacts to Indian trust assets have been identified for the proposed project. Therefore, there would be no contribution to cumulative effects to Indian trust assets from the Proposed Action.

CHAPTER 4 – PROJECT DESIGN FEATURES AND ENVIRONMENTAL COMMITMENTS

This section discusses the proposed design features and environmental commitments developed to protect resources and reduce unavoidable adverse impacts to a non-significant level. The Water Authority will implement the environmental commitments if the Proposed Action is approved and constructed. The environmental commitments will be included in the contractor bid specifications.

4.1 General Measures and Public Safety

Gen-1: All necessary permits for access points, staging areas, and study sites will be acquired prior to construction activity.

Gen-2: All work projects will have a contract in place for the rental of portable restroom facilities, with secondary containment, during the duration of the project.

Gen-3: Each individual operator will be briefed on local environmental considerations specific to the project tasks.

Public-1: The public will be notified of project construction through informational flyers, signs posted in the area, letters to nearby residences, and posts to Water Authority social media accounts.

Public-2: Temporary signage and site protection from public use, press releases, and online public notices will be used to notify the public of project area closure during construction.

Public-3: Any homeless encampments will be removed prior to construction following the City of Albuquerque and/or Bernalillo County's policy for responding to encampments on public property.

Public-4: All waste material associated with the project must be disposed of properly and not placed in identified floodway or wetland areas or in habitat for species listed under the ESA.

Public-5: To minimize noise disturbance impacts, implementation activities will be limited to occur between the hours of 7 a.m. to 6 p.m., and all equipment and machinery used will meet all applicable local, state, and federal noise control regulations.

Public-6: All Occupational Safety and Health Administration and local municipality noise control ordinance requirements will be adhered to.

4.2 Wildlife

Bird-1: The Proposed Action will avoid impacts to birds protected by the Migratory Bird Treaty Act (16 USC 703), including the federally listed endangered flycatcher and the threatened cuckoo, by conducting work activities outside of the normal breeding and nesting season (April 15 to August 15 for suitable flycatcher habitat¹).

- If work is necessary between April 15 and August 15, suitable/occupied migratory bird habitat will be avoided during the construction activities as much as possible, using the most current annual survey results in conjunction with habitat suitability designations. Coordination and consultation with the USFWS will occur prior to such work activities.
- The revegetation plan is currently under development. Reseeding or revegetation may be accomplished by hand or by mechanized means. Planting via mechanized means includes using a handheld or tractor-mounted auger. If mechanized means are used for either reseeded or replanting in the April 15 to August 15 time frame, migratory nesting bird surveys will be conducted within 2 weeks prior to the work to determine if any breeding birds are present. If birds are detected, the Water Authority will coordinate with Reclamation and the USFWS to determine appropriate next steps.

Fish-1: The construction contractor will limit bankline construction activities to approximately 250 feet of surface disturbance/grading activities prior to moving to the next 250 feet of bankline. Each area can be worked on for up to 27 days.

Fish-2: A permeable barrier consisting of fine mesh (similar to a turbidity curtain or block nets) will be placed along the perimeter of the wetted river channel, adjacent to the active bankline construction zone to exclude fish from active work areas and thus avoid trapping, injuring, or causing mortality to RGSM or any other fish. Any fish within the interior of the barrier will be removed immediately following installation. The permeable barrier will be installed approximately 10 feet into the river.

- Fish sampling will occur when the fish exclusion area is established, relocating fish outside of the area, and then any time the exclusion area is disturbed or breached during construction activities. This process will be repeated at each active bankline construction zone.

Fish-3: If a coffer dam and water pumping are needed to remove water from the project area during construction, the Water Authority will coordinate with Reclamation and the USFWS to avoid impacts to RGSM eggs and larvae. Any fish within the interior of the coffer dam will be removed immediately following installation. Pump intake pipes will use a 0.25-inch

¹ No suitable habitat for the cuckoo occurs within the project area. Therefore, the timing restriction for the species (April 15–September 1) is not included in this design feature.

(0.64-centimeter) mesh screen at the opening of the intake hose to minimize entrainment of aquatic organisms.

Fish-4: The Water Authority will excavate an active bankline work area as few times as possible to minimize disturbance of sediment. When excavating along the wetted river channel, the following practices will be used to minimize disturbance of sediment:

- Minimize movement of excavator tracks
- Minimize excavator bucket contact with riverbed when not excavating

Monarch-1: The Proposed Action will avoid impacts to monarch butterfly, a federal candidate species, by conducting vegetation-removal activities outside of the normal breeding and migratory season in New Mexico (March 1 to November 30) to the greatest extent practicable.

- If work is necessary between March 1 and November 30, suitable/occupied stands of milkweed will be avoided during the construction activities as much as possible. Coordination and consultation with the USFWS will occur prior to such work activities.
- The Water Authority will conduct surveys to determine the presence of breeding monarchs before removal of any milkweed during March 1 through November 30. The Water Authority and Reclamation will coordinate monitoring and work activities with the USFWS, as appropriate, if eggs, caterpillars, or monarchs are found.
- Stands of milkweed occupied by monarch butterflies within the project area will be fully avoided by construction activities within a 10-foot buffer erected with flagging and stakes. This avoidance area will be maintained either for the duration of construction, or until all monarch eggs and caterpillars have developed into monarch butterflies and voluntarily left the stand of milkweed.
- The revegetation plan is currently under development. Reseeding or revegetation may be accomplished by hand or by mechanized means. Planting via mechanized means includes using a handheld or tractor-mounted auger. If mechanized means are used for either reseeded or replanting in the March 1 to November 30 time frame, stands of suitable milkweed plants will be surveyed for monarchs within 2 days prior to the work to determine if any breeding monarchs are present. If monarchs are detected, the Water Authority will coordinate with Reclamation and the USFWS to determine appropriate next steps.
- Native milkweed seeds and plants will be included in the revegetation plans to improve monarch butterfly habitat.

4.3 Soils, Water, and Vegetation Resources

Soil-1: Off-road use of wheeled equipment will occur only during times when soils are not saturated to minimize soil compaction, soil displacement, and rutting and erosion.

Soil-2: Vehicles and equipment will be cleaned of soil and debris capable of transporting weed seed prior to beginning work in the bosque to prevent the spread of noxious weeds.

Soil-3: Excavated material will be stored in an upland location to prevent sediment from entering the Rio Grande.

Soil-4: All project spoils and waste will be disposed of off-site at approved locations or may be used on-site, as appropriate to the project purpose, consistent with applicable environmental requirements.

Water-1: The Water Authority will ensure the construction contractor develops a Stormwater Pollution Prevention Plan and complies with CWA Section 402, NPDES Stormwater Program.

Water-2: The Water Authority will obtain the necessary CWA Sections 404/401 permits prior to construction.

Water-3: Minimize impact of hydrocarbons: To minimize potential for spills into or contamination of aquatic habitat:

- Hydraulic lines will be checked each morning for leaks and periodically throughout each workday. Any leaky or damaged hydraulic hoses will be replaced.
- All fueling will take place outside the active floodplain, where possible. All fueling will occur with a spill kit ready. If amphibious excavators are used, fueling will occur at the Rio Grande using airboats equipped with lined fuel containment. Fuel, hydraulic fluids, and other hazardous materials may be stored on-site overnight in a secured area, but outside the normal floodplain, not near the river or any location where a spill could affect the river.
- All equipment will undergo high-pressure spray cleaning and inspection off-site prior to initial operation in the project area.
- Equipment will be parked on pre-determined locations on high ground away from the river overnight, on weekends, and holidays.
- Spill protection kits will be on-site, and operators will be trained in the correct deployment of the kits.
- External hydraulic lines are composed of braided steel covered with rubber. When there is increased risk of puncture such as during mastication while removing vegetation, external hydraulic lines will be covered with additional puncture-resistant material, such as steel-mesh guards, Kevlar, etc., to offer additional protection.

Vegetation-1: Impacts to terrestrial habitats will be minimized by using existing roads whenever possible. In general, equipment operation will take place in the most open area available, and all efforts will be made to minimize damage to native vegetation and wetlands.

Vegetation-2: Vegetation control may consist of mechanical removal or mowing. No herbicides will be used for vegetation management.

Vegetation-3: Native vegetation may be finely mulched and scattered selectively across the project area. If used, mulch would not be placed within 2 feet of the drip line of native

cottonwood or willow trees and would be scattered at a depth not to exceed 3 inches, where applied.

Vegetation-4: Non-native vegetation that is removed at work sites will be mulched or removed off-site to an approved location.

Vegetation-5: The revegetation of the project area will follow the native revegetation plan developed as part of the final engineered design plans.

Vegetation-6: Healthy, native, primarily cottonwoods trees, equal to or larger than 6 inches DBH will be replaced at a ratio of 10:1 per the revegetation plan developed as part of the final engineered design plans.

4.4 Air Quality

Air-1: Vehicle speed on levee roads will be limited to 15 miles per hour, which will minimize dust.

Air-2: If windy conditions exist, excavated sediment may be wetted during spreading and loading.

Air-3: All vehicles involved in implementation will be required to have passed a current New Mexico emissions test and have required emission control equipment.

Air-4: Vehicle and equipment running times will be minimized, and engines will be properly maintained.

4.5 Cultural Resources

Cultural-1: If intact, buried cultural deposits are discovered during project construction activities, the following requirements will apply:

- Upon notification by a subrecipient of an unexpected discovery, or if it appears that an undertaking has affected a previously unidentified property or affected a known historic property in an unanticipated manner, the Water Authority will immediately notify Reclamation and:
 - Stop construction activities in the vicinity of the discovery.
 - Take all reasonable measures to avoid or minimize harm to the property until the Water Authority has completed consultation with the State Historic Preservation Office, appropriate tribe(s), and any other consulting parties. Upon notification by the recipient of a discovery, the Water Authority must immediately notify Reclamation, the State Historic Preservation Office, appropriate tribe(s), and other consulting parties that may have an interest in the discovery, previously unidentified property, or unexpected effects, and consult to evaluate the discovery for National Register of Historic Places eligibility and/or the effects of the undertaking on historic properties.

CHAPTER 5 – CONSULTATION AND COORDINATION

Reclamation's public involvement process presents the public with opportunities to obtain information about a given project and allows interested parties to participate in the project through written comments. This chapter discusses public involvement activities taken to date for the Proposed Action.

5.1 Public Involvement

The Draft EA and Preliminary Finding of No Significant Impact will be published on Reclamation's website (<https://www.usbr.gov/uc/DocLibrary/ea.html>) and the Water Authority's website (www.abcwua.org). The Final EA will meet the technical standards of Section 508 of the Rehabilitation Act of 1973 so that the documents can be accessed by people with disabilities using accessibility software tools.

The Proposed Action was also included in the New Mexico Office of Natural Resources Trustee's (ONRT's) *Addendum to the Restoration Plans for the Atchison Topeka and Santa Fe Tie-Treater and South Valley Superfund Sites* (ONRT 2022). Public participation and review are an integral part of the restoration planning process. As such, a copy of the addendum to the restoration plan, and a description of the SWRP Outfall Project, was available for download from the ONRT website (<https://onrt.env.nm.gov>).

The public comment period for the addendum to the restoration plan was posted for public review and comment between August 29 and October 21, 2022. Public comments received during the comment period are being evaluated and incorporated, as appropriate, into a final version of the restoration plan. A summary of public comments and ONRT's responses to those comments will be included in the final restoration plan. In addition, a copy of the final document will be available for download from the ONRT website.

Furthermore, on October 6, 2022, the Water Authority conducted a site visit with the Pueblo of Isleta as well as community representatives for the Friends of Valle de Oro and Los Jardines as part of the public comment period with ONRT.

The Water Authority provided the following opportunities for public outreach and involvement to engage the community on the Proposed Action:

- October 2021: Site tours with representatives from City of Albuquerque Open Space Division
- November 12, 2021: Site tour with ONRT and South Valley Community Leaders
- May 13, 2022: Tour with New Mexico State Legislators
- August 11, 2022: Presentation to the Technical Customer Advisory Committee
- August 17, 2022: Presentation to the Water Authority Governing Board
- October 31, 2022: Tour with USACE
- March 24, 2023: News story with KRQE

5.2 Agency Coordination and Consultation

The Water Authority and Reclamation have coordinated and consulted with the agencies and entities listed in Table 5.1.

Table 5.1. Summary of Agency Coordination and Consultation

Agency/Entity	Type of Coordination/Consultation
City of Albuquerque Open Space Division	The Water Authority coordinated with the City of Albuquerque Open Space regarding project design, and future project maintenance.
Middle Rio Grande Conservancy District	The Water Authority coordinated with MRGCD regarding project design, jetty jack removal, and the joint license agreement.
U.S. Fish and Wildlife Service	The Water Authority coordinated with USFWS on development of the BA, including the design features for biological resources that are listed in EA Chapter 4. Reclamation reviewed and submitted the BA to USFWS on May 3, 2023. USFWS issued the biological opinion for the project on June 2, 2023 (USFWS 2023a).
U.S. Army Corps of Engineers	The Water Authority coordinated with USACE regarding compliance with the CWA, jetty jack removal, and the project design.
New Mexico Environment Department	The Water Authority coordinated with USACE regarding compliance with the CWA.
New Mexico Historic Preservation Division	Reclamation has initiated National Historic Preservation Act Section 106 consultation with the New Mexico Historic Preservation Division.
New Mexico Office of the State Engineer	The Water Authority continues to coordinate with the NMOSE regarding the need for depletion offsets, which would be determined upon completion of the final design.
New Mexico Office of Natural Resources Trustee	The Water Authority continues to coordinate with ONRT regarding potential funding of the project as described in the <i>Addendum to the Restoration Plans for the Atchison Topeka and Santa Fe Tie-Treater and South Valley Superfund Sites</i> (ONRT 2022).

CHAPTER 6 – PREPARERS

The following list contains the specialists who participated in preparing this EA.

Name	Title	Organization or Agency
Scott Hebner	NEPA Lead	Reclamation
Raul Sanchez	NEPA Specialist	Reclamation
Ann Demint	MRG River Maintenance Project Manager	Reclamation
Bryan Lawlis	Project Management Specialist	Reclamation
Joel Lusk	Biologist	Reclamation
Eric Gonzales	Biologist	Reclamation
John Cater	Archaeologist	Reclamation
Raul Sanchez	NEPA Planner	Reclamation
Mark Kelly	Water Resources Division Manager	Water Authority
Diane Agnew	Water Rights Program Manager	Water Authority
Rochelle Larson	Project Engineer	Water Authority
Cetan Christensen	Senior Water Resources Scientist	Water Authority
Kelsey Bicknell	Environmental Manager	Water Authority
Coleman Burnett	Project Manager; Environmental Planner	SWCA
Jenn Clayton	Lead Biologist	SWCA
Sarah Griffin	Water Resources Lead	SWCA
Daniel Spivak	Water Resource Specialist	SWCA
Lili Perreault	Ecologist	SWCA
Stephanie Herbert	Biologist	SWCA
Stephen Zipper	Fisheries Biologist	SWCA
Jason Glenn	Technical Editor	SWCA
Kimberly Proa	Formatter	SWCA

CHAPTER 7 – LITERATURE CITED

- Bureau of Reclamation (Reclamation). 2012. Reclamation’s NEPA Handbook. U.S. Department of the Interior, Bureau of Reclamation.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. Washington, D.C.: U.S. Fish and Wildlife Service.
- Crawford, C., A. Cully, R. Leutheuser, M. Sifuentes, L. White, and J. Wilber. 1993. Middle Rio Grande Ecosystem: Bosque Biological Management Plan. Los Lunas, New Mexico: Middle Rio Grande Biological Interagency Team.
- Crawford, C., Y. Najmi, and S. Grogan. 2005. Bosque Landscape Alteration Strategy. Los Lunas, New Mexico: Middle Rio Grande Conservancy District.
- Dudley, R.K., and S. Plantania, and G. C. White. 2022. Rio Grande Silvery Minnow Population Monitoring During 2021. A U.S. Bureau of Reclamation Funded Research Program. May 19, 2022. Available at: https://webapps.usgs.gov/mrgescp/documents/Dudley-et-al_2022_RGSM-Population-Monitoring-During-2021.pdf. Accessed February 2023.
- Griffith, G.E., J.M. Omernik, M.M. McGraw, G.Z. Jacobi, C.M. Canavan, T.S. Schrader, D. Mercer, R. Hill, and B.C. Moran. 2006. Ecoregions of New Mexico (two-sided color poster with map, descriptive text, summary tables, and photographs). Scale 1:1,400,000. Reston, Virginia: U.S. Geological Survey.
- Hazen and Sawyer. 2021. Southside Wastewater Reclamation Plant Outfall Realignment Evaluation Project, Conceptual Alternatives Technical Memorandum. February 12, 2021. Written for Albuquerque Bernalillo Water Authority. 68 pp.
- . 2022. Southside Wastewater Reclamation Plant Outfall Restoration Design Project. Draft Basis of Design Report. 30% Design Phase. December 16, 2022. Written for Albuquerque Bernalillo Water Authority. 147 pp.
- McGranahan, D.A., and D.N. Poling. 2021. Fugitive road dust alters annual plant physiology but perennial grass growth appears resistant. *Plant Ecology* 222:485–497.
- Natural Resources Conservation Service. 2022. PLANTS Database. Available at: <http://plants.usda.gov>. Accessed November 2022.
- New Mexico Department of Agriculture (NMDA). 2020. New Mexico noxious weed list update. New Mexico State University. Available at: <https://www.nmda.nmsu.edu/wp-content/uploads/2020/07/Weed-List-memo-and-weed-list-2020.pdf>. Accessed November 2022.
- New Mexico Department of Transportation (NMDOT). 2023. NM 500 Rio Bravo Bridge Replacment Project Website. Available at: <https://nm500riobravo.nmdotprojects.org/>. Accessed February 22, 2023.

- New Mexico Environment Department (NMED). 2022. EPA-Approved 2022-2024 State of New Mexico Clean Water Act 303(d)/305(b) Integrated Report. Available at: <https://www.env.nm.gov/surface-water-quality/303d-305b/>. Accessed February 10, 2023.
- New Mexico Interstate Stream Commission (NMISC). 2022. Spring 2021 Study of Rio Grande Silvery Minnow Spawning and Nursery Habitat of the Middle Rio Grande Report.
- New Mexico Office of Natural Resources Trustee (ONRT). 2022. Addendum to the Restoration Plans for the Atchison Topeka and Santa Fe Tie-Treater and South Valley Superfund Sites. Available online: <https://onrt.env.nm.gov/onrt-seeks-public-comment-on-a-draft-addendum-to-restoration-plans-for-two-albuquerque-superfund-sites-and-the-proposed-southside-wastewater-reclamation-plant-outfall-restoration-project/>. Accessed on October 6, 2022.
- New Mexico Office of the State Engineer (NMOSE). 2011. Depletions Offsetting for Habitat Restoration Projects within the Middle Rio Grande Project. Available in project file.
- SWCA Environmental Consultants (SWCA). 2021. Spring 2021 Study of Rio Grande Silvery Minnow Spawning and Nursery Habitat of the Middle Rio Grande Report.
- . 2022a. A Class III Cultural Resources Investigation for the Southside Water Reclamation Plant Outfall Restoration Project in Bernalillo County, New Mexico. NMCRIS Investigation Abstract Form. September 12, 2022.
- . 2022b. Aquatic Resources Inventory Report for the Southside Water Reclamation Plant Outfall Restoration Project in Bernalillo County, New Mexico. January 2023.
- . 2022c. Biological Survey Report for the Southside Water Reclamation Plant Outfall Restoration Project in Bernalillo County, New Mexico. November 2022.
- . 2023. Biological Assessment for the Southside Water Reclamation Plant Outfall Restoration Project in Bernalillo County, New Mexico.
- U.S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Engineers Waterways Experiment Station.
- . 2009. *Updated Authorization for Removal of Jetty Jacks – May 2009*. U.S. Army Corps of Engineers, Albuquerque District, Bureau of Reclamation – Albuquerque Area Office, Middle Rio Grande Conservancy District, Albuquerque, New Mexico.
- . 2010. Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region (Version 2.0), edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-12. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.
- U.S. Environmental Protection Agency. 2007. Developing Your Stormwater Pollution Prevention Plan. A Guide for Construction Sites. Accessed on March 27, 2023. Available online: https://www3.epa.gov/npdes/pubs/sw_swppp_guide.pdf
- U.S. Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants: Final rule to list the Rio Grande silvery minnow as an endangered species. Federal Register 59(139):36988–36995.

- . 1995. Final rule determining endangered status for the Southwestern willow flycatcher. Federal Register 60(38):10694–10715.
 - . 2003. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Rio Grande Silvery Minnow. Federal Register 68(33):8087–8135.
 - . 2014. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*). Federal Register 79(192):59992–60038.
 - . 2020a. Endangered and Threatened Wildlife and Plants; 12-month finding for the monarch butterfly. Federal Register 85:2020–27523. December 17, 2020.
 - . 2020b. Monarch butterfly (*Danaus plexippus*) Species Status Assessment Report, Version 2.1. U.S. Fish and Wildlife Service.
 - . 2021a. Rio Grande silvery minnow (*Hybognathus amarus*). Available at: <https://ecos.fws.gov/ecp/species/1391>. Accessed January 2023.
 - . 2021b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo. Federal Register 86(75):20798–21005.
 - . 2022a. National Wetlands Inventory. U.S. Fish and Wildlife Service Ecological Services. Available at: <http://www.fws.gov/wetlands/Data/State-Downloads.html>. Accessed January 2023.
 - . 2022b. Jennifer Davis, Wildlife Biologist, U.S. Fish and Wildlife Service, to Coleman Burnett, Principal Environmental Planner, SWCA Environmental Consultants, Albuquerque, New Mexico, Email, December 7, 2022.
 - . 2023a. Biological Opinion for the Southside Water Reclamation Plant Outfall Restoration Project. Consultation Number 2023-0064556. Albuquerque, New Mexico.
 - . 2023b. Valle de Oro NWR Website. Available at: <https://www.fws.gov/refuge/valle-de-oro/about-us>. Accessed January 17, 2023.
 - . 2023c. Wildlife Biologist. Personal communication with Jennifer Davis regarding southwestern willow flycatcher required habitat patch sizes. Albuquerque, New Mexico: U.S. Fish and Wildlife Service. Written communication.
- U.S. Geological Survey (USGS). 2021. Microbial Source Tracking and *Escherichia coli* Monitoring in the Rio Grande in the South Valley, Albuquerque, New Mexico, February – September 2021. USGS Water Science Center in cooperation with Bernalillo County.
- . 2022. National Water Information System: Web Interface. Water Quality Data for USGS 350135106402210 Rio Grande Below Rio Bravo Gage. Available at: https://nwis.waterdata.usgs.gov/nwis/qwdata?site_no=350135106402210&agency_cd=USGS&inventory_output=0&rdb_inventory_output=file&TZoutput=0&pm_cd_compare=Greater%20than&radio_parm_cds=all_parm_cds&format=html_table&qw_attributes=expanded&qw_sample_wide=wide&rdb_qw_attributes=expanded&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=brief_list. Accessed February 20, 2023.

CHAPTER 8 – ABBREVIATIONS AND ACRONYMS

BA	biological assessment
BEMP	Bosque Ecosystem Monitoring Program
CFR	Code of Federal Regulations
cfs	cubic feet per second
cuckoo	yellow-billed cuckoo
CWA	Clean Water Act
DBH	diameter at breast height
EA	Environmental Assessment
ESA	Endangered Species Act
flycatcher	southwestern willow flycatcher
MRG	Middle Rio Grande
MRGCD	Middle Rio Grande Conservancy District
NEPA	National Environmental Policy Act of 1969, as amended
NM 500	New Mexico State Highway 500
NMDA	New Mexico Department of Agriculture
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMISC	New Mexico Interstate Stream Commission
NMMJM	New Mexico meadow jumping mouse
NMOSE	New Mexico Office of the State Engineer
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
ONRT	New Mexico Office of Natural Resources Trustee
project	Southwest Reclamation Plant Outfall Restoration Project
Reclamation	Bureau of Reclamation
RGSM	Rio Grande silvery minnow
SEL	soil encapsulated lift

SLO	New Mexico State Land Office
SWCA	SWCA Environmental Consultants
SWRP	Southwest Reclamation Plant
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Water Authority	Albuquerque Bernalillo County Water Utility Authority
WOTUS	waters of the U.S.

APPENDIX A

Project Maps

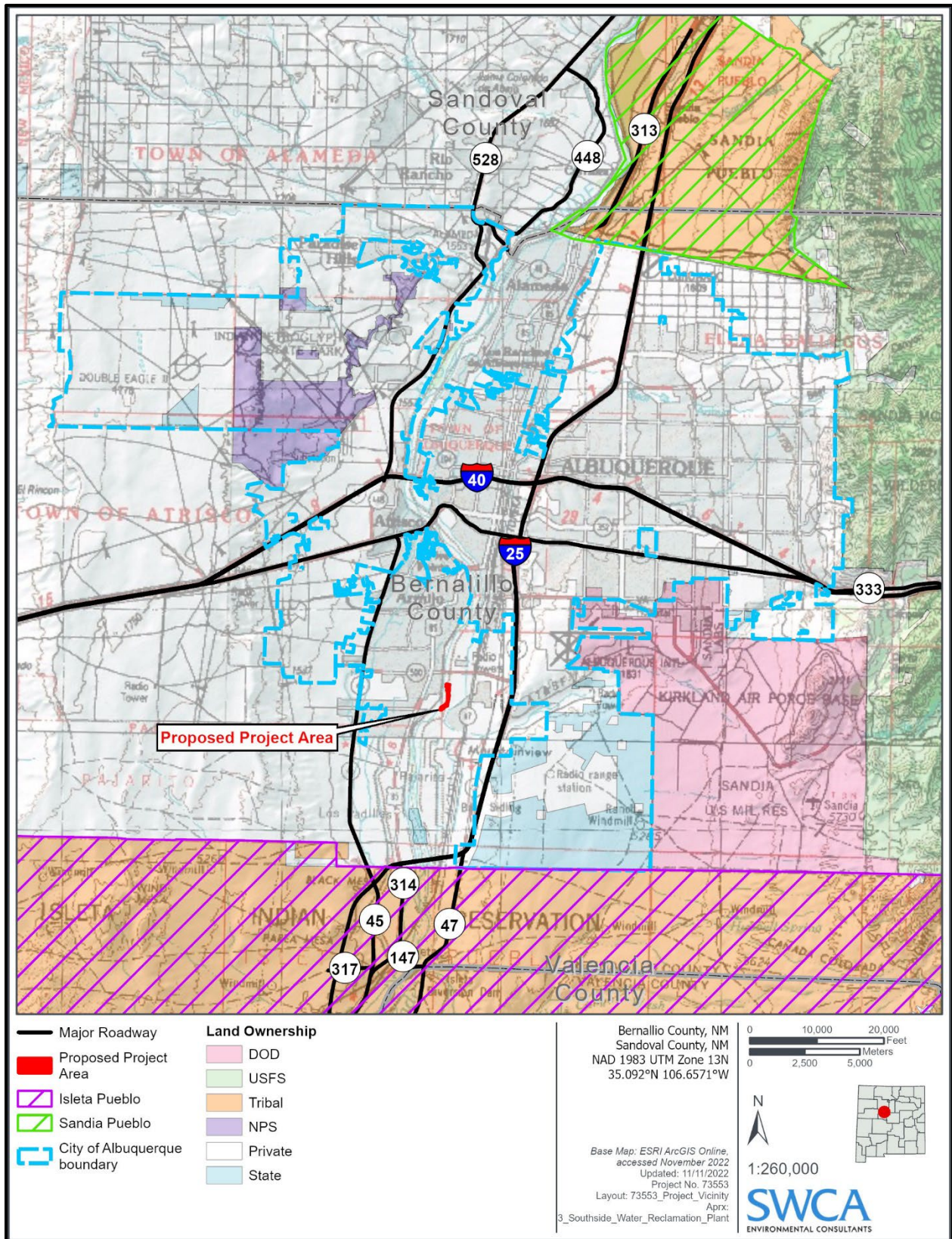


Figure A-1. Project vicinity map.



Figure A-2. Project area map.

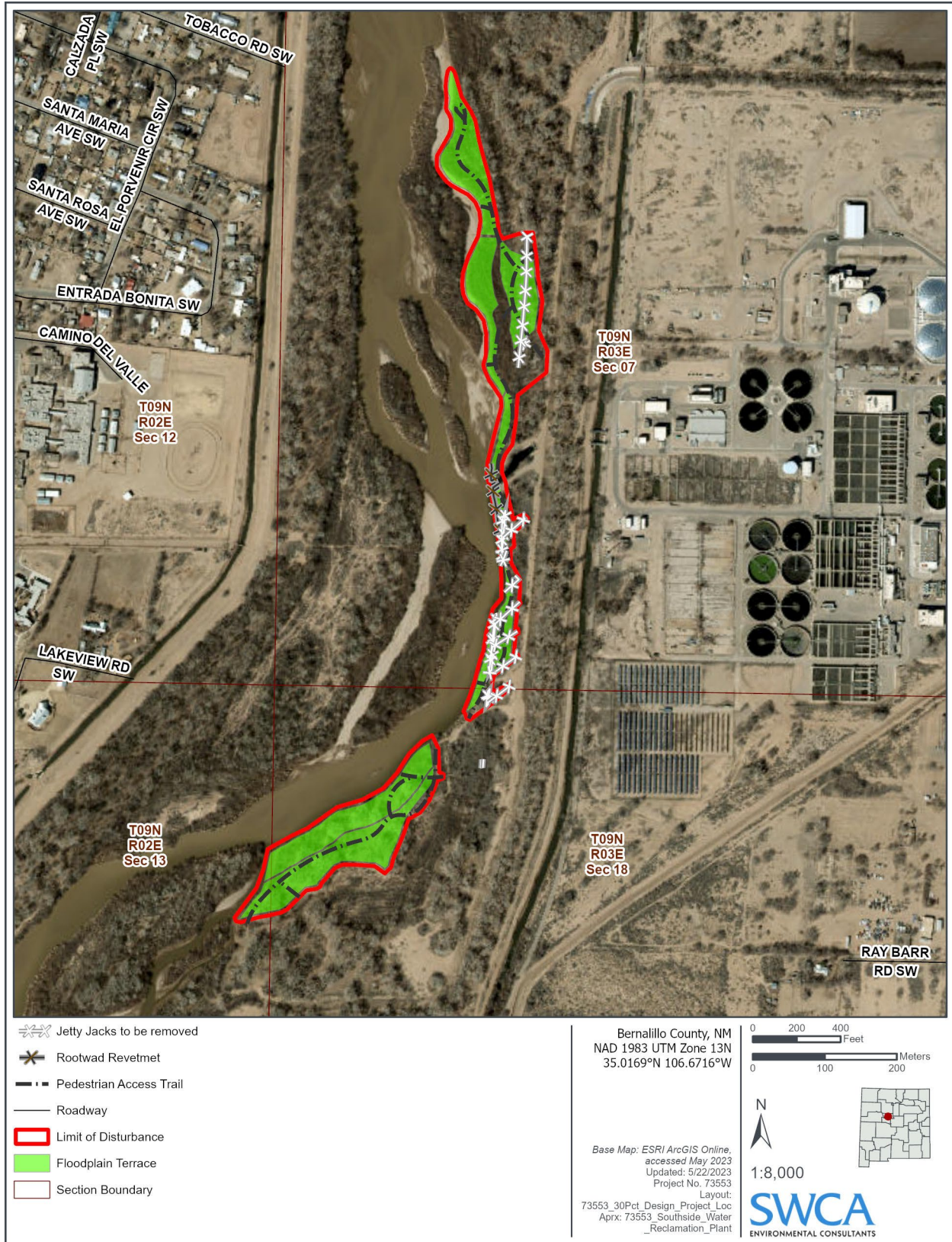


Figure A-3. Project restoration components.

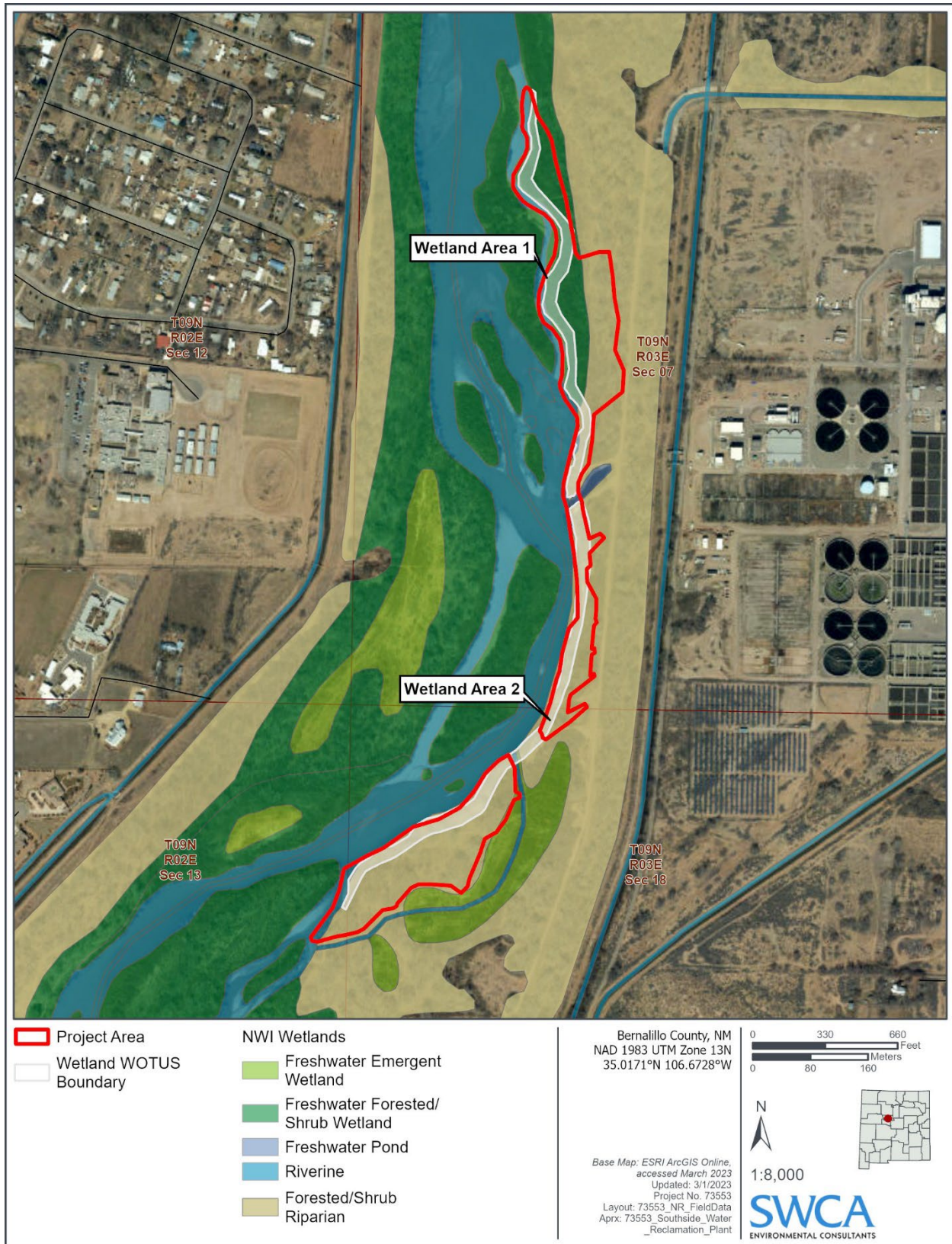


Figure A-4. Wetlands and NWI riparian areas.



Figure A-5. Rio Grande silvery minnow habitat.

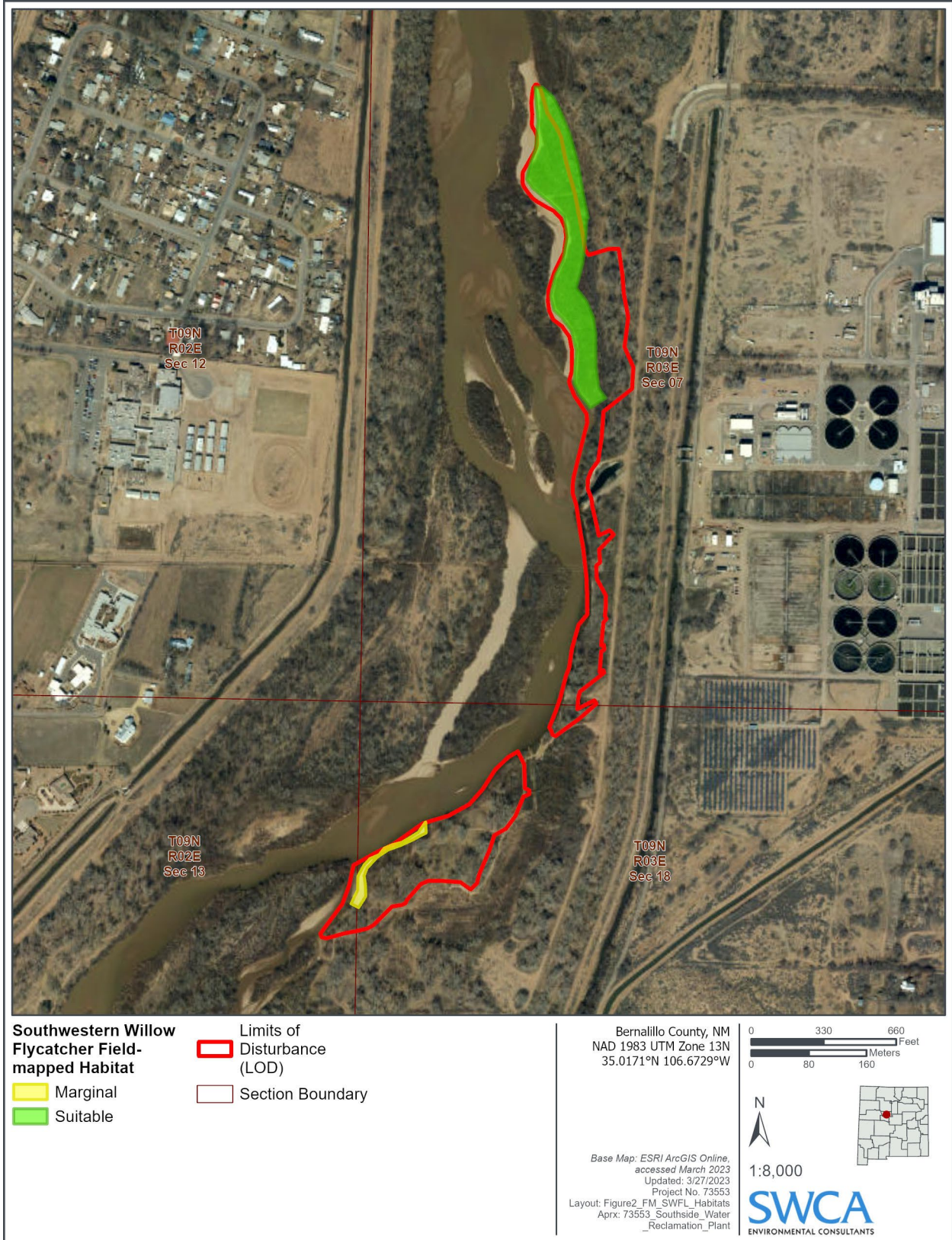


Figure A-6. Southwestern willow flycatcher field-mapped habitat.

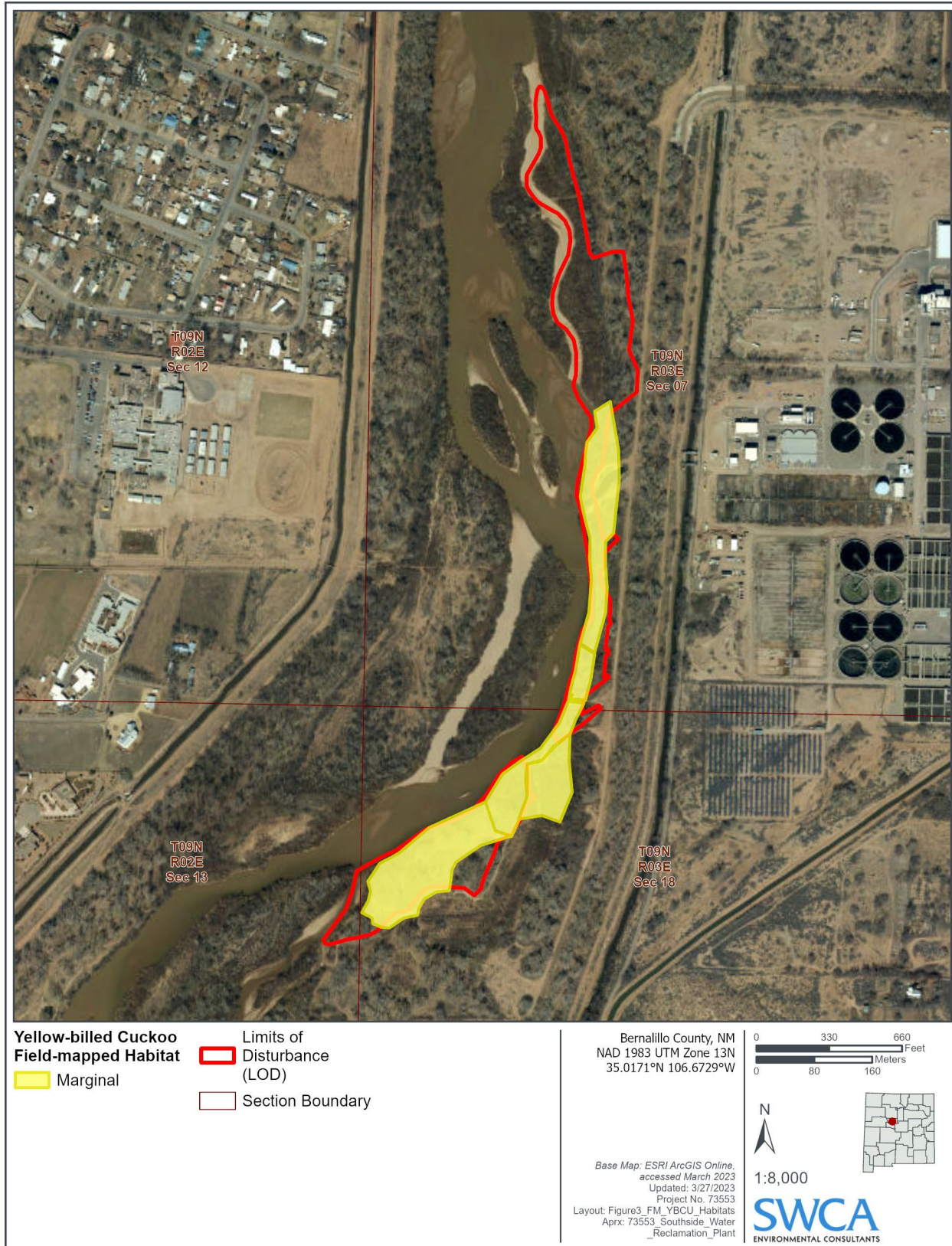


Figure A-7. Yellow-billed cuckoo field-mapped marginal habitat.

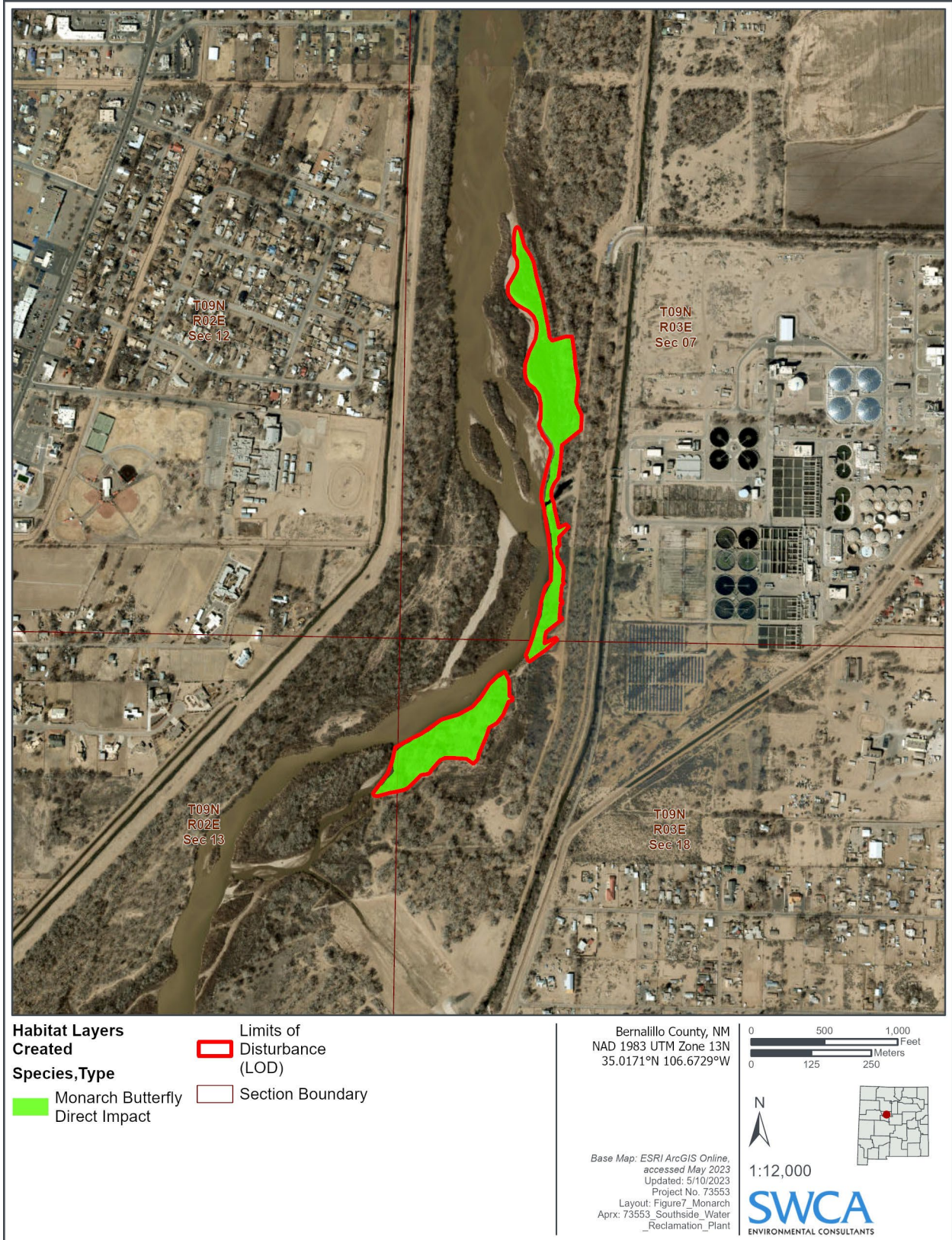


Figure A-8. Monarch butterfly field-mapped habitat.

APPENDIX B

Project Photographs



Photograph B-1. General habitat overview from the north side of the project area, facing north.



Photograph B-2. General habitat overview from the north side of the project area, facing east.



Photograph B-3. General habitat overview from the north side of the project area, facing south.



Photograph B-4. General habitat overview from the north side of the project area, facing west.



Photograph B-5. General habitat overview slightly north of the outfall, facing north.



Photograph B-6. General habitat overview slightly north of the outfall, facing west.



Photograph B-7. General habitat overview slightly south of the outfall, facing north.



Photograph B-8. General habitat overview slightly south of the outfall, facing east.



Photograph B-9. General habitat overview slightly south of the outfall, facing west.



Photograph B-10. Riparian corridor overview south of the outfall, facing north.



Photograph B-11. Riparian corridor overview south of the outfall, facing east.



Photograph B-12. Riparian corridor overview south of the outfall, facing south.



Photograph B-13. General habitat overview from the south side of the project area, facing south.



Photograph B-14. General habitat overview from the south side of the project area, facing west.



Photograph B-15. Example of dense coyote willow habitat on the north side of the project area, facing east.



Photograph B-16. Example of dense coyote willow habitat on the north side of the project area, facing west.