

## **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.

<b>Environmental Resources</b>	<b>Proposed Action</b>	<b>No Action</b>
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.