


RECORD OF DECISION
CITY OF ALBUQUERQUE DRINKING WATER PROJECT
Final Environmental Impact Statement
June 2004

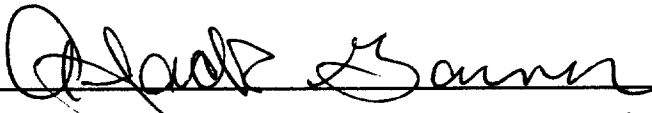
Approved



Regional Director, Bureau of Reclamation

6-1-04
Date

Recommended by



Albuquerque Area Manager, Bureau of Reclamation

5/27/04
Date

I. Introduction

This document constitutes the Record of Decision of the Department of the Interior, Bureau of Reclamation (Reclamation), Upper Colorado Region, regarding the preferred alternative for the City of Albuquerque's Drinking Water Project (Project or Drinking Water Project) in Albuquerque, New Mexico. The Project is the subject of the Final Environmental Impact Statement (FEIS) for the City of Albuquerque Drinking Water Project dated March 5, 2004, developed in compliance with the National Environmental Policy Act.

The FEIS was prepared by Reclamation and the City of Albuquerque to analyze the impacts of developing a safe and sustainable water supply through utilization of the City's imported renewable surface water supply and conjunctive management of surface and groundwater resources. Absent the Project, the City's continued sole reliance on groundwater as a source of drinking water supply would have significant environmental consequences and fail to provide a sustainable, adequate water supply for its citizens.

II. Recommended Decision

The recommendation is to proceed with the preferred alternative as identified in the FEIS. The preferred alternative was identified as the environmentally preferred alternative. This alternative is the construction and operation of a low-head diversion dam on the Rio Grande, and associated treatment and distribution infrastructure, to allow the City to fully consume its San Juan-Chama water. The preferred alternative provides the greatest flexibility for diverting water from the Rio Grande, fully satisfies the Project purpose and need, and avoids any major impacts to the environment. The mitigation measures attendant to the preferred alternative fully address environmental impacts and are protective of endangered species. The no action and other two action alternatives each have the potential for significant impacts on environmental or other resources.

III. Alternatives Considered

Alternatives were developed after years of public review and involvement. The FEIS analyzed three action alternatives and the No Action Alternative. The four alternatives analyzed in the FEIS are:

1. No Action. The continued reliance on groundwater resources to meet current and projected potable water demand and continuation of conservation measures. This alternative does not fulfill the purpose and need.
2. Paseo del Norte Diversion (Environmentally Preferred Alternative). The diversion and full consumptive use of the City's San Juan-Chama water at a new surface diversion dam to be constructed on the Rio Grande north of Paseo del Norte in Albuquerque with conveyance of raw water to a new water treatment plant through a new pipeline, and distribution of treated, potable water to consumers in Albuquerque. This alternative includes fish passage and curtails diversions to protect aquatic life.

3. Angostura Diversion. The diversion and full consumptive use of the City's San Juan-Chama water through the existing Angostura Diversion Dam (a Middle Rio Grande Project facility) on the Rio Grande, with conveyance of raw water to a new water treatment plant through two existing Middle Rio Grande Project conveyance facilities, and distribution of treated, potable water to consumers in Albuquerque. This alternative would impact streamflow through the Pueblos of Sandia and Santa Ana as well as cultural and other resources.

4. Subsurface Diversion. The diversion and full consumptive use of the City's San Juan-Chama water through new subsurface collectors to be constructed in the Rio Grande near Paseo del Norte, with conveyance of raw water to a new water treatment plant through a new pipeline, and distribution of treated, potable water to consumers in Albuquerque. This alternative may be less technologically reliable and could alter more than 500 acres of riparian forest (bosque).

IV. Basis of Decision and Issues Evaluated

Synopses of the significant issues analyzed in detail in the FEIS are presented below:

Aesthetics and Visual Resources

The Paseo del Norte Diversion would be visible from roads and some places in the bosque. The Subsurface Diversion would not be visible once constructed. For both alternatives, pump stations located within the bosque would be visible.

Cultural Resources

Construction and operation of the Paseo del Norte Diversion would not affect traditional cultural properties or other historic properties. In contrast, the Angostura Diversion Alternative would potentially affect historic properties.

Geology

None of the facilities would be constructed in areas affected by shallow groundwater constraints or subject to subsidence. The reduction of groundwater pumping once the Drinking Water Project is operational would reduce the possibility of land subsidence in Albuquerque. The No Action Alternative would likely result in land subsidence.

Hydrology (Surface Water and Groundwater)

Under the Paseo del Norte Diversion and Subsurface Diversion Alternatives, flows in the Rio Grande would increase based on the City's voluntary cooperation regarding timing of releases from Heron Reservoir to Abiquiu Reservoir and to the point of diversion near Paseo del Norte. Increased instream flows in this river segment at the San Felipe gage would be approximately 61 cubic feet per second (cfs) relative to the No Action Alternative which provides no increase in flows, and which would over time result in a decrease in surface flows from groundwater pumping. From the Paseo del Norte and Subsurface Diversion Alternative's diversion point to the City's Southside Water Reclamation Plant outfall, modeled results indicate there would be a net depletion of 11 cfs to 33 cfs of Rio Grande flows as compared to No Action. The affected reach would be approximately 15 miles long. The affected reach under the Angostura Diversion Alternative would be 33 miles. A comparison of severe dry year flows in the Rio Grande below the diversion points shows an increase in flows during City curtailment periods of 5 to 15 cfs as

compared to the No Action Alternative. This is a result of operating criteria for cessation of diversions during low flows.

The amount of surface water to be diverted during the Project operations would be approximately 94,000 acre-feet per year (47,000 acre-feet per year of City San Juan-Chama water and 47,000 acre-feet per year of Rio Grande native water). The average annual reduction in Rio Grande flows within the Middle Project Subarea, as measured at the Albuquerque gage, would be 7 percent under all three action alternatives. There would be a range of change of flow from -14 cfs to +21 cfs, attributable to the action in the Rio Grande south of the City's Southside Water Reclamation Plant outfall at the I-25 bridge.

If the Drinking Water Project is implemented, the maximum aquifer drawdown (from pre-development conditions) in the groundwater critical-management area would be approximately 100-150 feet below ground surface by 2060, while under the No Action Alternative, the aquifer drawdown would exceed 250 feet from pre-development conditions. The supply of groundwater would be improved over time by the reduction in aquifer pumping allowed by the use of the City's San Juan-Chama water. This increase in groundwater supply would be a positive effect of the action. No contamination of existing wells would occur from implementing the action alternatives. Groundwater drawdown in the bosque in the vicinity of the subsurface collectors, under the Subsurface Diversion Alternative, would be 3 to 3.5 feet relative to current conditions.

Indian Trust Assets and Other Tribal Resources

No adverse effects to Indian Trust Assets were identified, although other tribal resources could be affected. Above Paseo del Norte, Rio Grande flows would increase by approximately 61 cfs relative to the No Action Alternative if the Paseo del Norte location is selected. Regardless of diversion location, the Drinking Water Project would result in small flow decreases and small flow increases between the Southside Water Reclamation Plant and the Pueblo of Isleta. These flow changes would occur between 2006 and 2060. None of the flow changes would be adverse and there would be no substantial change in water surface elevation or water quality. The Angostura Alternative would deplete flows through Santa Ana and Sandia Pueblos and would involve substantial construction on pueblo land.

Riparian Areas

Under the action alternatives, there would be disturbance of the riparian areas along the Rio Grande from construction and operation activities. The amounts of riparian vegetation to be temporarily affected during construction of diversion facilities would be 14.7 acres under the Paseo del Norte Diversion. Another 2.4 acres of riparian area would be temporarily affected by water pipeline construction under this alternative. The amounts of riparian area that would be removed due to the construction of new facilities would be 6.6 acres under the Paseo del Norte Diversion Alternative. According to the Biological Opinion issued by the U.S. Fish and Wildlife Service (Service), the City will minimize the impact of construction and operation activities by creating an overbank project of 10 acres for restoration of riparian vegetation. The Subsurface Diversion has the potential to impact approximately 500 acres within the bosque during operation.

Socioeconomics

Quality of life was a factor in evaluating alternatives and assessing socioeconomics. There would be increases in water rates, staged over a period of years, to pay for the construction and operations of the Drinking Water Project. The rate increases have been approved by the City Council and are borne by all commercial and private customers of the City. The rate increases are the same for the three Project alternatives. The No Action Alternative could have significant socioeconomic effects if the City continued its reliance on an unsustainable water strategy which could have water quality and land subsidence costs.

Threatened and Endangered Species

Three federally listed endangered or threatened species exist in the Project area: the bald eagle, the Southwestern willow flycatcher, and the Rio Grande silvery minnow. Pursuant to Section 7 consultation, the Service has determined in a Biological Opinion that the Project may affect but will not adversely affect either the bald eagle or the Southwestern willow flycatcher. With regard to the Rio Grande silvery minnow, the Service concluded that the Project is not likely to jeopardize the continued existence of the silvery minnow and will not adversely modify its critical habitat.

The threatened bald eagle has been known to roost near Alameda Boulevard in Albuquerque and uses the river corridor for feeding and roosting. However, as documented in the Biological Opinion for the Project, the Service has concluded that the operation of the City's Project will not directly affect the bald eagle. Mitigation measures for Project construction would eliminate any potential effect.

The endangered Southwestern willow flycatcher uses riparian habitat along the Rio Grande for nesting and rearing their young. However, the Southwestern willow flycatcher has not been known to occupy the middle subarea of the Project region of influence, and Project construction will not occur in the Rio Grande or bosque during flycatcher nesting or breeding seasons

Effects on the Rio Grande silvery minnow could consist of modification and fragmentation of habitat, loss of individuals, disruption of flow requirements, and possible disruption of spawning and fish movement within the Rio Grande. There would be effects of a temporary nature on the minnow population during in-river construction for all action alternatives. Fish screens and fishways would be constructed under the Paseo del Norte Diversion to minimize effects on fish in the river. River drying in the Albuquerque reach could be lessened under all action alternatives. Numerous conservation measures will be implemented, including revegetation and creation of minnow habitat. Approximately 7.6 acres of designated critical habitat for the minnow will be permanently altered by construction of the Paseo del Norte Diversion. As documented in the Biological Opinion, the Project will not cause jeopardy to the Rio Grande silvery minnow or adversely modify critical habitat.

Water Quality

After treatment at the water treatment plant, water distributed to City customers would meet all current and anticipated drinking water standards. All federal or state water quality criteria would be met as a result of Project construction or operations. Treated wastewater will continue to be discharged to the Rio Grande at the Southside Water Reclamation Plant for both the Action and No Action Alternatives. The Southside Water Reclamation Plant would continue to meet all

applicable discharge standards. The Drinking Water Project would provide water to the distribution system that is low in arsenic. The Rio Grande typically has arsenic concentrations ranging from 2 micrograms per liter ($\mu\text{g/L}$) to 3 $\mu\text{g/L}$. The Drinking Water Project water treatment process will utilize ferric chloride as a coagulant, and thus consistently remove any arsenic from the Rio Grande to less than 2 $\mu\text{g/L}$. The Drinking Water Project would significantly reduce the arsenic levels in Albuquerque's drinking water and would allow the high arsenic wells to be shut off.

V. Implementing the Decision, Environmental Commitments, and Monitoring

Project planning, as described in the FEIS, included all practicable means of avoiding adverse environmental impacts. Where this was not possible, the City has committed to the following environmental mitigation programs, where appropriate and necessary, to ensure the protection of environmental resources and to establish the appropriate level of mitigation for impacts resulting from the Paseo del Norte Alternative. Mitigation activities will be coordinated and administered by the City of Albuquerque. The City will participate in an interagency group that includes the Bureau of Reclamation, U.S. Fish and Wildlife Service, New Mexico Office of the State Engineer, New Mexico Department of Fish and Game, and New Mexico Interstate Stream Commission to monitor and manage the effectiveness of the environmental commitments. Specific mitigation and monitoring proposals are described in detail in the FEIS.

The City intends to mitigate Project impacts to the fullest extent practicable. Where possible, the City has made commitments to specific mitigation measures, such as those required to avoid impacts to the Rio Grande silvery minnow. In some instances, the City has identified proposed rather than final mitigation measures because permitting agencies will consider and require measures they conclude are appropriate as part of the permitting process. The potential mitigation measures detailed in the FEIS represent the types of requirements that may be imposed by permitting agencies and that the City may implement on its own initiative as good construction and environmental management practices.

Mitigation Measures

Aesthetics and Visual Resources

- Appropriate landscaping and interposed wall structures, consistent with site maintenance, access, and security, would minimize visual effects and prevent vandalism and graffiti. The City Public Works Department would coordinate the onsite requirements for construction of Project facilities with local and adjacent neighborhood associations.
- Appropriate wall structure patterns and colors would be used to minimize visual intrusion. The Public Works Department would coordinate the onsite requirements for construction of Project facilities with local and adjacent neighborhood associations.
- Appropriate site access limitations and maintenance activities would be implemented to provide security and prevent vandalism and graffiti and to ensure continued visual minimization.

Air Quality

- Limit the amount of trench that would be open at any time.
- Each construction contractor would be responsible for assuring that construction equipment (especially diesel equipment) meets City opacity standards for operating emissions.
- The Environmental Protection Agency estimates that the effects of fugitive dust from construction activities would be reduced significantly with an effective watering program. This will be implemented pursuant to City dust control ordinances.
- Conform to the best management practices to minimize particulate and dust emissions from construction work sites that are specified in the City excavation, grading, and surface disturbance permits that would be obtained for this Project.
- Each construction contractor would acquire excavation, grading, and surface disturbance permits that specify best management practices to minimize particulate and dust emissions from construction work sites.
- Each construction contractor would adhere to any other requirements placed on the activity, and be subject to inspection by the City to enforce the requirements of the permits and the requirements of 20 New Mexico Administrative Code 11.20 (New Mexico, 1997).

Aquatic Life

- Fishway: The fishway for the Paseo del Norte Diversion would be designed to enhance aquatic habitat by providing a route around the new surface dam at Paseo del Norte.
- Fish screens: The sluice channel for Paseo del Norte Diversion would be equipped with fish screens.
- Operational criteria: Water diversions would be completely curtailed, as defined by the Operation Criteria defined in Section 2 of the FEIS, at a flow of 130 cfs below the Paseo del Norte Diversion.
- During construction in the river, any fish stranded by construction of the facility would be salvaged and relocated to a different portion of the river. By agreement, Service staff would be available to relocate fish if they inadvertently become separated from the main river channel by construction activities.

Cultural Resources

- Any portions of the Middle Rio Grande Project irrigation system that would be affected by construction would be carefully documented prior to construction and restored to their pre-construction condition following construction.
- A cultural resources discovery plan was prepared as part of the cultural resources inventory report. The plan has been approved by Reclamation and will be submitted to the State Historic Preservation Office (SHPO) for their approval prior to the beginning of construction. The plan outlines procedures for protecting newly discovered cultural resources, evaluating their importance, and avoiding or mitigating the Project's adverse effects. The plan also details procedures for complying with the Native American Graves Protection and Repatriation Act or New Mexico state burial laws in the event human remains are discovered. The plan includes the following three provisions:

1. A pre-construction meeting;
 2. The availability of archaeological assistance during construction; and
 3. Evaluation of discoveries for National Register of Historic Places (NRHP) eligibility.
- Before ground-disturbing construction work takes place, a meeting would be conducted to inform construction crews of the potential for disturbing subsurface cultural resources, and of the required discovery plan procedures should a site or human remains be encountered.
 - Precautions would be taken to ensure that qualified archaeological assistance would be immediately available in case of a discovery. The discovery plan approved by Reclamation and the SHPO outlines these precautions in detail. Work would cease if cultural resources were unearthed during construction activities. The archaeologist would either be present during construction, or available to respond to a telephone call from the site to evaluate the unearthed materials and to ensure that any uncovered cultural resources were appropriately recorded or avoided, in accordance with the discovery plan.
 - Any cultural resources encountered during construction would be documented and evaluated for NRHP eligibility. Reclamation would consult with the SHPO regarding the eligibility of these sites. Site LA 132366 would be avoided by realigning the Project or a data recovery plan would be implemented to mitigate adverse effects.
 - Construction of the Drinking Water Project would not begin until consultation with the SHPO is completed.
 - Water transmission lines would be located to minimize impacts on historic structures. Care would be taken during construction to minimize impacts to vulnerable structures.
 - The City would submit a final Drinking Water Project design report showing all pipeline alignments to Reclamation. Reclamation would consult with the SHPO to ensure compliance with the NHPA on any additions or changes to the pipeline alignments, including required monitoring of sensitive areas including historic structures.
 - Consultation would occur with the pueblos as necessary.

Energy

- Water treatment plant and pumping stations would be operated in accordance with the standards of Operation and Maintenance (O&M) manuals that would be completed during and after design and construction of these facilities.
- Structures that will house workers on a routine basis (e.g., the water treatment plant) would be designed to meet all building codes and insulation requirements for energy efficiency.
- Compliance with these design and operational measures would be required to obtain City construction permits. Building heating, ventilation, and air conditioning systems would be appropriately sized and maintained to minimize energy consumption.

Floodplains

- Construction will require some temporary modifications of levees that could include access road construction or improvement and the placement of pipelines within or through levees. Construction may require the removal or modification of Kelner jetty jacks. Both would require coordination with the U.S. Army Corps of Engineers and/or Reclamation. Disturbed

areas or facilities would be restored to pre-construction conditions, or as directed by the U.S. Army Corps of Engineers or Reclamation.

Hazardous Materials

- Construction of any Drinking Water Project facility within 100 feet of a known hazardous waste site, underground storage tank, or leaking underground storage tank would be coordinated with the owners of the site or tank to minimize the risk of worker or public exposure to hazardous substances.
- The water treatment plant and pumping stations would be operated in accordance with the standards of O&M manuals that would be developed for each individual facility. These manuals would include health and safety plans and emergency response procedures.
- Transportation of regulated materials would be in accordance with all applicable U.S. Department of Transportation and State of New Mexico regulations.
- Storage of regulated substances would be in accordance with applicable state regulations and municipal ordinances.
- The City would comply with City of Albuquerque Landfill Monitoring Interim Guidelines.

Human Health and Safety

- The construction contractor would be required to comply with the City cross-connection ordinance and standards.
- The construction contractor would be required to secure all construction zones to control public access and ensure safety. Best management practices and compliance with applicable federal, state, and local construction site safety regulations and ordinances, as specified in the City construction permits, would also be required.
- The water treatment plant would be operated in accordance with the standards of O&M manuals to be developed during design and construction.

Hydrology

- When total river flows above the diversion point are less than 260 cfs, the City will adjust operations of the surface diversion dam and begin curtailing diversion amounts to minimize depletion effects downstream. The City has the option to shut down the plant earlier. When flows just above the diversion point fall below 260 cfs, at the surface diversion dam, the City will begin curtailing the quantity of the native (non-San-Juan-Chama) water diverted by reducing the diversion amount by 1 cfs for each 1 cfs reduction of native flow, but will continue to release and divert the full 65 cfs of its San Juan-Chama water. When native flow reaches 130 cfs just above the diversion, all raw water diversions and San Juan-Chama water releases will be suspended (100 percent curtailment), and the adjustable height dam will be completely lowered (about 0.5 feet above the river bottom).
- During installation of the diversion facility, the City would require the construction contractor to use appropriate best management practices to minimize and contain the discharge of suspended sediments into the Rio Grande.
- The City will conduct environmental enhancements with a coordinated sediment management element. The City will seek to coordinate and facilitate appropriate sediment

management actions with respect to Jemez Reservoir, Cochiti Reservoir, Galisteo Reservoir, irrigation diversion dams, and Albuquerque Metropolitan Arroyo Flood Control Authority facilities.

- If existing river gages are incapable of measuring river flows, the City would install appropriate stream gaging. The City would also install meters in the pump station at the diversion structure to measure the amount of water diverted on a constant basis. The City will be installing new gages at Alameda, the diversion would be metered, and a gage installed at Paseo del Norte and I-25 below the Southside Water Reclamation Plant discharge. Flow data will be available to the public on a real-time basis.
- The City will participate in an interagency group that includes Reclamation, the Service, the Office of the State Engineer, the New Mexico Department of Game and Fish, and the New Mexico Interstate Stream Commission to monitor and manage the effectiveness of both current and long-term environmental enhancement measures described above. This group will identify and recommend to the City and the Service necessary operational changes to address environmental issues that are uncertain or unforeseen as a result of operating the Drinking Water Project.
- The City will create, maintain, and update an accounting system that will identify the location(s) and quantities of water released from upstream reservoirs, diverted from the river, and the amount returned to the river. The City will also provide annual reports to the State Engineer with copies to the Service showing the timing of releases of San Juan-Chama water and diversion and return flow amounts. If curtailment of diversion of San Juan-Chama water were necessary during any year due to stream flow conditions, this will also be reported.
- When flows are low due to drought, the City may, in coordination with the Service, decide to shut the diversion off during the entire summer to avoid impacts to the environment. The City will coordinate with the Service beginning April 15 of each year to determine when the diversion facility will curtail or cease operations.
- The City will meet with the Service to discuss their Annual Operation Plan for the Drinking Water Project by May 15 of each year.
- The City will provide the Service with an annual report on water accounting for the previous year by February 15 of each year. The City's accounting system will identify the locations and quantities of San Juan-Chama water released and diverted from the river, the amount returned to the river, and the amount of water that will be consumed through beneficial use.
- The City will notify the Service in writing regarding any changes in operations related to curtailment or increases of diversions.
- The City will install meters in the pump station at the diversion structure to continuously measure the amount of water diverted. Gaging information related to the City's Drinking Water Project will be made available to the Service on a real-time basis.
- When developing release schedules for San Juan-Chama water, the City will work with Reclamation, the Service, the State Engineer, the New Mexico Department of Game and Fish, and the New Mexico Interstate Stream Commission so that releases can benefit stream fisheries above the diversion. However, the City's releases must be consistent with state and federal laws, and must be approved by the State Engineer. The City's San Juan-Chama water will be released from storage in upstream reservoirs in accordance with the conditions set forth in the approved State Engineer permit. The application for diversion of the City's San Juan-Chama water for this project was submitted to the Office of the State Engineer in May

2001. Upon approval, the City will provide a copy of the permit to the Service. The final release schedule will be determined by the City under the conditions of the permit.

- The City has a revised water conservation goal of a 40 percent reduction in demand compared to the baseline established in 1995. The timeframe for the implementation of the new goal will be ten years starting in 2005 (175 gallons per capita per day [gpcd]) and ending in 2014 (150 gpcd). This goal supplements the original 30 percent reduction goal that is projected to be achieved in 2005.
- The City has developed a drought management strategy for a drought reserve for the City water supply.

Land Use

- The contractor would adhere to project work/hour restrictions (work allowed only between 7 a.m. and 10 p.m.) within 500 feet of residences, hospitals, and schools. Additional work hours would be added only if approved by the local residents.
- Project pipeline alignments would be routed primarily in developed public rights-of-way to minimize activity in undisturbed areas.
- Open Space Division, Environmental Land Use Committee land-use approval may require an environmental resource commitment. Commitments would be determined during the approval negotiations.

Noise and Vibration

- The construction contractor would meet the requirements of noise ordinance ACC § 6-22 for noise control on construction equipment.
- The contractor would arrange the construction schedules to restrict work to five days within 500 feet of the same residences, hospitals, schools, churches, and libraries. Additional work days would be added only if approved by the local residents, hospitals, schools, churches, and libraries.
- Project operating equipment (e.g., pumps) would be housed in structures designed to minimize radiated noise outside the structure, and would meet the City's noise ordinance requirements.

Recreation

- During construction in parks or the bosque, the construction contractor would have to meet the City's noise abatement requirements (City, 1981) for operating construction equipment.
- If bike or pedestrian trails are temporarily obstructed during construction, where possible a temporary pathway or rerouting would be arranged to allow passage. Access to the City's open space parking lot on Alameda Boulevard would be maintained during all phases of construction.
- With the Drinking Water Project in operation, the City would continue with its historic practice of cooperating with Reclamation and the Bureau of Land Management in the coordination of releases from Heron Reservoir to Abiquiu Reservoir to benefit winter fisheries. This program of voluntary cooperation is subject to the City's prerogative and ability to meet its water requirements.

Riparian Areas

- Temporary materials- and equipment-staging areas at the water diversion facility construction area would be reclaimed and revegetated with suitable native woody trees and shrubs.
- Project facilities to be located in the riparian corridor would be sited and sized to minimize the loss of cottonwoods and other native vegetation.
- The City would restore the bosque and Rio Grande in the areas temporarily affected by the construction of the project to the original condition or complete environmental enhancements. During development of the technical plans and specifications for restoration of the Rio Grande channel, the City would coordinate with Reclamation, the U.S. Army Corps of Engineers, the Service, and the New Mexico Interstate Stream Commission to design a channel section that could provide some area of potential habitat for the Rio Grande silvery minnow, potential habitat for the Southwestern willow flycatcher, and areas for cottonwood seedling production. If permits and approvals could not be obtained to construct the channel in such a manner, the City would construct the channel to match the existing section, as approved.
- The City would provide funding to continue to monitor and improve the Albuquerque Water Resources Management Strategy environmental enhancement program, including continuation of mammal and human use studies for the bosque. Additional monitoring of amphibian/reptile populations and vegetation is needed in the Rio Grande Valley State Park within the Middle Project Subarea. Permanent transects have been established at 12 sites throughout the Rio Grande Valley State Park to monitor these populations. The Bosque Action Plan mandates that these transects be monitored for changes every 3 to 5 years.
- Continue fuel reduction throughout the Rio Grande Valley State Park utilizing the Inmate Work Camp Program through State Forestry under its current agreement with the Open Space Division. Remove dead and downed material, thin and remove non-native species, treat stumps of non-native species so that they do not resprout, and replant with native cottonwood and understory species. The City is committed to improving the bosque and the Rio Grande Valley State Park and will coordinate annual programs with the Service. These programs, which include removing non-native plant species, will continue throughout the life of the Project. In addition, the City began an extensive program in the fall of 2002 to remove non-native species from the riparian area within Albuquerque over the next five years. The City has already invested about \$650,000 for equipment in this endeavor.
- Areas where fuel reduction or non-native species removal occurs will need to be replanted with native species, primarily the Rio Grande Cottonwood (*Populus deltoides* spp. *wislizeni*). Trees that are approximately 3 years old can be pole planted by placing them directly in contact with the shallow groundwater. This is accomplished by digging a hole with an auger to the water table. Poles are then pushed through so that the root system is in contact with the water and the hole is refilled with dirt. Poles must be planted while they are dormant (i.e., from January through April of each year). Poles are usually wrapped with chicken wire to protect them from girdling by beavers. The pole planting program has been in place for more than 10 years and has a success rate of approximately 80 percent in the Rio Grande Valley State Park. Specific sites for plantings will be dependent upon fuel reduction sites as well as areas that may need to be rehabilitated after a burn.

- The City has an ongoing program for improvements to the Rio Grande Valley State Park. These programs, which include removing non-native plant species, will continue throughout the life of the project. In addition, the City began an extensive program in the fall of 2002 to remove non-native species from the riparian area within Albuquerque.
- A habitat mapping technical report has been developed to supplement the City's ongoing conservation measures to include opportunities for additional aquatic and riparian projects in the Albuquerque Reach of the river. This report included extensive field surveys mapping and ranking of potential sites within the Middle Rio Grande. Field efforts for this project were conducted in cooperation with the Service during February 2002.
- The location for the habitat restoration mitigation activities is south of Paseo del Norte on the west side of the river and currently includes 160 acres of mixed bosque and 48 acres on the Montaña Oxbow. The work will include mechanical clearing of non-native vegetation to promote native species regeneration. The restoration of native vegetation will be done by either planting or re-establishing hydrologic connectivity. Individual cottonwood poles and willow whips, willow bundles/mats, individual shrubs, reseeding, or other planting methods at a density of 120 plant units per acre are potential methods that may be used to enhance flycatcher habitat.
- An overbank project of 10 acres will be created that will provide refuge for aquatic organisms, restoration of riparian vegetation, and re-establishment of a river channel/floodplain interaction. The newly created terraces will be placed in an area where the channel is relatively incised and the potential for overbank flows is minimal.
- Two high-flow side channels will be constructed to provide aquatic habitat at flows greater than 1,500 cfs (42.48 m³s) and 2,000 cfs (56.63 m³s), respectively. The functional purpose of the side channels is to provide backwater and slower velocity areas for aquatic and terrestrial species and increase the potential for overbank flooding and native species regeneration.
- Channel widening and bank destabilization will be promoted by the removal of 120 jetty jacks. Removal of the jetty jacks, in combination with clearing vegetation and bank lowering, will encourage native species reestablishment and the creation of shallower, slower velocity habitats for the Rio Grande silvery minnow.
- Two river bars will be enhanced by a combination of non-native species vegetation clearing, lowering, and pilot channel work. This project will also promote the creation of shallower, slower velocity habitats for the Rio Grande silvery minnow.
- Flow will be reestablished to the Montaña Oxbow by the construction of an additional high-side flow channel and non-native vegetation removal. This project will be designed to provide backwater and side channel habitat adjacent and connected to the river channel for Rio Grande silvery minnow habitat and restoration of native riparian vegetation.
- The City will be responsible for identifying and reporting the presence of all cottonwoods (seedlings through mature trees) remaining in the construction site to the City's Open Space Division. The City will plant 3 new plants for each plant removed smaller than 6 inches in diameter, and 10 new plants for each removed plant larger than 6 inches in diameter within the City's Open Space. These replacement ratios apply to native vegetation within those areas directly damaged by construction. Planting native vegetation near a disturbance area at a ratio of 1 native for every exotic species removed and 2 natives for every native plant removed will mitigate the loss of riparian vegetation.

- To determine whether these projects are successful, baseline data will be collected and both short- and long-term objectives will be established.

Socioeconomic Factors

- Use existing road and utility rights-of-way as much as possible to reduce permitting and land acquisitions cost and to reduce disruption of commercial facilities.
- Hire local construction personnel to build the project.
- Hire and train local professional or service personnel to operate and maintain facilities so direct and secondary spending remains in the local economy.

Soils

- The construction contractor would have to meet Occupational Safety and Health Administration and City requirements for slope stability during construction.
- The contractor would have to comply with construction permit requirements and local ordinances governing the generation of fugitive dust, control of run-on and run-off, and site restoration (e.g., re-vegetation or seeding) to prevent erosion.

Threatened and Endangered Species

- Monitor habitat restoration efforts, other mitigation measures, diversion impacts, and fish and wildlife enhancement measures for success and suspend unsuccessful projects/practices. This will be an adaptive process with evaluation of methods and practices that are successful and unsuccessful. This monitoring will be carried out for five years upon completion of each mitigation or restoration effort.
- The City will provide the Service with an annual report describing the status of the conservation measures by February 15 of each year. This report will describe activities carried out during previous years and projects planned for the upcoming year(s).
- The City will provide the Service with an annual report describing egg collection directly upstream of the diversion dam by September 1 of each year.
- The City will coordinate with the Service when developing and implementing the habitat restoration projects described in the action.
- Consultation with the Service has occurred under Section 7 of the Endangered Species Act concerning all potential effects to threatened and endangered species. As a result of the consultations, selected conservation measures have been developed and there has been a determination that no jeopardy will occur.
- Fishway: A fishway for the Paseo del Norte Diversion would be designed to enhance aquatic habitat by providing a route around the diversion. Design of the fishway will be coordinated with the Service.
- Fish screens: The sluice channel for the Paseo del Norte Diversion would be equipped with fish screens. These screens are designed to prevent adult fish from being diverted and transported to the water treatment plant. The City will maintain fish screens. Any structural or mechanical failures associated with the fish screens shall be reported to the Service within one hour of when the problem is identified.

- Operational criteria: Water diversions would be curtailed, when necessary, when flows fall below 260 cfs and would cease entirely below 130 cfs downstream of the Paseo del Norte Diversion.
- During construction in the river, any fish stranded by construction of the facility would be salvaged and relocated to a different portion of the river. By agreement, Service staff would be available to move individual specimens of the Rio Grande silvery minnow if members of this species inadvertently become separated from the main river channel by construction activities. The City will coordinate with the Service when isolated pools form during installation of the coffer dam and seine isolated pools as the river recedes. The sampling protocol developed by New Mexico Ecological Services Field Offices will be used. The Service will coordinate data collection and salvage/rescue of the silvery minnows.
- Initial installation of the water diversion facility would be conducted during the river's low-flow period from September through March to avoid to the extent possible the spring snowmelt and summer monsoon seasons of high flows in the river, and in accordance with Clean Water Act Section 404 permit special conditions.
- The City will restore the bosque and Rio Grande in the area affected by the construction of the Drinking Water Project to the original condition or complete environmental enhancements. During development of the technical plans and specifications for restoration of the Rio Grande channel, the City would coordinate with the U.S. Army Corps of Engineers, the Service, and the New Mexico Interstate Stream Commission to design a channel section that could provide some area of potential habitat for the Rio Grande silvery minnow. If permits and approvals cannot be obtained to construct the channel in such a manner, the City would construct the channel to match the existing section, as approved.
- During installation of the water diversion facility, the City would require the construction contractor to use appropriate best management practices to minimize and contain the discharge of suspended sediments into the Rio Grande.
- The City will continue support for the Rio Grande Silvery Minnow Naturalized Refugium for 10 years from the date of the corresponding biological opinion (Appendix I to the FEIS). This may consist of rearing, research, and maintenance of experimental populations. In the year 2002, the City provided \$150,000 to the Albuquerque Aquarium for construction, staffing, and monitoring of Rio Grande silvery minnow rearing facilities to raise eggs to the young-of-year stage before the fish are relocated to transplant locations upstream from the San Acacia Diversion Dam. The City is supporting and funding ongoing research to increase understanding of the Rio Grande silvery minnow life cycle at the Albuquerque Zoo and Naturalized Refugium. These studies will contribute to the understanding of spawning behavior, swimming capabilities, and habitat needs.
- The City will provide funding to develop projects that provide for the continued enhancement and health of the bosque in coordination with the Bosque Action Plan through the City Open Space Department.
- Non-native vegetation, jetty jacks, and root structures along the banks will be removed to allow overbank flooding and ecological enhancements.
- Channels will be cut into the terrace to allow for flow through or backwater flows to mimic the natural pattern, which would encourage a more permanent water supply in these bosque areas, and would possibly create additional habitat suitable for the Southwestern willow flycatcher and the yellow-billed cuckoo. It would also allow for a better connection between the river and the floodplain.

- Woody debris from bosque fuel-reduction programs can be placed into the river to allow for greater braiding and return of organic materials. This could create additional habitat for juvenile fish, especially the Rio Grande silvery minnow. Sites will need to be determined based on fuel reduction sites.
- The City Open Space Department recently finished acquiring properties in the Montañño Oxbow for protection as Major Public Open Space. This area is a 58-acre wetland that supports bosque upland and wetland plant species. A number of projects have been determined as needed in order to restore and protect this wetland including: channelization to ensure water flow through the system, control of cattail populations, control of beaver populations, creating open water areas, removal of non-native species, and replanting with native species. Phasing of these projects has begun and will continue depending on funding.
- If a bald eagle is observed within 0.25 mile from the active project construction site on any morning before construction starts, or following breaks in construction activity, the contractor would be required to suspend all activity until the bird departs the area on its own volition. However, if an eagle arrives during construction activities or if an eagle is observed at a distance greater than 0.25 mile from the construction area, construction need not be interrupted.
- Specific tasks that the City has committed to do during project construction/restoration include:
 1. Construction site visits.
 2. Map and document with photos or drawings construction progress and compliance with mitigation and monitoring requirements.
 3. Training and explanation of environmental requirements to contractors and designers.
 4. Progress meetings and completing progress memos.
 5. Assist and train field monitoring personnel.
 6. Ensure compliance with permits and stipulations of the FEIS for mitigation and monitoring.
 7. Maintain mitigation plan checklist and update periodically by verification.
 8. Collection and analysis of environmental data as needed to ensure mitigation and monitoring steps are accurate and completed in a timely manner.
 9. Development and implementation of adaptive management procedures.
 10. Monthly and annual reporting to the Service and Reclamation.
- The City will restore the bosque and Rio Grande in the areas temporarily affected by the construction of the project or complete environmental enhancements at an offsite location. During development of the technical plans and specifications for restoration of the Rio Grande channel, the City will coordinate with Reclamation, the U.S. Army Corps of Engineers, the Service, and the New Mexico Interstate Stream Commission to design a channel section that could provide potential habitat for the Rio Grande silvery minnow, Southwestern willow flycatcher, and areas for cottonwood seedling production. If permits and approvals could be obtained, the City will construct the channel to match the existing section, as approved.
- The City will develop an adaptive management plan as soon as practicable after the first monitoring periods for the restoration sites and fish monitoring. The adaptive management

plan will address modifications of the mitigation plan and outline monitoring schedules. This plan will be based on the results from initial monitoring efforts. The City will monitor habitat restoration efforts, other minimization methods, diversion impacts, and fish and wildlife enhancement measures for success and suspend unsuccessful projects/practices. This will be an adaptive process with evaluation of methods and practices that are successful and unsuccessful. This monitoring will be carried out for five years upon completion of each minimization or restoration effort.

- The City will continue to provide funds for utilities, staffing, and equipment for the captive breeding program at the Albuquerque Aquarium for a period of ten years beginning on the date of the corresponding biological opinion (Appendix I of the FEIS). The program has been expanded, in partnership with the New Mexico Interstate Stream Commission, to include a naturalized refugium. Funding will be provided in the amount of no more than \$165,000 per year. The Rio Grande silvery minnow raised from the captive breeding program will be reintroduced to the wild in coordination with the New Mexico Fishery Resources Office and the New Mexico Ecological Services Field Office.
- The City will provide funding to continue to monitor and improve the Albuquerque Water Resources Management Strategy mitigation measures program, including continuation of mammal, avian, and human use studies for the bosque. Additional monitoring of amphibian/reptile populations and vegetation is needed in the Rio Grande Valley State Park. Permanent transects have been established at 12 sites throughout the Rio Grande Valley State Park to monitor these populations. The Bosque Action Plan mandates that these transects be monitored for changes every 3 to 5 years.
- For the first 10 years of the project, as determined and requested by the Service, the City will cease operations of the diversion during a 24-hour period once a year during the Rio Grande silvery minnow spawn to reduce the take of eggs. After 10 years, the need for this conservation measure will be assessed, and if deemed necessary by mutual agreement, may continue. This measure between the City and the Service does not apply if the City's diversion is not in operation during the spawn. The Service will notify the City in writing within one week of the requested shutdown when flows are managed to manufacture the spawn. For natural spawning flows the Service will coordinate closely with the City to determine when benefits to the Rio Grande silvery minnow from the 24-hour operational shutdown can be maximized, realizing that: (1) the City needs at least 48 hours to shutdown and (2) natural flow spikes cannot be predicted.
- During the spawning period, the City will monitor and collect Rio Grande silvery minnow eggs. This egg collection will consist of 1 egg collector for 2 hours per day from May 1 – 31 each year for the first 10 years of the project. The monitoring and collection sites will be identified in coordination with the Service and should be located near the diversion structure (either in the sluice channel or directly upstream of the water intake structures) to reduce the amount of entrainment associated with the diversion of flows and to more accurately monitor incidental take.
- The City signed an Interim Memorandum of Understanding with federal, state, and local entities to continue to support the development and implementation of the long-term program entitled the Endangered Species Act Workgroup Collaborative Program. The City has assisted in obtaining significant federal funding for short- and long-term conservation measures via their participation in the Collaborative Program.

- The City has provided personnel and funding for Rio Grande silvery minnow monitoring and habitat surveys in the Middle Rio Grande during late 1999, early 2000, and 2002. In addition, the City completed a flycatcher survey during May, June, and July 2001. The City has committed to conducting annual winter fish monitoring surveys for the first 10 years of the project. After 10 years, the need for additional fish monitoring will be assessed and, if deemed necessary by mutual agreement between the City and Service, may continue.
- The City has an agreement to provide personnel, operation and maintenance costs, and other construction improvements for the Naturalized Refugium Project at the Albuquerque Biopark. The refugium will expand the current captive rearing and breeding program, including the construction of a natural habitat for the fish. This project is intended to supplement populations of the Rio Grande silvery minnow by approximately 25,000 fish per year. The City will continue to support these activities for 10 years from the date of the Biological Opinion (February 13, 2004).
- The City proposes that construction activities will not occur in the Rio Grande or bosque during the flycatcher nesting and breeding season.
- The City will participate in an interagency group that includes Reclamation, the Service, Office of the State Engineer, New Mexico Game and Fish Department, and New Mexico Interstate Stream Commission to monitor and manage the effectiveness of both current and long-term environmental enhancement measures described above. This group will identify and recommend to the City and the Service necessary operational changes to address environmental enhancement measures described above. This group will identify and recommend to the City and the Service necessary operational changes to address environmental issues that are uncertain or unforeseen as a result of the project.
- The City will provide the Service with an annual report describing the status of the conservation measures by February 15 of each year. This report will describe activities carried out during previous years and projects planned for upcoming years. The City will provide the Service with an annual report describing egg collection directly upstream of the diversion dam by September 1 of each year. The city will coordinate with the Service when developing and implementing the habitat restoration projects described in the action.
- The City will conduct egg collection activities just upstream of the Paseo del Norte diversion or in the sluice channel using sampling protocols developed by the Service. This egg collection will consist of 1 egg collector for 2 hours per day from May 1 – 31 each year for the first 10 years of the project. After the first 10 years of the project, the need for continued egg collection will be assessed and may continue for an additional time period if the Service and City cooperatively agree that it is necessary.

Traffic and Circulation

- Water pipelines would be routed in existing utility rights-of-way to minimize potential interference with traffic.
- Pipeline installations would be bored under major intersections involving state and interstate highway crossings to minimize traffic disruption.
- The construction contractor would meet City requirements for preparing an impedance analysis and traffic/barricade plan, where necessary, and would implement appropriate work measures as needed to ensure an adequate level of service on affected streets.
- Limit the amount of trench that would be open at any time.

- Existing road and utility rights-of-way would be used as much as possible to reduce permitting and land acquisition costs and to reduce disruptions to commercial facilities.

Upland Vegetation

- Project pipeline alignments have been routed primarily in developed public rights-of-way to minimize activity in undisturbed areas. Those undeveloped areas that are disturbed during construction would be replanted with appropriate native upland vegetation.

Water Quality

- The City would perform periodic sampling of raw-water water treatment plant influent and treated water to ensure compliance with the Safe Drinking Water Act, state requirements, and City water treatment plant operating procedures.
- The water treatment plant would be operated and maintained in accordance with the O&M procedures to be detailed in a plant specific manual.
- During in-river construction activities, the City would require the construction contractor to use appropriate best management practices to control turbidity and minimize and contain the discharge of suspended sediments into the Rio Grande.
- A plan to monitor the turbidity levels in the river during in-river construction would be developed and implemented. The plan will be submitted to the Service for approval prior to construction activities taking place.
- The City would implement measures to address Section 401 water quality certification conditions and Section 404 discharge limitations.
- The treated surface water may be conditioned with hydrated lime (calcium hydroxide) to create treated surface water that is compatible with the groundwater.
- The City would implement necessary spill prevention and containment methods and training during construction and in the long-term operations and maintenance of facilities. The City will provide the Service with a copy of the spill prevention and containment plan for the action prior to construction beginning and will notify the Service of any spills or contamination associated with construction or maintenance within one hour of occurrence. The Service will determine whether silvery minnow salvage is appropriate, water quality testing is necessary, and assess the effects of the spill on the silvery minnow. The City will ensure that all construction workers have received spill prevention and containment training prior to construction beginning.

VI. Accounting – Annual Operational Plan

As has been the case since the inception of the San Juan-Chama Project in 1971, under the Project, the City will continue to work closely with those agencies having responsibility for managing the flows of the Rio Grande and Rio Chama. These include Reclamation, the U.S. Army Corps of Engineers, the Office of the State Engineer, and the Middle Rio Grande Conservancy District. More recently, because of the critical habitat designation for the Rio Grande silvery minnow, the Service has become a more active player in flow management on the river. With the evolution of the multi-agency sponsored Upper Rio Grande Water Operations Model, and continued conference calls and meetings during critical times of the year, the

management of the San Juan-Chama Project and river flows and reservoirs on the Rio Chama and Rio Grande should become more efficient.

The City, in concert with the above agencies, will monitor snowpack, reservoir storage, seasonal weather forecasts, and other factors - particularly in the late winter and early spring periods leading up to the irrigation season (which begins in March). Preliminary decisions and action plans will be formulated as to how the City’s San Juan-Chama water will be managed, particularly in the case of likely low-flow or drought conditions, and whether or not surface diversions under the Drinking Water Project will be curtailed or shut down entirely for several months in the coming year. As the critical warm weather irrigation season approaches (usually beginning in April or May), flow forecasts and river management decisions will be updated using the Upper Rio Grande Water Operations Model and specific plans formulated relative to the City’s Drinking Water Project release and diversion program for the coming year.

VII. Curtailment Flow

The City will curtail operations of the Drinking Water Project during times of low flow. For the Paseo del Norte Alternative, the City will begin curtailing diversion of native flow and will coordinate its diversion with Reclamation and the Service when the total flow at the Alameda gage decreases to 260 cfs. The City will cease release and diversion of both its San Juan-Chama water and native water when native flow reaches 130 cfs just above the Paseo del Norte Diversion.

VIII. Discussion of Monitoring Mitigation Measures

There are three biological resource areas that require monitoring. In general, monitoring will occur over the life of the project. The monitoring would include the use of the fishway, entrainment at the fish screen, and the effectiveness of riparian area restorations. Annual monitoring reports are also required. The monitoring program should also be considered an adaptive management program, meaning that a successful process could be monitored less frequently or that changes in techniques or technology could be implemented into the monitoring program. Monitoring tasks and the first four years frequency:

GENERAL TIMING AND FREQUENCY OF MONITORING

Monitoring Task	Year One	Year Two	Year Three	Year Four
Fishway	Quarterly	Quarterly	Quarterly	Annually
Dam	Annually	Annually	Annually	Annually
Fish Screens	Quarterly	Annually	Annually	Annually
Riparian	Annually	Annually	Annually	Annually

The fishway monitoring process would consist of fish monitoring within and near the fishway, using passive and active capture techniques. To establish fish use patterns and provide design and modification results, the frequency should be quarterly for a period of three years. Ongoing

research into the aspects of Rio Grande silvery minnow life history and habitat requirements should be considered in initial designs and for opportunities to enhance the fishway. Again, if there is some success, it may be possible to have longer periods of time between monitoring intervals. It may be necessary to coordinate some events with re-introduction of fish at points on the river, especially early in the Project. Basic environmental data, such as velocity, depth, and conditions of the fishway should also be noted during monitoring events. Related fisheries data, in addition to the presence and condition of the Rio Grande silvery minnow, would include species compositions within the fishway, native/non-native composition, relative abundance, and age distribution. In addition, the diversion dam would be monitored when the dam was down to determine (if possible) fish passage over the deflated dam.

In general, fish habitat monitoring indicators will include the following variables:

- Average fishway or channel width
- Average fishway velocities
- Fishway depth
- Percent composition of macro habitat types (backwaters, pools, debris, channel of fishway)
- Substrate material

In general, fish community monitoring indicators will include the following variables:

- Species
- Relative abundance
- Size classes
- Condition

Monitoring at the screens is necessary for an evaluation of take. This will occur for larval fish and eggs during the spawning season. Annual sampling is adequate, and it may also be necessary to sample at points near the dam (rip-rap area or around retaining walls to check for fish presence around the dam). Techniques will include those currently in use by other researchers (including the City) to collect eggs and evaluate reproductive success. This approach should also be considered adaptive as knowledge is gained about fish in the river and operations of the screen and dam. Standard data presentation and analysis techniques should be used in preparing reports.

Riparian monitoring information would likely include success rates for planting and removal of vegetation, monitor well information, and other monitoring data. Plant species composition, understory density, and plant productivity are variables which contribute to the functional value of riparian plant communities. These variables are linked to river flows and groundwater and would be monitored at mitigation sites. Specific monitoring parameters for riparian sites might include woody species diversity (long-term trend); productivity of these parameters can be monitored annually at riparian sites. Photos would be used to help establish the success rates of new plantings.

IX. Schedule

Identified mitigation measures, some of which are already being implemented, would be continued through the life of the Project where necessary. An adaptive management program, implemented at the initiation of construction, would provide information to modify the monitoring program and mitigation measures as necessary. Construction mitigation measures would begin during construction periods.

At the present time, the Rio Grande silvery minnow captive breeding program is ongoing and the City is completing some steps to enhance and improve the health of the bosque. These activities include fuel wood reduction, debris removal, the re-planting of native species, and other tasks. These tasks would continue for approximately 20 years while the monitoring schedule may last for the life of the Project, but may be modified from the adaptive management program. The operational commitments would last through the life of the Project.

X. Comments Received on the FEIS

Reclamation received no comments on the FEIS. However, Reclamation received one letter requesting a 30-day extension of the FEIS public review period. The request was denied.