RECLAMATION

Managing Water in the West

Rio Grande Silvery Minnow Sanctuary Environmental Assessment and Finding of No Significant Impact

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

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Rio Grande Silvery Minnow Sanctuary

Environmental Assessment

Final

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ACRONYMS AND ABBREVIATIONS

BA	biological assessment
BMP	best management practice
BO	biological opinion
ºC	degrees Celsius
cfs	cubic feet per second
CWA	Clean Water Act
dbh	diameter at breast height
dB	decibels
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
ºF	degrees Fahrenheit
FR	Federal Register
ISC	New Mexico Interstate Stream Commission
ITA	Indian Trust Assets
MBTA	Migratory Bird Treaty Act
MOU	memorandum of understanding
MRG	Middle Rio Grande
MRGCD	Middle Rio Grande Conservancy District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMAC	New Mexico Administrative Code
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMNHP	New Mexico Natural Heritage Program
NMRPTC	New Mexico Rare Plant Technical Committee
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSE	Office of the State Engineer
OSHA	Occupational Safety and Health Administration
Program	Middle Rio Grande Endangered Species Collaborative Program
Reclamation	U.S. Bureau of Reclamation
RGSM	Rio Grande silvery minnow
RGVSP	Rio Grande Valley State Park
RPA	Reasonable and Prudent Alternatives
Sanctuary	Rio Grande Silvery Minnow Sanctuary
SHPO	State Historic Preservation Officer
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TCP	Traditional Cultural Properties
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Rio Grande silvery minnow (RGSM; *Hybognathus amarus*) was formerly one of the most widespread and abundant species in the Rio Grande basin in New Mexico, Texas, and Mexico. Due to population declines resulting from the dewatering of portions of the Middle Rio Grande (MRG) through water-regulation activities as well as habitat degradation, the RGSM is currently listed as endangered both federally and by the State of New Mexico, and is protected under the Endangered Species Act (ESA). The development of captive breeding and rearing facilities and restoration of riverine habitats that support the RGSM are considered to be essential components for recovery of the species (USFWS 1994; 2003a).

The Bureau of Reclamation proposes to construct a facility intended to supplement RGSM production in the vicinity of Albuquerque, New Mexico. This facility, termed the Rio Grande Silvery Minnow Sanctuary (Sanctuary), will be comprised of an artificial rearing and breeding channel, containing elements of the natural environment including backwater pools and eddies, located parallel to the MRG near the existing BioPark in the City of Albuquerque. The intent of this facility is to contribute to the continued enhancement and recovery of the RGSM through the creation of additional habitat for the species. Congress recently authorized the Secretary of the Interior to implement construction and operation of the Sanctuary (C. Gibson, pers. comm., 6/1/05). The Middle Rio Grande Conservancy District (MRGCD), U.S. Fish and Wildlife Service (USFWS), and the City of Albuquerque are cooperating agencies. Agency scoping and technical meetings have occurred in 2004 and 2005.

The Project is funded by Reclamation. This Environmental Assessment (EA) has been conducted to evaluate the impacts of the construction and operation of the Sanctuary on environmental resources and their relationship to other projects and undertakings in compliance with the National Environmental Policy Act (NEPA) (42 U.S.C. 4331-4335).

1.2 Proposed Action

The Proposed Action involves the construction and operation of a Sanctuary that will contribute to the enhancement and recovery of RGSM in the MRG (Figure 1-1 for vicinity map). The proposed project site, near downtown Albuquerque, is at an elevation of approximately 4,940 feet and is located 4,800 feet south of Bridge Blvd., on the east side of the MRG (Figure 1-2).

The proposed Sanctuary will include diverse habitats such as channels, backwaters, and pools for all life stages to assist in increasing the population of this endangered fish in concert with other ongoing projects in the MRG. It is proposed that this facility be operated on a year round basis. For the initial phase of this project, it is anticipated that advanced larvae, the progeny of adults currently reared at the BioPark, will be introduced into the facility in the early summer months.

1.3 Purpose and Need

The purpose of the Proposed Action is to develop and construct an additional breeding and rearing facility for the RGSM in the Albuquerque Reach of the MRG with the intent of

increasing captive populations and enhancing augmentation efforts in the area. The Proposed Action will contribute towards efforts aimed to satisfy federal requirements under the *Biological Opinion for Reclamation's Water and River Maintenance Operations, the U.S. Army Corps of Engineers (USACE) Flood Control Operations, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico, 2003* (2003). As mitigation for loss of RGSM habitat resulting from maintenance operations on the river, the USFWS mandated the development of breeding and rearing facilities in addition to the existing BioPark Refugium. The intent of these facilities is to alleviate jeopardy to the species by increasing captive populations, with the ultimate goal of improving the status of RGSM in the wild. The Biological Opinion (BO) requires the funding and collaborative execution of the construction of captive propagation facilities for the RGSM in the MRG, as specified in RPA element AA:

> Upon the successful operation and evaluation of the recently construction refugium (Breeding and Rearing Facility #1 [BioPark Refugium]), the action agencies, in coordination with parties to the consultation, shall construct two new naturalized Refugia breeding and rearing facilities for the captive propagation of the silvery minnow. The first new breeding and rearing facility must be completed by May 31, 2005, and the second new facility must be completed by May 31, 2006. One facility should be located in the Cochiti or Angostura Reach and the other facility should be located in the Isleta or San Acacia Reach. The design, siting, and operation of the facility should be determined in coordination with the Service and Pueblos, as appropriate, and should include design adaptations following the lessons learned from the operation of the Breeding and Rearing Facility #1 (USFWS 2003a).

The Sanctuary will provide created RGSM habitat until natural habitat and river processes can be recovered to the extent that allows the population to recover in the Middle Rio Grande. Areas of the bosque disturbed during construction of the facility will be revegetated with native species to improve the existing condition of the habitat and benefit native wildlife. In addition to RPA Element AA as discussed above, the USFWS BO (2003a) also requires the funding and execution of habitat restoration projects on the MRG that will improve survival of all life stages of the endangered RGSM, as specified in RPA element S:

> In consultation with the USFWS and appropriate Pueblos and in coordination with parties to the consultation, action agencies shall conduct habitat/ecosystem restoration projects in the Middle Rio Grande to increase backwaters and oxbows, widen the river channel, and/or lower river banks to produce shallow water habitats, overbank flooding, and regeneration stands of willows and cottonwood to benefit the silvery minnow, the flycatcher, or their habitats. Projects should be examined for depletions. It is the USFWS's understanding that the objective of the action agencies and parties to the consultation is to develop projects that are depletion neutral. By 2013, additional restoration totaling 1,600 acres (648 hectares) will be completed in the action area. In the short term (5 years or less), the emphasis for silvery minnow habitat restoration projects shall be placed on river reaches north of the San Acacia Diversion Dam. Projects should result in the restoration/creation of blocks of habitat 24 hectares (60 acres) or larger (USFWS 2003a).

1.4 Relevant Statutes, Regulations, and Other Plans

The Proposed Action will be required to conform to the provisions of all applicable local, state and federal regulations and ordinances. Specifically, compliance is required under the provisions of several federal regulations including Section 7 of the ESA as administered by the USFWS, and Section 106 of the National Historic Preservation Act (NHPA; 16 U.S.C.) as administered by the New Mexico State Historic Preservation Officer (SHPO). Because more than one acre of land will be disturbed by the Proposed Action, the project requires a National Pollution Discharge Elimination System (NPDES) permit for construction.

Proposed work below the ordinary high water mark of the Rio Grande and the Albuquerque Riverside Drain, which are jurisdictional Waters of the U.S, could be covered under an existing nationwide permit to comply with requirement of Section 404 of the Clean Water Act (CWA). This work includes installation of the fish release/water return channel and installation of the intake structure and outfall pipeline.

The Fish and Wildlife Coordination Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the act requires federal agencies undertaking projects affecting water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources. Reclamation has consulted with the USFWS and the New Mexico Department of Game and Fish (NMDGF) in the review of supporting information provided by Reclamation.

The Endangered Species Act of 1973, as amended, 16 USC *et seq.* Section 7 consultation, has been conducted through an intra-agency consultation. Reclamation has provided supporting information to assist with the consultation and effects determination.

Indian Trust Assets (ITAs) must be addressed in accordance with Secretarial Order 3175 and Reclamation ITA policy. A Temporary Construction Noise Permit may be required by the Albuquerque Environmental Health Department prior to construction, as specified in the local Noise Ordinance. Other local permits, including, but not limited to a fugitive dust, clearing and grading, and building permit, may be required from the City of Albuquerque. Regarding the use of Drain water for the Sanctuary, the MRGCD has prepared a letter of commitment to supply water for the Sanctuary (Appendix A). The purpose of this letter is to confirm the commitment of the MRGCD to provide, subject to the physical availability of water, an average of 10 cfs of water for the Sanctuary. The water will come from the Albuquerque Riverside Drain, and will be moved from the Drain into the Sanctuary by means of a structure to be built as part of the Sanctuary project. Inasmuch as the Sanctuary parallels and is adjacent to the Drain, MRGCD preliminary analyses show that moving water from the Drain into the Sanctuary will result in relatively small increases in depletions due to seepage or evaporation.

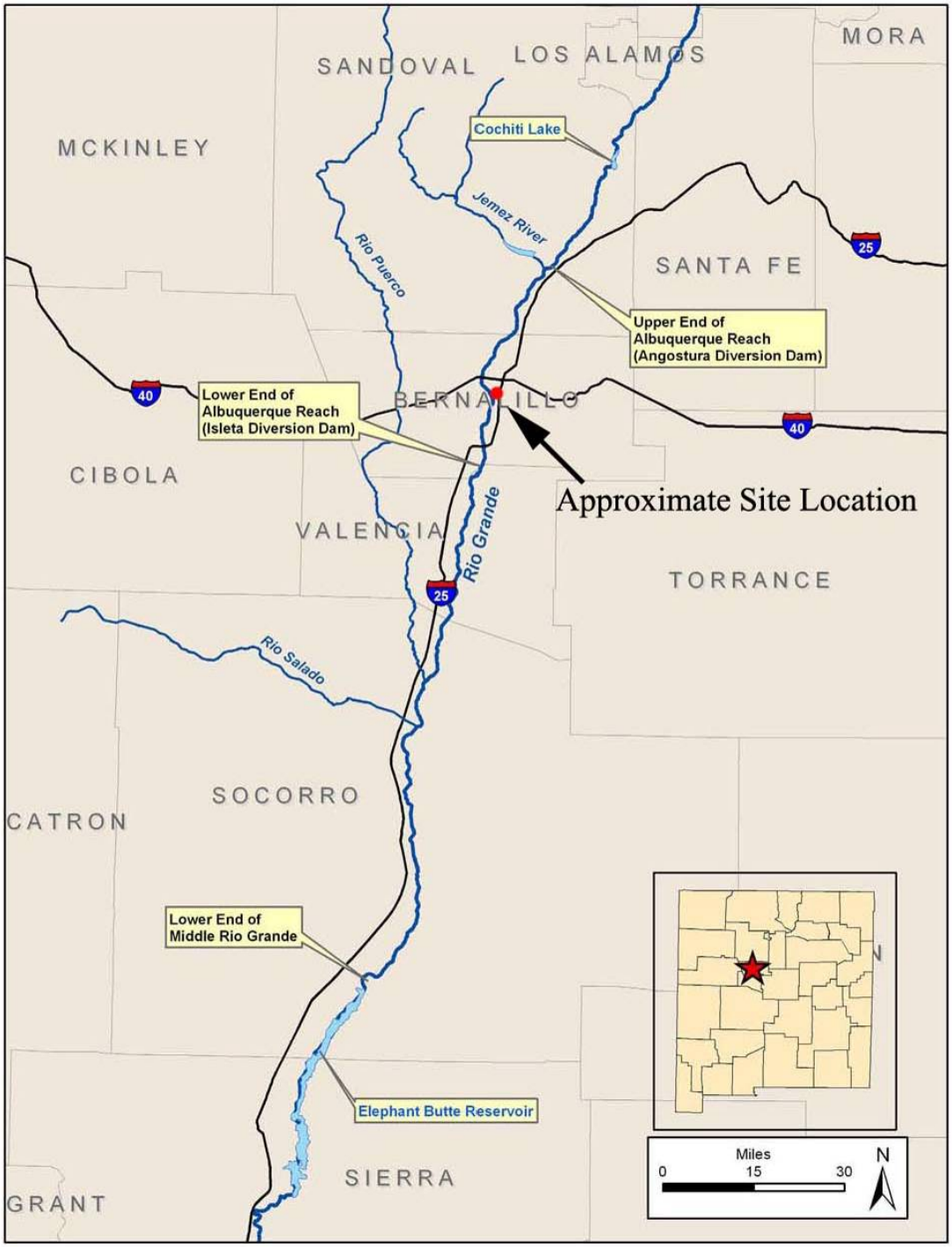

Figure 1-1. Project Area Map (adapted from SWCA 2005).

Figure 1-2. Project Vicinity Site Map.

1.5 Agency Activities in Support of the Environmental Assessment

Public comment was solicited during the EA review process in the form of a public meeting held in the Albuquerque area on July 28, 2005. This meeting sought public comments or concerns on the Proposed Action as described within the Draft EA.

Reclamation has consulted directly with the USFWS, a cooperating partner in the project, to identify any potential issues and concerns that they have regarding this project and potential impacts to sensitive species and their habitat. Dr. Jennifer Parody of the USFWS has been the primary contact regarding this project and has attended several Sanctuary Technical Group meetings throughout the course of project development. Consultation with the USFWS regarding impacts to species listed or proposed as threatened and endangered (T&E) under the ESA has been completed. Supporting information was recently developed and submitted to the USFWS to comply with Section 7 of the ESA. During initial preparation of a BA, it was determined that ESA consultation would take place via USFWS intra-agency consultation.

Other agencies and groups consulted by Reclamation for development of this EA included the USACE, New Mexico Environment Department (NMED), and NMDGF. Cooperating agencies are the USFWS, MRGCD, and the City of Albuquerque.

Discussion among members of the project working group resulted in the identification of issues that should be addressed within the EA, including:

1. The potential for effects to protected species;
2. Removal of existing cottonwood trees, willows, and other vegetation within the project area and effects to native wildlife;
3. The introduction of state-listed noxious weeds;
4. Erosion and water quality during and after construction;
5. Impacts of Sanctuary components on flood storage capacity within the floodplain on connectivity with the river;
6. Air quality from dust generation during construction;
7. Potential impacts to cultural and archaeological resources, as well as potential sacred sites in the project area;
8. Construction noise levels and the associated potential impact on the commercial and residential receptors that may be close enough to the project site such that noise levels may approach or exceed standard noise threshold levels;
9. The importance of water quantity in the Middle Rio Grande, where surface water availability is limited and its downstream delivery is vital to various communities. This project will evaluate changes in water depletions and develop methods to ensure that depletions are not increased as a result of the action;
10. Avoidance of impacts to visual and aesthetics resources in the area.
11. The avoidance of ITAs in the project area; and

12. The assurance of Environmental Justice.

The following issues were not considered relevant to the project:

- There are no segments of designated Wild and Scenic Rivers in the vicinity of the project site that could be affected by the Proposed Action.
- There are no wetlands in the area that will be impacted by project implementation.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

This chapter describes the two alternatives analyzed in this EA: the No action Alternative and the Preferred Action Alternative. An analysis of all alternatives considered but dismissed from further consideration is presented below and describes how the Preferred Action was chosen for Sanctuary development.

2.2 Alternatives Considered but Eliminated from Further Study

Initially, several alternatives for the RGSM Sanctuary were discussed and analyzed for feasibility, reasonable cost and benefit to the species (Reclamation 2004). During the alternative screening process, five different alternatives were considered and each evaluated to determine which best met the objective of the project's Purpose and Need. Alternatives considered included the following:

- Drain Diversion: Development of a rearing channel utilizing diverted ditch/canal water. This alternative would include a constructed channel and pools supplied with water from a Middle Rio Grande Project irrigation canal. Water would be returned into the drainage system, or to the river.
- Closed Loop: Development of a closed loop similar in concept to the BioPark Refugium, but larger and more "naturalized". It would include a closed loop channel with integrated pools.
- Side Channel: Development of a Sanctuary side channel utilizing river water as the main source of water to the system. The Sanctuary would include a side channel off the river with integrated pools. Water would be diverted from the river through a gated control structure and returned to the river downstream. A weir or dam would be needed in the river to allow gravity diversion to the Sanctuary during low flow; alternatively water could be pumped in. Optional fish screens could be installed to exclude non-target fish and aquatic predators, but these would also prevent movement of RGSM into and out of the Sanctuary.
- Existing Drain: Development of a Sanctuary within and adjacent to existing irrigation drain. The Sanctuary would be based on an existing drain. Pools and backwaters would be built into and adjacent to the drain. The drain would be connected with the river at the downstream end through an existing or constructed outlet. Fish screens could be incorporated to exclude non-target fish and aquatic predators, but this would keep RGSM from moving into and out of the Sanctuary.
- In Channel: Development of a Sanctuary within and adjacent to the Rio Grande. This alternative would require work in the river and associated riparian areas, and considerable maintenance to maintain flows through the Sanctuary. Predation control difficulties may also be associated with this alternative.

Reclamation conducted a project team meeting to determine the preferred alternative by comparing a number of factors for each alternative. Each of the team members provided input as related to their field of expertise. Construction and operational cost, siting flexibility, control of

environmental factors, and connection to the Rio Grande were established as the criteria for evaluating the alternatives listed above.

Table 2-1. Parameters Considered for Selecting the Preferred Alternative.

Parameter Considered
Source of water
Cost
Siting flexibility
Control of environmental factors
River connection

Based on parameters considered and other factors including permitting requirements, excavation quantities and engineering challenges, construction of the Sanctuary utilizing the Drain Diversion alternative was determined to be the Preferred Alternative. In this alternative, facility siting is relatively flexible as several suitable sites are present throughout the MRG that meet the project objectives. Siting will require a sufficiently sized parcel near the existing irrigation canals and drains with adequate reserve capacity to serve the Sanctuary. Additionally, siting will require a suitable location to return flow back to the Drain and to the Rio Grande. The Preferred Alternative also presents a high degree of control over conditions (flow of water, potential for predation exclusion, etc.). Finally, with an established river connection, this alternative could be used to acclimate hatchery fish to a river-like environment while allowing fish to be released into their native habitat, the Rio Grande.

Each of the alternatives had varying requirements of environmental compliance and potential future maintenance. The Preferred Alternative was considered one of the best alternatives with regard to impacts to the river's aquatic environment because, although some work below bankfull will be required to construct a fish and water return channel to the Rio Grande, no in-river diversion or rearing structures will be constructed.

In summary, the Drain Diversion alternative was chosen as the Preferred Alternative for several reasons. Initial construction will comprise the greatest costs of this alternative and long-term maintenance will be relatively low. Construction will require site clearing and grading, channel and pool excavation and the addition of miscellaneous habitat structures (woody debris, etc.), installation of a water intake structure at an existing canal diversion, installation of fish screens and water/fish return conveyances. Following initial construction, the costs of operation and maintenance activities, including periodic cleaning and sediment removal, operation and maintenance of the water control structure, and monitoring and feeding of the RGSM, will be relatively low.

2.3 Alternatives Considered in EA

2.3.1 Alternative A: No Action

Under this alternative, the proposed Sanctuary would not be constructed. Fulfillment of the RGSM refugium requirements (RPA AA) of the USFWS 2003 BO would not occur through the

development of a Sanctuary. There would be a continuing shortage of grow-out and acclimation facilities for the RGSM. Additionally, habitat enhancement within the vicinity of the Sanctuary would not occur in association with Element S of the RPA.

2.3.2 Alternative B: Preferred Alternative (Proposed Action)

Description and Production Scenario

The proposed Sanctuary will provide diverse habitats such as channels, backwaters, and pools for all RGSM life stages to assist in increasing the population of this endangered fish. It is proposed that this facility will be operated on a year round basis. For the initial phase of this project the emphasis will be on growing out and acclimating larvae and juvenile fish. It is anticipated that advanced larvae obtained from the existing Refugium will be introduced into the facility in the early summer months. As the Sanctuary is considered a pilot project, the number of fish initially reared in the facility will be conservative until the performance of the system can be determined. Using the low end of the "high" density RGSM populations (>150 RGSM/100m^2) (Reclamation and USACE 2003) this equates to approximately 10,000 to 15,000 fish for an initial stocking event. Production numbers will be adjusted following operational reviews and evaluations.

Juveniles may be released in October with a percentage of the population being held over winter to be released as sub-adults in early spring. Prior to fish release, it is desired that the facility have the ability to enumerate, mark, and take data (lengths, weights, etc.) to assist in evaluating the success not only of the Sanctuary but of its contribution to the overall RGSM restoration program. A collection "kettle" will be located at the south end of the Sanctuary. Fish could either be sorted in this kettle or physically moved to an outside portable tank for processing prior to release.

Although the USFWS prefers that all RGSM exiting the Sanctuary be marked to facilitate future monitoring, marking of eggs and larvae will present extreme operational difficulties that may be counterproductive to the intent of the project. Because the Sanctuary's egg/larvae carrying capacity is currently unknown, there is a desire to allow offspring to volitionally exit to the Rio Grande to prevent potential loss through density constraints on habitat and space (if spawns are productive enough to overwhelm the facility). Eggs and larvae that volitionally exit the Sanctuary will not be marked. The USFWS has agreed that eggs and larvae may be released into the river without marking due to potential take issues associated with the unknown carrying capacity of the facility (J. Parody, USFWS, pers. comm.).Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. As the Sanctuary is an experimental facility, amendments and improvements to release protocols are planned to be a component of monitoring and evaluation. In accordance with USFWS policies, handling of any fish, regardless of lifestage, will be kept to a minimum. All juveniles or adults that reach sufficient size (30 mm standard length [SL]) will be marked; released fish will be monitored according to USFWS protocols.

Design Concepts

Key components of the project include a pump station and outlet facilities. Figure 2-1 illustrates the project site.

Water Supply

Source and Flow

Sanctuary water will be provided from the Albuquerque Riverside Drain. During the irrigation season (March – October), the source of this water is diversions from the Rio Grande, groundwater seepage inflow, and occasional stormwater flows. During the non-irrigation season (November – February) source water for the Drain is groundwater and stormwater return flow. Based upon the water supply available during the non-irrigation season 15 cubic feet per second (cfs) is considered to be the maximum design flow for the Sanctuary. All screening and conveyance facilities will be designed to accommodate 15 cfs.

The Drain is operated by the MRGCD, which is a cooperating partner in this project. The MRGCD has prepared a letter of commitment (Appendix A) to Reclamation regarding use of Drain water. The initial operators of the Sanctuary will be Reclamation or another operator, working under contract or agreement with Reclamation. The Sanctuary operator will be permitted by the USFWS who will also provide oversight in the operations of the Sanctuary. The capabilities of the Sanctuary will be modified and adjusted as indicated by operations over time. The Sanctuary operators will work closely with the City of Albuquerque BioPark and others performing research and restoration efforts. At this time, no additional water supply is planned. However, a water recirculation pump will be provided as an emergency back up to recirculate existing water throughout the facility when necessary.

Pump Station

A new pump station will be required to divert water from the Drain. The pump station will be located approximately 150 feet east of the Sanctuary alongside the Drain. The pump station will be set into the Drain bank and equipped with a self-cleaning vertical screen; a trash rack will be located just upstream of the screen and pumps. Three-phase power will be required to run the screen's trolley brush cleaning system and pumps. The trash rack and screen will remove medium to large sized debris and fish before entering the pump station.

CONCRETE LINED FLUME
PUMP BUILDING
ACCESS ROAD
INLET PIPE
FILTER BUILDING
SUPPLY HEADER
ROOT WAD ROOK CLUSTER, TYPICAL
ROCK WEIR, TYPICAL
PLUNGE POOL TYPICAL
WETTED CHANNEL
OVERBANK AREA, VEGETATED, TYPICAL
ROCK VANE, TYPICAL
CROSS VANE WEIR, TYPICAL
PLUNGE POOL
CROSS VANE USING LOGS, TYPICAL
FAST FLOW
OVERBANK CONNECTION, TYPICAL
THALWEG
ROCK CLUSTER COMBINATION, TYPICAL
DREDGE PUMP VAULT
W-CROSS VANE WEIR, TYPICAL
RETURN TO DRAIN
ACCESS ROAD
CULTURAL RESOURCE AREA
OUTLET STRUCTURE
RELEASE CHANNEL
PLAN
SCALE IN FEET
50 0 50
ALWAYS THINK SAFETY
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MIDDLE RIO GRANDE PROJECT – NEW MEXICO
RIO GRANDE SILVERY MINNOW SANCTUARY
FIGURE 2-1 SITE PLAN
SANCTUARY PLAN
DESIGNED
CHECKED
DRAWN
TECH. APPROVAL
KPF
SLS
APPROVED
ACS
VALUE ENGINEERING PAYS
CADD SYSTEM
CADD FILENAME
$FILES$
DATE AND TIME PLOTTED
$DATE$ $TIME$
ALBUQUERQUE, NEW MEXICO
JULY 26, 2005
SHEET C-8

All in-water work will be completed during low flow periods from October 1 through February 28. Because the Drain generally contains 6-12 inches of water during the winter (S. Grogan, MRGCD, pers. comm., 6/1/05), installation of the intake diversion will require the use of a small cofferdam and dewatering well system. This cofferdam and well system will be used to temporarily dewater an area anticipated to occupy 1/3 of the channel width, leaving 2/3 of the channel width for fish bypass during construction. Water removed from the cofferdam area will be discharged back into the Drain downstream of the construction area. Fish stranded by dewatering will be salvaged by qualified biologists and relocated away from construction activities.

The concrete foundation for the intake structure will be poured within the dewatered area contained within the cofferdam. Installation of the structure will result in the removal of approximately 100 square feet (ft^2) of the riverbank and associated riparian vegetation, which consists primarily of weedy herbaceous vegetation that provides minimal bank stabilization or instream shading. No trees will be removed at this location. A small amount of riprap or other erosion protection may be required for stabilization of the intake. For all locations requiring bank stabilization (intake and fish release/water return conveyance outlets), riprap will be hauled in from one of several existing Reclamation stockpiles in the local vicinity. Approximately 5 truck loads of riprap will be transported to the site using a route that takes I-25, Avenida Cesar Chavez, and Second Street to the project area. The riprap hauling will require approximately 5 days, spread out over the estimated eight month construction period.

Conveyance from Sanctuary

Water discharging from the Sanctuary will be returned via gravity flow to either the Rio Grande or to the Drain, depending upon operations, river hydraulics, and fish release scenarios. Mr. Sterling Grogan, MRGCD biologist, indicated that Drain flow is eventually returned to the Rio Grande about 10 miles downstream of the Sanctuary site (pers. comm. 2005).

Water exiting the Sanctuary will flow through a 500 ft^2 covered outlet structure, which will be equipped with a trash rack to remove any large debris that may have entered the Sanctuary channel. From the trash rack, water will flow through two drum screens, which will act to maintain juvenile and adult RGSM within the Sanctuary through small mesh openings and a low approach velocity (0.2 ft/sec). Water flowing past the drum screens will be routed to the Rio Grande release channel (described below), or water could be directed to the Drain discharge pipeline. A sloped debris screen will be located behind the drum screens. When so desired, a gate beneath that screen will be opened to allow flow (maximum of 5 cfs) to enter a recirculation pump where it will be oxygenated and returned to the facility.

During most of the year, including periods of fish release, discharge water from the Sanctuary will be directed into a 500 foot long open channel that will convey flow into the Rio Grande. The river bank at the channel mouth will be armored with riprap to provide protection during high flow events and to prevent bank sloughing. Although installation of the outlet structure will occur during low flow periods in the winter, a small cofferdam, extending approximately 5 feet from the bank into the river, might be required. Water removed from the cofferdam area will be discharged into a small settling basin prior to discharge back into the river downstream of the construction area. Because the river is approximately 500 feet wide at this location,

cofferdamming will result in a negligible impact to instream resources as best management practices (BMPs) to prevent erosion and sedimentation will be implemented. Installation of the fish release channel and associated bank protection will remove 100 cy of bank material. Two to four mature cottonwoods may be removed from this location.

During periods of peak river flow, when the hydraulic profile precludes gravity flow of return water to the river, facility water will be routed to the Drain. Discharge from the Sanctuary will be routed 150 feet to the Drain via a 36-42 inch diameter pipeline that will penetrate the levee prior to entering the Drain. Vegetation within the pipeline corridor consists of weedy herbaceous species that provide limited habitat value. As a precautionary erosion-prevention measure, a small amount of rock or riprap will be placed in-water on the drainbed under the pipeline discharge to minimize scour. Installation of the discharge pipeline will be conducted during low flow periods and is not anticipated to require a dewatering cofferdam. Approximately 25 ft^2 of Drain-bank, consisting primarily of weedy herbaceous vegetation will be removed at this site. No trees will be removed from this location.

Water Supply Screening

The Drain has been documented to contain as many as fifteen species of fish. It is critical to keep these various species from entering the Sanctuary to: 1) prevent predacious fish from impacting the RGSM; and, 2) minimize biomass of other species (i.e. fathead minnows and red shiners) that could overload the system and out-compete the RGSM for available food and space. Screening of water supply structures will be required at three locations: 1) at the intake to preclude debris from entering the structure; 2) at the fish screen building to prevent predator fish from entering the Sanctuary and to return RGSM eggs and larvae to the Drain; and 3) at the water discharge outlet to contain RGSM juveniles and adults within the Sanctuary and prevent fish from coming into the Sanctuary from the river. All screens will be designed to accommodate the maximum facility flow of 15 cfs.

Intake Debris Screen

A self-cleaning vertical screen will be located at the diversion structure to preclude the entrance of debris into the water conveyance system. The openings in the wedgewire screen will be approximately 1.75 millimeter (mm; 0.07 inch) in size which will prevent the entrance of fish, woody debris, algal and plant masses, and refuse. However, the openings are too large to prevent entrance of RGSM eggs and larvae that may naturally be present in the Drain. Therefore, an additional screen (described below) will be required to prevent the entrance of RGSM eggs and larvae (as well as other small fish) into the Sanctuary in order to return them to the Drain.

Sanctuary Fish Screen

Small matter, including RGSM fish eggs, larva, and fish, will be prevented from entering the Sanctuary through the use of a drum screen, to be housed within a building near the northern end of the Sanctuary. The Sanctuary drum screen will be equipped with 300 micron mesh and spray bars that continually backwash the screen. The bars will be modified to discharge low velocity spray to prevent damage to eggs/larva/fish. A continuous flow of water will be provided to safely return eggs/larva/fish back to the Drain via a small (4 inch) fish return pipe that will penetrate the levee and discharge into the Drain. Power will be required for operation of the drum screens. Construction of the screen building will require the removal of approximately 250 ft^2 of

floodplain bosque habitat, currently occupied by weedy herbaceous species dominated by invasive mustard. No trees will be removed from this location. The building design incorporates materials, elements, and features to make it as unobtrusive as possible.

Outlet Screens

A third screening system will be provided at the Sanctuary water discharge outlet structure. Two 5 feet diameter by 10 feet long drum screens (screen size opening = 2.2 mm) will be housed side by side at the main outlet. Following spawning, the screens will be monitored via use of a stationary egg collector. Once eggs are observed, the gate to the volitional release channel can be opened to allow eggs and larvae to exit the facility and enter the Rio Grande. A stationary screen system can be placed in front of the drum screens to capture any eggs, if desired. A percentage of eggs will be captured in the overbank areas where they will hatch and larvae will reside.

Fish that may enter the Rio Grande release channel from the river will be prohibited from entering the facility by the drum screen structure during normal operations. When volitional release is occurring, it is likely that the velocity and turbulence created in the channel will prevent predatory fish from entering the structure. However, if there is a need in the future to prevent entry of unwanted fish, a downstream facing finger weir or a screen/grate could be installed in the release channel. The slope and velocity of the Drain discharge pipeline will act as a barrier to entry of fish within the Drain.

Sanctuary Channel Features

The overall geometry of the Sanctuary will conform to the landform that is available in the bosque between Glass Gardens to the north and the construction debris landfill to the south. The actual Sanctuary will vary in width and direction to conform to the existing topography and to avoid removal of existing cottonwood trees to the greatest extent possible. The proposed facility, including overbank areas, will occupy a maximum area 1,500 feet long and 100 feet wide, with variable widths averaging 50 feet.

The Sanctuary and internal features, including bars, channels, pools, and backwaters will be constructed with native soil (from excavated materials on site, if suitable) combined with hard materials (i.e. rock, sand bags, small gabions, large woody debris, etc.) to create forms with defined structure. Mature cottonwoods removed from the site will be recycled and used as large woody debris within the channel. Fine sand to small gravels will be used as substrate for the Sanctuary. All imported materials will come from locally approved, certified sources. A limited number of haul trips will be required along existing public roads to bring these materials to the site.

Construction of the rearing channel will permanently remove approximately 1.8 acres (78,000 ft^2) of bosque habitat that is dominated by weedy invasive species and serves as low quality habitat for terrestrial species. Up to 18 mature cottonwoods and 60 immature cottonwoods will be removed from the Sanctuary and release channel footprint. A revegetation plan will be developed with the City of Albuquerque Open Space Division to mitigate for loss of any native trees. Approximately 5,800 cy of material will be excavated during Sanctuary construction. Excavated material will be stockpiled on site and used for creation of Sanctuary features and levee road fill. Excess material will be hauled off site and deposited at a Reclamation-approved location.

Upland vegetation and/or emergent vegetation could be used for bank stabilization around the perimeter of the Sanctuary. Existing cottonwood trees that border either side of the Sanctuary site will be maintained to contribute leaf litter and other organic debris associated with overhead canopy habitat. Existing and replanted trees also help to shade the Sanctuary.

Sanctuary Support Facilities

Storage and Maintenance Building

It is anticipated that a small storage/operations and maintenance building will be needed to support the Sanctuary. The building is anticipated to be a portable unit, approximately 20 feet wide and 40 feet long, located between the Drain and Barr Main Canal. The storage building will be outside the floodplain, east of the Drain, in an area that is devoid of vegetation.

Predation Protection

Allowing some predator exposure conditions fish to natural conditions when released into the Rio Grande. As there is a desire to maintain the Sanctuary in as natural a state as possible, the facility will not initially be equipped with predation protection. Upon operation, if predation is found to significantly reduce the number of RGSM in the Sanctuary, predator fencing may be installed to prevent predacious reptiles and amphibians from entering. Additionally, if deemed necessary, a predator prevention system will be installed to minimize bird predation.

Monitoring and Alarms

It is proposed that flows, dissolved oxygen, temperature, and water level be monitored on a continuous basis. The monitoring system will include a remote telemetry system to notify appropriate personnel of any problems. An intrusion alarm may also be considered to minimize vandalism.

Access

Security measures will be determined in the final design. Access to the project site will be provided via existing paved roadways and frontages with the main entrance off 2nd Street through the MRGCD gate. The existing levee road will be used for access to the Sanctuary site and fish/water conveyance channels. During construction, temporary gravel access roads may be required along the perimeter of the Sanctuary and along pipeline/channel routes to allow access to those locations from the levee road. All gravel roads not required for facility operation will be obliterated following construction, and the areas will be revegetated with native trees and shrubs.

Powerline Easement

Three-phase power will be required for facility operations at three locations: 1) the vertical screen at the intake diversion, 2) the fish screen building for drum screens, and 3) the drum screens and recirculation pump at the outlet structure. Power will be provided by Public Service Company New Mexico (PNM). Approximately 200 feet of overhead line and two poles will be required to bring power to the intake location from the nearest power source at the City of Albuquerque South Second Softball fields to the east. A separate overhead line, approximately 100 feet in length, will be required to power structures at the outlet. From the outlet, power will be buried along the western edge of the Sanctuary to the fish screen building.

Summary of Ground Disturbance under Preferred Alternative

As described above, construction of the Sanctuary and its associated infrastructure will necessitate ground disturbance within the bosque and removal of habitat primarily dominated by non-native herbaceous species. In addition, excavation will be required to develop several components of the facility. Fill, utilizing material excavated during site development where possible, will also be required for the construction of facility infrastructure. Tables 2-2 depicts those activities and provides preliminary estimates of disturbance, excavation and fill quantities.

Table 2-2. Estimated Areas of Disturbance and Cut and Fill Quantities.

Clearing/Excavation Location	**Area cleared (square feet)**	**Area cleared (acres)**	**Excavation Quantity (cy)**	**Fill Quantity (cy)**
Roadways				
Sanctuary perimeter road	18,000	0.41	NA	NA
Sanctuary				
Rearing channel and overbank	78,000	1.8	5,800	NA[a]
Buildings				
Storage and maintenance	800	0.02	--	--
Fish Screen building	250	0.005	--	--
Facility discharge structure	500	0.01	--	--
Water and Fish Conveyance				
Pump Station at Drain	320	0.007	380	135[b]
Fish release/water return channel to Rio Grande	10,000	0.23	1,200	60[c]
Water return pipeline to Drain	600	0.01	200	100[c]
TOTALS	**108,470**	**2.492**	**7,580**	**295**

[a] Quantities for Sanctuary construction features, including sand substrate, rock and large woody debris are unknown at this time; however, these materials would be placed within areas excavated for the Sanctuary channel and would not impact additional bosque habitat.
[b] Indicates estimated quantity of riprap at intake, fish release/water discharge outlets on river and Drain
[c] Fill quantities include backfill. Backfill would be comprised of recovered materials excavated for pipeline/channel installation.

2.4 Alternatives Considered but Eliminated from Consideration

As discussed in Section 2.2, five alternatives for the creation of additional RGSM habitat were considered during preliminary development of the project. Four alternatives were dismissed after thorough comparison of environmental constraints, permitting requirements, hydrologic requirements, siting flexibility, and long-term cost:

- Closed Loop: Development of a closed system would not truly mimic the natural environment. Based on these parameters, along with high construction and operational maintenance requirements and cost, Reclamation eliminated this alternative from further consideration.
- Side Channel: Development of a side channel utilizing river water would require a weir or dam in the river to provide flow to the created channel, specifically during periods of low flow. A side channel would also likely require a berm for flood protection. This alternative presents permitting and design challenges that would necessitate the consideration of naturally occurring elements in the river, including extreme hydrologic fluctuation,

predation, and human intrusion. Costs are also high under this alternative. Based on these considerations, this alternative was eliminated from further consideration.

- Existing Drain: Development of a rearing channel within and adjacent to an irrigation drain with a connection to the river would achieve the objectives of the purpose and need. However, irrigation drains are operated by the MRGCD, and development within a drain would involve extensive consultation to determine if this alternative were truly feasible considering irrigation users and flow requirements. Surrounding environmental factors and human intrusion potential would also present design challenges that eliminated this alternative from consideration.
- In Channel: Development of a rearing channel within and adjacent to the Rio Grande presents regulatory and design challenges similar to the side channel alternative. This alternative would require work in the river and associated riparian areas, and considerable maintenance to maintain flows through the channel. Controlling predators would be extremely difficult in an in-channel environment. These challenges eliminated this alternative from further consideration.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This section describes the current condition of resources in the study area that may be affected by the Proposed Action. Resources and related topics presented include geology and soils, hydrology and hydraulics, floodplains, water resources and net depletions, erosion control and water quality, air quality and noise, vegetation communities, noxious weeds, fish and wildlife, threatened, endangered and special status species, cultural resources, Indian trust assets, socioeconomic considerations, visual and aesthetic resources, land use and recreational resources, and environmental justice.

The Albuquerque Reach of the Rio Grande extends from the Angostura Diversion Dam to the Isleta Diversion Dam (Figure 1-1). This area has been identified by Reclamation and the ISC, as well as the Collaborative Program, as being a reach of the Rio Grande where habitat/ecosystem restoration projects would be highly beneficial to all life stages of the RGSM.

3.2 Description of Relevant Affected Resources

3.2.1 Geology and Soils

The MRG lies in an asymmetric, elongated valley along the Rio Grande Rift (Chapin 1988; Hawley 1978). The Rio Grande Rift valley is dominated by connected alluvial-filled sub-basins defined by normal faulted mountain ranges. The land flanking the Rio Grande Basin on the east is predominantly mountainous, with merging colluvial-alluvial fans and stream terraces sloping down and westward toward the Rio Grande. The geologic surface west of the river is ancestral Rio Grande alluvial deposits with isolated mountains and volcanoes. The river channel flows in a wide valley with a fertile but narrow (2-3 mile wide) floodplain that has been cultivated for centuries (Bartolino and Cole 2002).

Historically, the shape and pattern of the Rio Grande channel have continuously redefined the spatial distribution of sediments throughout the floodplain. However, in the twentieth and twenty-first centuries, floodway constriction and channel stabilization projects have altered the natural course of the river. For example, flow regulation by dams, levees, and jetty jacks have been used to control the location of the channel, preventing flow from reaching the historic floodplain and causing sediment to accumulate in some areas and scour in others (MEI 2003).

Sedimentology and fluvial geomorphology play an important role in describing the evolution of the Rio Grande and in influencing the spatial extent and species diversity of vegetation in riparian areas. The present-day channel is composed of clay, silt, sand, and gravel, similar to the composition of ancestral river deposits. In addition to the erosion and transportation of sediment through the main-stem channel, tributary streams can contribute large volumes of sediment to the system. The historic floodplain in other reaches, such as the Albuquerque Reach, has become disconnected from the river (MEI 2003).

The United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) classifies soils at the project site as part of the "Gila" series (Intera 2005a). Soils in this series are coarse loams with moderate infiltration.

Surface and subsurface soils near and around the project site in association with the Proposed Action were recently evaluated (Intera 2005a). A few soil samples taken in the survey contained elevated levels of lead and arsenic, above NMED industrial and residential soil screening levels. However, these samples were taken outside the footprint of proposed Sanctuary. During drilling boring logs indicated that sands are the predominant geologic material encountered to depths of 10 feet below surface or greater (Intera 2005b). Occasional layers of clay or silt material are also present, generally less than five feet below surface.

3.2.2 Hydrology and Hydraulics

The MRG is the portion of the Rio Grande from the Colorado/New Mexico state line southward to the headwaters of Elephant Butte Reservoir, and includes the Rio Chama watershed. Most of the annual flow and discharge of the Rio Grande that reaches the MRG is generated in the headwaters of the river basin in Colorado and in the Rio Chama in northern New Mexico.

Most of the discharge volume of the Rio Grande is late spring snowmelt. Late summer monsoon events produce runoff and briefly alter the hydrograph of the river. These summer flows typically carry high sediment loads; however, the operations of Cochiti Dam since 1973 have greatly reduced the total supply of sediment throughout the Albuquerque Reach (SSPA 2004). Human activities have produced significant changes in the hydrology of the Rio Grande during the past century. The operation of upstream dams (Heron, El Vado, and Abiquiu Reservoirs on the Rio Chama, Jemez Dam on the Jemez River, and Cochiti Dam on the Rio Grande) affects flows in the river by storing and releasing water in a manner that generally decreases the spring flood peaks and alters the timing of the annual hydrograph.

Average daily flow for the Albuquerque gage (USGS gage 08330000), located upstream of the project site near the Central Bridge, was 1,206 cfs from 1942 to 2002 (USGS 2005).

The MRGCD operates the Drain. During the irrigation season (March through October) the Drain conveys water that is diverted from the Rio Grande approximately 25 river miles upstream of the project site at Angostura. During the irrigation season (March – October) some flow is diverted from the Drain to the Barr Main Canal. During the non-irrigation season (November – February), flow in the Drain comes from groundwater seepage, none is diverted to the Barr Canal.

Table 3-1 presents monthly flows (based on water years 2001-2003) in the Drain, as measured at the Tingley Beach gage, approximately one mile upstream of the Barr Main Canal Heading. Data presented in the table may be conservative because groundwater seepage likely contributes additional flow before reaching the diversion.

Table 3-1. Monthly Flow Data (2001-2003) from Tingley Beach Gage, Approximately One Mile Upstream from Barr Main Canal Heading.

Flow (cfs)	Month											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean	29.4	21.0	76.0	114.9	113.9	107.0	127.5	140.7	119.1	112.3	42.5	25.8
High	36.0	59.0	168.0	162.0	164.0	146.0	194.0	233.0	166.0	161.0	76.0	38.0
Low	19.0	16.0	15.0	68.0	64.0	73.0	65.0	72.0	33.0	61.0	13.0	9.0

Source: D. Gensler, MRGCD hydrologist, pers. comm., 5/5/05

3.2.3 Floodplains

The floodplain of the Rio Grande, in the vicinity of the proposed Sanctuary, extends from the riverbank to the levee. All project components are proposed to be sited within the floodplain with the exception of the storage building, the intake pipeline, and the intake and outfall structures along the Drain.

Cochiti Dam has extensive flood control capacity and is designed to reduce flooding in the Albuquerque reach of the Rio Grande by maintaining peak outflows of 10,000 cfs or less (Bullard 2000b). According to USGS stream gage data from December 1, 1974 until September 30, 2002, 453 days were recorded with flows at or exceeding 5,000 cfs. While this is less than 5% of the recorded occurrences, it indicates a repeated event in the last 28 years. Reclamation Technical Service Center reports that five year peak flows in this reach range from 4,631 to 4,942 cfs; ten year peak flows are at or near 10,000 cfs (Bullard 2000a).

3.2.4 Water Resources and Net Depletions

The Rio Grande Compact, in effect, limits the amount of surface water that can be depleted (consumed) in the MRG based upon the natural flow of the river measured at the Otowi gage near Los Alamos (Rio Grande Compact 1939). In addition, the New Mexico State Engineer has determined the MRG is fully appropriated. Therefore, any increase in water use in one sector of use must be offset by a reduction in use in another sector such that senior water rights or New Mexico's ability to meet its downstream delivery obligations are not impaired. Therefore, the New Mexico State Water Plan (Office of the State Engineer/Interstate Stream Commission 2003) requires that new projects not result in increases in net water depletions, or that any increases are offset by purchased or leased water rights.

As described in Chapter 2, the Proposed Action will use an existing water supply, the Albuquerque Riverside Drain, which is operated by the MRGCD. Sanctuary water will be returned to the Drain and to the Rio Grande, which, combined with some groundwater seepage, is ultimately the source of drainflow. The use of the Drain water is non-consumptive in nature.

3.2.5 Erosion Control and Water Quality

Water quality standards exist for reaches and sub-reaches throughout the State of New Mexico including the Albuquerque reach. The water quality standards listed below are from the New

Mexico Water Quality Control Commission as amended through October 11, 2002, and are for the Albuquerque Reach between Sandia and Isleta Pueblos, within which the project site is located.

New Mexico Water Quality Standards (20.6.4.105):

A. Designated Uses: irrigation, limited warm water fishery, livestock watering, wildlife habitat, and secondary contact.

B. Standards:

1. In any single sample: pH shall be within the range of 6.6 to 9.0, and temperature shall not exceed 32.2°C (90°F). The use-specific numeric standards set forth in 20.6.4.900 New Mexico Administrative Code (NMAC) are applicable to the designated uses listed above in Subsection A of this section.
2. The monthly geometric mean of fecal coliform bacteria shall not exceed 1,000/100 mL; no single sample shall exceed 2,000/100 mL (see Subsection B of 20.6.4.13 NMAC)
3. At mean monthly flows above 100 cfs, the mean monthly average concentration for: TDS shall not exceed 1,500 mg/L, sulfate shall not exceed 500 mg/L, and chloride shall not exceed 250 mg/L
4. Narrative standards are those set forth in section 20.6.4.12 of the State of New Mexico Standards for Interstate and Intrastate Surface Waters. These include, but are not limited to:
   i. Bottom Deposits – Surface waters of the State shall be free of water contaminants from other than natural causes that will settle and damage or impair the normal growth, function, or reproduction of aquatic life or significantly alter the physical or chemical properties of the bottom.
   ii. Plant Nutrients – Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.
   iii. Turbidity – Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function, or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water.

To obtain baseline information relevant to the Proposed Action, water quality sampling for a variety of parameters was conducted in spring 2005 (Intera 2005b). Surface water samples were taken at two locations in the Drain (at the proposed diversion and below the Sanctuary site) and at one location within the Rio Grande, near the mid-point of the proposed Sanctuary (Intera 2005b). Results are shown in Table 3-2. The table also presents some existing water quality data provided by Reclamation (2005) and the USFWS (2004) for both the Drain and the Rio Grande in the vicinity of the proposed Sanctuary.

Table 3-2. Results of Surface Water Quality Testing for Several Parameters from Locations Near the Proposed Site

Location	DO (mg/L)	pH	TSS (mg/L) Total Suspended Solids	TDS (mg/L) Total Dissolved Solids	Conductivity (µmhos/cm)	Temp. °C (°F)	Turb. (NTU)
Drain at Diversion[1]	9.0	8.15	27	260	410	NA	NA
Drain Below Sanctuary[1]	8.0	8.07	23	260	410	NA	NA
River at Mid-Sanctuary[1]	7.0	8.04	400	260	410	NA	NA
Drain (unknown location)[2]	6.8	7.49	NA	NA	255	13.7 (56.6)	NA
River at Barelas (August)[3]	6.4	8.2	NA	NA	350	24.9 (76.8)	359
River at Barelas (January)[4]	10.2	8.3	NA	NA	274	5.4 (41.7)	334

[1] Intera 2005, sampled on March 30, 2005
[2] M. Porter, Reclamation, pers. comm., 4/21/05. Averages from five dates from 2/8/05-3/27/05
[3] USFWS 2004. Collected at Barelas (USFWS 2004) August 22-23, 2002
[4] USFWS 2004. Collected at Barelas (USFWS 2004) in January 17-19, 2003

Water quality sampling indicates that existing conditions within sampled locations comply with New Mexico water quality standards. No metal concentrations, volatile organic compounds, chlorinated herbicides, pesticides, polychlorinated biphenyls, TPH, PAH, anions or other surface water parameters at tested locations exceeded New Mexico water standards. Similarly, groundwater studies conducted at the project site by Intera did not reveal the presence of any contaminants (Intera 2005a, b).

3.2.6 Air Quality and Noise

The proposed project is located in New Mexico's Air Quality Control Region No.152, which encompasses all of Bernalillo County. The county is "in attainment" (i.e.: does not exceed State and Federal Environmental Protection Agency air quality standards) for all criteria pollutants (NMED 1997). Air quality in the project area is generally good.

Albuquerque's noise control ordinance was placed into effect in June 1975. The Environmental Health Department's Consumer Protection Division personnel are responsible for enforcing the ordinance. The ordinance stipulates a property-line value in which the noise level emitted must not exceed 50 decibels (dB) or 10 dB above the ambient level; whichever is greater (Mitzelfelt 1996). For example, if operating a stereo, the sound level traveling from the stereo to the neighboring property lines cannot be more than 10 dB higher than the general noise level existing before the stereo was turned on.

Ambient noise in the vicinity of the proposed Sanctuary site is relatively minimal due to the undeveloped nature of the site.

3.2.7 Vegetation Communities

The riverbank community along the MRG consists of open sand bars along the main channel. These areas are subject to frequent disturbance from erosion and flood events and typically have little or no vegetation. Sparse growth of young cottonwood (*Populus deltoides*), coyote willow (*Salix exigua*), tamarisk (*Tamarix* sp.), and a variety of annual forbs is occasionally found. An increase in non-native vegetation has been identified as the most significant indicator of failing ecological health in the riparian ecosystem. Species such as tamarisk, Russian olive (*Elaeagnus angustifolia*), and Siberian elm (*Ulmus pumila*) have more extensive reproductive cycles than native species, allowing them to out-compete native trees in many locations. The facts that flood peaks have been reduced and the river has incised through the Albuquerque Reach also contribute to the transformation of riparian forests, since the non-native species are more tolerant of reduced floods and lower water tables.

The project site has recently been mechanically cleared of underbrush, although non-native weedy species have colonized cleared areas in most locations. Remaining vegetation is composed of a mid-successional riparian forest with a nearly closed canopy comprised predominantly of Rio Grande cottonwood trees and saplings. Limited riparian cover is present along the nearly vertical banks of the Drain, which are dominated by invasive weeds. Siberian elm, saltcedar, and numerous weedy herbaceous species including Western salsify (*Tragopogon dubius*), cheatgrass (*Bromus tectorum*), and mustard (*Sisymbrium* and *Descurainia* spp.) occupy the bosque floodplain. The site was cleared in 2004 by the USACE as part of the ongoing fuel reduction project. A number of cottonwoods have been pole planted in the project site with moderate success (Reclamation and USACE 2003). No wetlands are present in the vicinity of the Sanctuary or proposed infrastructure.

3.2.8 Noxious Weeds

The Federal Noxious Weed Act of 1974 (Public law 93-269; U.S.C. 2801) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. Executive Order (EO) 13112 directs Federal agencies to prevent the introduction of invasive (exotic) species and provides for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

The State of New Mexico, under administration of the United States Department of Agriculture, designates and lists certain weed species as being noxious (Nellessen 2000). “Noxious” in this context means plants not native to New Mexico that may have a negative impact on the economy or environment, and are targeted for management or control. Class A weeds have limited distributions within the state. Preventing new infestations and eliminating existing infestations is the priority for Class A weeds. Class B weeds are considered common within certain regions of the state but are not widespread. Control objectives for Class B weeds are to prevent new infestations, and in areas where they are already abundant, to contain the infestation and prevent their further spread. Class C listed weeds are common, widespread species that are fairly well established within the state.

At the site, several young saltcedar and Russian olive trees have become established in areas containing open canopy. Additionally, scattered Siberian elm occur on the site, and are the predominant tree species that line the Drain and Canal conveyances east of the project site. All

three plant species are considered Class C weeds. Management and suppression of Class C weeds is at the discretion of the lead agency.

3.2.9 Fish and Wildlife

Changes in the river elevation relative to the floodplain and the hydrologic and sediment regime as well as the introduction of predatory species (game fish) have affected the fauna of the Rio Grande. Historically, the riparian corridor of the MRG supported a wide diversity of terrestrial species. Prior to increased anthropogenic control, the river system periodically contributed water and nutrients to the floodplain and supported a number of aquatic species that no longer inhabit the area.

Common fish species of the MRG include river carpsucker (*Carpiodes carpio*), flathead chub (*Platygobio gracilis*), common carp (*Cyprinus carpio*), western mosquitofish (*Gambusia affinis*), and red shiner (*Cyprinella lutrensis*) (Platania and Bestgen 1988). Less common fish species present in the system are channel catfish (*Ictalurus punctatus*), fathead minnow (*Pimephales promelas*), longnose dace (*Rhinichthys cataractae*), white sucker (*Catostomus commersoni*), and the RGSM. Western mosquitofish, white sucker, and common carp are introduced species that are now common throughout the MRG.

In the most intensive biological survey of the MRG to date, Hink and Ohmart (1984) found 18 different species of reptiles and amphibians in the MRG. Eastern fence lizard (*Sceloporus undulatus*), New Mexican whiptail (*Aspidoscelis neomexicanus*), and Woodhouse toad (*Bufo woodhousii*) were common and widespread. Several common species in the MRG, such as bullfrogs (*Rana catesbeiana*), leopard frogs (*Rana pipiens*), and Woodhouse toads, are ubiquitous throughout the state. Others like the chorus frog (*Pseudacris triseriata*) and the common gartersnake (*Thamnophis sirtalis*), are unique to the MRG (Hink and Ohmart 1984).

Throughout the year, riparian communities of the MRG provide important habitat during breeding and migration for many bird species. Hink and Ohmart (1984) recorded 277 species of birds within 163 miles of MRG bosque habitat. Stahlecker and Cox (1997) documented 126 species in the Rio Grande Nature Center State Park. They estimate that 60–65 species of birds breed most years in the park (Stahlecker and Cox 1997). The 10 most common species in the bosque during the summer of 1997 were black-chinned hummingbird (*Archilochus alexandri*), red-winged blackbird, black-headed grosbeak (*Pheucticus melanocephalus*), spotted towhee (*Pipilo maculatus*), brown-headed cowbird (*Molothrus ater*), mourning dove (*Zenaida macroura*), Bewick's wren (*Thryomanes bewickii*), black-capped chickadee (*Poecile atricapillus*), cliff swallow (*Petrochelidon pyrrhonota*), house finch, and European starling (Stahlecker and Cox 1997). At the Albuquerque Overbank Project near the proposed project 46 species of birds were noted during the summer of 2000 through spring 2001 (Ellis 2001).

The Rio Grande is a major migratory corridor for songbirds (Yong and Finch 2002), waterfowl, and shorebirds. At various times of the year, riparian areas of the MRG support the high bird densities and species diversity. Both the river channel and the drains adjacent to the bosque provide habitat for species such as mallards, wood ducks, great blue herons, snowy egrets, green herons, belted kingfishers and black phoebes.

An active great horned owl nest is present near the northern boundary of the site, just south of the Glass Gardens (M. Schmader, pers. comm., 4/20/05). The nest tree and a 100 meter buffer were flagged during the spring to notify geotechnical and survey crews to avoid the area.

The peak nesting season for birds is April through August. The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) is the primary legislation in the United States established to conserve migratory birds. The list of the species protected by the MBTA appears in title 50, section 10.13, of the Code of Federal Regulations (50 CFR 10.13), and includes several species that may occur on the site including the bald eagle (*Haliaeetus leucocephalus)*. The MBTA prohibits taking, killing, or possessing of migratory birds unless permitted by the Secretary of the Interior. The USFWS and the Department of Justice are the Federal agencies responsible for administering and enforcing the statute.

Hink and Ohmart (1984) recorded 35 mammal species in their study of the MRG, and Campbell et al. (1997) observed 14 mammal species in their survey of the Albuquerque Reach. Based on both surveys, the most common small mammals in the proposed project area include white-footed mouse (*Peromyscus leucopus*), western harvest mouse (*Reithrodontomys megalotis*), and house mouse (*Mus musculus*) (Hink and Ohmart 1984; Campbell et al. 1997). Large mammals in the area include coyotes, raccoons, beavers, muskrats, pocket gophers, and rock squirrels. Several species of bats also utilize the MRG.

3.2.10 Threatened, Endangered and Special Status Species

The agencies that have primary responsibility for the conservation of plant and animal species in New Mexico are the USFWS, under authority of the ESA; the NMDGF, under authority of the New Mexico Wildlife Conservation Act of 1974; and the New Mexico Energy, Minerals and Natural Resources Department, under authority of the New Mexico Endangered Plant Species Act. These agencies maintain lists of plant and animal species that have been classified, or are potential candidates for classification, as Threatened or Endangered in Bernalillo County (Appendix B). Of those species known to occur in the County, 13 are likely to occur in the project area as shown in Table 3-3.

Protection from harassment, harm, or destruction of habitat is granted to species protected under the ESA. The New Mexico Wildlife Conservation Act and New Mexico Endangered Plant Species Act protect state-listed species by prohibiting taking without proper permits.

Table 3-3. Threatened (T), Endangered (E), State Sensitive or Federal Species of Concern (S), Candidate (C), and Proposed (P) Plant and Wildlife Species Known to Occur in Bernalillo County, New Mexico with Potential to Occur in the Project Area.

Common Name	Scientific Name	Federal	State	General Habitat
Fish				
Rio Grande Silvery Minnow	*Hybognathus amarus*	E[1]	E	Silt and sand substrates in slow backwaters; Chihuahuan desert scrub, plains-mesa grassland
Birds				
Neotropic Cormorant	*Phalacrocorax brasilianus*		T	Rivers, lakes and reservoirs with adjacent wooded sites; desert grassland, Rocky Mountain upper and lower montane coniferous forest
Bald Eagle	*Haliaeetus leucocephalus*	T	T	Winters along shores of rivers and lakes; Chihuahuan desert scrub, Rocky Mountain upper and lower montane coniferous forest
Common Black-Hawk	*Buteogallus anthracinus anthracinus*		T	Woodlands along lowland streams
American Peregrine Falcon	*Falco peregrinus anatum*	S	T	Chihuahuan desert scrub, Rocky Mountain upper and lower montane coniferous forest; Montane species, prefers to perch in open areas often near water
Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	C	S	Forest canopy desert grassland, Rocky Mountain upper and lower montane coniferous forest; dense riparian shrub
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E[1]	E	Rocky Mountain upper and lower montane coniferous forest; dense riparian groves of willow or saltcedar
Loggerhead Shrike	*Lanius ludovicianus*		S	Chihuahuan desert scrub, plains-mesa grassland; riparian areas and woodlands of pinion-juniper
Bell's Vireo	*Vireo bellii*		T	Chihuahuan desert scrub, piñon juniper woodland; riparian
Mammals				
Yuma Myotis Bat	*Myotis yumanensis yumanensis*		S	Scrub shrub, desert grassland, Rocky Mountain upper and lower montane coniferous forest; riparian and aquatic habitats for feeding
Occult Little Brown Myotis Bat	*Myotis lucifugus occultus*		S	Chihuahuan desert scrub, subalpine coniferous forest; riparian and aquatic habitats for feeding
Red Fox	*Vulpes vulpes*		S	Piñon juniper woodland, alpine tundra
Western Spotted Skunk	*Spilogale gracilis*		S	Mixed woodlands and open areas, scrub, and farmland
Plants – None in project area				

E = Endangered, T = Threatened, P = Proposed, C = Candidate; S = Sensitive or Species of Concern
[1] Federal critical habitat has been designated or proposed for this species; [2]Non-essential experimental population;
Sources: Information received via email from L. Pierce, BISON-M Coordinator, NMDGF, 4/15/05; NMDGF 2004a; Plant data: New Mexico Rare Plant Technical Council (2005) http://nmrareplants.unm.edu/nmrptc/county.htm#Section1

The general vegetation type that each species is known from is listed in Table 3-3 in the "General Habitat" column. Four of the 13 species with the potential to occur in the project area are listed or candidates for listing under the Federal ESA: Rio Grande silvery minnow (endangered); bald eagle (threatened); yellow-billed cuckoo (candidate); and southwestern willow flycatcher (endangered).

Of the remaining ten species, four are state-listed (all threatened): neotropic cormorant, common black-hawk, American peregrine falcon, and Bell's vireo. The last five species are Federal or state species of concern: loggerhead shrike, Yuma myotis bat, Occult little brown myotis bat, red fox and western spotted skunk. A discussion of each of these species and the potential effects from the Proposed Action is presented below. No sensitive plants have potential to occur on site.

Fish

Rio Grande Silvery Minnow *(Hybognathus amarus)*. In 1994, the RGSM was classified as endangered by the USFWS (FR 1994a) and has been considered endangered at the state level since 1979. Historically, the RGSM was one of the most widespread and abundant fishes in New Mexico. The species has declined as a result of impacts from dewatering, habitat degradation from dams after dewatering, channelization and flow regulation for irrigation, diminished water quality, and competition/predation by non-native species. The species is endemic to New Mexico, where it historically occupied large rivers with shifting sand substrates. The RGSM currently occupies less than 10 percent of its historic range and is found only in the Rio Grande from Cochiti Reservoir downstream to Elephant Butte Reservoir (Propst 1999).

Natural habitat for the RGSM includes stream margins, side channels, and off-channel pools where water velocities are lower than in the main channel. Areas with detritus and algal-covered substrates are preferred. The lee sides of islands and debris piles often serve as good habitat. Stream reaches dominated by straight, narrow, or incised channels with rapid flows would not typically be occupied by the RGSM (Sublette et al. 1990; Bestgen and Platania 1991). Critical habitat for the RGSM was designated by the USFWS from the Highway 22 Bridge downstream to the headwaters of Elephant Butte Reservoir, including the Albuquerque Reach (FR 1999). This designation became effective February 19, 2003 (USFWS 2003b).

Constituent elements of critical habitat required to sustain the RGSM include, in summary: (1) A hydrologic regime that provides flowing water to maintain a diversity of aquatic habitats, including backwaters, shallow side channels, pools, eddies, and runs for each life-history stage in appropriate seasons; (2) The presence of low-velocity habitat (including eddies created by debris piles, pools, or backwaters, or other refuge habitat); (3) Substrates of sand or silt; and, (4) Water of sufficient quality to maintain water temperatures in the approximate range of greater than 1 °C (35 °F) and less than 30 °C (85 °F) and reduce degraded water quality conditions essential for the survival and reproduction of RGSM (USFWS 2003b).

RGSM populations within the Albuquerque Reach of the MRG, within which the project site is located, have been monitored on an ongoing basis by the University of New Mexico and the USFWS. Generally, the data collected indicate that RGSM are rare throughout the reach, with many of the individuals collected being adults (Platania and Dudley 2004). Data collected through December 2003 indicate a near-absence of Age-0 RGSM in the MRG, suggesting that

the population has dramatically decreased in recent years (USFWS 2003b). These data indicate that the population may benefit by retaining eggs, larvae, and juveniles in upstream areas like the Albuquerque Reach, where they can contribute to the population growth and aid in the recovery of the species.

Dr. Michael Porter, Reclamation Fishery Biologist, stated that recent electroshocking surveys were completed in the Albuquerque reach of the MRG in which the project site is located. These surveys have documented RGSM occurrence in the vicinity of the project site, however, numbers are low. New Mexico State University researcher Dr. David Cowley has sampled the Drain and found that RGSM are present in low numbers in the vicinity of the Barr Main Canal Heading (pers. comm., 6/1/05). Six RGSM were observed during surveys conducted in November 2004 in the Albuquerque Riverside Drain, South of Avenida de Cesar Chavez, which is several hundred feet north of the project site (Cowley 2004). RGSM may enter the Drain upstream of the project site via the unscreened irrigation diversion at Angostura Dam; however, because there are very few RGSM above the dam, most fish present in the Drain likely enter through unscreened irrigation outfalls throughout the system (M. Porter, pers. comm., 4/21/05).

Birds

Bald Eagle. This species is currently listed as threatened by both the USFWS and the State of New Mexico. Bald eagles are associated with habitats near open water and commonly winter adjacent to rivers and lakes, or where carrion is available. The major food items of bald eagles in New Mexico are waterfowl, fish, and carrion (NMDGF 2004b). Bald eagles are uncommon during the summer and have limited breeding sites in New Mexico, though nests have been documented in the extreme northern and western portions of the state. The number of birds wintering in the state has been steadily increasing. Important wintering areas include the upper Rio Grande, but seldom the MRG (NMDGF 2004b).

Bald eagles frequent all major river systems in New Mexico from November through March, including the Rio Chama and Rio Grande. Potential roost sites in the project vicinity are large cottonwoods located along the banks of the Rio Grande. According to Dr. Rob Doster (Reclamation Wildlife Biologist, 3/28/05), bald eagles are incidentally present in the vicinity of the proposed project, and may occasionally use trees in the vicinity during winter roosting.

Southwestern Willow Flycatcher. The southwestern willow flycatcher is considered endangered by both the USFWS and the State of New Mexico. The subspecies is restricted to dense riparian vegetation along select waterways in New Mexico. The decline of the species has been attributed to loss of riparian habitat, brood parasitism, and lack of adequate protective regulations.

The flycatcher is an obligate riparian species and nests in thickets associated with streams and other wetlands where dense growth of willow, Russian olive, saltcedar, or other shrubs are present. Dense riparian woodlands are particularly important as breeding habitat. In New Mexico, the flycatcher occupies riparian habitat along the Rio Grande, Rio Chama, Zuni River, San Francisco River, and Gila River drainages and is generally found within 150 feet of a water source. Nests are frequently associated with an overstory of scattered cottonwood.

Dr. Jennifer Parody and Ms. Nancy Baczek of the USFWS (Albuquerque office) visited the proposed project site and surrounding area with Mr. Rick Billings (HDR/FishPro) on April 7, 2005. The purpose of the site visit was to determine if the site contained potential habitat. Service personnel walked the entire site and adjacent areas and determined that there is no actual or potential suitable habitat for the species within ¼ mile of the site in any direction. Although USFWS personnel did indicate that the area could potentially be used as a migratory corridor for the species, no further surveys or construction restrictions were indicated to be necessary in association with the Proposed Action (R. Billings, pers. comm., 4/11/05). In New Mexico, as part of the MBTA, construction timing restrictions (April 15 – August 15) are generally imposed at sites known to contain habitat.

Yellow-billed Cuckoo. The yellow-billed cuckoo is a USFWS candidate species that occurs locally along riparian corridors throughout New Mexico. Ideal habitat appears to be dominated by cottonwood canopy with a well-developed willow understory. In New Mexico, historical accounts indicate that the cuckoo was locally very common along the Rio Grande, but rare statewide (NMDGF 2004). Both Hink and Ohmart (1984) and Stahlecker and Cox (1997) reported yellow-billed cuckoo as a nesting bird in the bosque of the MRG. Limited habitat for this species is available along the riparian corridor of the Rio Grande in the vicinity of the project site.

Neotropic Cormorant. The neotropic cormorant is listed as threatened by the State of New Mexico and is a rare to uncommon non-breeder to the middle and lower Rio Grande valley (Hubbard 1978). Though this cormorant is considered rare in Bernalillo County (NMDFG 2005a), the species has been recently observed in the county in the vicinity of the project area (R. Doster, Reclamation Wildlife Biologist, pers. comm., 5/11/05). In New Mexico, cormorants are generally found on larger bodies of water such as reservoirs, where they prey on fish (Hubbard 1978). They nest near or over water, in vegetation such as dead snags or trees. Nesting neotropic cormorants require stands of trees or shrubs in or near water and that are free from human disturbance (NMDGF 2005a). This species may occur in the project area, as evidenced by recent observations, but is unlikely to breed there due to lack of suitable lacustrine habitat and a relatively high degree of human disturbance.

Common Black-Hawk. The common black-hawk is listed as threatened by the State of New Mexico and may occur in the Albuquerque Reach (NMDGF 2004c). Though the common black-hawk is considered rare in Bernalillo County, nesting was observed in the Isleta Reach during the summer of 2003 (Williams 2003) and the species has been reported as breeding along the Rio Grande north to Albuquerque (Hundertmark 1974). The common black hawk primarily occupies riparian woodlands, particularly areas with well-developed cottonwood, or a variety of woodland and marsh habitats along permanent lowland streams. Breeding black-hawks require mature riparian forest stands near permanent water. A common black-hawk nest was recently observed just south of the proposed project area (R. Doster, Reclamation, pers. comm., 5/11/05). However, the degraded quality of existing riparian vegetation likely limits use of the immediate project site by this species.

American Peregrine Falcon. The American peregrine falcon is considered a sensitive species by the USFWS and is listed as threatened by the State of New Mexico. It is considered an

occasional winter migrant, occurring rarely as a transient in spring and fall in Bernalillo County (NMDFG 2005b). Peregrine falcons are summer residents or year-round residents in montane areas almost statewide in New Mexico, and are considered rare to uncommon and local (Hubbard 1978). In New Mexico, the breeding territories of peregrine falcons center on cliffs that are in wooded/forested habitats, with large "gulfs" of air nearby in which these predators can forage (Hubbard 1985). Dr. Rob Doster recently observed a peregrine, most likely a migrant, soaring over the Rio Grande in the vicinity of the proposed project site (pers. comm., 5/11/05). No nesting habitat occurs in the immediate project area, although marginal foraging habitat may be available.

Bell's Vireo. Bell's vireo is listed as threatened by the State of New Mexico and occurs rarely in Bernalillo County. The species summers locally in the lower and MRG and is a vagrant north to Albuquerque (NMDFG 2005d). In New Mexico this species characteristically occurs in dense shrubland or woodland along lowland stream courses, with willows, mesquite, and seepwillows associated most often with riparian habitat of the species (Hubbard 1985). In the immediate project site, the riparian habitat is relatively degraded; however, the species has a low probability of occurrence in the riparian corridor along the Rio Grande in the vicinity of the Proposed Action, although breeding is unlikely.

Loggerhead Shrike. The loggerhead shrike is considered a sensitive species by the State of New Mexico and is a rare summer breeder in Bernallilo County (NMDFG 2005c). Loggerhead shrikes are also uncommon transients within Bernallilo County during the spring, fall and winter. Loggerhead shrikes are usually seen in relatively xeric habitats dominated by shrubs and desert saltgrass and also inhabit open area, including shrubland and shrubby grasslands at lower (2800-5500 feet) to middle (5000-7500 feet) elevations. Open country interspersed with improved pastures, grasslands, and hayfields is primary shrike habitat throughout its range (NMDFG 2005c). The species is a casual visitor to riparian areas with sufficient permanent hydrologic regimes to allow for the establishment of emergent plants and deciduous trees and shrubs. Although the shrike may be an occasional user of the riparian fringe along the Rio Grande in the vicinity of the project site, primary habitat for the species does not occur in the area.

Mammals

Yuma Myotis. The Yuma myotis is considered a sensitive species by the State of New Mexico and has been collected along the Rio Grande (Findley et al. 1975). The species is typically found in grassland, woodland and riparian habitats from 4,000 to 7,000 feet in elevation. This species is most common in desert areas and is closely associated with foraging habitats of open water (Schmidly 1991). Yuma myotis forages at the water surface. Railroad bridges and buildings are common summer retreats for this bat (Findley et al. 1975). Young are raised in nursery colonies located in buildings, mine tunnels, and under bridges (Schmidly 1991). These nursery roosts are highly sensitive and are quickly abandoned if disturbed. Foraging Yuma myotis may occur in the project area associated with both the Rio Grande and the Drain.

Occult Little Brown Bat. The occult little brown bat is considered a sensitive species by the State of New Mexico and, like the Yuma myotis, is closely associated with foraging habitats consisting of large permanent water sources such as streams, drainage ditches, or lakes (Findley et al. 1975). Areas where such bodies of water are lacking support these animals only as

transients. Vegetation zone seems unimportant in determining their distribution (Findley et al. 1975), although nursery colonies of up to several hundred individuals frequently roost under exfoliating bark of old growth ponderosa pine snags. This species is insectivorous, foraging at the water surface. As with Yuma myotis, occult little brown bat may occur in the project area associated with open water habitat.

Red Fox. The red fox is considered a sensitive species by the State of New Mexico and occurs year round in Bernalillo County (NMDFG 2005e). In New Mexico, the status and threats to the red fox are so poorly known that little can be said as to their need for special protection (Frey and Yates 1996). Thompson et al. (1992) found that the red fox uses urban and agricultural habitat, with common usage of subalpine coniferous forest and mixed woodlands with good development of ground cover. Red foxes do well on the margins of urbanized areas and are common in open space and other undeveloped areas adjacent to urban sites (NMDGF 2004). Because red fox are highly mobile and can occur in many different types of habitat, the species is probable to occur at times within the project area.

Western Spotted Skunk. The western spotted skunk is considered a sensitive species by the State of New Mexico and likely occurs year round in Bernalillo County. Western spotted skunks are found in shortgrass plains, cottonwood/willow riparian areas, rabbitbrush, oak savanna and woodland, pinon-juniper, chapparal, and coniferous forest. Spotted skunks are known to prefer the scrub-shrub areas of the riparian bosque and are known to be abundant in agricultural areas and around human constructions (NMDFG 2005f). Due to the presence of scrub shrub plant associations along the riparian corridor of the Rio Grande, the western spotted skunk may occur in the vicinity of the proposed project.

3.2.11 Cultural Resources

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

The indigenous population in the Rio Grande Valley of New Mexico dates back at least 12,000 years (Cordell 1997). The steady influx of people of European descent into the Rio Grande Valley of present-day New Mexico from the sixteenth century onward has given rise to a diverse cultural mosaic and has left a multitude of varied cultural resources that are more than 50 years old. The state was part of the Spanish Colonial Empire until Mexico won its independence in 1821. Twenty-five years later, in 1846, New Mexico was claimed by the United States. These successive cultures have left archaeological sites (habitation, mining, industrial, and other), standing structures, bridges, utilities, and a network of irrigation canals more than 50 years old (Arrowsmith 1963; Cordell 1997; Rivera 1998; Van Citters 2003).

Archaeological resources in the Albuquerque Reach of the Rio Grande floodplain are limited because of poor preservation, the result of a long history of agricultural use of the valley floor, and development of the metropolitan area (for the most part on private lands) prior to the existence of a preservation ethic. Historical records emphasize protohistoric and historic settlement in the North Valley between Albuquerque and Bernalillo (Sargeant 1985; Campbell

2001), and archaeological work on the West Mesa has contributed a great deal to our understanding of regional prehistory (Schmader 1991, 1994).

No TCPs or sacred sites have been identified. Since the project is located in the original meandering path of the Rio Grande, any Tribal artifacts that might have once existed there have a very low probability of still being present.

In 1999, SWCA, Inc. Environmental Consultants recorded a historic urban trash dump at the "Glass Gardens" located just north of the proposed project site (SWCA 1999). Although numerous glass and crockery items occur on the site, it has not yet been determined if the site is listed on the National Register for Historic Places, or eligible for listing under the NHPA of 1974 (16 U.S.C. 470).

To determine if any sites known to be listed on or eligible for the NRHP are within the project area, Reclamation conducted a records search for the proposed project in the Archaeological Records Management Section database of the New Mexico Historic Preservation Division. In addition, a Reclamation archaeologist conducted a surficial investigation of the site to determine the extent of cultural resources that may be present in the project footprint. The results of the site visit indicate that the areas proposed for disturbance due to construction of the Sanctuary and associated infrastructure contain scattered debris, primarily glass artifacts from the Glass Gardens, that have been deposited relatively recently (J. Hanson, Reclamation, pers. comm., 6/1/05). These deposits are not intact and do not represent culturally or historically significant resources. However, approximately 20 wooden bollards, which are part of old river control works, occur along eastern edge of Sanctuary site that would likely be considered historically significant (J. Hanson, Reclamation, pers. comm., 6/1/05).

3.2.12 Indian Trust Assets

ITAs are legal interest in assets held in trust by the United States Government for Indian tribes or for Indian individuals. Some examples of ITAs are lands, minerals, water rights, hunting and fishing rights, titles and money. ITAs cannot be sold, leased, or alienated without the express approval of the United States government. The United States has a trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or individuals by treaties, statues, EOs, and rights further interpreted by the courts. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to protect such trust assets.

3.2.13 Socioeconomic Considerations

Socioeconomic resources include population and economic activity. Some related secondary components, such as housing availability and public services, are not considered in this analysis because the action has no potential to generate measurable changes in populations that will create demand for these resources. Statistics at the county level are used to describe the socioeconomic context.

The proposed project is in Bernalillo County, New Mexico. The population in Bernalillo County was estimated at 573,675 in 2002 (U.S. Census Bureau 2002). It is approximately 1,166 square

miles with 477 persons per square mile. It is generally urban in character. In 1999, Bernalillo County had a per capita personal income of $20,790 (U.S. Census Bureau 2002).

3.2.14 Visual and Aesthetic Resources

Visual and aesthetic resources generally include the presence or absence of man-made features, landforms, water surfaces, and vegetation relative to the surroundings and settings of an area. These features are the primary characteristics of an area or project that determine its visual character and the manner in which people view the setting. The bosque area is normally considered a sensitive area and viewshed. The existing visual character of the proposed action consists of two different settings.

The first is a complex of cottonwood trees, intermixed with openings and small stands of saltcedar, Russian olive, Siberian elm and other shrubs and trees. The riparian corridor the proposed action is located in is used for recreation and open space. The river itself is visible from the site in most vegetation and atmospheric conditions. Portions of the site have been subjected to illegal dumping of solid waste, some of which remains at the site. The visual characteristics of the site are not unique when compared to other, similar areas in the bosque.

The second is a complex of urban, recreational, commercial and light industrial area, with a mixture of different structural forms and open areas. The views change from one location to another. The levee serves as delineation physically, and visually, for the bosque, or wooded area. This complex borders the proposed site east of the levee and the drain.

3.2.15 Land Use and Recreational Resources

The bosque area within Albuquerque is designated as the Rio Grande Valley State Park through the Park Act of 1983 and is cooperatively managed by the City of Albuquerque Open Space Division and the MRGCD. The proposed site for the Sanctuary is within these lands. Immediate neighboring land uses are commercial and industrial to the east of the Proposed Action, on the east side of the river, across the Drain, within approximately 300 feet of the Proposed Action. On the west side of the river, outside the bosque, residential areas occur. The nearest agricultural land use is south and east of the Proposed Action, within approximately 500 feet of the southern boundary.

There are park areas with athletic fields just south and east of the Drain. Pedestrians and bicyclists are frequently encountered using the paths on the levee adjacent to the project site, and on the paths east of the Drain.

3.2.16 Environmental Justice

The planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations, including EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, which was issued by President Clinton on February 11, 1994. The essential purpose of EO 12898 is to ensure the fair treatment and meaningful involvement of all people

regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice concerns also reflect consideration of EO 13045, “Protection of Children from Environmental Health Risks and Safety Risks”. This EO directs Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children under the age of 18. These risks are defined as “risks to health or to safety that are attributable to products or substances that the child is likely to come into contact with or ingest.”

Compared to demographics on the national level, the population of Bernalillo County has proportionately more persons of Hispanic and Native American background and fewer persons of African-American and Asian background. Ethnic comparisons in the State of New Mexico are proportionately similar to Bernalillo County. It should be recognized that persons of Hispanic background might also claim identification with another ethnic group.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

Reclamation has used a scientific and analytic evaluation with which to compare the No Action and the Proposed Action Alternatives. This chapter of the EA evaluates direct, indirect, and cumulative impacts for all resources described in Chapter 3, Affected Environment. Environmental commitments, which would provide ongoing guidance for the proposed project, are summarized.

4.2 Environmental Consequences of Resources in Chapter 3

4.2.1 Geology and Soils

No change to existing geologic and soils conditions would occur under the No Action Alternative.

During construction of the Sanctuary, care will be taken to minimize sediment erosion. Prior to construction, all environmental protection measures as expressed by contract clauses, design drawings, or other means will be reviewed with the contractor at a pre-construction conference. Excavated material will be stockpiled on site in areas devoid of native vegetation and used for creation of Sanctuary features and levee road fill. Excess material will be hauled off site and deposited at a Reclamation-approved location. Silt fencing will be installed when working near the bank of the river or the Drain. Riprap and planted vegetation will be used to stabilize streambank structures while in operation to preclude erosion and bank sloughing.

All construction activities will be in compliance with applicable Federal, state and local regulations. Local soil disturbance permits will be required in locations where soil disturbance might take place during construction. All disturbed areas will be revegetated with native plants, including trees, shrubs, and herbaceous materials, as available through local nurseries. Disturbed areas will be monitored to insure that revegetation efforts are successful. Construction will produce temporary, short term increases in sedimentation caused by excavation on site; however, with mitigation measures including revegetation, long term erosion impacts are not anticipated.

4.2.2 Hydrology and Hydraulics

Under the No Action alternative there would be no change in the amount or duration of flow in the river.

Under the Proposed Action, water discharged from the Sanctuary will be returned via gravity flow to either the Rio Grande or to the Drain, depending upon operations, river hydraulics, and fish release scenarios. Mr. Sterling Grogan, MRGCD biologist, indicated that Drain flow is eventually returned to the Rio Grande about 10 miles downstream of the Sanctuary site (pers. comm. 2005). Therefore the discharge of water from the Sanctuary represents a shift in the discharge location roughly 10 miles upstream from the current return location for a portion of the

Drain flow. Due to the annual average flows sustained within the Rio Grande (1,206 cfs; USGS 2005), impacts caused by the addition of up to 15 cfs of flow from the Sanctuary will have negligible impacts to the river in the 10 mile reach. Proposed rip rapping of the Rio Grande fish return outlet may impact a very localized area of streambank, resulting in minor impacts to hydro-geomorphology; however, impacts will be negligible given the width of the river at this location.

Table 3-1 (section 3.2.2) presents monthly flows (based on water years 2001-2003) in the Drain, as measured at the Tingley Beach gage, approximately one mile upstream of the Barr Main Canal diversion. As shown in the Table, average flow is lowest during the winter months of December (25.8 cfs), January (29.4 cfs) and February (21.0 cfs). Flows increase quickly beginning in March (76.0 cfs). Under the Proposed Action, facility usage during winter months will not likely require the maximum design flow of 15 cfs. However, using that figure as a maximum withdrawal and comparing to average flow data, a withdrawal of 15 cfs from the Drain will still maintain an in-Drain flow of at least 6 cfs during February, the lowest flow month. Because the Drain is an artificial channel and irrigation does not occur during winter months, impacts of the proposed Sanctuary on Drain hydrology and hydraulic function are anticipated to be negligible. However, if extreme low flow periods do occur (for example, 2003 December low flow of 9 cfs), facility water usage could be adjusted to maintain flow within the Drain for fish species.

4.2.3 Floodplains

Under the No Action Alternative, no impacts to the existing floodplain in the vicinity of the Sanctuary site would occur.

Because the entire Sanctuary site is within the bosque floodplain, design efforts have focused on eliminating impacts of fill on flood storage capacity. Because the Sanctuary has been designed to be as unobtrusive as possible with little fill added within the historic floodplain, negligible impacts on flood storage capacity are anticipated.

It should be noted that recent (May – June 2005) flows within the Rio Grande (6,000 – 7,000 cfs) have been the highest in nearly a decade. During this period, the river has not overtopped its banks, but has created a bankfull condition consistent with inundation estimates predicted by Reclamation. Because the Sanctuary will be located approximately 500 feet east of the riverbank, a site that is higher in elevation than the riverbank, extremely high flows, higher than those experienced in decades, will be required to flood the Sanctuary site. Therefore, it is unlikely that the construction and operation of the Sanctuary would impact floodplain storage.

4.2.4 Water Resources and Net Depletions

No impacts to water resources would occur under the No Action alternative. The No Action Alternative would continue current levels of water depletions in the Albuquerque Reach, as identified in previous studies (SSPA 2004).

The MRGCD operates the Drain. The MRGCD has prepared a letter of commitment to Reclamation regarding use of Drain water (Appendix A). Reclamation will negotiate an operating agreement or license for the facility with the MRGCD.

Under the Proposed Action, net water use in the Sanctuary will be minimal. The OSE has calculated that approximately 12.0 acre feet per annum is the annual depletion. Any seepage losses will go into the shallow groundwater system and return to the Drain. Annual evaporative losses in the Albuquerque area average 5 feet per year (Dunne and Leopold 1978). Shading and cover in the Sanctuary area will tend to reduce this amount. Net depletions attributable to the project are anticipated to be negligible.

4.2.5 Water Quality

The No Action Alternative would result in continued water quality that meets applicable standards for most physical constituents, such as surface water temperature, pH, turbidity, dissolved oxygen, suspended sediments, conductivity/total dissolved solids, and fecal coliform.

Under the Proposed Action, no adverse impact to surface or groundwater quality are anticipated. The CWA provides for the protection of waters of the United States from impacts associated with discharges of dredged or fill material in aquatic habitats, including wetlands, as defined under Section 404(b)(1). Although no work will take place within wetlands, installation of intake and outfall structures will require work below the ordinary high water mark of the Rio Grande and the Drain. Since both waterbodies are considered Waters of the U.S., work will require a Section 404 permit from the USACE. Because a Section 404 permit will be necessary, a state water quality certification permit will also be required under Section 401 of the CWA. Compliance with the CWA will ensure that the Proposed Action will have no adverse effect on water quality of the Rio Grande or the Drain. Due to work along the riverbank, short term, localized impacts to water quality may result; however, because cofferdams will be used during in-water construction of the intake and outfall structures, impacts to water quality, including increased turbidity and sedimentation, are anticipated to be minimal.

Section 402(p) of the CWA regulates point source discharges of pollutants into water of the United States and specifies that storm water discharges associated with construction activity be conducted under NPDES guidance. Ground disturbance exceeding one acre will take place during Sanctuary construction activities; therefore, an NPDES permit for construction will be required. A Notice of Intent has been filed, and a stormwater pollution prevention plan (SWPPP) for the project has been developed and will be kept on file at the construction site and become part of the permanent project record. Reclamation has obtained the NPDES permit. Compliance with these requirements, in addition to implementation of BMPs to control erosion (i.e. silt fencing, straw bales) will ensure that construction will have no significant effect on the water quality of the Rio Grande and the Drain.

Fish production at the facility will be extremely low (less than 100 pounds total production) and is not likely to produce measurable amounts of nutrients in the effluent. A minimum of artificial fish feeds will be utilized. Discharge of facility water to the Rio Grande, a large river system with high potential for rapid dilution, is not anticipated to have any measurable effect on water quality within the river. Discharge into the Drain is not expected to have any measurable effect on Drain water quality. Water quality inside the facility will be monitored to provide management information to the operators.

4.2.6 Air Quality and Noise

The No Action Alternative would maintain the status quo of noise and air quality levels at the project site.

Under the Proposed Action, all vehicles involved in transporting material from the project site to the deposition area will be required to have passed a current New Mexico emissions test and have required emission control equipment. A fugitive dust permit will be obtained from the City of Albuquerque for construction. All work areas will periodically be wet down to minimize dust. All vehicles hauling material will be covered during transport. Short-term impacts to air quality are anticipated during construction but will be abated to the extent possible using BMPs as described above. Construction equipment will temporarily generate fumes and air emissions under the Proposed Action; however, the level of air emissions is anticipated to be low and in compliance with state and local standards. There will be no long-term adverse effects to air quality by the Proposed Action as there will be no generation of particulate matter, odor or other pollutants during operations of the Sanctuary.

The Proposed Action is not anticipated to generate ambient noise that exceeds the City of Albuquerque Noise Ordinance. Construction equipment to be used during the Proposed Action will create temporary noise levels that will likely exceed allowable ambient noise in the immediate vicinity of the Sanctuary site; however, noise impacts during heavy equipment use will be short term and occur during normal business hours to minimize disturbance. A lack of residential communities near the immediate construction area minimizes the impact of construction noise on local residents. If necessary, a Construction Noise Permit may be issued from the City of Albuquerque if sensitive noise receptors are identified within 500 feet of the construction site.

4.2.7 Vegetation Communities

The No Action Alternative would maintain vegetative resources at the proposed project site in their current condition. No removal of weedy invasive species or planting of native trees and shrubs would occur under this Alternative.

Under the Proposed Action, vegetation within the bosque will be disturbed by mechanical clearing and grading of the site during the construction activities. The estimated acreage of impacts to vegetation within the bosque during construction is shown in Table 2-2. With the exception of 18 mature cottonwoods and 60 immature saplings, this habitat is currently disturbed and dominated by non-native herbaceous species, including mustard, thistle, Western salsify and cheatgrass. These species do not provide high quality wildlife habitat.

During construction, all attempts will be made to avoid the removal of existing cottonwoods and other native trees and to “weave” the Sanctuary within existing vegetation. It is estimated that approximately 18 mature (diameter at breast height [dbh] >6 inches) and 60 immature (dbh <6 inches) cottonwoods will be removed as a result of grading activities associated with new temporary access roads, Sanctuary construction, and water conveyance channels. A plan for mitigating the loss of native trees will be developed with the City of Albuquerque Open Space Division. Two to four mature cottonwoods may be removed from the area of the conveyance from the Sanctuary.

Proposed staging areas will be coordinated with the City's Open Space Division and the MRGCD. Construction staging areas will likely be located on-site, within habitat that is primarily comprised of weedy herbaceous species. The removal of mature cottonwoods will be avoided for construction staging. Following construction, staging areas will be restored and vegetated with native species.

During construction, temporary gravel access roads may be required along the perimeter of the Sanctuary and along pipeline/channel routes to allow access to those locations from the levee road. All gravel roads not required for facility operation will be obliterated following construction, and the areas will be re-vegetated with native trees and shrubs.

Temporary erosion and sedimentation during construction is expected to be minimal due to the relatively flat nature of the site. The majority of upland construction activity will occur away from the Rio Grande and Drain channels and will be managed through the use of erosion control devices (silt fencing, straw bales, plastic sheeting on exposed soils, etc.), preservation of as much riparian vegetation as possible, and revegetation of the site immediately following construction.

4.2.8 Noxious Weeds

The No Action Alternative would maintain the current condition of the bosque in the vicinity of the Proposed Action. No noxious weed removal and native vegetation planting would occur under this alternative.

Under the Proposed Action, several noxious weed species will be removed from the site to clear ground for the Sanctuary and associated infrastructure. Three noxious weeds known to occur on the site include saltcedar, Russian olive, and the Siberian elm, which are considered Class C weeds. Management and suppression of Class C weeds is at the discretion of the lead agency. Removal and the prevention of the establishment of other Class A, B, or C weeds that might establish after construction is a requirement of management guidelines under EO 13112 that directs Federal agencies to prevent the introduction of invasive (exotic) species.

To delay or preclude infestation, removal of saltcedar, Russian olive, and Siberian elm will occur where feasible during construction. Sites that have been revegetated following disturbance will be monitored. If noxious weeds are observed in these areas, including those plants currently present on site, or those that may become established (Canada thistle, bull thistle, etc.) they will be removed. Therefore, the Proposed Action will comply with the provisions of the Federal Noxious Weed Act.

4.2.9 Fish and Wildlife

Short-term impacts to fish and wildlife resources due to construction disturbance would not occur under the No Action Alternative.

The Proposed Action will produce short-term direct impacts on wildlife in the immediate area of disturbance, and long-term beneficial effects on RGSM from increased available aquatic habitat. The great horned owl nest tree located on the northern portion of the site will not be affected by any construction-related activities associated with the Sanctuary.

To avoid direct impact to migratory birds protected by the MBTA, clearing and grubbing of woody vegetation will be scheduled between August 15 and April 15, outside of the normal breeding season for many avian species. Should vegetation removal and construction take place between April 15 and August 15, preconstruction nesting bird surveys should be conducted to identify potential MBTA issues. Any positive preconstruction survey results or observations should be brought to the attention of USFWS in order to determine methods of MBTA impact avoidance.

Other wildlife species inhabiting the construction area of the bosque and in-water areas of the Drain and Rio Grande, such as reptiles, mammals, amphibians, and fish, will be temporarily displaced and may experience mortality during the implementation of the Proposed Action. However, through implementation of the environmental commitments presented in Chapter 5.0, no adverse long-term impacts on fish or wildlife species are expected to occur under the Proposed Action. The mitigation plantings proposed for site restoration activities following construction could benefit terrestrial communities by increasing habitat diversity and potentially increasing prey abundance on site.

4.2.10 Threatened, Endangered and Special Status Species

Fish

Rio Grande Silvery Minnow. The No Action Alternative would maintain the existing project site as it currently stands and would not provide a rearing and breeding facility for RGSM in the Albuquerque Reach of the MRG. There would be no construction and in-water work within the Drain or river under this alternative, and therefore no potential for take during construction activities.

Under the Proposed Action, construction of in-water components will occur during low flow periods from October 1 – February 28. Direct effects to migrating or rearing RGSM present in the project area may occur during in-water construction within the Drain at the surface intake and outfall locations, as well as along the banks of the Rio Grande in the vicinity of the proposed fish release/water return discharge. Direct impacts may include harassment (take) due to temporary increases in sedimentation and turbidity. The use of heavy machinery within the streambeds of the Drain and Rio Grande due to intake/outfall work will temporarily disturb sediment and force RGSM potentially present in the area to move away from the construction channel. These effects will be temporary, and will occur during low-flow periods (i.e., the winter months) in areas that are not known to have high numbers of RGSM. The cofferdams proposed for intake installation in the Drain and for in-water work in the Rio Grande will allow for fish bypass during construction. During the cofferdam dewatering phase of construction, all stranded RGSM will be salvaged and returned/relocated to the river away from construction activities.

RGSM critical habitat includes the Rio Grande. Short-term effects to critical habitat immediately following in-water work associated with the fish release/water discharge channel will be negligible. To avoid increases in sedimentation and turbidity associated with in-water work, BMPs will be enforced to minimize erosional inputs into the river and Drain during periods of work. No long-term adverse impacts to RGSM or critical habitat are anticipated to occur as a

result of construction or operation of the Sanctuary. The anticipated benefits to the RGSM resulting from Sanctuary implementation far outweigh any potential negative impacts.

Birds

Bald Eagle. The No Action Alternative would not disturb riparian habitat.

The Proposed Action may have short-term potential effects to wintering bald eagles during construction, related to temporary noise and other disruptions. The removal of approximately 18 mature cottonwoods from the project footprint will have relatively minor, if any, impact on wintering bald eagles and their roost trees as the majority of tree removal will be conducted away from the mainstem river channel where perching is most likely to occur. Removal of two to four mature cottonwoods in the vicinity of the Rio Grande fish release/water return outlet is not likely to impact roosting eagles as there are ample available perch trees in the general vicinity.

Operation of construction equipment at the proposed Sanctuary site will produce noise levels that are likely to disturb any wintering bald eagles potentially foraging within this section of the river. Temporary displacement of some individuals may occur. Construction of main facilities will occur between September and March (in-water construction from October 1 – February 28). Because no nesting territories are documented within miles of the site, noise impacts to nesting eagles are not anticipated. During construction of the Sanctuary, if a bald eagle is spotted within 0.25 mile of active project construction, prior to starting, construction activities will be delayed until the eagle leaves the area on its own accord. Bald eagles are present in the Middle Rio Grande during the winter months and may be disturbed during river and riparian construction of the diversion structures and associated activities. However, this area is not known to provide breeding habitat for the bald eagle. As a result, nesting pairs and chicks will not be disturbed or threatened during construction activities.

The addition of approximately 300 feet of overhead transmission lines associated with facility components may pose a low risk of electrocution for bald eagles in the area. If so required by the USFWS, transmission line retrofitting including insulation of exposed jumpers, addition of bird deflectors on the lines, and construction of perch deterrents may be added to the transmission line to reduce potential raptor mortalities. Adverse impacts are not anticipated.

Southwestern Willow Flycatcher. The No Action Alternative would not disturb the riparian vegetation where flycatcher migrants may potentially occur; therefore this alternative would have no effect on the species. However, under this alternative, existing non-native vegetation would remain on site and native shrubs and trees would not be planted.

Clearing and grubbing of woody vegetation will take place between September and April, which is outside of the breeding season for flycatchers. Because the project site does not contain actual or potential habitat for the species, the Proposed Action will have no effect on breeding habitat and no direct effects to the species. Should vegetation removal and construction be implemented during the breeding season (April-August), pre-construction breeding bird surveys will be conducted and monitoring performed to assure avoidance of impacts. If surveys result in the observation of individuals or identification of nests, Reclamation will coordinate with USFWS to discuss nesting area avoidance.

The project area is located within proposed critical habitat Management Unit (MU) 21, the Middle Rio Grande MU. However, the habitat in the area is not suitable for nesting and no flycatchers are known to nest in the area

Yellow-billed Cuckoo. The No Action Alternative would not alter the riparian habitat utilized by this species as no cottonwoods or willows would be removed. However, under this alternative, existing non-native vegetation would remain on site and native shrubs and trees would not be planted.

The relatively limited amount of potential cuckoo habitat to be removed combined with the mitigation planting ratios that will occur under the Proposed Action may result in minor positive impacts to the yellow-billed cuckoo. To minimize impact on this and other riparian species, clearing and grubbing of woody vegetation will be scheduled between September and March. Should vegetation removal and construction be implemented during the breeding season (April 15 – August 15), pre-construction breeding bird surveys will be conducted and monitoring performed to assure avoidance of impacts.

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

The neotropic cormorant may occur in the project area but is unlikely to breed there due to lack of suitable lacustrine habitat. Therefore, the Proposed Action will result in no adverse effects to the neotropic cormorant.

Common Black-Hawk. The No Action Alternative would not result in any changes to riparian vegetation used by this species, therefore no adverse impacts to this species or its habitat would occur.

The Proposed Action will include clearing of woody vegetation, including cottonwoods. However, although areas proposed for vegetation clearing do contain some mature trees, the dominating landscape is not a mature forest habitat. Therefore, the Proposed Action should have no adverse impact on the common black-hawk. As a precautionary measure, the contractor or project biologist will follow the same protocol as that applied to bald eagles during construction activities.

American Peregrine Falcon. The No Action alternative would have no effect on the American peregrine falcon or its habitat.

No nesting habitat occurs in the immediate project area and foraging habitat is likely limited due to the disturbed nature of the site. Construction activities are not anticipated to affect migrating falcons that may fly overhead. Therefore, the Proposed Action is not likely to affect the species.

Loggerhead Shrike. The No Action alternative would not alter the potential riparian habitat potentially utilized by this species and therefore would have no effect.

Although the shrike may be an occasional user of the riparian fringe along the Rio Grande in the vicinity of the project site, primary habitat for the species does not occur in the area.

Bell's Vireo. The No Action Alternative would not alter the riparian habitat utilized by this species as no cottonwoods or willows would be removed.

Bell's vireo has not been documented as a breeding bird in the project area and habitat suitable for the species is not found there. Therefore, the Proposed Action will not affect the Bell's vireo.

Mammals

Yuma Myotis. Under the No Action alternative, there would be no impact on potential prey resources of the Yuma myotis and therefore no effect to the species.

Although no construction is proposed in habitats used as retreats for the species (namely under bridges), the project may alter feeding behavior during in-water work if bats utilize the construction corridors for feeding. However, because the construction areas are relatively limited in size and ample feeding sites occur through the Drain and river, and because feeding generally takes place at night, when construction will not occur, adverse impacts are unlikely.

Occult Little Brown Bat. Under the No Action alternative, there would be no impact on potential prey resources of the occult little brown bat and therefore no effect to the species.

No project-related work will take place in the potential habitat for the occult little brown bat (old growth ponderosa snags). Similar to the Yuma myotis, construction may impact feeding behavior in the vicinity of in-water work; however, adverse impacts are unlikely.

Red Fox. Under the No Action alternative, construction would not occur and therefore potential habitat for the red fox would not be disturbed.

Under the Proposed Action, the red fox may avoid the area during construction activities and a minimal amount of marginal migratory habitat may be removed. However, because red fox are highly mobile, if present during construction, the species will likely disperse from the site temporarily until construction ceases. Because the proposed Sanctuary site does not likely provide optimal habitat for the species and the Rio Grande riparian corridor is unlikely to be impacted to a significant degree due to placement of the fish return channel, red fox will likely continue to utilize the site as a migratory corridor or foraging area following completion of construction.

Western Spotted Skunk. Under the No Action alternative, construction would not occur and therefore potential habitat for the skunk would not be disturbed.

Similar to the red fox, the western spotted skunk is highly mobile and will likely disperse from the immediate project area during construction activities. However, following construction the species will likely return to the site, continuing to utilize the riparian corridor along the Rio Grande.

4.2.11 Cultural Resources

Under the No Action alternative there would be no change to cultural resources or TCPs in the vicinity of the Proposed Action.

No TCPs or sacred sites were identified, therefore, no impact to TCPs or sacred sites is anticipated to occur due to the Proposed Action.

To address potential impacts to cultural resources due to Sanctuary construction, Reclamation has submitted an expanded consultation letter to SHPO describing the existing condition of scattered glass artifacts and wooden bollards present at the project site (see Appendix A). If the SHPO concludes that construction may occur, any conditions required as provisions of the authorization will be adhered to in compliance with the requirements of the NHPA. Should archeological resources be found during construction at staging areas, access locations, or facility locations, work in that area will stop and the proper authorities informed. No impacts to cultural or historical resources present at the Glass Gardens site are anticipated to occur as the water conveyance pipeline corridor from the intake to the Sanctuary will be located east of the river levee, avoiding the Glass Gardens completely.

4.2.12 Indian Trust Assets

Under the No Action alternative there would be no change to ITAs in the vicinity of the Proposed Action.

Reclamation has not identified any ITAs in the project area, and no impacts to ITAs will occur.

4.2.13 Socioeconomic Considerations

Under the No Action Alternative there would be no effects to existing socioeconomic considerations.

The Proposed Action will not adversely affect the current socioeconomic conditions of Bernalillo County. Industrial and commercial activities occur directly east of the project site and a few athletic fields are located near the northern terminus of the site, in the vicinity of the proposed intake structure. Both of these areas are east of the Drain and somewhat isolated from the project site. Short term positive economic affects to construction and supply companies involved with construction of the Sanctuary will occur during the construction phase of the project.

4.2.14 Visual and Aesthetic Resources

Implementation of the No Action alternative would not impact any existing visual or aesthetic resources, as no construction would occur.

Under the Proposed Action, direct effects on aesthetics and visual resources will result from the placement of screens and associated covers to house them. While permanent, they will not disrupt existing views from outside the bosque. From views within the bosque, mitigation will include several environmental design features. There is no predicted visual contrast, blocking or

disruption of existing urban views, or reduced public opportunities to view any other scenic resources.

There are no changes to existing land use predicted from implementing the project, so the existing views in the area will not be expected to vary substantively. There is an existing structure at the water diversion point. Cottonwoods trees will be minimally disturbed, and it is the intent of the design for the Sanctuary to remain as natural in appearance as feasible. The required screen covers will be designed and built as unobtrusively to views as possible. They will use natural colors and employ native vegetation to help screen them from view.

4.2.15 Land Use and Recreational Resources

Under the No Action alternative there would be no changes to existing land uses.

The Proposed Action will have no effect on current uses of water for agriculture, ranching, residential, or other activities in the area. State of New Mexico designated uses and standards applied to the Rio Grande will not be affected by the proposed project. The Proposed Action will not affect adjacent agricultural land use and will not change current land status or uses.

The Proposed Action will not affect existing recreational uses as most activities occur along the paths that run adjacent to the Drain and Barr Main Canal, east of the proposed Sanctuary site.

4.2.16 Environmental Justice

The No Action alternative would not result in any effect upon environmental justice considerations.

The project will not disrupt or displace any residential or commercial structures or impact disproportionately any minority communities. The Proposed Action has been reviewed for compliance with this order and it has been determined it will not adversely affect the health or environment of minority or low-income populations.

4.3 Irretrievable Commitment of Resources

The implementation of the Project will result in the commitment of resources such as fossil fuels, construction materials, and labor. In addition, State and Federal public funds will be expended for the construction of the proposed project.

4.4 Cumulative Impacts

The 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 U.S.C. 4331-4335). Cumulative environmental impacts associated with the Proposed Action have been evaluated for the following projects relative to the Proposed Action.

Middle Rio Grande Endangered Species Act Collaborative Program

The MRG Endangered Species Act Collaborative Program has solicited and funded multiple habitat restoration projects, including the City of Albuquerque and USACE restoration projects in the vicinity of the Proposed Action (Reclamation 2002). RGSM augmentation funded by the Collaborative Program should provide positive synergistic interactions with habitat that will be created by this project.

Upper Rio Grande Water Operations Environmental Impact Statement

Currently, the USACE, the ISC, and Reclamation are signatories of a Memorandum of Agreement to develop integrated water operations rules for several dams on the Rio Grande upstream of the project area (URGWOPS 1999).

City of Albuquerque San Juan–Chama Drinking Water Project

The City of Albuquerque has begun construction of a diversion dam in the Rio Grande south of Alameda Bridge to divert San Juan–Chama water for the City's drinking water supply. The City is currently constructing water intakes and a crossing of the Rio Grande at Campbell Road for the same project. Several proposed habitat restoration projects are specified for the Albuquerque Reach as mitigation for adverse effects from this project (Reclamation 2004).

Middle Rio Grande Bosque Wildfire Project and Wetland Restoration Project

The USACE is involved in a Bosque Wildfire Project throughout the Albuquerque Reach of the Rio Grande, thinning riparian vegetation at selected locations adjacent to the river (USACE 2004). The USACE is also involved in Ecosystem Restoration projects at the Albuquerque Biologic Park and the Wetland Restoration Project south of Central Avenue.

New Mexico State RGSM Habitat Restoration Projects

Currently, the New Mexico Water Trust Board and the ISC are conducting projects to improve RGSM habitat. These projects include increasing scientific knowledge of available food for aquatic species within the MRG and incorporating large woody debris for improved meso-habitat (Tetra Tech 2004).

In combination with the activities described above, the proposed Sanctuary will contribute toward a loss of approximately 3 acres of bosque habitat, currently dominated by invasive weedy species. However, all areas that are disturbed by construction and not occupied by facility infrastructure will be revegetated with native plants to restore riparian function and wildlife habitat value.

In addition to a small loss of bosque habitat, the cumulative effects of the Proposed Action may include short-term changes in some aspects of the existing hydrology and hydraulics of the Albuquerque Riverside Drain, which is the source of water for the Proposed Action. However, facility flow strategies may be adjusted so as not to impact Drain/Canal irrigators or fish habitat within the conveyances. Other projects listed here may affect the Proposed Action by altering physical processes upon which the proposed techniques depend. Changes in upstream water operations and improved habitat conditions may improve or degrade the effectiveness of the Proposed Action by increasing or decreasing available habitat for RGSM released from the Sanctuary. The objective of the Proposed Action, to spawn, rear and release RGSM into the Rio

Grande in an effort to enhance populations, is not likely to affect other projects in an adverse manner.

4.5 Summary of Effects to Each Resource

Construction and operation of the RGSM Sanctuary will have short-term effects on some environmental resources but long-term beneficial effects on biological resources, particularly the endangered RGSM. The overall effects of construction and operation of the proposed Sanctuary are summarized in Table 4-1.

Table 4-1. Environmental Consequences of Proposed Action and No Action Alternative.

Environmental Resources	Proposed Action	No Action
Geology and Soils	Short-term adverse impact on channel and bank geomorphology; no long-term effects on channel geomorphology anticipated; no long term impact on soils and geology within Sanctuary footprint.	The No Action Alternative would continue the geologic, soils and geomorphic trends currently present on site with no soil disturbance due to construction operations.
Hydrology and Hydraulics	No impact to river hydrology or hydraulics is anticipated. Potential impacts to Drain hydraulics could be mitigated by changes to facility operations and water use strategies.	No change in the amount or duration of flows in the Albuquerque Riverside Drain. No upstream shift in discharge from Drain to Rio Grande.
Floodplains	Limited use of fill will minimize impacts to flood storage capacity; however, extreme flows may flood site.	No change in current flood storage capacity would occur.
Water Resources and Net Depletions	Drain flow may be reduced during low flow periods; however, facility water usage could be adjusted to maintain adequate flow. No effect to water resources or net depletions as facility use is non-consumptive and returned to river. No impact to irrigation users.	No effect on water resources or net depletions.

Table 4-1 continued.

Environmental Resources	Proposed Action	No Action
Erosion Control and Water Quality	Short-term effects due to increased erosional input to waterbodies; minimized by use of BMPs. No change in water quality anticipated.	No change in levels of constituents such as pH, dissolved oxygen, temperature, and turbidity. No change in existing state of erosion on riverbank/Drain bank.
Air Quality and Noise	Short-term adverse impact from increased ambient noise levels and fugitive dust during construction.	No change in air quality or noise.
Vegetation Communities	Limited short-term effects on bosque vegetation including removal of 18 mature cottonwoods; impacts primarily to herbaceous understory dominated by non-native weeds. Mitigated by extensive native plantings.	Continued trends in vegetation such as increases in non-native species in bosque.
Noxious Weeds	Removal of noxious weeds due to construction; revegetation with native species and monitoring planted areas for invasive species infestations.	No change to current condition of noxious weeds would occur. No revegetation of the site with native species or control of weeds would occur.
Fish and Wildlife	Short-term adverse impacts; long-term positive effect on fish and wildlife abundance and diversity from habitat improvements relating to native plantings.	Continued fish and wildlife use of bosque in current condition, dominated by minimal value wildlife habitat.
Threatened, Endangered and Special Status Species	No adverse impacts anticipated for the RGSM and bald eagle, no effects on SWWF.	No construction impacts to T&E species. Continued adverse trend toward decreased habitat for RGSM and no habitat creation.
Cultural Resources	No adverse effects on cultural Resources.	No change to cultural resources.
ITAs	No ITAs identified.	No change to any existing ITAs.
Socioeconomic Considerations	No adverse effects. Short term beneficial affects for construction companies involved in Sanctuary implementation.	Socioeconomic impact of No Action may result from higher costs of implementing other RGSM habitat restoration projects in the Albuquerque Reach
Visual and Aesthetic Resources	Short-term impacts in vicinity of project site during construction; no long term adverse impact. Likely beneficial impact due to mitigation plantings.	No impact to existing visual and aesthetic resources.
Land Use and Recreational Resources	Reduction in degraded bosque habitat should not affect recreational uses. No effect on current uses of water for agriculture, ranching, residential, or other activities in the area.	No change in current land or recreational uses.
Environmental Justice	No adverse effect.	No change in existing conditions.

5.0 ENVIRONMENTAL COMMITMENTS

Reclamation will be responsible for the successful implementation of all environmental commitments. Compliance with the CWA is required for work within the Rio Grande and the Drain, as both are considered Waters of the U.S. and under the jurisdiction of the USACE. Because in-water work will be completed within aquatic areas regulated by the CWA, a 404 permit is required. A state water quality certification permit, administered under Section 401 of the CWA, is also required. Both permits have been issued by the respective agencies. Section 402 of the CWA regulates point source discharges of pollutants into Waters of the U. S. and specifies that storm water discharges associated with construction activity be conducted under NPDES guidance. Storm water discharges as a result of construction of the proposed project will be limited to ground-disturbing activities outside the ordinary high water mark. All such activities will be evaluated for compliance with NPDES guidance; an NPDES permit for construction will be required and a SWPPP for the project will be developed by the contractor and kept on file at the construction site.

To avoid direct impact to migratory birds protected by the MBTA, clearing of woody vegetation and construction will be scheduled between August 15 and April 15, outside of the normal breeding season for many avian species. Should vegetation removal and construction be implemented during the breeding season (April 15-August 15), pre-construction breeding bird surveys will be conducted and monitoring performed to assure avoidance of impact to migratory birds and associated avian species. Any positive preconstruction survey results or observation of affected species during construction will be coordinated with USFWS to discuss nesting area avoidance. A temporary Construction Noise Permit may be required by the Albuquerque Environmental Health Department prior to construction, as specified in the local Noise Ordinance, Article 9 Section 9-13.

Appropriate permits for the Rio Grande Bosque and river access and staging areas will be acquired prior to the commencement of the Proposed Action. Proposed staging and access will be coordinated with the City's Open Space Division and the MRGCD. The MRGCD will acquire an OSE permit as the OSE has determined that there is a new point of diversion, new purpose of use and a new place of use of Rio Grande water.

ESA compliance has been addressed via an intraservice consultation with USFWS regarding potential impacts to threatened and endangered species and their habitat. BMPs will be enforced to minimize potential impacts to RGSM from direct construction impacts and erosional inputs into the river during periods of work. Consultation with USFWS determined the most effective BMPs. Compliance with the Fish and Wildlife Coordination Act will occur prior to project implementation in association with ESA compliance.

Reclamation has coordinated with the SHPO for purposes of NHPA Section 106 compliance. The Project is committed to avoidance of any TCPs in the project area. Should evidence of possible scientific, prehistorical, historical, or archeological data be discovered during the course

of this action, work shall cease at that location and the area archaeologist shall be notified by phone immediately, with the location and nature of the findings. Care shall be exercised so as not to disturb or damage artifacts or fossils uncovered during operations, and the proponents shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.

In addition to compliance with permitting requirements, the following early environmental commitments are included as part of the Proposed Action:

1. Should a bald eagle be observed within 0.25 mi. upstream or downstream of the active project site in the morning before project construction activity starts, or following breaks in project construction activity, the construction crew will be required to suspend all activity until the bird leaves on its own volition, or if the Reclamation biologist, in consultation with the USFWS, determines that the potential for harassment is minimal. However, if a bald eagle arrives during project construction activities or if a bald eagle is observed beyond the specified distance, construction will not need to be interrupted. If bald eagles are found consistently in the immediate project area during the construction period, Reclamation will contact the USFWS to determine whether formal consultation under the ESA is necessary.

2. Disturbance of riparian vegetation shall be limited to the minimum amount necessary to achieve construction objectives, in order to minimize habitat alteration and limit the effects of erosion and sedimentation. Mitigation for vegetation losses will include replanting at ratios of 3 new plants for each removed plant < 6 inches dbh, and 10 new plants for each plant > 6 inch dbh. These replacement ratios will apply for native vegetation within those areas directly damaged by construction. The 18 mature cottonwood trees removed at the beginning of construction will be replaced by pole plantings of 180 cottonwood saplings in selected areas near the riverbank to improve their potential for survival and in bosque within the project site. Coyote willows will also be planted as mitigation for removal of riparian shrubs and cottonwood saplings. All pole plantings may be caged with chicken wire initially to prevent animal damage.

3. Native grass, shrubs and pole plantings will be used to reestablish vegetation in areas disturbed by construction. Only the amount of the proposed staging and stockpiling areas needed will be used or disturbed. Upon completion of activities, the project area and the staging and stockpiling areas will be cleaned up and all materials and equipment removed. Disturbed areas will be reseeded with native grasses and shrubs using species including coyote willow, three leaf sumac, and wolfberry, or suitable species available from local nurseries. The reestablishment of vegetation will be monitored by Reclamation and irrigation water will be brought in by truck, if necessary, to ensure the successful establishment of the seeded areas.

4. To minimize soil erosion and increased turbidity in the Rio Grande during rain storms, standard construction BMPs will be used to minimize runoff during construction.

5. Fugitive dust will be suppressed by spreading water over disturbed areas where heavy equipment is working during dry conditions.

6. Standard BMPs will be used to manage water runoff during construction activities to prevent runoff during rainstorms from causing an unnaturally high level of sediment loading in the river and/or Drain. The contractor will utilize straw bails and silt fences placed at strategic locations to manage water runoff in the construction areas.

7. Design features and landscape plantings will lessen long-term impacts to visual and aesthetic resources.

6.0 AGENCY COORDINATION AND CONSULTATION

In preparation of this EA, formal or informal coordination was conducted with the following entities:

- Bernalillo County
- City of Albuquerque BioPark
- City of Albuquerque Open Space Division
- Middle Rio Grande Conservancy District
- New Mexico Department of Game and Fish
- New Mexico Rare Plant Technical Council
- New Mexico State Historic Preservation Officer
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Sandia Pueblo

7.0 DISTRIBUTION LIST

To Be Inserted

8.0 LIST OF PREPARERS

Becky Holloway, Environmental Biologist, HDR/FishPro
Rick Billings, Senior Environmental Scientist, HDR/FishPro
Patty Michak, Senior Fisheries Biologist, HDR/FishPro
Ken Ferjancic, Senior Fisheries Biologist and Project Manager, HDR/FishPro

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Appendix A. Correspondence

- Letter of commitment from MRGCD (water use).
- Letter from Reclamation (J. Hanson) to SHPO regarding concurrence on cultural resource findings and concurrence.
- Intra-service Section 7 Biological Evaluation Form
- U.S. Fish and Wildlife Service Final Fish and Wildlife Coordination Act Report

June 9, 2005

Mr. Karl Martin, Acting Director
Albuquerque Area Office
U.S. Bureau of Reclamation
555 Broadway NE
Albuquerque, New Mexico 87102

Re: Water for Rio Grande Silvery Minnow Sanctuary

Dear Mr. Martin:

The purpose of this letter is to confirm the commitment of the Middle Rio Grande Conservancy District to provide, subject to the physical availability of water, an average of 10 cfs of water for the Rio Grande Silvery Minnow Sanctuary. That water will come from the Albuquerque Riverside Drain, and will be moved out of the Drain into the Sanctuary by means of a structure to be built as part of the Sanctuary project. Inasmuch as the Sanctuary parallels and is adjacent to the Drain, our preliminary analyses show that moving water from the Drain into the Sanctuary is unlikely to result in any discernable increase in depletions due to seepage or evaporation.

If you have any questions, please call me.

Very Truly Yours,

(original signed)

Subhas Shah
Chief Engineer

xc: Dr. Charles T. DuMars, General Counsel

Ferjancic, Kenneth P.

From: Sterling Grogan [Grogan@mrgcd.us]
Sent: Monday, August 29, 2005 10:15 AM
To: Subhas Shah
Cc: Yasmeen Najmi; Chris Gorbach; Ferjancic, Kenneth P.; David Gensler
Subject: Minnow sanctuary design changes

Shah:

David and I met with Reclamation and FishPro, their consultant, on Friday Aug 26 to discuss changes to the preliminary design of the minnow sanctuary. Those changes, and other items discussed:
1. Supply pipeline is replaced by a pump station located in the drain approximately even with N. end of sanctuary, about 4,000 feet downstream from Barr heading. It will probably use two 10-cfs pumps, plus a 3 cfs "nuisance pump" with generator for emergencies. Maximum diversion will be 15 cfs, and it will be metered.
2. A planned 1.7 foot tall "berm" in bottom of drain to "check" for sump, is going to be replaced, at David's suggestion, by a "ramp flume", i.e., a hard-surfaced section of the drain associated with the pump station, designed to get the required head at expected flows.
3. Reclamation needs an MoA with MRGCD, Chris Gorbach with get us a draft.
4. Ground breaking ceremony with Sen. Domenici now scheduled for Tuesday, October 11. No other details available now.
5. Reclamation received a couple of letters of complaint about the minnow sanctuary (via the NEPA process), will provide us with copies.
6. Construction planned to be done by March 1, but could run into March, which David indicated would be OK.
7. Return flows will enter drain via a pipe above 300 cfs water level, without a flapper valve on end, angled downstream at 45 degrees; erosion is not a concern; capacity to return to either drain or river will be built-in.

Sterling

Sterling Grogan, Biologist & Planner
Middle Rio Grande Conservancy District
1931 2nd Street SW
Albuquerque, New Mexico 87102
Voice: 505 247 0235 ext. 337
Mobile: 505 263 1212
Fax: 505 243 7308
grogan@mrgcd.com

United States Department of the Interior

BUREAU OF RECLAMATION

Albuquerque Area Office
555 Broadway Blvd., NE Suite 100
Albuquerque, New Mexico 87102-2352

IN REPLY REFER TO:

ALB-189
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Action

FEDERAL EXPRESS

Ms. Lisa Meyer
New Mexico State Historic Preservation Office
New Mexico Historic Preservation Department
228 E. Palace Ave
Santa Fe, NM 87501

Subject: Rio Grande Silvery Minnow Sanctuary

Dear Ms. Meyer:

In order to comply with Section 106 of the National Historic Preservation Act of 1966, the Albuquerque Area Office of the Bureau of Reclamation requests your views on our efforts to identify historic properties for the above project (as specified in 36 CFR 800.4). The Bureau of Reclamation, Albuquerque Area Office proposes to construct a sanctuary for the Rio Grande Silvery Minnow. As currently proposed, the artificial rearing channel will be dug along the eastside floodplain, between the river and the levee, and would be approximately 1,000 feet in length (see site map). The site is on land administered by the City of Albuquerque Parks and Open Space Division and the Middle Rio Grande Conservancy District. Operational water for the facility, approximately 15 cfs maximum, would be provided by surface water from the Barr Riverside Drain. A new 24-30 inch pipe would convey water from the existing Barr Main Canal diversion structure. The existing diversion structure would be modified and would fit with inclined wedge wire screens to prevent large debris from entering the pipeline. The pipeline would direct water under the levee and into a new 3,500 foot long water delivery canal that will be located next to an existing road. As the canal approaches the artificial rearing channel, water will be directed through a fish screen housing building that would contain a screen filter. A small pipeline would return screened materials from the building (including eggs, larvae, and fish) back to the Barr Riverside Drain. After screening, water will be routed to the sanctuary rearing channel. Following circulation through the facility, water will be discharged to either the Rio Grande or the Barr Riverside Drain. The discharge outlet would be either screened to contain minnows within the sanctuary or allow for releases and to prevent entry by other species into the system. Minnows will be released directly or transported to various locations in the Rio Grande once collected and enumerated.

LA127144, the Glass Gardens Site lies directly north of the project area. The site was the main Albuquerque city dump up until the middle 20th century. The clear area to the north of the project area (see site map) contains deep, intact midden deposits of glass, ceramics, slag, construction

ubble, wood, metals, and rubber. On May 27, 2005, City archaeologist Matt Schmader and Reclamation archaeologist Dr. Jeffery Hanson, conducted a site visit to the project area. It was determined that while some surface material from the Glass Garden site extends into the project area, it is re-deposited and lacking in integrity. That portion of the site that contains the historically significant midden deposits will be avoided. There is also an historic line of cable and post fencing that runs parallel to the route of the proposed sanctuary. This fencing will also be avoided.

Directly to the south of the proposed project area there is a trash dump which most likely represents a separate episode of city dumping. The area sits several feet above the existing floodplain and contains cultural material over fifty years of age including a Royal Crown soda bottle dated 1948 and a New Mexico license plate dated 1947. Within this site there is a service road and utility power line that transects it. This site will also be avoided by the proposed project.

Please provide your views on this proposal as your schedule permits. Should you have any questions about the project, please do not hesitate to call Dr. Jeffery Hanson, of my staff, at 505-462-3607.

Sincerely,

A. Jack Garner
Area Manager

Enclosure

No Historic Properties Affected.

7/14/05

for NM State Historic Preservation Officer

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

Originating Person: Jennifer Parody
Telephone Number: 505-761-4710
Date: August 22, 2005
Consultation #: 02-22-05-I-520

I. Region: 2

II. Service Activity (Program):
Ecological Services: Element AA of the Reasonable and Prudent Alternative (RPA) in the March 2003 U.S. Fish and Wildlife Service (USFWS) Biological Opinion for the U.S. Bureau of Reclamation's (Reclamation) Water and River Maintenance Operations, the U.S. Army Corps of Engineers' (USACE) Flood Control Operations, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:
Rio Grande silvery minnow (*Hybognathus amarus*) (silvery minnow) (E)
Rio Grande silvery minnow critical habitat
Southwestern willow flycatcher (*Empidonax traillii extimus*) (flycatcher) (E)
Bald eagle (*Haliaeerus leucocephalus*) (T)
Interior least tern (*Sterna antillarum athalassos*) (E)

B. Proposed species and/or proposed critical habitat within the action area:
Southwestern willow flycatcher critical habitat

C. Candidate species within the action area:
Yellow-billed cuckoo (*Coccyzus americanus*)

IV. Location:

A. Ecoregion: Upper Middle Rio Grande

B. County and State: Bernalillo County, New Mexico

C. Latitude and Longitude: Lat: 35° 05'; Long: 106° 39'

D. Distance (Miles) and direction to nearest Town: the project site is within the limits of the City of Albuquerque

E. Species/Habitat Occurrence
Occupied habitat and critical habitat for the silvery minnow encompasses the mainstem of the Rio Grande from Cochiti dam to the headwaters of Elephant Butte Reservoir. The silvery minnow requires different velocity of flow for its life stages including slow

moving backwater areas, deeper pools, and higher flows for spawning.
The flycatcher has been documented to nest near or adjacent to the river at numerous locations throughout the Middle Rio Grande. Nesting occurs from May through August. Nesting flycatcher have not been documented in the action area, however, the species is known to use the area for migration.

The bald eagle winters on the Rio Grande arriving in early November and departing in late February each year. Bald eagles have been observed roosting within the action area.

Interior least terns typically nest on sand bars in inland rivers in the Midwestern US, but in New Mexico they nest in playa habitats, not on river bars. They require aquatic habitats nearby for foraging on small fishes. These birds may use sand bars or wetlands near but not in the action area as foraging sites while migrating in March through May annually.

Yellow-billed cuckoos occur within gallery cottonwood forest patches with mixed woody native and exotic understory layers. While the overstory exists, understory vegetation of this types is not present in the action area.

V. Geographic area and Proposed Action

The proposed project site would be located south of downtown Albuquerque, New Mexico, in Bernalillo County, approximately 4,800 feet south of Bridge Blvd., on the eas side of the Middle Rio Grande (see attached BA, Figure 1). The project's region of influence is limited to approximately 5 acres of bosque, and includes the project site, referred to as the Barr site, a minor portion of the bank of the Middle Rio Grande, and two artificial water conveyance canals east of the existing levee: the Albuquerque Riverside Drain (Drain) and the Barr Main Canal (Figure 2).

Proposed Action:

The proposed project, the Rio Grande Silvery Minnow Sanctuary (Sanctuary), was developed in partnership with the Bureau of Reclamation and the Middle Rio Grande Conservancy District (MRGCD). The intent of this facility is to contribute to the continued enhancement and recovery of the Rio Grande silvery minnow (silvery minnow) through the creation of additional habitat for the species. The Sanctuary will be comprised of an artificial rearing and breeding channel, containing elements of the natura environment including backwater pools and eddies.

The overall geometry of the Sanctuary would conform to the landform that is available in the bosque between the Glass Gardens site to the north and the construction debris landfill to the south (see Figure 2). The actual Sanctuary would vary in width and direction to conform to the existing topography and to avoid removal of existing cottonwood trees to the greatest extent possible. The proposed facility, including overbank areas, would occupy a maximum area 1,500 feet long and 100 feet wide, with variable widths averaging 50 feet.

The Sanctuary and internal features, including bars, channels, pools, and backwaters would be constructed with native soil (from excavated materials on site, if suitable)

combined with hard materials (i.e. rock, sand bags, small gabions, large woody debris, etc.) to create forms with defined structure. Mature cottonwood removed from the site would be recycled and used as large woody debris within the channel. Fine sand to small gravels would be used as substrate for the Sanctuary. All imported materials would come from locally approved, certified sources. A limited number of haul trips would be required along existing public roads to bring these materials to the site.

The Sanctuary will be located off channel, in the bosque, and will use water from the adjacent Barr Main diversion canal. Water from the sanctuary will re-circulate through the Sanctuary and subsequently drain either into the Rio Grande via an outfall channel or when river hydraulics preclude discharge, return to the drain. A fish screen with mesh 300 micron openings, a size sufficient to prevent entry by RGSM larvae and eggs, would be provided for the water conveyance channel at the fish screen building. The facility outfall channel would be equipped with fish screens to contain juvenile and adult RGSM in the Sanctuary until they are released, as well as to prevent entry by aquatic species present in the drain and river. Release of silvery minnows into the river would be entirely controlled by outfall structures and would occur only under a Section 10 permit from the Service.

Work in the drain would occur in winter, when flows are low. To minimize effects to any silvery minnows that may be present in the drain, coffer dams will be installed to allow dewatering of the construction area and fish movement past the work site.

The bank surrounding the outfall channel would be armored at the mouth with riprap to provide protection during high flow events and to prevent bank sloughing. Although installation of this structure would occur during low flow periods in the winter, a small cofferdam, extending approximately 5 feet from the bank into the river, might be required. Water removed from the cofferdam area would be discharged into a small settling basin prior to discharge back into the river downstream of the construction area. Because the river is approximately 500 feet wide at this location, cofferdamming would result in a negligible impact to instream resources as best management practices (BMPs) to prevent erosion and sedimentation would be implemented. Installation of the fish release channel and associated bank protection would remove 100 cy of bank material. Two to four mature cottonwoods may be removed from this location.

The Sanctuary site has been mechanically cleared of underbrush, and invasive weedy species have colonized cleared areas in many locations. Vegetation clearing was done by the US Army Corps of Engineers as part of the Bosque Fuels Reduction Project. Remaining vegetation is composed of a mid-successional riparian forest with a nearly closed canopy comprised predominantly of Rio Grande cottonwood trees. Limited riparian cover is present along the nearly vertical banks of the Drain. Siberian elm, salt cedar, and numerous weedy herbaceous species including Western salsify, cheatgrass, and tumble mustard occupy the bosque floodplain. Up to 18 mature cottonwoods and 60 immature cottonwoods would be removed from the project area. All other vegetation removal would be restricted to minimal herbaceous and weedy species removal largely around the drains.

VII. Determination of Effects:

A. Explanation of effects of the action on species and critical habitat

Bald Eagle

The proposed project 'may affect, but is not likely to adversely affect' the bald eagle. The removal of approximately 18 mature cottonwoods from the project footprint would have relatively minor, if any, adverse effects on wintering bald eagles and their roost trees as the majority of tree removal would be conducted away from the mainstem river channel where perching is most likely to occur. Removal of one to four mature cottonwood in the vicinity of the Rio Grande fish release/water return outlet is not likely to adversely effect roosting eagles as there are ample available perch trees in the general vicinity.

Operation of construction equipment at the proposed Sanctuary site would produce noise levels that are likely to disturb any wintering bald eagles potentially foraging within this section of the river. Temporary displacement of some individuals may occur. Construction of main facilities would occur between September and March (in-water construction from October 1 – February 28). Because no nesting territories are documented within miles of the site, noise impacts to nesting eagles are not anticipated. During construction of the Sanctuary, if a bald eagle is spotted within 0.25 mile of active project construction, construction activities would be delayed until the eagle leaves the area on its own accord. Bald eagles are present in the Middle Rio Grande during the winter months and may be disturbed during river and riparian construction of the diversion structures and associated activities. However, this area is not known to provide breeding habitat for the bald eagle. As a result, nesting pairs and chicks would not be disturbed or threatened during construction activities.

Southwestern Willow Flycatcher and Proposed Critical Habitat

The proposed project 'may affect, but is not likely to adversely affect' the willow flycatcher. Conducting construction during the winter would avoid any direct effects on migrating flycatchers. The removal of trees should have no effect on flycatchers, since they are not known to utilize the site for nesting. Although the project area is located in proposed critical habitat for the flycatcher, the habitat in the area is not suitable for nesting and no flycatchers are known to nest in the area.

The proposed project is not likely to adversely modify proposed critical habitat. Areas to be cleared of vegetation do not contribute to any PCEs of the proposed critical habitat. The project site and adjacent area (approximately ¼ mile direction, north and south) were evaluated in April 2005 for the presence of potential or actual habitat for the flycatcher. The results of this site visit indicate that the project site has no potential or actual suitable habitat for the species; however, it may serve as a migrational corridor. Clearing and grubbing activities would occur after the flycatcher nesting season. The loss of trees that may incidentally be used during migration would be replaced by replanting efforts.

Rio Grande Silvery Minnow and Critical Habitat

The proposed project 'may affect, but is not likely to adversely affect' the silvery minnow or its critical habitat. Construction of in-water components would occur during low flow periods from October 1 – February 28. Direct effects to the few, if any, silvery minnows present in the project area may occur during in-water construction within the Drain at the surface intake and outfall locations, as well as along the banks of the Rio Grande in the vicinity of the proposed fish release/water return discharge. Direct impacts to individuals may occur due to temporary increases in sedimentation and turbidity. The use of heavy machinery within the streambeds of the Drain and Rio Grande due to intake/outfall work would temporarily disturb sediment and force any silvery minnows present in the area to move away from the construction channel. The cofferdams proposed for intake installation in the Drain and for in-water work in the Rio Grande would allow for fish bypass during construction. During the cofferdam dewatering phase of construction, project managers would utilize BMPs to exclude silvery minnows from the construction area.

Disturbance and short-term increases in suspended sediment levels can reduce light penetration, inhibit primary production, abrade and clog fish gills, stop migration, and cause any fish in the area to avoid disturbed reaches of the river or Drain. These impacts could result in a disruption to silvery minnow behaviors, causing them to avoid available habitat, lose foraging opportunities near the project area, and delay or prevent movement to potential habitat in adjacent reaches. Noise and vibrations caused by machinery operating in the Drain and the river may cause silver minnows to avoid the area during periods of construction activity. However, these effects would be minimized by the short duration of in-water portions of the project (estimated to be less than one month). Few silvery minnows are known to occur within the Drain; therefore adverse effects to the species are anticipated to be insignificant due to in-water and bank work at that location.

There is some potential risk to the silvery minnow associated with releases of fuel or oil into the Drain and Rio Grande from equipment and machinery used during the Sanctuary construction. In the event of a spill, fish could be adversely affected by released chemicals or contaminants; effects could range from death to harassment resulting in abandonment of the area of the spill. The potential for this effect will be reduced with the implementation of a spill prevention, containment, and control plan which will be in place at the start of construction.

Construction would disturb a negligible amount of designated critical habitat within the Rio Grande, including 34 linear feet of streambank and a very minor amount of riverbed due to construction of the outlet channel. In-water work in the Drain would be initiated during the river's winter low-flow period to avoid to the extent possible the spring snow melt and summer monsoon seasons of high flows in the river. The Drain is located outside of the Rio Grande levee, and is therefore not included in the designated critical habitat for the species.

Potential short-term adverse effects of the project on RGSM critical habitat are

mostly related to increased sediment and turbidity as a result of placement of the fish release/water return outfall structure along the Rio Grande streambank (PCE #4, water quality). A potential fuel spill would also increase the contaminant level of the system, thus reducing the quality of habitat in the project area. Construction activities (including noise, and equipment near the stream and increased sediment) could create a temporary physical migratory barrier, displacing silvery minnow in the project area and have minor, short-term adverse effects to silvery minnow critical habitat.

Interior Least tern

The interior least tern occurs as an occasional spring migrant in the project area and in the Middle Rio Grande Valley. The species is not known to nest in the project area. Most project work will take place outside the nesting season or in the bosque away from potential habitat. Construction activities along the riverbank will be completed by October and therefore are not expected to affect migrating terns. Minimal effects to potential habitat at the location of the outfall channel are possible. Therefore, the proposed project may affect, not likely to adversely affect the interior least tern.

Yellow-billed Cuckoo

The proposed project will not affect yellow-billed cuckoo because habitat for this species is not present within the project area. The project site and adjacent area (approximately ¼ mile direction, north and south) were evaluated in April 2005 for the presence of potential or actual habitat for the cuckoo. The results of this site visit indicate that the project site has no potential or actual suitable habitat for the species; however, it may serve as a migrational corridor. Clearing and grubbing activities would occur after the cuckoo nesting season. The loss of trees that may incidentally be used during migration would be replaced by replanting efforts.

B. Explanation of actions to be implemented to reduce adverse effects:

Not applicable

VIII. Effect determination and response requested:

Determination	Response Requested
A. Listed species/designated critical habitat: may affect, is not likely to adversely affect	
Rio Grande silvery minnow	✓ Concurrence
Rio Grande silvery minnow critical habitat	✓ Concurrence
Southwestern willow flycatcher	✓ Concurrence
Interior least tern	✓ Concurrence
B. Proposed species/proposed critical habitat: not likely to adversely modify	
Southwestern willow flycatcher critical habitat	✓ Concurrence
C. Candidate species: not likely to adversely affect	
Yellow-billed cuckoo	✓ Concurrence

Kyle Davis 8/30/05

Signature Date

Endangered Species Branch Chief, New Mexico Ecological Services Field Office

IX. Reviewing ESFO Evaluations:

B. Concurrence: ✓ Nonconcurrence: _____

C. Formal consultation required: _____

D. Conference required _____

E. Informal conference required _____

F. Remarks (attach additional pages as needed):

Susan Ilkallullin 8/29/05

Signature Date

Field Supervisor, New Mexico Ecological Services Field Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

September 8, 2005

Memorandum

To: U.S. Bureau of Reclamation, Attention: Charles Fischer, Albuquerque, New Mexico

From: Field Supervisor, U.S. Fish and Wildlife Service, Albuquerque, New Mexico

Subject: Final Fish and Wildlife Coordination Act Report for the Rio Grande Silvery Minnow Sanctuary Project, Albuquerque, New Mexico

Attached is the final Fish and Wildlife Coordination Act Report (CAR) for the Rio Grande Silvery Minnow Sanctuary Project. The proposed project would create an artificial rearing and breeding channel (naturalized refugia), containing elements of the natural environment including backwaters, pools and eddies, to augment Rio Grande silvery minnow production.

This report has been prepared by the U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, under the authority of and in accordance with the requirements of Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e). Should project plans change or a considerable amount of time elapse before this project begins, impacts on fish and wildlife should be re-examined.

Susan MacMullin

Susan MacMullin

Attachment

Fish and Wildlife Coordination Act Report
for the
Rio Grande Silvery Minnow Sanctuary Project
Albuquerque, New Mexico

Submitted to:
U.S. Bureau of Reclamation
555 Broadway NE, Suite 100
Albuquerque, New Mexico 87102

Prepared by:
Michael J. Buntjer
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Road NE
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September 2005

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INTRODUCTION

This is the final Fish and Wildlife Coordination Act Report (CAR) for the Rio Grande Silvery Minnow Sanctuary (Minnow Sanctuary) and has been prepared by the U.S. Fish and Wildlife Service (Service) under authority of and in accordance with the requirements of Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 USC 661-667e). Should project plans change or a considerable amount of time elapse before this project begins, impacts on fish and wildlife should be re-examined.

The Rio Grande silvery minnow (silvery minnow, *Hybognathus amarus*) is federally listed as endangered. It is also listed as endangered in the states of New Mexico and Texas, and the Republic of Mexico. It was historically one of the most abundant and widespread fishes in the Rio Grande Basin, occurring from Española, New Mexico, downstream to the Gulf of Mexico (Bestgen and Platania 1991). The silvery minnow was also found in the Pecos River from Santa Rosa, New Mexico, downstream to its confluence with the Rio Grande (Pflieger 1980). The known distribution of the silvery minnow is limited to the Rio Grande between Cochiti Dam and Elephant Butte Reservoir (Sublette *et al.* 1990; Bestgen and Platania 1991). The decline of the silvery minnow has been attributed to modification of the flow regime from impoundments, water diversion for agriculture, stream channelization, habitat fragmentation, and interactions with both non-native fish and decreasing water quality (Cook *et al.* 1992; Bestgen and Platania 1991; U.S. Fish and Wildlife Service (Service) 2003a; Buhl 2001).

Restoring aquatic habitats and creating naturalized refugia that support the silvery minnow are considered essential components for recovery of the species (Service 1994). Recommendations for such efforts are included as part of the Reasonable and Prudent Alternative (RPA) in the March 2003 Service Biological Opinion for the U.S. Bureau of Reclamation's (Reclamation) Water and River Maintenance Operations, the U.S. Army Corps of Engineers' (Corps) Flood Control Operations, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico (Service 2003a).

Reclamation, in cooperation with the Service and the Middle Rio Grande Conservancy District (MRGCD), has initiated the feasibility and design of the Minnow Sanctuary to augment silvery minnow production. This facility would be comprised of an artificial rearing and breeding channel, containing elements of the natural environment including backwaters, pools and eddies. The project is located parallel to the Middle Rio Grande near the existing City of Albuquerque refugium, approximately 0.9 miles south of Bridge Boulevard (at 2323 Second Street), in Bernalillo County, New Mexico (Figure 1). The purpose of this facility is to contribute to the recovery of silvery minnow through captive propagation of the species as part of the Middle Rio Grande ESA Collaborative Program (Collaborative Program).

This report describes fish and wildlife resources in the project area, anticipated benefits to those resources, and recommendations to minimize any potential adverse effects for those resources.

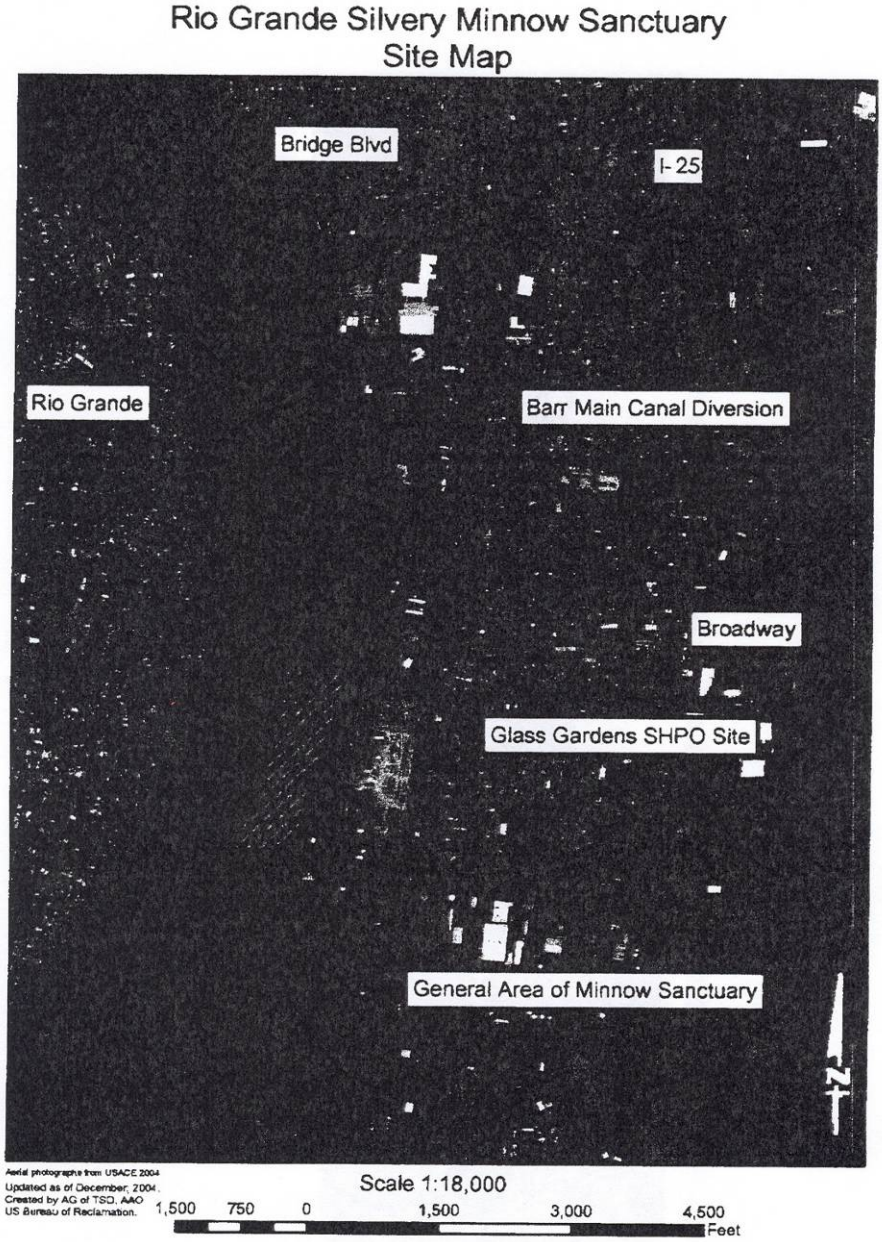

Figure 1. Rio Grande Silvery Minnow Sanctuary project site and surrounding area of influence (modified from Draft Environmental Assessment (Draft EA) 2005)

STUDY AREA DESCRIPTION

Site Description

The project site is located on land administered by the City of Albuquerque Parks and Recreation Open Space Division and the MRGCD (Figure 1). The site was historically used for industrial, agricultural, and residential purposes. An old landfill believed to be used in the 1930s and 1940s is located just north of the site, referred to as the "Glass Gardens", and a smaller landfill of unknown age is located immediately to the south of the site. The project's area of influence includes approximately 5 acres of bosque, a portion of the bank of the Middle Rio Grande, and the Albuquerque Riverside Drain (Riverside Drain). The Riverside Drain diverts water from the Rio Grande at the Angostura Dam, approximately 25 river miles upstream of the project site, and returns to the Rio Grande about 10 miles downstream. Although the project features are still being developed, the proposed facility would be a maximum 1,500 feet (ft) long and 100 ft wide within the bosque, with the proposed length currently approaching 1,000 ft.

The project area has been mechanically cleared of underbrush, and invasive weedy species have colonized cleared areas in many locations. Remaining vegetation in the bosque is comprised predominantly of Rio Grande cottonwood trees. The City Open Space Division manages the bosque where the proposed Minnow Sanctuary would be located. Mitigation is planned for vegetation removed during construction (Draft EA 2005). There is some riparian cover present along the banks of the Riverside Drain, particularly on the east bank. Siberian elm, salt cedar, and numerous weedy herbaceous species including Western salsify, cheatgrass, and tumble mustard occupy the bosque floodplain. The site contains significant amounts of debris, including concrete piles, tires, household items, glass and asphalt.

The Barr Main Canal diversion structure, known as the Barr Main Canal Heading, is located approximately 0.75 miles upstream of the project site. The diversion structure consists of a check/gate dam that diverts a portion of the Riverside Drain flow east into the Barr Main Canal for irrigation purposes. The Riverside Drain and Barr Main Canal flow parallel each until they are south of the project site, where the Canal diverts to the east away from the river channel. Water for the proposed project would be pumped from the Riverside Drain to the Minnow Sanctuary, and returned to the Rio Grande or to the drain depending on operational considerations.

Geomorphology and Hydrology

The Minnow Sanctuary project occurs within the floodplain of the Rio Grande. The Rio Grande flows 1,885 miles from its headwaters in southern Colorado, through New Mexico, where it empties into the Gulf of Mexico as it forms the border between Texas and Mexico. In New Mexico, the Rio Grande is divided into three regions: the Upper, Middle, and Lower Rio Grande. The Rio Grande at Albuquerque lies within the Middle Rio Grande region, which

extends from Cochiti Dam downstream to Elephant Butte Reservoir, a distance of approximately 175 miles. The river in this region prior to dam construction was a wide, braided, shallow, sand bed channel and wide floodplain (Crawford *et al.* 1993). Flows in the Middle Rio Grande and its tributaries upstream of Albuquerque follow a seasonal pattern of high flows during spring runoff and low flows during the fall and winter months, with occasional (monsoonal) flow spikes from summer thunderstorms.

The Rio Grande is highly regulated for flood control and water delivery. Upstream of the proposed project there are six reservoirs: Heron, El Vado, Abiquiu, Galisteo, Cochiti, and Jemez Canyon. There are some diversion dams including Angostura Diversion Dam downstream of Cochiti Dam, and other diversions such as Isleta Diversion Dam and San Acacia Diversion Dam, downstream of Albuquerque. Numerous other conveyances, drains, and laterals move water within the Rio Grande floodplain (U.S. Geological Survey 1996). Each reservoir, diversion dam, and associated irrigation water conveyance system is operated at a multi-agency level that includes Federal, State, and local regulations in compliance with the Rio Grande Compact. Water is managed for municipal and agricultural purposes, factoring in necessary flood control and mandatory deliveries to Texas and Mexico.

Current water operations affecting the general project area result in reduced peak releases and reduced volumes due to consumption, irrigation, flood control, timing of water releases, and water salvage efforts. Reservoirs, diversion dams, and irrigation management have changed the hydrology and sediment supply of the Rio Grande, causing degradation of the channel and chronic erosion of the river banks in some areas. Kellner jetty jacks were placed along the river to channelize and stabilize the banks. Through the Minnow Sanctuary project area, the Rio Grande is a relatively straight sand bed river with sandy banks.

Vegetation Changes

Fragmentation of the native riparian forest, river manipulation, hunting, trapping, livestock grazing, and the introduction of exotic species (plants and animals) have altered the vegetation and historic abundance and diversity of fish and wildlife (Crawford *et al.* 1993). Human development and encroachment in the Rio Grande floodplain have greatly restricted the active floodplain width. Analysis of aerial photography taken by Reclamation in February 1992 shows that of the 175 miles of Middle Rio Grande, only 1 mile, or 0.6 percent of the floodplain has remained undeveloped.

Water management, including development of impoundments, levees, and diversions have drastically altered natural hydrological processes (e.g., spring and monsoonal runoff). This altered hydrology limits natural regeneration of native cottonwoods and willows, and promotes the growth of non-native salt cedar and Russian olive, which are replacing the native cottonwood/willow vegetative complex. As a result of these changes, the quality and quantity of

fish and wildlife habitat has steadily decreased (Service 2001). A list of common and scientific names of plants that may occur in the Middle Rio Grande floodplain is provided in Appendix A.

The most dramatic changes in vegetation composition along the Rio Grande resulted from the reduction of wetted areas such as marshes and wetlands, and the increase in agricultural lands and exotic vegetation, primarily salt cedar and Russian olive. From 1918 to the present, wetland-associated habitats (e.g., wet meadows) have undergone a 93 percent reduction (Crawford *et al.* 1993). Salt cedar and Russian olive were introduced into New Mexico (as ornamentals, shade trees, and for erosion control) in the early 1900s (Crawford *et al.* 1993). By 1935, both plants were common along the Middle Rio Grande (Hink and Ohmart 1984).

Fish and Wildlife Changes

Historically, 27 native fish species occupied the Rio Grande drainage (Sublette *et al.* 1990). Many native fish are extinct and/or extirpated from the Rio Grande in New Mexico. There are at least 31 introduced or non-native fish species within the Rio Grande drainage (Sublette *et al.* 1990). Terrestrial wildlife that have been extirpated from the Rio Grande drainage include the gray wolf, jaguar, grizzly bear, river otter, and mink (Hink and Ohmart 1984). Approximately 46 mammalian species currently occur within the Middle Rio Grande (see Appendix B for a list of common and scientific names of mammals). Surveys of the Middle Rio Grande in 1981 and 1982 documented 277 bird species (Hink and Ohmart 1984), and 259 species were documented in 1992 and 1993 (Thompson *et al.* 1994). Bird occurrence and abundance have also changed with habitat changes. Swans and loons may have been plentiful, but are now absent or rare (Abert 1962). Twelve bird species are declining in abundance and 14 species are increasing. The declining species are associated with decreasing native riparian areas, and the increasing species are associated with agricultural areas (Thompson *et al.* 1994). Therefore, changes in the fish and wildlife community of the Rio Grande are largely due to the direct and indirect effects of human settlements and/or development and manipulation of the Rio Grande and associated changes in watershed and riparian zones.

Aquatic Resources

The aquatic habitat in the Rio Grande has been altered by levees, dams, irrigation structures, and reservoirs for agriculture, flood control, recreation, and protection for developments within the floodplain. Jetty jack fields have straightened and channelized the river for more effective water transport. Reservoir operations have altered the river's natural hydrograph (i.e., its characteristic rise and fall) including reductions in peak spring flows (Crawford *et al.* 1993). Downstream of Cochiti Dam, the altered sediment and flow regimes have transformed the river from a wide, braided, sand bed system to a narrower and deeper channel with no active floodplain (U.S. Bureau of Reclamation (Reclamation) 1999). Therefore, wetlands and slack water areas are scarce (Crawford *et al.* 1993). The cold, clear-water releases from Cochiti Dam and the entrenched channel, armored with a gravel bed, have created an aquatic system that favors cool-

water fishes and invertebrates, and limits warm-water fisheries below the dam downstream to Albuquerque. Consequently, the existing aquatic resources in the project area differ from those that occurred historically due to human activities (Crawford *et al.* 1993). A list of common and scientific names of fish that may occur in the Middle Rio Grande and adjacent drains is provided in Appendix C.

The loss of native fish species in the Middle Rio Grande illustrates that the hydrologic and morphological changes in the channel have had a major affect on fishery resources. The historical or pre-development ichthyofauna of the Middle Rio Grande in New Mexico is thought to have included at least 16 species (Hatch 1985; Smith and Miller 1986; Propst *et al.* 1987), four of which were endemic to the region. The silvery minnow is the only native pelagic, broadcast spawning minnow surviving in the Middle Rio Grande (Bestgen and Platania 1991). A considerable number of non-native fishes have been introduced into the Middle Rio Grande, either accidentally or as game fish by the New Mexico Department of Game and Fish. Today, the Middle Rio Grande contains at least 27 fish species, of which 12 are native and 15 are introduced or non-native.

On November 20, 2004, the Southwest Ichthyological Research Laboratory at New Mexico State University (NMSU) sampled the Riverside Drain adjacent to the project site. A total of 48 specimens (seven fish species) were collected including Rio Grande silvery minnow, white sucker, rainbow trout, fathead minnow, longnose dace, channel catfish, and yellow bullhead (David E. Cowley, NMSU, unpublished data). The most commonly collected species were white sucker ($n = 24$) and Rio Grande silvery minnow ($n = 6$). The presence of Rio Grande silvery minnow, rainbow trout, and longnose dace suggest seasonally adequate water quality within the drain.

Terrestrial Resources

Vegetation

The Middle Rio Grande corridor winds its way through a mosaic of Plains-Mesa Sand Scrub from Desert Grasslands in the north to Chihuahuan scrub in the south (Dick-Peddie 1993). Vegetative communities within the riparian corridor of the Middle Rio Grande were historically characterized by a cottonwood overstory with a willow and saltgrass-dominated understory. Other riparian species included New Mexico olive, baccharis, false indigo bush, and wolfberry. Wetlands were common, vegetated with cattails, sedges, spikerush, rushes, yerba mansa, and other wetland plants (Scurlock 1998).

The existing vegetation community of the bosque in the project area is a result of the altered flow regime, drainage for agriculture and development, levees, channelization, and the explosive growth of exotic salt cedar, Russian olive, and Siberian elm. Overbank flooding and in-channel scouring rarely occurs, reducing the opportunity for cottonwood regeneration. As a result, rapid colonizers such as salt cedar, Russian olive, and other exotics that thrive in the altered hydrologic

regime have significantly degraded the native riparian plant community (Crawford *et al.* 1993). In addition, salt cedar thickets contribute to the loss of wetlands (a habitat type that is now very limited in the Middle Rio Grande) by stabilizing channels and having high evapotranspiration rates.

Vegetation assemblages within the project area are a mixture of exotic and native plants, with the majority being exotic species. Salt cedar, Russian olive, Siberian elm, and tree-of-heaven occur extensively in the area. Native woody species present in the project area include cottonwood and coyote willow. Vegetation associated with the proposed restoration area contains an overstory of woody riparian exotic/natives and exotic understory shrubs. The dominant overstory assemblage is comprised of native Rio Grande cottonwoods, and exotic Siberian elm and Russian olive.

Mammals

Existing mammal populations are also a result of the existing water operations and land uses in the project area. Hink and Ohmart (1984) performed systematic floral and faunal surveys throughout the Middle Rio Grande. Residential development, agricultural conversion and subsequent irrigation systems, and construction of bridges/roads resulted in the permanent loss of all habitats within developed areas. Development has also caused a disruption of animal movement and dispersal patterns, and has caused continual disturbance to animal communities in the adjacent, fragmented portions of the bosque (Crawford *et al.* 1993). The largest mammal likely to occur in the project area is the coyote. Other mammals such as raccoon, beaver, muskrat, long-tailed weasel, and striped skunk may occur in the general project area. Desert cottontail rabbit, black-tailed jackrabbit, rock squirrel, pocket gopher, deer mouse, western harvest mouse, and American porcupine are also likely to occur. The most common small mammals in the Middle Rio Grande bosque are the white-footed mouse and house mouse (Stuart and Bogan 1996). Eleven species of bats are found along the Rio Grande (Findley *et al.* 1975). Two bat species are restricted to riparian areas, the Yuma myotis and little brown bat.

Birds

Hink and Ohmart (1984) found that riparian areas are used heavily by most bird species in New Mexico. Cottonwood-dominated community types are highly used and are preferred habitat for many species, especially during the nesting season. Marshes, drains, and areas of open water contribute to the bird diversity of the riparian ecosystem because of the strong attraction by water-loving birds. At various times of the year, such as during migration, riparian areas support the highest bird densities and species richness in the Middle Rio Grande region.

The river in and near the proposed project area provides habitat on a seasonal basis for a variety of waterfowl including Canada geese, mallard, gadwall, green-winged teal, American widgeon, northern pintail, northern shoveler, ruddy duck, and common merganser. Raptors that may occur in the project area include the bald eagle, turkey vulture, northern harrier, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, American kestrel, common barn owl, and great-horned owl.

Game species include the mourning dove and scaled quail. A list of common and scientific names of birds that may occur in the Middle Rio Grande floodplain is provided in Appendix D.

Reptiles and Amphibians

Hink and Ohmart (1984) documented 3 turtle species, 17 lizard species, and 18 snake species in the Middle Rio Grande ecosystem. According to Degenhardt *et al.* (1996), up to 57 species of reptiles may occur in the Middle Rio Grande of New Mexico. Reptiles typically found in the habitat types within the project area include the western collared lizard, southern prairie lizard, Great Plains skink, regal ringneck snake, desert striped whipsnake, smooth green snake, and western garter snake. Thirteen amphibian species may be found in the Middle Rio Grande Valley (Degendardt *et al.* 1996). Amphibians associated with riparian areas such as wet meadows and marshes include chorus frogs, leopard frogs, and bullfrogs (Crawford *et al.* 1993). Amphibians common to all the habitat types (wetland, riparian, and upland) include the tiger salamander, Woodhouse's toad, red-spotted toad, and northern leopard frog. The most often captured or perhaps the most abundant amphibians along the Rio Grande are the bullfrog and Woodhouse's toad (Hink and Ohmart 1984). Other species documented along the Rio Grande include Couch's spadefoot toad, New Mexico spadefoot, red-spotted toad, and northern leopard frog (Hink and Ohmart 1984). Applegarth (1983) suggests the northern leopard frog and painted turtle were more abundant when wetlands were more numerous. A list of common and scientific names of reptiles and amphibians that may occur in the Middle Rio Grande floodplain is provided in Appendix E.

Threatened and Endangered Species

As the quality and quantity of the fish and wildlife habitat within the Rio Grande corridor has decreased over time, so has its ability to sustain certain native flora and fauna. Several species endemic to the Middle Rio Grande are extinct, extirpated, or have been federally listed as threatened or endangered under the Endangered Species Act (ESA). This report provides information pertaining to listed species (i.e., Rio Grande silvery minnow, southwestern willow flycatcher, bald eagle) that may be affected by the proposed project.

Rio Grande Silvery Minnow

The silvery minnow is a moderately sized, stout minnow, approximately 3.5 inches in length that spawns in the late spring and early summer, coinciding with high spring flows (Sublette *et al.* 1990). Natural 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. Stream reaches dominated by straight, narrow, incised channels with rapid flows are not typically occupied by silvery minnows (Sublette *et al.* 1990; Bestgen and Platania 1991).

The species was federally listed as endangered in July 1994 (Service 1994, 59 FR: 36988-37001). The Service (1993, 58 FR: 11821-11828) cited the de-watering of portions of the Rio Grande below Cochiti Dam through water regulation activities, the construction of main-stream dams,

the introduction of non-native competitor/predator species, and the degradation of water quality as factors responsible for declines in the silvery minnow population. On February 19, 2003, the Service published a final rule establishing critical habitat for the minnow within the last remaining portion of their historical range in the Middle Rio Grande, from Cochiti Dam to the utility line crossing the Rio Grande, a permanent identified landmark in Socorro County (Service 2003b, 68 FR: 8088-8135). The width of critical habitat along the Rio Grande is defined as those areas bound by existing levees or, in areas without levees, 300 ft of the riparian zone adjacent to the bankfull stage of the river. Most of the proposed project occurs within designated silvery minnow critical habitat (i.e., between the river levees).

Past actions within the project area have eliminated and severely altered habitat conditions for the silvery minnow. Narrowing and channel deepening, restraints to channel migration through jetty jacks, the invasion of non-native vegetation species, and changes in the flow regime have all adversely affected the silvery minnow and its habitat.

Southwestern Willow Flycatcher

The Service listed the southwestern willow flycatcher (flycatcher) as endangered on February 27, 1995 (Service 1995a, 60 FR: 10694-10715). The flycatcher is also classified as endangered by the State of New Mexico (New Mexico Department of Game and Fish 1987). The current range of the flycatcher includes southern California, southern portions of Nevada and Utah, Arizona, New Mexico, western Texas, and southwestern Colorado (Unitt 1987; Browning 1993). In New Mexico, the species has been observed in the Rio Grande, Rio Chama, Zuni, San Juan, San Francisco, and Gila River drainages. Available habitat and overall numbers have declined statewide (Service 1997, 62 FR: 39129-39147). A final recovery plan for the flycatcher has been developed (Service 2003c, 68 FR: 10485).

Loss and modification of nesting habitat is the primary threat to this species (Phillips *et al.* 1964; Unitt 1987; Service 1997, 62 FR: 39129-39147). Loss of migratory stopover habitat also threatens the flycatcher's survival. Large scale losses of southwestern wetlands have occurred, particularly the cottonwood-willow riparian habitats that are used by the flycatcher (Phillips *et al.* 1964; Carothers 1977; Rea 1983; Johnson and Haight 1984; Howe and Knopf 1991). The flycatcher is a riparian obligate and nests in riparian thickets associated with streams and other wetlands where dense growths of willow, buttonbush, boxelder, Russian olive, salt cedar or other plants are present. Nests are often associated with an overstory of scattered cottonwood. Throughout the flycatcher's range, these riparian habitats are now rare, widely separated by vast expanses of arid lands, in small and/or linear patches. Flycatchers begin arriving in New Mexico in late April and May to nest, and the young fledge in early summer. Flycatchers nest in thickets of trees and shrubs approximately 6.5 to 23 ft in height or taller, with a densely vegetated understory from ground or water surface level to 13 ft or more in height. Surface water or saturated soil is usually present beneath or next to occupied thickets (Phillips *et al.* 1964; Muiznieks *et al.* 1994). At some nest sites, surface water may be present early in the nesting season with only damp soil present by late June or early July (Muiznieks *et al.* 1994; Sferra *et al.* 1995). Habitats not selected for nesting or singing are narrower riparian

zones with greater distances between willow patches and individual willow plants. Suitable habitat adjacent to high gradient streams does not appear to be used for nesting. Areas not selected for nesting or singing may still be used during migration.

Potential flycatcher habitat exists along the Rio Grande in the Albuquerque area. This habitat is primarily composed of riparian shrubs and trees, chiefly Goodding's, peachleaf, and coyote willow, Rio Grande cottonwood, and salt cedar; and may be used by migrating flycatchers.

Bald Eagle

The project area is also within the known and historic range of the bald eagle. The Service reclassified the bald eagle from endangered to threatened on July 12, 1995 (Service 1995b, 60 FR: 36000-36010). Adults of this species are easily recognized by their white heads and dark bodies. Wintering bald eagles frequent all major river systems in New Mexico from November through March, including the Rio Grande. Bald eagle prey includes fish, waterfowl, and small mammals. Bald eagles prefer to roost and perch in large trees near water. Suitable perch sites occur within the project area, typically large cottonwoods at the river's edge.

At present and in the foreseeable future, major threats to the eagle are destruction and degradation of its habitat and environmental contamination of its food supply. The main threats to New Mexico's wintering population are impacts to their prey base and availability of roost-sites. Eagles may also occur around ponds outside the riparian zone but cottonwood trees within the riparian zone are used for perches and night roosts. Winter bald eagle surveys were conducted annually for eight years along the Rio Grande between 1988 and 1996 from Albuquerque, upstream to the confluence of the Rio Chama. The mean annual sighting is 64, with the largest number sighted in 1993 (88). The survey data show that wintering bald eagles use the habitat in the vicinity of the project for feeding and perching (Reclamation 1999).

PROJECT DESCRIPTION

Two alternatives were developed for the Minnow Sanctuary. The two alternatives include a no action alternative and an action alternative (Preferred Alternative).

Preferred Alternative

The Minnow Sanctuary would be an artificial rearing and breeding channel designed to provide a diversity of habitats such as side channels, backwaters, and pools for all life stages of silvery minnow. The proposed project would be operated year-round and would help fulfill the naturalized refugia requirements (i.e., one of two breeding and rearing facilities for the captive propagation of silvery minnow) of the Service's March 2003 Biological Opinion. Because project success can vary due to site-specific conditions and other uncertainties, post-project monitoring would be implemented to refine the anticipated production goal of 10,000 to 15,000 fish. Mitigation and adaptive management strategies would also be implemented upon project completion.

The project would include a water intake and enclosed pump station on the Riverside Drain at the north end of the Minnow Sanctuary site, and outlet facilities on the south end of the project site. Although the final project design is not yet complete, the proposed facility would be a maximum

1,500 ft long and 100 ft wide (50 ft average width), with a proposed length of approximately 1,000 ft. Water for the Minnow Sanctuary would be provided from the Riverside Drain. The maximum flow design for the project and associated facilities is 15 cubic feet per second (cfs).

During the irrigation season (March to October) the primary water source for the drain is diversions from the Rio Grande with minor contributions from groundwater and storm runoff. During the non-irrigation season (November to February) source water for the drain is primarily groundwater and occasional stormwater return flow. The average monthly flows in the Riverside Drain range from 9 to 141 cfs (Table 1). Mean flows in the drain are lowest in winter during the non-irrigation season. Because water withdrawals from the drain in winter would not likely require 15 cfs, it is anticipated the drain would maintain a minimum flow of 6 cfs.

Table 1. Monthly flow data (2001-2003) for the Riverside Drain, as measured approximately one mile upstream from Barr Main Canal Heading (modified from Draft EA 2005); values may be minimal because groundwater seepage likely provides additional flow before reaching the diversion.

Flow	Month											
(cfs)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean	29	21	76	115	114	107	128	141	119	112	42	26
High	36	59	168	162	164	146	194	233	166	161	76	38
Low	19	16	15	68	64	73	65	72	33	61	13	9

A new surface water intake structure and pump station would be required to divert water from the drain at the upstream end of the Minnow Sanctuary. The intake would be set into the bank and equipped with a self-cleaning vertical screen that would remove medium- to large-sized debris and fish before entering the intake structure. Water diverted from the drain would be pumped through a pipe to the sanctuary. Water exiting the sanctuary would flow through a 500 ft^2 covered outlet structure with a fish screen. Screening of intake and outlet structures would be incorporated to preclude debris and non-target fish species from entering the sanctuary and preventing silvery minnow from escaping.

All flow would be returned to the Rio Grande (via a 500 ft open channel) or to the drain (via a 150 ft 30 inch diameter pipe). During high flows, when flows in the Rio Grande preclude gravity flow of return water to the river, water would be returned to the drain. To allow for release of fish, larvae, and eggs, flows would be returned to the river. Because no additional water supply is planned, a water recirculation pump would be provided as an emergency back up to re-circulate existing water throughout the facility when necessary. If drain water is not available for extensive periods of time fish held in the facility would be released.

The design of the sanctuary would conform to the existing bosque landform. The sanctuary and internal features including bars, side channels, pools, and backwaters would be constructed with native soil (from excavated materials on site, if suitable) combined with hard materials (i.e., rock,

sand bags, small gabions, large woody debris, etc.) to create defined habitat structures. Fine sand to small gravels would be used as substrate for the sanctuary.

Because the sanctuary would be designed to be as natural as possible, the facility would not be equipped with predator controls. If monitoring reveals that predation is an issue, predator fencing may be installed to exclude predacious reptiles and amphibians from entering the sanctuary. Measures to minimize bird or raccoon predation could also be installed. It is proposed that flows, dissolved oxygen, temperature, and water level be monitored continuously.

Because the sanctuary is a pilot project, the number of fish reared in the facility would be conservative until the performance of the system can be evaluated. Using a range of 51 to 150 silvery minnow per 100 m^2, the initial stocking density would be approximately 11,250 fish (for roughly 7,500 m^2 of habitat) (Draft EA 2005). Production numbers would be adjusted following operational reviews and evaluations.

No Action Alternative

Under the No Action Alternative, no project elements would be implemented. Measures to create a naturalized refugium for silvery minnow and off- or side channel habitat would not be implemented.

EVALUATION METHODOLOGY

Since May 1, 2005, the Service has attended project status meetings with Reclamation and other stakeholders (e.g., MRGCD, the City of Albuquerque, the Corps, and Congressional staff) to discuss project features, design, and construction methods. The Service and Reclamation also conducted joint field trips to the project area. Additional biological data and background information were derived through review of relevant literature and personal communications. Reclamation has provided a majority of the technical and background information. Surveys for the southwestern willow flycatcher were conducted in 2000 (Howell 2000) in the project vicinity, but no flycatchers were detected. Surveys for bald eagles in the project area were conducted by the Corps between 1988 and 1996. A fish survey was conducted in the Riverside Drain adjacent to the project area in November 2004. In addition, silvery minnow surveys have been conducted in the Rio Grande along the Albuquerque reach since the winter of 1999, and in previous years.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

The Minnow Sanctuary and surrounding area has been degraded by water management, flood control, and human use. If the sanctuary is not constructed, an opportunity to create a naturalized refugium and increase silvery minnow production would be missed. The bosque in the project area would remain as is and continue to provide minimal aquatic habitat without the project. The Riverside Drain would continue to provide marginal aquatic and riparian habitat. Short-term impacts to fish and wildlife resources due to construction would not occur.

Threatened and Endangered Species

An opportunity to increase production of silvery minnow would not occur without the project. Aquatic habitat would continue to be minimal for silvery minnow and could ultimately hamper recovery efforts. Projects such as these may help to reverse the trend in loss of silvery minnows.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Temporary, short-term impacts to fish and wildlife may occur from noise, dust, and the presence of workers and machinery during project construction. Runoff from construction work sites, access routes, staging areas, and unprotected fills could degrade water quality in the Rio Grande. Accidental spills of fuels, lubricants, hydraulic fluids and other petrochemicals, although unlikely, would be harmful to aquatic life.

Construction of the rearing channel would permanently remove approximately 1.8 acres (78,000 ft^2) of bosque habitat that is dominated by weedy invasive species. Up to 18 mature cottonwoods and 60 immature cottonwoods would be removed from the project area. Existing cottonwood trees that border the sanctuary site would be maintained to contribute leaf litter and other organic debris associated with overhead canopy habitat.

Implementation of the Minnow Sanctuary project should provide unique aquatic habitat for silvery minnow and help ensure the continued persistence of this federally listed species. Although some seasonal impacts to the adjacent Riverside Drain fishery (via reduced winter flows downstream of the diversion structure) could occur, these should be minimal and off-set by development of the naturalized refugium. The overall quality and quantity of fish and wildlife habitat within the project area is expected to improve.

Threatened and Endangered Species

Analysis of effects to listed species will be addressed in detail in the ESA intraservice section 7 consultation.

DISCUSSION

The Service anticipates some minor short-term impacts to fish and wildlife resources associated with project construction. To ensure that federally listed species are not adversely impacted by the project, ESA section 7 consultation should be completed prior to construction. To minimize adverse impacts to birds protected under the Migratory Bird Treaty Act, tree stands or other adequately vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds during the general migratory bird nesting season of March through August. Disturbance to nesting areas should be avoided until nesting is completed. Vegetation clearing and construction related soil disturbances can cause sediment-laden runoff to enter waterways. To minimize impacts associated with erosion, the contractor should employ silt curtains, coffer

dams, dikes, straw bales, or other suitable erosion control measures. Construction related petrochemical spills can also negatively impact fish and wildlife resources. Therefore, measures should be implemented to minimize the likelihood of petrochemical spills. Spill procedures should be in place prior to construction to minimize impacts associated with unexpected spills. To ensure that the project objectives are met, post-construction monitoring of the project area should be conducted.

The Minnow Sanctuary would benefit fish and wildlife by providing a naturalized refugium and increasing the production of silvery minnow. The Minnow Sanctuary would expand upon restoration efforts associated with other Middle Rio Grande projects. The project would be in addition to ongoing efforts including the Tingley Ponds and Route 66 projects and the upcoming Middle Rio Grande Bosque Restoration Project. The project would also partially fulfill the requirements of the Service's March 2003 Biological Opinion by creating a breeding and rearing facility for the captive propagation of silvery minnow. Therefore, the Service believes the project would provide important short- and potentially long-term aquatic habitat for silvery minnow within the Rio Grande corridor in Albuquerque.

Construction activities that result in unavoidable adverse impacts to fish and wildlife require the development of mitigation plans. These plans consider the value of fish and wildlife habitat affected. The Service has established a mitigation policy used as guidance in determining resource categories and recommending mitigation (Service 1981, 46 FR: 7644-7663). The riparian bosque and associated floodplain habitat within the project area are consistent with "Resource Category No. 2"; that is, habitats of high value that are relatively scarce or becoming scarce on a national basis or in the eco-region.

Although the project area contains a large amount of exotic species; overall, riparian and floodplain habitats are classified in Category 2 because they are scarce. According to Johnson and Jones (1977), about 90 percent of the historic riparian habitat in the Southwest has been eliminated. The Service mitigation policy states that the degree of mitigation should correspond to the value and scarcity of the fish and wildlife habitat at risk. Consequently, no net loss of in-kind habitat value should be the mitigation goal for this resource category. The Service believes that the proposed project not only meets, but exceeds the "no net loss of in-kind habitat" mitigation goal for this resource category. Therefore, no mitigation beyond what has already been identified in the Environmental Commitments section of the DEA (2005) for the project is needed.

RECOMMENDATIONS

The Service offers the following recommendations concerning fish and wildlife resources for the proposed project:

1. As proposed, avoid construction during the migratory bird nesting season of March through August. Where that is not possible, tree stands or other adequately vegetated areas slated for grubbing or clearing should be surveyed for the presence of nesting birds prior to construction. Avoid disturbing nesting areas until nesting is complete.

2. Employ silt curtains, cofferdams, dikes, straw bales or other suitable erosion control measures during project construction.

3. Store and dispense fuels, lubricants, hydraulic fluids, and other petrochemicals outside the 100-year floodplain. Inspect construction equipment daily for petrochemical leaks. Contain and remove any petrochemical spills and dispose of these materials at an approved upland site. Construction equipment should be parked outside the 100-year floodplain during periods of inactivity.

4. Ensure equipment operators carry an oil spill kit or spill blanket at all times and are knowledgeable in the use of spill containment equipment. Develop a spill contingency plan prior to initiation of construction. Immediately notify the proper Federal and State authorities in the event of a spill.

5. Incorporate post-project monitoring and adaptive management strategies to ensure project success.

6. Implement the Environmental Commitments identified in the DEA 2005.

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Appendix A. Common and Scientific Names of Plants That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Baccharis (N)	*Baccharis spp.*
Seepwillow (N)	*Baccharis glutinosa*
Coyote willow (N)	*Salix exigua*
Peachleaf willow (N)	*Salix amygdaloides*
Goodding's willow (N)	*Salix gooddingii*
Buttonbush (N)	*Cephalanthus spp.*
False indigo bush (N)	*Amorpha fruticosa*
New Mexico olive (N)	*Forestiera neomexicana*
Black locust (N)	*Robinia pseudo-acacia*
Boxelder (N)	*Acer negundo*
Chinaberry (I)	*Melia azedarach*
Rio Grande cottonwood (N)	*Populus fremonti*
White mulberry (I)	*Morus alba*
Russian olive (I)	*Elaeagnus angustifolia*
Salt cedar (I)	*Tamarix spp.*
Siberian elm (I)	*Ulmus pumila*
Tree-of-heaven (I)	*Ailanthus altissima*
Apache plume (N)	*Fallugia paradoxa*
Wolfberry (N)	*Lycium andersonii*
Fourwing saltbush (N)	*Atriplex canescens*
Virginia creeper (I)	*Parthenocissus inserta*
Phragmites (N)	*Phragmites communis*
Sago pondweed (N)	*Potamogeton pectinatus*
Sedge (N)	*Carex spp.*
Saltgrass (N)	*Distichlis stricta*
Spikerush(N)	*Eleocharis spp.*
Horsetail (N)	*Equisetum spp.*
Rush (N)	*Juncus spp.*
Bulrush (N)	*Scirpus spp.*
Sacaton (N)	*Sporobolus spp.*
Cattail (N)	*Typha latifolia*
Smartweed (N)	*Polygonum lapathifolium*
American milfoil (N)	*Myriophyllum exalbescens*
Yerba manza (N)	*Anemopsis californica*
Primrose (N)	*Oenothera spp.*
Fendler globemallow (N)	*Sphaeralcea fendleri*
Pricklypear (N)	*Opuntia spp.*
Buffalo gourd (N)	*Cucurbita foetidissima*
Spiny aster (I)	*Aster spinosus*
Golden currant (N)	*Ribes aureum*
Watercress (N)	*Nasturtium officionale*

(N = native, I = introduced or non-native)

Appendix B. Common and Scientific Names of Mammals That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Opossum	*Didelphis virginiana*
Desert shrew	*Notiosorex crawfordi*
Yuma myotis	*Myotis yumanensis*
Little brown bat	*Myotis lucifugus*
Long-legged myotis	*Myotis volans*
Silver-haired bat	*Lasionycteris noctivagans*
Big brown bat	*Eptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Spotted bat	*Euderma maculatum*
Townsend's big-eared bat	*Plecotis townsendii*
Pallid bat	*Antrozous pallidus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Desert cottontail	*Sylvilagus auduboni*
Black-tailed jackrabbit	*Lepus californicus*
Beaver	*Castor canadensis*
Gunnison's prairie dog	*Cynomys gunnisoni*
Colorado chipmunk	*Eutamias quadrivittatus*
Spotted ground squirrel	*Spermophilus spilosoma*
Rock squirrel	*Spermophilus variegatus*
Red squirrel	*Tamiasciurus hudsonicus*
Northern grasshopper mouse	*Onychomys leucogaster*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	*Peromyscus leucopus*
Piñon mouse	*Peromyscus truei*
Western harvest mouse	*Reithrodontomys megalotis*
Hispid cotton rat	*Sigmodon hispidus*
Norway rat	*Rattus norvegicus*
Muskrat	*Ondatra zibethicus*
New Mexican jumping mouse	*Zapus hudsonius luteus*
Ord kangaroo rat	*Dipodomys ordii*
Merriam kangaroo rat	*Dipodomys merriami*
Silky pocket mouse	*Perognathus flavus*
Plains pocket mouse	*Perognathus flavescens*
Yellow-faced pocket gopher	*Pappogeomys castanops*
Botta pocket gopher	*Thomomys bottae*
American porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Gray fox	*Urocyon cinereoargenteus scottii*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis mephitis*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
Badger	*Taxidea taxus*
Bobcat	*Lynx rufus*
Mountain lion	*Felis concolor*
Mule deer	*Odocoileus hemionus*

Appendix C. Common and Scientific Names of Fish That May Occur in the Middle Rio Grande and Associated Drains.

Common Name	Scientific Name
Gizzard shad (N)	*Dorosoma cepedianum*
Rainbow trout (I)	*Oncorhynchus mykiss*
Brown trout (I)	*Salmo trutta*
Northern pike (I)	*Esox lucius*
Red shiner (N)	*Cyprinella lutrensis*
Common carp (I)	*Cyprinus carpio*
Rio Grande chub (N)	*Gila pandora*
Rio Grande silvery minnow (N)	*Hybognathus amarus*
Fathead minnow (N)	*Pimephales promelas*
Flathead chub (N)	*Platygobio gracilis*
Longnose dace (N)	*Rhinichthys cataractae*
River carpsucker (N)	*Carpiodes carpio*
Flathead catfish (N)	*Pylodictis olivaris*
White sucker (I)	*Catostomus commersoni*
Rio Grande sucker (N)	*Catostomus plebeius*
Smallmouth buffalo (N)	*Ictiobus bubalus*
Black bullhead (I)	*Ameiurus melas*
Yellow bullhead (I)	*Ameiurus natalis*
Channel catfish (I)	*Ictalurus punctatus*
Western mosquitofish (N)	*Gambusia affinis*
White bass (I)	*Morone chrysops*
Green sunfish (I)	*Lepomis cyanellus*
Bluegill (N)	*Lepomis macrochirus*
Longear sunfish (I)	*Lepomis megalotis*
Largemouth bass (I)	*Micropterus salmoides*
White crappie (I)	*Pomoxis annularis*
Black crappie (I)	*Pomoxis nigromaculatus*
Yellow perch (I)	*Perca flavescens*

(N = native; I = introduced or non-native; Sublette *et al.* 1990 designations)

Appendix D. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Pied-billed grebe	*Podilymbus podiceps*
Common loon	*Gavia immer*
American white pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
Olivaceous cormorant	*Phalacrocorax olivaceus*
American bittern	*Botaurus lentiginosus*
Least bittern	*Ixobrychus exilis*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Little blue heron	*Egretta caerulea*
Cattle egret	*Bubulcus ibis*
Green-backed heron	*Butorides striatus*
Black-crowned night heron	*Nycticorax nycticorax*
White-faced ibis	*Plegadis chihi*
Snow goose	*Chen caerulescens*
Canada goose	*Branta canadensis*
Wood duck	*Aix sponsa*
Green-winged teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Cinnamon teal	*Anas cyanoptera*
Northern shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
Hooded merganser	*Mergus cuculatus*
Red-breasted merganser	*Mergus serrator*
Ruddy duck	*Oxyura jamaicensis*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Whooping crane	*Grus americana*
Killdeer	*Charadrius vociferus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*
Solitary sandpiper	*Tringa solitaria*
Spotted sandpiper	*Actitis macularia*
Long-billed curlew	*Numenius americanus*
Forster's tern	*Sterna forsteri*
Black tern	*Chlidonias niger*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Black-shouldered kite	*Elanus caeruleus*
Mississippi kite	*Ictinia mississippiensis*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Cooper's hawk	*Accipiter cooperii*
Common black-hawk	*Buteogallus anthracinus*

Appendix D continued. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Swainson's hawk	*Buteo swainsoni*
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
American peregrine falcon	*Falco peregrinus anatum*
Ring-necked pheasant	*Phasianus colchicus*
Northern bobwhite	*Colinus virginianus*
Scaled quail	*Callipepla squamata*
Gambel's quail	*Callipepla gambelii*
Rock dove	*Columba livia*
White-winged dove	*Zenaida asiatica*
Morning dove	*Zenaida macroura*
Common ground-dove	*Columbina passerina*
Yellow-billed cuckoo	*Coccyzus erythropthalmus*
Greater roadrunner	*Geococcyx californianus*
Common barn-owl	*Tyto alba*
Great horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Lesser nighthawk	*Chordeiles acutipennis*
Common nighthawk	*Chordeiles minor*
White-throated swift	*Aeronautes saxatalis*
Black-chinned hummingbird	*Archilochus alexandri*
Rufous hummingbird	*Selasphorus rufus*
Belted kingfisher	*Ceryle alcyon*
Northern flicker	*Colaptes auratus*
Olive-sided flycatcher	*Contopus borealis*
Western wood-pewee	*Contopus sordidulus*
Southwestern willow flycatcher	*Empidonax traillii extimus*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Cassin's kingbird	*Tyrannus vociferans*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Violet-green swallow	*Tachycineta thalassina*
Bank swallow	*Riparian riparia*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Black-billed magpie	*Pica pica*
American crow	*Corvus caurinus*
Chihuahuan raven	*Corvus cryptoleucus*
Black-capped chickadee	*Parus atricapillus*
Verdin	*Auriparus flaviceps*
White-breasted nuthatch	*Sitta carolinensis*
Cactus wren	*Campylorhynchus brunneicapillus*
Black-tailed gnatcatcher	*Polioptila melanura*
Eastern bluebird	*Sialia sialis*
Western bluebird	*Sialia mexicana*

Appendix D continued. Common and Scientific Names of Birds That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Lesser goldfinch	*Carduelis psaltria*
Northern mockingbird	*Mimus polyglottos*
Curved-billed thrasher	*Toxostoma curvirostre*
Crissal thrasher	*Toxostoma dorsale*
European starling	*Sturnus vulgaris*
Bell's vireo	*Vireo bellii*
Warbling vireo	*Vireo gilvus*
Orange-crowned warbler	*Vermivora celata*
Virginia's warbler	*Vermivora virginiae*
Lucy's warbler	*Vermivora luciae*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Yellow-breasted chat	*Icteria virens*
Summer tanager	*Piranga rubra*
Western tanager	*Piranga ludoviciana*
Northern cardinal	*Cardinalis cardinalis*
Pyrrhuloxia	*Cardinalis sinuatus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Indigo bunting	*Passerina cyanea*
Painted bunting	*Passerina ciris*
Spotted towhee	*Pipilo maculatus*
Brown towhee	*Pipilo fuscus*
Dark-eyed junco	*Junco hyemalis*
Rufous-crowned sparrow	*Aimophila ruficeps*
American tree sparrow	*Spizella arborea*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Black-throated sparrow	*Amphispiza bilineata*
Lark bunting	*Calamospiza melanocorys*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Red-wing blackbird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Great-tailed grackle	*Quiscalus mexicanus*
Bronzed cowbird	*Molothrus aeneus*
Brown-headed cowbird	*Molothrus ater*
Orchard oriole	*Icterus spurius*
Northern oriole	*Icterus galbula bullockii*
House finch	*Carpodacus mexicanus*

Appendix E. Common and Scientific Names of Reptiles and Amphibians That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Tiger salamander	*Ambystoma tigrinum*
Couch's spadefoot	*Scaphiopus couchii*
Plains spadefoot	*Spea bombifrons*
New Mexico spadefoot	*Spea multiplicata*
Great Plains toad	*Bufo cognatus*
Green toad	*Bufo dibilis*
Red-spotted toad	*Bufo punctatus*
Woodhouse's toad	*Bufo woodhousii*
Canyon treefrog	*Hyla arenicolor*
Western chorus frog	*Pseudacris triseriata*
Plains leopard frog	*Rana blairi*
Bullfrog (introduced)	*Rana catesbeiana*
Northern leopard frog	*Rana pipiens*
Yellow mud turtle	*Kinosternon flavescens*
Snapping turtle	*Chelydra serpentina*
Painted turtle	*Chrysemys picta*
Ornate box turtle	*Terrapene ornata*
Big Bend slider	*Trachemys gaigeae*
Red-eared slider (introduced)	*Trachemys scripta*
Spiny softshell	*Trionyx spiniferus*
Collared lizard	*Crotaphytus collaris*
Leopard lizard	*Gambelia wislizenii*
Greater earless lizard	*Cophosaurus texanus*
Lesser earless lizard	*Holbrookia maculata*
Texas horned lizard	*Phrynosoma cornutum*
Roundtail horned lizard	*Phrynosoma modestum*
Desert spiny lizard	*Sceloporus magister*
Crevice spiny lizard	*Sceloporus poinsettii*
Eastern fence lizard	*Sceloporus undulatus*
Tree lizard	*Urosaurus ornatus*
Side-blotched lizard	*Uta stansburiana*
Chihuahuan whiptail	*Cnemidophorus exsanguis*
Checkered whiptail	*Cnemidophorus grahamii*
Little striped whiptail	*Cnemidophorus inornatus*
New Mexico whiptail	*Cnemidophorus neomexicanus*
Western whiptail	*Cnemidophorus tigris*
Desert grassland whiptail	*Cnemidophorus uniparens*
Plateau striped whiptail	*Cnemidophorus velox*
Many-lined skink	*Eumeces multivirgatus*
Great Plains skink	*Eumeces obsoletus*
Texas blind snake	*Leptotypholps dulcis*
Western blind snake	*Leptotypholps humilis*
Glossy snake	*Arizona elegans*
Trans-pecos rat snake	*Bogertophis subocularis*
Racer	*Coluber constrictor*
Ringneck snake	*Diadophis punctatus*
Great Plains rat snake	*Elaphe guttata*

Appendix E continued. Common and Scientific Names of Reptiles and Amphibians That May Occur in the Middle Rio Grande Floodplain.

Common Name	Scientific Name
Western hooknose snake	*Gyalopion canum*
Western hognose snake	*Heterodon nasicus*
Night snake	*Hypsiglena torquata*
Common kingsnake	*Lampropeltis getula*
Milk snake	*Lampropeltis triangulum*
Coachwhip	*Masticophis flagellum*
Striped whipsnake	*Masticophis taeniatus*
Bullsnake or gopher snake	*Pituophis melanoleucus*
Longnose snake	*Rhinocheilus lecontei*
Big Bend patchnose snake	*Salvadora deserticola*
Mountain patchnose snake	*Salvadora grahamiae*
Ground snake	*Sonora semiannulata*
Plains blackhead snake	*Tantilla nigriceps*
Blackneck garter snake	*Thamnophis cyrtopsis*
Wandering garter snake	*Thamnophis elegans*
Checkered garter snake	*Thamnophis marcianus*
Common garter snake	*Thamnophis sirtalis*
Lyre snake	*Trimorphodon biscutatus*
Western diamondback rattlesnake	*Crotalus atrox*
Blacktail rattlesnake	*Crotalus molossus*
Western rattlesnake	*Crotalus viridis*
Massasauga	*Sistrurus catenatus*

Appendix B. Complete List of Sensitive Species in Bernalillo Co.

Note: Animals and plants that could occur in the project area are shown in boldface.

Common Name	Scientific Name	Federal	State	General Habitat
Fish				
Rio Grande Chub	*Gila pandora*		S	Aquatic; plains-mesa grassland, Rocky Mountain upper and lower montane coniferous forest
Rio Grande Silvery Minnow	***Hybognathus amarus***	**E[1]**	**E**	**Silt and sand substrates in slow backwaters; Chihuahuan desert scrub, plains-mesa grassland**
Birds				
Neotropic Cormorant	***Phalacrocorax brasilianus***		**T**	**Rivers, lakes and reservoirs with adjacent wooded sites; desert grassland, Rocky Mountain upper and lower montane coniferous forest**
White-faced Ibis	*Plegadis chihi*	S		
Bald Eagle	***Haliaeetus leucocephalus***	**T**	**T**	**Winters along shores of rivers and lakes; Chihuahuan desert scrub, Rocky Mountain upper and lower montane coniferous forest**
Northern Goshawk	*Accipiter gentilis*	S	S	Rocky Mountain upper and lower montane coniferous forest, Dense coniferous and mixed woodlands
Common Black-Hawk	***Buteogallus anthracinus anthracinus***		**T**	**Woodlands along lowland streams**
American Peregrine Falcon	***Falco peregrinus anatum***	**S**	**T**	**Chihuahuan desert scrub, Rocky Mountain upper and lower montane coniferous forest; Montane species, prefers to perch in open areas often near water**
Whooping Crane	*Grus americana*	E[2]	E	Marshes and prairie potholes
Mountain Plover	*Charadrius montanus*	PT	S	Semiarid grasslands and prairies
Black Tern	*Chlidonias niger surinamensis*	S		scrub shrub, desert grassland, Rocky Mountain upper and lower montane coniferous forest; wet, dense marshlands
Yellow-billed Cuckoo	***Coccyzus americanus occidentalis***	**C**	**S**	**FC, desert grassland, Rocky Mountain upper and lower montane coniferous forest; dense riparian shrub**
Burrowing Owl	*Athene cunicularia hypugaea*	S		Chihuahuan desert scrub, plains-mesa grassland; semiarid grasslands and prairies
Mexican Spotted Owl	*Strix occidentalis lucida*	T[1]	S	Rocky Mountain upper and lower montane coniferous forest, subalpine coniferous forest; mature mixed conifer and pine oak forest
Black Swift	*Cypseloides niger borealis*		S	
White-eared Hummingbird	*Hylocharis leucotis borealis*		T	piñon juniper woodland, Rocky Mountain upper and lower montane coniferous forest; montane riparian areas
Southwestern Willow	***Empidonax traillii***	**E[1]**	**E**	**Chihuahuan desert scrub, Rocky**

Common Name	Scientific Name	Federal	State	General Habitat
Flycatcher	***extimus***			**Mountain upper and lower montane coniferous forest; dense riparian groves of willow or saltcedar**
Buff-breasted Flycatcher	*Empidonax fulvifrons pygmaeus*	S		Open canyon growth and pine-oak forests
Loggerhead Shrike	***Lanius ludovicianus***		**S**	**Chihuahuan desert scrub, plains-mesa grassland; riparian areas and woodlands of pinion-juniper**
Bell's Vireo	***Vireo bellii***		**T**	**Chihuahuan desert scrub, piñon juniper woodland; riparian**
Gray Vireo	*Vireo vicinior*		T	piñon juniper woodland, open woodlands with well developed grasses
Baird's Sparrow	*Ammodramus bairdii*	S	T	desert grassland, plains-mesa grassland; winters in prairies
Mammals				
Western Small-footed Myotis Bat	*Myotis ciliolabrum melanorhinus*		S	scrub shrub, piñon juniper woodland
Yuma Myotis Bat	***Myotis yumanensis yumanensis***		**S**	**scrub shrub, desert grassland, Rocky Mountain upper and lower montane coniferous forest; riparian and aquatic habitats for feeding**
Occult Little Brown Myotis Bat	***Myotis lucifugus occultus***		**S**	**Chihuahuan desert scrub, subalpine coniferous forest; riparian and aquatic habitats for feeding**
Long-legged Myotis Bat	*Myotis volans interior*		S	Rocky Mountain upper and lower montane coniferous forest; aquatic habitats for feeding
Fringed Myotis Bat	*Myotis thysanodes thysanodes*		S	scrub shrub, desert grassland, Rocky Mountain upper and lower montane coniferous forest; rocky outcroppings
Spotted Bat	*Euderma maculatum*		T	piñon juniper woodland, Rocky Mountain upper and lower montane coniferous forest; rocky outcrops, mature forests and caves
Pale Townsend's Big-eared Bat	*Plecotus townsendii pallescens*	S	S	Caves and rocky outcrops
Big Free-tailed Bat	*Nyctinomops macrotis*		S	piñon juniper woodland, Rocky Mountain upper and lower montane coniferous forest; rocky outcrops
Gunnison's Prairie Dog	*Cynomys gunnisoni*		S	desert grassland, plains-mesa grassland, SMG
Botta's Pocket Gopher	*Thomomys bottae connectens*		S	plains-mesa grassland, piñon juniper woodland
New Mexican Jumping Mouse	***Zapus hudsonius luteus***	**S**	**T**	**Chihuahuan desert scrub, subalpine coniferous forest; riparian; forb-grassland communities in Jemez Mountains**
Red Fox	***Vulpes vulpes***		**S**	**piñon juniper woodland, alpine tundra**
Ringtail	*Bassariscus astutus*		S	piñon juniper woodland, subalpine coniferous forest; rocky outcrops and riparian areas
Western Spotted Skunk	***Spilogale gracilis***		**S**	**Mixed woodlands and open areas, scrub, and farmland**
Mollusks				

Common Name	Scientific Name	Federal	State	General Habitat
Socorro Mountainsnail	*Oreohelix neomexicana*		S	inhabits igneous-rock talus and limestone in variety of habitats
Insects and Invertebrates				
Pearly Checkerspot Butterfly	*Charidryas acastus acastus*	S		Riparian canyons, meadows
Slate Millipede	*Comanchelus chihuanus*	S	S	burrow into soils and live near boulders in variety of habitats
Plants				
Plank's catchfly	*Silene plankii*	–	S	Rock outcrops
Santa Fe milkvetch	*Astragalus feensis*	–	S	Sandy benches, gravelly hillsides, granitic and metamorphic rocks in juniper savanna or on barren areas
La Jolla prairie clover	*Dalea scariosa*	–	S	Sandy clay banks and bluffs, often found along recently disturbed road right-of-ways
Sapello Canyon larkspur	*Delphinium sapellonis*	–	S	Montane areas in the Sandia Mountains
Sandia Mountain alumroot	*Heuchera pulchella*	–	S	Rock outcrops in montane areas

E = Endangered, T = Threatened, P = Proposed, C = Candidate; S = Sensitive or Species of Concern
[1] Federal critical habitat has been designated or proposed for this species
[2]Non-essential experimental population
Sources: Information received via email from L. Pierce, BISON-M Coordinator, NMDGF, 4/15/05; NMDGF 2004a; Plant data: New Mexico Rare Plant Technical Council (2005) http://nmrareplants.unm.edu/nmrptc/county.htm#Section1

Appendix C. Comments

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Albuquerque, NM 87102
Telephone 505-248-0118
Fax 505-248-0187

August 18, 2005

Mr. Charles Fisher
Bureau of Reclamation
Albuquerque Area Office
555 Broadway NE, Suite 100
Albuquerque, NM 87102

Via Facsimile (505-462-3780) and Mail

Dear Mr. Fisher:

Thank you for the opportunity to provide comments on the content and scope of the Draft Environmental Assessment (EA) for the Rio Grande Silvery Minnow Sanctuary. These comments are submitted on behalf of Defenders of Wildlife (Defenders). Defenders is a national non-profit, public-interest organization with over 450,000 members and supporters, including over four thousand of whom reside in New Mexico. Defenders works to preserve the integrity and diversity of natural ecosystems, prevent the decline of native species, and restore threatened habitats and wildlife populations. Furthermore, Defenders has a long-standing interest in the survival and recovery of the Rio Grande silvery minnow (silvery minnow) and the restoration of the Rio Grande. Defenders would like to provide a few comments and questions with regard to the preferred alternative for the sanctuary.

The Bureau of Reclamation (Reclamation) proposes to build a sanctuary in the Albuquerque Reach of the Rio Grande. Please define, for ease of reading, the reaches as used in the Biological Opinion RPA elements (Angostura, Cochiti, etc.) and those used in the Draft EA (Albuquerque).

The purpose of and need for the action is, for the most part, satisfaction of some requirements of the 2003 Biological Opinion for Reclamation's Water and River Maintenance Operations. Specifically, the Draft EA cites RPA elements AA – two naturalized refugium breeding and rearing facilities – and element S – 1,600 acres of restored habitat. Draft EA at 2. Please clarify in the Final EA whether this is the first or second refugium required by the Biological Opinion. Defenders is concerned that this is the first refugium, which was to be completed by May 31, 2005, almost three months ago, and that Reclamation has not timely implemented the RPA elements.

Relatedly, the No Action Alternative (Draft EA at 10) paints an unrealistically grim picture. It is not clear, as stated in the Draft EA, that RPA elements AA and S would not be fulfilled without implementation of the proposed action. There is a great deal of habitat restoration occurring in the Middle Rio Grande, by the Bureau of Reclamation and others. Also, as stated above, it would appear that RPA element AA is already unfulfilled.

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Lastly, there is inadequate description of the preferred alternative. CEQ regulations call on Reclamation to "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated" and "[d]evote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits." 50 C.F.R. § 1502.14. The Draft EA fails to examine the effects of the environment on the refugium, and hence, whether this alternative is appropriate as compared to others. For example, there is no discussion on whether existing water quality in the Riverside Drain will impact silvery minnows and is suitable for use in the refugium.

The Draft EA also fails to describe adequately the use of the refugium. The Draft EA states that the initial emphasis will be on "growing out and acclimating larvae and juvenile fish." Draft EA at 10. These activities would include release of fish to the refugium, release from the refugium to the river, and marking and taking data from fish in the refugium. *Id.* What is unknown, and should be clarified in the Final EA, is who will be performing these activities. What kind of Endangered Species Act (other) compliance will be needed for these activities, and by whom?

Thank you again for this opportunity to comment. Please contact me if you have any questions, and please place me on your mailing list for a Final EA and any other information associated with this project.

Sincerely,

Kara Gillon
Staff Attorney

Domestic Return Receipt Article
Number 7005 1820 0000 0608 9662

Robert G. Perry-Pepper

August 11, 2005
135 Rincon Valverde
Pojoaque, NM 87044

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Mr. Charles Fischer
Bureau of Reclamation
Albuquerque Area Office
555 Broadway NE
Suite 100
Albuquerque, NM 87102

Dear Charles,

The Fish and Wildlife Coordination Act of 1980 (16 USC 2901 et. seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. Maintenance operations on the river that result in loss of Rio Grande Silvery Minnow habitat do not satisfy the aforementioned.

The essence of the Rio Grande Silvery Minnow Sanctuary is to bypass the Endangered Species Act of 1973; Carson National Forest

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Plan (USDA-FS-1986, Sustainable Forests Section, Page 2): "maintain genetic and ecological diversity", of which we know the Rio Grande plays a part, as well as a vision statement in same (USDA-FS-1986, Wildlife and Fish Section, Page 1) that emphasizes biological diversity; and the Santa Fe National Forest Plan (USDA-FS-1987, Page 20): "riparian areas will be enhanced through direct improvement projects", of which we know the Rio Grande plays a part.

In providing 10 cfs of water to the Sanctuary, with all the screening and conveyance facilitie designed to accommodate 15 cfs, and the source of this water being diversions from the Rio Grande (Jemez River), the Jeme Watershed's perennial upstream riparian wildlife, plant and human populations would be jeopardized If the Middle Rio Grande Council of Governments refuses to validate Rio Jemez and Rio Puerco subregio

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riparian usage amount as being 25,000 acre feet and if another long-noted discrepancy in the Middle Rio Grande Council of Governments' land use map showing irrigated agriculture in the Rio Jemez and Rio Puerco subregions to be six times less than they actually are remains unrevised then the delicate balance that the Jemez ajudication; United States, et. al, v. Abousleman, et. al, Jemez River Ajudication, United State District Court CIV, No. 83-[04] JC, struck could be compromised by depletions Albuquerque Riverside Drain and the Sanctuary would create in, as John Kelly says, "getting the trunk" to build tributaries to in the next 10 years. I, as a full-time resident of the Rio Jemez Watershed, do not wish for my quality of life to be threatened in order to provide a projected 45,000 acre feet per year, of surface water to

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the Rio Grande Drain.

This Sanctuary Project, if approved, would create a new population of silvery minnows that would be classified as "nonessential experimental", no longer endangered nor protected. If the U.S. Fish and Wildlife Service decided, or decides, this week to raise the number of endangered minnows that can be found dead this year in the Rio Grande and if the minnow population is not big enough to withstand additional take, anoth major tool in protecting the model of the Rio Grande Silvery Minnow of New Mexico recovering in its Rio Grande habitat in New Mexico (ensuring New Mexico's Rio Grande is protected, as well as New Mexico's Rio Grande Silvery Minnow) will be removed. Since U.S. District Judge James A. Parker did not allow the Middle Rio Grande Conservancy District relief from

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Endangered Species Act obligations and favored claims by Native Americans and land grant heirs as being valid in the water war that's unfolding, I am disappointed that this Sanctuary continues to have credence.

I feel that, in time, all the Rio Grande Silvery Minnows in this Sanctuary will be bagged and airlifted from what was once their significant historic Middle Rio Grande range to a new home in Big Bend National Park and the Rio Grande Wild and Scenic River in Texas, under a plan proposed by U.S. Fish and Wildlife Service. It no longer shocks me to contemplate this image. After 12 years of living in the Middle Rio Grande Valley (after 15 years, prior, of living in Louisiana) and witnessing the annual precipitation in the Middle Rio Grande Valley, year after year, after reading in the Journal last month about how officials estimate that

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it will cost more than $110 million to address all the flooding problems in the South Valley of Albuquerque (as well as wondering what special rainy place 500 residents north of Rio Bravo have been living for the past 12 years) and then trying to fathom how the South Valley has had severe flooding problems for decades (which decades?)....

Well, again, the tactic of flying all the Rio Grande Silvery Minnow left in New Mexico to the Texas Big Bend goes along with the entire distasteful effort to privatize every aspect of water use, to disenfranchise everyone who uses water freely in the Middle Rio Grande Valley.

In short, do not build another component of the Rio Grande Drain by purporting it to be the Rio Grande Silvery Minnow Sanctuary. Instead, use that taxpayer money to revitalize New Mexico's Rio Grande and restore its Silvery Minnow.

Helena G. Perry-Piper