

Chapter 2 Alternatives

2.1 Introduction

This chapter describes the two alternatives analyzed in the PEA, the No action alternative and the Proposed Action alternative. An analysis of alternatives considered but eliminated from further study is presented in this chapter.

2.2 Description of the Alternatives

2.2.1 Alternative A: No Action

The no action alternative for this Supplement is defined as discontinuing the Program, elements of which have been implemented since 1996. Basically, the water leasing program with willing lessors would be discontinued, no concurrence with waiver requests for the benefit of the RGSM would occur, pumping to transport water from the LFCC to the Rio Grande would cease, and water conservation opportunities would not be pursued by the farming community and the general public. It is extremely likely, absent extraordinary water runoff conditions and unusual monsoonal storm patterns, that drying of portions the Middle Rio Grande would result. The no action alternative would clearly not meet the stated purpose and need and would most likely result in non-compliance with the 2003 BiOp.

2.2.2 Alternative B: Proposed Action

As previously discussed, the proposed action consists of several components as follows:

San Juan-Chama Water

Leases - Reclamation would conduct a water leasing program to provide supplemental water to the Rio Grande for approximately five years, from 2006-2011. Fifteen entities have repayment or water service contracts with the Bureau of Reclamation for the use of San Juan-Chama (SJ-C) project water. Some of these entities may be willing to temporarily lease back to Reclamation some of this contracted water for use in its Supplemental Water Program. Reclamation would enter into lease-back agreements with such willing SJ-C project contractors. Primary purposes of the SJ-C project are to furnish a water supply via trans-basin diversions to the middle Rio Grande valley for M&I as well as irrigation uses. Incidental benefits include recreation and fish and wildlife. Reclamation is not proposing to take any actions that would involve reallocating contracted water or exceeding the firm yield of the SJ-C project. Reclamation will obtain all permits required for implementation and will conduct required consultation with appropriate parties.

Reclamation would expect to lease 10,000 to 15,000 acre-feet per year of SJ-C contracted water from 2006 to 2011. However, depending on environmental conditions, water availability, funding, and the willingness of SJ-C water contractors to enter into leasing agreements with Reclamation, the quantity of SJ-C water to be leased could be as low as 5,000 acre-feet per year or as great as 70,000 acre-feet per year. The M&I contractors from whom Reclamation could lease SJ-C water may include the following: City of Albuquerque, City of Santa Fe, Santa Fe



County, Jicarilla Apache Nation, San Juan Pueblo, City of Espanola, County of Los Alamos, City of Belen, Town of Bernalillo, Town of Taos, Village of Los Lunas, Town of Red River, and the Village of Taos Ski Valley. Reclamation does not contemplate leasing irrigation water. Reclamation would exchange the leased SJ-C water with the MRGCD for native Rio Grande flows. The SJ-C water leased each year by Reclamation would be used beneficially in New Mexico for irrigation, while native waters would augment stream flow and would benefit the silvery minnow.

Table 2-1 Leased Supplemental San Juan-Chama Project Water (1997-2005)

CONTRACTOR	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
City of Albuquerque	10,000	10,000	10,000	64,500		40,000				134,500
City of Belen			800	700	400	470	504	354	242	3,470
City of Bernalillo						300				300
City of Espanola		2,000	2,000	5,000		1,687		1,650	1,000	13,337
Jicarilla Apache Nation			6,500	6,500	6,500	6,500	6,500	6,500	6,500	45,500
County of Los Alamos		3,650	3,600	5,000	1,200	1,529	1,200	1,200	1,200	18,579
Town of Los Lunas		500	500	300	200	500	100			2,100
San Juan Pueblo						2,000	2,000	2,000	2,000	8,000
City of Santa Fe and Santa Fe County		10,000	10,000	10,000			2,500			32,500
Town of Red River			60	60	60	60	60	60	60	420
Town of Taos			400	400		937	419	400	400	2,956
Taos Ski Valley			50	50		53				153
Total	10,000	26,150	33,910	92,510	8,360	54,036	13,283	12,164	11,402	261,815

Uncontracted - Pursuant to the 1902 Reclamation Act giving the Secretary of the Interior has discretion in the use of project water, thus the uncontracted portion of SJ-C water which is reserved for future Indian water rights settlement in the Taos, New Mexico area is available for use in Reclamation's Program. This water would be exchanged with MRGCD as described above.

Emergency Drought Water

Reclamation may also release water captured, stored, and made available under the Emergency Drought Water Agreement (EDWA) to meet the needs of the Middle Rio Grande Project and to benefit the listed federally endangered species. EDWA water is stored and made available by the State of New Mexico consistent with the relevant interstate compacts and with state and Federal law as a conservation pool upstream of Elephant Butte Reservoir. Water that is native to the Rio Grande basin may be stored in reservoirs upstream of Elephant Butte following relinquishment of New Mexico's Rio Grande Compact credits, and upon acceptance of the relinquishment by



the State of Texas under Article VII of the Rio Grande Compact. As specified in the agreement (2003-2013), the amount of relinquished water made available to the United States was to be prorated in the event that the full amount of relinquishment between New Mexico and Texas that was anticipated in April 2003 did not occur. Accordingly, New Mexico is to make available to the United States up to 56,483 acre-feet of EDWA water. Reclamation may release up to 20,000 acre-feet of water in any one calendar year. To date, Reclamation has released approximately 30,000 acre-feet of EDWA water.

Concurrence with Waiver Requests

Reclamation would concur with temporary waiver requests from SJ-C water contractors to modify the date of their water delivery into the following calendar year, if such waivers would benefit the United States. In the past, temporary waivers have been used for activities such as enhancing winter flows and fisheries management on the Rio Chama and taking advantage of opportunities for supplemental water storage and management. Waivers generally would allow SJ-C water to remain in Heron Reservoir through April 30 of a particular year. This date has been extended in the past, but only under extreme circumstances. Reclamation concurs with waivers for reasons other than benefits to the RGSM, but those actions are not considered within this NEPA process. This part of the proposed Program addresses Reclamation policy on SJ-C contractors requesting temporary waivers of the contract requirement to take delivery of the annual allocation of project water prior to December 31 of each year, allowing flexible management of water releases to benefit the RGSM. Reclamation would concur with waiver requests that would assist it in its program for conservation of the RGSM, in compliance with the ESA. These requests could be initiated by the SJ-C contractors and would be honored at the discretion of Reclamation if conditions were appropriate.

Waivers for delivery of San Juan-Chama project allocations for a given year allow for delivery of such water in the following year. Changes in timing of these deliveries occur when concurred to by Reclamation and the appropriate contractor. Reclamation concurs to waivers at times when maintaining water in Heron will allow for use of such water as part of the Supplemental water program at a later date or when changing of timing of deliveries helps maintain fishery flows on the Rio Chama. The Rio Chama Instream Flow Assessment published by the Bureau of Land Management in 1992 is utilized as a guide for fishery flows on the Rio Chama.

LFCC Water Management Options and Temporary Pumping Operations and Maintenance

Reclamation proposes each year, as required, to reinstall pumps at four locations along the LFCC adjacent to the Rio Grande, which shall be used to convey supplemental water from the LFCC to the Rio Grande for the benefit of the RGSM and the SWWF. These sites are located at the northern boundary and southern boundary of Bosque del Apache Wildlife Refuge, Neil Cupp and at Fort Craig. Each location may require different actions before pumping may begin or to maintain the facility integrity and operations.

- The following operations and maintenance activities may be performed utilizing various types of heavy equipment at one or more of the pump sites:

- Pumping sites may require clearing of vegetation on both sides of the LFCC up to the Rio Grande within existing rights-of-way. Vegetation (weeds) may also be cleared or mowed on the eastern access road of the LFCC. In addition, vegetation (weeds) will be cleared at or near the pumps and the levee access road for safe access and as a precaution to prevent fires.
- The removal of sediment from conveyance channels west of the weirs and LFCC sumps and placement (spreading) the material in an area adjacent to channels and LFCC may be required.
- Pumping sites may require excavation of the adjacent Rio Grande levee (west levee) for removal or replacement of corrugated metal pipe (CMP) and polyvinyl chloride (PVC) pipe if they fail or if they are damaged. Excavation of levee material would be accomplished and spoil material would be placed on or adjacent to the Rio Grande west levee. The existing CMP or PVC pipe may need to be removed and replaced with new pipe as required.
- The trimming of vegetation within existing cleared areas of outfall channels and pipelines to improve access may be performed in the vicinity of the pump sites. Trimming of vegetation may be accomplished using chainsaws, other hand tools, and/or equipment.
- Pumping sites may require maintenance, resetting, and calibration of sheet pile weirs in existing conveyance channels. Maintenance may include excavation or re-grading of conveyance channels adjacent to weirs using excavating equipment.
- Breached or inundated conveyance channels east of the Rio Grande levee to the Rio Grande may require re-excavation. Excavation of deposited sediment will be accomplished using excavation equipment and the material will be placed adjacent to the conveyance channels within the existing rights-of-way. Also, dewatering of breached or inundated conveyance channels east of the Rio Grande levee to the Rio Grande channel may be necessary. The dewatering process will include first seining the channel for stranded RGSM and then pumping water from the channel while screening the pump to prevent RGSM from entering the pump intake.
- Pumping sites may require removal or demolition of existing facilities (fences, pipelines, earth channels) or structures (sheet pile weirs) associated with, or adjacent to, the existing pumping stations. Also, personnel may need to enter the Rio Grande channel on foot to remove material or debris that has become dislodged or otherwise been freed from existing pumping facilities.
- Placement of riprap, gravel material, earth fill, or synthetic erosion protection at required locations adjacent to the pumping stations may be performed in the floodplain or in the Rio Grande channel in order to maintain the integrity of the pumping facilities. Material placed may be used for bedding, bank stabilization, or area restoration. In addition, pumping sites may require placement of concrete at existing pumping facilities to seal breaches or protect the pumping facilities.

- Pumping sites may require construction, removal, or reconstruction of riprap check dams in the LFCC to provide a checked water surface for the pumps. This work will require use of heavy equipment to lift or relocate large rocks and large quantities of gravel material (used to seal voids in rock dams).

Water Conservation Measures

There are numerous water conservation and efficiency efforts taking place within the Middle Rio Grande Project system which include cooperative efforts by Reclamation and the Middle Rio Grande Conservancy District (MRGCD) under Reclamation's Water 2025 program.

With the challenges of meeting water demands on the Rio Grande in New Mexico, there is a need to provide for improvement on irrigation facilities to increase water management efficiencies. These improvements include gate canal and diversion dam gate automation and control with telemetry and water measurement to better track and control water deliveries, canal lining and studies for other system improvements. These measures will improve and modernize irrigation surface water conveyance facilities to increase water conveyance efficiency, reduce system losses due to seepage and evaporation, and improve water management in the Middle Rio Grande Valley. System improvements include but are not limited to: replacement of turnouts and old gates, concrete lining of canals, telemetry and measurement devices, automation, and a computer system able to manage hundreds of gates whose information can be dumped into the internet for access by other water agencies for managing flows of the Rio Grande. In addition, the potential for water conservation savings exists for individual on-farm improvements.

In addition, there are opportunities in the M&I sector for further water conservation savings in the Middle Rio Grande area. Examples would include but are not limited to more stringent usage of water for landscaping, retrofitting of shower heads and low flow toilets, the use of more efficient appliances such as clothes washers and dishwashers, and recycling of water in industrial processes

The long term impacts from these projects and M&I conservation measures on Reclamation's Program acquisition efforts are not fully known, however improvements to the Middle Rio Grande Project system will allow more flexibility in operations by the MRGCD.

2.3 Alternatives Considered but Eliminated from Further Study

In addition to alternatives considered and eliminated in the 2001 PEA, the following alternatives have been eliminated from further analysis in this document, but may be addressed in the Programmatic EIS for the CP. Reasons that further analysis was not pursued include the unavailability of funds, long-term nature of the alternatives which will be addressed in the Middle Rio Grande Endangered Species Collaborative Program Programmatic EIS, and jurisdiction and concurrence may reside with other identities.

Off-channel Interim Storage of Water at Refuges

In the 2001 PEA, it was proposed to utilize potential capacity in existing ponds in Federal and state refuges along the Rio Grande, which included the the Sevilleta National Wildlife Refuge, La Joya State Game Refuge, and the Bosque del Apache National Wildlife Refuge. Reclamation has explored opportunities at these refuges and with the state of New Mexico to store water, which might be available as a result of Reclamation's water leases or intervening high flow events. With this option, Reclamation would collaborate with the refuges to manage the release of this water to maintain native flows for silvery minnow benefits, and to ensure compatibility with refuge programs and operations.

After further study, it was concluded that there were constraints due to the logistics of the delivery system, i.e. inlet and outlet operations which would result in an extremely limited amount of wet water that would be made available to the river, and the threat of reduced water quality due to evaporation. There were concerns about growth of invasive species and the potential for growth of algae and bacteria associated with the ponded water.

Use of groundwater wells

This alternative which was part of the proposed action of the 2001 PEA, would entail the drilling of new wells by Reclamation. In addition, Reclamation could obtain the right to pump existing supplemental wells from willing lessors to augment Rio Grande flows during emergencies. Another component of this alternative includes the leasing by Reclamation of water from wells developed by other entities. The wells could be used to provide water in exchange for maintaining native flows.

It was determined that this option, which would result in a very limited amount of wet water available to the river, was constrained by water availability as the surface and groundwater supplies are hydraulically connected in the fully appropriated Middle Rio Grande.

Forbearance

This alternative involves the voluntary reduction of use of irrigation water so that water can be provided in the upstream reservoirs for storage. With the storage of water, instream flow could be maintained to benefit endangered species in the Middle Rio Grande. However, there are constraints on the storage of water, i.e. lack of storage facilities below El Vado for Rio Chama flows as well as timing of irrigation.

Although forbearance may be a promising alternative, it is beyond the scope of this document and the timing of such will require study in the PEIS for the Middle Rio Grande Endangered Species Act Program

Water Banking & Supplemental Water

Water banking is a fairly generic term applied to the temporary transfer of water between willing sellers/lessors and end users to stretch water supplies in times of shortage. In some cases, these

can be simple paper transactions that allow a change in the place of use over a single irrigation season. In other situations, water banking involves a complex transfer of water not just in place, but also in time. Transfers in time require a storage component for physical wet water. Surface water storage is typically accomplished by reservoir storage. However, groundwater storage may also be used thereby offering opportunities for conjunctive management of both surface and groundwater resources. For example, the state of Arizona is storing surplus Colorado River water supplies in their underground aquifer for future use as a water supply. Interstate water banking is then applied wherein the state of Nevada pays Arizona to store Nevada's excess Colorado River water in Arizona aquifers. When Nevada wants to redeem its storage credits, Nevada water users take surface water from Lake Mead. Arizona users benefit from the water stored underground in the aquifer.

Water banking may be pursued in the future, but is beyond the scope of this supplement and would require future environmental analysis.

Operation of Existing Reservoirs & Construction of New Reservoirs

In the middle Rio Grande, the greatest opportunities for improved water management lie in enhancing the ability to manage and store water along the mainstem of the Rio Grande. With the exception of a single flood control facility, Cochiti Lake, all other storage reservoirs are located on tributaries, most notably along the Rio Chama. The Rio Chama contributes about one third of flows into the middle Rio Grande. With the exception of flood control, the remaining two thirds of flows along the middle Rio Grande are largely unregulated. Cochiti Lake is operated by the U.S. Army Corps of Engineers and is authorized for the purposes of flood control and sediment control, recreation, and fish and wildlife resources.

The addition of new storage capacity in the Rio Grande system is a long-term endeavor requiring activities such as Congressional authorization, siting and feasibility studies, NEPA compliance, stakeholder and landowner concurrence, as well as time for the actual construction of a facility. The examination of re-regulation opportunities in Abiqui or Cochiti reservoirs or the benefits of creating new storage opportunities for mainstem flows is beyond the scope of this PEA and this alternative may be studied at a future date.