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RECLAMATION

Draft Environmental Assessment and Finding of No Significant Impact

San Acacia Diversion Dam Fish Passage, New Mexico



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

Draft Environmental Assessment and Finding of No Significant Impact

**San Acacia Diversion Dam Fish Passage, New Mexico
Albuquerque Area Office, Upper Colorado Region**

Prepared for
U.S. Bureau of Reclamation, Albuquerque Area Office

Prepared by
Tetra Tech

January 2021

Cover Photo: San Acacia Diversion Dam. (Tetra Tech, July 2020)

Finding of No Significant Impact

**U.S. Bureau of Reclamation
Environmental Assessment**

San Acacia Diversion Dam Fish Passage Environmental Assessment

Environmental and Lands Division Manager

Date

Albuquerque Area Office Manager

Date

Based on the analysis of potential environmental impacts contained in the attached environmental assessment, the proposed action does not constitute a major federal action. Considering the significance criteria in 40 CFR 1508.27, I have determined that the San Acacia Diversion Dam Fish Passage Project will not have a significant effect on the human environment. An environmental impact statement is therefore not required.

FONSI Number _____

Summary of the Analyzed Alternatives

The U.S. Department of the Interior, Bureau of Reclamation, is proposing to implement fish passage at the San Acacia Diversion Dam (SADD) in order to facilitate both upstream and downstream movement of the federally endangered Rio Grande Silvery Minnow (*Hybognathus amarus*; Silvery Minnow), and reconnect habitat currently fragmented by the dam. This dam is located east of the village of San Acacia, New Mexico on the Rio Grande in Socorro County (34.255727 N, -106.887377 W). This Draft Environmental Assessment (DEA) analyzes the effects of two alternative concepts for fish passage on environmental and cultural resources in the Project Area. The Proposed Action is to construct a fishway outside of the Rio Grande and around the SADD and the other action alternative is to construct a fishway in the main channel of the Rio Grande and through the SADD. Because scoping for this analysis began prior to September 14, 2020, this DEA has been developed following the previous version of the Council on Environmental Quality regulations (40 CFR parts 1500-1508, 1978 as amended in 1986 and 2005). After this DEA is finalized, Reclamation will proceed into a design phase for the preferred alternative, and additional environmental compliance will be done as appropriate.

A determination was made that the following resources and conditions would not be impacted from either of the analyzed alternatives: aesthetics; migratory birds; and water delivery. A determination was made that the analyzed alternatives would not have the potential for significant impacts on hydrology, hydraulics, and geomorphology; water quality; air quality and noise; vegetation and wetlands; Southwestern Willow Flycatcher (*Empidonax traillii extimus*; SWFL) and designated Critical Habitat; Yellow-billed Cuckoo (*Coccyzus americanus*; cuckoo) and proposed Critical Habitat; cultural resources; Indian Trust Assets; and socioeconomic. The rationale for all determinations can be found in Chapter 3 of the attached DEA.

It was determined that both alternatives “may affect and are likely to adversely affect” the Silvery Minnow because of construction impacts within wetted habitats. Both alternatives “may affect and are likely to adversely affect” Silvery Minnow Critical Habitat in the Proposed Project Area because of permanent occupation of aquatic habitat by either fishway alternative. Both analyzed alternatives “may affect but are not likely to adversely affect” either the SWFL or its Critical Habitat, or the cuckoo or its proposed Critical Habitat.

With the implementation of environmental commitments and best management practices (BMPs), effects to other resources are considered neutral and only minor and/or temporary negative impacts have been identified.

Environmental Impacts

The following resources, conditions, and socioeconomic factors were evaluated in this DEA to determine the impacts that would result from the proposed alternatives at SADD: Hydrology, hydraulics and geomorphology; Water quality; Air quality and noise; Vegetation and wetlands; Threatened, Endangered Species and their habitat; Cultural Resources; Indian Trust Assets (ITA); and Socioeconomic environment and environmental justice.

Water Resources/Water Quality

Implementation of either analyzed alternative would result in temporary river impacts (i.e., increased turbidity) when equipment is mobilized into and across the river channel in the immediate vicinity of the SADD to construct either fishway design and connect the upstream and downstream entrance and exit(s). Dam gates would be managed to dewater the area below these gates, with only seepage flow present. This will allow for a reduced wet area in the construction zone thus limiting the energy that would mobilize sediment downstream. In the event that river flow is not able to be managed through gate operations alone, a temporary dewatering barrier (e.g. coffer dam) will be constructed in such a way to divert flows around the in-channel work sites. Some crossing of the active flow area will need to occur to place this temporary dewatering barrier to confine flows away from the work area. Crossings through the active channel may occur if material from the upstream bar is needed to be moved to the apron rock ramp area.

Both analyzed alternatives would cause some short-term increases in turbidity levels within the water column due to the construction activities, i.e., ground disturbance and exposed soils. However, the increase would be a small contribution relative to the sediment load the river already carries. The effects of either analyzed alternative on erosion and water quality are considered minor and temporary in nature. Much of the work would be performed in a partially dewatered work area to minimize adverse effects of increased turbidity due to construction activities. BMPs (i.e., initial steam cleaning of all the equipment and checking the equipment several times per day) would be followed to avoid the inadvertent risk of a discharge of pollutants into surface waters while the equipment is being used in the vicinity of the river. All requirements from consultation and coordination for Clean Water Act sections 401, 402, and 404 will be implemented.

Air Quality and Noise

Implementation of either analyzed alternative may result in slight and temporary impacts to air quality and noise in the Proposed Project Area. The dust abatement BMP described in the Environmental Commitments section will help to minimize particulate matter caused by soil disturbance and equipment operation. Equipment operation might also lead to increased noise levels in the Project Area, but these would cease when construction is complete.

Vegetation and Wetlands

Both of the alternatives analyzed would result in the permanent removal of woody vegetation on the downstream, river left bank of the Rio Grande for placement of the fishway. Both alternatives would result in impacts to likely jurisdictional wetlands located on the upstream river left bank-attached bar.

Threatened and Endangered Species (Critical Habitat)

In accordance with Section 7(a) (2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. Consultation with the U.S. Fish and Wildlife Service is a separate process and will continue through the design process and is only referenced in this document.

As some construction is anticipated to occur in the wet, and flows will be diverted within the river channel away from existing wetted habitat, a determination was made that the proposed project “may affect and is likely to adversely affect” the Silvery Minnow. A determination has been made that construction of either alternative “may affect and is likely to adversely affect” Silvery Minnow Critical Habitat from the permanent occupation of main river channel habitats by either constructed fishway. In addition, there may be temporary and generally minor impacts to water quality during construction with no impacts to water flow. Overall, it is expected that the short-term impacts to the Silvery Minnow, and the long-term impacts to designated Critical Habitat, are outweighed by reconnecting fragmented riverine habitat in the Rio Grande. A determination was made that the Proposed Project Area “may affect and is not likely to adversely affect” the SWFL because of the timing of construction; and “may affect but is not likely to adversely affect” its designated Critical Habitat. The Proposed Project Area “may affect but is not likely to adversely affect” the cuckoo because of timing of construction; and “may affect but is not likely to adversely affect” its proposed Critical Habitat.

Use of a temporary dewatering barrier limiting most flows in the work area to seepage flow by closure of select dam gates, and BMPs related to equipment maintenance and operation, should help minimize the adverse effects to the Silvery Minnow. Timing construction activities to occur outside of nesting season should help minimize adverse effects to the SWFL and cuckoo. Any other requirements identified during consultation and coordination for the Endangered Species Act will also be implemented.

Cultural Resources

Construction of either alternative would result in impacts to previously and newly recorded cultural resources in the Proposed Project Area. Impacts to cultural resources would be minimized through design considerations, BMPs, and mitigated in consultation with the State Historic Preservation Office as appropriate.

Indian Trust Assets

No ITA Assets were identified in the work area so there is no effect to these resources.

Environmental Justice

As reported in the 2018 U.S. Census Bureau data, none of the jurisdictions in the affected area have low-income (reported as Individuals in Poverty) populations of greater than 50 percent, also none of the jurisdictions have nonwhite populations or Hispanic populations that are over 50 percent of their population. Reclamation does not think that this project will have a disproportionate effect on this population.

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Chapter 1 Purpose and Need

Introduction

The U.S. Bureau of Reclamation (Reclamation) is proposing to implement fish passage at the San Acacia Diversion Dam (SADD) in Socorro County, New Mexico (Figure 1). The proposed project would entail constructing long term fish passage for the purpose of connecting habitat upstream and downstream of the SADD for the Rio Grande Silvery Minnow (*Hybognathus amarus*, Silvery Minnow). This Draft Environmental Assessment (DEA) was prepared to assess the potential effects of two different action alternatives for accomplishing fish passage at SADD and one no action alternative.

Need for Proposal

The need for action is to implement long term Silvery Minnow passage and river connectivity at the SADD, in accordance with the 2016 Biological Opinion (BiOP) for management and maintenance activities on the Middle Rio Grande. The 2016 BiOp outlines a Silvery Minnow survival and recovery strategy and restoring river connectivity is an element of this (U.S. Fish and Wildlife Service [Service] 2016). In order to accomplish this, the BiOP includes Conservation Measures that require that fish passage be constructed around the Angostura, Isleta and San Acacia Diversion Dams. Fish passage will allow movement for Silvery Minnow, which is critical to survival of the species because it provides access to additional suitable habitat and genetic connectivity for the species (Service 2016). The BiOP requires that the fish passage be implemented at SADD within 5 years (Reasonable and Prudent Measure 3).

Decision to be Made

This DEA has been prepared to evaluate the effects of the two action alternatives and a no action alternative, and to provide a basis for decision by Reclamation on whether or not to implement any of the alternatives analyzed. The basis provided for decision making by this DEA is associated with minimizing impacts to both environmental and cultural resources, which is consistent with the intent of the National Environmental Policy Act (NEPA). After this DEA is finalized, Reclamation will proceed into a design phase for the preferred alternative, and additional environmental compliance will be done, as appropriate.

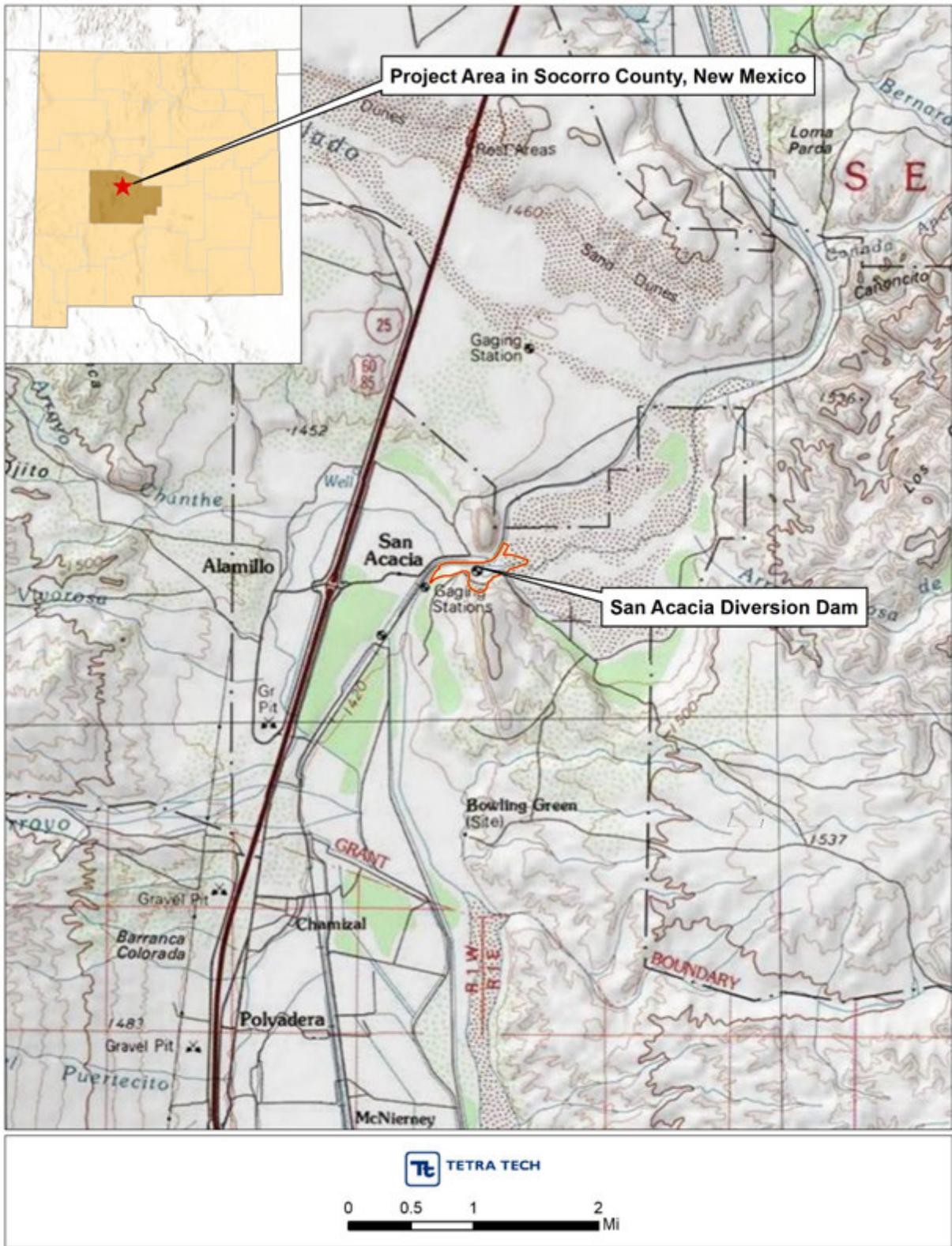


Figure 1. Project vicinity map.

Relationship to Other Projects

The SADD and immediate vicinity are the location of previous operation and maintenance activities including vegetation was removed on approximately 11 acres of a sediment bar immediately upstream from SADD in 2011 and islands and vegetation on 2.5 acres downstream of the dam were removed and a 10% rock ramp was installed to protect the concrete apron in 2019.

Scoping, Coordination, and Public Review

Reclamation has coordinated closely with other operators and stakeholders in the Rio Grande, including the Middle Rio Grande Conservancy District (MRGCD), New Mexico Interstate Stream Commission (NMISC), U.S. Bureau of Indian Affairs (BIA), and the U.S. Fish and Wildlife Service (Service) Ecological Services Field Office regarding fish passage at SADD. Design concepts for this DEA have been refined based upon feedback from these partners, and coordination with these partners will continue through the formal design phase. Reclamation coordinated with the Sevilleta National Wildlife Refuge regarding access and staging. One scoping meeting has been held with the MRGCD in August of 2020. Scoping meetings with NMISC and Sevilleta were held in November 2020. Topics discussed included the alternative designs to date, MRGCD facilities in the area including the dam and supporting infrastructure, potential sediment management issues with a constructed fishway, and landowner permits required for access and long-term operation.

This draft EA will be circulated for public comment.

Chapter 2 Analyzed Action Alternatives

Location and Environmental Setting of Proposed Project

The San Acacia Diversion Dam (SADD) is located on the Rio Grande between Belen and Socorro. The MRGCD uses the dam to divert water into the Socorro Main Canal. The SADD was constructed in 1934 to provide the MRGCD the ability to divert surface flows from the Rio Grande to the Socorro Main Canal for irrigation supply to the Socorro Division. Oriented in a north-south direction, the dam was constructed using reinforced concrete over driven pilings. The SADD has a total of 29 spillways equipped with radial arm gates and two automated Langemann® gates to create the diversionary head and regulate downstream release rates during summer low-flow conditions. During operations, the gates are closed in what is referred to as “checked” and flows are diverted for irrigation. Concrete aprons, which are sill-like structures, extending 57 feet upstream and 18.5 feet downstream of the dam were installed to prevent bed scour. In addition, metal sheet piling incorporated into the structure further protects against bed erosion and sediment piping. Riprap has also been placed as a supplemental aid in erosion control, as further addressed in the following section. Degradation of the riverbed below SADD is a long-term downstream issue, which is expected to continue. In 2019, the downstream apron rock ramp was rehabilitated with additional riprap and now extends 67 feet with a 10% grade.

In 1953, the ownership of the SADD was conveyed to Reclamation from the MRGCD. Reclamation repaired the spillway structures and implemented a series of rehabilitative modifications including the renovation of the headworks area and the construction of the Low Flow Conveyance Channel (LFCC). In 1992, Reclamation completed the installation of additional sheet piling located downstream of the SADD to safeguard against continuous headcutting that could ultimately threaten the dam’s structural integrity. MRGCD conducts regular maintenance activities at the SADD including removing sediment and clearing vegetation in the immediate vicinity of the dam.

Alternative 1: Fish Passage Outside of River Channel and Around Dam, The Proposed Action

Under the Proposed Action, fish passage will be accommodated by constructing a fishway outside the river channel and around the diversion dam (Figure 2). The fishway will be an engineered channel which may contain natural rocks and shapes to accommodate fish passage during checked conditions and low river flows. It may include a feature called the Bernal entrance which consists of a structure to direct and guide fish towards the entrance of the fishway. This structure (or any other method that would function in the same manner) will be placed in the river oriented parallel to flow. This fishway will be constructed outside and adjacent to the active channel of the Rio Grande but will be connected at both the upstream and downstream ends. There will be a single exit located upstream of the dam on the attached bar located on the south side of the river channel. As design and the final exit location is determined, a portion of the sand bar may be removed and/or lowered to provide a better engineered feature. This alternative will go around, not through, the SADD. There is a small building utilized by MRGCD on the south side of the SADD. In order to

implement Alternative 1, it will be necessary to relocate this building. Final designs are not yet available for the fishway and so this environmental assessment will consider the maximum footprint disturbed for construction and will evaluate potential preliminary design elements.

The width of the channel has not been determined yet, but it is expected that the width of construction impacts will not exceed 100 feet. In order to overcome the elevation difference, the channel will need to extend approximately 1,260 linear feet downstream of SADD and extending 846 linear feet upstream with a slope of 0.62%. Total length will be approximately 2,106 linear feet. A maximum total of 6 acres immediately adjacent and connected to the Rio Grande will be impacted by this alternative. An estimated 50,000 cubic yards of material will be removed in order to construct the fishway. Excavated material will be spoiled in either the laydown areas or hauled off site. Some of this spoiling may involve the movement of excavated material across the river using large articulated dump trucks. Excavators and dozers will be used to perform excavation operations. Dewatering of the fishway channel, and the Bernal entrance structure if final designs require such, will be required in order to place foundation materials that will consist of a subgrade layer of gravel and riprap. For construction and for future maintenance, most of the vegetation in the construction area, nonnative and native, will be removed from the south side of the channel prior to construction. All vegetation will be removed outside of the migratory bird nesting season as noted in Section 3.

Portions of the fishway channel may be located on the Sevilleta National Wildlife Refuge. Reclamation will obtain all permits required for long term placement, operation, and maintenance and will follow all required terms and conditions of such permits.

Reclamation has determined that this alternative will be easier to construct because of a stable ground base along the river bankline area, the fishway channel will be able to follow a much gradual slope downstream and around the dam, and less construction work will occur in the river channel.

Access and Staging

Access to the Project Area is from Interstate 25 from the community of San Acacia. Hauling of construction equipment through San Acacia will proceed with care as this small community does not frequently experience a large volume of traffic or heavy equipment. There is a railroad track on the river right bank and frequent rail traffic. There will be a traffic control plan implemented for the project to provide adequate signage and to specify a communication plan between the construction crew and railroad personnel. There is a road on the river left side that will allow for access to the river channel both upstream and downstream of the dam. This road will require improvement for use (i.e. adding crusher fine to the surface) which may be below the ordinary high water mark in places and require a permit to discharge from the U.S. Army Corps of Engineers (USACE). This may include reconstruction of small arroyo crossings on the river left road that may be damaged by episodic and large runoff events during the project construction period. As listed above this work would comply with any permits or other compliance that may be needed at the time. Crossing the Rio Grande in order to access the south side of the dam will occur either by driving vehicles and equipment across existing bridges and existing roads (which may need to be upgraded in order to support heavy equipment) or by driving vehicles and equipment across the river channel in the immediate project vicinity (where there are no existing bridges).

In either case, earthen ramps will be constructed to bring heavy equipment to the river. Exact locations have not been identified for river crossings yet, but they will likely be downstream of the SADD. The number of times that equipment will need to cross the river is not yet known, but for the environmental assessment and other consultations it is expected that there will be many daily crossings needed. BMPs identified in the 2016 BiOp will be implemented to reduce impacts to the river and Silvery Minnow, and also reduce the risk of spills or leaks.

Laydown areas for staging equipment and materials will be located along both river right and river left banks on the downstream side of the dam and along the river right bank on the upstream side of the dam. The largest areas are on the river left side, both upstream and downstream of the dam. The river left downstream area is on lands under the jurisdiction of the Sevilleta National Wildlife Refuge and legal access will be acquired. Vegetation removal will likely occur, including removal of native vegetation (i.e. cottonwoods). BMPs will be followed to minimize impacts and mitigate for loss large cottonwoods as appropriate. Approximately 20 acres have been identified for potential use as laydown and staging activities as shown in Figure 2.

Access and staging occurring on the Sevilleta National Wildlife Refuge or any other land management entity will require permits for access and staging. Reclamation will secure those permits prior to construction and will observe all required terms and conditions of permits.

Temporary Water Operations

Construction operations are proposed for the non-irrigation season, mainly during the winter months (November 1 to March 15 when the irrigation gates are open), when the river is at low flows. It will be necessary to dewater the fishway channel area to place foundation materials that will consist of a subgrade layer of gravel and riprap, and to place the forms for the fishway. Because flows are typically 500 cfs or less, water can be directed around the work area through dam gate closures in sequence. In the event that river flow is not able to be managed through gate operations alone, a temporary dewatering barrier (e.g. coffer dam) will be constructed in such a way to divert flows around the in-channel work sites. This will serve to protect workers, construction equipment, and the channel work area. This dewatering barrier will be located in the river channel as needed and will be constructed from the dam downstream to the end of the work area. Another dewatering barrier may be constructed for the upstream portion in order to construct the fishway past SADD and through the upstream bar. The actual locations will be determined based on upstream and downstream conditions during construction and will be removed after construction is finished.

Long-term Operation and Maintenance

Specific information regarding operation of the fishway under this alternative is not yet known because the design has not been finalized. At this time it is expected that the fish passage structure will operate during the irrigation season when the irrigation gates at SADD are closed and there is no other route for Silvery Minnows to move upstream. Maintenance activities will likely include routine sediment removal to keep the fishway clear. In order to accommodate long-term maintenance, an access route free of woody vegetation will be required along the south side of the fishway.

Alternative 2: Fish Passage Through the Dam

Under Alternative 2, fish passage will be accommodated by constructing a fishway inside the river channel and going through the dam (Figure 3). The fishway will be an engineered channel which may contain specific features such as natural rocks and shapes to accommodate fish passage during dam operations (checked condition during low river flows). This alternative also may include the Bernal entrance to attract and direct fish that are moving upstream towards the entrance to the fishway. The fishway will sit inside the footprint of the river channel and will occupy one or two of the existing south end dam gates. The recently rehabilitated 10% slope rock ramp located downstream of the dam may need to be modified in order to accommodate the 1% slope fishway and passage over the apron and through SADD during unchecked conditions. There will be a single exit located upstream on the attached bar located on the south side of the river channel. As design and the final exit location is determined, portions of the bank-attached bar may be removed and/or lowered to provide a better engineered feature. Final designs are not yet available; therefore, this environmental assessment will consider the maximum footprint that could be disturbed for construction and will evaluate potential design elements.

In order to create an independent channel within the active channel of the river, either sheet pile or reinforced concrete will be required. The width of the channel has not been determined yet, and it is expected that the width of construction impacts will not exceed 100 feet. In order to overcome the elevation difference between the river base and the dam apron, the channel will need to extend about 1,175 linear feet downstream of SADD at a slope of 1.01% and 865 linear feet upstream with a slope of 0.11% . Total length would be approximately 2,040 linear feet. A maximum total of approximately 6 acres within the river channel will be impacted. An estimated 50,000 cubic yards of material will be removed in order to construct the fishway. Excavated material will be spoiled in either the laydown areas or hauled off site. Some of this spoiling may involve the movement of excavated material across the river using large articulated dump trucks. Excavation operations will be accomplished with excavators and dozers. Dewatering of the fishway channel will be required in order to place foundation materials that will consist of a subgrade layer of gravel and riprap, and to fill in the gap between existing surface and the fishway channel. Less than for Alternative 1, all vegetation in the construction area, nonnative and native, will be removed from the south side of the channel prior to construction. All vegetation will be removed outside of the migratory bird nesting season as noted in Section 3.

Portions of the fishway channel may be located on the Sevilleta National Wildlife Refuge. Reclamation will obtain all permits required for long term placement, operation, and maintenance and will follow all required terms and conditions of such permits.

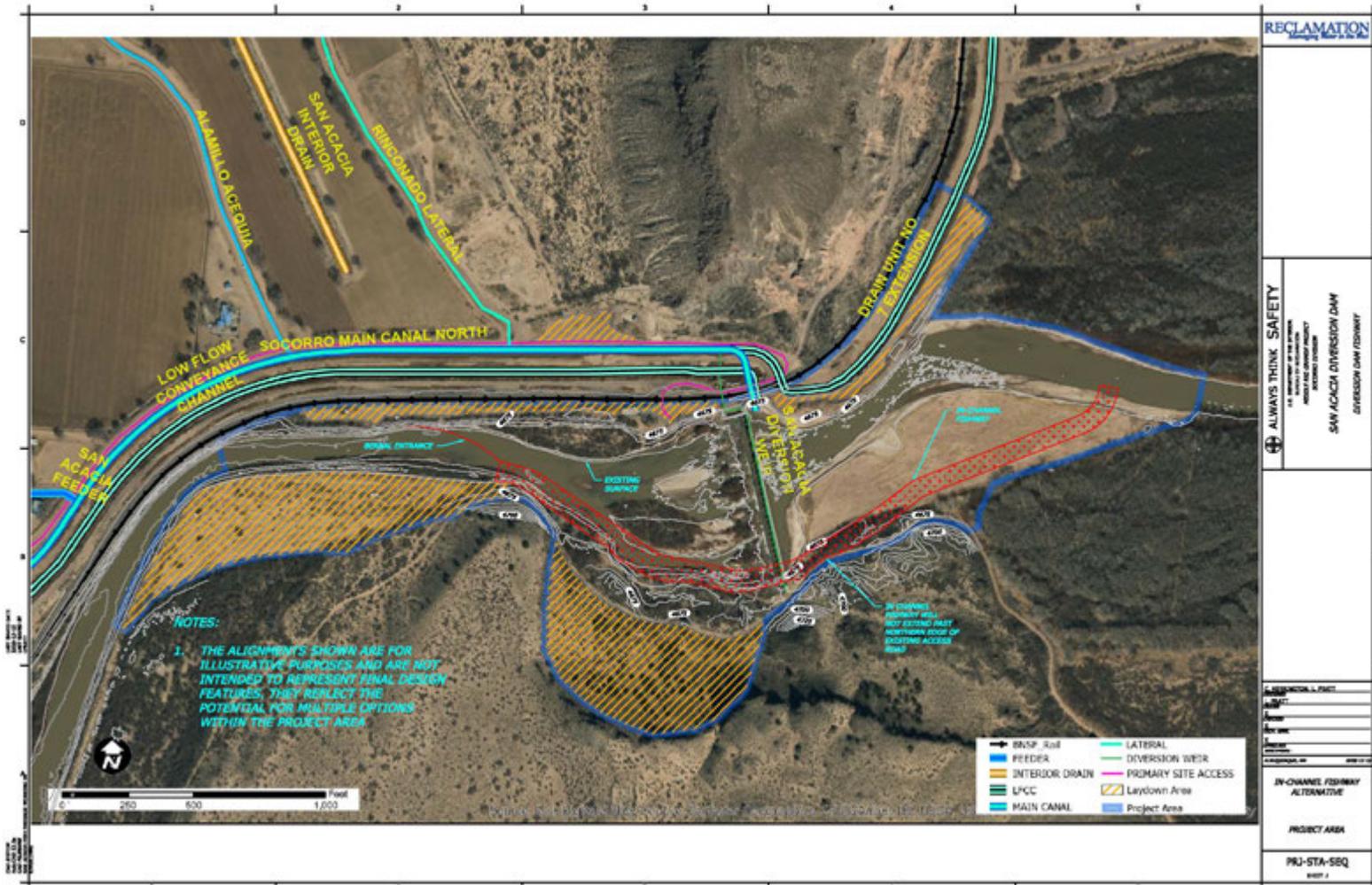


Figure 3. Schematic of maximum area of disturbance, laydown areas, and access for Alternative 2, fish passage through the dam.

Access and Staging

Access to the Project Area for Alternative 2 will proceed in the same manner as for Alternative 1.

Temporary Water Operations

Alternative 2 will be constructed at the same time of year as Alternative 1 and will have the same impacts to temporary water operations.

Long-term Operation and Maintenance

Alternative 2 will operate during the same times of the year as Alternative 1 and will require the same ongoing maintenance activities. This alternative will also require an access route free of woody vegetation on the south side of the fishway for maintenance activities like recurring sediment/debris removal from the fishway channel.

No Action Alternative

This alternative represents the existing conditions at the dam and existing gate operations. Reclamation recently completed the rehabilitation of the rock ramp downstream of the dam, restoring the 10% slope that was created in the early 1980s. This 10% slope starts at the dam apron and extends approximately 67 feet downstream to the location of a sheet pile wall with a cement cap that stabilizes the toe of the rock ramp. This is the current condition and under the no action alternative, no measures to facilitate fish passage around/through the SADD will be implemented. In addition, there will be no changes to dam gate operations which can currently be characterized as:

- Non-irrigation season (November 1st to March 15th) gates are open;
- Irrigation season – High Flows: Alternate gates are open in 1-foot increments to maintain upstream water surface elevation for diversion; and
- Irrigation season – Low Flows: checked condition in which all gates are closed, with seepage and a small amount of water passing over the “minnow” gate to reduce/prevent downstream drying of the upper portion of the San Acacia Reach.

Chapter 3 Affected Environment and Environmental Consequences

In order to streamline this EA, only resources with the potential to experience more than negligible adverse effects were retained for analysis. Council on Environmental Quality (CEQ) and Department of Interior regulations (40 CFR 1500.4(n) and 43 CFR 46.120(d)) indicate that Federal agencies should reduce duplication by adopting appropriate environmental documents prepared by other agencies. Because scoping for this project began prior to September 14, 2020, this DEA was developed following provisions of the previous version of the CEQ regulations (40 CFR parts 1500-1508, 1978 as amended in 1986 and 2005). In many instances, resource analysis in other final NEPA documentation was reviewed and the Responsible Official determined them to be applicable to these analyzed alternatives. Where appropriate, that analysis has been incorporated by reference here.

Environmental Resources Considered but Excluded from Analysis

The rationale for excluding resources from further analysis is as follows:

Aesthetics: Aesthetics were not identified as an issue during scoping activities. The area around SADD is highly modified and the construction of fishways either within or outside the channel would not add appreciable impacts.

Migratory Birds: Direct impact to migratory birds would be avoided by conducting work activities outside of the normal breeding and nesting season. In accordance with the 2016 BiOp, if work becomes necessary between April 15 to August 15 (or September 1 if there are cuckoo), suitable/occupied migratory bird habitat will be avoided during construction activities to the greatest extent possible. Native vegetation removed for construction will be replaced/replanted in the Project Area but leaving the fishway structure and long-term maintenance access route clear. Reclamation would conduct migratory nesting bird surveys, and coordinate and consult with the Service to determine appropriate next steps prior to work commencing if birds are detected.

Water Delivery: There are no depletions anticipated under either analyzed alternative. All existing water flow will be allowed to flow through the area during construction, with flows being channeled through a series of open gates and away from the construction area.

Hydrology, Hydraulics, and Geomorphology

Rio Grande hydrology through the reach is characterized by snowmelt and summer monsoon storm events. Flow in the Middle Rio Grande is regulated by flow from Cochiti Dam which was completed in 1975 for flood and sediment storage. Because flows upstream are regulated by Cochiti Dam and influenced by irrigation needs, drying of the river channel downstream of SADD is not uncommon in some summers.

In addition to the dams upstream of the SADD (Cochiti, Abiquiu, Jemez and El Vado), major changes to the hydrology over the last century have resulted from the installation of levees, jetty jacks, and increased water use from urban and agricultural use. Water diversions from the river for irrigation is a major factor. Peak flows have been reduced because of concerns about levee stability and drought. As a result, many reaches have become channelized and the river is less dynamic. Sediment transport has decreased, and vegetation has encroached on bank attached bars because they are inundated less. Doidge et al. 2020 used flow duration curves (generated from mean daily discharge) to determine that the 1% probability of exceedance flow was 7000 cfs at the Rio Grande at San Acacia gage (period of record 1936 to 1964) and 5270 cfs at the Rio Grande Floodway at San Acacia gage (period of record 1958 to present). They also show that from 1958 to 2018, at the Rio Grande Floodway at San Acacia gage, the largest instantaneous peak flows (cfs) were more frequently from summer monsoon events than from spring runoff (Doidge et al. 2020). And, since 1992, the number of days with peak flows from 500 to 6000 cfs has showed a general decreasing trend (Doidge et al. 2020).

Construction of dams upstream of SADD has reduced the sediment supply to the reach by an order of magnitude since the 1960s. Mean annual suspended sediment concentration has decreased since the 1960s (Doidge et al. 2020). There are two large tributaries upstream of SADD, the Rio Puerco and the Rio Salado, the latter of which contributes sand, gravel, cobble, and small boulders which create a dynamic channel upstream of the SADD. Some coarse sediment, sourced from the Rio Salado and other small tributaries, makes its way downstream to SADD. The Rio Salado and Rio Puerco flow during large monsoon events. During drought periods, when monsoon events are less frequent, the larger sediment supplied to the SADD also decreases. However, it should be noted that the magnitude of the total sediment load transported through the reach is still much higher compared to other rivers. When the gates are closed, a backwater pool extends approximately 1 mile upstream of SADD, during which time several feet of sediment accumulates on the bed of the river. When the gates are opened this sediment is expected to be flushed downstream, but with lower flows less sediment moves downstream. The deposited sediment demonstrates how much sediment is in the river even at low flows.

Downstream of SADD the river channel is narrow and incised with high banks, and the bed is armored with gravel and cobble. The channel elevation has dropped approximately 10 feet since 1960s (Doidge et al. 2020), but the channel was determined in 2011 to be sufficiently coarse downstream of SADD such that further significant bed degradation is not expected. In the reach below SADD, the 2011 geomorphic assessment predicted that future geomorphic change would include bed material coarsening, bank erosion, and channel widening where banks are unprotected.

No Action

Under the no action alternative, no fish passage structures would be constructed and there would be no change to hydrology, hydraulics or geomorphology in the Rio Grande.

Alternative 1

Constructing fish passage outside the river channel is not expected to change the hydrology. The bed of the river below SADD is sufficiently coarse so any decrease in flow is unlikely to cause major degradation of the channel. Because the Rio Grande still has a high sediment load, even at low

flows, it is expected that sediment in the water column will deposit in the constructed fishway channel and maintenance will be required to ensure water conveys effectively and sediment does not build up.

Alternative 2

Constructing fish passage inside the river channel through two end gates of the dam is not expected to change the hydrology. The channel bed below the SADD is sufficiently coarse that this alternative is unlikely to cause major geomorphic changes. Because the Rio Grande still has a high sediment load, even at low flows, it is expected that sediment in the water column will deposit in the constructed channel, especially in the portion across the upstream bar. Recurring maintenance or designed in a way to ensure water conveys effectively and sediment does not build up for Silvery Minnow to be able to swim.

Water Quality

The Project Area is within the Rio Grande, a perennial river and jurisdictional water of the U.S. Current information on the water quality of the river in the Middle Rio Grande is available from the U.S. Geological Survey (USGS) gage stations. Water quality constituents that are typically monitored include surface water temperature, pH, turbidity, dissolved oxygen, suspended sediments, conductivity/total dissolved solids, and fecal coliform. State of New Mexico water quality standards for the Middle Rio Grande from the SADD to the Escondida Drain outfall has designated uses of irrigation, marginal warm water aquatic life, livestock watering, wildlife habitat, and primary contact (New Mexico Administrative Code Title 20 Chapter 6 Part 4 Section 105 (20.6.4.105)).

Relevant to the Proposed Project Area, the New Mexico Environment Department (NMED) has identified the Middle Rio Grande impaired for *E. coli*, total recoverable aluminum and dissolved copper. Total Maximum Daily Loads (TMDL) have been developed for *E. coli* and aluminum and are estimated to be prepared for copper in the near future (NMED 2018). The following sources are identified as contributors to water pollution in the Middle Rio Grande: municipal point source discharges, waterfowl, on-site treatment systems (septic systems and similar decentralized systems), source unknown, wastes from pets, municipal (high density area), and impervious surface/parking lot runoff, (NMED 2016). The Clean Water Act (CWA) regulates discharges of pollutants into waters of the United States. Different types of pollution are regulated by different sections of the CWA and require specific permitting and compliance.

Current water information collected by the USGS is limited with the most recent information provided including discharge, gage height readings, water temperature and suspended sediment. Water quality typically contains high turbidity readings due to large amounts of sediment naturally present in the system. Turbidity readings are elevated especially when the river flows are high, and the adjoining arroyos are depositing additional sediment due to surface runoff. The Rio Salado and the Rio Puerco are both upstream of SADD and can contribute significant amounts of sediment to the Rio Grande periodically throughout the year. Additional information may be found at:

<http://waterdata.usgs.gov/nm/nwis>.

No Action

Under the no action alternative, no fish passage structures would be constructed and there would be no change to water quality in the Rio Grande. No CWA permitting would be required.

Alternative 1

Constructing fish passage outside the river would also occur during winter low flow periods. A dewatering barrier will also be used in this alternative, and both installation and removal of the dewatering barriers are expected to cause minor, short-term impacts to water quality. Construction activities would be phased such that nearly all excavation and construction of the fishway would be completed with plugs left at the entrance and exit to the fishway. The final step would be excavating the plugs, starting with the downstream most and moving upstream. This construction sequence would minimize the amount of contact with the river. Slight increases in turbidity would occur when the entrance and exit plugs are removed, but these effects are expected to be short term and minimal. If excavated sediment is spoiled in laydown and staging areas, care will be taken to ensure it is spoiled above the ordinary high-water mark. At this time, it is not known where sediment might be spoiled.

BMPs (i.e., initial steam cleaning of all the equipment and checking the equipment several times per day) would be followed to avoid the inadvertent risk of a pollutant discharge into surface waters while the equipment is being used near or in the river. The use of BMPs would minimize the chance of chemical or petroleum pollution to the water column. Work activities should not contribute additional sources of aluminum, copper or biological constituents that are indicated by increased *E. coli* levels. Prior to any construction occurring, Reclamation would obtain all required permits in compliance with the CWA and any BMPs or other requirements identified will be implemented. In addition, the BMPs described in the Environmental Commitments section would minimize these impacts to the extent possible to water quality by preventing runoff or disturbed soil from entering the Rio Grande. Therefore, no large impacts to water resources quality would be attributable to this alternative.

Alternative 2

Constructing fish passage through the dam would occur during winter low flow periods and would cause short-term increases in turbidity levels within the water column from ground disturbance and in-channel construction activities. The increased turbidity would produce a small contribution to the typical sediment load carried by the Rio Grande, known for the large amount of sediment load and often elevated locally by isolated runoff events in local arroyos. Although the work will be occurring in the main channel, the work area will be dewatered using a combination of dewatering barriers and closed gate configurations. A small amount of water, seepage, will remain in the work area allowing for work to occur in a mostly dry riverbed. Both installation and removal of the dewatering barriers are expected to be minor, short-term impacts to water quality. Because of the temporary nature of the project and the low flow environment of the work area, it is thought that minimal energy will be present to mobilize local sediment loads that contribute to excess river turbidity. If excavated sediment is spoiled in laydown and staging areas, care will be taken to ensure it is spoiled above the ordinary high-water mark. At this time it is not known exactly where sediment might be spoiled. BMP for visual monitoring will occur as needed and if an excess amount of sediments or other

visible pollutants occur this will be reported to the project manager and to the appropriate staff to address.

The use of BMPs would minimize the chance of chemical or petroleum pollution to the water column. Work activities should not contribute additional sources of aluminum, copper or biological constituents that are indicated by increased *E. coli* levels. Prior to any construction occurring, Reclamation would obtain all required permits in compliance with the CWA and any BMPs or other requirements identified will be implemented. In addition, the best management practices described in the Environmental Commitments section would minimize these impacts to the extent possible to water quality by preventing runoff or disturbed soil from entering the Rio Grande. Therefore, no large impacts to water resources would be attributable to this alternative.

Air Quality and Noise

The Proposed Project Area is within the Southwestern Mountains-Augustine Plains Intrastate Air Quality Control Region 156 (USEPA 2020a). In general, air quality in the vicinity of the SADD is good; summarized air quality index data from Socorro County in 2018 show that air quality was good 110 days and moderate for 2 days; there were no records for unhealthy for sensitive groups, unhealthy, or very unhealthy (USEPA 2020b). Air quality indicator pollutants for this station included particulate material (USEPA 2020b).

Sound levels in the Proposed Project Area are low, except during irrigation season, which is typical in rural, agrarian areas. During irrigation season operation of SADD, major sources of intermittent noise in the area are attributed to automobile traffic, farm operations, railroad operations, and Reclamation's and MRGCD's maintenance operations.

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and no change to air quality or noise in the Project Area.

Alternative 1

If the Proposed Action is implemented, constructing fish passage outside of the dam may also lead to slight and temporary impacts to air quality and noise in the Proposed Project Area. If excavated sediment is hauled off-site, this would result in more truck traffic and associated increases to noise and dust. The dust abatement BMP described in the Environmental Commitments section will help to minimize particulate matter caused by soil disturbance and equipment operation. Construction activities may include vegetation removal, pile-driving, building forms and pouring concrete, and other similar activities. Equipment operation might also lead to increased noise levels above those already present in the Project Area, but these would cease when construction is complete.

Alternative 2

Similar to Alternative 1, if Alternative 2 is implemented and fish passage through the dam is constructed, there may be slight and temporary impacts to air quality and noise in the Proposed Project Area. If excavated sediment is hauled off-site, this would result in more truck traffic and associated increases to noise and dust. The dust abatement BMP described in the Environmental

Commitments section will help to minimize particulate matter caused by soil disturbance and equipment operation. Construction activities may include vegetation removal, pile-driving, building forms and pouring concrete, and other similar activities. Equipment operation might also lead to increased noise levels above those already present in the Project Area, but these would cease when construction is complete.

Vegetation and Wetlands

Woody vegetation in the vicinity of SADD consists of a mix of native Rio Grande cottonwood bosque (*Populus deltoides* spp. *nislizeni*), saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), and some coyote willow (*Salix exigua*). As part of regular operation and maintenance of the diversion structure, the MRGCD clears woody vegetation from in-channel islands and bars both upstream and downstream of the SADD, as needed.

Jurisdictional waters of the United States, including wetlands, that may be affected by the Proposed Action are protected under several rules and regulations including federal guidelines outlined by Sections 401, 402, and 404 of the CWA, Executive Order (E.O.) 11988 (Floodplain Management), and E.O. 11990 (Protection of Wetlands). Wetland field surveys were conducted in June 2020 (Tetra Tech 2020). Potential jurisdictional wetland features were identified west of the SADD along the northern channel bank edge, river right (Wetland A) and at the attached bar east of the SADD (Wetland B and C) (Figure 4) on river left. Wetland A is a palustrine emergent wetland alongside the Rio Grande and is approximately 0.04 acres in size. Dominant plant species include common three-square (*Schoenoplectus pungens*), coyote willow, and Rio Grande Cottonwood. Wetlands B and C are also palustrine emergent wetlands and are approximately 0.19 acres and 0.06 acres, respectively. Dominant species included pale smartweed (*Persicaria lapathifolia*), prostrate knotweed (*Polygonum aviculare*), with smaller quantities of annual sunflower (*Helianthus annuus*), and curly dock (*Rumex crispus*). All mapped features are likely to be considered jurisdictional by USACE.

The attached upstream bar initially formed around 2000 as a result of dam operations. Mapped wetlands located on the attached bar (Wetland B and C) located upstream of SADD occur in areas that are a result of flow management during runoff season when the dam gates are open, and when the dam gates are closed during the irrigation season in order to divert water into the Socorro Main Canal North. Gates on the SADD are open during runoff season and are typically closed by mid-May and remain closed until October. The closure of these gates creates a constant pool elevation for approximately 5 months per year, which allows for sediment to be deposited that can only be moved when gates reopen if flows are high and no veg is allowed to armor the newly deposited sediment.

The attached bar has also been modified by vegetation management activities. A review of aerial imagery shows no bar evident in 1996. In 2005, the bar is present and is sparsely vegetated with what appears to be herbaceous plants. By 2006 most of the bar has been colonized by woody plants, and in 2017 the bar appears devoid of vegetation following vegetation removal activities by the MRGCD (Google Earth 2020).

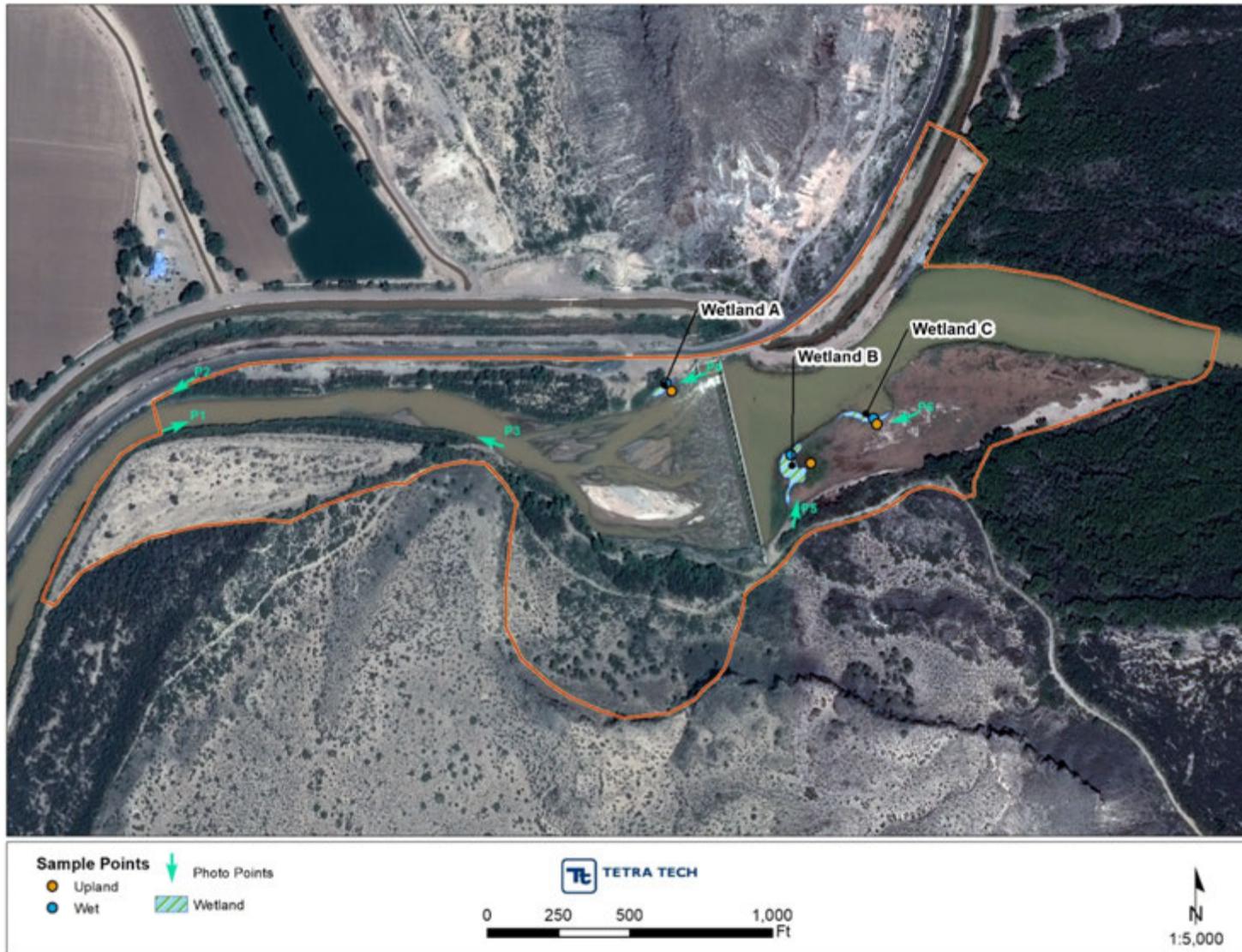


Figure 4. Delineated wetland features in the Proposed Project Area. Photos indicated by photo points are presented in the SADD Wetland Survey Report.

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and no change to vegetation or wetlands in the Project Area. MRGCD may continue to maintain the bar free of vegetation as part of regular, ongoing maintenance, per previous consultation with all parties.

Alternative 1

Constructing fish passage outside the river and around the dam necessitate the permanent removal of all woody vegetation from the downstream river left bank, as well as from laydown and staging areas, and as well as to construct earthen ramps for access and crossing the river. Reclamation would avoid riparian vegetation impacts where feasible or mitigate where avoidance is not feasible. An estimated 1.2 acres of riparian vegetation could be permanently impacted for long-term access to the fishway. Native riparian vegetation, including cottonwoods, would be replanted when construction activities are completed in areas not needed for long-term operation and maintenance of the fishway. Construction of the upstream exit would have no impact to Wetlands B and C, as shown in Figure 4, pending final design and construction requirements. All requirements and BMPs resulting from CWA coordination and consultation would be implemented. This alternative would result in a slightly greater permanent loss of vegetation than Alternative 2 because of the space occupied by the fishway outside of the river channel and on the bankline area.

Alternative 2

Constructing fish passage through the dam would necessitate the permanent removal of woody vegetation from the downstream river left bank, adjacent to the in-channel fishway. Woody vegetation would also be removed from laydown and staging areas, as well as to construct earthen ramps for access and crossing the river. Reclamation would avoid riparian vegetation impacts where feasible or mitigate where avoidance is not feasible. An estimated 1.1 acres of riparian vegetation could be permanently impacted for long-term access to the fishway. Native riparian vegetation, including cottonwoods, would be replanted when construction activities are completed in areas not needed for long-term operation and maintenance of the fishway. Construction of the upstream exit would have no impact to Wetlands B and C, as shown in Figure 4. All requirements and BMPs resulting from CWA coordination and consultation would be implemented. During design, Reclamation will attempt to avoid all impacts. If that is not possible, Reclamation will mitigate all impacts as required.

Special Status Species

In accordance with Section 7(a) (2) of the Endangered Species Act of 1973, (ESA) as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. As part of the ESA section 7 consultation process, Reclamation prepared a Memorandum for the Service with Notification of the Included Project under the Middle Rio Grande Biological and Conference Opinion (02ENNM00-2013-F-0033) to address the effects of the proposed project on the Silvery Minnow, Southwestern Willow Flycatcher (*Empidonax traillii extimus*; SWFL), and Yellow-billed Cuckoo (*Coccyzus americanus*; cuckoo). This is included as Appendix A.

An initial review was completed using the Service's Information for Planning and Consultation (IPaC) for Socorro County. Upon completion of review, the federally listed species with no potential to occur and/or no potential for adverse impacts from project activities in the Project Area and eliminated from further consideration included 2 plants, 4 invertebrates, 1 amphibian, 1 mammal, and 4 birds. The complete list with rationale for elimination from further consideration is provided in the Appendix B: Federally Listed Species Eliminated from Further Consideration.

Rio Grande Silvery Minnow

Reduction in the occupied range of the Silvery Minnow and threats to its continued existence in the Middle Rio Grande were central to this species being listed as endangered (Service 1994). The final rule establishing Silvery Minnow Critical Habitat was published in the Federal Register on February 19, 2003 and designated the entire Middle Rio Grande as Critical Habitat (Service 2003). The species currently occurs in only 5% of its former geographic range (not including experimental reintroductions) 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. Reestablishing connectivity between these reaches is a key conservation measure in the recent BiOp (Service 2016). Critical habitat was designated on February 19, 2003 (Service 2003). 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 most pueblo lands. SADD is within designated Critical Habitat.

Dudley and Platania (1997) reported that the Silvery Minnow was most commonly collected in habitats with depth less than 8 inches or between 12 and 16 inches and were not commonly found in habitats with water depths greater than 20 inches. More than 85 percent were collected from low-velocity habitats (less than 0.325 ft/sec). Habitat for the Silvery Minnow includes stream margins, side channels, and off-channel pools where water velocities are low or reduced from main-channel velocities. Areas with detritus and algal-covered substrates are preferred. Lee sides of islands and debris piles often serve as good habitat (Magana 2012). During the winter, the Silvery Minnow tends to concentrate in low-velocity areas in conjunction with vegetation and debris piles for cover (Dudley and Platania 1996; Tetra Tech 2013).

There has been some study of Silvery Minnow swimming capabilities. Most recently, Bestgen et al. (2010) found that in a laboratory setting with wild-caught fish, Silvery Minnow were able to ascend a variety of different types of passageways but recommend that a mixed-substrate (sand to cobble with boulders placed) to create various flow velocities but velocities should not exceed 3.3 ft/sec for short distances and 1.5 to 2 ft/sec for longer distances (Bestgen et al. 2010). An experiment using hatchery-reared fish determined that Silvery Minnow would use a rock channel fishway around the Alameda Diversion Dam in Albuquerque (Archdeacon and Remshardt 2012).

The Silvery Minnow is the only surviving endemic cyprinid fish species of the Rio Grande in New Mexico that produces semi-buoyant eggs (Porter and Massong 2004). The species is a pelagic spawner. Individual females may produce more than 3,000 semi-buoyant, non-adhesive eggs during a spawning event. Spawning by Silvery Minnow is associated with high and/or increased flow events such as spring runoff or summer rainstorms, and typically occurs over a relatively brief period (1 month) in May or June, although spawning can occur later or earlier in the season when temperature

and flows are suitable (Service 2010). Based on Horwitz et al. (2018), the majority (95 percent) of silvery minnows collected during spring 2010 were Age 1 (95.3%; n = 1,213), while less than 5 percent were age-2 or age-3 individuals (4.7%; n=60).

The Silvery Minnow population has fluctuated widely since monitoring for the species began (Dudley et al. 2020). The abundance of the species appears to be closely related to the timing, magnitude, and duration of river flows during spring and summer (Dudley et al. 2020). Prolonged and elevated spring flows result in overbank flooding of vegetated areas both within the river channel and along the river margins. These conditions delay the onset of low flows during summer irrigation season and help to ensure the availability of productive nursery habitats during spring runoff, which result in successful recruitment for the species (Dudley et al. 2020). Annual population monitoring from the Angostura Diversion Dam in Sandoval County to below the San Marcial railroad bridge in Socorro County has consistently found that occurrence and density of Silvery Minnows is highest in the downstream-most reaches of the Rio Grande (Dudley et al. 2018), which includes the Project Area.

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and thus no construction-related impacts to the Silvery Minnow. There would be no change to Critical Habitat. Silvery Minnow populations would remain fragmented by the SADD.

Alternative 1

The effects of implementing Alternative 1, fish passage outside of the river channel, would occur during winter low flow periods. Construction activities for the upstream, around the dam, and upstream portions of the fishway would be phased such that all excavation and construction would be completed with plugs left at the entrance and exit areas. As the portions are finished and connected, the final plugs at the upstream and downstream ends would be removed. At this time without a final design and construction sequence defined, it is most likely that construction would proceed from upstream end and moving downstream in order to maintain access to cross the river downstream of SADD. This conceptual construction sequence would minimize the amount of contact with the river and allow crossing at the easiest location. Slight increases in turbidity would occur when the entrance and exit plugs are removed, but these effects are expected to be short term. Because there will be construction activity in the wetted channel, and although it is minimal compared to constructing fish passage in the main channel of the Rio Grande, Reclamation has made the determination that Alternative 1 “may affect and is likely to adversely affect” the Silvery Minnow during construction, but with a great benefit due to the fishway providing connectivity between the two river reaches.

Construction of Alternative 1 would also have impacts to Silvery Minnow Critical Habitat. The use of BMPs would minimize the chance of chemical or petroleum pollution to the water column and so the impacts associated with construction activities are anticipated to be minor and temporary. The out of channel fishway is anticipated to permanently occupy an estimated 0.8 acres of existing aquatic habitat. Reclamation has determined that implementation of a fishway outside the main channel “may affect and is likely to adversely affect” approximately 0.81 acres of Silvery Minnow Critical Habitat for the same reasons listed above. Overall, it is expected that the short-term impacts

to the Silvery Minnow, and the long-term impacts to designated Critical Habitat, are outweighed by reconnecting fragmented riverine habitat in the Rio Grande. During design with coordination with the partners, Reclamation will attempt to avoid impacts. If that is not possible, Reclamation will consult with the Service and mitigate impacts, as required and appropriate.

Alternative 2

Construction of the fishway in the river channel and through the dam is anticipated to occur primarily in the dry after flows have been diverted away from the section to be constructed. However, seepage flows may occur, and some construction may occur in the wet while installing the temporary dewatering barrier, if it is needed, to isolate flows away from the construction area. Construction of the fishway upstream of SADD would be phased such that nearly all excavation and construction of the would be completed with plugs left at the entrance and exit to the fishway. The final step would be excavating the plugs, most likely starting with the upstream end and moving downstream in order to maintain access to cross the river downstream of SADD. This construction sequence would minimize the amount of contact with the river. Construction vehicles would cross the river to access the south bank. This would constitute disturbance to wetted instream habitats. Some construction is anticipated to occur in the wet, and flows will be diverted within the river channel away from existing wetted habitat, and river crossings. Silvery Minnows exposed in the project area may be adversely affected by noise, vibrations, being passed through or into areas of high velocities, by reductions in habitat, altered water qualities, or by other disturbances that harass, stress, injure, or reduce the fitness of Silvery Minnows in the Proposed Project Area. Therefore, Alternative 1 may affect, and is likely to adversely affect the Silvery Minnow.

Construction activities that are conducted in the wet and the diversion of flows away from a portion of the wetted habitat within the river channel may result in disturbance and potential stranding of Silvery Minnow, including possible mortality. To minimize the impacts to Silvery Minnow, to the extent possible, the areas that are isolated from flow for construction will be immediately netted by permitted biologists to collect and relocate Silvery Minnow from isolated pools in the newly dried portions to wetted, connected downstream habitats. Any excavation or placement of materials in the wetted channel will be conducted from upstream to downstream or in a way that avoids creating isolated pools of water which would have the capacity to isolate and strand fish. Reclamation will utilize construction techniques and implement the standard BMPs identified in the 2016 BiOp for the proposed project, which will minimize contact with fish and minimize potential for harm, harassment, or mortality.

Construction activities for the proposed project such as the excavation and placement of materials in the channel, installation and removal of the temporary dewatering barrier, and any construction that occurs in wetted habitat may affect Critical Habitat for the Silvery Minnow by impairing water quality, however these effects would be temporary and transient in nature. The use of BMPs presented in Chapter 4 would lessen these temporary impacts. Construction of a fishway in the Rio Grande, along with the Bernal entrance, would also have permanent impacts to Critical Habitat by occupying an estimated 1.6 acres of aquatic habitat. Reclamation has determined that construction of a fishway in the main channel may affect and is likely to adversely affect approximately 1.62 acres of Silvery Minnow Critical Habitat. Overall, it is expected that the short-term impacts to the Silvery

Minnow, and the long-term impacts to designated Critical Habitat, are outweighed by reconnecting fragmented riverine habitat in the Rio Grande.

Southwestern Willow Flycatcher

The SWFL was listed as endangered in February 1995 (Service 1995). Critical habitat for the SWFL was designated in July 1997, re-designated in 2005 (Service 2005), and re-designated again in 2013 (Service 2013a). The SADD is within designated Critical Habitat. The current range of the SWFL includes Arizona, New Mexico, southern California, extreme western Texas, southwestern Colorado, and southern portions of Nevada and Utah (Service 2002). In New Mexico, SWFL are known to breed along the Rio Grande, and in the Zuni, San Francisco, and Gila River drainages. A recovery plan for the SWFL has been completed (Service 2002).

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

Reclamation has been conducting willow flycatcher (WIFL) surveys throughout the Middle Rio Grande since the mid-1990s, and in the vicinity of the SADD since 1996. WIFL that are not the *extimus* subspecies, or *extimus* subspecies that are passing through and not actively defending territories are traditionally present in the survey area. As migrating flycatchers, these have the potential to be the northern subspecies of WIFL. SWFL can only be verified by staying at the site and nesting. WIFL documented on or after June 10 are typically considered resident birds (Moore and Ahlers 2019), though they can also be late migrants.

During the 2018 survey season, no WIFL were located in the vicinity of the SADD and the nearest detections were approximately 4 miles upstream and included 2 SWFL nesting pairs in addition to migrants and unpaired males (Moore and Ahlers 2019). There were no 2018 SWFL detections downstream of the SADD until the San Antonio area, where there were a number of WIFL migrants and unpaired males (Moore and Ahlers 2019).

Quality SWFL habitat in the San Acacia reach is limited and composed of small patches of native vegetation along the river channel (Moore and Ahlers 2019). The active floodplain here is relatively narrow and constrained and the channel has degraded such that overbank flooding does not regularly occur (Moore and Ahlers 2019).

Suitable and marginally suitable habitat was assessed utilizing the *Southwestern Willow Flycatcher Habitat Suitability 2016* (Siegle and Ahlers 2017) report and associated data (Hink and Ohmart vegetation classification, 2016). Moderately suitable habitat is present adjacent to the north boundary (above

the dam on river right) of the Proposed Project Area. This moderately suitable habitat can be avoided. Additionally, the understory density of that polygon has been likely affected by leaf beetles, and during the 2021 habitat suitability surveys, it could be less to not suitable.

A small patch of moderately suitable habitat is also present downstream of the dam, and will be affected by the fish passage structure, but can be mitigated or offset within the terms of the 2016 BO. Vegetation in the Proposed Project Area includes some coyote willow and saltcedar but is not present in the density or structure typically used by SWFL.

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and thus no construction-related impacts to the SWFL. There would be no change to Critical Habitat.

Alternative 1

While the Project Area is located within designated Critical Habitat, no suitable habitat occurs within the Proposed Project Area. A small amount of moderately suitable habitat occurs upstream of the dam that has been used by migrant WIFL (as noted above). The nearest nesting SWFL were recorded 4 miles upstream of the Proposed Project Area. Construction would occur outside the nesting season (April 15 – August 15) and none of the moderately suitable habitat would be impacted. Reclamation has determined that implementing construction of a fishway outside of the main channel “may affect but is not likely to adversely affect” the SWFL or its Critical Habitat. Native riparian vegetation, including cottonwoods, would be replaced/replanted when construction activities are completed in areas not needed for long-term operation and maintenance of the fishway. During design, Reclamation will attempt to avoid impacts. If that is not possible, Reclamation will coordinate/consult with the Service and mitigate impacts as required and appropriate.

Alternative 2

The effects of implementing Alternative 2 are the same as Alternative 1. While the Project Area is located within designated Critical Habitat, no suitable habitat occurs within the Proposed Project Area. A small amount of moderately suitable habitat occurs upstream of the dam that has been used by migrant WIFL. The nearest nesting SWFL were recorded 4 miles upstream of the Proposed Project Area. Construction would occur outside the nesting season (April 15 – August 15) and none of the moderately suitable habitat would be impacted. Reclamation has determined that implementing construction of a fishway within the main channel “may affect but is not likely to adversely affect” the SWFL or its Critical Habitat. Native riparian vegetation, including cottonwoods, would be replaced/replanted when construction activities are completed in areas not needed for long-term operation and maintenance of the fishway.

Yellow-billed Cuckoo

The western population of the cuckoo was listed as a threatened species on November 3, 2014 (Service 2014a). In August 2014, the Service proposed designated Critical Habitat for the cuckoo which was never finalized. In February 2020, the Service proposed revised designated Critical Habitat which includes the Middle Rio Grande unit NM-6B containing a continuous segment of the

lower Rio Grande from Elephant Butte Reservoir in Sierra County at approximately river mile 38, upstream through Socorro, Valencia, and Bernalillo Counties (Service 2020). These units are consistently occupied by a large number of breeding cuckoos and currently is the largest breeding group of the species north of Mexico. The unit also provides a movement corridor for cuckoos moving farther north. The SADD is within this proposed Critical Habitat.

The cuckoo is an obligate riparian species occurring in scattered locations in the western U.S. during the breeding season. The cuckoo nests almost exclusively in low to moderate elevation riparian woodlands with native, broadleaf trees and shrubs that are at least 50 acres in size and at least 325 feet (100 m) in width (Service 2013b). They arrive in New Mexico beginning in late April and early May and nest from late May through August (Howe 1986). Mature cottonwood forest with well-developed willow understory appear to be important characteristics of habitat for cuckoo (Buffington et al. 1997; Gaines and Laymon 1984). While willows appear to be a preferred nest tree, the species will also nest in dense saltcedar stands (Howe, 1986). In addition, as the proportion of saltcedar increases, the suitability of the habitat for cuckoos decreases, and sites with a monoculture of saltcedar are unsuitable for breeding cuckoos (Service 2014b).

Potential suitable cuckoo habitat consists of mature cottonwood forest with well-developed understory of at least 50 acres in size and at least 325 feet in width.

Suitable and potentially suitable habitat was assessed using the *Western Yellow-billed Cuckoo Habitat Suitability* (Siegle et al. 2018) report and associated geospatial data. Suitable habitat is present upstream and adjacent to the attached bar on the south side of the river (left bank). The southern boundary of this polygon is adjacent to the road which will be utilized for access. Potentially suitable habitat is also adjacent to the Proposed Project Area upstream of the dam on the right bank. There is no suitable or potentially suitable habitat downstream of the dam. As with the SWFL, there is also the potential for cuckoo use in areas as stopover habitat that may not quite meet potential habitat requirements.

Formal surveys in the reach upstream and downstream of SADD began in 2009 (Dillon et al. 2019). During surveys conducted in 2018, there was one cuckoo detected immediately upstream from SADD (Dillon et al. 2019). Cuckoo were much more abundant in the reach downstream of SADD and the 2018 surveys determined dozens of detections and several territories, the nearest was approximately 2 miles away (Dillon et al. 2019). This downstream reach has had relatively stable populations of cuckoo with both detections and territories increasing since 2012 (Dillon et al. 2019). There is not potential habitat in the Proposed Project Area for cuckoo; however, they may use the area for migrating and foraging. Cuckoos have not been detected in the Proposed Project Area.

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and thus no construction-related impacts to the cuckoo. There would be no change to proposed Critical Habitat.

Alternative 1

The Proposed Project Area is located within proposed Critical Habitat for the cuckoo but no suitable habitat for the cuckoo occurs within the Proposed Project Area. In 2018, no nesting

cuckoos were detected within 0.5 miles of the Proposed Project Area and no work would be conducted in the cuckoo nesting season (April 15 – September 1). Reclamation has determined that implementing fish passage outside of the river channel and around the dam “may affect but is not likely to adversely affect” the cuckoo. Some woody vegetation may be removed and this “may affect but is not likely to adversely affect” proposed Critical Habitat for the cuckoo. Native riparian vegetation, including cottonwoods, would be replaced/replanted when construction activities are completed in areas not needed for long-term operation and maintenance of the fishway. During design, Reclamation will attempt to avoid impacts. If that is not possible, Reclamation will coordinate/consult with the Service and mitigate impacts as required and appropriate.

Alternative 2

The Proposed Project Area is located within proposed Critical Habitat for the cuckoo and but no suitable habitat for the cuckoo occurs within the Proposed Project Area. In 2018, no nesting cuckoos were detected within 0.5 miles of the Proposed Project Area and no work would be conducted in the cuckoo nesting season (April 15 – September 1). Reclamation has determined that implementing fish passage in the main channel and through the dam “may affect but is not likely to adversely affect” the cuckoo. Some woody vegetation may be removed and this “may affect but is not likely to adversely affect” proposed Critical Habitat for the cuckoo. Native riparian vegetation, including cottonwoods, would be replaced/replanted when construction activities are completed in areas not needed for long-term operation and maintenance of the fishway.

Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations require Federal agencies to consider the effects of their undertakings (e.g., projects or permits) on historic properties. Historic properties are legally considered to be those properties (cultural resources) eligible for listing on the National Register of Historic Places (NRHP). To be eligible for listing, a property must have “the quality of significance in American history, architecture, archeology, engineering and culture” that can be “present in districts, sites, buildings, structures, and objects” and which must “possess integrity of location, design, setting, materials, workmanship, feeling, and association” and meet at least one of a set of four criteria relating to association with historical events, historically significant people, distinctive characteristics of a period or style, and/or are likely to yield information important to prehistory or history. Cultural resources consist of discrete areas of human activity, occupation, or use, evidenced by material remains, historical documents, or oral interviews. They include archaeological and architectural resources, as well as traditional cultural properties (TCPs). Archaeological resources are spatially finite areas containing physical traces of past human activity both on and within the ground. Architectural resources are built-environment resources, typically consisting of historical buildings and structures. TCPs are locations that derive their significance from traditional values of a cultural group such as an Indian tribe or local community. All types of cultural resources can provide information and connections to past lifeways.

In order to comply with Section 106 of the NHPA, Federal agencies must consult on the effects of their undertakings on historic properties with the State Historic Preservation Officer, Native

American Tribes, other stakeholders, and the public. The Project vicinity has long been used by humans, who left behind material remains in the form of prehistoric archaeological sites, historic archaeological sites and localities, and locations of traditional religious and cultural importance to Indian tribes and local communities. For management purposes, these remains take the form of sites, artifacts, buildings, structures, districts, ruins, features, and landscapes with particular cultural importance. With a few exceptions, these remains must be at least fifty years old. In the case of TCPs, the period of traditional use of that place must also be at least fifty years old. Considerable information is available from archeological resources within the Middle Rio Grande Valley. Archaeological sites in the valley span nearly the entire known period of human occupation in North America. Chapter 3 of *A Cultural Resource Inventory and Evaluation of the Proposed San Acacia Diversion Dam Fish Passage Project, Socorro County, New Mexico* (in progress) contains a detailed cultural history narrative of the Middle Rio Grande valley.

Before the cultural resources inventory fieldwork, a records search of previously recorded cultural resources and previously conducted cultural resource investigations within the proposed project's area of potential effects (APE) and surrounding vicinity was performed through a review of the files available in the New Mexico Cultural Resources Information System database and at the Archaeological Records Management Section. The records search resulted in the identification of 12 previously recorded cultural resources and two previously conducted investigations within 500 m of the project APE.

Four cultural resources had previously been recorded in the project area: two archaeological sites (LA 1999 and LA 31704) and two Historic Cultural Property Inventory (HCPI) linear resources (HCPI 44139 and 44155). Based on results of the current survey, all four of the sites are recommended eligible for listing in the NRHP and avoidance is recommended for these sites. Segments of the HCPIs were previously recorded within and beyond the Project Area, and have been recommended eligible for listing in the NRHP under Criteria a, for association with the broad patterns of New Mexico history. Reclamation concurs with the recommendation of HCPI 44139 and HCPI 44155 as eligible for listing in the NRHP under Criterion a. LA 1999 and LA 31704 have been previously recommended eligible for listing in the NRHP under Criterion d. Reclamation concurs with the recommendation of LA 1999 and LA 31704 as eligible for listing in the NRHP under Criterion d. No new archaeological sites were identified during this investigation; one new HCPI (HCPI 49715) was recorded. This HCPI is the San Acacia Diversion Dam itself. An additional 5 individual occurrences were also identified and recorded.

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and no impacts to any cultural resources in the Project Area. Recurring impacts from erosional events will continue.

Alternative 1

The out-of-channel fishway alternative would be located on the south bank of the Rio Grande running south of the SADD. The total length would be approximately 2,106 linear feet, beginning 1,260 linear feet downstream of the diversion dam and extending 846 linear feet upstream of the dam with a slope of 0.62%. This alternative would require impacting the equipment rail track system

from the dam into a small storage shed that houses the dam's mobile, radial gate control mechanism (mule). Around the dam fishway design would impact this equipment rail and would require the demolition or relocation of the housing shed that protects it from the elements, which could include a need to construct a new housing shed upon the dam's existing catwalk. This alternative also runs through a bar that has accumulated on the upstream side of the diversion dam. Additionally, there is an earthen roadway that runs east-west along the southern bankline and allows for heavy equipment access to the lands lying east and west of the dam on the southern side. Routing the fish passage channel around the dam on this bankline could result in impacting at least a portion of this roadway, which would then inhibit the movement of equipment or vehicles on this bankline without also realigning the road around the newly constructed channel. There is enough space around the dam and upstream, but we must wait for final designs to assess any final impacts to the resources and what is needed for access roads for the heavy machinery.

Equipment traffic through the proposed project site will occur on both riverbanks and will require regular crossing of the active river channel downstream of the diversion dam throughout the construction schedule (Reclamation 2020). The projected site traffic layout and equipment travel routes indicate that access to the south bank of the river will be provided through use of the earthen roadway that forms the southeast boundary of the project area (Reclamation 2020). These improvements will potentially adversely affect LA 1999, but would not adversely affect LA 31704 or HCPI 44139 and HCPI 44155. This alternative would adversely affect HCPI 49715, which is the SADD. Adverse effects to SADD could be mitigated through conducting a Historic American Engineering Record (HAER) of the dam. According to Reclamation's drawings for the proposed Alternative 1 alignment (see Reclamation 2020: Figure 3), construction of the fishway would impact the area from the edge of the dam to the edge of the mesa, including portions of the existing access road that forms the northern boundary of LA 1999. The construction of this alignment would therefore adversely affect LA 1999, the boundary of which extends below the edge of the mesa. During design, Reclamation will attempt to avoid impacts. If that is not possible, Reclamation will coordinate/consult with the SHPO and mitigate impacts as required and appropriate.

Alternative 2

The construction of Alternative 2, an in-channel fishway, would be located on the south bank of the Rio Grande running through the two southern most gates of the SADD, HCPI 49715. The total length of the fishway would be approximately 2,040 linear feet. Beginning at the entrance, downstream of the diversion dam, the fishway would run 1,175 linear feet at a slope of 1.01% to the diversion dam. Upstream of the diversion dam the fishway would extend 865 linear feet at a slope of 0.11% to its proposed exit on the clay bar. Construction of this alternative would result in the removal of two gates of HCPI 49715 and therefore adversely affect that cultural resource.

Equipment traffic through the proposed project site will occur on both riverbanks and will require regular crossing of the active river channel downstream of the diversion dam throughout the construction schedule (Reclamation 2020). The projected site traffic layout and equipment travel routes indicate that access to the south bank of the river will be provided through use of the earthen roadway that forms the southeast boundary of the project area (Reclamation 2020). These improvements will potentially adversely affect LA 1999, but would not adversely affect LA 31704 or HCPI 44139 and HCPI 44155. Construction of this alternative would adversely affect HCPI 49715,

which is the SADD because of the need to construct fish passage through the dam. Adverse effects to SADD could be mitigated through conducting a HAER of the dam. According to Reclamation's drawings for the proposed Alternative 1 alignment (see Reclamation 2020: Figure 2), construction of the fishway would not impact any areas within the project area south of the northern edge of the existing access road. This Alternative 2 would avoid directly impacting the northern portion of LA 1999, the edge of which is manifested along the existing access road. It should be noted that the possibility of buried cultural materials in the footprint of the proposed Alternative 2 fishway east of SADD and north of the current boundary of LA 1999 is high, and monitoring of any construction activities by an archaeologist is recommended.

Indian Trust Assets

Indian Trust Assets (ITA) are legal interests in assets held in trust by the United States Government for Native American tribes or individuals. Some examples of ITA are lands, minerals, water rights, hunting and fishing rights, titles, and money. ITA's cannot be sold, leased, or alienated without the express approval of the U.S. Government. Secretarial Order 3175 and Reclamation ITA policy require that Reclamation assess the impacts of its projects on ITA. An inventory of all ITA within the Proposed Project Area is required. If any ITAs are impacted, mitigation or compensation for adverse impacts to these assets is required. ITAs were not identified in the Project Area.

No Action

There are no ITAs identified in the Proposed Project Area.

Alternative 1

There are no ITAs identified in the Proposed Project Area and therefore there would be no adverse effects to ITAs from implementation of Alternative 1.

Alternative 2

There are no ITAs identified in the Proposed Project Area and therefore there would be no adverse effects to ITAs from implementation of Alternative 2.

Socioeconomic Environment and Environmental Justice

The Proposed Project Area is located within the San Acacia Census Designated Place (CDP) in Socorro County. Approximately 83 people live in the San Acacia CDP (17,000 people live in all of Socorro County, 2,094,434 in the state of New Mexico) and the median household income in 2018 inflation-adjusted dollars was \$48,059 for Socorro County, or \$66,565 for the state of New Mexico (U.S. Census Bureau 2018). Median household income was not available for the San Acacia CDP.

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income. Executive Order 12898 directs all Federal agencies to ensure that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal and local programs and policies. The Proposed Project Area is located within

the San Acacia CDP and none of the population of the CDP identifies as non-white, whereas 18.0% percent of Socorro County identifies as non-white, compared to 22.9% of New Mexico (U.S. Census Bureau 2018). Poverty rates are 29.1% for Socorro County and 19.5% for the State of New Mexico and were not available for San Acacia CDP (U.S. Census Bureau 2018).

No Action

Under the no action alternative, there would be no construction activities associated with fish passage at SADD and no additional impacts to socioeconomic conditions. There would be no impacts to the people in terms of environmental justice.

Alternative 1

If Alternative 1 is implemented and fish passage is constructed outside the river channel and around the SADD, it is not likely to have any impact on the population size of the immediate Project Area or Socorro County; however, it may have a slight impact on the local economy if construction crews were to patronize local businesses for fuel or food. There would be no change to water operations at SADD and no irrigation water would be lost to the fish passage structure. Therefore, irrigation in the Socorro Division of the MRGCD would not see any impacts from this alternative.

Implementation of Alternative 1 is not expected to have any negative impact in terms of environmental justice. There would be no displacement, relocation, economic or adverse action to people living in the Project Area.

Alternative 2

If Alternative 2 is implemented and fish passage is constructed in the river channel and through the SADD, it is not likely to have any impact on the population size of the immediate Project Area or Socorro County; however, it may have a slight impact on the local economy if construction crews were to patronize local businesses for fuel or food. There would be no change to water operations at SADD and no irrigation water would be lost to the fish passage structure. Therefore, irrigation in the Socorro Division of the MRGCD would not see any impacts from this alternative.

Implementation of Alternative 2 is not expected to have any negative impact in terms of environmental justice. There would be no displacement, relocation, economic or adverse action to people living in the Project Area.

Cumulative Effects

The Council on Environmental Quality regulations implementing NEPA define cumulative impacts 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 (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The existing condition of the affected environment is largely a product of the cumulative effects of a variety of Federal and non-Federal actions in the Middle Rio Grande more broadly and the SADD in particular. River management activities, including the construction and operation of flood control and agricultural diversion dams have contributed to the hydrologic, hydraulic, and geomorphic conditions described above. Implementation of fish passage at SADD in combination with other habitat restoration and dam modification projects is expected to facilitate Silvery Minnow movement and distribution in an upstream direction and contribute to recovery of the species.

Summary of Expected Effects

Table 1. Summary of expected effects of implementing the No Action Alternative, Alternative 1, or Alternative 2 for fish passage at SADD.

Resource	No Action Alternative	Alternative 1, Proposed Action Out channel downstream Around SADD Through bar	Alternative 2 In channel downstream Through SADD 2 end gates Through bar
Aesthetics	<i>considered but excluded from analysis</i>		
Migratory birds	<i>considered but excluded from analysis</i>		
Water delivery	<i>considered but excluded from analysis</i>		
Hydrology, hydraulics, and geomorphology	No change from existing conditions	No change to hydrology, but sediment is expected to accumulate in channel so maintenance will be required. Gradual 1% slope from downstream river channel around dam to upstream exit.	No change to hydrology, but sediment is expected to accumulate in channel so maintenance will be required. Gradual 1% slope to dam apron which acts as hard point through dam on concrete apron through bar.
Water quality	No change from existing conditions	Potential for short term, temporary impacts during construction, impacts expected lower than Alternative 2 because a temporary dewatered area is much narrower than Alt 2. Need final design and construction sequence.	Potential for short term, temporary impacts during construction, impacts expected to be higher than Proposed Action because of the need for wide dewatered area inside river channel which needs a temporary dewatering barrier
Air quality and noise	No change from existing conditions	Potential for short term, temporary impacts during construction	Potential for short term, temporary impacts during construction
Vegetation and wetlands	No change from existing conditions	Impacts to vegetation during construction but native riparian, including cottonwoods, would be mitigated with replanting within the Project Area Potential for long-term loss of approximately 1.2 acres of vegetation adjacent to fishway channel in order to facilitate access.	Impacts to vegetation during construction but native riparian, including cottonwoods, would be mitigated with replanting within the Project Area Potential for long-term loss of approximately 1.1 acres of vegetation adjacent to fishway channel in order to facilitate access. No impact to wetlands.

		No impact to wetlands. Need final design and construction needs.	
Rio Grande Silvery Minnow	No change from existing conditions	Potential for short term, temporary impacts during construction, impacts expected to be less than Alternative 2, “may affect, likely to adversely affect” the Silvery Minnow Fishway would occupy approximately 0.81 acres of designated Critical Habitat, therefore “may affect, likely to adversely affect” designated Critical Habitat	Potential for short term, temporary impacts during construction, impacts expected to be greater than Alternative 1, “may affect, likely to adversely affect” the Silvery Minnow Fishway would occupy approximately 1.62 acres of designated Critical Habitat, therefore “may affect, likely to adversely affect” designated Critical Habitat
Southwestern Willow Flycatcher	No change from existing conditions	Construction would occur outside of breeding season. Native vegetation would be replaced/replanted. “May affect but not likely to adversely affect” the flycatcher or its designated Critical Habitat	Construction would occur outside of breeding season. Native vegetation would be replanted. “May affect but not likely to adversely affect” the flycatcher or its designated Critical Habitat
Yellow-billed Cuckoo	No change from existing conditions	Construction would occur outside of breeding season. Native vegetation would be replaced/replanted. May affect but not likely to adversely affect the cuckoo or its proposed Critical Habitat	Construction would occur outside of breeding season. Native vegetation would be replanted. “May affect but not likely to adversely affect” the cuckoo or its proposed Critical Habitat
Cultural resources	No change from existing conditions	Fishway around dam affects visual integrity. Higher potential for adverse impacts to LA 1999 because of fishway alignment, impacts to SADD may be mitigated. Need final design and construction needs.	Fishway through dam affects 2 end gates, Lower potential for adverse impacts to LA 1999, impacts to SADD may be mitigated
Indian trust assets	<i>No Indian Trust Assets exist in the proposed project area</i>		

Socioeconomics and environmental justice	No change from existing conditions	No impacts to socioeconomics or environmental justice	No impacts to socioeconomics or environmental justice
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Chapter 4 Environmental Commitments

2016 Biological Opinion

BMPs related to the 2016 BiOp were described in the Special Status Species as it relates to those specific species. BMPs were also described in relation to CWA commitments. Below is a list of BMPs that are relevant to this proposed action. Refer to the 2016 BiOp (Service 2016) for the complete list of BMPs.

Timing of the Proposed Action

1. The Action Agency/Project Proponent/Implementing Party will seek to avoid impacts to birds protected by the Migratory Bird Treaty Act (16 United States Code [U.S.C.] 703; MBTA), including the flycatcher and cuckoo, by conducting work activities outside of the normal breeding and nesting season (April 15 to August 15, or September 1 for work in suitable cuckoo habitat).
 - 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 will be avoided during the construction activities as much as possible, utilizing the most current annual survey results in conjunction with habitat suitability. The Action Agency will use current SWFL and cuckoo monitoring data to avoid work within 0.25 miles of an active nest as much as possible. Coordination and consultation with the Service will 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 Vegetation Planting and Control below). Planting via mechanized means, includes using a hand-held 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/or the appropriate project partner(s) would coordinate with the Service to determine appropriate next steps.
2. The Action Agency will seek to avoid impacts to the New Mexico meadow jumping mouse by not conducting work activities from August 15 to October 31 if suitable mouse habitat is found during mouse habitat surveys conducted prior to work. Mouse habitat surveys will occur in early summer (June or July) or when vegetation that characterizes mouse habitat is most likely to be at its peak growth. If suitable mouse habitat is found, Reclamation and/or the appropriate project partner(s) will coordinate with the Service prior to work. Road maintenance such as grading and washout repair may be performed throughout the year to maintain safe access to and from the river, but vegetation control will not occur between April 15 and August 15 (or September 1 for work in suitable cuckoo habitat), as per MBTA measure 1 above.

Water Quality

3. The Action Agency will obtain all applicable permits prior to implementation of the project, including CWA permits. The Action Agency 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.
4. 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.
5. The Action Agency will visually monitor for water quality in the areas below areas of river work before and during the workday. Water quality will be monitored during construction and after equipment operates in the river channel. Monitoring will include visual observations and may include direct sampling, as appropriate.
 - 5.1. 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.
 - 5.2. 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.

Equipment and Operations

6. 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 onsite 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.
7. The Action Agency will operate equipment in an area as little as possible to minimize disturbance of sediments. When operating equipment within the wetted channel, the following practices will be used to minimize disturbance of sediments:
 - 7.1. Minimize movement of equipment, and;
 - 7.2. Minimize contact with the riverbed when not operating equipment.
8. Each individual operator will be briefed on local environmental considerations specific to the project tasks.
9. Minimize impact of hydrocarbons: To minimize potential for spills into or contamination of aquatic habitat:
 - 9.1. Hydraulic lines will be checked each morning for leaks and periodically throughout each workday. Any leaky or damaged hydraulic hoses will be replaced.
 - 9.2. 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.
 - 9.3. All equipment will undergo high-pressure spray cleaning and inspection prior to initial operation in the project area.

- 9.4. Equipment will be parked on pre-determined locations on high ground away from the river overnight, on weekends, and holidays.
 - 9.5. Spill protection kits will be onsite, and operators will be trained in the correct deployment of the kits.
 - 9.6. 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.
10. Equipment will be removed from the channel in the event of high storm surges.
 11. 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 workdays, so that fish are less likely to return to the area once work has begun.
 12. Riprap to be placed in the water will be reasonably clean to the extent possible. If there are large clumps of soil bigger than 1 foot within the riprap, those clumps will be set aside during the loading or placing operations.

Access and Staging

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

Vegetation Replanting and Control

15. A variety of revegetation strategies may be used: stem and pole cuttings (Los Lunas Plant Materials Center 2007b; long stem transplants (Los Lunas Plant Materials Center 2007a); 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.
16. Vegetation control may consist of mechanical removal, burning, mowing, and/or herbicide treatment. Herbicides will be used when non-chemical methods are unsuccessful or are not economically feasible (see section Herbicide and Pesticide Use below).
 - 16.1. Vegetation control will be completed between August 15 (or September 1 for work in suitable cuckoo habitat) and April 15. Any need for deviations from this work window would be considered on a project-specific basis and coordinated with the Service. If work is planned within two weeks before April 15 or after August 15 (or September 1 for work in suitable cuckoo habitat), the Action Agency will conduct additional surveys, if warranted, to determine the presence of breeding flycatchers, cuckoos, or other breeding birds.

Reclamation and/or the appropriate project partner will coordinate monitoring and work activities with the Service, as appropriate, if bird nests are found.

17. 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 will be replaced at a ratio of 10:1. 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. Native vegetation that cannot be replanted may be mulched (mulch will be removed or spread on site at a depth of three inches or less) or temporarily stockpiled and used to create dead tree snags or brush piles in the project area upon completion.
18. Nonnative vegetation that is removed at work sites will be mulched, burned, or removed offsite to an approved location. Mulched vegetation may also be spread on site at a depth of three inches or less.

Dust Abatement

19. If water is needed for dust abatement or to facilitate grading of roads, water may be pumped from the Rio Grande, irrigation drains, sumps, or secondary channels adjacent to the river. During irrigation season (March 1 to October 31), water will not be pumped from the river but will be pumped from the irrigation drains if possible. Pumping from the river is not expected to be needed between April 15 and August 15 (or September 1 in suitable cuckoo habitat); however, if pumping is needed between May 1 and July 1 (emergencies only), Reclamation and/or the appropriate project partner(s) will coordinate with the Service to avoid impacts to minnow eggs and larvae. Outside of the irrigation season, 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. Sumps or secondary channels adjacent to the river will be used, whenever feasible. Pump intake pipes will use a 0.25 in (0.64 cm) mesh screen at the opening of the intake hose to minimize entrainment of aquatic organisms.

Other Measures

20. All treatment and control areas will be monitored for three years following construction to determine the effectiveness of the methods implemented and identify project-related hydrologic and geomorphic alterations. The monitoring will consist of biological, vegetation, geomorphic, and hydrologic monitoring, as appropriate to the project design and purpose.
21. All project spoils and waste will be disposed of offsite at approved locations or may be used on site as appropriate to the project purpose, consistent with applicable environmental requirements.
22. All work projects will have a contract in place for the rental of portable restroom facilities during the duration of the project.

Clean Water Act Coordination

This is a placeholder for BMPs identified during CWA coordination with the U.S. Army Corps of Engineers and New Mexico Environment Department.

New Mexico State Historic Preservation Office Consultation

This is a placeholder for BMPs identified during consultation with the New Mexico State Historic Preservation Office.

Additional BMPs

This is a placeholder for any additional BMPs identified during scoping, consultation, or coordination activities.

Chapter 5 Consultation and Coordination

Laws and Policy:

Endangered Species Act

Migratory Bird Treaty Act

Fish and Wildlife Coordination Act

Clean Water Act, section 404

National Historic Preservation Act, and other Cultural Resource compliance

Indian Trust Assets

Indian Sacred Sites (EO 13007)

Environmental Justice (EO 12898)

Wetlands and Floodplains executive orders

Key agency coordination:

U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office

U.S. Fish and Wildlife Service, Sevilleta National Wildlife Refuge

New Mexico Interstate Stream Commission

Middle Rio Grande Conservancy District

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Appendix A: Endangered Species Act Coordination with U.S. Fish and Wildlife Service

Appendix B: Federally Listed Species Eliminated from Further Consideration

Species	Federal Status and Type	Rationale for Elimination from Further Consideration
Wright's Marsh Thistle (<i>Cirsium wrightii</i>)	Candidate Plant	Known populations do not occur at the project location. No designated Critical Habitat for this species.
Pecos Sunflower (<i>Helianthus paradoxus</i>)	Threatened Plant	Known populations do not occur at the project location. Project area is outside of designated Critical Habitat.
Alamosa Springsnail (<i>Tryonia alamosae</i>)	Endangered Snail	Known populations do not occur at the project location. No designated Critical Habitat for this species.
Chupadera Springsnail (<i>Pyrgulopsis chupaderae</i>)	Endangered Snail	Known populations do not occur at the project location. Project area is outside of designated Critical Habitat.
Socorro Springsnail (<i>Pyrgulopsis neomexicana</i>)	Endangered Snail	Known populations do not occur at the project location. No designated Critical Habitat for this species.
Socorro Isopod (<i>Thermosphaeroma thermophiles</i>)	Endangered Crustacean	Known populations do not occur at the project location. No designated Critical Habitat for this species.
Chiricahua Leopard Frog (<i>Rana chiricabuensis</i>)	Threatened Amphibian	Known populations do not occur at the project location. Project area is outside of designated Critical Habitat.
New Mexico Meadow Jumping Mouse (<i>Zapus hudsonius luteus</i>)	Endangered Mammal	Known populations do not occur within the project location. Suitable habitat does not occur in the project area and it is located outside of designated Critical Habitat.
Least Tern (<i>Sterna antillarum</i>)	Endangered Bird	Known populations do not occur at the project location. No designated Critical Habitat for this species.
Mexican Spotted Owl (<i>Strix occidentalis lucida</i>)	Threatened Bird	Known populations do not occur at the project location. Project area is outside of designated Critical Habitat.
Northern Aplomado Falcon (<i>Falco femoralis septentrionalis</i>)	EXPN – Experimental Population Bird	Known populations do not occur at the project location. No designated Critical Habitat for this species.
Piping Plover (<i>Charadrius melodus</i>)	Threatened Bird	Known populations do not occur at the project location. Project area is outside of designated Critical Habitat.