

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section of the EA evaluates direct, indirect, and cumulative impacts to all resources described in Section 3.0, Affected Environment. Environmental commitments, which would provide ongoing guidance for the proposed project, are summarized at the end of the section.

4.2 GEOMORPHOLOGY AND SOILS

Under the No Action Alternative, the geomorphology of the Rio Grande is expected to remain relatively stable on its current trajectory, though it may be exacerbated by drought conditions, which could cause channels between islands to narrow and deepen. In the absence of frequent and sustained high discharges, the river in this reach would continue to have high velocities. Meandering capability, a process that is important in moving and redefining islands and bars, would continue to be limited. Channels within the river are expected to degrade, resulting in high banks and islands that are rarely inundated. Islands and bars would be stabilized with increasingly mature vegetation, predominantly non-native species. The geomorphic trends produced under the No Action Alternative are unfavorable for the silvery minnow because of decreased capacity for egg retention or larval survival and decreased presence of quality mesohabitat.

Under the Proposed Action, the project would undertake actions to alter channel banks to create the desired habitat types. As a result, the current local geomorphology is anticipated to change. Changes in local geomorphology would facilitate an increase in the amount of habitat necessary for egg retention, rearing of larvae, and survival of young-of-year. Under the Proposed Action, there would be minimal to moderate soil and sediment disturbance levels. The overall effects would be monitored and quantified, but are expected to be beneficial and completely within normal parameters for a sand-bed river system.

Before the initiation of construction activities, environmental protection measures would be reviewed at a pre-project meeting. All activities would be in compliance with local, state, and federal regulations. To mitigate negative effects from erosion, native herbaceous communities may be planted.

4.3 HYDROLOGY AND HYDRAULICS

Under the No Action Alternative and the Proposed Action, there would be no change in the amount or duration of flow in the river. However, the Proposed Action would cause decreased flow velocities in some restoration locations, but based upon FLO-2D modeling, HEC-RAS modeling, and hydrologic analysis, the project is not expected to significantly alter the hydrologic conditions of the river on a broader scale. The results of the FLO-2D modeling show the amount of expected inundation in each reach based on flows. Using this information, the Proposed Action would work with the existing hydrologic conditions to develop the desired habitat types.

4.3.1 HYDRAULIC MODELING

Hydraulic models were run for the Isleta Reach to gain a better understanding of stream dynamics and the level of inundation at each of the two subreaches at given stream flows. HEC-RAS modeling was used to assess overtopping discharges of bank-attached bars and islands and FLO-2D modeling was used to assess the channel capacity, overbank flows and overbank flow paths at discharges greater than channel capacity (MEI 2008).

The HEC-RAS model was run for a range of discharges from 500 to 8,000 cfs in 500 cfs increments. Water surface profiles were developed to identify the overtopping discharges for delineated island and bank-attached bar surfaces. Table 4.1 summarizes the representative elevation and overtopping discharge for bank-attached bars and islands in the Peralta and LP1DR subreaches. Island and bank-attached bar inundation mapping is presented in Appendix B.

The results from the HEC-RAS modeling are presented in Figure 4.1 and Figure 4.2. Analysis of the existing areas of inundation indicate that 60% of the islands and 79% of the bank-attached bars are inundated at 3,500 cfs in the Peralta Subreach, while 23% of the islands and 54% of the bank-attached bars are inundated at 3,500 cfs in the LP1DR Subreach (Table 4.2 and Table 4.3). The Proposed Action will not alter the channel capacity or the Base Flood Elevation of the Rio Grande floodway in the project area.

Table 4.1. Summary of Location, Area, Length, Representative Elevation, and Overtopping Discharge of the Bank-Attached and Mid-Channel Bars in the LP1DR and Peralta Subreaches (MEI 2008)

| Feature | Easting (feet) | Northing (feet) | Area (acre) | Representative Elevation (feet) | Overtopping Discharge (cfs) | % MDF Exceedance | Exceedance days/year |
|-------------|----------------|-----------------|-------------|---------------------------------|-----------------------------|------------------|----------------------|
| Peralta_I1 | 1,491,754 | 1,343,144 | 2.05 | 4,814.00 | 3,121 | 8.5 | 31 |
| Peralta_I2 | 1,491,738 | 1,342,513 | 3.39 | 4,814.00 | 3,726 | 4.9 | 18 |
| Peralta_I3 | 1,492,062 | 1,341,662 | 3.60 | 4,813.00 | 3,339 | 7.5 | 27 |
| Peralta_I4 | 1,492,447 | 1,339,305 | 3.84 | 4,811.00 | 3,948 | 3.7 | 14 |
| Peralta_I5 | 1,492,382 | 1,338,673 | 1.58 | 4,811.00 | 4,619 | 1.7 | 6 |
| Peralta_I6 | 1,491,912 | 1,337,746 | 5.20 | 4,809.00 | 2,267 | 14.7 | 53 |
| Peralta_I7 | 1,491,588 | 1,337,106 | 0.93 | 4,809.00 | 2,694 | 11.1 | 40 |
| Peralta_I8 | 1,491,215 | 1,335,802 | 2.87 | 4,806.00 | 2,034 | 16.9 | 62 |
| Peralta_I9 | 1,491,199 | 1,334,068 | 17.45 | 4,807.00 | 4,375 | 2.3 | 8 |
| Peralta_I10 | 1,491,394 | 1,334,485 | 2.87 | 4,806.00 | 2,691 | 11.1 | 40 |
| Peralta_I11 | 1,491,187 | 1,332,841 | 8.77 | 4,805.00 | 2,456 | 12.9 | 47 |
| Peralta_I12 | 1,492,495 | 1,330,935 | 11.74 | 4,803.00 | 2,475 | 12.7 | 46 |
| Peralta_I13 | 1,493,253 | 1,329,736 | 1.42 | 4,802.00 | 2,900 | 9.7 | 35 |
| LP1_I1 | 1,493,836 | 1,329,133 | 0.16 | 4,802.00 | 3,344 | 7.5 | 27 |
| LP1_I2 | 1,494,048 | 1,327,845 | 0.13 | 4,800.00 | 2,276 | 14.6 | 53 |
| LP1_I3 | 1,494,036 | 1,327,345 | 1.31 | 4,800.50 | 3,622 | 5.5 | 20 |
| LP1_I4 | 1,494,119 | 1,327,383 | 0.22 | 4,801.00 | 4,311 | 2.4 | 9 |
| LP1_I5 | 1,493,747 | 1,325,556 | 2.70 | 4,799.00 | 3,596 | 5.7 | 21 |
| LP1_I6 | 1,493,576 | 1,325,193 | 1.70 | 4,799.00 | 4,178 | 2.9 | 10 |
| LP1_I7 | 1,492,999 | 1,324,187 | 4.48 | 4,798.00 | 3,796 | 4.5 | 16 |
| LP1_I8 | 1,492,297 | 1,323,195 | 1.49 | 4,797.00 | 3,454 | 6.7 | 24 |
| LP1_I9 | 1,492,035 | 1,322,949 | 0.37 | 4,796.00 | 2,517 | 12.4 | 45 |
| LP1_I10 | 1,490,686 | 1,321,317 | 0.95 | 4,795.00 | 2,783 | 10.5 | 38 |

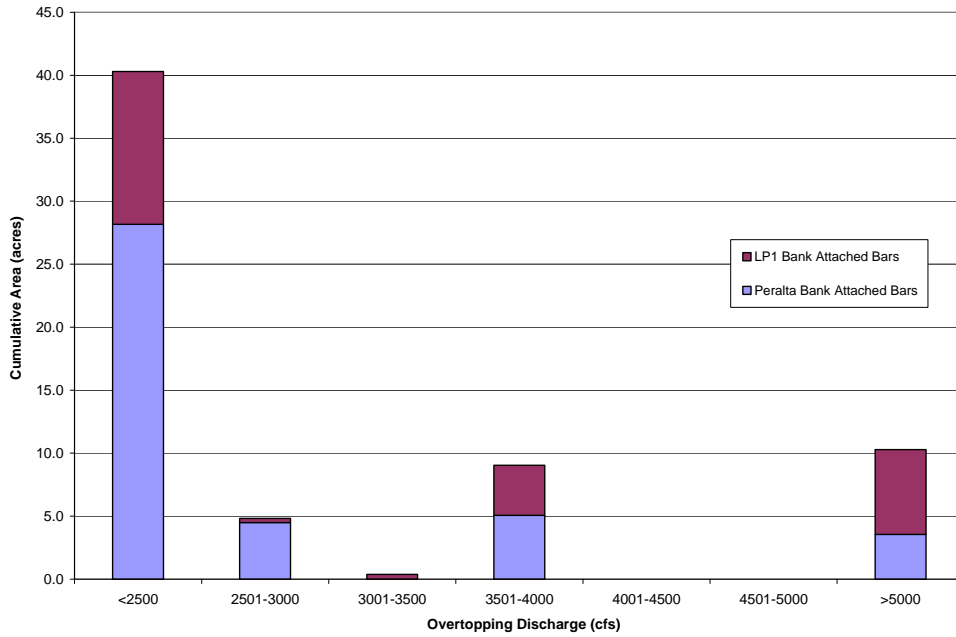


Figure 4.1. Inundation discharge summary for bank-attached bars.

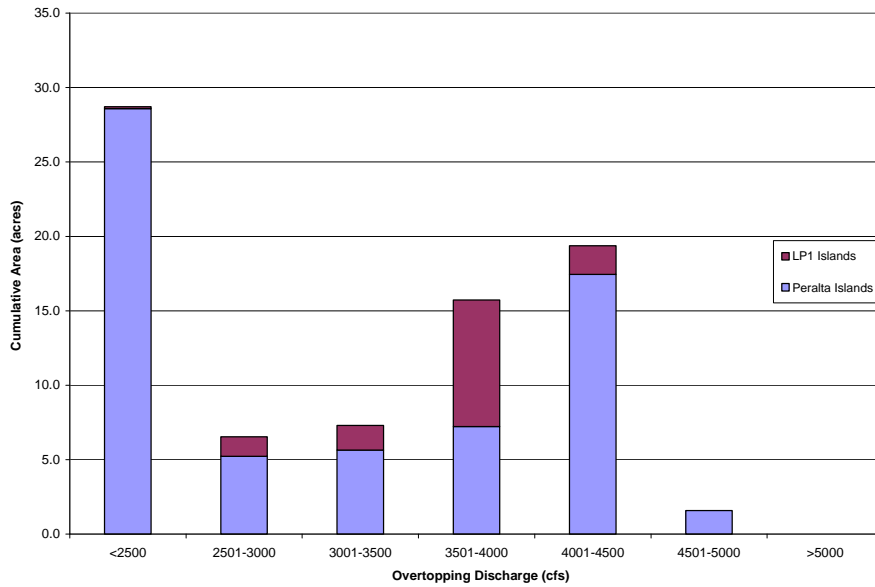


Figure 4.2. Inundation discharge summary for islands.

Table 4.2. Summary of Existing Areas of Inundation of Islands

| Discharge (cfs) | Average number of days inundation per year | Peralta | | LP1 | |
|--------------------|---|-------------|---------------|-------------|---------------|
| | | (acres) | (%) | (acres) | (%) |
| <2,500 | >46 | 28.6 | 43.5% | 0.1 | 1.05 |
| 2,501–3,000 | 46–33 | 5.2 | 7.9% | 1.3 | 9.8% |
| 3,001–3,500 | 33–23 | 5.7 | 8.6% | 1.7 | 12.2% |
| 3,501–4,000 | 23–13 | 7.2 | 11.0% | 8.5 | 62.8% |
| 4,001–4,500 | 13–7 | 17.5 | 26.6% | 1.9 | 14.2% |
| 4,501–5,000 | 7–4 | 1.6 | 2.4% | 0.0 | 0.0% |
| >5,000 | <4 | 0.0 | 0.0% | 0.0 | 0.0% |
| Total | | 65.8 | 100.0% | 13.5 | 100.0% |

Table 4.3. Summary of Existing Areas of Inundation of Bank-Attached Bars (MEI 2008)

| Discharge (cfs) | Average number of days inundation per year | Peralta | | LP1 | |
|--------------------|---|-------------|---------------|-------------|---------------|
| | | (acres) | (%) | (acres) | (%) |
| <2,500 | >46 | 28.2 | 68.1% | 12.1 | 51.5% |
| 2,501–3,000 | 46–33 | 4.5 | 10.9% | 0.3 | 1.3% |
| 3,001–3,500 | 33–23 | 0.0 | 0.0% | 0.4 | 1.7% |
| 3,501–4,000 | 23–13 | 5.1 | 12.3% | 4.0 | 17.0% |
| 4,001–4,500 | 13–7 | 0.0 | 0.0% | 0.0 | 0.0% |
| 4,501–5,000 | 7–4 | 0.0 | 0.0% | 0.0 | 0.0% |
| >5,000 | <4 | 3.6 | 8.7% | 6.7 | 28.5% |
| Total | | 41.4 | 100.0% | 23.5 | 100.0% |

FLO-2D modeling was executed at steady-state discharges of 4,000 cfs through 8,000 cfs in 500 cfs increments, and overbank inundation mapping was provided (Appendix B). The results indicate that no overbank inundation was computed within the project area at discharges less than 3,000 cfs and begins at approximately 4,000 cfs in the Peralta and LP1DR subreaches (MEI 2008). Figure 4.3 indicates that the predicted area of overbank inundation and the associated mean daily flow exceedance values for the Peralta and LP1DR subreaches. At the Willie Chavez site in the LP1DR Subreach, inundation begins at 4,500 cfs. Approximately 16 acres (6.5 hectares) would be inundated, and based on the mean daily flow exceedance analysis, this discharge would be exceeded, on average, for approximately 8 days per year (MEI 2008).

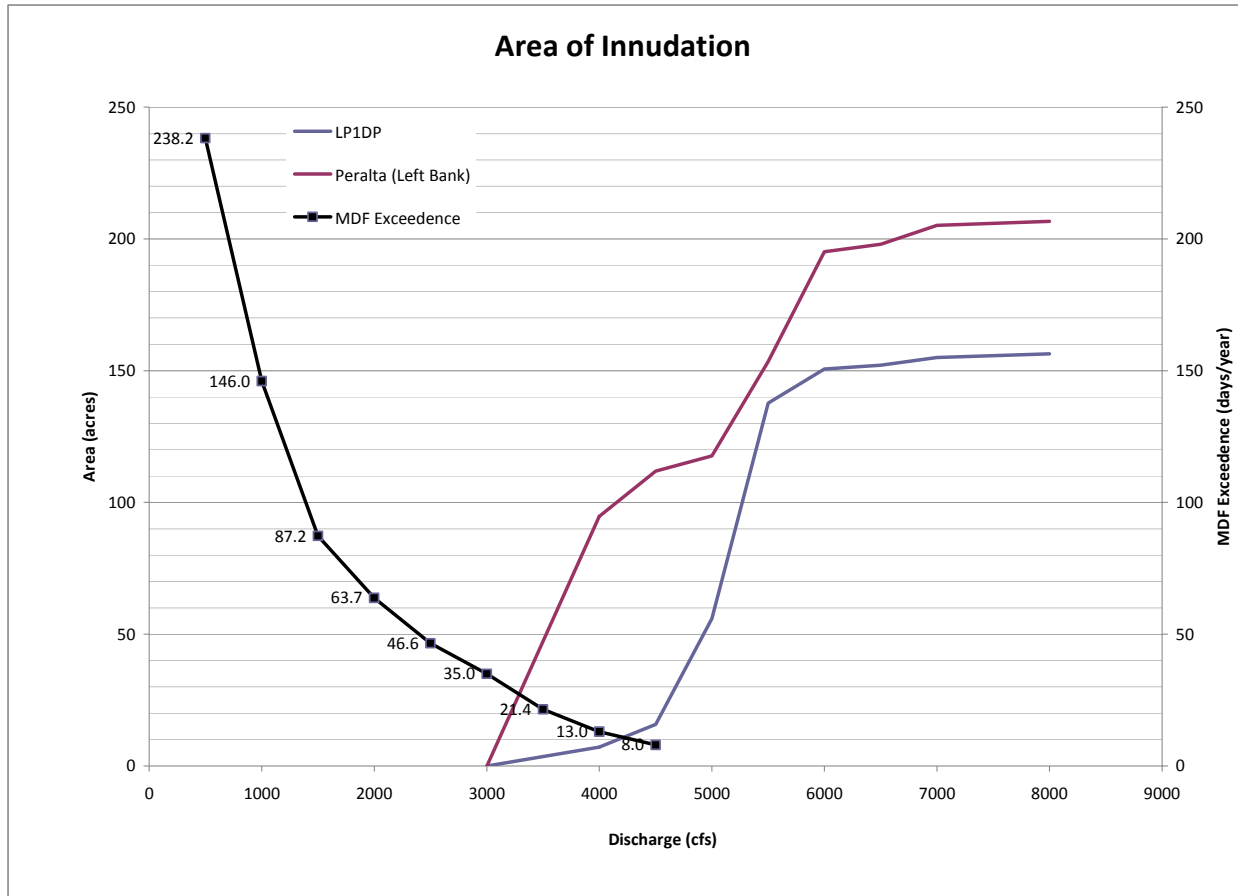


Figure 4.3. Predicted area of overbank inundation Peralta and LP1DR Subreaches and the corresponding mean daily flow exceedance values (MEI 2008).

Additional outputs from HEC-RAS and FLO-2D modeling in the Isleta Reach can be found in Appendix B.

4.4 WATER QUALITY

The No Action Alternative and the Proposed Action would not result in negative changes to water quality where it currently meets applicable standards for physical constituents, such as surface water temperature, pH, turbidity, DO, SSED, conductivity/TDS, and fecal coliform. A temporary and localized change in turbidity and TDS would occur under the Proposed Action because of the mobilization and dispersal of sediments within the river channel during excavation work. Turbidity and TDS levels are expected to return to normal shortly after completion of the excavation work.

The CWA provides protection for wetlands and waters of the United States from impacts associated with dredged or fill material in aquatic habitats, as defined under Section 404(b)(1). CWA compliance is required of all aspects of the project, and since most work associated with the Proposed Action would be completed within jurisdictional areas, a 404 permit from the USACE and 401 permits from the State of New Mexico are required for the NMISC project. For

the MRGCD portion of the project, it is unclear whether a 404 permit would be required; the MRGCD is in consultation with the USACE to determine this. If necessary, the MRGCD would obtain its own 404 permit for its portion of this project. Compliance with the CWA would ensure that the Proposed Action would have no adverse effect on the water quality of the MRG. Water quality would be monitored and evaluated for the duration of the project.

The Proposed Action would result in temporary and localized changes in the measures for physical constituents, particularly for turbidity and TDS, because of the mobilization and dispersal of sediments within the river channel. Short-term and localized adverse effects to water quality may result, but are not expected to exceed applicable standards. The techniques to be tested would depend on high-flow events to release and redistribute sediments within the floodplain. The high-volume flows would be expected to dilute the effects of added sediment load on water quality standards.

4.5 CULTURAL RESOURCES AND TRADITIONAL CULTURAL PROPERTIES

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

Under the Proposed Action, the project would use existing depressions and abandoned channels to create high-flow ephemeral channel and backwater habitat for the silvery minnow within the floodplain. Additional willow habitat would be created adjacent to existing wetland depressions. Revegetation work to restore riparian habitat would be implemented throughout the 100-acre (40-hectare) Willie Chavez site.

Archaeological resources that are listed on or eligible for the NRHP are protected under the NHPA of 1966 (16 United States Code [USC] 470). To determine if any cultural resources sites known to be listed on or eligible for the NRHP are within the project area, Tom Messerli of SWCA conducted a records search for the proposed project in the Archaeological Records Management Section (ARMS) database of the New Mexico Historic Preservation Division on June 16, 2008. Eleven archaeological sites are within 3,281 feet (1,000 m) of the boundaries of the adjacent Peralta and LP1DR subreach project areas found in the course of 19 past cultural resources surveys, mostly for road and associated utility projects in the vicinity. Site and survey locations are provided in a confidential appendix (Appendix E). Most sites outside the project area are found just outside the floodplain. A check of the State and National Registers of Historic Places found no properties within 3,281 feet (1,000 m) of the project areas.

A cultural resources investigation of the Peralta and LP1DR subreaches was conducted during June 17 to 19, 2008, by Christopher Carlson of SWCA. A pedestrian survey was conducted using a transect interval of 50 feet (15 m) throughout the project areas, though dense thickets of brush and trees necessitated a more circuitous route in some portions of the project area. No archaeological sites were found inside the levees (within the historical floodplain of the river) where the Proposed Action would take place. However, Reclamation requested that jetty jacks (placed both parallel and perpendicular to the Rio Grande by the USACE in the early 1950s through the 1960s) be designated as cultural resources. Out of 42 jetty jacks recorded in the entirety of both the LP1DR and Peralta subreaches (labeled 1–42 from north to south), 23 were within or contained portions within the cultural resources survey area; their locations, characteristics, and representative photos are presented in Figure 4.4 through Figure 4.8 and Table 4.4.

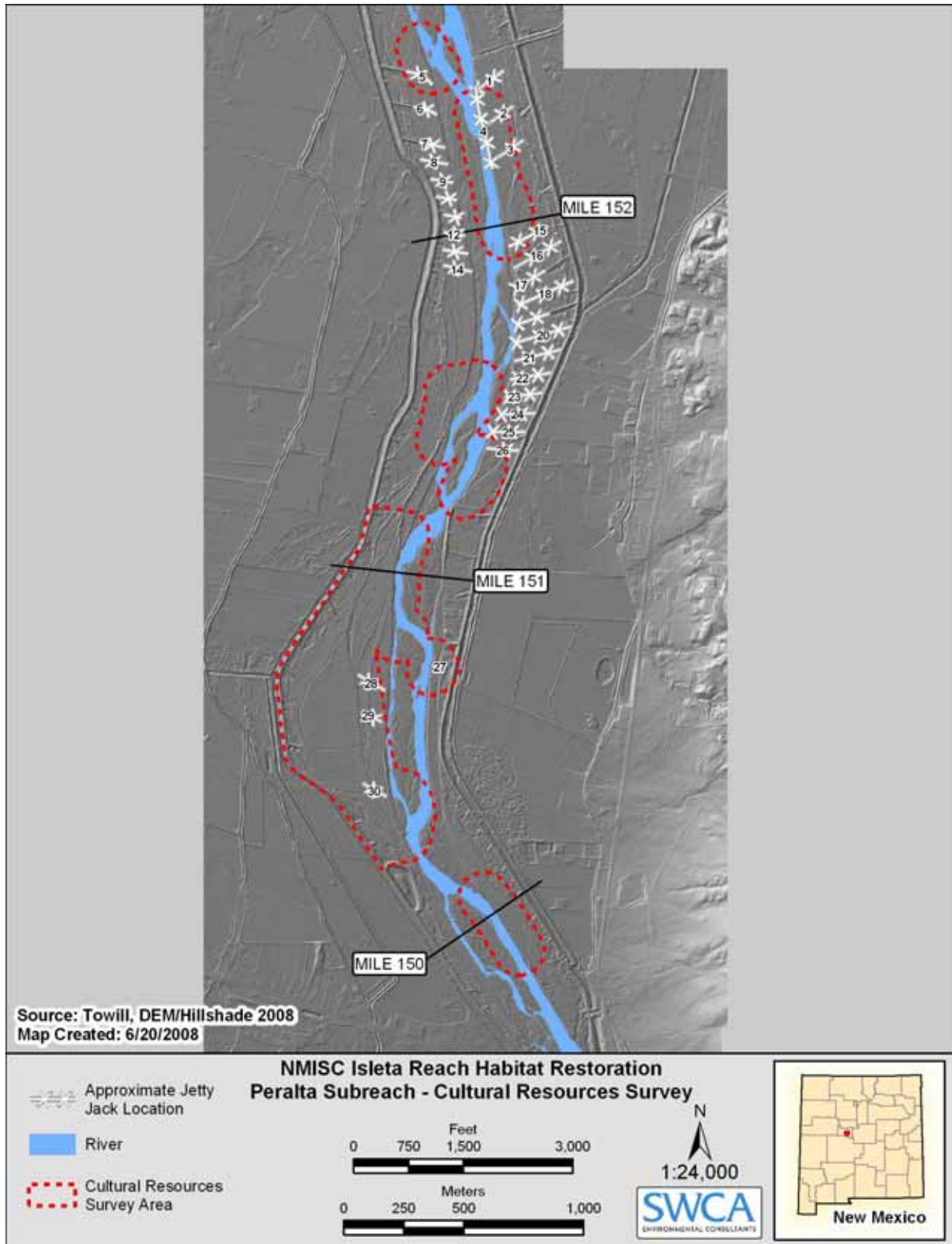


Figure 4.4. The cultural resources survey area within the Peralta Subreach.

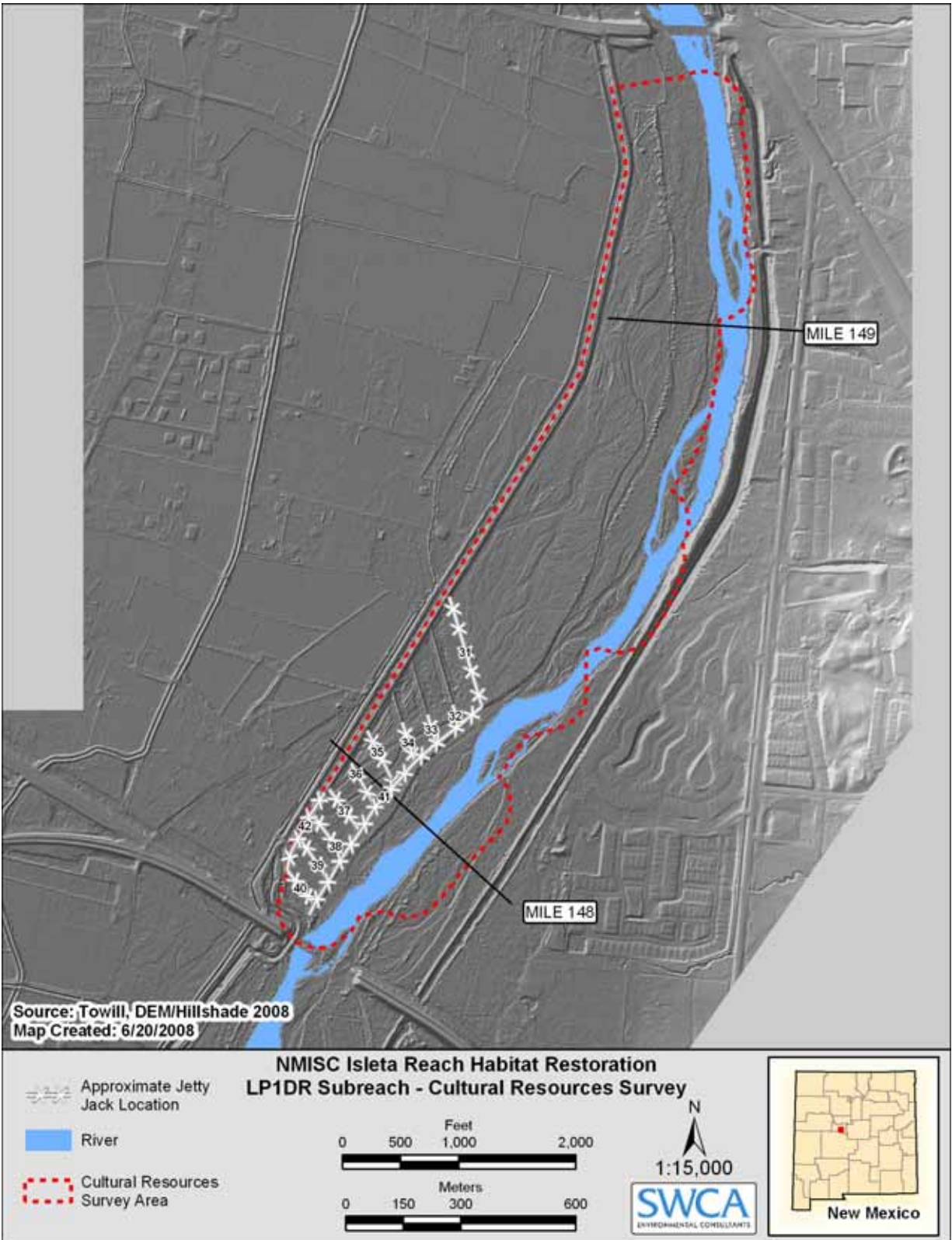


Figure 4.5. The cultural resources survey area within the LP1DR Subreach.



Figure 4.6. Partial overview of Jetty Jack No. 2, view facing west-southwest.



Figure 4.7. Partial overview of Jetty Jack 27, view facing west.



Figure 4.8. Overview of Jetty Jack No. 2, view facing west-southwest.

Table 4.4. Jetty Jack Characteristics within the Cultural Resources Survey Areas

| Jetty Jack Number | Bank Side | Length (feet) | Length (m) | Length (m) of Segment within Cultural Resources Survey Area |
|-------------------|-----------|---------------|------------|---|
| 1 | East | 466.4 | 142.2 | 21.1 |
| 2 | East | 444.0 | 135.3 | 98.8 |
| 3 | East | 443.1 | 135.1 | 85.8 |
| 4 | East | 1159.7 | 353.5 | 345.4 |
| 5 | West | 418.5 | 127.6 | 127.6 |
| 15 | East | 613.5 | 187.0 | 102.1 |
| 26 | East | 444.4 | 135.5 | 70.8 |
| 27 | East | 83.5 | 25.4 | 25.4 |
| 28 | West | 438.5 | 133.6 | 114.3 |
| 29 | West | 323.1 | 98.5 | 98.5 |
| 30 | West | 383.1 | 116.8 | 116.8 |
| 31 | West | 980.9 | 299.0 | 299.0 |
| 32 | West | 188.8 | 57.6 | 57.6 |
| 33 | West | 263.1 | 80.2 | 80.2 |
| 34 | West | 358.5 | 109.3 | 109.3 |
| 35 | West | 526.3 | 160.4 | 160.4 |
| 36 | West | 423.8 | 129.2 | 129.2 |
| 37 | West | 451.1 | 137.5 | 137.5 |
| 38 | West | 455.8 | 138.9 | 138.9 |
| 39 | West | 450.9 | 137.4 | 137.4 |
| 40 | West | 367.3 | 112.0 | 112.0 |
| 41 | West | 2345.2 | 714.8 | 714.8 |
| 42 | West | 749.7 | 228.5 | 228.5 |

Should archeological resources be found during construction at staging areas, access locations, or proposed construction sites, work would stop and the proper authorities (Reclamation Albuquerque Area Office Archaeologist, New Mexico SHPO) would be informed. Project activities would be restricted to the channel of the Rio Grande and to the banks and floodplain of the river. The channel would be accessed wherever it is possible, but most likely along existing access routes, minimizing adverse impacts to any potentially undiscovered archaeological resources from the Proposed Action.

Tribal entities have been contacted through a request for government-to-government consultation to determine whether any TCPs occur within or near the proposed project areas. If TCPs are identified, mitigation would be implemented to preclude any adverse impacts. Consultation with the New Mexico SHPO has been initiated.

4.6 VEGETATION AND WETLAND RESOURCES

Under the No Action Alternative, vegetation may increase, particularly non-native species, on islands and bars. Overbank flooding would remain very limited under current conditions. Under the Proposed Action, some temporary overbank flooding would occur, and over-island flooding would increase. Riparian vegetation is, by definition, subject to intermediate levels of disturbance from flooding. Reduced levels of annual maximum flows under the No Action Alternative have reduced these natural processes. Under the Proposed Action, some native and non-native vegetation would be disturbed by mechanical means during the implementation of the restoration techniques.

The proposed techniques have different levels of potential impact on riparian vegetation. All vegetative communities, native and non-native, would be altered on selected vegetated islands under the Proposed Action. Dead-and-downed native woody species may be used for in-channel placement to create LWD areas. Live native deciduous species would be avoided to the extent possible. Some herbaceous floodplain species may be trampled during construction, but impacts would be moderate.

The Rio Grande, including the proposed project locations, is a USACE jurisdictional waterway. Executive Order 11990 (Protection of Wetlands; FR 1977a) requires the avoidance of short- and long-term adverse impacts associated with the destruction, modification, or other disturbance of wetland habitats. Compliance with Sections 404/401 of the CWA would prevent the permanent loss of wetlands associated with project actions. The Proposed Action would disturb jurisdictional wetland areas; however, these impacts would be temporary, and full wetland functionality should be restored during the following growing season. Following construction, an increased amount of substrate would have the potential to be inundated and/or saturated for significant time periods, which should lead to a net gain in both the area and function of wetlands. Executive Order 11988 (Floodplain Management; FR 1977b) provides federal guidance for activities within the floodplains of inland and coastal waters and requires federal agencies to “ensure that [their] planning programs and budget requests reflect consideration of flood hazards and floodplain management” (FR 1977b). Proposed modification to riverbanks and islands would not result in significant changes in flooding patterns outside the existing floodplain.

4.7 FISH AND WILDLIFE

Short-term impacts to fish and wildlife resources would not occur under the No Action Alternative. Long-term adverse effects on breeding and foraging fish, birds, and mammals, however, are gradual and difficult to quantify. These effects result from long-term reduction in riparian ecological processes, encroachment of non-native species, increased fire hazard, and increased depth to groundwater.

By comparison, the Proposed Action would produce short-term direct impacts to wildlife in the immediate area of disturbance (Siegle 2005) and long-term beneficial effects on fish and riparian wildlife from improved ecological function and increased aquatic habitat. Habitat values particularly for birds are predicted to gradually increase if stands of riparian plants become established and develop adequate structure. To avoid direct impacts to migratory birds protected by the MBTA (16 USC 703, et seq.), clearing and grubbing of woody vegetation would be scheduled between August 15 and April 15, outside the normal breeding season for many birds. Should vegetation removal and construction take place between April 15 and August 15, pre-construction nesting bird surveys would be conducted to identify potential MBTA issues. Any positive pre-construction survey results or observations would be brought to the attention of the USFWS to determine methods of MBTA impact avoidance. Because there may be annual variation in breeding cycles, the NMISC and the MRGCD would consult with the USFWS and/or Reclamation if work would be planned within two weeks before April 15 or after August 15 and would conduct additional surveys if warranted to determine the presence of breeding flycatchers or other breeding birds.

Other wildlife species inhabiting vegetated islands, such as amphibians, reptiles, and mammals, would be temporarily displaced and may experience mortality during the implementation of the Proposed Action. The short-term effects would be outweighed by the long-term benefits of a healthier riparian ecosystem that includes aquatic habitat creation and increased food abundance within mesohabitats.

The LP1DR site that was impacted by the Belen fire in 2007 is likely to experience the greatest impacts on wildlife species abundance as native vegetation regenerates and treatments on invasive species are implemented. The MRGCD has already implemented the removal of dead trees and treatment of regenerating non-natives estimated at 50 to 200 stems per acre (personal communication, Wicklund 2008); approximately 150 native plants have already been planted in the regeneration area. Analysis of a 2000 burn site in riparian vegetation in Los Lunas that was later incorporated into the Los Lunas Habitat Restoration in 2003 revealed that the burned/regenerating cottonwood forest had an abundant and diverse avian population in 2003 and 2004, which is probably due to the dense regenerating understory vegetation (Siegle 2005). This dense new-growth understory of the cottonwood forest site provides high-quality foraging and nesting habitat, and similar conditions are expected at the LP1DR site.

4.8 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Rio Grande Silvery Minnow (*Hybognathus amarus*)

The No Action Alternative would continue the trends of population decline for this species in the Isleta Reach. The channel in the Isleta Reach is incised, and degradation is expected to continue (Porter and Massong 2004). The silvery minnow is known to occur within the defined project area, and fish obtained from recent salvage operations conducted during river intermittency have been stocked in the Isleta Reach. Emergency salvage in 2007 occurred on fifty (50) days and relocated 546 (adults and juveniles) from isolated pools between the Los Lunas Bridge and the Peralta Wasteway (Remshardt 2008). Increasing the amount and/or quality of suitable riverine habitat is essential for application of rescue and recovery efforts associated with successful silvery minnow population management.

The Proposed Action may affect, but is not likely to adversely affect, designated silvery minnow critical habitat. The primary objective of the Proposed Action is to enhance, restore, and/or create mesohabitat for the silvery minnow at various life stages. The Proposed Action is expected to provide beneficial effects for the silvery minnow and their critical habitat, including improved egg and larva retention, increased recruitment rates, and the increased survival of young-of-year and adult silvery minnow in the Isleta Reach.

Silvery minnow critical habitat encompasses the entire project area (FR 2003). Short-term effects to silvery minnow critical habitat may occur following habitat restoration activities, as discussed in the Biological Assessment (SWCA 2008d). Portions of the work associated with construction activities would take place within the river channel. Developed BMPs would be strictly enforced to minimize erosion and sediment inputs into the river during construction.

The short-term construction activities and the deposition of sediment in shallow water (current habitat areas) of the Proposed Action is likely to adversely affect silvery minnow and lead to take. Consultation with the USFWS is required before construction can begin to ensure that the Proposed Action would not likely jeopardize the continued existence of the species (USFWS 2005).

Common Black-hawk (*Buteogallus anthracinus*)

The No Action Alternative would not cause any changes to riparian vegetation used by this species; therefore, no adverse impacts to the species and its habitat would occur.

The Proposed Action would include clearing of woody vegetation but not mature gallery trees. In addition, areas proposed for vegetation clearing and disturbance are not vegetated with mature forest habitats. Therefore, the Proposed Action should have no adverse impact on the Common Black-hawk.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

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

The Proposed Action may affect, but is not likely to adversely affect, the Western Yellow-billed Cuckoo. Habitat enhancement resulting from revegetation may cause long-term benefits. To minimize impact on this and other riparian species, clearing and grubbing of woody vegetation would be scheduled to take place between August 15 and April 15. Should vegetation removal and construction be implemented during the breeding season (April–August), pre-construction breeding bird surveys would be conducted and monitoring would be performed to assure avoidance of impacts. Any positive pre-construction survey results or observations of affected species during construction would be discussed with the USFWS to coordinate nesting area avoidance.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

A vegetation survey was conducted to evaluate the potential suitability of habitats for flycatcher in the project area. Vegetation of suitable height and density to support flycatcher breeding was not found in any areas to be impacted by the project. Further, there are no known flycatcher nesting territories within the proposal area (personal communication, R. Doster 2008). Without existing suitable habitat or records of breeding, the No Action Alternative would have no effect on the species.

The proposal area is within designated critical habitat for the flycatcher. Per the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002), suitable habitat is defined as a riparian area with all the components needed to provide conditions suitable for breeding; these conditions are generally dense, mesic riparian shrub and tree communities 0.25 acre (0.1 hectare) or greater in size within floodplains large enough to accommodate riparian patches at least 33 feet (10 m) wide, measured perpendicular to the channel. Small quantities of this habitat may be disturbed by noise or by modification during the construction phase of the project. The Proposed Action would temporarily disturb or remove riparian vegetation that might support migrating flycatchers in the project area; however, this project should provide long-term benefit for the flycatcher by enhancing the available habitat. Since the proposed construction would take place outside of the breeding season for the flycatcher (flycatchers have a short, approximately 100-day breeding season, with individuals typically arriving in May or June and departing in August [Sogge et al. 1997]), no adverse effects to the species are anticipated.

The Proposed Action may affect, but is not likely to adversely affect, flycatcher migratory stop-over habitat. To minimize impact on this and other riparian species, clearing and grubbing of woody vegetation would be scheduled between September and April. Should vegetation removal and construction be implemented during the breeding season (April–August), pre-construction breeding bird surveys would be conducted and monitoring would be performed to assure avoidance of impacts. Any positive pre-construction survey results or observations of affected species during construction would be discussed with the USFWS to coordinate nesting area avoidance.

Bell's Vireo (*Vireo bellii*)

The No Action Alternative would not disturb the riparian vegetation where this species may occur; therefore, this alternative would have no effect on the species.

The Proposed Action may affect the Bell's Vireo summertime habitat during the construction phase. However, the construction phase of the project is slated for winter, when the species is not present in the MRG; thus, the species is not likely to be impacted by noise and the increased presence of humans. Long-term, the Proposed Action will not reduce habitat used by Bell's Vireo.

Bald Eagle (*Haliaeetus leucocephalus*)

The No Action Alternative would not disturb the riparian vegetation where this species may occur; therefore, this alternative would have no effect on the species.

The Proposed Action may affect, but is not likely to adversely affect, the Bald Eagle. Project activities may have short-term potential effects on Bald Eagles during construction, related to temporary noise and other disruptions. Removal of woody vegetation and other construction activities may take place during the winter months when Bald Eagles may be in the proposed project area. Guidelines would be employed to minimize the potential for disturbing Bald Eagles. If a Bald Eagle is visible within 0.25 mile (0.4 km) of the proposed project area in the morning when activity starts, or arrives during breaks in activity, the contractor would be required to suspend all construction activity until the bird leaves on its own volition, or the project biologist, in consultation with the USFWS, determines that the potential for harassment is minimal. However, if a Bald Eagle arrives during construction activities, or is observed 0.25 mile (0.4 km) or more from the construction site, activity would not be interrupted.

New Mexican Jumping Mouse (*Zapus hudsonius luteus*)

Lack of suitable habitat in the project area makes it unlikely that either the No Action Alternative or the Proposed Action would have an adverse effect on the New Mexican jumping mouse.

Pecos Sunflower (*Helianthus paradoxus*)

A survey conducted on September 3, 2008, indicated that the Pecos sunflower is not present in the project area. No further analysis will be conducted.

4.9 SOCIOECONOMICS

The long-term economic consequences of the No Action Alternative are unknown at this time and are difficult to assess. These impacts may be greater than those resulting from the Proposed Action due to the significant costs of other silvery minnow habitat restoration options that have been proposed by the Collaborative Program.

The Proposed Action would not adversely affect current economic and socioeconomic conditions within Valencia County. The salvage of firewood from the Belen fire site could provide economic benefit to local communities through approximately 2,500 cords of free wood use and potential use of local contractors. Depending on available funds, the cost of the Proposed Action is estimated at approximately \$603,000. This amount is low in comparison with total federal expenditures in Valencia County (approximately \$970 million in 2007, [U.S. Census Bureau 2008]) and would not adversely affect current economic conditions.

4.10 VISUAL AND AESTHETIC RESOURCES

The No Action Alternative and Proposed Action would not produce any long-term changes in the visual and aesthetic experience of the river user. The project would imitate the natural processes of shifting channel configuration, islands and bars, and the vegetation mosaic that are part of the river's aesthetic value. Channel and bank modifications may be visible to adjacent homeowners along the river edge or to pedestrians using bridges, trails, and the river edge during project implementation. Much of the area, formerly part of Willie Chavez State Park, was damaged in 2007 in a bosque fire, reducing the aesthetics of the project area. The area burned at the LP1DR (Willie Chavez) site is currently undergoing salvage work to reduce danger to the public as part of the MRGCD restoration project. The riparian restoration outlined in the Proposed Action would not interfere with this restoration and is likely to create no additional impact to visual and aesthetic resources. The proposed construction may be visible from the Belen Bridge. Visual and aesthetic impacts of the proposed project would be brief and limited, and may improve aesthetics in the burn area.

4.11 AIR QUALITY AND NOISE

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

The Proposed Action is not anticipated to generate ambient noise that exceeds county noise ordinances. Construction equipment to be used during the Proposed Action would create temporary variable noise levels that would likely exceed allowable ambient noise levels of 80 dBA in the immediate vicinity of the restoration site. However, all construction sites are anticipated to be more than 500 feet (152 m) from any sensitive noise receptors. The nearest noise receptors would include residents of nearby homes outside the levees. Under the Proposed Action, noise impacts during heavy equipment use would be short term, and heavy equipment would be used only during normal business hours to minimize noise disturbance. The riparian vegetation and levee would abate some of the noise generated by the equipment. A Construction Noise Permit may be issued by the appropriate city or county if sensitive noise receptors are identified within 500 feet (152 m) of restoration construction sites.

Under the Proposed Action, construction equipment would temporarily generate fumes and air emissions. The level of air emissions is anticipated to be low and in compliance with local and federal air emission standards.

4.12 NET WATER DEPLETIONS

The majority of proposed riverine restoration work would occur along the banks of the channel, most of the work falls within the nominal 600-foot (183-m) width of the channel (the original river channel design width for this reach to maintain flow delivery efficiency and reduce flood risk). The NMOSE considers features within the 600-foot (183-m) channel width to be dynamic aspects of the channel. Therefore, no depletion offsets are required for riverine restoration work within the nominal channel width. The NMISC anticipates that the bosque inundation portion of the project will require depletion offsets. The NMISC plans to use water available under the amended Emergency Drought Water Agreement (Appendix A) to offset the depletions that occur annually. These offsets will be made in accordance with the requirements of the NMOSE. The

NMISC may also use state funds to acquire water rights and provide offsets through the New Mexico Strategic Water Reserve a process currently under development. .

The NMISC will submit a permit application or applications, including the EA and other pertinent documentation as necessary. Work would not occur at locations where permits are needed until the necessary permits have been secured. Work at locations where NMOSE permits are not required would be phased for initial construction.

4.13 ENVIRONMENTAL JUSTICE

Under the No Action there would be no change to environmental justice.

The Proposed Action is in compliance with Executive Order 12898 (FR 1994b), Environmental Justice in Minority and Low-Income Populations. The proposed project is on the active floodplain of the Rio Grande, between the flood control levees and within the Isleta Reach of the river. Outside of the levees, nearby land use along this reach of the river includes residential neighborhoods of all economic strata, agricultural land, and commercial and industrial uses.

Regardless of their level, impacts would be similar throughout the Isleta Reach of the river and would affect a diverse group of communities and populations. There would be no disproportionately high or adverse human health or environmental effects on minority or low-income populations from the proposed project.

4.14 INDIAN TRUST ASSETS

The Pueblo of Isleta has been contacted to request a government-to-government consultation to identify any ITAs in the project area and to assess potential impacts in accordance with Secretarial Order 3175 and Reclamation ITA policy. No ITAs were identified; therefore, no impacts are anticipated from the No Action Alternative or the Proposed Action.

4.15 IRRETRIEVABLE COMMITMENT OF RESOURCES

The Proposed Action may result in unavoidable, temporary harm to the silvery minnow. While this result would represent a loss to the species, the USFWS did not anticipate that similar activities conducted under similar projects (Phase I and II Habitat Restoration Projects conducted by the NMISC) in the Albuquerque Reach (Reclamation 2007) would jeopardize the species' continued existence (USFWS 2005). Implementation of the project would also result in the commitment of resources such as fossil fuels, construction materials, and labor. In addition, state and federal public funds would be expended for the construction of the proposed project.

4.16 CUMULATIVE IMPACTS

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

4.16.1 MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM

The Collaborative Program has solicited and funded multiple habitat restoration projects in the Isleta and Albuquerque reaches (Reclamation 2002). Silvery minnow augmentation funded by the Collaborative Program should provide positive synergistic interactions with the habitat that would be created by this project.

4.16.2 PERENNIAL RIO GRANDE SILVERY MINNOW REFUGIA AT DRAIN OUTFALLS

The MRGCD has performed work in the Isleta Reach near drain outfalls to create continual habitat by the creation of perennial pools (Reclamation 2007). These projects involve the placement of LWD in the channel to create scouring with the intent of creating deep pools that remain wet even during periods of river drying. These pools have the effect of providing refugia for the silvery minnow during periods of low or no flow.

4.16.3 NMISC HABITAT RESTORATION PROJECTS

Currently, the New Mexico Water Trust Board and the NMISC are conducting projects to improve silvery minnow habitat. These projects include increasing scientific knowledge of available food for aquatic species within the MRG and incorporating LWD for improved mesohabitat (Tetra Tech 2004). Phase I construction for the habitat restoration projects included modification of 37 acres (15 hectares) within three subreaches in the Albuquerque Reach of the MRG using many of the techniques outlined in this EA. Phase II of that project continued habitat restoration efforts in the Albuquerque Reach.

4.16.4 LOS LUNAS HABITAT RESTORATION PROJECT

In 2002, the USACE and Reclamation implemented the Los Lunas Habitat Restoration Project (USACE/Reclamation 2002) to improve habitat conditions for the silvery minnow and the flycatcher in a riparian area that had burned in 2000 in the Isleta Reach. The project permanently removed approximately 1,400 jetty jacks, created approximately 40 acres (16 hectares) of shallow-water/low-velocity aquatic habitats, and restored native vegetation to burned areas. Aquatic habitat features included the excavation of a series of high-flow channels, embayments, and backwater mesohabitats designed to provide egg retention and rearing habitat. The USACE and Reclamation have committed to providing 15 years of monitoring.

4.16.5 MIDDLE RIO GRANDE CONSERVANCY DISTRICT MAINTENANCE PROJECTS

The MRGCD routinely performs maintenance on irrigation canals and ditches throughout the MRG. In the Isleta Reach, the MRGCD has begun an effort to reduce sediment levels in the channels and reduce sediment contributions back into the channel at drain outfalls by dredging those canals. Additionally, the MRGCD has, in conjunction with the Pueblo of Isleta, performed work in the channel to destabilize islands to help re-create the dynamic nature of the channel.

4.16.6 U.S. ARMY CORPS OF ENGINEERS LEVEE MAINTENANCE

The U.S. Army Corps of Engineers routinely conducts maintenance on the levees in the Isleta area on an ad-hoc basis for the purpose of flood control. When work is conducted, disturbances

such as noise and increases in fugitive dust occur in and around the bosque. No levee work is currently proposed in close proximity with the restoration work.

4.16.7 U.S. BUREAU OF RECLAMATION PROPOSED DRAIN UNIT 7 PROJECT

Drain Unit 7, is a U.S. Bureau of Reclamation project designed to strengthen an area approximately 500 feet (152 m) upstream of San Acacia dam. This project will strengthen the streambank on the western side of the river. This project is approximately 33 miles (55 km) downstream of the proposed restoration area.

4.16.8 PUEBLO OF ISLETA HABITAT RESTORATION PROJECTS

The Pueblo of Isleta has undertaken several projects with the goal of increasing channel sinuosity and destabilizing in-channel bars. The Pueblo of Isleta's projects could increase suitable habitat for the silvery minnow and redistribute sediment in the channel. The project area is approximately 14 miles (23 km) upstream of the proposed restoration area.

4.17 ANALYSIS OF CUMULATIVE IMPACTS

The cumulative effects of the Proposed Action plus the described related projects may produce short-term changes in several aspects of the existing hydrology, hydraulics, and fluvial geomorphology throughout the Isleta Reach. The Proposed Action may affect other specific downstream restoration projects by changing local fluvial geomorphology and hydrology. Other projects described here may affect the Proposed Action by altering physical processes upon which the proposed techniques depend. Changes in upstream water operations may augment and improve or may decrease the effectiveness of proposed projects.

All treatment and control areas would be monitored for two years to determine the effectiveness of the methods implemented during Phase I of the Proposed Action and the potential hydrologic and geomorphic alterations to the project area. Long-term monitoring (up to 10 years) and adaptive management would be a coordinated effort with the Collaborative Program and would incorporate interagency objectives to assess the self-sustaining and successful regenerating ability of restoration treatments. After monitoring and natural reshaping, the remaining island areas void of native vegetation may be replanted with appropriate native species to stabilize the contours to the extent possible. Following restoration, the treated islands and bars are expected to have a surface elevation suitable for inundation at moderate to high river flows. Revegetation, whether natural or planted, would also provide suitable roughness to decrease flow velocities and increase egg and larva retention.

Fluvial geomorphic, vegetation, and fisheries monitoring would be components of the monitoring plan. Fluvial geomorphic monitoring would occur at least once a year following spring runoff or summer monsoons. Hydrologic events may constitute the need for additional geomorphic monitoring efforts. Vegetation monitoring would occur once a year.

All participants in the various activities on the Rio Grande recognize the need for dramatic change in the riverine ecosystem to provide better support for the endangered silvery minnow; however, the complex cumulative outcome of multiple actions is unpredictable and potentially

adverse to water quality and various indicators of silvery minnow reproductive success. The only effective means of assessing complex cumulative effects on ESA critical habitat and species is to have group participation among all involved parties. Sound scientific measurement of baseline parameters most closely associated with silvery minnow success needs to be developed, and a detailed silvery minnow monitoring protocol needs to be implemented.

4.18 SUMMARY OF EFFECTS

Different techniques considered for habitat restoration within the Isleta Reach would have short-term effects on environmental resources but long-term beneficial effects on biological resources, including the silvery minnow and the flycatcher and their critical habitats. The two subreaches considered for the different restoration techniques are not equally suitable. The overall effects of the proposed restoration techniques are summarized in Table 4.5.

Table 4.5. Environmental Consequences of Proposed Restoration Techniques and No Action Alternative

| Environmental Resources | Proposed Action | No Action |
|--------------------------------|---|---|
| Geomorphology and Soils | Short-term adverse impact to channel and bank characteristics; long-term beneficial effects on these altered channel features | Development of channel features that are unfavorable for silvery minnow egg retention and larval and adult success would continue |
| Hydrology and Hydraulics | Short-term minimal adverse impact to hydrology during construction when some increases in turbidity and total dissolved may be observed. The proposed work will not alter the channel capacity or the base flood elevation of the Rio Grande floodway in the project area. Long-term positive effect is anticipated | No change in the amount or duration of flows in the Isleta Reach |
| Water Quality | Short-term effects within applicable water quality standards (namely turbidity and TDS); no long-term adverse effects | No change in levels of constituents such as pH, DO, temperature, and turbidity |
| Cultural Resources and TCPs | No adverse effects on archaeological resources or TCPs are anticipated | No change in cultural resources and traditional cultural properties |
| Vegetation and Wetlands | Limited short-term effects on vegetation, including some wetlands; no adverse effect on dense, native woody vegetation > 10 feet (3 m) tall. Potential long-term benefits through the active revegetation | Continued trends in vegetation, such as increases in non-native species and woody vegetation on islands |
| Fish and Wildlife | Short-term adverse impacts; long-term positive effect on fish and wildlife abundance and diversity from habitat improvements are anticipated | Continued adverse trends toward decreased fish and wildlife abundance and diversity |

Table 4.5. Environmental Consequences of Proposed Restoration Techniques and No Action Alternative, continued

| Environmental Resources | Proposed Action | No Action |
|--|---|---|
| Threatened, Endangered, and Special Status Species | Short-term direct effects may occur from the operation of heavy equipment in the channel where the silvery minnow is known to occur, but effects would be minimal and not likely to jeopardize the continued existence of silvery minnow; may affect but not likely to adversely affect flycatcher, yellow-billed cuckoo, and bald eagle. Potential long-term benefits through enhancing existing habitat | Continued adverse trend toward decreased habitat for silvery minnow |
| Socioeconomics | No adverse effects; the costs of implementing the project are within the annual range of variability for federal and state expenditure for Valencia County | No short-term change in socio-economics is anticipated |
| Visual and Aesthetic Resources | Short-term negative impacts; long-term positive effect | No long-term or short-term changes in the visual and aesthetic experience |
| Air Quality and Noise | Short-term adverse impact from increased ambient noise levels; short-term adverse impacts to air quality may be observed because of ground disturbances leading to small increases in fugitive dust and particulate matter | No change in air quality or noise |
| Net Water Depletions | A small increase in net depletions may occur,, further evaluation required; these depletions would be off-set per NMOSE regulations | No change in net water depletions |
| Environmental Justice | No adverse effect | No change in environmental justice |
| Indian Trust Assets | No ITAs identified at this point in time; no adverse effects | No change in ITAs |

4.19 ENVIRONMENTAL COMMITMENTS BY NMISC AND MRGCD

All applicable permits would be obtained separately by the NMISC and the MRGCD prior to implementation of each phase of their respective projects, including but not limited to:

- Landowner access permissions, including the MRGCD who would serve as a project partner for a portion of this project
- CWA Section 404—State Water Quality Certification under CWA, Section 401
- Temporary Construction Noise Permit, Valencia County Environmental Health Department
- Temporary Construction Noise Permit, Town of Belen Environmental Health Department

- National Pollutant Discharge Elimination System (NPDES) Permit
- Storm Water Pollution Prevention Plans

In addition to obtaining these permits, the following environmental commitments are to be undertaken separately by the NMISC and the MRGCD:

- Avoiding construction or location of staging areas in jurisdictional wetlands.
- Avoiding impacts to birds protected by the MBTA by scheduling construction outside of the bird breeding season. The NMISC and The MRGCD will consult with the USFWS and/or Reclamation if work will be planned within two weeks before April 15 or after August 15 and will conduct additional surveys if warranted to determine the presence of breeding birds.
- Implementing specific mitigation measures to avoid impacts to threatened or endangered species and their habitats that will be issued by the USFWS in the forthcoming BiOp for this project.
- Avoiding any TCPs identified in the project area identified during previous consultation with the SHPO and tribal entities.
- Implementing measures to stop work and notify the Reclamation Area Archaeologist in the event that prehistoric or historic remains, human burials, or other archaeological resources are discovered during construction or monitoring.
- Assessing water depletions for each site. If increases do occur, they would be offset through a permitting process established by the NMOSE.
- Using silt curtains and fences to minimize any potential increases in turbidity in the river during and immediately after construction-related activities.
- Conducting monitoring at each site to ensure that project goals are met.