

**San Acacia Habitat Restoration Project
from River Mile 116 to 99,
Socorro County, New Mexico
Environmental Assessment**

Prepared for

Bureau of Reclamation, Albuquerque Area Office

On Behalf of

**New Mexico Interstate Stream Commission,
Albuquerque Office**

Prepared by

SWCA Environmental Consultants

February 2016

**SAN ACACIA HABITAT RESTORATION PROJECT
FROM RIVER MILE 116 TO 99,
SOCORRO COUNTY, NEW MEXICO**

ENVIRONMENTAL ASSESSMENT

Prepared for

BUREAU OF RECLAMATION, ALBUQUERQUE AREA OFFICE
555 Broadway NE, Suite 100
Albuquerque, New Mexico 87102

On behalf of

NEW MEXICO INTERSTATE STREAM COMMISSION, ALBUQUERQUE OFFICE
5550 San Antonio Drive NE
Albuquerque, New Mexico 87109

Prepared by

SWCA ENVIRONMENTAL CONSULTANTS
5647 Jefferson Street NE
Albuquerque, New Mexico 87109
Telephone: 505-254-1115, Fax: 505-254-1116
www.swca.com

SWCA Project No. 34090

February 2016

TABLE OF CONTENTS

1.0	Purpose and Need for Action	1
1.1	Introduction	1
1.2	Purpose and Need for the Action.....	3
1.3	Relevant Statutes, Regulations, and Other Plans.....	3
1.4	Issues	4
2.0	Alternatives	6
2.1	No Action Alternative	6
2.2	Proposed Action	6
2.3	Alternatives Considered But Eliminated from Further Analysis	18
3.0	Affected Environment	19
3.1	Land Use.....	19
3.2	Air Quality and Noise.....	19
3.3	Vegetation and Wetlands.....	20
3.4	Water Quality and Water Depletion	21
3.5	Fish and Wildlife Resources.....	22
3.6	Threatened and Endangered Species and their Critical Habitat	23
3.7	Soils	27
3.8	Cultural Resources.....	27
3.9	Environmental Justice	28
3.10	Indian Trust Assets	28
3.11	Climate Change	29
4.0	Environmental Consequences	30
4.1	Land Use.....	30
4.2	Air Quality and Noise.....	30
4.3	Vegetation and Wetlands.....	31
4.4	Water Quality and Water Depletions	32
4.5	Fish and Wildlife Resources.....	34
4.6	Threatened and Endangered Species and Their Critical Habitat.....	34
4.7	Soils	38
4.8	Cultural Resources.....	39
4.9	Environmental Justice	39
4.10	Indian Trust Assets	40
4.11	Climate Change	40
4.12	Cumulative Impacts.....	40
5.0	Environmental Commitments	42
5.1	Timing of the Proposed Action	42
5.2	Water Quality	42
5.3	Equipment and Operations	43
5.4	Access and Staging.....	44
5.5	Vegetation Replanting and Control	44
5.6	Dust Abatement	45
5.7	Other Measures.....	45
6.0	Summary	46

7.0	Consultation and Coordination	47
8.0	Preparers and Contributors.....	47
8.1	SWCA Preparers	47
8.2	New Mexico Interstate Stream Commission Preparers	47
8.3	Bureau of Reclamation Contributors	47
9.0	References	49
	Appendix A.....	55

LIST OF FIGURES

Figure 1.1.	Project location map.	2
Figure 2.1.	RM 114 project area, access roads, staging, and spoils areas.....	8
Figure 2.2.	RM 112 project area, access roads, staging, and spoils areas.....	10
Figure 2.3.	RM 100.5 project area, access roads, spoils, and staging areas.....	11
Figure 2.4.	RM 100 project area, access roads, and spoils areas.	13
Figure 2.5.	RM 99.5 project area, access roads, staging, and spoils areas.....	14

LIST OF TABLES

Table 2.1.	San Acacia Reach Project Components and Acreages.....	6
Table 2.2.	Estimated Acres of Off-channel Habitat Restored for the Silvery Minnow	7
Table 3.1	Average Water Quality Data by Constituent for the Central Avenue Gage (1975–2001)	21
Table 3.2	Federally Listed Species That Could Occur within Socorro County, New Mexico.....	23
Table 3.3.	Historic Sites Closest to the Proposed Project Area.....	28
Table 4.1.	Acres above and below the Ordinary High Water Mark.....	33
Table 4.2.	Effect Determinations for Federally Listed Species Likely to Occur in the Project Area.....	34
Table 4.3.	Cubic Yards of Spoil Material Removed from Each Restoration Site.....	38
Table 4.4.	Projects Considered for Cumulative Impacts Analysis	40

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
CFR	Code of Federal Regulations
cfs	cubic feet per second
Collaborative Program	Middle Rio Grande Endangered Species Collaborative Program
cuckoo	yellow-billed cuckoo
CWA	Clean Water Act
dba	decibel A-weighted
DO	dissolved oxygen
EA	environmental assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
flycatcher	southwestern willow flycatcher
GIS	geographic information system
I-25	Interstate 25
ITA	Indian Trust Asset
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
MRG	Middle Rio Grande
MRGCD	Middle Rio Grande Conservancy District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	New Mexico Highway
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMISC	New Mexico Interstate Stream Commission
NMOSE	New Mexico Office of the State Engineer
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
NWI	National Wetland Inventory
OHWM	ordinary high water mark
Reclamation	Bureau of Reclamation
RM	river mile
SADD	San Acacia Diversion Dam
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
silvery minnow	Rio Grande silvery minnow
SSED	suspended sediments
SWCA	SWCA Environmental Consultants
SWPPP	Stormwater Pollution Prevention Plan
TCP	traditional cultural property
TDS	total dissolved solids
USACE	U.S. Army Corps of Engineers
USC	United States Code
USGS	U.S. Geological Survey

This page intentionally left blank.

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The New Mexico Interstate Stream Commission (NMISC) is proposing to implement habitat restoration projects along an approximately 17-mile reach of the Middle Rio Grande (MRG) immediately downstream of the San Acacia Diversion Dam (SADD) in Socorro County, New Mexico. The proposed project areas are aligned north to south and located in between the New Mexico Highway (NM) 60 Bridge near Bernardo (River Mile [RM] 116) downstream to RM 99, just below the Escondida Drain outfall (Figure 1.1).

As part of its commitments for the Middle Rio Grande Endangered Species Collaborative Program's (Collaborative Program's) Recovery Implementation Program, the NMISC plans to continue to contribute to funding the planning, compliance, and construction of certain habitat restoration projects for endangered species in the MRG. The Bureau of Reclamation (Reclamation), the NMISC, and the Middle Rio Grande Conservation District (MRGCD) have provided a number of commitments that are linked with implementing river conveyance and flood control projects, as described in the river maintenance activities section (Part III) of the Reclamation's Joint Biological Assessment (Reclamation 2015). As part of these commitments, the NMISC and Reclamation have agreed to work cooperatively on new habitat restoration projects in the Isleta and San Acacia Reaches of the MRG with other participating entities, including the U.S. Fish and Wildlife Service (Service) (Sevilleta Wildlife Refuge), the MRGCD, the New Mexico Department of Game and Fish's (NMDGF's) wildlife refuge (La Joya Wildlife Management Area), and private landowners. Reclamation has agreed to perform the construction of the projects described in this environmental assessment (EA), and as such, Reclamation is the lead federal agency for this undertaking and decision under the National Environmental Policy Act (NEPA).

This EA describes and analyzes the construction of five habitat restoration projects south of the SADD proposed for immediate implementation and three additional restoration sites planned north of the dam to be constructed after the five sites south of the dam are completed and once all required permits and consultation has been completed. The five sites south of the SADD are within the San Acacia Reach of the MRG and include restoration at RM 114, RM 112, RM 100.5, RM 100, and RM 99.5. These proposed restoration sites are managed by Reclamation and the MRGCD.

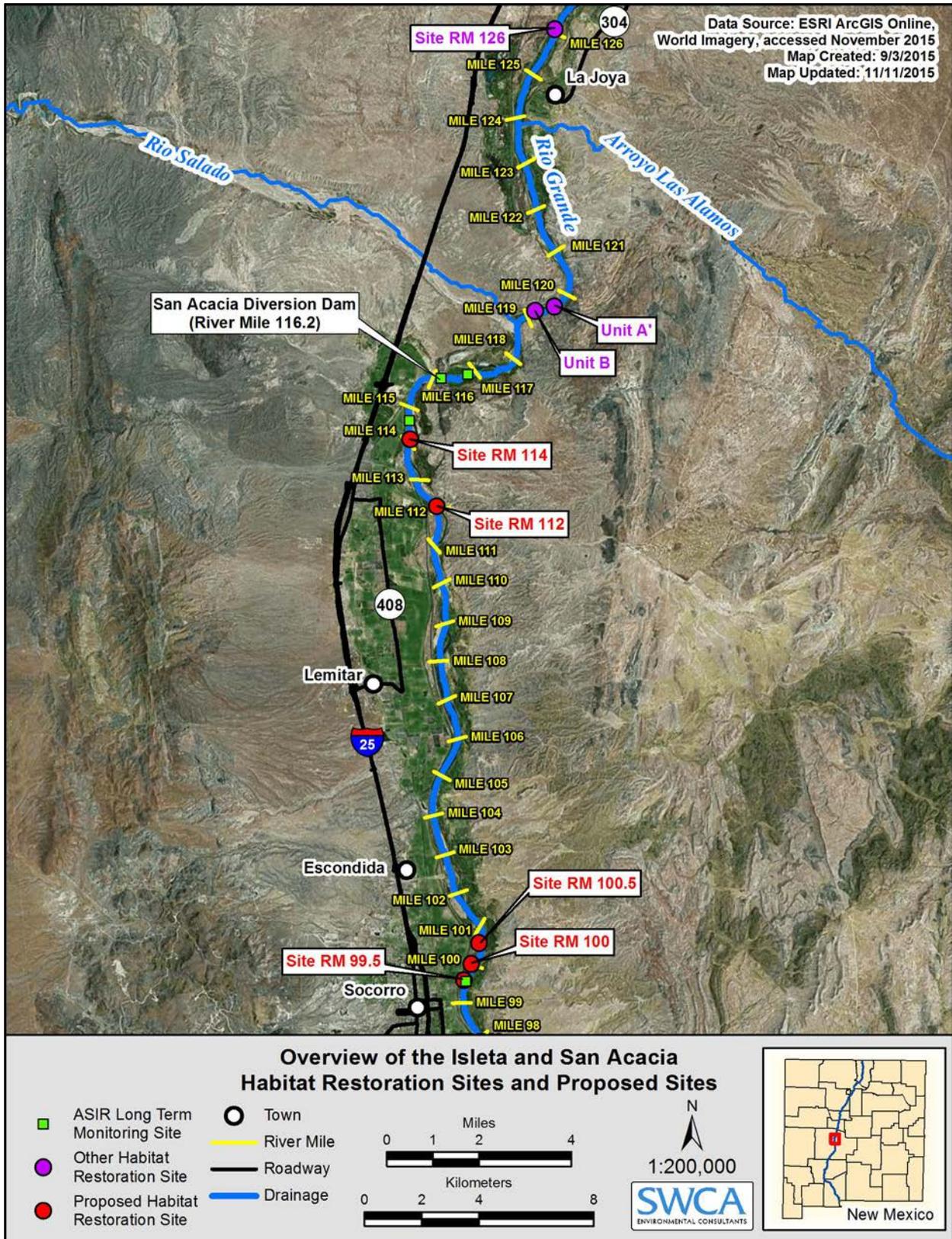


Figure 1.1. Project location map.

1.2 PURPOSE AND NEED FOR THE ACTION

The State of New Mexico, through the NMISC, has implemented habitat restoration projects as a part of the state's commitment to improving habitat conditions for the Rio Grande silvery minnow (*Hybognathus amarus*; silvery minnow) and the southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher). The NMISC's habitat restoration projects constructed in the Albuquerque and Isleta Reaches of the MRG, with Reclamation serving as the lead federal action agency (Reclamation 2005, 2007a, 2009; SWCA Environmental Consultants [SWCA] 2010), contributed to the Collaborative Program's goal of meeting the habitat restoration requirements as stated in Element S of the Reasonable and Prudent Alternatives in the March 2003 Biological Opinion (Service 2003a).

The primary objective is to design and implement habitat restoration for the silvery minnow under river discharges of approximately 1,000 to 2,000 cubic feet per second (cfs). The habitat to improve is within the 17-mile reach of the MRG (RM 116–RM 99). The objective of the restoration process is to increase measurable habitat complexity in support of various life stages of the silvery minnow by providing slackwater habitat and facilitating lateral migration of the river across bars and riverbanks during various mid-level and high-flow stages.

The project would also provide benefit for the federally listed flycatcher, the Western Distinct Population Segment of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*; cuckoo), and the Rio Grande ecosystem as a whole. These activities are designed to restore river processes that specifically benefit the silvery minnow, but also benefit the flycatcher and cuckoo by making modifications to the current channel and bankline configuration, creating spawning and rearing habitats, reconnecting floodplains, redistributing sediment, and removing of non-native vegetation. Heavy equipment construction activities are necessary to achieve these goals because of historic and ongoing river management and operations that have resulted in significant changes in river geomorphology and hydrologic regime.

1.3 RELEVANT STATUTES, REGULATIONS, AND OTHER PLANS

The Proposed Action does not conflict with any known state or local planning or zoning ordinances. The Proposed Action is required to conform to the provisions of Section 7 of the Endangered Species Act (ESA) and the Migratory Bird Treaty Act (MBTA) as administered by the Service; Section 106 of the National Historic Preservation Act (NHPA) as administered by the New Mexico State Historic Preservation Officer (SHPO); Sections 401, 402, and 404 of the Clean Water Act (CWA); and Floodplain Management (Executive Order [EO] 11988). Mitigation measures and best management practices are incorporated in the Proposed Action or identified in Chapter 5, Environmental Commitments. This EA also reflects compliance with applicable regulations and statutes, as well as the following relevant statutes, regulations, and other plans:

- American Indian Religious Freedom Act of 1978 (42 United States Code [USC] 1996)
- Archaeological Resources Protection Act of 1979 (16 USC 470)
- Clean Air Act of 1972, as amended (42 USC 7401 et seq.)
- CWA of 1972, as amended (33 USC 1251 et seq.)

- ESA of 1973 as amended (16 USC 1531 et seq.)
- Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, 1994 (EO 12898)
- Fish and Wildlife Coordination Act of 1958, as amended (16 USC 661 et seq.)
- Floodplain Management (EO 11988)
- NEPA of 1969, as amended (42 USC 4321 et seq.)
- Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500 et seq.)
- MBTA of 1918, as amended (16 USC 703–712)
- NHPA of 1966, as amended (16 USC 470 et seq.)
- National Pollutant Discharge Elimination System (NPDES), as amended (33 USC 1251 et seq.)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.)
- Protection and Enhancement of the Cultural Environment (EO 11593)
- Protection of Wetlands (EO 11990)
- Procedures for Implementing NEPA (33 CFR 230; Engineer Regulation 200-2-2)
- Secretarial Order 3206, American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act

1.4 ISSUES

The issues for analysis were identified by Reclamation and NMISC staff in collaboration with other stakeholders. The project area includes levees, canals, and levee access roads; however, there is no residential or commercial development within or directly adjacent to the restoration sites, and there are no major public uses that are incompatible with the Proposed Action. These areas have intentionally been left in a natural state. The NMISC and Reclamation do not expect public controversy regarding the Proposed Action.

1.4.1 *ECOLOGICAL VALUES*

The Rio Grande floodplain, including the riparian corridor (bosque) and river channel, is highly valued by the residents of New Mexico for its natural beauty, recreational opportunities, importance as a refuge for birds and other wildlife, and the presence of rare and protected species. The floodplain provides numerous ecosystem services to all citizens of New Mexico (Costanza et al. 1997). The proposed habitat restoration may cause disturbance to access, solitude, recreation, or other visual and social values; the impact would be short term, lasting during the construction phase at each site. However, the proposed restoration treatments would have long-term ecological benefits for the silvery minnow, flycatcher, cuckoo, and other species, and would restore native riparian vegetation and hydrologic functions of wetlands along the Rio Grande.

1.4.2 NET WATER DEPLETIONS

The Rio Grande Compact limits the amount of water that can be depleted (consumed) in the MRG (Rio Grande Compact 1939). 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 senior water rights or New Mexico's ability to meet its downstream delivery obligations are not impaired. Additionally, the New Mexico State Water Plan (NMOSE and NMISC 2003) states that habitat restoration projects should not increase net water depletions, or that should depletions occur they would be offset through a permitting process established by the NMOSE. The NMOSE considers features within the 600-foot channel width to be dynamic aspects of the channel; therefore, no depletion offsets are required for riverine restoration work. However, habitat restoration features constructed outside the nominal channel width are subject to depletion offsets.

2.0 ALTERNATIVES

Two alternatives are analyzed in this EA: the Action Alternative (Proposed Action) and the No Action Alternative. A discussion of the alternatives considered but not carried forth for analysis in this EA are also presented below with rationale for dismissal.

2.1 NO ACTION ALTERNATIVE

The No Action Alternative assumes that no anthropogenic changes would be made to bars, riparian environments, or the riverine habitats available to the silvery minnow in the San Acacia Reaches at the proposed project locations. Current river operations, as well as trends in riverine habitat quality and quantity, with the exception of other habitat restoration projects in the reaches, would remain dominant under the No Action Alternative. Reclamation and the NMISC would not meet the requirements of the Biological Opinion and Record of Decision (Service 2003a).

2.2 PROPOSED ACTION

The proposed project area extends from RM 116 to 99 of the MRG (see Figure 1.1). The Proposed Action consists of the application of several restoration/rehabilitation techniques designed to create aquatic habitat in the San Acacia Reach. These methods are described below in Section 2.2.2. The Proposed Action implements the restoration techniques with the goal of restoring, and/or creating riparian habitat for the silvery minnow, with benefits also for the cuckoo and the flycatcher.

There are five restoration sites proposed within the San Acacia Reach. The action area includes the areas immediately surrounding each habitat restoration site, access roads, and staging areas. The total acreage of the action area for the five restoration sites is approximately 29 acres. Table 2.1 provides an overview of the acres of disturbance associated with each restoration site, including the excavation footprint at each site, acres used for staging, and disposing of spoils, and access. See full descriptions of the proposed recreation actions at each site described below under each reach heading.

Table 2.1. San Acacia Reach Project Components and Acreages

Reach	Site Excavation Footprint (acres)	Staging, Spoils and Access Road (acres)	Total (acres)
RM 114	1.44	0.76	2.20
RM 112	1.40	3.85	5.25
RM 100.5	8.80	3.94	12.74
RM 100	1.93	0.7	2.65
RM 99.5	3.48	2.56	6.04
Total	17.05	11.81	28.88

2.2.1 SAN ACACIA RESTORATION SITES

This section describes the restoration features proposed for each of the five restoration sites (RM 114, RM 112, RM 100.5, RM 100, and RM 99.5). The restoration goal for all five of the restoration sites is to improve off-channel habitat for rearing silvery minnow by constructing a backwater area to:

- initiate site inundation at flows ~800 cfs;
- increase functional longevity, i.e., design for \geq 2-foot inundation depth at flows between 1,000 and 2,000 cfs;
- achieve backwater velocities $<$ 1 feet per second; and
- implement connectivity to the river under a range of flow conditions to avoid silvery minnow entrapment.

Approximately 14 acres of off-channel aquatic habitat would be created from restoring the five sites within the San Acacia Reach for the benefit of the silvery minnow, southwestern willow flycatcher, and the cuckoo. Table 2.2 identifies the estimated off-channel habitat acres that would be restored at each site based on acres of inundation that would be initiated at river flows of 1,000 and 2,000 cfs. Where necessary, jetty jacks and flood control structures would be removed to enable inundation at the selected restoration sites. The project would be implemented with construction starting no earlier than February 1, 2016, and taking place over approximately 3 years. Specific restoration treatments would be implemented, monitored, and evaluated to inform the restoration plans of future phases as a part of an adaptive management process.

Table 2.2. Estimated Acres of Off-channel Habitat Restored for the Silvery Minnow

Restoration Site	Estimated Acres of Habitat Restored	
	Acres Inundated at 1,000 cfs	Acres Inundated at 2,000 cfs
RM 114	0.4	1.2
RM 112	0.7	1.4
RM 100.5	4.7	6.4
RM 100	0.6	1.5
RM 99.5	2.4	3.1
Total	8.8	13.6

RM 114

This feature is a backwater design with sufficient slope that would promote drainage, minimize sedimentation, and reduce silvery minnow stranding. The total excavation footprint would be 1.4 acres, including the slope of the feature. This feature would have two inlets to promote connectivity and longevity of the backwater area. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 0.4 acre. At 2,000 cfs, designed inundation is expected to be approximately 1.2 acres with greater depths and variability.

Vegetation at this site comprises a cottonwood (*Populus* sp.) and Russian olive (*Elaeagnus angustifolia*) canopy with a dense coyote willow (*Salix exigua*) and saltcedar (*Tamarix* sp.) understory. Access for the RM 114 feature is along the Low Flow Conveyance Channel (LFCC) and the Lemitar Riverside Drain canal road to an existing road within the bosque leading to the site. To reach the southern river cut, Reclamation would use selective vegetation removal with a skid-steer to avoid unanticipated native species removal. Approximately 2,800 cubic yards of spoil material (i.e., vegetation and soils) would be excavated and hauled to be spread along the access road and ramps adjacent to the feature. Total acreage of RM 114 including the project area, access roads, staging, and spoil areas is 2.20 acres (Figure 2.1).

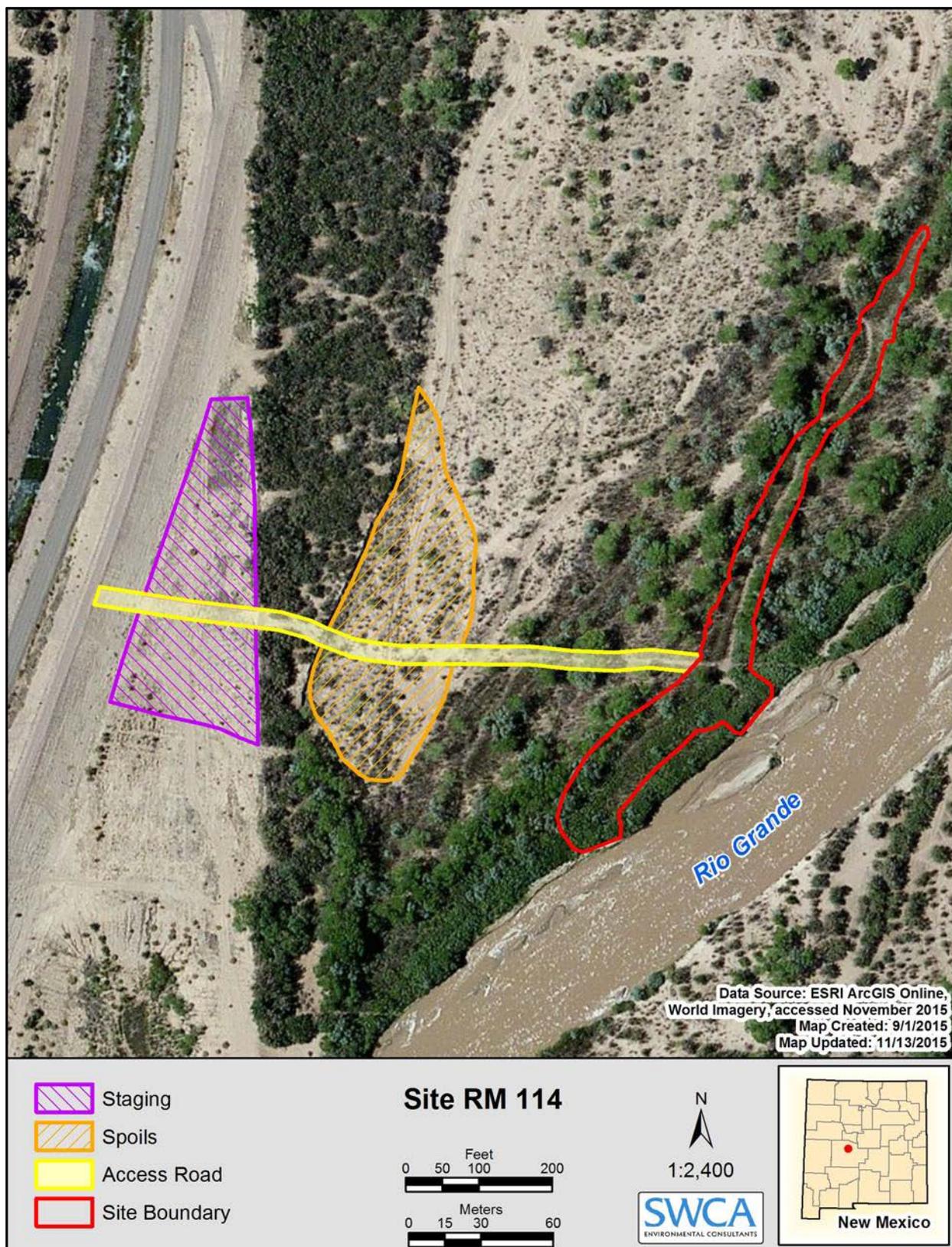


Figure 2.1. RM 114 project area, access roads, staging, and spoils areas.

RM 112

Restoration at this site would include constructing a backwater area by creating one inlet with sufficient slope that would promote drainage, minimize sedimentation, and reduce silvery minnow stranding. The total excavation footprint would be 1.4 acres, including the slope of the feature. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 0.7 acre. At 2,000 cfs, the designed inundation is expected to be approximately 1.4 acres with greater depths and variability.

Vegetation at this site is composed mostly of a coyote willow understory with a small amount of Russian olive and cottonwood canopy. Access for the RM 112 feature would be along the LFCC canal road to an existing road within the bosque leading to the site. Approximately 2,700 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road and ramps adjacent to the feature or within the staging area adjacent to the LFCC. Total acreage of RM 112 including the project area, access roads, staging, and spoil areas is 5.25 acres (Figure 2.2).

RM 100.5

This site would incorporate two backwater features that connect at flows greater than 1,000 cfs. Each feature would slope towards the river independently to promote drainage, minimize sedimentation, and minimize the possibility of silvery minnow stranding. A narrow inlet design would also prevent sedimentation within the inlets. The downstream backwater area has two inlets to promote connectivity and longevity. The total excavation footprint would be 8.80 acres. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 4.7 acres. At 2,000 cfs, the designed inundation is expected to be approximately 6.4 acres with greater depth and variability.

Vegetation at this site is a mixed native and non-native canopy and understory, primarily with a Russian olive and cottonwood canopy and dense stands of coyote willow, baccharis (*Baccharis* sp.), saltcedar, and Russian olive understory. Access for the RM 100.5 feature would be along the LFCC canal road to an existing road within the bosque leading to the site. Approximately 11,600 cubic yards of spoil material would be excavated and spread on the bar along the access road. Additional spoils would be hauled via the LFCC canal road to be spread northwest of the feature near the Escondida Drain. Total acreage of RM 100.5 including the project area, access roads, staging, and spoil areas is 12.74 acres (Figure 2.3).

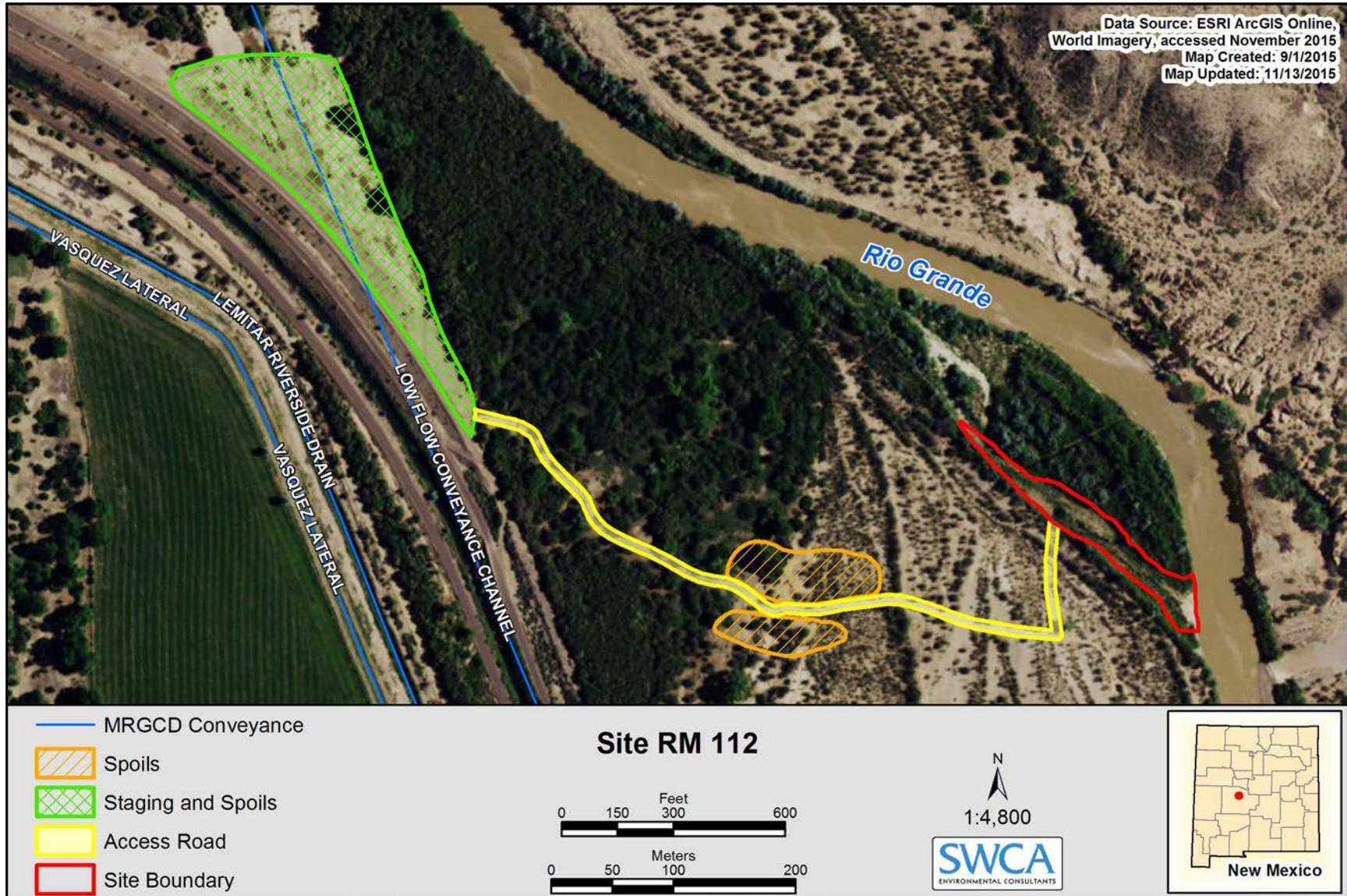


Figure 2.2. RM 112 project area, access roads, staging, and spoils areas.

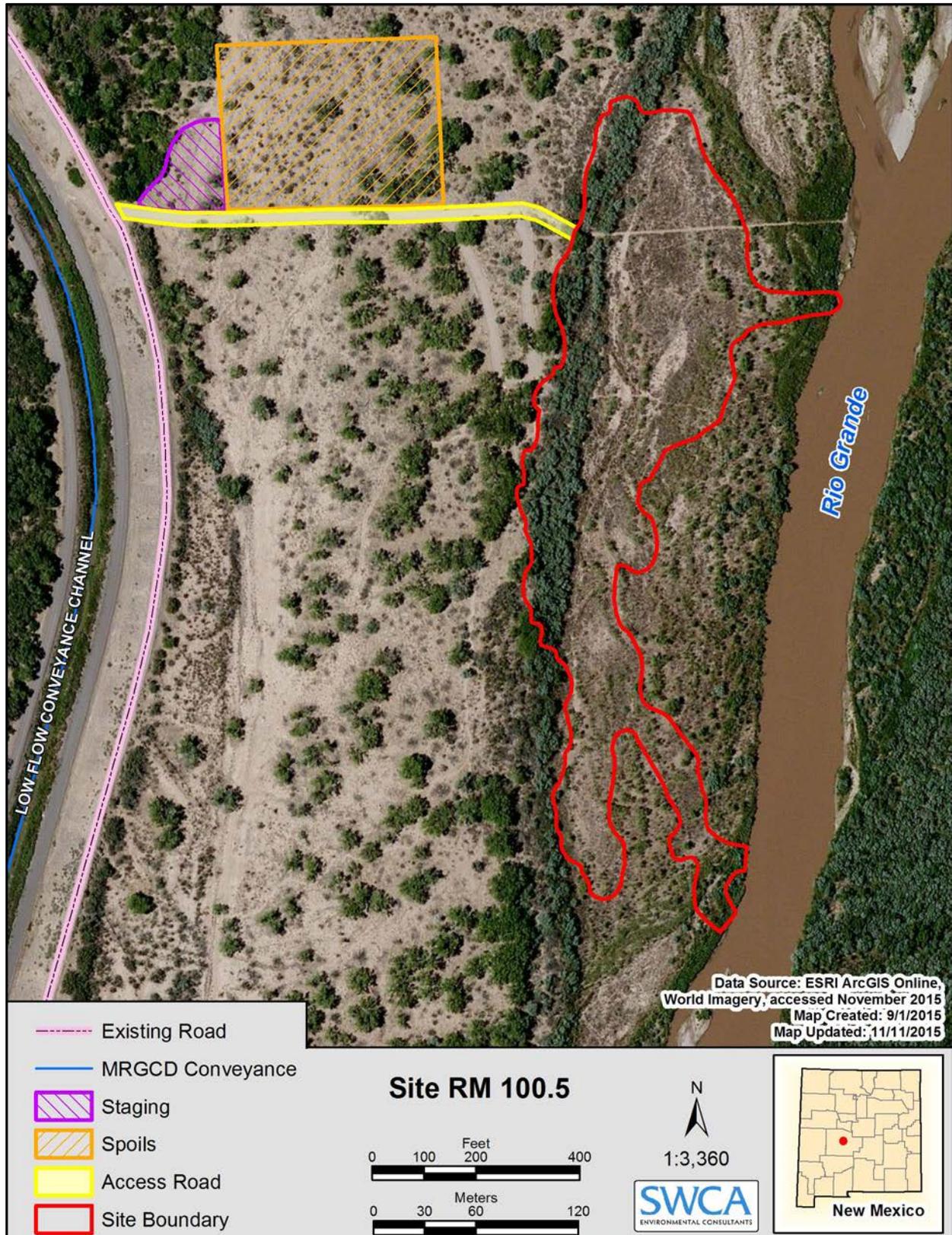


Figure 2.3. RM 100.5 project area, access roads, spoils, and staging areas.

RM 100

This restoration feature would create small channels further into the floodplain and slope back towards the river so that entrapment of the silvery minnow would be unlikely to occur. The total excavation footprint would be 1.9 acres. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 0.6 acre. At 2,000 cfs, designed inundation is expected to be approximately 1.5 acres with greater depths and variability.

Vegetation at this site is a native canopy composed of cottonwood with a non-native understory, primarily with dense stands of saltcedar and Russian olive (see Section 4.3). Access for the RM 100 feature would be along the LFCC canal road to an existing road within the bosque leading to the site. Approximately 7,700 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road adjacent to the feature or hauled along the LFCC canal road to be spread northwest of the feature near the Escondida Drain. Total acreage of RM 100 including the project area, access roads, and spoil areas is 2.65 acres (Figure 2.4).

RM 99.5

Restoration at this site would include three backwater features that connect at flows greater than 1,000 cfs. These features would slope towards the river to promote drainage, minimize sedimentation, and reduce silvery minnow stranding. A narrow inlet design would also prevent sedimentation within the inlets. The downstream backwater area has two inlets to promote connectivity and longevity. The total excavation footprint would be approximately 3.5 acres. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 2.4 acres. At 2,000 cfs, designed inundation is expected to be approximately 3.1 acres with greater depths and variability.

Vegetation at this site is a mixed native and non-native canopy and understory, primarily with a Russian olive/cottonwood canopy and an understory composed of dense stands of baccharis, saltcedar, and coyote willow (see Section 4.3). Access for the RM 99.5 feature is along the LFCC canal road to an existing road within the bosque leading to the site. Approximately 7,400 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road adjacent to the feature or hauled along the LFCC canal road to be spread northwest of the feature near the Escondida Drain. Total acreage of RM 99.5 including the project area, access roads, staging, and spoil areas is 6.04 acres (Figure 2.5).

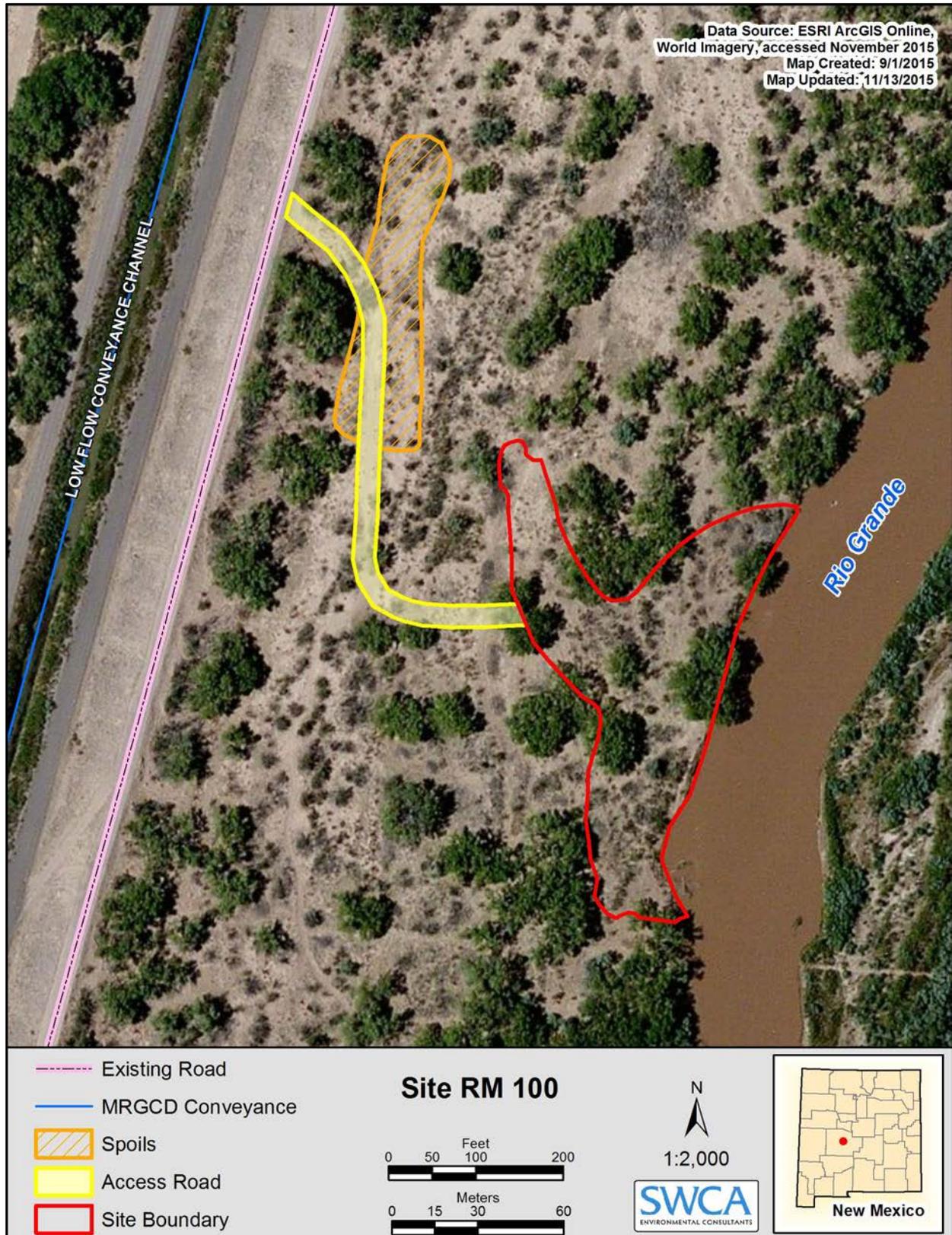


Figure 2.4. RM 100 project area, access roads, and spoils areas.

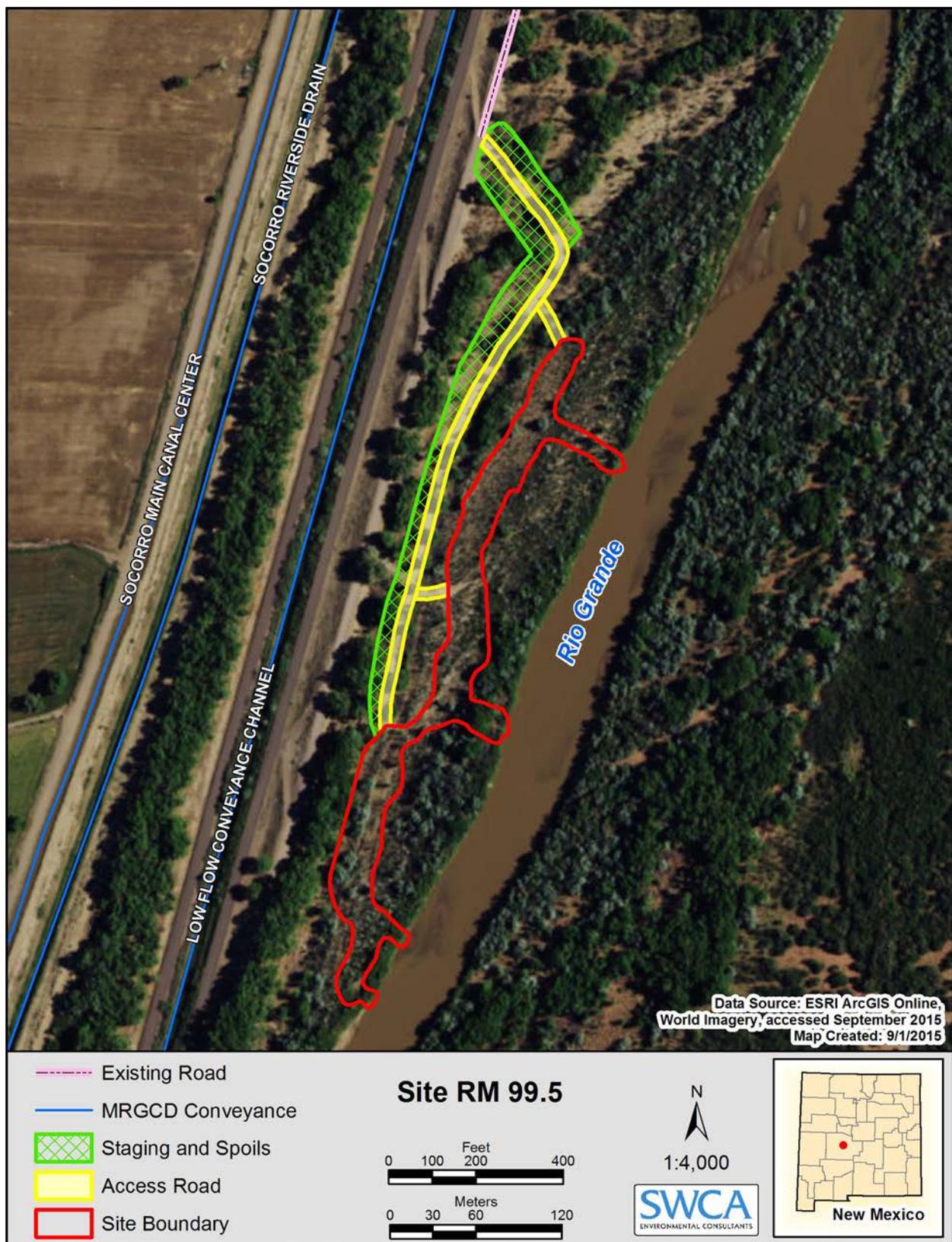


Figure 2.5. RM 99.5 project area, access roads, staging, and spoils areas.

2.2.2 RESTORATION METHODS

The NMISC and Reclamation propose the habitat restoration projects in sections of the MRG that have a relatively low probability of drying and, thus, are more likely to be able to maintain populations of silvery minnow throughout the year. Monitoring of river drying through Reclamation's "River Eyes" project suggests that the highest probability of drying occurs from the southern Bosque del Apache boundary approximately at RM 96 to approximately RM 74.5 96 just upstream of Brown Arroyo (SWCA 2014).

The NMISC and Reclamation are planning five specific habitat restoration projects for implementation starting no earlier than February 2016, in the project area. Work is not planned to occur between April 15 and September 1 during any year of work in consideration of migratory birds. If work is needed during this time, the NMISC and Reclamation would coordinate with the Service prior to the beginning of any work.

Each restoration method presented involves the physical manipulation of a predetermined portion of the surface area of selected features with an excavator and other land-based equipment such as a dozer, belly scraper, skid-steer, or backhoe. Treatments may involve the removal of vegetation, excavation to desired cut-depths, and distribution of sediment spoils. These treatments would generate woody debris and sediments that must be used in designated areas of the project sites or disposed of in accordance with the CWA Section 404 permit. The following is a description and summary of habitat restoration techniques used to achieve these goals.

- *High-flow bankline lowering and enhancements of backwater and side channel area functions.* Years of river confinement have disconnected the floodplain from the main river channel. Floodplains provide productive sheltered habitats at high flow that are important nursery areas for the silvery minnow. This technique involves cutting areas into banks where water enters, primarily during high-flow events, including spring runoff and floods to reconnect parts of the floodplain and peripheral low-lying areas. Such active restoration activities often promote passive restoration within the project or surrounding areas. All features would be built with a slope back to the river such that entrapment is unlikely to occur.
- *Passive restoration.* When water is available, higher magnitude peak flows are delivered through the MRG. This allows the energy in the river to accelerate natural channel-forming processes and improve floodplain habitat. These high flows redistribute sediment in the river channel, scour pool habitats, and remove non-native vegetation that results in greater habitat diversity for listed species. Inundation of the floodplain would improve conditions for Goodding's willow (*Salix gooddingii*), coyote willow, and Rio Grande cottonwood (*Populus deltoides* ssp. *wislizenii*) recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and connect the floodplain as an active ecological process.

2.2.3 CONSTRUCTION ACTIVITIES AND SEQUENCE

In general, construction would be sequenced in the following manner: vegetation removal, excavation and storage/redistribution of sediment and vegetation spoils, monitoring, revegetation,

and monitoring. Work may proceed at one site before proceeding to the next or may proceed at more than one site simultaneously, depending on the availability of equipment.

Project implementation would begin as soon as all necessary permits have been obtained, but not before February 2016, and would take place over approximately 3 years.

Access Roads and Staging Areas

If necessary to ensure safe and convenient access, road improvements (e.g., clearing, mowing, trimming, blading, widening, gravel cap placement, etc.) may be made to the dirt roads designated as access routes at each site (see Figure 2.1–Figure 2.5). For RM 99.5, RM 100, and RM 100.5, access to a stockpile site to the north is via the LFCC road (see Figure 2.3–Figure 2.5). Clearing involves the removal of vegetation within the roadway with some amount of subsurface disturbances of the vegetation roots. This is typically undertaken with new or minimally used access routes. A typical impact range for clearing is 20 to 30 feet per linear foot of access road. Mowing is the process of cutting vegetation in and along the access route to provide safe conditions for access by maximizing line-of-sight and increasing the reaction time to respond to other vehicles, wildlife, and livestock within the access road corridor.

Horizontal clearance also provides the ability for equipment to drive without hitting and damaging equipment. The total range of horizontal clearing would be 5 to 10 feet on each side, for a total impact of 10 to 20 feet wider per linear foot of access roads. This action is typically performed by mowing the vegetation, with the expectation that vegetation would return in a year or two. Trimming involves the selective cutting of tree branches that would restrict vehicular access along the route. This is especially relevant when large trees are near the access routes that have low branches that extend into the access route, making vehicular access difficult. The height from the road surface to be cleared varies with the type of equipment, with a range of 10 to 20 feet.

Staging areas would be used to temporarily store construction materials and equipment (see Figure 2.1–Figure 2.5). These areas would be located in previously disturbed sites and would be reseeded where necessary after construction with a weed-free, upland seed mix selected by Reclamation biologists.

Vegetation Removal

Vegetation clearing involves the removal of vegetation within the construction site with some amount of subsurface disturbance of the vegetation roots. Most of the vegetation within the project area consists of exotic species such as saltcedar and Russian olive, as well as mature cottonwoods and willow species. The exotic species in the project area would be mulched to clear the site and allow access for construction. Any vegetation that is removed would be mulched and spread in designated areas of the project sites at a depth of 3 inches or less. All vegetation removal would occur from dry land and no herbicides would be used.

Some large cottonwoods may need to be removed for safety reasons. Large trees, if removed, may be used for large woody debris or tree snags within the project area. Large woody debris placement would occur in the dry. Cottonwoods would only be removed if absolutely necessary, but all Russian olives at the bank or elsewhere would be removed. If large cottonwoods need to be

removed, they would be replaced at a ratio of 10:1. Where possible, Reclamation would remove willow species at the root ball to be saved and replanted on-site. To do this, the excavation work removes the willows along with the first few feet of dirt to be saved and then placed back in the finished excavated area to promote willow growth. Temporary staging areas would be located within the delineated area of disturbance shown in Figure 2.1 through Figure 2.5 and situated to avoid or minimize the removal of native tree species.

Dust Abatement

Dust abatement typically occurs on access routes and in project areas during implementation when there is not sufficient moisture in the soil to inhibit the formation of dust. Dust abatement involves the distribution of water onto an earthen surface. If dust becomes a safety concern at the site or while hauling spoils from the sites, roads would be wetted with water pumped from the LFCC. In the unlikely event the LFCC does not have sufficient flow, water would be pumped from the Rio Grande.

Pumping rates would vary between 1.8 and 2.2 cfs, requiring 4 to 8 minutes to fill a water truck. At the maximum pumping rate, this would be a minimal impact to river flows, equating to a decrease in flows of approximately 0.6% for river flows of 350 cfs and approximately 0.2% for river flows of 1,250 cfs for 4 to 8 minutes. A typical project may use four to six truckloads per day and, at a maximum, 18 truckloads per day. This project is expected to use the typical amount or less.

Only as a last possible source, if pumping from the Rio Grande, the pump setup would use a 0.25-inch mesh screen at the opening to the intake hose to minimize entrainment of aquatic organisms. For areas where the water surface is too far from the pump setup, an intermediate area would be leveled to create a temporary pad for the pump. Water is typically distributed using a truck-based water unit that allows for a controlled and uniform spraying of the desired surface.

Vegetation Planting

All disturbed project areas would be reseeded with a native, weed-free, seed mix selected by Reclamation biologists at the next appropriate season (typically during the summer monsoon) following the conclusion of activity at these areas, unless otherwise noted. Reseeding or revegetation may be accomplished by hand or mechanized means, such as using a Truax imprinter followed by hand or tractor broadcast seeding. If mechanized means (hand power or tractor-mounted auger) are needed for either reseeded or replanting between April 15 and September 1, migratory bird surveys would be conducted immediately prior to the work to determine if any breeding birds are present. If birds are detected, Reclamation would coordinate with the Service to determine appropriate next steps.

Some native vegetation may need to be removed to construct or provide access to the restoration sites. Where possible, Reclamation would remove willow species at the root ball to be saved and replanted on-site. To do this, the excavation work removes the willows along with the first few feet of dirt to be saved and then placed back in the finished excavated area to promote willow growth. Large, healthy, mature trees would be replaced with pole cuttings of the same tree species at a ratio of 10:1. Pole cuttings of other species may also be used.

Native cottonwoods and willows are expected to regenerate naturally. The project sites will be monitored for success of the revegetation and natural regeneration for 3 years. If needed, revegetation areas may include areas designated within this project's disturbance area or in another mutually agreed upon location. If revegetation is needed, Reclamation biologists will select plantings appropriate for the hydrologic regime of a given location, including pole plantings or upland shrubs where appropriate.

Post-Construction Monitoring

If mitigation is required per CWA Section 404 requirements, monitoring would take place for 5 years or until the performance standards are met. Success of the reseeding and replanted vegetation would be monitored for 3 years by the NMISC using photo points of the project sites. The NMISC and/or Reclamation will also monitor inundation levels of the project sites during spring runoff for 3 years.

In the areas where suitable flycatcher and cuckoo habitat are impacted by the proposed project, Reclamation and the NMISC will assess the natural regeneration of vegetation after 3 years and coordinate with the Service to determine if additional revegetation activities are needed to develop suitable habitat.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The selection of sites for rehabilitation was based on analysis of a 31-mile stretch of the MRG to identify and prioritize the best locations to design and implement restoration projects that expand off-channel habitat availability for the silvery minnow, as well as the flycatcher (GeoSystems Analysis, Inc. 2015). Site selection factors included hydrologic modeling, field reconnaissance/model verification, vegetation mapping, and design complexity and cost to facilitate off-channel seasonal inundation of vegetated floodplains at each site. Twenty-one sites were considered and prioritized with regard to these factors to identify the best locations to implement habitat restoration.

Reclamation is proposing habitat restoration at the five of the 21 sites analyzed, as described in the Proposed Action. These five sites were selected because their location features are best suited for successful channel modifications to restore and/or create riparian habitat for the silvery minnow and the flycatcher. The other sites analyzed are not proposed for modifications at this time either because they are already inundating at discharges greater than 1,500 cfs, modifications would cause too great of impact to existing, native vegetation that is already capable of providing habitat, or due to design complexity, access challenges and cost.

3.0 AFFECTED ENVIRONMENT

This section describes the current condition of resources in the study area that may be affected by the Proposed Action. Resources and related topics include geomorphology and soils, hydrology and hydraulics, water quality, cultural resources, air quality and noise, fish and wildlife, vegetation and wetlands, threatened and endangered species, recreation, socioeconomics, visual and aesthetic resources, net water depletions, environmental justice, and Indian Trust Assets (ITAs).

The project reach is located in the Rio Grande valley within the floodplain of the MRG in Socorro County, New Mexico.

3.1 LAND USE

The proposed project area stretches north-south along the Rio Grande between RM 99 and RM 116. Sites RM 114, RM 112, RM 100.5, RM 100, and RM 99.5 are managed by Reclamation and the MRGCD. There are no major public uses that are incompatible with the Proposed Action.

3.2 AIR QUALITY AND NOISE

The proposed project area lies within the Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region 156 and includes all of Socorro and Catron Counties in western New Mexico, as well as portions of McKinley and Valencia Counties lying east of the Continental Divide (excluding the Zuni and Ramah Navajo Reservations). All of these counties are in attainment for all criteria pollutants (carbon monoxide, lead, nitrogen dioxide, sulfur oxides, ozone, and particulate matter) of the National Ambient Air Quality Standards (New Mexico Administrative Code 2004; U.S. Environmental Protection Agency [EPA] 2015).

The closest Class I air quality areas (a national park or wilderness area) to the project are the Bosque del Apache wilderness area to the south and the Apache Kid wilderness area to the southwest. Air quality in the project area is considered to be good. Due to inversions and an increase in the use of wood-burning stoves, carbon monoxide and airborne particulates are occasionally high along the Rio Grande during winter months.

The project area lies between NM 85/Interstate 25 (I-25) to the west and the Bosquecito Road to the east. These paved roads are within 3 miles on either side of the project area. However, all access roads between them are dirt roads, which can become dry and dusty during periods of low precipitation, thereby acting as a potential source of fugitive dust.

Noise levels are limited to 90 A-weighted decibels (dBA) averaged over an 8-hour day by the Occupational Safety and Health Administration (29 CFR 1910.95). No worker may be exposed to 115 dBA averaged over an 8-hour day without hearing protection. The project is within a predominantly natural and agricultural area. Noise in the area results from the nearby NM 85/I-25 and occasionally from farm equipment operating in the area. There is no baseline data for noise in the project area.

3.3 VEGETATION AND WETLANDS

The riverbank ecosystem found directly along the main channel of the MRG consists of open sand bars, riverbank areas with herbaceous and shrubby vegetation, and small, seasonally saturated or inundated areas characterized by a variety of hydrophytic wetland flora. Open sand bars are subject to frequent disturbance from erosion caused by flood events and typically have little or no vegetation establishment. Sparse growth of young cottonwood, coyote willow, saltcedar, and a variety of herbaceous vegetation is occasionally found following reduced river flows, but because sand bars are prone to frequent disturbance during moderate- and high-flow events, the vegetation typically does not have the opportunity to mature.

Herbaceous and shrubby vegetation is common along the riverbank in areas where the river channel has become deeply incised. Vegetation has successfully established along the channel margins due to a decrease in overbank flooding, which results in a lack of scouring, displacement, and removal of substrate immediately adjacent to the riverbank. The root structures of the vegetation serve to reinforce the riverbank, deepening the channel incision and causing aggradation along the bankline resulting in a ‘natural levee,’ and overall reduces the potential for lateral river migration.

The dominant vegetative community in the project area is riparian woodland, which is found along much of the Rio Grande (Dick-Peddie 1993). The riparian woodland occurs primarily between the flood levees and consists of Rio Grande cottonwood, Russian olive, coyote willow, saltcedar, and baccharis with a variety of grasses and native forbs. Field surveys conducted in September 2015 found that the vegetation at the restoration sites consisted of exotic species such as saltcedar and Russian olive, as well as mature cottonwoods and willow species. The specific vegetation communities at each project restoration site, as well as access roads, spoils areas, and staging areas, are detailed in Appendix A.

Wetlands are defined by the U.S. Army Corps of Engineers (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). An ordinary high water mark (OHWM) is a line on a shore or bank established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. The OHWM is a defining element for identifying the lateral limits of non-wetland waters. Fill placed below the OHWM would need to be permitted by the USACE.

Recent high flows in the project area appear to have removed much of the existing wetlands or have prevented edge wetlands from forming along the banks of the river and habitat restoration sites within the San Acacia Reach.

Wetland boundaries were delineated where all three fundamental characteristics of hydrophytic vegetation, hydric soils, and hydrology were present. The presence/absence of wetlands and other special aquatic sites was determined by visual observation during a pedestrian survey of the project area in September 2015. Six palustrine emergent wetlands were delineated in the project area

including two wetlands at the RM 114 restoration site, one wetland at the RM 100.5 site, one wetland at the RM 100 site, and two wetlands at the RM 99.5 site. Coyote willow, a facultative wet indicator plant, is the dominant wetland vegetation in the project area and was present in each of the delineated wetlands. Other wetland features within the project included sedges (*Carex* sp.), soils exhibiting gleying and low chroma, as well as some redox features, and wetland hydrology as indicated by saturated soils and a high water table (SWCA 2015a).

3.4 WATER QUALITY AND WATER DEPLETION

3.4.1 WATER QUALITY

The project area is bordered by the Rio Grande, a perennial river and jurisdictional water of the U.S. Current information on the water quality of the river in the MRG is available from the U.S. Geological Survey (USGS), USACE, Reclamation, University of New Mexico, New Mexico Environment Department (NMED), and Service, as well as other sources. Water quality constituents that are typically monitored include surface water temperature, pH, turbidity, dissolved oxygen (DO), suspended sediments (SSED), conductivity/total dissolved solids (TDS), and fecal coliform. These data may be collected in the Rio Grande, in adjacent canals, or within reservoirs. Typically, personnel at specific riverine, canal, or reservoir locations collect the data with automatic data logging devices at stream gage stations. Long-term water quality data for the San Acacia Reach are lacking, but the nearest available data occurs in the Albuquerque Reach just to the north of the Proposed Action. These data are characterized by a high degree of seasonal variability for several water quality measures, as detailed in Table 3.1.

Table 3.1 Average Water Quality Data by Constituent for the Central Avenue Gage (1975–2001)

Season	Turbidity (NTU)	DO (mg/L)	pH	Conductivity (mg/L)	Water Temp (°C)	TDS (mg/L)	Fecal Coliform (col/100mL)	SSED (mg/L)
Nov–Feb	9.12	10.19	8.08	391.86	6.66	255.08	N/A	539.01
Mar–June	45.57	8.66	7.97	359.11	15.90	209.74	82.50	1,167.12
July–Oct	25.67	8.03	8.13	387.95	18.89	273.17	8.00	2,114.67

NTU = nephelometric turbidity unit; mg/L = milligrams per liter; °C = degrees Celsius; col/100mL = coliform per 100 milliliters.
Source: USGS 2003.

Water quality standards for the MRG from the San Acacia diversion dam to the Escondida Drain outfall has designated uses of irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat, and secondary contact (20.6.4.900 New Mexico Administrative Code).

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

3.4.2 NET WATER DEPLETIONS

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 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.

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 District I Office of the State Engineer. The NMOSE will determine whether a permit is needed and, in consultation with the NMISC, whether the project is likely to result in increased depletions, and how those increased depletions will be offset. However, per the Depletions Offsetting Policy for habitat restoration projects, the NMOSE does not require Reclamation, the USACE, or the NMISC to obtain water rights permits for habitat restoration activities conducted within the MRG floodplain (defined as levee to levee) between Velarde and Elephant Butte Reservoir because of their respective flood control authorities and/or compact delivery statutory roles (NMOSE 2011). Further, 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.

3.5 FISH AND WILDLIFE RESOURCES

Wildlife species in the bosque and adjacent riparian area are typical for the MRG valley. The Seasonal bird surveys conducted in the bosque over many years by different entities and landowners have documented more than 60 bird species (Stahlecker and Cox 1997). In addition, numerous species of mammals, reptiles, and amphibians are present.

The MRG has been known to provide habitat for the following fish species: the silvery minnow, red shiner (*Cyprinella lutrensis*), river carpsucker (*Carpionodes carpio*), flathead chub (*Platygobio gracilis*), fathead minnow (*Pimephales promelas*), longnose dace (*Rhinichthys cataractae*), white sucker (*Catostomus commersoni*), common carp (*Cyprinus carpio*), western mosquitofish (*Gambusia affinis*), and channel catfish (*Ictalurus punctatus*) (Dudley and Platania 2008). Western mosquitofish, white sucker, and common carp are introduced species that are now common throughout the MRG.

In addition to the aquatic ecosystem of the Rio Grande, the riparian corridor historically supported a wide diversity of herpetological species. Prior to increased anthropogenic control, the river system periodically spilled into the floodplain, contributing both water and nutrients that supported a number of reptilian and amphibian species that no longer inhabit the area. In the most intensive biological survey of the MRG to date, Hink and Ohmart (1984) found 18 different species of amphibians and reptiles. Eastern fence lizard (*Sceloporus undulatus*), New Mexican whiptail (*Aspidoscelis neomexicanus*), and Woodhouse's toad (*Bufo woodhousii*) were common and widespread. Several species common to the MRG, such as bullfrog (*Rana catesbeiana*), leopard

frog (*Rana pipiens*), and Woodhouse’s toad, are ubiquitous throughout the state. Others, such as the chorus frog (*Pseudacris triseriata*) and the common garter snake (*Thamnophis sirtalis*), are unique to the MRG (Hink and Ohmart 1984).

Riparian communities of the bosque provide important year-round habitat for many bird species. Hink and Ohmart (1984) recorded 277 species of birds within 163 miles of bosque habitat. Stahlecker and Cox (1997) documented 126 species in Rio Grande Nature Center State Park and estimated that 60 to 65 species of birds breed in the park in most years. The 10 most common species during the winter of 1996–1997 were dark-eyed junco (*Junco hyemalis*), American crow (*Corvus brachyrhynchos*), American goldfinch (*Carduelis tristis*), white-crowned sparrow (*Zonotrichia leucophrys*), American robin (*Turdus migratorius*), Canada goose (*Branta canadensis*), red-winged blackbird (*Agelaius phoeniceus*), mallard (*Anas platyrhynchos*), European starling (*Sturnus vulgaris*), and house finch (*Carpodacus mexicanus*). The 10 most common species in the bosque during the summer of 1997 were black-chinned hummingbird (*Archilochus alexandri*), red-winged blackbird, black-headed grosbeak (*Pheucticus melanocephalus*), spotted towhee (*Pipilo maculatus*), brown-headed cowbird (*Molothrus ater*), mourning dove (*Zenaida macroura*), Bewick’s wren (*Thryomanes bewickii*), black-capped chickadee (*Poecile atricapillus*), cliff swallow (*Petrochelidon pyrrhonota*), house finch, and European starling (Stahlecker and Cox 1997). Red-tailed hawk (*Buteo jamaicensis*), Cooper’s hawk (*Accipiter cooperii*), western screech owl (*Megascops kennicottii*), and great-horned owl (*Bubo virginianus*) also occur in the proposed project area (Stahlecker and Cox 1997).

The most common small mammals in the proposed project area include white-footed mouse (*Peromyscus leucopus*), western harvest mouse (*Reithrodontomys megalotis*), and house mouse (*Mus musculus*). Large mammals in the area include coyote (*Canis latrans*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), pocket gopher (*Thomomys bottae*), and rock squirrel (*Spermophilus variegates*). Several species of bats also utilize the MRG (Hink and Ohmart 1984).

3.6 THREATENED AND ENDANGERED SPECIES AND THEIR CRITICAL HABITAT

In accordance with Section 7(a)(2) of the ESA, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and threatened and endangered species. Nine endangered species, four threatened species, and one candidate species are federally listed and protected in Socorro County and therefore have historical records or potentials of occurring in or near the project area (Table 3.2) (Service 2015a). Of the 12 federally listed species, three have critical habitat within the project area, including the cuckoo, the flycatcher, and the silvery minnow.

Table 3.2 Federally Listed Species That Could Occur within Socorro County, New Mexico

Species	Listing Status	Critical Habitat
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	Endangered	Designated; includes project area
Southwestern willow flycatcher (<i>Empidonax traillii eximius</i>)	Endangered	Designated; includes project area
Chupadera springsnail (<i>Pyrgulopsis chupadera</i>)	Endangered	Designated; does not include project area

Species	Listing Status	Critical Habitat
New Mexican meadow jumping mouse (<i>Zapus hudsonius luteus</i>)	Endangered	Proposed; does not include project area
Alamosa springsnail (<i>Pseudotryonia alamosae</i>)	Endangered	Designated, does not include project area
Socorro springsnail (<i>Pyrgulopsis neomexicana</i>)	Endangered	Designated, does not include project area
Socorro isopod (<i>Thermosphaeroma thermophilum</i>)	Endangered	Designated, does not include project area
Least tern (<i>Sternula antillarum</i>)	Endangered	Designated, does not include project area
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Threatened	Proposed; includes project area
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	Designated; does not include project area
Chiricahua leopard frog (<i>Lithobates chiricahuensis</i>)	Threatened	Designated; does not include project area
Piping plover (<i>Charadrius melodus</i>)	Threatened	Designated; does not include project area
Sprague's pipit (<i>Anthus spragueii</i>)	Candidate	Designated, does not include project area

Source: Reclamation 2015; Service 2015a.

The list of threatened and endangered species that occur in Socorro County were consulted to determine listed species that may be present in the project area. Formal surveys of the project area were conducted in August 2015 to review the habitat and spatial characteristics of the project area and to evaluate the likely presence or absence of threatened and endangered species with critical habitat in the project area. Surveys conducted in the main channel adjacent to the proposed sites yielded 54 wild and one marked silvery minnow. During these surveys, silvery minnow were collected from all sites except for site RM 114 (SWCA 2015b). All species found to have a moderate to high probability of using the action area are analyzed in the biological assessment prepared for the project (SWCA 2015b) and are presented in the discussion below. These species include the silvery minnow, the flycatcher, and the cuckoo.

3.6.1 FISH

Rio Grande Silvery Minnow (*Hybognathus amarus*)

The silvery minnow is a federally and state listed endangered fish species. The species currently occurs in only 7% of its former geographic range and now exists as four fragmented sub-populations in four reaches of the Rio Grande that are separated by dams: 1) Cochiti Reach, 2) Albuquerque Reach, 3) Isleta Reach, and 4) San Acacia Reach. The silvery minnow was listed as endangered in 1994 because of an extremely reduced habitat, declining abundance, and because the species could be expected to become extinct in the foreseeable future due to continued threats to the species and its habitats.

Critical habitat was designated on February 19, 2003 (Service 2003b). The critical habitat designation extends from Cochiti Dam downstream to the utility line crossing the Rio Grande upstream of the Elephant Butte Reservoir delta in Socorro County, excluding all pueblo lands. Thus, the project area occurs within the critical habitat designation.

The silvery minnow is a moderate-sized, stout minnow that reaches 3.5 inches in total length and spawns in the late spring and early summer, coinciding with high spring snowmelt flows (Sublette et al. 1990). The silvery minnow is omnivorous, feeding primarily on diatoms (Shirey 2004; Magaña 2007). These fish travel in schools and tolerate a wide range of habitats (Sublette et al. 1990), but generally prefer low-velocity areas (<0.33 feet per second) over silt or sand substrate that are associated with shallow (<15.8 inches) braided runs, backwaters, or pools (Dudley and Platania 1997). Habitat includes stream margins, side channels, and off-channel pools where water velocities are low or reduced from main-channel velocities. Stream reaches dominated by straight, narrow, incised channels with rapid flows are not typically occupied by silvery minnow (Bestgen and Platania 1991).

The silvery minnow produces semi-buoyant eggs (Platania and Altenbach 1996), which have been observed both in main river channel habitat (Platania 1995) and backwater and low and no flow floodplain habitats (Beck and Fluder 2006; SWCA 2007; Hatch and Gonzales 2008, 2010; Gonzales and Hatch 2009). The silvery minnow typically spawns during late spring and early summer, coinciding with high spring snowmelt (Sublette et al. 1990). The eggs hatch in 2 to 3 days, and the larvae may drift in the main channel or remain in low-velocity areas. Shallow, low-velocity areas formed on inundated floodplains may provide nursery habitat for the silvery minnow, as these habitats provide forage (periphyton) and cover (debris and emergent vegetation) for both larval and adult fish (Massong et al. 2004; Hatch and Gonzales 2008). The creation of nursery habitat by lowering banklines and creating secondary channels into previously isolated floodplain habitats has been a major habitat restoration goal in the MRG (Massong et al. 2004; SWCA 2008). Natural flow regimes, movement within the limited remaining range, and the availability of diverse habitats are important to completion of the life cycle.

Results from an SWCA (Hatch and Gonzales 2008) fisheries monitoring study at the Los Lunas Habitat Restoration Project site suggest that floodplain inundation provides important spawning habitat. To be effective, floodplain inundation must be sustained to exceed a threshold that provides adequate time for parental stock to occupy the floodplain, for embryos to develop and hatch, and for young-of-year to develop at least to the juvenile stage to enable fish evacuation when the floodplain drains (Hatch and Gonzales 2008). The conclusions of this study support a working hypothesis that silvery minnow adaptively and preferentially spawn in low water exchange habitats and that restoration of inundated floodplains is a plausible strategy, along with the creation of backwater and other hydrologic retentive floodplain habitats, to minimize the downstream displacement of eggs and larvae (Hatch and Gonzales 2008).

Silvery minnow population surveys in the MRG have occurred since 1993 on an ongoing basis (surveys were not conducted in 1998) by the American Southwest Ichthyological Research Foundation (Dudley and Platania 2007, 2008, 2009, 2011, 2012, 2013, 2014a, 2014b, 2015a, 2015b), Reclamation, the NMISC, and the Service. Between 1993 and 2015, estimated October density of silvery minnow has fluctuated from a high of 44.84 fish/100 m² in 2005 to lows of 0.00 fish/100 m² in 2012 and 2014, respectively (Dudley and Platania 2015a).

During the last 5 years, silvery minnow have been consistently collected from long-term monitoring sites located upstream and downstream of the proposed project locations (Dudley and Platania 2011, 2012, 2013, 2014a, 2014b, 2015a, 2015b). In 2015, the number of silvery minnow

collected from these sites was low, with the majority indicated as marked fish of hatchery origin (Dudley and Platania 2015b).

3.6.2 BIRDS

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The flycatcher was federally listed as an endangered subspecies in February 1995 by the Service (1995). Critical habitat for the flycatcher was designated in October 2005 (Service 2005); a revised critical habitat designation was issued in January 2013 (Service 2013a). Critical habitat for the flycatcher does occur within the project area. The historic range of the flycatcher includes riparian areas throughout Arizona, California, Colorado, New Mexico, Texas, Utah, and Mexico (Service 2002). The flycatcher is an insectivore that forages in dense shrub and tree vegetation along rivers, streams, and other wetlands and prefers dense riparian thickets, typically willows with a scattered cottonwood overstory. Dense riparian woodlands are particularly important as breeding habitat (Service 2002).

Declining flycatcher numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat; loss of wintering habitat; and brood parasitism by the brown-headed cowbird (Service 2003a). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development; water diversion and groundwater pumping; and channelization, dams, and livestock grazing.

The flycatcher currently is known to use six breeding areas along the MRG in New Mexico: 1) Velarde to San Juan Pueblo, 2) Isleta Pueblo, 3) Sevilleta National Wildlife Refuge, 4) San Acacia Dam to Bosque del Apache National Wildlife Refuge, 5) Bosque del Apache National Wildlife Refuge, and 6) San Marcial to Elephant Butte Reservoir. The highest densities of breeding pairs occur in the San Marcial Reach, supporting 205 pairs (Moore and Ahlers 2015).

The nearest recorded flycatcher nesting territories to the project area are within proximity to several of the restoration sites and are detailed in Appendix A. Several detections have taken place in the last 2 years, but only one sighting is in proximity (approximately 365 feet) to RM 100.5. There were no territories within 0.25 mile of the project area in 2015 (SWCA 2015b).

Yellow-billed Cuckoo (*Coccyzus occidentalis*)

The western United States Distinct Population Segment of the cuckoo has been listed as a threatened species under the ESA (78 Federal Register 78321; Service 2013b). The cuckoo occurs locally along riparian corridors throughout New Mexico. Ideal habitat appears to be dominated by cottonwood canopy with a well-developed willow understory. The cuckoo's diet consists mainly of caterpillars but may also include other insects, some fruit, and the occasional lizard or frog (NMDGF 2015). The breeding range of the cuckoo extends from California and northern Utah north and east to southwestern Quebec and south to Mexico. In New Mexico, historical accounts indicate that the cuckoo was very common along the Rio Grande but was rare statewide (NMDGF 2015). Both Hink and Ohmart (1984) and Stahlecker and Cox (1997) reported the cuckoo as a nesting bird in the bosque of the MRG. The project area is located in proposed cuckoo critical habitat (Service 2015b).

3.7 SOILS

The MRG lies in an elongated valley along the Rio Grande Rift and alluvial sub-basins defined by normally faulted mountain ranges. The land flanking the Rio Grande Basin on the east is predominantly mountainous, with merging alluvial fans and stream drainages sloping down and westward toward the Rio Grande. Historically, the Rio Grande has continuously reworked valley deposits on the active floodplain. However, in the twentieth and twenty-first centuries, the movement of the river channel has been reduced due to human activities. For example, dams, levees, and jetty jacks have been used to increase channelization, preventing flow from reaching the historic floodplain and causing sediment to accumulate within the levees (Mussetter Engineering, Inc. 2003).

Soils within the habitat restoration sites are typical for floodplains along the Rio Grande containing sandy and sandy loamy soils, with a small proportion of gravel soils (Natural Resources Conservation Service 2015). The parent material consists of stream alluvium derived from sandstone and shale. Soils in the project area are well drained with gentle slopes between 0% and 2%. Wooden flood control structures, as well as metal and wooden jetty jacks, that provide bank stabilization are present in the project area. Desktop analysis and site inspections conducted in August 2015 determined that the metal jetty jacks were installed more than 50 years ago and thus are historic features. The wooden jetty jacks were installed within the last 25 years and are not historic. Some of these structures would be removed in order to facilitate adequate inundation for silvery minnow habitat. Reclamation maintains records of which jetty jacks are removed.

3.8 CULTURAL RESOURCES

Cultural resources include archaeological sites, sites eligible for the State Register of Cultural Properties and/or the National Register of Historic Places, and properties of traditional religious or cultural importance (traditional cultural properties [TCPs]).

The indigenous population in the Rio Grande valley of New Mexico dates back at least 12,000 years (Cordell 1997:67–68). The steady influx of peoples of European descent into the Rio Grande valley of present-day New Mexico from the sixteenth century onward has given rise to a diverse cultural mosaic and has left a multitude of varied cultural resources that are more than 50 years old throughout the state. The state was part of the Spanish Colonial Empire until Mexico won its independence in 1821. Twenty-five years later, in 1846, New Mexico was claimed by the United States.

There have been a number of previous archaeological surveys near several of the habitat restoration areas. None of the habitat restoration areas have been surveyed. No cultural resources were identified in the habitat restoration project areas. However, there are historic water conveyance systems that are part of the MRGCD. Table 3.3 gives the distance to the closest site for each of the proposed project areas. The closest sites are historic water conveyance systems at the staging and spoils area for RM 99.5, RM 100, RM 100.5, and a segment of the historic El Camino Real near RM 112. The area of RM 112 may have been a river crossing for El Camino Real and may have other cultural resources from that era in the project area.

Table 3.3. Historic Sites Closest to the Proposed Project Area

Project Area	Site Number	Distance to Nearest Site
RM 114	LA 31717	2,168 feet
RM 112	Lemitar Riverside Drain	300 feet
	Vasquez Lateral	350 feet
	El Camino Real	474 feet
Staging/Spoils area	Socorro Main Canal	Immediately adjacent
	Socorro Riverside Drain	Immediately adjacent
	LA 31718 La Parida	4,582 feet
RM 100.5	Socorro Riverside Drain	400 feet
	LA 8907	3,936 feet
RM 100 and RM 99.5	Socorro Main Canal	450 feet
	Socorro Riverside Drain	400 feet
	LA 31736	3,445 feet

3.9 ENVIRONMENTAL JUSTICE

EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” directs all federal agencies to develop strategies for considering environmental justice in their programs, policies, and activities. Additionally, the Council on Environmental Quality has issued the “Environmental Justice Guidance under the National Environmental Policy Act (NEPA)” to further assist federal agencies with their procedures under NEPA. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations of the execution of federal, state, local, and tribal programs and policies (EPA 2012).

Compared to the demographics in the state of New Mexico, Socorro County has a slightly greater percentage of persons living below the poverty level by 5%, and a slightly greater Native American and Hispanic population, by approximately 3% and 2%, respectively (U.S. Census Bureau 2010a). The nearest Census Designated Places to the project area are two small agricultural communities—San Acacia with a population of less than 50 and Polvadera with a population less than 300. Polvadera is predominantly Hispanic (73%) and 27% white, while Acacia mirrors the demographics of Socorro County, which includes a nearly equal mix of white and Hispanic and approximately 10% Native American (U.S. Census Bureau 2010b).

3.10 INDIAN TRUST ASSETS

ITAs or resources are defined as legal interests in assets held in trust by the U.S. Government for Native American Indian tribes or individual tribal members. Examples of ITAs are lands, minerals, water rights, other natural resources, money, or claims. An ITA cannot be sold, leased, or otherwise alienated without approval of the federal government. There are no Native American ITAs in the vicinity of the proposed project sites.

3.11 CLIMATE CHANGE

Climate change is a long-term alteration in global weather patterns, especially increases in temperature and storm activity, regarded as a potential consequence of the greenhouse effect. In addition, climate change is a change in the statistical properties of the climate system when considered over periods of decades or longer, regardless of cause. Accordingly, fluctuations on periods shorter than a few decades, such as pacific decadal oscillation, do not represent climate change. Change of climate that is attributed directly or indirectly to human activity could alter the composition of the global atmosphere in addition to natural climate variability observed over comparable time periods.

4.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA evaluates direct, indirect, and cumulative impacts to all resources described in Section 3.0, Affected Environment. Both the Proposed Action and No Action Alternative are evaluated. Environmental commitments, which would provide ongoing guidance for the proposed project, are summarized in Section 5.0.

4.1 LAND USE

Under the No Action Alternative, land use would not change. Reclamation would continue to manage all activities and operation.

Under the Proposed Action, land use and management responsibility by Reclamation would not change. However, the increase in desirable native vegetation would likely enhance the experience of visitors that frequent the area. Farmland is not present where construction would occur, and therefore none would be impacted by the Proposed Action.

The equipment and material required for implementation of the Proposed Action may result in some impacts to existing infrastructure, including underground utilities, crossings over irrigation facilities, and established dirt and paved roads. Reclamation would take steps to avoid impacting existing infrastructure or to minimize the impacts if avoidance is not possible. Some examples of these steps include:

- Identify possible access routes that minimize irrigation facility crossings and avoid locations of underground utilities.
- Place additional fill on top of irrigation facilities if existing cover is not sufficient to absorb the heavy construction loads.
- Maintain dirt roads through blading, wetting, placement of gravel cap, etc., to ensure that the existing dirt road conditions are maintained or improved.

Infrastructure impacts are considered temporary in nature, since actions would be taken to avoid, minimize, and, where necessary, repair any damages incurred.

4.2 AIR QUALITY AND NOISE

The project area is a natural area in which a quiet atmosphere is expected. The No Action Alternative would hold ambient noise and air quality levels to this level.

Construction equipment to be used during the Proposed Action would create temporary variable noise levels that would likely exceed allowable ambient noise levels of 80 dBA in the immediate vicinity of the restoration sites. The nearest noise receptors would include visitors to Sevilleta Wildlife Refuge, approximately five miles north of the Proposed Action. Under the Proposed Action, noise impacts during heavy equipment use would be short term, and heavy equipment would be used only during normal business hours to minimize noise disturbance. The riparian vegetation would abate some of the noise generated by the equipment.

Under the Proposed Action, construction equipment would temporarily generate fumes and air emissions. The level of air emissions is anticipated to be low and in compliance with local and federal air emission standards. The amount of fugitive dust that would be generated during the spreading and grading of soil in nearby areas to each site would occur slowly, allowing it to settle within the bosque, away from nearby residences. Fugitive dust would also be generated by vehicles accessing the project area via dirt roads and loading the trucks for soil disposal. The access roads, including the LFCC road, would become dusty during construction. Dust control measures, such as wetting of access roads and soil during spreading or loading, would be required to limit the amount of fugitive dust generated during construction. The temporary nature and scope of this project, in relation to air quality, would preclude any impacts to known Class I airsheds.

4.3 VEGETATION AND WETLANDS

Under the No Action Alternative, overbank flooding would remain very limited and thus further hindering the establishment of wetlands and native riparian vegetation. Riparian vegetation is, by definition, subject to intermediate levels of disturbance from flooding. Under the No Action Alternative, these natural processes would be limited and replaced with the current trend of a deeply incised river channel that hinders overbank flooding, leading to the loss of wetlands and riparian habitat and increasing non-native species.

Under the Proposed Action, only the vegetation required to accomplish the Proposed Action would be removed. Removal of native species would be minimized while removal of any noxious weeds within the project area would be maximized. Reclamation would use selective vegetation removal with a skid-steer to avoid unanticipated native species removal. Live native deciduous species, such as cottonwoods, would be avoided to the extent possible. Some herbaceous floodplain species may be trampled during construction, but impacts would be moderate. Combined, the San Acacia sites would include removal of approximately 32,200 cubic yards of spoil material (including vegetation and soils). The spoil materials would be excavated and spread along the access road and ramps adjacent to each restoration site or spread at designated locations including staging areas, along the bar ditch adjacent to the LFCC canal road, and near the Escondida Drain.

The Rio Grande, including the proposed restoration sites, is a USACE jurisdictional waterway. EO 11990 (Protection of Wetlands) requires the avoidance of short- and long-term adverse impacts associated with the destruction, modification, or other disturbance of wetland habitats. Compliance with Sections 404/401 of the CWA would prevent the permanent loss of wetlands associated with project actions. Under the Proposed Action, six wetlands would be impacted including two wetlands at the RM 114 restoration site, one wetland at the RM 100.5 site, one wetland at the RM 100 site, and two wetlands at the RM 99.5 site. The total area of wetlands mapped during the wetland delineation is roughly 0.0699 acre. Five of the six wetlands delineated stretched beyond the restoration site boundaries. The portion of the wetlands outside the restoration sites (0.025 acre) would not be impacted and 0.045 acre would be directly impacted.

The Proposed Action would result in temporary impacts from sediment and vegetation removal to 0.045 acre of wetlands. Approximately 995 cubic yards of soil and vegetation would be excavated from the six wetland sites and hauled to be spread at designated locations near each site and/or hauled along canal roads to be deposited at a Reclamation stockpile site near the Escondida Drain.

The use of mechanized equipment for soil movement would modify the on-site topography and temporarily remove all wetland functions within these wetland areas. However, these impacts would be temporary, and full wetland functionality should be restored during the following the growing season. The construction activities would occur outside the rainy season and soil erosion practices should be implemented to ensure minimal impacts to the Rio Grande. See Section 2.2.3 for construction details and Section 5.0, Environmental Commitments, for mitigations that would be implemented to minimize resource impacts.

Under the Proposed Action, it is anticipated that riparian and wetland vegetation would increase due to increased inundation in the floodplain. Following construction, an increased amount of substrate would have the potential to be inundated and/or saturated for significant time periods, which should lead to a net gain in both the area and function of wetlands. Often, restored low-flow, slackwater areas develop a fine sediment layer that is conducive to re-establishing diverse herbaceous wetland communities. Some of the expected effects on wetland function include an increase in surface water storage, increase in the ability of wetlands to perform water quality improvement functions, an increased amount of organic carbon available for export, and beneficial effects on the ecosystem diversity. The proposed project is expected to improve conditions for Goodding's willow, coyote willow, and Rio Grande cottonwood recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and connect the floodplain as an active ecological process. Vegetative growth at each of the restoration sites will be monitored for 3 years following construction to determine the effectiveness of the methods implemented as described in Section 2.2.3, Post-Construction Monitoring.

4.4 WATER QUALITY AND WATER DEPLETIONS

4.4.1 WATER QUALITY

The No Action Alternative and the Proposed Action would not result in changes to water quality where it currently meets applicable standards for physical constituents, such as surface water temperature, pH, turbidity, DO, SSED, conductivity/TDS, and fecal coliform.

The Proposed Action would result in temporary and localized changes in the measures for physical constituents, particularly for turbidity and TDS, associated with breaching the berms and operating 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 TDS levels would return to normal shortly after completion of excavation work. Best management practices, including initial steam cleaning of all equipment prior to initiating construction, and checking the equipment several times per day for leaks, would be followed to avoid adverse effects to water quality. Water quality would be monitored and evaluated during work along the channel edge.

During the field survey, the OHWM of the west bank of the Rio Grande was delineated. The San Acacia Reach of the Rio Grande is deeply incised along both the east and west banks. The Rio Grande is a jurisdictional water of the U.S. and impacts to project areas below the OHWM were

delineated during the same visit. A small portion of each restoration site falls below the OHWM where each site meets the west bank of the Rio Grande (Table 4.1).

Table 4.1. Acres above and below the Ordinary High Water Mark

Treatment Area Name	Acres above OHWM	Acres below OHWM	Total Acreage
RM 114	1.40	0.00	1.40
RM 112	1.30	0.10	1.40
RM 100.5	8.80	0.00	8.80
RM 100	1.70	0.20	1.90
RM 99.5	3.50	0.00	3.50
Total	16.70	0.30	17.0

Impacts to the Rio Grande below the OHWM are expected to total 0.30 acre and would be temporary. It is anticipated that hydrologic function would be re-established shortly after construction is complete and that vegetation and wetland functionality would be restored during the following growing season.

CWA compliance is required of all aspects of the project, since most work associated with the Proposed Action would be completed within jurisdictional areas. Compliance with the CWA ensures that the Proposed Action would have no long-term adverse effect on the water quality of the Rio Grande. CWA Sections relative to the Proposed Action include Sections 404 (permitted through USACE) and 401 (permitted through a state certificate)—both of which provide protection for wetlands and waters of the U.S. from impacts associated with dredged or fill material in aquatic habitats. Reclamation has submitted the pre-construction notification form to the USACE to obtain a Nationwide Permit 27 “Aquatic Habitat Restoration, Establishment, and Enhancement Activities,” and has requested a Section 401 water quality certification from the State of New Mexico. Compliance with Section 402 (NPDES) would also be required.

4.4.2 WATER DEPLETIONS

Under the No Action Alternative the proposed restoration activities would not be implemented and thus water depletion would be considered neutral.

Under the Proposed Action, the majority of the riverine restoration work would occur along the banks of the channel and some of the work falls within 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 NMOSE considers features within the 600-foot channel width to be dynamic aspects of the channel. Therefore, no depletion offsets are required for riverine restoration work within the nominal channel width. The NMISC anticipates a portion of the project will require depletion offsets. The NMISC plans to use water available in the Rio Grande reach of the Strategic Water Reserve to offset the depletions that occur annually. The NMISC will submit the project plan to the NMOSE and make offsets in accordance with the requirements of the NMOSE.

4.5 FISH AND WILDLIFE RESOURCES

Under the No Action Alternative, there would not be improvement in habitat for the silvery minnow. Floodplain inundation would not occur which would not benefit the flycatcher and other wildlife dependent upon that process.

By comparison, the Proposed Action would produce short-term direct impacts to wildlife in the immediate area of disturbance and long-term beneficial effects on fish and riparian wildlife from improved ecological function and increased aquatic habitat. Habitat values, particularly for birds, are predicted to gradually increase if stands of riparian plants become established and develop adequate structure. To avoid direct impacts to migratory birds protected by the MBTA, construction and clearing of dense woody vegetation would be scheduled between September 1 and April 15, outside the migratory bird nesting season. This construction period is outside the normal breeding season for the flycatcher and most avian species.

Other wildlife species, such as amphibians, reptiles, and mammals, would be temporarily displaced and may experience mortality during the implementation of the Proposed Action. Disturbance would result from the activities surrounding the reshaping of the riverbanks, removal of vegetation, planting of vegetation, and the general presence of humans during construction. The short-term effects are not deemed significant due to the temporary and short term nature and would be outweighed by the long-term benefits of a healthier riparian ecosystem that includes aquatic habitat creation and increased food abundance within mesohabitats.

4.6 THREATENED AND ENDANGERED SPECIES AND THEIR CRITICAL HABITAT

In accordance with Section 7(a)(2) of the ESA, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. Of the species listed in Table 3.2, the flycatcher, the cuckoo, and the silvery minnow have the potential to occur in the project vicinity. Potential effects to these species from the Proposed Action and the No Action Alternative are discussed below. A summary of the effect determinations for these species is presented in Table 4.2 (SWCA 2015b).

Table 4.2. Effect Determinations for Federally Listed Species Likely to Occur in the Project Area

Species	Effect Determination	Critical Habitat Determination
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	May affect, is likely to adversely affect	May affect, not likely to adversely affect
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	May affect, is likely to adversely affect	May affect, not likely to adversely affect

4.6.1 FISH

Rio Grande Silvery Minnow (*Hybognathus amarus*)

Under the No Action Alternative, there would not be improvement in habitat for the silvery minnow.

The Proposed Action would provide long-term direct and indirect beneficial effects on silvery minnow and its critical habitat in the San Acacia Reach. Silvery minnow critical habitat encompasses the entire project area (Service 1999, 2003b). The primary objective of the project is to create mesohabitat for the silvery minnow based on the best available information. Beneficial effects include improved egg and larval retention, increased recruitment rates, and increased survival of both young-of-year and adults.

The direct effects of the riverine restoration treatments are limited to small, isolated areas and a short disturbance time period. Direct impacts of the project on the silvery minnow would only occur in the disturbed wetted portions of each constructed feature. The estimated impact area of wetted habitat for the entire project totals 0.56 acre (see Appendix A for an explanation of calculations and impacts associated with each restoration site). The majority of wetted area impact is estimated to occur at RM 100.5, which has an estimated wetted impact area of 0.25 acre. The remaining four sites have a combined wetted impact area of 0.30 acre.

While silvery minnow are likely to be harassed by the project activities in wetted areas, Reclamation crews will operate equipment such that it enters the water slowly and silvery minnow are expected to exhibit an avoidance response to such activities, including any sediment disturbance, and sustained avoidance during the short duration of construction work for each construction activity. There will be no river crossings. Given silvery minnow mobility, their avoidance response, and the limited impact area, the avoidance response is not expected to lead to any long-term significant effects on silvery minnow.

Construction may cause localized increases in turbidity and SSED. Any sediment disturbance is anticipated to drop within background SSED levels quickly and within the project area. Any decreases in primary production are expected to be minor and temporary and, thus, adverse effects on the silvery minnow are likely to be insignificant.

Indirect harm or mortality from reduced water quality in the silvery minnow critical habitat may occur from accidental introduction of hydrocarbon contaminants from fuel and fluids used by the proposed equipment, but conservation measures and best management practices in place for operation of equipment minimize risk of adverse effects due to accidental introduction of hydrocarbon contaminants. Conservation measures and best management practices described in Section 5.0 would minimize risk of adverse effects from equipment operations and accidental introduction of hydrocarbon contaminants.

Implementation of the project is expected to provide long-term benefits to the silvery minnow through increasing the amount and diversity of mesohabitats within the project reach. However, a risk of harming silvery minnow cannot be ruled out during construction. Therefore, the Proposed

Action *may affect, is likely to adversely affect* the silvery minnow. Reclamation requesting an Incidental Take from the Service.

The project area does occur in designated critical habitat for the silvery minnow; however, given the actions that will be implemented with the proposed environmental commitments in Section 5.0 and the proposed conservation measures detailed in Appendix A of the Biological Assessment (SWCA 2015b), the determination is that there will not be any significant adverse effects to those critical habitat components that are essential for the primary biological needs of the silvery minnow. Furthermore, the project will have beneficial effects on critical habitat that would be created by beginning inundation at flows of 800 cfs. The Proposed Action *may affect, is not likely to adversely affect* critical habitat for the silvery minnow.

4.6.2 BIRDS

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

The No Action Alternative would have no effect on the flycatcher and would not cause changes to the habitats used by this species.

Flycatcher critical habitat encompasses the entire project area (Service 2005, 2013a, 2015b). The proposed project would improve conditions for Goodding's willow, coyote willow, and Rio Grande cottonwood recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and would have a beneficial effect for the species.

Under the Proposed Action, approximately 1.5 acres of suitable flycatcher habitat would be impacted, including 1.3 acres at the RM 114 site and 0.2 acre at the RM 99.5 site (along the eastern side of the project area). Based on surveys in the project area, there are no flycatcher territories in the project area (SWCA 2015b). Potential short-term impacts may result from vegetation removal within the project area. However, this restoration project would increase breeding habitat for the flycatcher through passive restoration of willow-dominated habitat that is expected to occur due to increased inundation of the floodplain and increased areas of moist soil conditions during flycatcher breeding seasons. Because there are no 2015 territories within the project area and the proposed project may benefit willow habitat, the proposed project *may affect, but is not likely to adversely affect* the flycatcher.

Construction work at the restoration sites would not be conducted at a time of year when flycatchers are present (April 15–August 15). During construction, existing native vegetation, such as Rio Grande cottonwood and willow species, along access roads and within the project areas would be left in place and not removed to the extent possible. Vegetative growth at each of the restoration sites will be monitored for 3 years following construction to determine the effectiveness of the methods implemented. If project activities need to occur during the migratory bird season (between April 15 and August 15), Reclamation will coordinate with the Service and conduct migratory bird surveys immediately prior to the initiation of work. If flycatchers are detected during the surveys, then project activities will halt until flycatchers leave the area. Additionally, the environmental commitments discussed in Section 5.0 would be implemented to avoid or minimize any potential effects to the flycatcher or its critical habitat.

Given that there are no 2015 territories impacted by the project and that regeneration of vegetation is expected, the proposed project would not diminish the conservation value of designated critical habitat for the flycatcher. Therefore, the Proposed Action *may affect, but is not likely to adversely affect* designated critical habitat for the flycatcher.

Yellow-billed Cuckoo (*Coccyzus occidentalis*)

The No Action Alternative would not cause changes in the riparian habitats used by this species, and no effects would occur.

Under the Proposed Action, there would be no direct effects to cuckoos since they will not be present during project construction. Reclamation and the NMISC will seek to avoid impacts to birds protected by the MBTA, including the flycatcher and cuckoo, by conducting work activities outside the normal breeding and nesting season (April 15–August 15, or September 1 for work in suitable cuckoo habitat) during any year of work in consideration of migratory birds. If work is necessary between April 15 and September 1 in suitable cuckoo habitat, Reclamation and NMISC will coordinate with the Service prior to such work activities. During construction, existing native vegetation, such as Rio Grande cottonwood and willow species, along access roads and within the project areas would be left in place and not removed to the extent possible. Along the Middle Rio Grande, the species is known to nest from late June to late July (V. Ryan, pers. comm). Environmental commitments discussed in Section 5.0 would be implemented to avoid or minimize any potential effects to the cuckoo or its proposed critical habitat.

Potential short-term indirect effects may result from vegetation removal at the sites that have suitable or foraging habitat for cuckoos. Vegetation removal at four of the five restoration sites would impact suitable and foraging habitat as detailed in Appendix A. Total impacted cuckoo habitat in the project area would be approximately 2.3 acres (0.03%) for suitable habitat and 9.9 acres (0.13%) for foraging habitat. Since the impacted suitable and foraging habitat acreage at the RM 114, RM 100.0 and RM 99.5 sites was not within 750 meters of a territory center point in 2015 and the impacted acreage within each territory ranges from 0.003% to 0.1% of the territory, the effect at those sites is not meaningfully measurable, and therefore insignificant. Although impacts at RM 112 are within 750 meters of a territory center point in 2015, the acreage between the territory center and the project site at RM 112 is sparse, monotypic saltcedar and is only 0.02% of the entire territory. Therefore, the effect is not meaningfully measurable and insignificant.

The project may have an adverse impact to 0.8 acre of suitable habitat and 8.0 acres of foraging habitat at the RM 100.5 site, which is within approximately 50 meters of a territory center point in 2015 (LF03P1). This is expected to be a short-term impact and revegetation and/or natural regrowth of young native willows are expected to have a positive effect on cuckoos and cuckoo habitat at all project sites. Due to the short-term adverse effect of vegetation removal at the RM 100.5 site, the proposed project may affect, is likely to adversely affect the cuckoo.

The proposed project is expected to improve conditions for Goodding's willow, coyote willow, and Rio Grande cottonwood recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and connect the floodplain as an active ecological process. Therefore, project is expected to provide long-term direct and indirect beneficial effects for the cuckoo and its proposed critical habitat in the San Acacia Reach.

In the areas where suitable cuckoo habitat is impacted by the proposed project, Reclamation will monitor vegetation growth and assess the natural regeneration of vegetation after 3 years following construction to determine the effectiveness of the methods implemented. Reclamation will coordinate with the Service to determine if additional revegetation activities are needed to develop suitable habitat.

Given the small proportion of impacted area to territory size and the expected regeneration of vegetation, the proposed project would not diminish the conservation value of proposed critical habitat for the cuckoo and therefore *may affect, is not likely to adversely affect* proposed critical habitat.

Other Federally Listed Species

Eleven other endangered or threatened species that are found in Socorro County (see Table 3.2) do not occur in the action area. As a result, none of these species or their habitats would be affected by the Proposed Action or the No Action Alternative.

4.7 SOILS

The No Action Alternative would not disturb any soils because the project would not be implemented. Under the No Action Alternative the deeply incised river channel would persist, thereby preventing lateral river migration, and overbank flooding would be infrequent to non-existent.

Under the Proposed Action, impacts to soils would result from the removal of vegetation, excavation along the river channel, removal of jetty jacks, and distribution of sediment spoils. Each restoration method would involve physical manipulation of the surface area with an excavator and other land-based equipment such as a dozer, belly scraper, skid-steer, or backhoe to access the site. These treatments would generate woody debris and sediments that must be used in designated areas of the project sites or disposed of in accordance with the CWA Section 404 permit. Approximately 32,200 cubic yards of spoil material (including vegetation and soils) would be removed from all five San Acacia sites (Table 4.3).

Table 4.3. Cubic Yards of Spoil Material Removed from Each Restoration Site

Restoration Site	Excavated Spoil Materials (cubic yards)
RM 114	2,800
RM 112	2,700
RM 100.5	11,600
RM 100	7,700
99.5	7,400
Total	32,200

Constructing the restoration sites would require removing jetty jacks at some sites. Jetty jacks would be removed only where necessary to facilitate inundation. Loose ends on the remaining jetty jacks would be tied back or secured and would continue to provide bank stabilization. Removing the jetty jacks would result in short-term sediment disturbance but is not expected to impair water quality, which would be monitored during removal of the jetty jacks and throughout the construction phase (see Chapter 5.0, Environmental Commitments).

Deposition of sediment and vegetation spoils would be hauled to specified areas in the vicinity of the project sites or in previously identified off-site areas. Soil erosion and sediment controls, for example, will be used during and after construction to manage water runoff in the site in accordance with CWA requirements. Once the project is completed, the erosion controls would be removed and some sediment may settle out downstream of the project area.

The impacts to soils from excavation, vegetation and jetty jack removal, and soil compaction would be temporary and soil conditions would be restored through reseeding and the re-establishment of vegetation as described in Chapter 5.0, Environmental Commitments. Final soil stabilization would be accomplished through the establishment of native vegetation.

4.8 CULTURAL RESOURCES

Under the No Action Alternative, there would be no change to cultural resources or TCPs.

Under the Proposed Action, it is anticipated that no cultural resources or TCPs would be affected. A Class I, background research, for the proposed project areas was conducted. The nearest documented historic and cultural resources include the Socorro Main Canal and Socorro Riverside Drain, which are immediately adjacent to the staging/spoils area for RM 99.5, RM 100, and RM 100.5. In addition, a segment of the historic El Camino Real is approximately 474 feet from the RM 112 project area. The project area may have served as a river crossing for the trail. This area is in the Rio Grande floodplain and it is not likely that any objects or other evidence of the trail is still present. A survey was conducted of this site on December 15, 2015 with negative results. All other sites and historic water conveyance systems are far enough away from the proposed project areas that they will not be impacted.

Should archeological resources be found during construction at staging areas, access locations, or proposed construction sites, work would stop and the proper authorities (the Reclamation Albuquerque Area Office Archaeologist and the New Mexico SHPO) would be informed. Project activities would be restricted to the banks and floodplain of the river, minimizing adverse impacts to any potentially undiscovered archaeological resources from the Proposed Action.

4.9 ENVIRONMENTAL JUSTICE

The Proposed Action is in compliance with, and methodology used in this analysis conforms to, criteria outlined in EO 12898. The proposed project is located on the active floodplain of the Rio Grande, south of the San Acacia Dam. Nearby land use along this reach of the river includes residential neighborhoods of all economic strata, agricultural land, and recreational uses.

Regardless of their level, impacts would be similar throughout the project area and would affect a diverse group of communities and populations. There would be no disproportionately high or adverse human health or environmental effects on minority or low-income populations from the proposed project. There would also be a potential for beneficial impacts to all populations, including low-income and minority populations residing adjacent to the project area, due to an improved riparian habitat and improved recreational access.

The No Action Alternative would have no impact to environmental justice.

4.10 INDIAN TRUST ASSETS

There are no Native American ITAs in the vicinity of the proposed project sites; therefore, no impacts are anticipated from the No Action Alternative or the Proposed Action.

4.11 CLIMATE CHANGE

There would be no additional effects to climate change from the No Action Alternative or the Proposed Action. Construction activities would only exist for a short period of time and thus would not be a factor in altering the composition of global warming from greenhouse gases.

4.12 CUMULATIVE IMPACTS

NEPA defines cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (42 USC 4331–4335). Cumulative environmental impacts associated with the Rio Grande, including islands and riparian areas, have been evaluated relative to the Proposed Action.

Reclamation has developed the Middle Rio Grande River Maintenance Program Comprehensive Plan and Guide to best manage and guide activities within the MRG (Reclamation 2012a). This plan and guide provides strategies suitable and specific to each reach considering the physical characteristics, historic uses, modifications and trends, channel stability, water delivery, infrastructure, public health and safety, and habitat needs. This plan helps Reclamation ensure that the multiple actions occurring and proposed for implementation promote sustainability consistent with the uses and values of the MRG.

The Proposed Action would expand upon the ongoing restoration activities of the NMISC and Reclamation together with their partners and other programs (Table 4.4). The overall goal of these collective programs is to enhance the riparian habitat complexity, including enhancing nesting habitat substrates, removing non-native wood vegetation to reduce competition for native cottonwood and willow species, improving native tree density, and increasing habitat potential for egg retention and rearing for the silvery minnow. The beneficial and minor adverse impacts of these other projects and programs would likely be similar to those of the Proposed Action.

Table 4.4. Projects Considered for Cumulative Impacts Analysis

Proponent(s)	Relevant Project Description
USACE and MRGCD	Habitat restoration projects on 916 acres of riparian habitat within the MRG in Bernalillo and Sandoval Counties with the goals of improving bosque habitat and re-establishing fluvial process between the river and the bosque (USACE 2011).
City of Albuquerque Open Space Division and Albuquerque Bernalillo County Water Utility Authority	Habitat restoration for the flycatcher at the La Orilla site in the MRG through the creation of 10 acres of willow and riparian habitat (Reclamation 2012b).

Proponent(s)	Relevant Project Description
NMDGF Habitat Restoration Projects at RM119 and RM 120	The NMDGF is proposing two habitat restoration projects within the Sevilleta Wildlife Refuge to be implemented in 2016. One project is similar to the Proposed Action of this EA and would benefit the silvery minnow and flycatcher. This project is anticipated to affect approximately 16 acres. The other project proposes to replace an existing gated water control structure to improve habitat for wintering waterfowl, as well as improve connectivity from the existing embankment to the river for the silvery minnow. Total acres affected is not known at this time.
NMDGF Habitat Restoration at RM 126 within the La Joya Wildlife Management Area	The NMDGF is planning to implement flood inundation to promote habitat for the silvery minnow similar to the proposed actions of this EA. Approximately 6.5 acres are estimated to be impacted by this project.

These related projects would produce changes in hydrology, channel capacity, fish and wildlife habitat, and habitat connectivity that are designed and anticipated to be largely beneficial and complementary with some potential for minor adverse impacts. However, the cumulative outcomes of multiple actions on a dynamic river system, their associated habitats, and adjacent lands are not predictable with complete certainty.

Other ongoing activities along the MRG can adversely impact water quality, erosion, channel maintenance, sediment levels, and riverine habitats. These include municipal wastewater discharges, urban runoff, agricultural runoff, riparian clearing, and chemical use for vegetation control and crops. Recreation along and in the riparian zone, urban and industrial growth, stocking of exotic and predator fish, and riparian clearing without revegetation could also affect multiple resources and species, including the silvery minnow, flycatcher, and cuckoo.

When combined with the effects of other cumulative actions, the effects of the Proposed Action would be largely beneficial and not contribute to any long-term cumulative impacts on any resource or threatened or endangered species or critical habitat.

5.0 ENVIRONMENTAL COMMITMENTS

Reclamation and the NMISC propose the following environmental commitments to minimize or avoid adverse effects of implementing the Proposed Action:

5.1 TIMING OF THE PROPOSED ACTION

1. Reclamation and the NMISC will seek to avoid impacts to birds protected by the MBTA, including the flycatcher and cuckoo, by conducting work activities outside the normal breeding and nesting season (April 15–August 15, or September 1 for work in suitable cuckoo habitat) during any year of work in consideration of migratory birds.
 - 1.1. If work is necessary between April 15 and August 15 (or September 1 for work in suitable cuckoo habitat), suitable/occupied migratory bird habitat would be avoided during the construction activities as much as possible, utilizing the most current annual survey results in conjunction with habitat suitability. Reclamation and the NMISC would use current flycatcher and cuckoo monitoring data to avoid work within 0.25 mile of an active nest as much as possible. Coordination and consultation with the Service would occur prior to such work activities.
 - 1.2. Reseeding or revegetation may be accomplished by hand or by mechanized means, such as using a Truax imprinter followed by hand or tractor broadcast seeding (see *Vegetation Replanting and Control* below). 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 timeframe (or September 1 for work in suitable cuckoo habitat), migratory bird surveys would be conducted immediately prior to the work to determine if any breeding birds are present. If birds are detected, Reclamation and the NMISC would coordinate with the Service to determine appropriate next steps.

5.2 WATER QUALITY

2. The NMISC will obtain all applicable permits prior to implementation of the project, including CWA permits. Reclamation and the NMISC will comply with the requirements of the CWA and other permits associated with the project, including required reporting to the appropriate authorities as needed and will not begin work until all required permits are obtained.
3. Silt fences and/or appropriate erosional controls will be used around the project site to manage water runoff in the site in accordance with CWA requirements.
4. Reclamation and/or the NMISC will visually monitor for water quality in the areas below areas of river work before and during the work day when work results in contact with wetted areas. Monitoring will include visual observations and may include direct sampling, as appropriate.
 - 4.1. If direct sampling is needed, water quality parameters to be tested include pH, temperature, dissolved oxygen, and turbidity. Parameters will be measured both upstream and downstream of the work area.

- 4.2. Responses to changes in water quality measures exceeding the applicable standards would include reporting the measurements to the NMED Surface Water Quality Bureau and moving construction activities away from the shore.

5.3 EQUIPMENT AND OPERATIONS

5. Reclamation-led work activities that have the potential for adverse impacts will be monitored by properly trained Reclamation personnel in order to ensure compliance. Non-Reclamation partners will have an on-site environmental monitor during all work activities that have the potential for adverse impacts in order to ensure compliance. Also, an environmental monitor will regularly assess other activities to ensure compliance.
6. The sites will be excavated as few times as possible to minimize disturbance of sediments. Excavation will not occur within the wetted channel; however, removal of the last part of the riverbank to connect the feature to the river will result in some contact with wetted areas. The excavator operator will minimize disturbance of sediments in the river by minimizing excavator bucket contact with the riverbed.
7. Each individual operator will be briefed on local environmental considerations specific to the project tasks.
8. The impact of hydrocarbons will be minimized by mitigating potential for spills into or contamination of aquatic habitat:
 - 8.1. Hydraulic lines will be checked each morning for leaks and periodically throughout each work day. Any leaky or damaged hydraulic hoses will be replaced.
 - 8.2. All fueling will take place outside the active floodplain with a spill kit ready. Fuel, hydraulic fluids, and other hazardous materials may be stored on-site overnight, but outside the normal floodplain, not near the river or any location where a spill could affect the river.
 - 8.3. All equipment will undergo high-pressure spray cleaning and inspection prior to initial operation in the project area.
 - 8.4. Equipment will be parked on pre-determined locations on high ground away from the river overnight, on weekends, and holidays.
 - 8.5. Spill protection kits will be on-site, and operators will be trained in the correct deployment of the kits.
 - 8.6. 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.
9. Equipment will be removed from the floodplain in the event of high storm surges that inundate the floodplain.

10. To allow fish time to leave the area before in-water work begins, equipment will initially enter the water slowly. In-water work will be fairly continuous during work days, so that fish are less likely to return to the area once work has begun.

5.4 ACCESS AND STAGING

11. 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 (see also section titled *Vegetation Replanting and Control* below).
12. All necessary permits for access points, staging areas, and study sites will be acquired prior to construction activity.

5.5 VEGETATION REPLANTING AND CONTROL

13. A variety of revegetation strategies may be used: long stem transplants (Los Lunas Plant Materials Center 2007a), stem and pole cuttings (Los Lunas Plant Materials Center 2007b), and upland planting with and without a polymer, zeolite, or similar compound to maximize soil water retention (Dreesen 2008). Planting techniques may vary from site to site and may consist of buckets, augers, stingers, and/or water jets mounted on construction equipment. In some areas, a trench may be constructed to facilitate the placement of a significant number of plants, specifically stem and pole cuttings. Seeding would be accomplished using a native seed drill, where feasible, and spread with a protective covering, which would provide moisture to the seeds.
14. Vegetation control may consist of mechanical removal, burning, and/or mowing. Herbicides will not be used.
15. Native vegetation at work sites will be avoided to the extent possible. If large, native woody vegetation (primarily cottonwood) needs to be trimmed or removed, they would be replaced at a ratio of 10:1. To the extent possible, cottonwoods will be planted to replace Russian olive species removed on-site. When and where possible, small, native woody vegetation will be removed or harvested at the appropriate season to use for revegetation work at another location in the project area or at another project site. Where necessary, willow species will be removed at the root ball to be saved and replanted on-site. Native vegetation that cannot be replanted may be mulched (mulch would be removed or spread in designated areas of the project sites at a depth of 3 inches or less) or temporarily stockpiled and used to create dead tree snags or brush piles in the project area upon completion.
16. Non-native vegetation that is removed at work sites will be mulched, burned, or removed off-site to an approved location. Mulched vegetation may also be spread on-site at a depth of 3 inches or less.
17. Post-construction monitoring will be conducted by Reclamation and NMISC (See #19 below). This project is considered self-mitigating. Vegetative growth at each of the restoration sites will be monitored for 3 years following construction to determine the effectiveness of the

methods implemented. Therefore, no long-term adverse impacts would be experienced. No compensatory mitigation is proposed.

5.6 DUST ABATEMENT

18. If water is needed for dust abatement or to facilitate grading of roads, water may be pumped from the LFCC. In the unlikely event the LFCC does not have sufficient flow, water would be pumped from the Rio Grande or secondary channels adjacent to the river. Pumping is not expected to be needed between April 15 and August 15 (or September 1 in suitable cuckoo habitat); however, if pumping from the river is needed as a last possible source between May 1 and July 1 (emergencies only), Reclamation and the NMISC would coordinate with the Service to avoid impacts to silvery minnow eggs and larvae. If pumping from the river is necessary, an amount not to exceed 5% of river flows at the time of pumping may be drawn from the Rio Grande. Pumping is short duration (minutes) for filling whatever water transport equipment is used. Pump intake pipes would use a 0.25-inch mesh screen at the opening of the intake hose to minimize entrainment of aquatic organisms.

5.7 OTHER MEASURES

19. All treatment and control areas will be monitored for 3 years following construction to determine the effectiveness of the methods implemented and identify project-related hydrologic alterations. The monitoring would consist of biological, vegetation, and hydrologic monitoring, as appropriate, to the project design and purpose.
20. 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.
21. All work projects will have a contract in place for the rental of portable restroom facilities during the duration of the project.
22. The project will avoid any TCPs in the project area identified during previous consultation with the SHPO and tribal entities.
23. Reclamation and the NMISC will implement measures to stop work and notify the Reclamation Area Archaeologist in the event prehistoric or historical remains, human burials, or other archaeological resources are discovered during construction or monitoring.

6.0 SUMMARY

The purpose and goal of this project is to restore and create riparian habitat for the silvery minnow, flycatcher, and cuckoo. For the five proposed sites, the project purpose would be accomplished while minimizing adverse effects and implementing best management practices into the Proposed Action. Environmental commitments described in Section 5.0 would be implemented.

The analysis in this EA has addressed land use, water resources and water quality, air quality and noise, vegetation and wetlands, fish and wildlife, threatened and endangered species, soils, cultural resources, environmental justice, ITAs, and climate change. No other resources are expected to be affected. With mitigation measures and the implementation of environmental commitments, effects are largely beneficial, and only minor, temporary adverse impacts have been identified with the exception of the potential impacts to the silvery minnow and the cuckoo during construction. While mitigation measures would be implemented to minimize impacts to the silvery minnow during construction, the risk of harming silvery minnow cannot be ruled out. Therefore, the Proposed Action *may affect, is likely to adversely affect* the silvery minnow, and Reclamation is requesting an Incidental Take from the Service. The project area does occur in designated critical habitat for the silvery minnow; however, given the actions that would be implemented and the proposed conservation measures, the determination is that there would not be any significant adverse effects to those critical habitat components that are essential for the primary biological needs of the silvery minnow. Furthermore, the project would have beneficial effects on critical habitat by creating 17 acres of habitat that would begin inundating at flows of 800 cfs. Therefore, the Proposed Action *may affect, but is not likely to adversely affect critical habitat* for the silvery minnow.

Impacts to the cuckoo are expected to be short term and avoided or minimized by mitigations such as constructing the project outside the cuckoo's nesting season. However, due to site RM 100.5 being within 50 meters of a territory center point in 2015 (LF03P1), the proposed project *may affect, is likely to adversely affect* the cuckoo. Given the small proportion of impacted area to territory size and the expected regeneration of vegetation, the proposed project would not diminish the conservation value of proposed critical habitat for the cuckoo and therefore *may affect, but is not likely to adversely affect* proposed critical habitat.

Because flycatchers would not be present during project activity, there are no 2015 territories within the project area, and the proposed project may benefit willow habitat, the proposed project *may affect, but is not likely to adversely affect* the flycatcher and its designated critical habitat.

Based on the analysis in this EA, implementing the Proposed Action would have a direct effect to the silvery minnow and an indirect effect to the cuckoo, but there would be no other potentially significant direct, indirect, or cumulative effects on the quality of the natural or human environment. In accordance with NEPA, as amended, and based on the analysis in this EA, Reclamation has determined that implementing the Proposed Action would not result in a significant impact on the human environment and does not require the preparation of an environmental impact statement.

7.0 CONSULTATION AND COORDINATION

Agencies and other entities contacted formally or informally to coordinate efforts in preparation of this EA include:

- New Mexico State Historic Preservation Division
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Middle Rio Grande Conservancy District
- New Mexico Interstate Stream Commission

Copies of the Public Draft EA has been made available for a 15-day public inspection and review.

8.0 PREPARERS AND CONTRIBUTORS

8.1 SWCA PREPARERS

- Brian J. Bader, Program Director
- Matt McMillan, Project Manager
- Paige Marchus, NEPA Specialist
- Shannon Manfredi, NEPA Specialist
- Eric Gonzales, Aquatic Ecologist
- Anne Russell, Geographic Information System (GIS) Specialist
- Cherie Walth, Cultural Resources Lead
- Justin Elza, Editor

8.2 NEW MEXICO INTERSTATE STREAM COMMISSION PREPARERS

- Grace Haggerty, ESA Program Manager
- Page Pegram, Hydrologist

8.3 BUREAU OF RECLAMATION CONTRIBUTORS

- Hector Garcia, NEPA
- Mark Hungerford, Cultural Resources
- Ann Demint, Project Manager/Biologist

This page intentionally left blank.

9.0 REFERENCES

- Beck, S.E., and J. J. Fluder. 2006. *Silvery Minnow Egg and Larval Fish Monitoring in Nursery Habitats: Summary of Findings Report*. Albuquerque, New Mexico.
- Bestgen, K.R., and S.P. Platania. 1991. Status and conservation of the Rio Grande silvery minnow, *Hybognathus amarus*. *The Southwestern Naturalist* 36: 225–232.
- Bureau of Reclamation (Reclamation). 2005. *Environmental Assessment. Middle Rio Grande Riverine Restoration Project*. Albuquerque Area Office, Albuquerque.
- . 2007. *Environmental Assessment. Middle Rio Grande Riverine Restoration Project Phase II*. Albuquerque Area Office, Albuquerque.
- . 2009. *Final Environmental Assessment and Finding of No Significant Impact. Pueblo of Sandia Rio Grande Bosque Rehabilitation Project*. Albuquerque Area Office, Albuquerque.
- . 2012a. *Middle Rio Grande River Maintenance Program Comprehensive Plan and Guide*. Albuquerque Area Office, Albuquerque.
- . 2012b. *Final Environmental Assessment and Finding of No Significant Impact. Albuquerque Bernalillo County Water Utility Authority Southwestern Willow Flycatcher Habitat Restoration Project*. Albuquerque Area Office, Albuquerque.
- . 2015. *Pueblo of Sandia Rio Grande Silvery Minnow Habitat Restoration Project: Biological Assessment*. Albuquerque Area Office, Albuquerque.
- Cordell, L. 1997. *Archaeology of the Southwest* (Second Edition). San Diego: Academic Press.
- Costanza, R., R. d'Arge, R. de Groot, S. Farberk, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R.V. O'Neill, J. Paruelo, R.G. Raskin, P. Suttonkk, and M. van den Belt. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253–260.
- Dick-Peddie, W.A. 1993. *New Mexico Vegetation — Past, Present, and Future*. Albuquerque: University of New Mexico Press.
- Dreesen, D.R. 2008. *Basic Guideline for Seeding Native Grasses in Arid and Semi-Arid Ecoregions*. Los Lunas, New Mexico: U.S. Department of Agriculture Natural Resources Conservation Service Plant Materials Center.
- Dudley, R.K., and S.P. Platania. 1997. *Habitat Use of the Rio Grande Silvery Minnow*. Prepared for New Mexico Department of Game and Fish and U.S. Bureau of Reclamation.
- . 2008. *Rio Grande Silvery Minnow Population Monitoring Program Results from 2007*. Report to the Middle Rio Grande Endangered Species Collaborative Program and the U.S. Bureau of Reclamation, Albuquerque, New Mexico.

- . 2009. *Summary of the Rio Grande Silvery Minnow Population Estimation Program Results from October 2009*. Report to the U.S. Bureau of Reclamation, Albuquerque.
- . 2011. *Rio Grande Silvery Minnow Population Monitoring Results from September 2009 to October 2010*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2012. *Rio Grande Silvery Minnow Population Monitoring Results from December 2010 to October 2011*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2013. *Rio Grande Silvery Minnow Population Monitoring Results from December 2011 to October 2012*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2014a. *Rio Grande Silvery Minnow Population Monitoring Results from May 2013 to October 2013*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2014b. *Rio Grande Silvery Minnow Population Monitoring Results from October 2014*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2015a. *Rio Grande Silvery Minnow Population Monitoring Results from February to December 2014*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2015b. *Summary of Rio Grande Silvery Minnow Population Monitoring Results from February to September 2015*. Albuquerque: American Southwest Ichthyological Researchers.
- GeoSystems Analysis, Inc. 2015. *Habitat Restoration Analysis and Design River Mile 130-99 Final Conceptual Design, Phase I*. Prepared for the New Mexico Interstate Stream Commission, Santa Fe, New Mexico.
- Gonzales, E.J., and M.D. Hatch. 2009. *2008 Middle Rio Grande Habitat Restoration Monitoring*. Santa Fe, New Mexico: New Mexico Interstate Stream Commission.
- Hatch, M.D., and E.G. Gonzales. 2008. *Los Lunas Habitat Restoration Fisheries Monitoring*. Project Summary Report. Albuquerque: U.S. Bureau of Reclamation.
- . 2010. *Los Lunas Habitat Restoration Fisheries Monitoring - 2009*. Albuquerque: U.S. Bureau of Reclamation.
- Hink, V.C., and R.D. Ohmart. 1984. *Middle Rio Grande Biological Survey*. Contract No. DACW47-81-C-0015, Arizona State University. U.S. Army Engineer District, Albuquerque, New Mexico.
- Los Lunas Plant Materials Center. 2007a. *Deep Planting: The Groundwater Connection – Guidelines for Planting Longstem Transplants for Riparian Restoration in the Southwest*. Los Lunas, New Mexico: U.S. Department of Agriculture Natural Resources Conservation Service Plant Materials Center.

- . 2007b. *Deep Planting: The Groundwater Connection – Guidelines for Planting Dormant Whip Cutting to Revegetate and Stabilize Streambanks*. Los Lunas, New Mexico: U.S. Department of Agriculture Natural Resources Conservation Service Plant Materials Center.
- Magaña, H. 2007. The case for classifying the Rio Grande silvery minnow (*Hybognathus amarus*) as an omnivore. Doctoral dissertation, University of New Mexico, Albuquerque, New Mexico.
- Massong, T., M.D. Porter, and T. Bauer. 2004. *Design Improvements for Constructed Rio Grande Silvery Minnow Nursery Habitat*. Albuquerque: U.S. Bureau of Reclamation.
- Moore, D., and D. Ahlers. 2015. 2014 Southwestern Willow Flycatcher Study Results – Selected Sites Along the Rio Grande From Bandelier National Monument to Elephant Butte Reservoir, New Mexico. Bureau of Reclamation, Technical Service Center, Fisheries and Wildlife Resources. Denver, Colorado.
- Mussetter Engineering, Inc. 2003. *Geomorphic and Sedimentologic Investigations of the Middle Rio Grande between Cochiti Dam and Elephant Butte Reservoir*. Draft Report for New Mexico Interstate Stream Commission. MEI, Albuquerque.
- New Mexico Environment Department (NMED). 2010. US-EPA Approved Total Maximum Daily Load (TMDL) for the Middle Rio Grande Watershed. Natural Resources Conservation Service. 2015. Web Soil Survey. Available at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed November 21, 2015.
- New Mexico Administrative Code. 2004. 20.2 NMAC. Title 20: Environmental Protection, Chapter 2: Air Quality (Statewide), Part 3: Ambient Air Quality Standards.
- New Mexico Department of Game and Fish (NMDGF). 2015. BISON-M homepage. Available at: <http://www.bison-m.org>. Accessed November 21, 2015.
- New Mexico Office of the State Engineer (NMOSE). 2011. Depletions Offsetting for Habitat Restoration Projects within the Middle Rio Grande Project. October 28, 2011.
- New Mexico Office of the State Engineer (NMOSE) and New Mexico Interstate Stream Commission (NMISC). 2003. *New Mexico State Water Plan*. Working Together Towards Our Water Future. December 23, 2003.
- Platania, S.P. 1995. *Reproductive Biology and Early Life-history of the Rio Grande Silvery Minnow*, *Hybognathus amarus*. Prepared for U.S. Army Corps of Engineers, Albuquerque District Office, New Mexico. Purchase Order DACW47-94-P-0462. 15 February.
- Platania, S.P., and C.S. Altenbach. 1996. *Reproductive Ecology of the Rio Grande Silvery Minnow*, *Hybognathus amarus*: *Clutch and Batch Production and Fecundity Estimates*. Albuquerque: Division of Fishes, Museum of Southwestern Biology, University of New Mexico.

- Rio Grande Compact. 1939. States of Colorado, New Mexico, and Texas. Adopted December 19, 1939; amended February 25, 1952. On file, New Mexico Office of the State Engineer, Santa Fe, New Mexico.
- Shirey, P.D. 2004. Foraging habits and habitat utilization of Rio Grande silvery minnow (*Hybognathus amarus*) as inferred by diatom frustules. MS Thesis. New Mexico State University Las Cruces, New Mexico, August 2004.
- Stahlecker, D.W., and N.S. Cox. 1997. *Bosque Biological Monitoring Program: Bird Populations in Rio Grande Valley State Park, Winter 1996-97 and Spring 1997*. Prepared for City of Albuquerque, Open Space Division, Albuquerque, New Mexico.
- Sublette, J., M. Hatch, and M. Sublette. 1990. *The Fishes of New Mexico*. New Mexico Department of Game and Fish. Albuquerque: University of New Mexico Press.
- SWCA Environmental Consultants (SWCA). 2007. *Silvery Minnow Egg and Larval Fish Monitoring in Nursery Habitats*. Prepared for the U.S. Bureau of Reclamation, Albuquerque: SWCA Environmental Consultants.
- . 2008. *Pueblo of Sandia Habitat Restoration Analysis and Recommendations, Middle Rio Grande Endangered Species Collaborative Program, Bernalillo County, New Mexico*. Prepared for the U.S. Bureau of Reclamation, Albuquerque, and Pueblo of Sandia, Bernalillo, New Mexico. Albuquerque: SWCA Environmental Consultants.
- . 2010. *The Albuquerque Reach Habitat Analysis and Recommendations Study, Middle Rio Grande Endangered Species Collaborative Program*. Prepared for the US Army Corps of Engineers, Albuquerque District.
- . 2014. *RiverEyes Observations in the Middle Rio Grande for the 2014 Irrigation Season Final Report*. Prepared for the U.S. Bureau of Reclamation.
- . 2015a. *Wetland Delineation for the New Mexico Interstate Stream Commission San Acacia Habitat Restoration Project from River Mile 116 to 99, Socorro County, New Mexico*. Prepared for the U.S. Bureau of Reclamation.
- . 2015b. *Biological Assessment for the New Mexico Interstate Stream Commission San Acacia Habitat Restoration Project from River Mile 116 to 99, Socorro County, New Mexico*. Prepared for the U.S. Bureau of Reclamation.
- 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 Environmental Laboratory.
- . 2011. *Environmental Assessment. Middle Rio Grande Bosque Restoration*. Albuquerque District: U.S. Army Corps of Engineers.

- U.S. Census Bureau (Census Bureau). 2010a. State and County QuickFacts. Socorro County and New Mexico. Available at: <http://quickfacts.census.gov/qfd/states/35/35053.html>. Accessed December 7, 2015.
- . 2010b. American Factfinder: Profile of General Population and Housing Characteristics. Albuquerque, New Mexico. Available at: http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_SF1DP1&prodType=table. Accessed December 15, 2015
- U.S. Environmental Protection Agency (EPA). 2012. Environmental Justice Basic Information. Available at: <http://www.epa.gov/environmentaljustice/basics/index.html>. Accessed December 3, 2015.
- . 2015. Current Nonattainment Counties for All Criteria Pollutants. Available at: <http://www3.epa.gov/airquality/greenbk/ancl.html>. Accessed December 3, 2015.
- U.S. Fish and Wildlife Service (Service). 1995. Endangered and Threatened Wildlife and Plants: Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher. Final Rule. *Federal Register* 60(38):10694–10715.
- . 1999. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Rio Grande Silvery Minnow, Final Rule. *Federal Register* (64 FR 36274 36290), July 6, 1999. Albuquerque, New Mexico, USA. Available at: <http://www.gpo.gov/fdsys/pkg/FR-1999-07-06/pdf/99-16985.pdf>. Accessed November 21, 2015.
- . 2002. *Final Recovery Plan Southwestern Willow Flycatcher (Empidonax traillii extimus)*. Southwestern Willow Flycatcher Recovery Team Technical Subgroup. Albuquerque: U.S. Fish and Wildlife Service, Region 2.
- . 2003. *Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, Albuquerque*. Consultation Number 2-22-03-F-0129. March 17.
- . 2003b. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Rio Grande Silvery Minnow. Final Rule; Notice of Availability. *Federal Register* 68:8087–8135.
- . 2005. Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Final Rule. *Federal Register* 70:60886–61009.
- . 2009. *Biological Opinion on the Effects of the Middle Rio Grande Riverine Habitat Restoration Phase IIa Project Proposed by the Interstate Stream Commission*. Available at: https://www.fws.gov/southwest/es/NewMexico/documents/BO/2009-0016_ABq2a_Final_BiOp.pdf. Accessed November 21, 2015.

- . 2012. *Biological Opinion and Conference on the Effects of the Albuquerque Bernalillo County Water Utility Authority's San Juan-Chama Drinking Water Environmental Mitigation Project*. Available at: http://www.fws.gov/southwest/es/NewMexico/documents/BO/2012_0091_ABCWUA_HR.pdf. Accessed November 21, 2015.
- . 2013ba. *Endangered and Threatened Wildlife and Plants; Designation of Revised Critical Habitat for Southwestern Willow Flycatcher; Final Rule*. Federal Register 78, No. 2. Available at: http://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/SWWF/fCH2013/SWWF_FCH_FR_Final.pdf. Accessed November 21, 2015.
- . 2013b. *Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-Billed Cuckoo (*Coccyzus americanus*); Proposed Rule*. Available at: <http://www.gpo.gov/fdsys/granule/FR-2013-12-26/2013-30750>. Accessed November 21, 2015.
- . 2015a. *Critical Habitat Mapper*. Available at: <http://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77>. Accessed November 21, 2015.
- . 2015b. *Biological Opinion on the effects of U.S. Army Corps of Engineers Proposed Authorization of the Albuquerque Metropolitan Arroyo Flood Control Authority North Diversion Channel Project*. Available at: http://www.fws.gov/southwest/es/NewMexico/documents/BO/20151014_USFWS_BO_USACE_permit_filling_AMAFCA_North_Diversion_Channel_Embayment.pdf. Accessed November 21, 2015.
- U.S. Geological Survey (USGS). 2003. Gage data for USFS 08330000 Rio Grande at Albuquerque, New Mexico. National Water Information Service.

**APPENDIX A.
BIOLOGICAL ASSESSMENT**

This page intentionally left blank.

**Biological Assessment for the New
Mexico Interstate Stream Commission
San Acacia Habitat Restoration
Project from River Mile 116 to 99,
Socorro County, New Mexico**

Prepared for

**U.S. Bureau of Reclamation
Albuquerque Area Office**

On Behalf of

New Mexico Interstate Stream Commission

Prepared by

SWCA Environmental Consultants

January 2016

**BIOLOGICAL ASSESSMENT FOR THE NEW MEXICO
INTERSTATE STREAM COMMISSION SAN ACACIA
HABITAT RESTORATION PROJECT FROM RIVER MILE 116
TO 99, SOCORRO COUNTY, NEW MEXICO**

Prepared for

U.S. BUREAU OF RECLAMATION, ALBUQUERQUE AREA OFFICE
555 Broadway NE, Suite 100
Albuquerque, New Mexico 87102

On Behalf of

NEW MEXICO INTERSTATE STREAM COMMISSION
5550 San Antonio NE
Albuquerque, New Mexico 87109
(505) 980-0181

Prepared by

Matthew McMillan
Eric Gonzales
Brian Bader

SWCA ENVIRONMENTAL CONSULTANTS

5647 Jefferson Street NE
Albuquerque, New Mexico 87109
Telephone: (505) 254-1115; Facsimile: (505) 254-1116
www.swca.com

SWCA Project No. 34090

January 2016

TABLE OF CONTENTS

1	BACKGROUND.....	1
1.1	Purpose and Need.....	3
2	PROPOSED ACTION	4
2.1	Action Area	5
2.1.1	RM 114	5
2.1.2	RM 112	8
2.1.3	RM 100.5	8
2.1.4	RM 100	11
2.1.5	RM 99.5	11
2.2	Access Roads and Staging Areas	14
2.3	Dust Abatement.....	16
2.4	Vegetation Removal.....	16
2.5	Vegetation Planting.....	17
2.6	Post-Construction Monitoring.....	17
3	ENVIRONMENTAL BASELINE	17
3.1	Vegetation	18
4	SPECIES STATUS AND EFFECTS ANALYSIS	21
4.1	Federally Listed Species.....	21
4.1.1	Rio Grande Silvery Minnow (<i>Hybognathus amarus</i>)	21
4.1.2	Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>)	26
4.1.3	Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	30
5	CONCLUSION	36
6	CONSERVATION MEASURES	37
6.1	Timing of the Proposed Action	37
6.2	Water Quality	37
6.3	Equipment and Operations	38
6.4	Access and Staging.....	39
6.5	Vegetation Replanting and Control.....	39
6.6	Dust Abatement.....	40
6.7	Other Measures	40
7	REFERENCES	41
	APPENDIX A PROJECT AREA PHOTOGRAPHS	47

LIST OF TABLES

Table 3.1.	Hink and Ohmart Vegetation Types, Site RM 114.....	18
Table 3.2.	Hink and Ohmart Vegetation Types, Site RM 112.....	19
Table 3.3.	Hink and Ohmart Vegetation Types, Site RM 100.5.....	19
Table 3.4.	Hink and Ohmart Vegetation Types, Site RM 100.....	20
Table 3.5.	Hink and Ohmart Vegetation Types, Site RM 99.5.....	20
Table 4.1.	Number of Silvery Minnow Collected at RM 114.6 and RM 99.5 from 2011 through 2015.....	22
Table 4.2.	Number of Silvery Minnow Collected from the Main Channel adjacent to the Proposed Habitat Restoration Sites.....	23
Table 4.3.	Silvery Minnow Habitat Impact Analysis.....	25
Table 4.4.	Southwestern Willow Flycatcher Territories within the Project Area.....	27
Table 4.5.	Yellow-billed Cuckoo 2013 and 2014 Territories and 2015 Preliminary Territories within 2-miles of the Project Area.....	31
Table 4.6.	Yellow-billed Cuckoo Suitable and Foraging Habitat at Each Site within the Project Area	34

LIST OF FIGURES

Figure 1.1.	Overview of the Isleta and San Acacia habitat restoration sites and proposed sites.	2
Figure 2.1.	RM 114 project area, access roads, staging, and spoils areas.....	7
Figure 2.2.	RM 112 project area, access roads, staging, and spoils areas.....	9
Figure 2.3.	RM 100.5 project area, access roads, and staging areas.	10
Figure 2.4.	RM 100 project area, access roads, and spoils areas.	12
Figure 2.5.	RM 99.5 project area, access roads, and spoils areas.	13
Figure 2.6.	RM 99.5, RM 100, and RM 100.5 access roads, staging, and spoils areas.	15
Figure 4.1.	Flycatcher territories near RM 99.5, RM 100, and RM 100.5, 2013–2014.....	28
Figure 4.2.	Cuckoo territories near habitat restoration sites in 2015; 2-mile buffers for each territory overlapped and were merged to improve clarity.	33

1 BACKGROUND

The New Mexico Interstate Stream Commission (NMISC) is proposing to implement a habitat restoration project at five sites along an approximately 17-mile reach of the Middle Rio Grande (MRG) immediately upstream and downstream of the San Acacia Diversion Dam (SADD) in Socorro County, New Mexico. The proposed project sites occur between the SADD (River Mile [RM] 116) downstream to RM 99, just below the Escondida Drain outfall (Figure 1.1). The NMISC is currently planning to implement habitat restoration sites north of the SADD; however, these sites are not part of the action area and are not included in this biological assessment (BA). The project would provide benefits for the federally listed Rio Grande silvery minnow (*Hybognathus amarus*; silvery minnow), the southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher), the Western Distinct Population Segment of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*; cuckoo), and the Rio Grande ecosystem as a whole.

Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires federal agencies to use their authorities to carry out programs to conserve threatened and endangered species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species or result in the destruction or adverse modification of their critical habitat. A BA must be prepared for federal actions that entail major construction activities (also defined as a project significantly affecting the quality of the human environment as defined under the National Environmental Policy Act [NEPA]) to evaluate the potential effects on listed or proposed species.

This BA will evaluate and analyze potential impacts of the project on the following listed species that may occur within the project area during implementation: silvery minnow, flycatcher, and cuckoo. No suitable habitat for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*; jumping mouse) exists in any of the project sites and the only known population of jumping mouse occurs in the proposed critical habitat on the Bosque del Apache National Wildlife Refuge, 24 miles south of the project area. Therefore, the determination is that the proposed project will have no effect on the jumping mouse or its proposed critical habitat and the jumping mouse will not be discussed further in this BA.

The NMISC and U.S. Bureau of Reclamation (Reclamation) are planning for construction to start no earlier than February 1, 2016, and be completed prior to April 15, 2016; however, due to various factors, including the compliance schedule and other construction needs, construction may take place over approximately 3 years, with completion by April 15, 2019. This BA will enhance the NMISC's compliance with the following federal and state laws and regulations:

- NEPA (Public Law [PL] 91-190, 42 United States Code [USC] 4321 et seq.);
- ESA of 1973 (PL 93-205) and amendments of 1988 (PL 100-478);
- New Mexico Endangered Plant Species Act (9-10-10 New Mexico Statutes Annotated and attendant Regulation 19 New Mexico Annotated Code 21.2);
- New Mexico Wildlife Conservation Act of 1974 (New Mexico Statutes Annotated 17-2-37 through 17-2-46, 1978 compilation); and
- Sections 401 and 404 of the Clean Water Act (CWA).

All federal consultations, including the ESA, must be completed prior to U.S. Army Corps of Engineers (USACE) issuance of Section 404 authorizations.

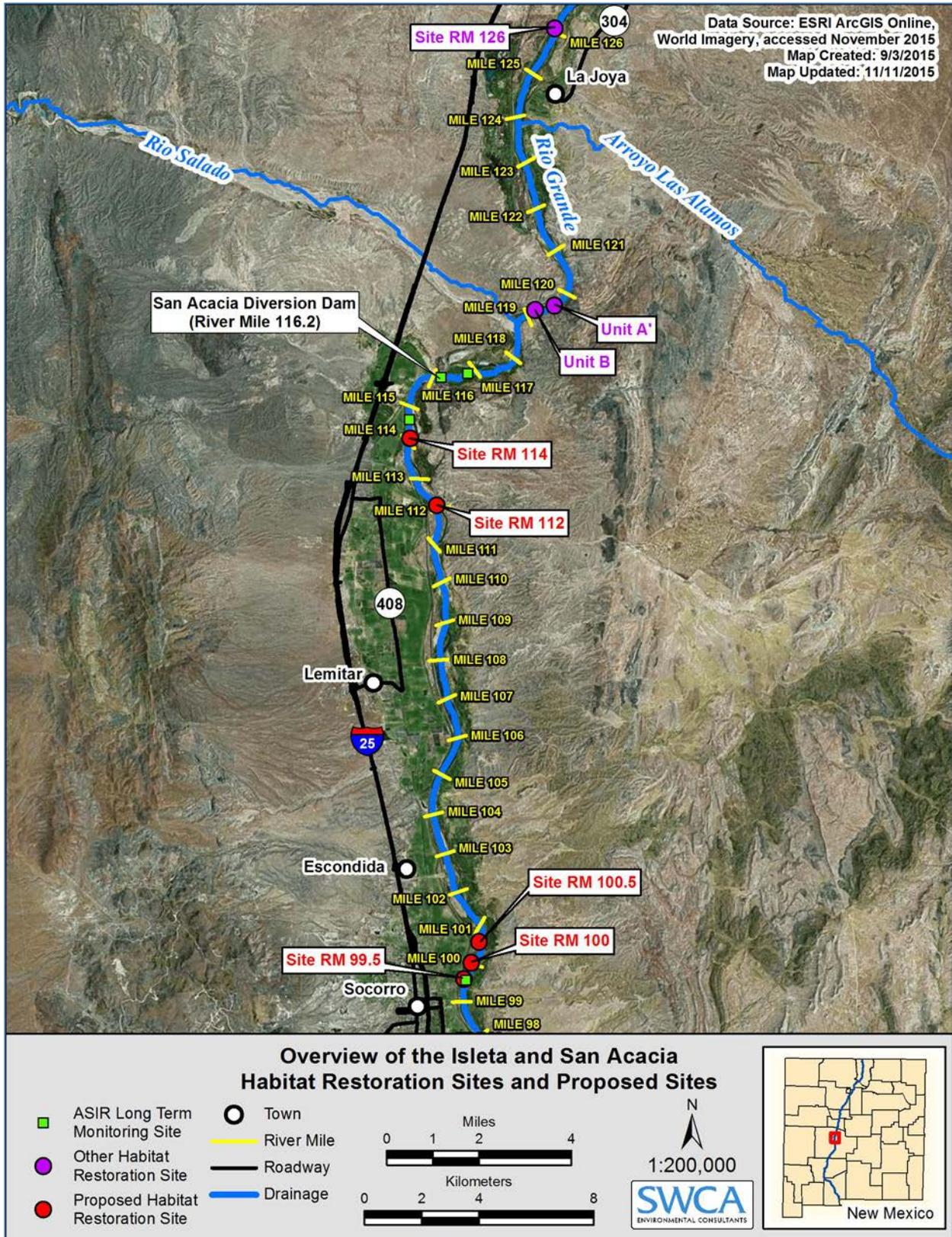


Figure 1.1. Overview of the Isleta and San Acacia habitat restoration sites and proposed sites.

1.1 PURPOSE AND NEED

The State of New Mexico, through the NMISC, has implemented habitat restoration projects as a part of the state's commitment to improving habitat conditions for the silvery minnow and the flycatcher. The NMISC's habitat restoration projects constructed in the Albuquerque and Isleta Reaches of the MRG, with Reclamation serving as the lead federal action agency (Reclamation 2005, 2007a, 2009; SWCA 2010), contributed to the Middle Rio Grande Endangered Species Collaborative Program's (Collaborative Program's) goal of meeting the habitat restoration requirements as stated in Element S of the Reasonable and Prudent Alternatives (RPA) in the March 2003 Biological Opinion (BO) (U.S. Fish and Wildlife Service [Service] 2003a).

Reclamation, in partnership with the Bureau of Indian Affairs (BIA), the NMISC, and the Middle Rio Grande Conservancy District (MRGCD), is currently engaged in a formal Section 7 consultation (Consultation No. 02ENNM00-2013-F-0033) with the Service for proposed federal and non-federal programmatic water management and maintenance activities on the MRG. Reclamation, the NMISC, and the MRGCD have provided a Joint BA (Reclamation 2015) to the Service that includes a number of commitments. As part of these commitments, the NMISC and Reclamation have agreed to work cooperatively on new habitat restoration projects for the benefit of the silvery minnow, flycatcher, and cuckoo in the Isleta and San Acacia Reaches with other participating entities, including the Service (Sevilleta Wildlife Refuge), the MRGCD, the New Mexico Department of Game and Fish's (NMDGF's) wildlife refuge (La Joya Wildlife Management Area), and private landowners. The proposed project described in this BA is part of those habitat restoration commitments. The NMISC has funded the planning, design, and compliance for the project described in this BA and Reclamation will fund the construction by its Socorro Field Division.

This BA does not include the two ongoing projects within the Sevilleta Wildlife Refuge that were planned cooperatively with the NMISC, the Sevilleta Wildlife Refuge, and Reclamation, because compliance and ESA consultation was conducted directly by the Sevilleta Wildlife Refuge. This BA includes the Sevilleta Wildlife Refuge sites as part of the baseline. Additionally, design plans at RM 126 (La Joya Wildlife Management Area) have not been finalized at this time, but they are part of the habitat restoration projects that the NMISC and Reclamation, with other partners, are proposing to build in the reach, and this BA includes this location in its description of NMISC sites within the project area. Formal consultation is not requested for the RM 126 site at this time.

These projects are designed to restore river processes that benefit the listed species, especially the silvery minnow, including modifications to the current channel and bankline configuration, creation of spawning and rearing habitats, floodplain reconnection, sediment redistribution, and removal of non-native vegetation. Heavy equipment construction activities are necessary to achieve these goals.

2 PROPOSED ACTION

The project consists of the application of several restoration/rehabilitation techniques designed to create aquatic habitat in the San Acacia Reach (see Figure 1.1). The primary objective is to design and implement habitat restoration for the silvery minnow under river discharges of approximately 1,000 to 2,000 cubic feet per second (cfs). The objective of the restoration process is to increase measurable habitat complexity in support of various life stages of the silvery minnow by providing slackwater habitat and facilitating lateral migration of the river across bars and riverbanks during various mid-level and high-flow stages. Specific restoration treatments would be implemented, monitored, and evaluated to inform the restoration plans of future phases as a part of an adaptive management process. Each site is designed to initiate inundation at flows at approximately 800 cfs to increase functional longevity. The sites are designed for greater than or equal to 2-foot inundation depth at flows between 1,000 and 2,000 cfs. These sites should achieve backwater velocities at less than 1 foot per second and implement connectivity to the river under a range of flow conditions to avoid silvery minnow entrapment.

The NMISC and Reclamation propose the habitat restoration project in sections of the MRG that have a relatively low probability of drying and, thus, are more likely to be able to maintain populations of silvery minnow throughout the year. Monitoring of river drying through Reclamation's "River Eyes" project suggests that the highest probability of drying occurs from the southern Bosque del Apache boundary approximately at RM 74.5 to approximately RM 96 just upstream of Brown Arroyo (SWCA 2014).

The project would be implemented with construction starting no earlier than February 1, 2016, and may require approximately 3 years to complete. Work is not planned to occur between April 15 and September 1 during any year of work in consideration of migratory birds. If work is needed during this time, the NMISC and Reclamation would coordinate with the Service prior to the beginning of any work.

Each restoration method presented involves the physical manipulation of a predetermined portion of the surface area of selected features with an excavator and other land-based equipment such as a dozer, belly scraper, skid-steer, or backhoe. Treatments may involve the removal of vegetation, excavation to desired cut-depths, and distribution of sediment spoils. These treatments would generate woody debris and sediments that must be used on-site or disposed of in accordance with the CWA Section 404 permit. The following is a description and summary of habitat restoration techniques used to achieve these goals.

- *High-flow bankline lowering and enhancements of backwater and side channel area functions.* Years of river confinement have disconnected the floodplain from the main river channel. Floodplains provide productive sheltered habitats at high flow that are important nursery areas for the silvery minnow. This technique involves cutting areas into banks where water enters, primarily during high-flow events, including spring runoff and floods to reconnect parts of the floodplain and peripheral low-lying areas. Such active restoration activities often promote passive restoration within the project or surrounding areas. All features would be built with a slope back to the river such that entrapment is unlikely to occur.

- *Passive restoration.* When water is available, higher magnitude peak flows are delivered through the MRG. This allows the energy in the river to accelerate natural channel-forming processes and improve floodplain habitat. These high flows redistribute sediment in the river channel, scour pool habitats, and remove non-native vegetation that results in greater habitat diversity for listed species. Inundation of the floodplain would improve conditions for Goodding's willow (*Salix gooddingii*), coyote willow (*S. exigua*), and Rio Grande cottonwood (*Populus deltoides* spp. *wislizenii*) recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and connect the floodplain as an active ecological process.

2.1 ACTION AREA

The project area is the immediate area involved in the Proposed Action, while the action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 Code of Federal Regulations 402.02). The project area for the proposed project extends from RM 116 to 99 of the MRG (see Figure 1.1). The action area for each site is listed below in Section 2.1. The action area includes the areas immediately surrounding each habitat restoration site, access road, staging area, and spoils area. The total acreage of the action area for the five sites is approximately 29 acres and figures of site features in this report are approximate.

Access to each restoration site would be along existing canal roads and roads within the bosque area. Staging areas are located on previously disturbed or currently used sites. Where necessary, Reclamation would improve access roads within the bosque for safe equipment access to each site. This may include blading of the existing roads or two-track roads within the bosque and clearing and grubbing vegetation along the sides of the road. However, any native vegetation, such as Rio Grande cottonwood and willow (*Salix* sp.) species along access roads and within the project area would be left in place and not removed to the extent possible without impeding project designs. Non-native species such as Russian olive (*Elaeagnus angustifolia*) along access roads and adjacent to the project area would be removed. Herbicide treatments would not be used for any vegetation removal at any of the sites.

Deposition of sediment and vegetation spoils would be hauled to specified sites in the vicinity of the project area or in previously identified off-site areas. Sediment and vegetation spoils would be spread within open riparian areas to match the existing terrain and seeded with native grasses and forbs. The following provides a summary of the proposed habitat restoration treatments. A complete description of each site, including topography, vegetation mapping, inundation depths, centerline elevation, and cross-sections, are provided in a GeoSystems Analysis (2014) report. All map imagery data in this BA was taken on June 2, 2014 (ESRI 2015).

2.1.1 RM 114

The goal of this backwater feature (Figure 2.1) is to improve off-channel habitat for rearing silvery minnow by constructing a backwater area. The total acreage of RM 114 including the project area, access roads, staging, and spoil areas is 2.20 acres. The total excavation footprint is 1.4 acres, including the slope of the feature. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 0.4 acre within the excavated footprint. At 2,000 cfs,

designed inundation is expected to be approximately 1.2 acres within the excavated footprint with greater depths and variability. This feature is a backwater design with sufficient slope that would promote drainage, minimize sedimentation, and reduce silvery minnow stranding. This feature would have two inlets to promote connectivity and longevity of the backwater area.

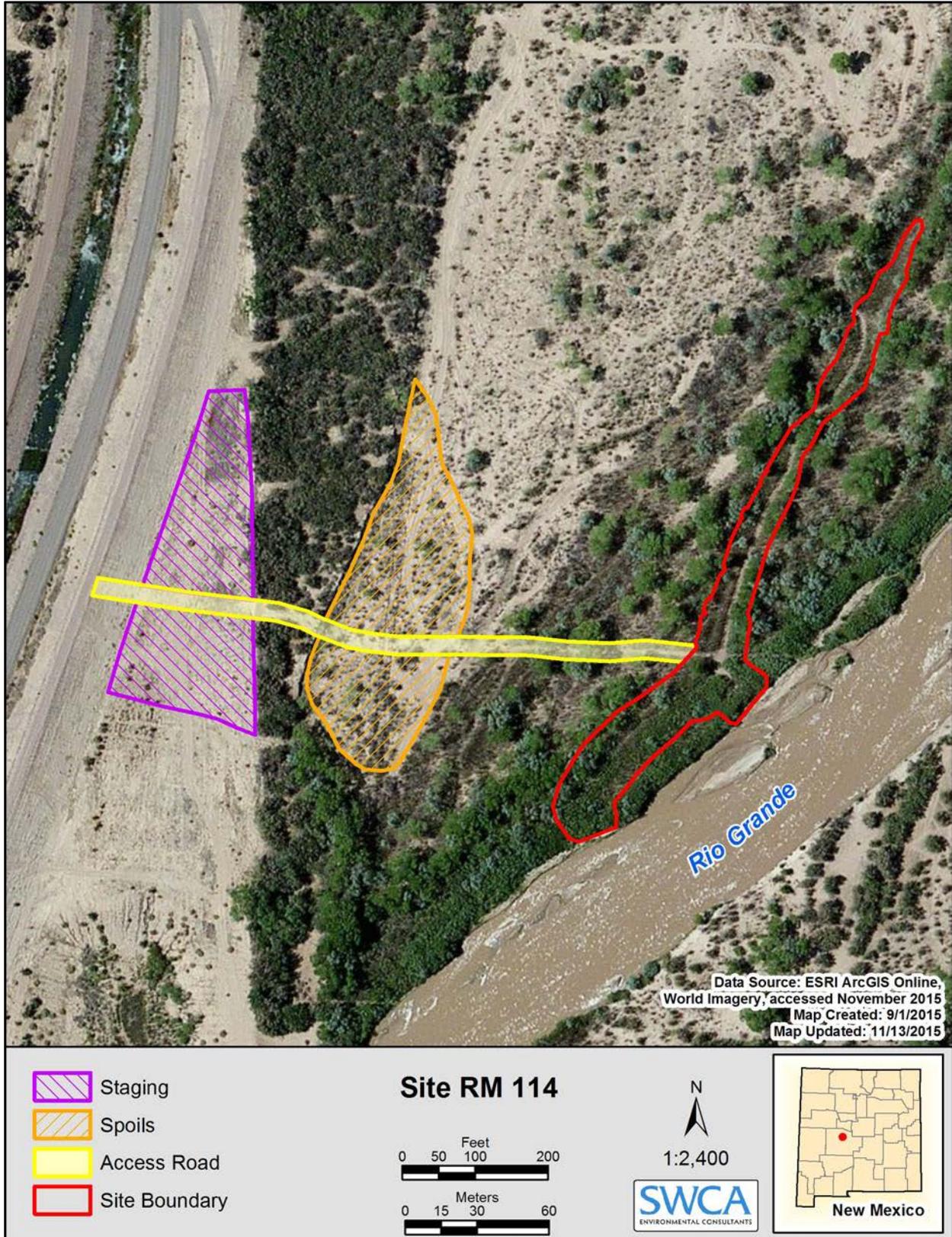


Figure 2.1. RM 114 project area, access roads, staging, and spoils areas.

Vegetation at this site comprises a cottonwood (*Populus* sp.) and Russian olive canopy with a dense coyote willow and saltcedar (*Tamarix* sp.) understory (see Section 3.1). Representative photographs of the vegetation at this site is included in Appendix A.

To reach the southern river cut, Reclamation may use selective vegetation removal with a skid-steer to avoid unanticipated native species removal. Approximately 2,800 cubic yards of spoil material would be excavated and hauled to be spread along the access road and ramps adjacent to the feature. Access for the RM 114 feature is along the Low Flow Conveyance Channel (LFCC) and the Lemitar Riverside Drain canal road to an existing road within the bosque leading to the site.

2.1.2 RM 112

The goal of this backwater feature (Figure 2.2) is to improve off-channel habitat for rearing silvery minnow by constructing a backwater area. Total acreage of RM 112 including the project area, access roads, staging, and spoil areas is 5.25 acres. The total excavation footprint is 1.4 acres, including the slope of the feature. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 0.7 acre within the excavated footprint. At 2,000 cfs, designed inundation is expected to be approximately 1.4 acres within the excavated footprint with greater depths and variability. A single backwater design with one inlet with sufficient slope would promote drainage, minimize sedimentation, and reduce silvery minnow stranding.

Vegetation at this site is composed mostly of a sparse coyote willow understory with a small amount of Russian olive and cottonwood canopy (see Section 3.1). Representative photographs of the vegetation at this site is included in Appendix A. Approximately 2,700 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road and ramps adjacent to the feature or within the staging area adjacent to the LFCC. Access for the RM 112 feature is along the LFCC canal road to an existing road within the bosque leading to the site.

2.1.3 RM 100.5

The goal of this backwater feature (Figure 2.3) is to improve off-channel habitat for rearing silvery minnow by constructing a backwater area. This site would incorporate two backwater features that connect at flows greater than 1,000 cfs. Total acreage of RM 100.5 including the project area, access roads, staging, and spoil areas is 12.74 acres. The total excavation footprint is 8.8 acres, including the slope of the feature. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 4.7 acre within the excavated footprint. At 2,000 cfs, designed inundation is expected to be approximately 6.4 acres within the excavated footprint with greater depths and variability. Each feature would slope towards the river independently to promote drainage, minimize sedimentation, and reduce silvery minnow stranding. A narrow inlet design would also prevent sedimentation within the inlets. The downstream backwater area has two inlets to promote connectivity and longevity.

Vegetation at this site is a mixed native and non-native canopy and understory, primarily with a Russian olive and cottonwood canopy and dense stands of coyote willow, baccharis (*Baccharis* sp.), saltcedar, and Russian olive understory (see Section 3.1). Representative photographs of the vegetation at this site is included in Appendix A.

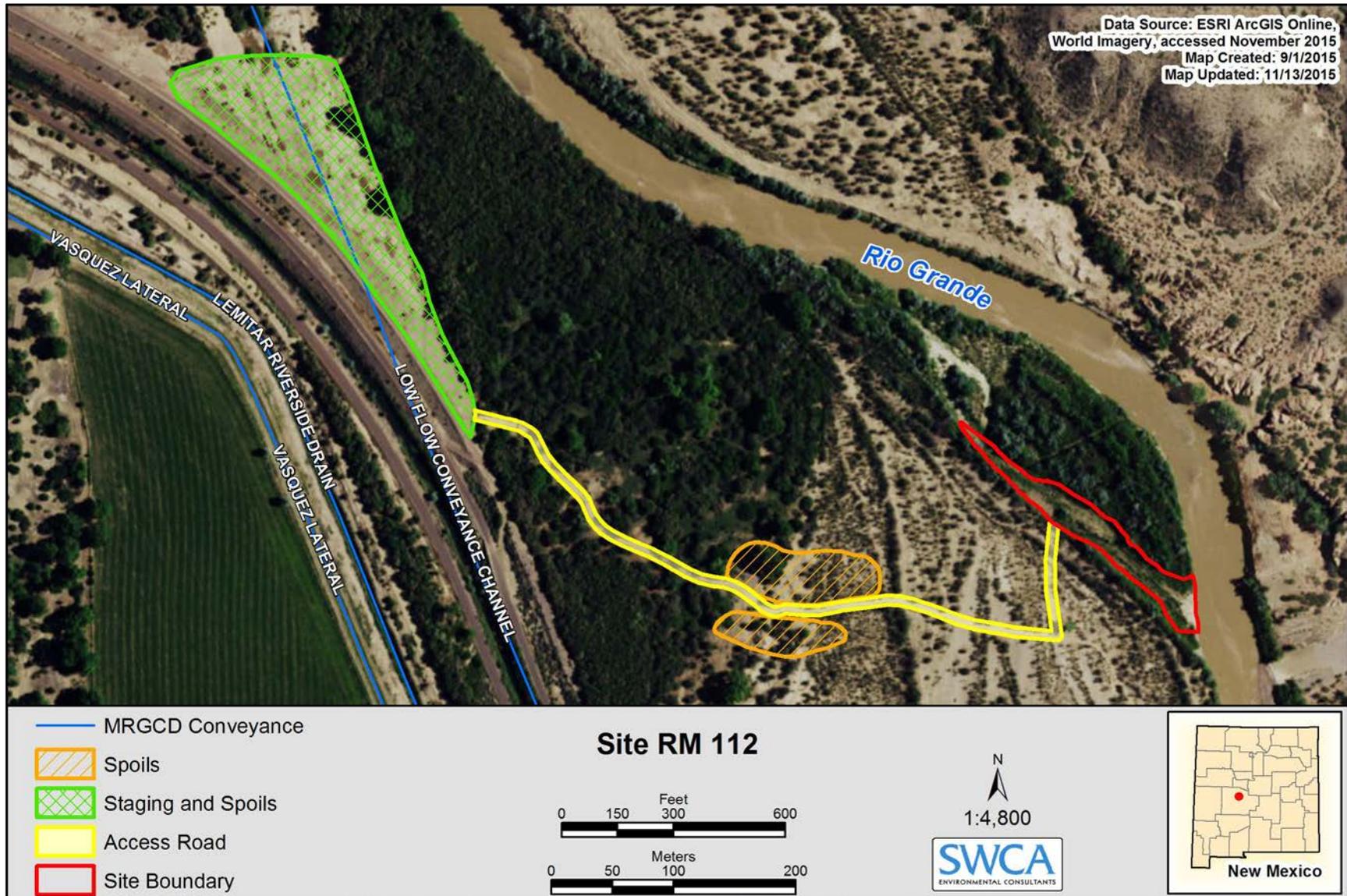


Figure 2.2. RM 112 project area, access roads, staging, and spoils areas.

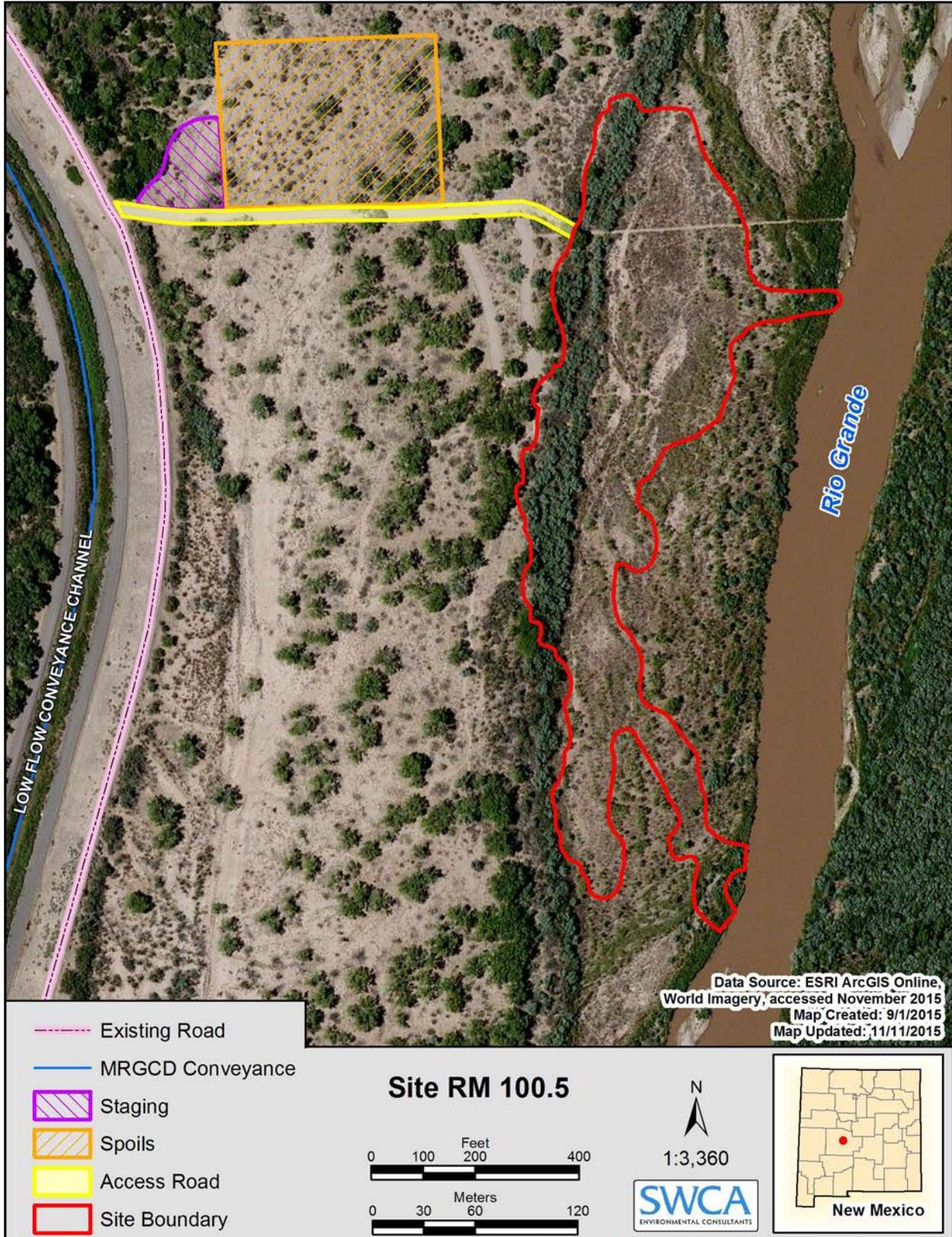


Figure 2.3. RM 100.5 project area, access roads, and staging areas.

Approximately 11,600 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road. Additional spoils will be hauled along the LFCC canal road to be spread northwest of the feature near the Escondida Drain. Access for the RM 100.5 feature is along the LFCC canal road to an existing road within the bosque leading to the site.

2.1.4 RM 100

The goal of this bankline scallop feature (Figure 2.4) is to improve off-channel habitat for rearing silvery minnow by constructing a backwater area. Total acreage of RM 100 including the project area, access roads, staging, and spoil areas is 2.65 acres. The total excavation footprint is 1.9 acres, including the slope of the feature. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 0.6 acre within the excavated footprint. At 2,000 cfs, designed inundation is expected to be approximately 1.5 acres within the excavated footprint with greater depths and variability. This feature would slope towards the river with small channels leading further into the floodplain. This feature would be built with a slope back to the river such that entrapment is unlikely to occur.

Vegetation at this site is a native canopy composed of cottonwood with a non-native understory, primarily with dense stands of saltcedar and Russian olive (see Section 3.1). Representative photographs of the vegetation at this site is included in Appendix A. Approximately 7,700 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road adjacent to the feature or hauled along the LFCC canal road to be spread northwest of the feature near the Escondida Drain. Access for the RM 100 feature is along the LFCC canal road to an existing road within the bosque leading to the site.

2.1.5 RM 99.5

The goal of this backwater feature (Figure 2.5) is to improve off-channel habitat for rearing silvery minnow by constructing a backwater area. Total acreage of RM 99.5 including the project area, access roads, staging, and spoil areas is 6.04 acres. The total excavation footprint is 3.5 acres, including the slope of the feature. At flows equivalent to 1,000 cfs, the designed inundation is expected to be approximately 2.4 acres within the excavated footprint. At 2,000 cfs, designed inundation is expected to be approximately 3.1 acres within the excavated footprint with greater depths and variability. This site would have three backwater features that connect at flows greater than 1,000 cfs. These features would slope towards the river to promote drainage, minimize sedimentation, and reduce silvery minnow stranding. A narrow inlet design would also prevent sedimentation within the inlets. The downstream backwater area has two inlets to promote connectivity and longevity.

Vegetation at this site is a mixed native and non-native canopy and understory, primarily with a Russian olive/cottonwood canopy and an understory composed of dense stands of baccharis, saltcedar, and coyote willow (see Section 3.1). Representative photographs of the vegetation at this site is included in Appendix A. Approximately 7,400 cubic yards of spoil material would be excavated and hauled to be spread on the bar along the access road adjacent to the feature or hauled along the LFCC canal road to be spread northwest of the feature near the Escondida Drain. Access for the RM 99.5 feature is along the LFCC canal road to an existing road within the bosque leading to the site.

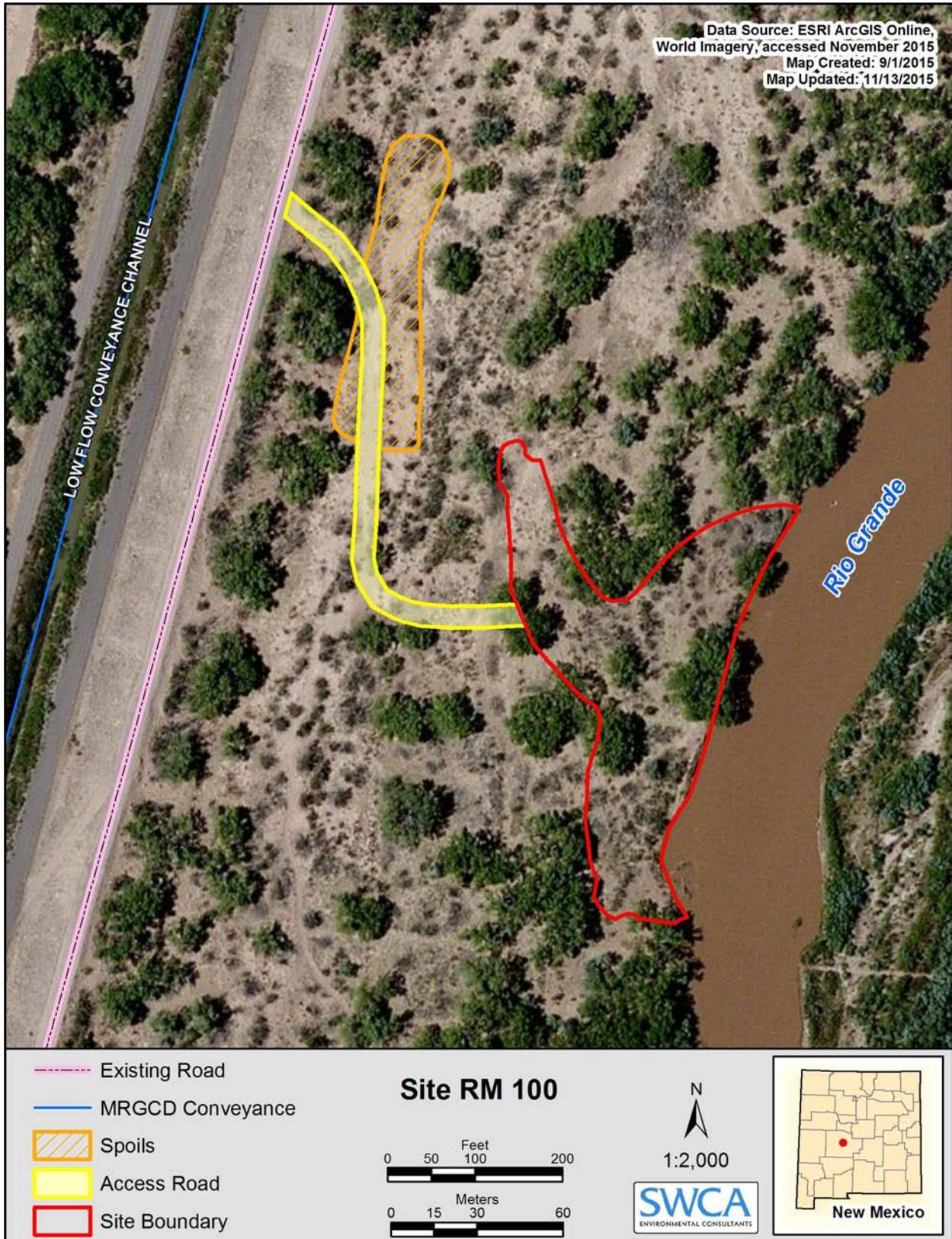


Figure 2.4. RM 100 project area, access roads, and spoils areas.



Figure 2.5. RM 99.5 project area, access roads, and spoils areas.

2.2 ACCESS ROADS AND STAGING AREAS

If necessary to ensure safe and convenient access, road improvements (e.g., clearing, mowing, trimming, blading, widening, gravel cap placement, etc.) may be made to the dirt roads designated as access routes at each site (see Figure 2.1–Figure 2.6). For RM 99.5, RM 100, and RM 100.5, access to a stockpile site to the north is via the LFCC road (Figure 2.6). Clearing involves the removal of vegetation within the roadway with some amount of subsurface disturbances of the vegetation roots. This is typically undertaken with new or minimally used access routes. A typical impact range for clearing is 20 to 30 feet per linear foot of access road. Mowing is the process of cutting vegetation in and along the access route to provide safe conditions for access by maximizing line-of-sight and increasing the reaction time to respond to other vehicles, wildlife, and livestock within the access road corridor. See Section 2.5 for further discussion on the disposition of vegetation as it relates to access.

Horizontal clearance also provides the ability for equipment to drive without hitting and damaging equipment. The total range of horizontal clearing would be 5 to 10 feet on each side, for a total impact of 10 to 20 feet wider per linear foot of access roads. This action is typically performed by mowing the vegetation, with the expectation that vegetation would return in a year or two. Trimming involves the selective cutting of tree branches that would restrict vehicular access along the route. This is especially relevant when large trees are near the access routes that have low branches that extend into the access route, making vehicular access difficult. The height from the road surface to be cleared varies with the type of equipment, with a range of 10 to 20 feet.

Staging areas would be used to temporarily store construction materials and equipment (see Figure 2.1–Figure 2.6). These areas would be located in previously disturbed sites and would be reseeded where necessary after construction with a weed-free, upland seed mix selected by Reclamation biologists.

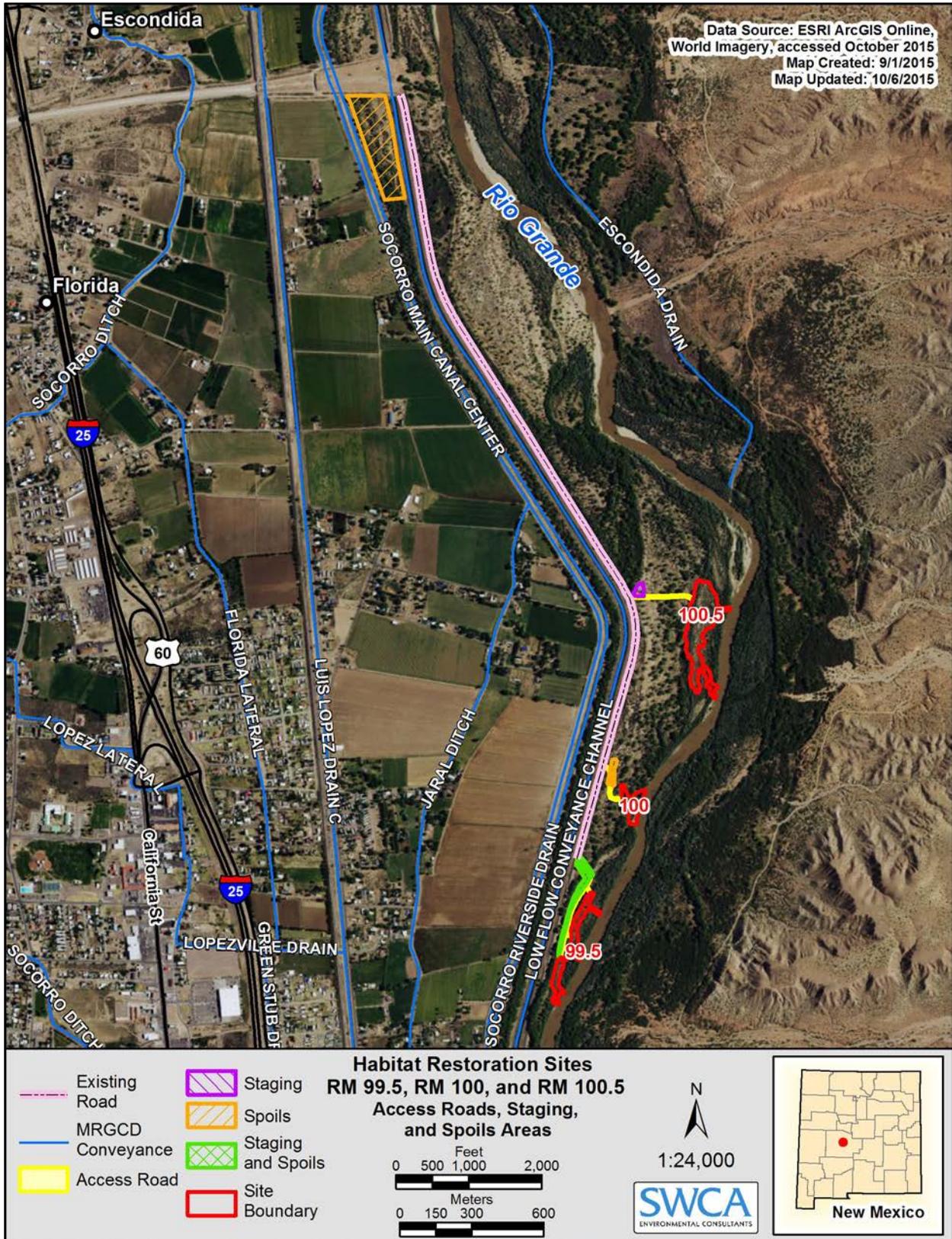


Figure 2.6. RM 99.5, RM 100, and RM 100.5 access roads, staging, and spoils areas.

2.3 DUST ABATEMENT

Dust abatement typically occurs on access routes and in project areas during implementation when there is not sufficient moisture in the soil to inhibit the formation of dust. Dust abatement involves the distribution of water onto an earthen surface. If dust becomes a safety concern at the site or while hauling spoils from the sites, roads would be wetted with water pumped from the LFCC. In the unlikely event the LFCC does not have sufficient flow, water would be pumped from the Rio Grande.

Pumping rates would vary between 1.8 and 2.2 cfs, requiring 4 to 8 minutes to fill a water truck. At the maximum pumping rate, this would be a minimal impact to river flows, equating to a decrease in flows of approximately 0.6% for river flows of 350 cfs and approximately 0.2% for river flows of 1,250 cfs for 4 to 8 minutes. A typical project may use four to six truckloads per day and, at a maximum, 18 truckloads per day. This project is expected to use the typical amount or less.

Only as a last possible source, if pumping from the Rio Grande, the pump setup would use a 0.25-inch mesh screen at the opening to the intake hose to minimize entrainment of aquatic organisms. For areas where the water surface is too far from the pump setup, an intermediate area would be leveled to create a temporary pad for the pump. Water is typically distributed using a truck-based water unit that allows for a controlled and uniform spraying of the desired surface.

2.4 VEGETATION REMOVAL

Vegetation clearing involves the removal of vegetation within the construction site with some amount of subsurface disturbance of the vegetation roots. Most of the vegetation within the project area consists of exotic species such as saltcedar and Russian olive, as well as mature cottonwoods and willow species. The exotic species in the project area would be mulched to clear the site and allow access for construction. Any vegetation that is removed would be mulched and spread on-site at a depth of 3 inches or less. All vegetation removal would occur from dry land and no herbicides would be used.

Some large cottonwoods may need to be removed for safety reasons. Large trees, if removed, may be used for large woody debris or tree snags within the project area. Large woody debris placement would either occur in the dry. Cottonwoods would only be removed if absolutely necessary, but all Russian olives at the bank or elsewhere would be removed. If large cottonwoods need to be removed, they would be replaced at a ratio of 10:1. Where possible, Reclamation would remove willow species at the root ball to be saved and replanted on-site. To do this, the excavation work removes the willows along with the first few feet of dirt to be saved and then placed back in the finished excavated area to promote willow growth. Temporary staging areas would be located within the delineated area of disturbance shown in Figure 2.1 through Figure 2.6 and situated to avoid or minimize the removal of native tree species.

2.5 VEGETATION PLANTING

All disturbed project areas would be reseeded with a native, weed-free, seed mix selected by Reclamation biologists at the next appropriate season (monsoon) following the conclusion of activity at these areas, unless otherwise noted. Reseeding or revegetation may be accomplished between April 15 and September 1 by hand or mechanized means, such as using a Truax imprinter followed by hand or tractor broadcast seeding. If mechanized means (hand power or tractor-mounted auger) are needed for either reseeded or replanting between April 15 and September 1, migratory bird surveys would be conducted immediately prior to the work to determine if any breeding birds are present. If birds are detected, Reclamation would coordinate with the Service to determine appropriate next steps.

Some native vegetation may need to be removed to construct or provide access to project components (rock placement, staging and stockpile areas, etc.). Where possible, Reclamation would remove willow species at the root ball to be saved and replanted on-site. To do this, the excavation work removes the willows along with the first few feet of dirt to be saved and then placed back in the finished excavated area to promote willow growth. Large, healthy, mature trees would be replaced with pole cuttings of the same tree species at a ratio of 10:1. Pole cuttings of other species may also be used.

Native cottonwood and willows are expected to regenerate naturally. The project sites will be monitored for success of the revegetation and natural regeneration for 3 years (see Section 2.6). If needed, revegetation areas may include areas designated within this project's disturbance area or in another mutually agreed upon location. If revegetation is needed, Reclamation biologists will select plantings appropriate for the hydrologic regime of a given location, including pole plantings or upland shrubs where appropriate.

2.6 POST-CONSTRUCTION MONITORING

If mitigation is required per CWA Section 404 requirements, monitoring would take place for 5 years or until the performance standards are met. Success of the reseeded and replanted vegetation would be monitored for 3 years by the NMISC using photo points of the project sites. The NMISC and/or Reclamation will also monitor inundation levels of the project sites during spring runoff for 3 years.

In the areas where suitable flycatcher and cuckoo habitat are impacted by the proposed project, Reclamation and NMISC will assess the natural regeneration of vegetation after 3 years and coordinate with the Service to determine if additional revegetation activities are needed to develop suitable habitat.

3 ENVIRONMENTAL BASELINE

Regulations implementing the ESA define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early Section 7 consultation; and the impacts of state and private actions that are contemporaneous with the consultation in progress. The environmental baseline defines the

current status of the species and its habitat in the action area to provide a platform to assess the effects of the action.

Reclamation, in partnership with the BIA, the NMISC, and the MRGCD, is currently engaged in a formal section 7 consultation (Consultation No. 02ENNM00-2013-F-0033) with the Service for proposed federal and non-federal programmatic water management and maintenance activities on the MRG. Reclamation, the NMISC, and the MRGCD have provided a Joint BA (Reclamation 2015) to the Service that describes the environmental baseline. Also, the Service has produced a recent BO for a U.S. Army Corps of Engineers project in the MRG that describes the environmental baseline, which applies to this project as well. The pertinent information regarding environmental baseline relevant to the minnow, flycatcher, and cuckoo in the current Proposed Action area can be found in those documents, which are listed below.

Bureau of Reclamation. 2015. *Joint Biological Assessment, Bureau of Reclamation, Bureau of Indian Affairs, and Non-Federal Water Management and Maintenance Activities on the Middle Rio Range, New Mexico.*

U.S. Fish and Wildlife Service. 2014. *Biological Opinion on the Effects of the U.S. Department of the Army, Corps of Engineers, Albuquerque District, Proposed Action of Construction, Operation and Maintenance of the Rio Grande Floodway, San Acacia to Bosque del Apache Unit in Socorro County, New Mexico (San Acacia Levee Project).* Consultation No. 02ENNM00-2012-F-0015.

3.1 VEGETATION

The dominant vegetative community in the project area is riparian woodland, which is found along much of the Rio Grande (Dick-Peddie 1993). This vegetative community consists of Rio Grande cottonwood, Russian olive, coyote willow, saltcedar, and baccharis with a variety of grasses and native forbs. GeoSystems Analysis (2014) quantified and mapped the vegetation composition and structure in the floodplain using the Hink and Ohmart classification system that has been used in earlier vegetation classification studies of the MRG (Hink and Ohmart 1984). The specific vegetation communities at each project restoration site, as well as access roads, spoils areas, and staging areas, are listed in Table 3.1 through Table 3.5. Representative photographs of the vegetation at each restoration site is included in Appendix A.

Table 3.1. Hink and Ohmart Vegetation Types, Site RM 114

Site Name	Area Acreage				TOTALS
	Site Boundary	Access Roads	Staging	Spoils	
RM 114					
C-RO/CW-SC3	0.90	0.18	–	0.16	1.24
CW5f	0.10	–	–	–	0.10
CW-SC5	–	0.10	–	0.16	0.27
RO/CW3f	0.31	–	–	–	0.31
Road	–	0.02	–	–	0.02
SC3	–	0.01	–	0.02	0.03
SC-C/SC1	–	0.05	–	0.18	0.23
TOTALS	1.31	0.36	0.00	0.52	2.20

Table 3.2. Hink and Ohmart Vegetation Types, Site RM 112

Site Name	Acreage				TOTALS
	Site Boundary	Access Roads	Spoils	Staging and Spoils	
CW6	1.11	–	–	–	1.11
RO-C/CW3f*	0.20	0.01	–	–	0.21
Road	–	0.001	–	0.86	0.86
SC-NMO5	–	0.58	0.74	0.08	1.40
SC5	–	0.21	1.06	–	1.27
SC6	–	0.39	–	–	0.39
TOTALS	1.31	1.19	1.80	0.94	5.25

*Field verification indicated that this is primarily Russian olive

Table 3.3. Hink and Ohmart Vegetation Types, Site RM 100.5

Site Name	Acreage				TOTALS
	Site Boundary	Access Roads	Staging	Spoils	
B5	0.05	–	–	–	0.05
C4	–	–	0.23	–	0.23
C/NMO3d	–	–	0.16	–	0.16
C/SC3	–	–	0.0004	–	0.0004
C4	–	–	0.11	–	0.11
C/CW-B3	0.76	–	–	–	0.76
C/RO1	0.18	–	–	–	0.18
C/SC2	0.21	0.31	–	–	0.52
C-RO/CW3	0.03	–	–	–	0.03
NA	0.01	–	–	–	0.01
RO-C/CW-B3*	2.48	–	–	–	2.48
RO-CW5	0.06	–	–	–	0.06
Road	–	–	0.03	–	0.03
SC5d	–	0.06	0.06	–	0.12
SC5	4.99	–	–	–	4.99
TOTALS	8.78	0.37	0.60	0.00	9.74

*Field verification indicated that this is primarily Russian olive

Table 3.4. Hink and Ohmart Vegetation Types, Site RM 100

Site Name	Acreage				TOTALS
	RM 100	Site Boundary	Access Roads	Staging	
C/RO-SC3	0.00	–	–	–	0.00
C/SC1	0.31	0.06	–	–	0.37
C/SC3	–	0.32	–	0.50	0.82
Road	–	0.005	–	–	0.005
SC4	1.45	–	–	–	1.45
TOTALS	1.76	0.38	0.00	0.50	2.65

Table 3.5. Hink and Ohmart Vegetation Types, Site RM 99.5

Site Name	Acreage			TOTALS
	RM 99.5	Site Boundary	Access Roads	
B-SC6	2.48	0.03	–	2.51
C/B-CW3	0.00	–	–	0.00
C/CW3	0.05	–	–	0.05
C/CW4	–	0.66	1.13	1.78
C/RO-SC3	–	0.02	0.27	0.29
C/SC2	0.13	0.10	0.15	0.38
CW5	0.07	–	–	0.07
CW-SC5	0.01	–	–	0.01
RO/CW3	0.44	0.02	0.00	0.46
RO-C/B3	0.16	–	–	0.16
RO-C/CW-SC3	–	–	–	0.00
SC5s	–	0.06	0.05	0.10
SC6	–	–	0.04	0.04
SC-CW5	0.03	–	–	0.03
TOTALS	3.37	0.88	1.63	5.89

4 SPECIES STATUS AND EFFECTS ANALYSIS

4.1 FEDERALLY LISTED SPECIES

4.1.1 RIO GRANDE SILVERY MINNOW (*HYBOGNATHUS AMARUS*)

The silvery minnow was listed as a federally endangered species by the Service in July 1994 (Service 1994). Information pertaining to status, life history, and habitat use of the silvery minnow can be found in the following documents:

Bureau of Reclamation. 2015. *Joint Biological Assessment, Bureau of Reclamation, Bureau of Indian Affairs, and Non-Federal Water Management and Maintenance Activities on the Middle Rio Range, New Mexico*.

Dudley, R.K., and S.P. Platania. 2015a. *Rio Grande Silvery Minnow Population Monitoring Results from February to December 2014*. Albuquerque: American Southwest Ichthyological Researchers.

Dudley, R.K., and S.P. Platania. 2015b. *Summary of Rio Grande Silvery Minnow Population Monitoring Results from February to September 2015*. Albuquerque: American Southwest Ichthyological Researchers.

Gonzales, E.J., D. Tave, and G.M. Haggerty. 2014. Endangered Rio Grande silvery minnow use constructed floodplain habitat. *Ecohydrology* 7:1087–1093

Hatch, M.D., and E. Gonzales. 2008. *Los Lunas Habitat Restoration Fisheries Monitoring*. Report to the U.S. Bureau of Reclamation, Albuquerque, New Mexico.

Hatch, M.D., and E. Gonzales. 2009. *Los Lunas Habitat Restoration Fisheries Monitoring - 2009*. Report to the U.S. Bureau of Reclamation, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; final rule to list the Rio Grande silvery minnow as an endangered species. *Federal Register* 59:36988–36995.

U.S. Fish and Wildlife Service. 2003b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Rio Grande Silvery Minnow; Final Rule. *Federal Register* 68:8087–8135.

U.S. Fish and Wildlife Service. 2010. *Rio Grande Silvery Minnow (Hybognathus amarus) Recovery Plan, First Revision*. Albuquerque, New Mexico.

Existing BOs and ongoing consultation information for the action area can be found in the following documents:

U.S. Fish and Wildlife Service. 2003a. *Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers'*

Flood Control Operation, and Related Non-federal Actions on the Middle Rio Grande, New Mexico. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 2014. *Biological Opinion on the Effects of the U.S. Department of the Army, Corps of Engineers, Albuquerque District, Proposed Action of Construction, Operation and Maintenance of the Rio Grande Floodway, San Acacia to Bosque del Apache Unit in Socorro County, New Mexico (San Acacia Levee Project).* Consultation No. 02ENNM00-2012-F-0015.

Current Population Trends in the Middle Rio Grande

Silvery minnow population surveys in the MRG have occurred since 1993 on an ongoing basis (surveys were not conducted in 1998) by the American Southwest Ichthyological Research Foundation (Dudley and Platania 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015a, 2015b), Reclamation, the NMISC, and the Service. Between 1993 and 2015, estimated October density of silvery minnow has fluctuated from a high of 44.84 fish/100 m² in 2005 to lows of 0.00 fish/100 m² in 2012 and 2014, respectively (Dudley and Platania 2015a).

During the last 5 years, silvery minnow have been consistently collected from long-term monitoring sites located upstream and downstream of the proposed project locations (Dudley and Platania 2011, 2012, 2013, 2014, 2015a, 2015b) (Table 4.1). In 2015, the number of silvery minnow collected from these sites was low, with the majority indicated as marked fish of hatchery origin (Dudley and Platania 2015b).

Table 4.1. Number of Silvery Minnow Collected at RM 114.6 and RM 99.5 from 2011 through 2015

Site	February	September	October	December
Site 13 (RM 114.6)				
2011	23(17)	0	0	36(36)
2012	7(7)	0	0	-
2013	-	0	0	51(51)
2014	29(28)	0	0	0
2015	1(0)	2(2)	-	-
Site 14 (RM 99.5)				
2011	48	1	0	0
2012	6(5)	0	0	-
2013	-	1(0)	0	46(41)
2014	27(26)	0	0	57(57)
2015	52(52)	1(1)	-	-

*Sites at these river miles are labeled sites 11 and 12 2009 through 2013. In 2014 they were relabeled sites 13 and 14.

Note: Numbers in parenthesis indicate marked fish of hatchery origin. Dashes indicate missing data.

Surveys conducted in the main channel adjacent to the proposed sites during August 2015 yielded 54 wild and 1 marked silvery minnow (Table 4.2). During these surveys, silvery minnow were collected from all sites except for site 114 (SWCA 2015).

Table 4.2. Number of Silvery Minnow Collected from the Main Channel adjacent to the Proposed Habitat Restoration Sites

Site	100.5	99.5	112	114	Total
# Collected	48	5	2	0	55

Critical Habitat along the Middle Rio Grande

In 1999 and later in 2003, the Service designated critical habitat for the silvery minnow in the MRG (Service 1999, 2003b). The designation extends from Cochiti Dam downstream about 157 miles to the utility line crossing the Rio Grande in Socorro County, which corresponds to the southern limit of the Collaborative Program boundary. This location is at 4,450 feet of elevation, corresponding to the elevation of the spillway crest for Elephant Butte Dam. The lateral limits (width) of critical habitat extend between the existing levees or, in areas without levees, 300 feet of riparian zone adjacent to each side of the bankfull stage of the MRG. The critical habitat designation does not include tribal lands of Cochiti, Santo Domingo, Santa Ana, Sandia, or Isleta Pueblos.

Effects Analysis and Effects Determination

Silvery minnow critical habitat encompasses the entire project area (Service 1999, 2003b). The species has declined as a result of impacts from dewatering, channelization, and flow regulation for irrigation, diminished water quality, and competition/predation by non-native species (Service 1994). The primary objective of the project would be to create mesohabitat for the silvery minnow based on the best available information. The project would provide long-term direct and indirect beneficial effects on silvery minnow and its critical habitat in the San Acacia Reach. Beneficial effects include improved egg and larval retention, increased recruitment rates, and increased survival of both young-of-year and adults. The described techniques would be implemented in phases and monitored for achievement of restoration goals.

Direct Effects

The creation of the in-channel low flow habitats, such as backwater areas and embayments, would be accomplished through excavating to desired cut depths to enable inundation at the target inundation discharge. All features would be built with a slope back to the river such that entrapment is unlikely to occur. Sediment spoils may be hauled off-site or spread and graded evenly in open areas outside the excavation footprints. If this latter option is selected, sediment spoils could form a layer 6 to 18 inches thick, but would not result in reduced inundation or reduced inundation frequency, based on modeling results. At all sites work along the water edge will be conducted behind barrier berms. Work conducted in the wet would be associated with the removal of the barrier berms to connect the feature to the river channel. Pumping water for dust abatement would have no indirect or direct effect to the silvery minnow due to the small amount of water being used and incorporating a screen on intake hose.

The anticipated disturbance area discussed in the following paragraph is presented in Table 4.3. The disturbance area for riverine restoration treatments includes the footprint of the proposed feature plus a 10% buffer. The construction time was estimated for each proposed restoration feature. The total area impact is the impact area multiplied by the construction time. The estimated impact area for the entire project totals 128.48 acres (see Table 4.3). Approximately 94% of the anticipated impacts would be for construction of the RM 100.5 site, which has an estimated impact area of 96.8 acres. The remaining four sites have a combined estimated impact area of 31.7 acres.

However, direct impacts of the project on the silvery minnow would only occur in the disturbed wetted portions of each constructed feature. The wetted area is defined as the area affected by the excavator bucket. To estimate the total wetted impact area, the length of estimated bankline excavation was multiplied by the excavator bucket width (4 feet) plus 10% of that width (buffer) times the number of construction days. The estimated impact area of wetted habitat for the entire project totals 0.56 acre (see Table 4.3). The majority of wetted area impact is estimated to occur at RM 100.5, which has an estimated wetted impact area of 0.25 acre. The remaining four sites have a combined wetted impact area of 0.30 acre.

While silvery minnow are likely to be harassed by the project activities in wetted areas, Reclamation crews will operate equipment such that it enters the water slowly and silvery minnow are expected to exhibit an avoidance response such activities, including any sediment disturbance, and sustained avoidance during the short duration of construction work for each construction activity. There will be no river crossings. Given silvery minnow mobility, their avoidance response, and the limited impact area, the avoidance response is not expected to lead to any long-term significant effects on silvery minnow. Any sediment disturbance is expected to drop within background suspended sediment levels quickly and within the project area. Conservation measures and best management practices in place for operation of equipment also minimize risk of adverse effects due to accidental introduction of hydrocarbon contaminants.

Table 4.3. Silvery Minnow Habitat Impact Analysis

Restoration Site	Existing Inundation Discharge (cfs)	Restoration Treatment	Target Inundation Discharge (cfs)	Area (acres)	Area Buffer (10) %	Construction Time (days)	Total Area Impact Estimate (acres)	Area of Bankline Excavation (acres)	Bankline Excavation Buffer (10%)	Total Wetted Area Impact Estimate (acres)
RM 114	2,500	Backwater area	800–2000	1.4	0.14	2	3.08	0.010	0.0010	0.023
RM 112	2,500	Backwater area	800–2000	1.4	0.14	2	3.08	0.016	0.0016	0.035
RM 100.5	2,500	Backwater area	800–2000	8.8	0.88	10	96.8	0.023	0.0023	0.253
RM 100	2,500	Bankline scallop	800–2000	1.9	0.19	3	6.27	0.046	0.0046	0.152
RM 99.5	2,500	Backwater area	800–2000	3.5	0.35	5	19.25	0.017	0.0017	0.093
Total							128.480	0.112	0.011	0.555

Indirect Effects

Indirect harm or mortality from reduced water quality in the silvery minnow critical habitat may occur from accidental introduction of hydrocarbon contaminants from fuel and fluids used by the proposed equipment, but conservation measures and best management practices in place for operation of equipment minimize risk of adverse effects due to accidental introduction of hydrocarbon contaminants. No effects on silvery minnow are expected to result from contamination-related to equipment fueling and leakage or accidental spills.

Construction may cause localized increases in turbidity and suspended sediments. Any sediment disturbance is anticipated to drop within background suspended sediment levels quickly and within the project area. Any decreases in primary production are expected to be minor and temporary and, thus, indirect adverse effects on the silvery minnow are likely to be insignificant.

Effects Determination

The direct effects of the riverine restoration treatments are limited to small, isolated areas and a short disturbance time period. There is risk of short-term harm or harassment to the silvery minnow in the immediate wetted impact area during construction due to the excavator bucket entering the river channel as the last step of construction. Pumping water for dust abatement would have no indirect or direct effect to the silvery minnow due to the small amount of water being used and incorporating a screen on intake hose. Implementation of the project is expected to provide long-term benefits to the silvery minnow through increasing the amount and diversity of mesohabitats within the project reach. Therefore, Reclamation makes the determination that the Proposed Action *may affect, is likely to adversely affect* the minnow. Therefore, Incidental Take is requested.

The project area does occur in designated critical habitat for the silvery minnow; however, given the actions that will be implemented and the proposed conservation measures, the determination is that there will not be any significant adverse effects to those critical habitat components that are essential for the primary biological needs of the silvery minnow. Furthermore, the project will have beneficial effects on critical habitat by creating 17 acres of habitat that will begin inundating at flows of 800 cfs. The Proposed Action *may affect, is not likely to adversely affect* critical habitat for the silvery minnow.

4.1.2 SOUTHWESTERN WILLOW FLYCATCHER (EMPIDONAX TRAILLII EXTIMUS)

Information pertaining to status, life history, and habitat needs of the flycatcher can be found in the following documents:

Bureau of Reclamation. 2015. *Joint Biological Assessment, Bureau of Reclamation, Bureau of Indian Affairs, and Non-Federal Water Management and Maintenance Activities on the Middle Rio Range, New Mexico.*

Moore, D. and D. Ahlers. 2015. *2014 Southwestern Willow Flycatcher Study Results – Selected Sites Along the Rio Grande From Bandelier National Monument to Elephant Butte Reservoir, New Mexico.* Bureau of Reclamation, Technical Service Center, Fisheries and Wildlife Resources. Denver, Colorado.

- U.S. Fish and Wildlife Service. 1995. Endangered and threatened wildlife and plants; final rule determining endangered status for the southwestern willow flycatcher. *Federal Register* 60:10693–10715.
- U.S. Fish and Wildlife Service. 2002. *Final Southwestern Willow Flycatcher Recovery Plan*. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- U.S. Fish and Wildlife Service. 2005. Designation of critical habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). *Federal Register* 70:60886–61009.
- U.S. Fish and Wildlife Service. 2014. *Biological Opinion on the Effects of the U.S. Department of the Army, Corps of Engineers, Albuquerque District, Proposed Action of Construction, Operation and Maintenance of the Rio Grande Floodway, San Acacia to Bosque del Apache Unit in Socorro County, New Mexico (San Acacia Levee Project)*. Consultation No. 02ENNM00-2012-F-0015.

The flycatcher was listed as endangered without critical habitat designation on February 27, 1995 (Service 1995). Critical habitat designation was finalized in October 2005 (Service 2005) and recently revised flycatcher critical habitat (Service 2013). The project sites are located in designated critical habitat for the flycatcher. The flycatcher currently is known to use six breeding areas along the MRG in New Mexico: 1) Velarde to San Juan Pueblo, 2) Isleta Pueblo, 3) Sevilleta National Wildlife Refuge, 4) San Acacia Dam to Bosque del Apache National Wildlife Refuge, 5) Bosque del Apache National Wildlife Refuge, and 6) San Marcial to Elephant Butte Reservoir. The highest densities of breeding pairs occur in the San Marcial Reach supporting 205 pairs (Moore and Ahlers 2015).

The nearest recorded flycatcher nesting territories to the project area are within proximity to several of the restoration sites. These data from 2013–2014 from the Service and Reclamation are listed in Table 4.4. Several detections have taken place in the last 2 years, but only one sighting (LF33M2) is in proximity (approximately 365 feet) to RM 100.5. Individual flycatcher territories within 0.25 mile of the project area are shown in Figure 4.1. There were no territories within 0.25 mile of the project area in 2015.

Table 4.4. Southwestern Willow Flycatcher Territories within the Project Area

Territory ID	Site	Detection Type	Distance (feet)	Direction
2013				
LF03P1N1	99.5	Nest with pair	695	NNE
	100	Nest with pair	424	S
LF33P2	99.5	Pair	447	S
LF33P3	100.5	Pair	404	E
LF33P1N1	100	Nest with pair	1,185	SW
	100.5	Nest with pair	674	S
2014				
LF33M1	100.5	Unpaired male territories	397	NE
LF33M2	100.5	Unpaired male territories	365	ENE

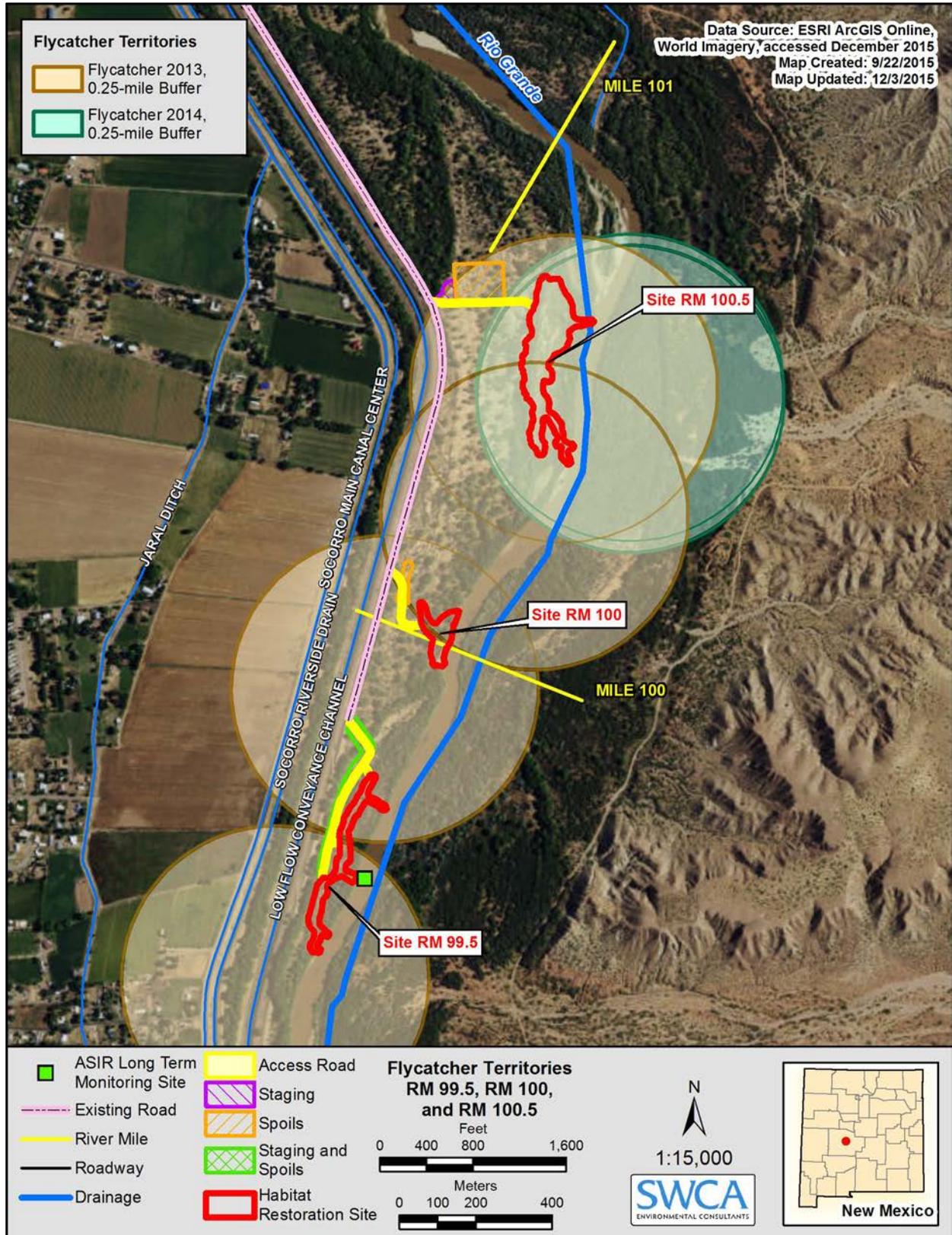


Figure 4.1. Flycatcher territories near RM 99.5, RM 100, and RM 100.5, 2013–2014.

Effects Analysis and Effects Determination

Potential short-term effects may result from vegetation removal within the project area. Best management practices discussed in Section 6 would be implemented to avoid or minimize any potential effects to the flycatcher or its critical habitat. Frequent flooding on banks and bars disturbs young or newly established vegetation through scouring and deposition processes. Since the project proposes to benefit native willow-dominated communities in disturbed areas through passive restoration, there may be an increase in willow habitat with increased inundation of the floodplain and increased areas of moist soil conditions during flycatcher migration and breeding seasons. This increase in the age diversity and structure of Goodding's and coyote willow would have a beneficial effect for the species. Vegetative growth at each of the restoration sites will be monitored for 3 years following construction to determine the effectiveness of the methods implemented. Therefore, no long-term adverse impacts would be experienced.

Flycatcher critical habitat encompasses the entire project area (Service 2005, 2013, 2015b). The proposed project would improve conditions for Goodding's willow, coyote willow, and Rio Grande cottonwood recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and connect the floodplain as an active ecological process. The project would provide long-term direct and indirect beneficial effects for the flycatcher and its critical habitat.

Hink and Ohmart (1984) vegetation with acreages at each site is listed in Section 3.1. Hink and Ohmart data was used during conceptual stages of the project and final vegetation data was based on field verification at each site. Flycatcher habitat based on GeoSystems Analysis (2014) vegetation mapping indicated that categories with a community type of 3d have high potential as flycatcher habitat; however, this was refined by a field visit by SWCA, Reclamation, and Service biologists. Total impacted suitable flycatcher habitat is approximately 1.3 acres at the RM 114 site and 0.2 acres at the RM 99.5 site (along the eastern side of the project area). There are 0.4 acres of dense willows along the western side of the project area at the RM 99.5 site; however, these area decadent and no longer provide suitable habitat. Also, while there was a territory in 2013 slightly less than 0.25 miles north of this patch, there were no territories within 0.25 miles in 2014 or 2015.

A temporary loss of breeding habitat would occur with the removal of vegetation in suitable habitat in the project area. However, there were no territories in 2015 in the project area and this restoration project would increase breeding habitat for the flycatcher through passive restoration of willow-dominated habitat that is expected to occur due to increased inundation of the floodplain and increased areas of moist soil conditions during flycatcher breeding seasons.

Construction work at the restoration sites would not be conducted at a time of year when flycatchers are present (April 15–August 15, or through September 1, when the cuckoo is present), so there are no direct effects to flycatchers. During construction, existing native vegetation, such as Rio Grande cottonwood and willow species, along access roads and within the project areas would be left in place and not removed to the extent possible. Vegetative growth at each of the restoration sites will be monitored for 3 years following construction to determine the effectiveness of the methods implemented. If project activities need to occur during the migratory bird season (between April 15 and August 15), Reclamation will coordinate

with the Service and conduct migratory bird surveys immediately prior to the initiation of work. If flycatchers are detected during project activity after April 15, then project activities will halt until flycatchers leave the area.

Because the project will not occur during the flycatcher breeding season, there are no 2015 territories within the project area, and the proposed project may benefit willow habitat, the proposed project *may affect, but is not likely to adversely affect* the flycatcher. The proposed project is expected to impact 1.5 acres of suitable flycatcher habitat; however, the project may increase willow habitat in this area, regenerating any removed vegetation. In the areas where suitable flycatcher and cuckoo habitat are impacted by the proposed project, Reclamation will assess the natural regeneration of vegetation after 3 years and coordinate with the Service to determine if additional revegetation activities are needed to develop suitable habitat. Given that there are no 2015 territories impacted by the project and the expected regeneration of vegetation, the proposed project would not diminish the conservation value of designated critical habitat for the flycatcher and therefore *may affect, but is not likely to adversely affect* designated critical habitat.

4.1.3 YELLOW-BILLED CUCKOO (*COCCYZUS AMERICANUS*)

Information pertaining to status, life history, and habitat needs of the cuckoo can be found in the following documents:

- Ahlers, D. and D. Moore. 2015. *Yellow-billed Cuckoo Study Results – 2014 Survey Results Middle Rio Grande from Los Lunas to Elephant Butte Reservoir, New Mexico*. Bureau of Reclamation, Technical Service Center, Fisheries and Wildlife Resources. Denver, Colorado.
- Bureau of Reclamation. 2015. *Joint Biological Assessment, Bureau of Reclamation, Bureau of Indian Affairs, and Non-Federal Water Management and Maintenance Activities on the Middle Rio Range, New Mexico*.
- U.S. Fish and Wildlife Service. 2013d. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); Final Rule. *Federal Register* 79:59992–60038.
- U.S. Fish and Wildlife Service. 2014c. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo; Proposed Rule. *Federal Register* 79:48548–48652.
- U.S. Fish and Wildlife Service. 2014. *Biological Opinion on the Effects of the U.S. Department of the Army, Corps of Engineers, Albuquerque District, Proposed Action of Construction, Operation and Maintenance of the Rio Grande Floodway, San Acacia to Bosque del Apache Unit in Socorro County, New Mexico (San Acacia Levee Project)*. Consultation No. 02ENNM00-2012-F-0015.

The western United States Distinct Population Segment of the cuckoo is federally listed as threatened by the Service (Service 2014c). Critical habitat for the cuckoo has been proposed for

the western distinct population segment (Service 2014a) including the project area. One of the largest populations of cuckoos occurs between Isleta Pueblo and Elephant Butte (Service 2014a, 2014b).

Recent recorded cuckoo territories within the project area are in the vicinity of several of the restoration sites. Service and Reclamation data from 2013–2015 are listed in Table 4.5. The 2015 data are preliminary territories and have not been finalized at the time of this BA. However, a 2-mile buffer was applied to determine the potential for impact at project sites. All the sites fall within overlapping cuckoo territories in 2015, with the exception of RM 114, which had only one territory that was within 1.84 miles. Since the 2-mile buffers overlap extensively, they are shown as a merged 2-mile buffer for clarity (Figure 4.2).

Table 4.5. Yellow-billed Cuckoo 2013 and 2014 Territories and 2015 Preliminary Territories within 2-miles of the Project Area

Detection Point	Site	Detection Type	Distance (feet)	Direction
2013				
LF03S1	99.5	Individual	> 2 miles	–
	100		> 2 miles	–
	100.5		9,327	NNW
LF03S2	99.5	Individual	1,283	NNE
	100		25	SW
	100.5		1,852	SSW
LF05S1	99.5	Individual	10,130	SSE
	100		> 2 miles	–
	100.5		> 2 miles	–
LF33S1	99.5	Individual	9,823	N
	100		8,411	NNW
	100.5		5,918	NNW
LF34S1	99.5	Individual	2,734	S
	100		5,206	S
	100.5		7,130	SSW
LF42S1	99.5	Individual	> 2 miles	–
	100		10,261	NNW
	100.5		7,895	NNW
LF42S2	99.5	Individual	10,039	NNW
	100		8,637	NNW
	100.5		6,162	NNW
2014				
LF01S1	112	Individual	5,686	S
	114		> 2 miles	–
LF01S2	112	Individual	7,595	S
	114		> 2 miles	–
LF03S1	99.5	Individual	> 2 miles	–

*Biological Assessment for the New Mexico Interstate Stream Commission San Acacia Habitat
Restoration Project from River Mile 116 to 99, Socorro County, New Mexico*

Detection Point	Site	Detection Type	Distance (feet)	Direction
	100		9,926	NNW
	100.5		7,689	NNW
LF05S1	99.5	Individual	10,246	SSE
	100		> 2 miles	–
	100.5		> 2 miles	–
LF33S1	99.5	Individual	9,553	NNW
	100		8,148	NNW
	100.5		5,691	NNW
LF34S1	99.5	Individual	2,141	S
	100		4,648	SSW
	100.5		6,596	SSW
2015				
LF33P1	99.5	Individual	3,696	E
	100		2,203	NNE
	100.5		777	NNE
LF03P1	99.5	Individual	4,537	NNE
	100		2,984	NNE
	100.5		196	NNE
LF03P2	99.5	Individual	6,715	NNW
	100		5,291	NNW
	100.5		3,008	NW
LF33P2	99.5	Individual	9,193	NNW
	100		7,761	NNW
	100.5		5,315	NNW
LF42P1	99.5	Individual	> 2 miles	–
	100		10,046	NNW
	100.5		7,754	NNW
LF04P1	99.5	Individual	9,351	SSE
	100		> 2 miles	–
	100.5		> 2 miles	–
LF34P1	99.5	Individual	10,023	SSE
	100		> 2 miles	–
	100.5		> 2 miles	–
LF01P1	112	Individual	2,137	SW
	114		9,715	S

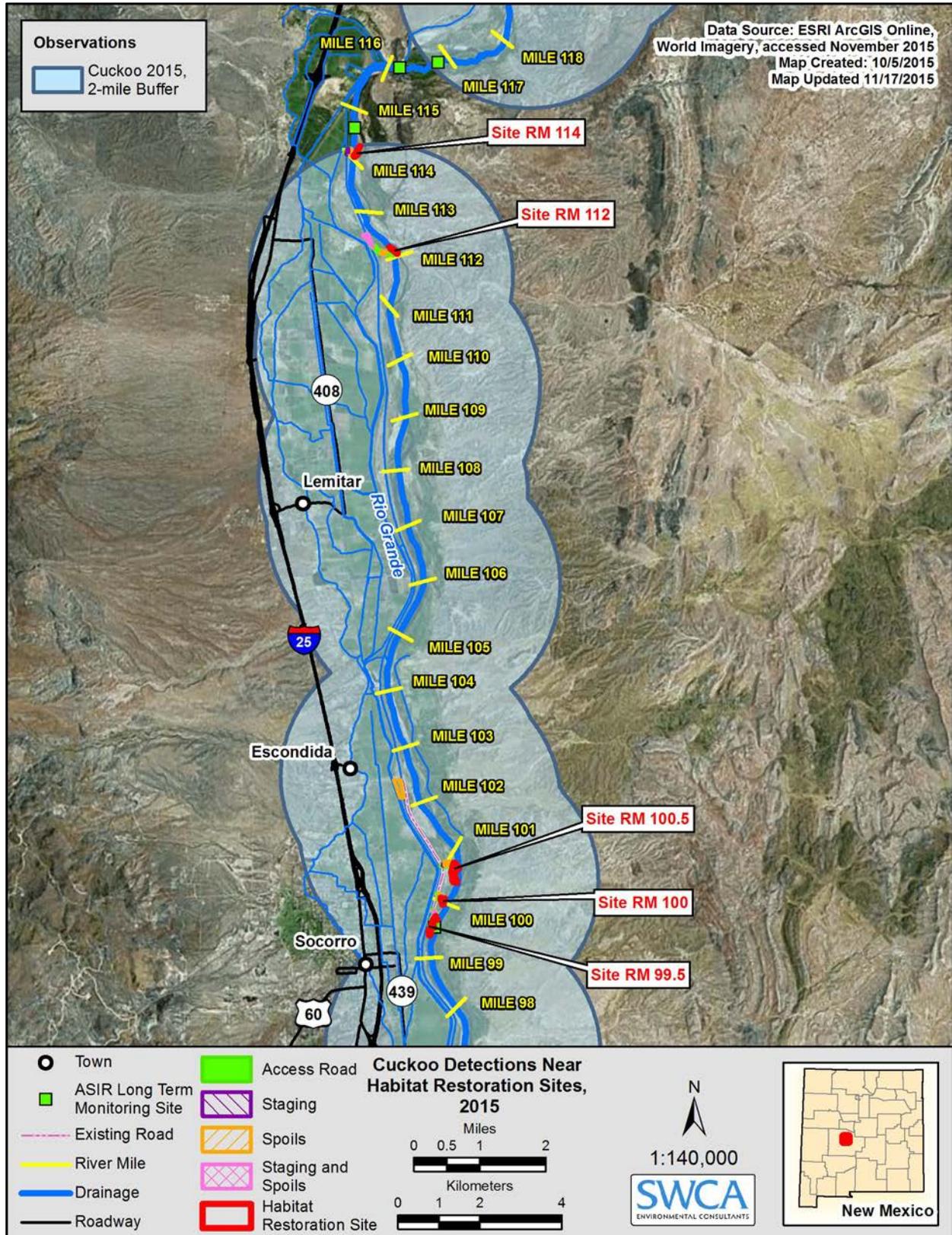


Figure 4.2. Cuckoo territories near habitat restoration sites in 2015; 2-mile buffers for each territory overlapped and were merged to improve clarity.

Effects Analysis and Effects Determination

Direct Effects

There are no direct effects to cuckoos since they will not be present during project activity. Reclamation and NMISC will seek to avoid impacts to birds protected by the Migratory Bird Treaty Act (MBTA), including the flycatcher and cuckoo, by conducting work activities outside the normal breeding and nesting season (April 15–August 15, or September 1 for work in suitable cuckoo habitat) during any year of work. If work is necessary between April 15 and September 1 in suitable cuckoo habitat, Reclamation and NMISC will coordinate with the Service prior to such work activities. During construction, existing native vegetation, such as Rio Grande cottonwood and willow species, along access roads and within the project areas would be left in place and not removed to the extent possible. Along the Middle Rio Grande, the species is known to nest from late June to late July (V. Ryan, pers. comm). In addition, revegetation and/or natural regrowth of young native willows are expected to have a positive effect on cuckoos and cuckoo habitat. Best management practices discussed in Section 6 would be implemented to avoid or minimize any potential effects to the cuckoo or its proposed critical habitat.

Indirect Effects

Potential short-term indirect effects may result from vegetation removal at the sites that have suitable or foraging habitat for cuckoos. Hink and Ohmart data was used during conceptual stages of the project and final vegetation data was based on field verification at each site. Hink and Ohmart (1984) vegetation with acreages at each site is listed in Section 3.1. Cuckoo habitat based on GeoSystems Analysis (2014) vegetation mapping indicated that categories with a community type of 1 and 3 have high potential as cuckoo habitat; however, this was refined by a field visit by SWCA, Reclamation, and Service biologists. The impact of vegetation removal on suitable and foraging habitat is shown in Table 4.6. Also, the proportion of the impacted area to the overall territory size is shown as a percentage of the acres of cuckoo territory in Table 4.6.

There are 0.4 acres of dense willows along the western side of the project area at the RM 99.5 site; however, these are decadent and no longer provide suitable habitat. Total impacted cuckoo habitat in the project area is approximately 2.3 acres (0.03%) and 9.9 acres (0.13%) for suitable habitat and foraging habitat, respectively. However, none of the cuckoo habitat at sites RM 114, RM 100.0 and RM 99.5 was within 750 meters of a territory center point in 2015. The RM 112 site was within approximately 650 meters of a territory center point in 2015 (LF01P1) and the RM 100.5 site was within approximately 50 meters of a territory center point in 2015 (LF03P1).

Table 4.6. Yellow-billed Cuckoo Suitable and Foraging Habitat at Each Site within the Project Area

Site	Total Project Area (acres)	Suitable Habitat Impacts (acres)	Impacted Suitable Percent of Territory (%)	Foraging Habitat Impacts (acres)	Impacted Foraging Percent of Territory (%)
RM 114	1.40	1.3	0.02	–	–
RM 112	1.40	–	–	1.3	0.02
RM 100.5	8.80	0.8	0.01	8.0	0.1
RM 100	1.90	–	–	–	–
RM 99.5	3.50	0.2	0.003	0.6	0.008
Total Acres	17	2.3	0.03	9.9	0.13

The proposed project is expected to improve conditions for Goodding's willow, coyote willow, and Rio Grande cottonwood recruitment through increasing moist soil conditions at seed dispersal. This would also increase the age diversity and structure of these species and connect the floodplain as an active ecological process. Therefore, the project is expected to provide long-term direct and indirect beneficial effects for the cuckoo and its proposed critical habitat in the San Acacia Reach. Vegetative growth at each of the restoration sites will be monitored for 3 years following construction to determine the effectiveness of the methods implemented (Section 2.6).

Since the impacted suitable and foraging habitat acreage at the RM 114, RM 100.0 and RM 99.5 sites was not within 750 meters of a territory center point in 2015 and the impacted acreage within each territory ranges from 0.003% to 0.1% of the territory, the effect at those sites is not meaningfully measurable, and therefore insignificant.

However, the sites at RM 112 and 100.5 were within 750 meters of a territory center point in 2015. Since the acreage between the territory center and the project site at RM 112 is sparse monotypic salt cedar and is only 0.02% of the entire territory, the effect is not meaningfully measurable and insignificant.

The RM 100.5 site was within approximately 50 meters of a territory center point in 2015 (LF03P1). Therefore, the project may have an adverse impact to 0.8 acres of suitable habitat and 8.0 acres of foraging habitat at this site. This is expected to be a short-term impact and revegetation and/or natural regrowth of young native willows are expected to have a positive effect on cuckoos and cuckoo habitat at all project sites. Due to the short term adverse effect of vegetation removal at this site, the proposed project *may affect, is likely to adversely affect* the cuckoo.

Given the small proportion of impacted area to territory size and the expected regeneration of vegetation, the proposed project would not diminish the conservation value of proposed critical habitat for the cuckoo and therefore may affect, is not likely to adversely affect proposed critical habitat.

5 CONCLUSION

Three of the federally listed species listed for Socorro County have the potential to occur in the project area: silvery minnow, flycatcher, and cuckoo.

Potential impacts of the proposed project to the silvery minnow are limited to small, isolated areas and a short disturbance time period. At all sites, work would be conducted in the dry behind barrier berms along the water's edge. Work conducted in the wet would be associated with the removal of the barrier berms to connect the feature to the river channel, resulting in a wetted impact area of 0.555 acre. Pumping water for dust abatement would have no indirect or direct effect to the silvery minnow due to the small amount of water being used and incorporating a screen on the intake hose.

Implementation of the proposed project is expected to provide long-term benefits to the silvery minnow through increasing the amount and diversity of mesohabitats within the project reach. As a result, no direct or indirect adverse effects to designated critical habitat of the silvery minnow are expected to occur. The proposed project *may affect, is not likely to adversely affect* critical habitat for the silvery minnow. However, a risk of harming silvery minnow cannot be ruled out during construction. The project *may affect, is likely to adversely affect* the silvery minnow. Therefore, Incidental Take is requested.

The flycatcher and cuckoo occur within the project area and designated and proposed critical habitat for both species occurs within the project area. Total impacted suitable flycatcher habitat in the project area is approximately 1.5 acres. However, there were no flycatcher territories in 2015 in the project area. Total impacted cuckoo habitat in the project area is approximately 2.3 acres (0.03%) and 9.9 acres (0.13%) for suitable habitat and foraging habitat, respectively. However, an increase in flycatcher and cuckoo habitat is expected due to natural regeneration and recruitment of native willow-dominated riparian habitat communities in the project area, providing better habitat than currently exists. In the areas where suitable flycatcher and cuckoo habitat are impacted by the proposed project, Reclamation and the NMISC will assess the natural regeneration of vegetation after 3 years and coordinate with the Service to determine if additional revegetation activities are needed to develop suitable habitat. Therefore, no long-term adverse impacts are expected.

Because flycatchers will not be present during project activity, there are no 2015 territories within the project area, and the proposed project may benefit willow habitat, the proposed project *may affect, but is not likely to adversely affect* the flycatcher and its designated critical habitat.

The impact to suitable and foraging habitat acreage at the RM 114, RM 112, RM 100.0 and RM 99.5 sites was determined to be insignificant and therefore discountable. However, vegetation removal may have an adverse impact to 0.8 acres of suitable habitat and 8.0 acres of foraging habitat at the RM 100.5 site. This is expected to be a short-term impact and revegetation and/or natural regrowth of young native willows are expected to have a positive effect on cuckoos and cuckoo habitat at all project sites. Due to the short term adverse effect of vegetation removal at the RM 100.5 site, the proposed project *may affect, is likely to adversely affect* the cuckoo. Given the small proportion of impacted area to territory size and the expected regeneration of vegetation, the proposed project would not diminish the conservation value of proposed critical habitat for the cuckoo and therefore *may affect, is not likely to adversely affect* proposed critical habitat.

6 CONSERVATION MEASURES

Reclamation and the NMISC propose the following conservation measures to minimize or avoid adverse effects of implementing the activities proposed in this BA:

6.1 TIMING OF THE PROPOSED ACTION

1. Reclamation and the NMISC will seek to avoid impacts to birds protected by the MBTA, including the flycatcher and cuckoo, by conducting work activities outside the normal breeding and nesting season (April 15–August 15, or September 1 for work in suitable cuckoo habitat) during any year of work in consideration of migratory birds.
 - 1.1. If work is necessary between April 15 and August 15 (or September 1 for work in suitable cuckoo habitat), suitable/occupied migratory bird habitat would be avoided during the construction activities as much as possible, utilizing the most current annual survey results in conjunction with habitat suitability. Reclamation and/or NMISC would use current flycatcher and cuckoo monitoring data to avoid work within 0.25 mile of an active nest as much as possible. Coordination and consultation with the Service would occur prior to such work activities.
 - 1.2. Reseeding or revegetation may be accomplished by hand or by mechanized means, such as using a Truax imprinter followed by hand or tractor broadcast seeding (see section 6.5 below). 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 timeframe (or September 1 for work in suitable cuckoo habitat), migratory bird surveys would be conducted immediately prior to the work to determine if any breeding birds are present. If birds are detected, Reclamation and the NMISC would coordinate with the Service to determine appropriate next steps.

6.2 WATER QUALITY

2. The NMISC will obtain all applicable permits prior to implementation of the project, including CWA permits. Reclamation and the NMISC will comply with the requirements of the CWA and other permits associated with the project, including required reporting to the appropriate authorities as needed and will not begin work until all required permits are obtained.
3. Silt fences and/or appropriate erosional controls will be used around the project site to manage water runoff in the site in accordance with CWA requirements.
4. Reclamation and/or the NMISC will visually monitor for water quality in the areas below areas of river work before and during the work day when work results in contact with wetted areas. Monitoring will include visual observations and may include direct sampling, as appropriate.

- 4.1. If direct sampling is needed, water quality parameters to be tested include pH, temperature, dissolved oxygen, and turbidity. Parameters will be measured both upstream and downstream of the work area.
- 4.2. Responses to changes in water quality measures exceeding the applicable standards would include reporting the measurements to the New Mexico Environment Department Surface Water Quality Bureau and moving construction activities away from the shore.

6.3 EQUIPMENT AND OPERATIONS

5. Reclamation-led work activities that have the potential for adverse impacts will be monitored by properly trained Reclamation personnel in order to ensure compliance. Non-Reclamation partners will have an on-site environmental monitor during all work activities that have the potential for adverse impacts in order to ensure compliance. Also, an environmental monitor will regularly assess other activities to ensure compliance.
6. The sites will be excavated as few times as possible to minimize disturbance of sediments. Excavation will not occur within the wetted channel; however, removal of the last part of the riverbank to connect the feature to the river will result in some contact with wetted areas. The excavator operator will minimize disturbance of sediments in the river by minimizing excavator bucket contact with riverbed.
7. Each individual operator will be briefed on local environmental considerations specific to the project tasks.
8. The impact of hydrocarbons will be minimized by mitigating potential for spills into or contamination of aquatic habitat:
 - 8.1. Hydraulic lines will be checked each morning for leaks and periodically throughout each work day. Any leaky or damaged hydraulic hoses will be replaced.
 - 8.2. All fueling will take place outside the active floodplain with a spill kit ready. Fuel, hydraulic fluids, and other hazardous materials may be stored on-site overnight, but outside the normal floodplain, not near the river or any location where a spill could affect the river.
 - 8.3. All equipment will undergo high-pressure spray cleaning and inspection prior to initial operation in the project area.
 - 8.4. Equipment will be parked on pre-determined locations on high ground away from the river overnight, on weekends, and holidays.
 - 8.5. Spill protection kits will be on-site, and operators will be trained in the correct deployment of the kits.
 - 8.6. 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.

9. Equipment will be removed from the floodplain in the event of high storm surges that inundate the floodplain.
10. To allow fish time to leave the area before in-water work begins, equipment will initially enter the water slowly. In-water work will be fairly continuous during work days, so that fish are less likely to return to the area once work has begun.

6.4 ACCESS AND STAGING

11. 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 (see also section 6.5 below).
12. All necessary permits for access points, staging areas, and study sites will be acquired prior to construction activity.

6.5 VEGETATION REPLANTING AND CONTROL

13. A variety of revegetation strategies may be used: long stem transplants (Los Lunas Plant Materials Center 2007a), stem and pole cuttings (Los Lunas Plant Materials Center 2007b), and upland planting with and without a polymer, zeolite, or similar compound to maximize soil water retention (Dreesen 2008). Planting techniques may vary from site to site and may consist of buckets, augers, stingers, and/or water jets mounted on construction equipment. In some areas, a trench may be constructed to facilitate the placement of a significant number of plants, specifically stem and pole cuttings. Seeding would be accomplished using a native seed drill, where feasible, and spread with a protective covering, which would provide moisture to the seeds.
14. Vegetation control may consist of mechanical removal, burning, and/or mowing. Herbicides will not be used.
15. Native vegetation at work sites will be avoided to the extent possible. If large, native woody vegetation (primarily cottonwood) needs to be trimmed or removed, they would be replaced at a ratio of 10:1. To the extent possible, cottonwoods will be planted to replace Russian olive species removed on-site. When and where possible, small, native woody vegetation will be removed or harvested at the appropriate season to use for revegetation work at another location in the project area or at another project site. Where necessary, willow species will be removed at the root ball to be saved and replanted on-site. Native vegetation that cannot be replanted may be mulched (mulch would be removed or spread on site at a depth of 3 inches or less) or temporarily stockpiled and used to create dead tree snags or brush piles in the project area upon completion.

16. Non-native vegetation that is removed at work sites will be mulched, burned, or removed off-site to an approved location. Mulched vegetation may also be spread on-site at a depth of 3 inches or less.

6.6 DUST ABATEMENT

17. If water is needed for dust abatement or to facilitate grading of roads, water may be pumped from the LFCC. In the unlikely event the LFCC does not have sufficient flow, water would be pumped from the Rio Grande or secondary channels adjacent to the river. Pumping is not expected to be needed between April 15 and August 15 (or September 1 in suitable cuckoo habitat); however, if pumping from the river is needed as a last possible source between May 1 and July 1 (emergencies only), Reclamation and the NMISC would coordinate with the Service to avoid impacts to silvery minnow eggs and larvae. If pumping from the river was necessary, an amount not to exceed 5% of river flows at the time of pumping may be drawn from the Rio Grande. Pumping is short duration (minutes) for filling whatever water transport equipment is used. Pump intake pipes would use a 0.25-inch mesh screen at the opening of the intake hose to minimize entrainment of aquatic organisms.

6.7 OTHER MEASURES

18. All treatment and control areas will be monitored for 3 years following construction to determine the effectiveness of the methods implemented and identify project-related hydrologic alterations. The monitoring would consist of biological, vegetation, and hydrologic monitoring, as appropriate, to the project design and purpose.
19. 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.
20. All work projects will have a contract in place for the rental of portable restroom facilities during the duration of the project.

7 REFERENCES

- Ahlers, D. and D. Moore. 2015. Yellow-billed Cuckoo Study Results – 2014 Survey Results Middle Rio Grande from Los Lunas to Elephant Butte Reservoir, New Mexico. Bureau of Reclamation, Technical Service Center, Fisheries and Wildlife Resources. Denver, Colorado.
- Bestgen, K.R., and S.P. Platania. 1991. Status and conservation of the Rio Grande silvery minnow, *Hybognathus amarus*. *The Southwestern Naturalist* 36: 225–232.
- Bestgen, K.R., and D.L. Propst. 1996. Redescription, geographic variation, and taxonomic status of Rio Grande silvery minnow, *Hybognathus amarus* (Girard 1856). *Copeia* 1996(1):41–55.
- Biota Information System of New Mexico (BISON-M). 2015. BISON-M home page. Available at: <http://www.bison-m.org>. Accessed June 2015.
- Browning, M.R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). *Western Birds* 24:241–257.
- Dick-Peddie, W.A. 1993. New Mexico vegetation past, present, and future. Albuquerque, New Mexico. University of New Mexico Press. 244 p.
- Dreesen, D.R. 2008. Basic Guideline for Seeding Native Grasses in Arid and Semi-Arid Ecoregions. USDA-NRC Plant Materials Center. Los Lunas, NM 4p.
- Dudley, R.K., and S.P. Platania. 1996. *Rio Grande Silvery Minnow Winter Population-Habitat Use Monitoring Project: Summary of Four Trips (December 1995-March 1996)*. Albuquerque, New Mexico.
- . 1997. *Habitat Use of Rio Grande Silvery Minnow*. Report to the New Mexico Department of Game and Fish, Santa Fe, and U.S. Bureau of Reclamation, Albuquerque, New Mexico.
- . 2007. *Rio Grande Silvery Minnow Population Monitoring Program Results from October 2005 to October 2006*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2008. *Rio Grande Silvery Minnow Populating Monitoring Program Results from December 2006 to October 2007*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2009. *Summary of the Rio Grande Silvery Minnow Population Estimation Program Results from October 2009*. Report to the U.S. Bureau of Reclamation, Albuquerque.
- . 2011. *Rio Grande Silvery Minnow Population Monitoring Results from September 2009 to October 2010*. Albuquerque: American Southwest Ichthyological Researchers.

- . 2012. *Rio Grande Silvery Minnow Population Monitoring Results from December 2010 to October 2011*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2013. *Rio Grande Silvery Minnow Population Monitoring Results from December 2011 to October 2012*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2014. *Rio Grande Silvery Minnow Population Monitoring Results from May 2013 to October 2013*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2015a. *Rio Grande Silvery Minnow Population Monitoring Results from February to December 2014*. Albuquerque: American Southwest Ichthyological Researchers.
- . 2015b. *Summary of Rio Grande Silvery Minnow Population Monitoring Results from February to September 2015*. Albuquerque: American Southwest Ichthyological Researchers.
- Environmental Systems Research Institute (ESRI). 2015. ArcGIS Online Basemap, World Imagery. Accessed November 2015.
- GeoSystems Analysis. 2014. Technical Memorandum: Habitat Restoration Project Prioritization for RIP Action Plan – Phase 2. Prepared for the New Mexico Interstate Stream Commission, Santa Fe, New Mexico. NMISC Work Order RG-14-01. June 2014.
- Gonzales, E.J., and M.D. Hatch. 2009. *Habitat Restoration Monitoring*. Prepared for the New Mexico Interstate Stream Commission, Santa Fe. Albuquerque: SWCA Environmental Consultants.
- Gonzales, E.J., D. Tave, and G.M. Haggerty. 2014. Endangered Rio Grande silvery minnow use constructed floodplain habitat. *Ecohydrology* 7:1087–1093.
- Hatch, M.D., and E.J. Gonzales. 2008. *Los Lunas Habitat Restoration Fisheries Monitoring. Project Summary Report*. Prepared for the U.S. Bureau of Reclamation.
- Hink, V.C. and R.D. Ohmart. 1984. Middle Rio Grande Biological Survey. Submitted to the U.S. Army Corps of Engineers (9Contract No. DACW47-81-C-0015), Albuquerque District, Albuquerque, New Mexico.
- Los Lunas Plant Materials Center. 2007a. *Deep Planting: The Groundwater Connection – Guidelines for Planting Longstem Transplants for Riparian Restoration in the Southwest*. USDA-NRC Plant Materials Center. Los Lunas, NM, 2 p.
- . 2007b. *Deep Planting: The Groundwater Connection – Guidelines for Planting Dormant Whip Cutting to Revegetate and Stabilize Streambanks*. USDA-NRC Plant Materials Center. Los Lunas, NM, 2 p.
- Moore, D. 2007. Vegetation Quantification of Southwestern Willow Flycatcher Nest Sites: Rio Grande from La Joya to Elephant Butte Reservoir Delta, New Mexico 2004–2006. Denver: U.S. Bureau of Reclamation, Fisheries and Wildlife Resources.

- Moore, D., and D. Ahlers. 2008. 2007 Southwestern Willow Flycatcher Study Results: Selected Sites along the Rio Grande from Velarde to Elephant Butte Reservoir, New Mexico. This document produced by the U.S. Bureau of Reclamation.
- . 2015. 2014 Southwestern Willow Flycatcher Study Results – Selected Sites Along the Rio Grande From Bandelier National Monument to Elephant Butte Reservoir, New Mexico. Bureau of Reclamation, Technical Service Center, Fisheries and Wildlife Resources. Denver, Colorado.
- SWCA Environmental Consultants (SWCA). 2010. *Middle Rio Grande Isleta Reach Riverine Restoration Project Phase II Environmental Assessment*. Prepared for the U.S. Bureau of Reclamation.
- . 2014. *RiverEyes Observations in the Middle Rio Grande for the 2014 Irrigation Season Final Report*. Prepared for the U.S. Bureau of Reclamation.
- . 2015. *Isleta and San Acacia Reach Habitat Restoration Monitoring. Draft Report*. Prepared for the New Mexico Interstate Stream Commission.
- Unitt, P. 1987. *Empidonax traillii extimus*: an endangered subspecies. *Western Birds* 18:137–162.
- U.S. Bureau of Reclamation (Reclamation). 2003. *Geomorphic Assessment of the Rio Grande San Acacia Reach, Final Report*. Albuquerque Area Office, Albuquerque.
- . 2005. *Middle Rio Grande Riverine Habitat Restoration Project Environmental Assessment and (FONSI)*. FONSI Number: AAO-05-010. Albuquerque Area Office, Albuquerque. 76 pp.
- . 2006. *2006 Southwestern Willow Flycatcher Study Results. Selected Sites along the Rio Grande from Velarde to Elephant Butte Reservoir, New Mexico*. Albuquerque: U.S. Bureau of Reclamation, Albuquerque Area Office.
- . 2007a. *Middle Rio Grande Riverine Habitat Restoration Project Phase II Environmental Assessment and (FONSI)*. FONSI Number: AAO-07-001. Albuquerque Area Office, Albuquerque. 76 pp.
- . 2007b. *Environmental Assessment. Perennial Rio Grande Silvery Minnow Refugia at Drain Outfalls*. Albuquerque Area Office, Albuquerque.
- . 2009. *Middle Rio Grande Isleta Reach Riverine Restoration Project Environmental Assessment and Finding of No Significant Impact (FONSI)*. FONSI Number: AAO-09-006. Albuquerque Area Office, Albuquerque.
- . 2015. *Joint Biological Assessment of Bureau of Reclamation and Non-federal Water Management and Maintenance Activities on the Middle Rio Grande, New Mexico. Middle Rio Grande Project, New Mexico / San Juan-Chama Project, New Mexico, Upper Colorado Region*. Albuquerque Area Office, Albuquerque.

- U.S. Fish and Wildlife Service (Service). 1994. Endangered and Threatened Wildlife and Plants; Final Rule To List the Rio Grande Silvery Minnow as an Endangered Species. *Federal Register* (59 FR 36988 36995), July 20, 1994. Albuquerque, New Mexico, USA. Available at: http://ecos.fws.gov/docs/federal_register/fr2631.pdf. Accessed June 2015.
- . 1995. Endangered and Threatened Wildlife and Plants; Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). *Federal Register* (60 FR 10693–10715), March 29, 1995. Phoenix, Arizona, USA. Available at: <http://www.gpo.gov/fdsys/pkg/FR-1995-02-27/pdf/95-4531.pdf>. Accessed June 2015.
- . 1999. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Rio Grande Silvery Minnow, Final Rule. *Federal Register* (64 FR 36274 36290), July 6, 1999. Albuquerque, New Mexico, USA. Available at: <http://www.gpo.gov/fdsys/pkg/FR-1999-07-06/pdf/99-16985.pdf>. Accessed June 2015.
- . 2001. Endangered and Threatened Wildlife and Plants; 12-Month Finding For A Petition to list the Yellow-Billed Cuckoo (*Coccyzus americanus*) in the Western Continental United States. *Federal Register* (66 FR 38611-38626), July 25, 2001. Sacramento, California, USA. Available at: http://ecos.fws.gov/docs/federal_register/fr3780.pdf. Accessed June 2015.
- . 2002. Final Recovery Plan Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Southwestern Willow Flycatcher Recovery Team Technical Subgroup. Albuquerque: U.S. Fish and Wildlife Service, Region 2.
- . 2003a. Biological and Conference Opinions on the Effects of Actions Associated with the Programmatic Biological Assessment of Bureau of Reclamation’s Water and River Maintenance Operations, Army Corps of Engineers’ Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, Albuquerque. Consultation Number 2-22-03-F-0129. March 17.
- . 2003b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Rio Grande Silvery Minnow, Final Rule. *Federal Register* (68 FR 8088-8135), February 19, 2003. Available at: <http://www.gpo.gov/fdsys/pkg/FR-2003-02-19/pdf/03-3255.pdf#page=1>. Accessed June 2015.
- . 2005. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). *Federal Register*, Volume 70, No. 20 / Wednesday, October 19, 1995 / Final Rule. Pp. 60886–61009.
- . 2013. Final Critical Habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*), Final Rule. *Federal Register* (78 FR 343–534), January 3, 2013. Albuquerque, New Mexico, USA. Available at: <http://www.gpo.gov/fdsys/pkg/FR-2013-01-03/pdf/2012-30634.pdf>. Accessed June 2015.
- . 2014a. Proposed Critical Habitat for the western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*). *Federal Register* (79 FR 71373–71375),

December 2, 2014. Albuquerque, New Mexico, USA. Available at:
<http://www.gpo.gov/fdsys/pkg/FR-2014-12-02/pdf/2014-28330.pdf>. Accessed June 2015.

- . 2014b. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); Final Rule. *Federal Register* (79 FR 59992–60038); October 3, 2014. Available at: <http://www.gpo.gov/fdsys/pkg/FR-2014-10-03/pdf/2014-23640.pdf>. Accessed June 2015.
- . 2014c. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo; Proposed Rule. *Federal Register* 79:48548-48652.
- . 2014d. Biological Opinion on the Effects of the U.S. Department of the Army, Corps of Engineers, Albuquerque District, proposed action of construction, operation and maintenance of the Rio Grande Floodway, San Acacia to Bosque del Apache Unit in Socorro County, New Mexico (San Acacia Levee Project). Consultation No. 02ENNM00-2012-F-0015.
- . 2015a. Endangered, Threatened, Proposed and Candidate Species of Socorro County, New Mexico. Information, Planning, and Conservation (IPaC) System. Available at: <http://ecos.fws.gov/ipac>. Accessed June 2015.
- . 2015b. U.S. Fish and Wildlife Service Critical Habitat Portal. Available at: <http://criticalhabitat.fws.gov/crithab/>. Accessed June 2015.
- . 2015c. Migratory Bird Treaty Act Trust Resources List. Available at: <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/MBTANDX.HTML>. Accessed June 2015.

This page left intentionally blank

APPENDIX A
PROJECT AREA PHOTOGRAPHS

This page left intentionally blank



Figure A.1. RM 114 project area.



Figure A.2. RM 114 project area.



Figure A.3. RM 112 project area.



Figure A.4. RM 112 project area.



Figure A.5. RM 100.5 project area.



Figure A.6. RM 100.5 project area.



Figure A.7. RM 100 project area.



Figure A.8. RM 99.5 project area.



Figure A.9. RM 99.5 project area.