

RECLAMATION

Managing Water in the West

Jicarilla Apache Nation Water Subcontract to the City of Santa Fe

Final Environmental Assessment and Finding of No Significant Impact



Heron Dam

Source: www.usbr.gov/dataweb/dams/images/heron2.jpg



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

October 4, 2005

FINDING OF NO SIGNIFICANT IMPACT

**Environmental Assessment
Jicarilla Apache Nation Water Subcontract to the City of Santa Fe
Santa Fe County, New Mexico**

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

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Date *October 17, 2005*

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10/17/05
Date

FONSI Number: AAO-05-006

Summary

An Environmental Assessment to address the environmental effects of an approval by the United States, through the Secretary of the Interior, of a water supply subcontract (i.e., lease) for a portion of the Jicarilla Apache Nation's (Nation) San Juan-Chama Project water supply to the City of Santa Fe, New Mexico (City) was prepared for Reclamation.

The proposed Action is the approval by Reclamation of a subcontract lease between the Nation and the City. Under the subcontract, the Nation would make available for delivery to the City at the outlet works of Heron Dam up to 3,000 acre-feet per year (ac-ft/yr) of the Nation's San Juan-Chama Project water entitlement under the Federal Contract. The term of the subcontract would be limited to 50 years beginning in 2007. The subcontract provides that the City is solely responsible for conveyance of the water from the outlet works at Heron Dam to the point of use. Thus, the Proposed Action does not involve the new construction, or additional operation, maintenance, or repair of any conveyance, diversion, treatment, or delivery works.

The subcontract and the approval are pursuant to the Jicarilla Apache Tribe Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237, as amended (Settlement Act), and the associated Contract between the Jicarilla Apache Nation and the United States dated December 8, 1992 (Federal Contract). Under the Settlement Act and the Federal Contract, the Nation has the right to subcontract its San Juan-Chama Project water to third parties for beneficial use outside the Jicarilla Apache Indian Reservation when the Nation is not using the water on the Reservation. Approval of any subcontract or lease by the Secretary of the Interior is required by the Settlement Act and Federal Contract. The Secretary of the Interior has delegated the authority to approve such subcontracts to the Regional Director of the Upper Colorado Regional Office of the Bureau of Reclamation (Reclamation). The Nation has formally requested the Secretary's approval of the proposed subcontract with the City.

Alternatives Considered

A No Action Alternative was presented in the document where Reclamation would not approve the subcontract between the Nation and the City. The subcontract would not take effect without this approval, and the Nation would not make available to the City of Santa Fe 3,000 ac-ft/yr of the Nation's San Juan-Chama Project for the 50-year period. The City would presumably seek alternative sources of water to meet its water supply requirements.

Under the No Action Alternative, the Buckman Well Field would continue to provide about 40 to 60 percent of the City's water supply.

Decision

Reclamation has decided to implement the proposed action alternative as described in the EA. This preferred alternative is approval of the subcontract. Approval of the subcontract will allow the Nation to utilize a portion of its water rights to benefit from water resources development through subcontract revenues as contemplated by the Federal Contract.

Environmental Impacts of the Jicarilla Apache Nation Water Subcontract to the City of Santa Fe

The following resources and factors were evaluated in detail in the EA for anticipated impacts from implementation of the subcontract: surface water, groundwater, biological resources, special status species, cultural resources, environmental justice and Indian trusts assets. The following resources are discussed further:

Surface Water Resources

The soils in the Research Project area vary from flat, alluvial loams to steep, rocky outcrops, to exposed caliche surfaces. Potentially better soil nutrient availability will result due to the treatment and research performed in the project area. No equipment or facilities requiring permitting through the New Mexico Environment Department Air Quality Bureau (NMAQB) are proposed for the action.

Groundwater Resources

Under the proposed action, additional flows to help meet the requirements from the Office of State Engineers to operate the Buckman well, specifically mitigating ground water and surface water depletions, would cause no adverse cumulative effects on groundwater resources.

Biological Resources

No adverse impacts to biological resources are expected with the proposed alternative.

Special Status Species

The proposed action is expected to have no affect on federally listed threatened or endangered species.

Cultural Resources

A cultural resources/archaeological survey were not completed as the proposed action does not involve any construction or alteration of any facility along the river system. It was determined that the proposed action would have no effect on cultural resources.

Environmental Justice

In following the Executive Order 12898 of 1994, "Federal Actions to Address Environmental Justice in Minority Populations," the proposed action could positively affect minority and low-income populations. The project would enrich those populations with drinking water.

Indian Trusts Assets

The water supply and water rights associated with the proposed project are Indian Trust Assets which will be benefited from the proposed project. No other Indian Trust Assets have been documented in the project area. Therefore, no adverse impact to Indian Trust Assets would result from the proposed action.

Cumulative Impacts

Cumulative Impacts are defined 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 (Federal or non-Federal) or person undertakes such other actions."

Cumulative impacts as a result of the proposed action are expected to be low.

Mitigation Measures/Environmental Commitments

No adverse impacts that would warrant mitigation have been identified, therefore no mitigation measures are proposed.

Nature of Environmental Impacts

Possible impacts include displacement of wildlife associated with the proposed treated saltcedar acreage. This would be due to the loss of vegetation if native species do not revegetate in the treated areas. Increases in sedimentation of surface waters within the project area may occur depending upon the results of the revegetation sites and the effectiveness of spraying saltcedar.

Consultation and Coordination

Coordination with other agencies and organizations included the Fish and Wildlife Service in 2004, U.S. Army Corp of Engineers, Bureau of Indian Affairs, City of Santa Fe and the Jicarilla Apache Nation. No public comments were received on the draft Environmental Assessment or Finding of No Significant Impact during or after the 30 day comment period.

Finding

Based on the analysis presented in the EA, Reclamation finds that there would be no significant impacts associated with implementation of the proposed action. Reclamation makes this Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) and the Council on Environmental Quality implementing regulations (40 CFR 1500). Reclamation has determined that the proposed action does not constitute a major federal action that would significantly affect the human environment. Therefore, no environmental impact statement will be prepared for this proposal.

MISSION STATEMENT

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.



ACRONYMS AND ABBREVIATIONS SUMMARY

ac-ft/yr

acre-feet per year

BLM

Bureau of Land Management

Buckman Water Diversion Projection DEIS

Buckman Water Diversion Project Draft
Environmental Impact Statement

CEQ

Council on Environmental Quality

cfs

cubic feet per second

City

City of Santa Fe, New Mexico

CWA

Clean Water Act

DO

dissolved oxygen

EA

Environmental Assessment

EIS

Environmental Impact Statement

ESA

Endangered Species Act

Federal Contract

Contract between the Jicarilla Apache Nation and
the United States dated December 8, 1992

ITA

Indian Trust Asset

mg/L

milligrams per liter

MRGCD

Middle Rio Grande Conservancy District

Nation

Jicarilla Apache Nation

NAWQA

National Water Quality Assessment

NEPA

National Environmental Policy Act

NMNHP

New Mexico Natural Heritage Program

NTU

Nephelometric Turbidity Unit

OSE

New Mexico Office of the State Engineer

Reclamation

Bureau of Reclamation

Settlement Act

Jicarilla Apache Tribe Water Rights Settlement Act
of October 23, 1992, 106 Stat. 2237, as amended

TDS

total dissolved solids

USACE

U.S. Army Corps of Engineers

USBIA

U.S. Bureau of Indian Affairs

USFWS

U.S. Fish and Wildlife Service

USGS

U.S. Geological Survey



SUMMARY OF RESOURCE EFFECTS BY ALTERNATIVE

AFFECTED RESOURCE	<i>Sub-Category</i>	NO ACTION	PROPOSED ACTION (PREFERRED ALTERNATIVE)
Direct & Indirect Effects 4.1			
Water Resources			
	<i>Surface Water</i> 4.1.1	No effect. The City would need to continue to meet permit requirements to offset surface water effects of its ground water pumping.	No effect.
	<i>Groundwater</i> 4.1.2	No effect. The City would still be required under existing permits to offset its groundwater depletions and reductions in streamflow in the Rio Grande and its tributaries attributed to the City's groundwater pumping.	No effect. Would provide 3,000 ac-ft/yr for groundwater offsets and other legal and regulatory requirements, as well as for direct diversions.
Biological Resources 4.1.3	<i>Aquatic Communities</i> 4.1.3.1	No effect. If the City is not able to acquire the Nation's subcontract water, the City is still required under its existing permits to offset the effects on surface water from its ground water depletions, and therefore aquatic communities would not be affected.	No effect. The Proposed Action would make additional water available to the City to enhance the City's ability to offset calculated depletions on the Rio Grande as a result of Buckman Well Field pumping, and to mitigate potential impacts on fish and macroinvertebrate communities within the Project Area.
Riparian Resources 4.1.4		No effect. The No Action Alternative would not remove or modify vegetation communities within the Project Area. As a condition of approval of regulatory permits, the City is required to monitor potentially impacted riparian/wetlands every five years and mitigate for effects to riparian areas as a result of Buckman Well Field pumping.	No effect. Additional in-stream water may be available to offset flow reductions caused by groundwater depletions.
Threatened & Endangered Species 4.1.5		No effect. There would be no disturbance or change in threatened and endangered or special status species. No Action would not guarantee the availability of the Nation's water to Reclamation to supplement flows for the silvery minnow.	No effect.



SUMMARY OF RESOURCE EFFECTS BY ALTERNATIVE

AFFECTED RESOURCE	<i>Sub-Category</i>	NO ACTION	PROPOSED ACTION (PREFERRED ALTERNATIVE)
Cultural Resources 4.1.6		No effect. The Proposed Action would involve no construction or disturbance to cultural resources and therefore would have no effect on cultural resources.	No effect. The Proposed Action does not involve any construction or alteration of any facilities along the river system. Because no alteration or ground disturbance is proposed, there would be no adverse effect on cultural resources.
Environmental Justice 4.1.7		Affected. The Nation would lose the benefit of the subcontract, resulting in the loss of revenue from the subcontract. The lost revenue would adversely impact the Nation's on-going efforts to provide human services and economic development opportunity to its people.	No effect. The Proposed Action will benefit the Nation and not affect other minority and low income communities.
Indian Trust Assets 4.1.8		Affected. The Nation would not be able to enjoy the economic benefit of the subcontract it has negotiated with the City. This would be an adverse effect on the Nation's water rights as an Indian Trust Asset.	No effect. The Proposed Action will have a positive benefit by facilitating the Nation's use of its Indian Trust Asset for an economic return to the Nation. The Proposed Action will not affect the Indian Trust Assets of any other tribe.
Cumulative Effects 4.2			
	<i>Surface Water</i> 4.2.2	No effect. Under the No Action Alternative, the City would need to continue to seek other methods (e.g., other water rights) to meet its near-term water supply needs for groundwater offsets and other water uses. Flows in the Rio Grande would continue to be regulated by the OSE and the City would need to find alternative releases of San Juan-Chama or other water for offsets. Therefore, the No Action Alternative, taken together with past, present and future actions, would have no cumulative effect on surface	No effect.



SUMMARY OF RESOURCE EFFECTS BY ALTERNATIVE

AFFECTED RESOURCE	<i>Sub-Category</i>	NO ACTION	PROPOSED ACTION (PREFERRED ALTERNATIVE)
		water resources.	
	<i>Groundwater Resources</i> 4.2.3	No effect. Under the No Action Alternative, the Buckman Well Field would continue to provide about 40 to 60 percent of the City's water supply, however, the cumulative effects of groundwater depletions and reductions in streamflow would continue to require current mitigation (offsets) to satisfy OSE requirements. If other proposed projects were constructed affecting groundwater depletions and associated stream depletions, the rate at which these groundwater depletions occur could be affected, constituting a cumulative effect. To the extent that future wells are proposed, the OSE will require appropriate mitigation for surface and groundwater protection. Therefore, no cumulative effects have been identified	No effect. If other proposed projects are constructed affecting groundwater depletions and associated stream depletions, such as the Buckman Water Diversion Project, the rate at which these groundwater depletions occur could be affected, constituting a cumulative effect. To the extent that future wells are proposed, the OSE will require appropriate mitigation for surface and groundwater protection. The Proposed Action would provide additional flows to help meet the requirements from the OSE to operate the Buckman wells, specifically mitigating groundwater and surface water depletions
Biological Resources 4.2.4	<i>Aquatic Communities</i> 4.2.4.1	No effect. The No Action Alternative would not effect aquatic communities, causing no cumulative effect. If the City is not able to acquire the Nation's subcontract water, the City is still required under its existing permits to offset the effects on surface water from its ground water depletions.	No effect.
Riparian Resources 4.2.5		No effect. The No Action Alternative would not remove or modify vegetation communities within the Project Area. As a condition of approval of regulatory permits, the City is required to monitor potentially impacted riparian/wetlands every five years and mitigate for effects to riparian areas as a result of Buckman Well Field pumping.	No effect.



SUMMARY OF RESOURCE EFFECTS BY ALTERNATIVE

AFFECTED RESOURCE	<i>Sub-Category</i>	NO ACTION	PROPOSED ACTION (PREFERRED ALTERNATIVE)
		Therefore, the No Action Alternative, taken together with past, present and future actions, would have no cumulative effect on surface water resources.	
Threatened and Endangered Species 4.2.6		No effect. Under the No Action Alternative, there would be no disturbance of or change in threatened and endangered or special status species. Other proposed water diversion projects will also be required to offset direct effects. Therefore, there would be no cumulative adverse effect.	No effect. Other proposed projects would be required to keep flow conditions at the Otowi gage whole with state and federal regulatory controls (for example, CWA, ESA) likely restricting such potential future degradations.
Cultural Resources 4.2.7		No effect. The Proposed Action would involve no construction or disturbance to cultural resources and therefore would have no cumulative effect on cultural resources.	No effect. The Proposed Action does not involve any construction or alteration of any facilities along the river system. Because no alteration or ground disturbance is proposed, there would be no adverse effect on cultural resources.
Environmental Justice 4.2.8		Affected. The Nation would lose the benefit of the subcontract, resulting in the loss of revenue from the subcontract. The lost revenue would adversely impact the Nation's on-going efforts to provide human services and economic development opportunity to its people, thereby causing an adverse cumulative effect.	No effect.
Indian Trust Assets 4.2.9		Affected. Under the No Action alternative, the Nation would not be able to enjoy the economic benefit of the subcontract it has negotiated with the City. This would have an adverse cumulative effect on the Nation's water rights as an Indian Trust Asset. The Nation has no current use for the water under the subcontract on the Reservation. Consequently, the	No effect. The Proposed Action would have a positive cumulative effect by facilitating the Nation's use of its Indian Trust Asset for an economic return to the Nation. The Proposed Action would not have a cumulative effect on the Indian Trust Assets of any other tribe.



SUMMARY OF RESOURCE EFFECTS BY ALTERNATIVE

AFFECTED RESOURCE	<i>Sub-Category</i>	NO ACTION	PROPOSED ACTION (PREFERRED ALTERNATIVE)
		<p>Nation would not realize any current and future offsetting benefit.</p> <p>No Indian Trust Assets of other tribes would be affected.</p>	



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CHAPTER 1. PURPOSE AND NEED FOR ACTION

1.1 Proposed Action

The Proposed Action involves the Bureau of Reclamation approving a subcontract between the Jicarilla Apache Nation (Nation) and the City of Santa Fe (City). Under the subcontract, the Nation would make available for delivery to the City at the outlet works of Heron Dam up to 3,000 acre-feet per year (ac-ft/yr) of the Nation's San Juan-Chama Project water entitlement under the Federal Contract. The term of the subcontract would be limited to 50 years beginning in 2007. The subcontract provides that the City is solely responsible for conveyance of the water from the outlet works at Heron Dam to the point of use. Thus, the Proposed Action does not involve the new construction, or additional operation, maintenance, or repair of any conveyance, diversion, treatment, or delivery works by the federal government. The City's development of its distribution system, located near Santa Fe NM, is covered by a separate EIS.

The subcontract limits the City's use of the leased water to use within the City's Water Utility Service System or for meeting legal, regulatory or offset requirements associated with the City's Water Utility Service System. The City's use is further limited to purposes authorized by the San Juan-Chama Project Act, and other applicable Reclamation laws and interstate compacts.

1.2 Need for the Action

The Proposed Action is needed to allow the Nation to benefit from subcontracting its water under the Federal Contract as intended by the United States Congress. The water supply subject to the subcontract is not currently needed for on-Reservation use and the Nation does not foresee a need for its use on-Reservation within the term of the subcontract. Accordingly, the water is available for subcontracting off-Reservation. The Legislative Council of the Nation has found that the subcontract with the City is for a term and contains conditions that will ensure the ability of the Nation to retrieve all or a portion of this water supply for its purposes at the expiration of the subcontract if the Nation determines it has alternative uses, and that the terms and conditions of this subcontract will not jeopardize the ability of the Nation to utilize all or a portion of this water supply for on-Reservation development as needed upon expiration of the subcontract.

1.3 Relevant Statutes, Regulations, and Other Plans

This Environmental Assessment (EA) addresses the environmental effects of the approval by the United States, through the Secretary of the Interior, of a water supply subcontract (i.e., lease) for a portion of the Jicarilla Apache Nation's (Nation) San Juan-Chama Project water supply to the City of Santa Fe, New Mexico (City). The subcontract and the approval are pursuant to the Jicarilla Apache Tribe Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237, as amended (Settlement Act), and the associated Contract between the Jicarilla Apache Nation and the United States dated December 8,



1992 (Federal Contract). Under the Settlement Act and the Federal Contract, the Nation has the right to subcontract its San Juan-Chama Project water to third parties for beneficial use outside the Jicarilla Apache Indian Reservation when the Nation is not using the water on the Reservation. Approval of any subcontract or lease by the Secretary of the Interior is required by the Settlement Act and Federal Contract. The Secretary of the Interior has delegated the authority to approve such subcontracts to the Regional Director of the Upper Colorado Regional Office of the Bureau of Reclamation (Reclamation). The Nation has formally requested the Secretary's approval of the proposed subcontract with the City.

1.3.1 Relationship to Other Actions

The Proposed Action is separate and independent of other projects affecting the Rio Chama and Rio Grande. Other independent projects proposed in the area that may have an impact on these rivers and related resources are discussed in Section 4.2.1, General Considerations for Cumulative Effects.

1.4 Issues, Public Scoping

1.4.1 Summary of Issues

The potential of the Proposed Action to affect existing resources can be grouped into three key issue areas considered in this document:

- **Water Resources** – The confluence of the Chama with the Rio Grande, and river flows in the Rio Grande to the tailwaters of Cochiti Reservoir.
- **Biological Resources** – The Project Area includes fish and aquatic habitats from below Heron Dam to the tailwaters of Cochiti Reservoir.
- **Riparian Resources** – The Project Area includes the wetted perimeter of the Rio Chama and Rio Grande from the outlet of Heron Dam to the tailwaters of Cochiti Reservoir.

1.4.2 Coordination with Agencies and Other Organizations

This EA will be distributed to the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (USACE), the U.S. Bureau of Indian Affairs (USBIA), the City, and Nation. This EA will also be available for review to entities and individuals requesting it from Reclamation or the Nation.

1.4.3 Scoping Process

Informal scoping between USFWS, Reclamation, and City began in early 2004.

1.4.4 Compliance with Other Federal Environmental Statutes

The Proposed Action would have no effect on compliance with other federal environmental statutes. This EA addresses two species, the Rio Grande Silvery Minnow (*Hybognathus amarus*) and the Southwestern Willow Flycatcher (*Empidonax trailii*)

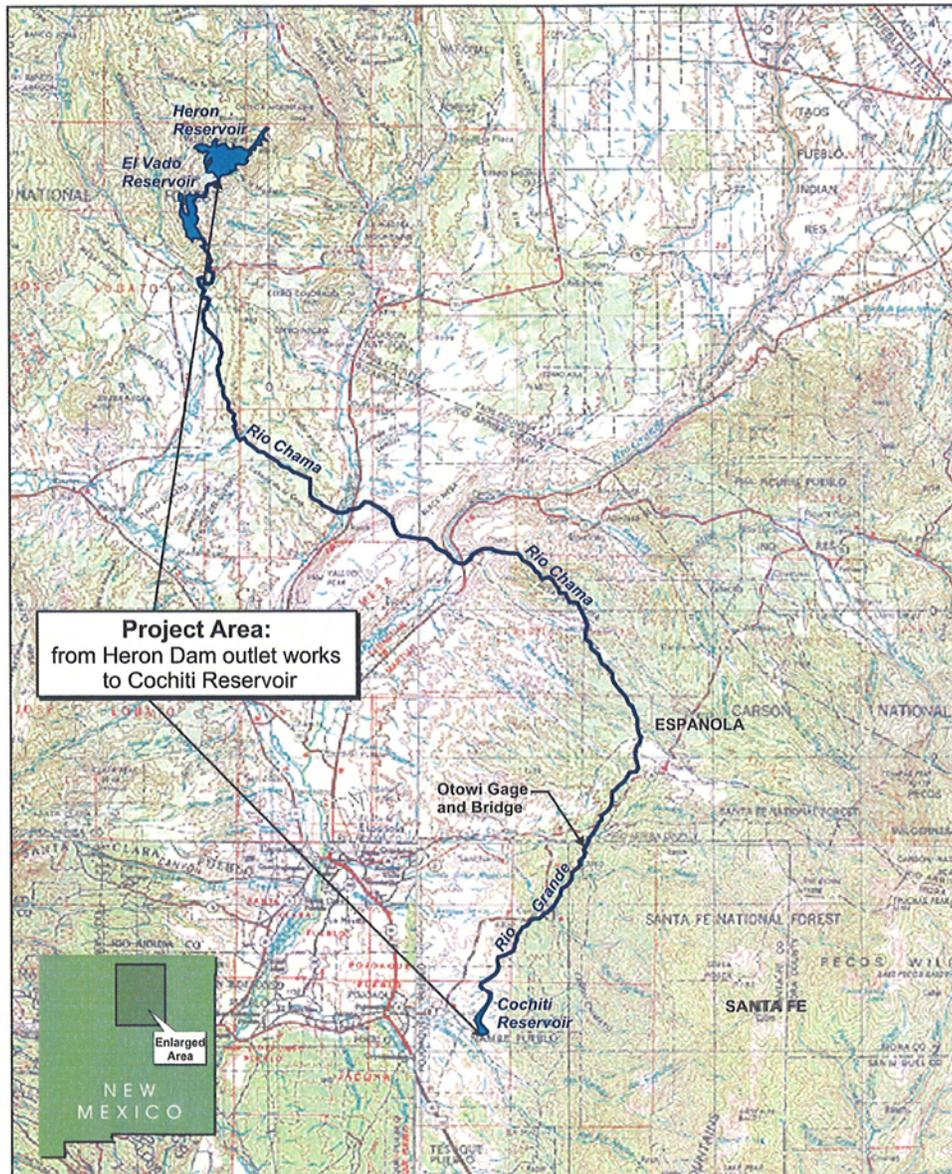


extimus), that are protected under the federal Endangered Species Act. These listed species are discussed in greater detail in Section 3.4. As explained in Section 2.2, the Proposed Action does not involve any construction activities and will not result in any impacts to the existing hydrograph and the wetted perimeter within the Project Area that are distinguishable from historical operations of the San Juan-Chama Project and conveyance or storage of San Juan-Chama Project water historically. The Proposed Action is entirely consistent with historical operations of the San Juan-Chama Project. Therefore, the Proposed Action will not affect any of the listed species or their critical habitat. As such, formal consultation under the federal Endangered Species Act is not required for this project.

1.5 Project Area

The Nation will make water available to the City under the subcontract at the outlet works of Heron Dam. Heron Dam is located on the upper Rio Chama approximately 80 miles northwest of the City of Santa Fe. For purposes of the analysis in this EA, the Project Area includes the wetted perimeter and riparian areas of the Rio Chama from the Heron Dam outlet works to its confluence with the Rio Grande and south from this confluence to Cochiti Reservoir.

Figure 1. Project Area



USGS 15 Minute Quadrangles: Aztec, New Mexico-Colorado 1954, Albuquerque, New Mexico 1983, Raton, New Mexico-Colorado 1954, Santa Fe, New Mexico 1954

Figure 1
Vicinity

 Scale - 1 : 750 000



CHAPTER 2. ALTERNATIVES

2.1 No Action

Under the No Action Alternative, Reclamation would not approve the subcontract between the Nation and the City. The subcontract would not take effect without this approval, and the Nation would not make available to the City of Santa Fe 3,000 ac-ft/yr of the Nation's San Juan-Chama Project for the 50-year period. The City would presumably seek alternative sources of water to meet its water supply requirements. The Nation's water cannot be assumed to be available for use by Reclamation to supplement flows for the silvery minnow under the No Action Alternative. Although the Nation has entered into subcontracts with Reclamation for the use of the Nation's water to supplement flows for the silvery minnow in the past several years, the Nation's water is not subcontracted to Reclamation during any year corresponding to the term of the proposed subcontract to the City. Nor is the Nation obligated to subcontract its water to Reclamation beyond the term of the current subcontract between Reclamation and the Nation ending in 2005.

2.2 Proposed Action

The Proposed Action is Reclamation's approval of the subcontract. Approval of the subcontract will allow the Nation to utilize a portion of its water rights to benefit from water resources development through subcontract revenues as contemplated by the Federal Contract. The Nation wishes to exercise its right to subcontract under the Federal Contract. Under the subcontract, the Nation would make available for delivery to the City at the outlet works of Heron Dam up to 3,000 ac-ft/yr of the Nation's San Juan-Chama Project water entitlement. The term of the subcontract would be 50 years beginning in 2007.

As noted above, the Proposed Action does not involve conveyance of water from the point of delivery of the outlet works of Heron Dam. This EA considers the effects of the Proposed Action, including the indirect effects, by analyzing the effects on the Rio Chama, the Rio Grande, and reservoirs from Heron to Cochiti. Upon delivery and release from Heron Dam, the water would remain primarily in-river for the purpose of offsetting the effects of groundwater depletions or meeting other legal or regulatory water delivery requirements. At the City's option, all or part of this water supply may be stored in reservoirs for subsequent use by the City, or all or part of the leased water may be diverted directly from the Rio Grande as one of several sources for the City's water supply delivery system. The leased water may be fully consumptively used when diverted, subject to the conditions of applicable permits.

Under foreseeable operating conditions for deliveries of the leased water, releases would be made in a manner that is consistent with the existing operations for delivery of San Juan-Chama Project water from Heron Dam to Cochiti Reservoir as called for by the project contractors, specifically by the City. The range of the historic operations of the



project has varied between storing all or part of released water in El Vado and/or Abiquiu reservoirs for future use by contractors including the City, to conditions requiring releases below Abiquiu Dam to be concentrated in short periods depending upon specific hydrologic and operational conditions or regulatory and operational needs of the City. Similarly, release patterns for this block of water will be performed to replace calculated depletion effects on Rio Grande flows as a result of the pumping of the Buckman wellfield (offsets) or to provide for direct diversions for drinking water supply from the Rio Grande. These conditions are considered in Chapter 3, Affected Issues and Environmental Resources.

CHAPTER 3. AFFECTED ISSUES AND ENVIRONMENTAL RESOURCES

3.1 Introduction

This Chapter describes the existing conditions of the affected environment. It is based, in large part, on the information and data found in the Draft Environmental Impact Statement for the Buckman Water Diversion Project (Buckman Water Diversion Project DEIS) (USFS, 2004).

3.2 Surface Water Resources

The Proposed Action would approve the lease of water which would be released for use by the City from Heron Dam, located on the Rio Chama approximately 80 miles northwest of Santa Fe. The hydrologic setting commences at Heron Dam, south into Rio Chama, through El Vado and Abiquiu reservoirs, to Rio Chama's confluence with the Rio Grande and ending at Cochiti Reservoir.

3.2.1 Hydrologic Setting

There are four reservoirs within the Project Area: Heron, El Vado, Abiquiu, and Cochiti. Table 1 provides a summary of information about each of these reservoirs.

Table 1. Summary of Reservoir Data

Reservoir	Purpose	Storage Capacity (ac-ft)	Crest Elevation (ft)	Max Dam Height (ft)	Max Surface Area (ac)	Drainage Area (sq mi)	Type	Location	Operator
Heron	Storage and delivery of San Juan-Chama water	401,000	7,199	269	5,950	193	Earthfill	80 miles northwest of Santa Fe	Reclamation
El Vado	Storage for irrigation, recreation, incidental flood control, and sediment control	209,330 minus sediment reductions	6,902	205	3,200	877	Earthfill and steel-plated rockfill	5 miles downstream of Heron Reservoir	Reclamation



Reservoir	Purpose	Storage Capacity (ac-ft)	Crest Elevation (ft)	Max Dam Height (ft)	Max Surface Area (ac)	Drainage Area (sq mi)	Type	Location	Operator
Abiquiu	Flood and sediment control, and San Juan-Chama water storage	1,212,000 minus sediment reductions	6,375	341	15,536	2,146	Rolled earth	32 miles upstream of Rio Grande confluence	USACE Albuquerque District
Cochiti	Primary flood control for snowmelt runoff control on mainstem of the Rio Grande; recreation pool	596,400 minus sediment reductions	Approx. 5,475	250	9,365	14,900	Rolled earth	About 25 miles west-southwest of Santa Fe	USACE Albuquerque District

Source: USFS, 2004

3.2.1.1 Rio Chama

The Rio Chama flows for approximately 60 miles below Heron Dam, with a drainage area of 3,159 square miles, of which 2,146 square miles are above Abiquiu Dam. Elevations in the entire watershed range from about 12,000 feet above sea level in the San Juan Mountains to about 5,600 feet above sea level at the mouth of the Rio Chama.

3.2.1.2 Heron Dam and Reservoir

Heron Dam is located on Willow Creek, a tributary of the Rio Chama, just above the creek's confluence with the Rio Chama. The dam and reservoir provide regulating and storage capability for San Juan River water diverted through the Continental Divide via the San Juan-Chama Project. Heron Dam is located about 80 miles northwest of Santa Fe. Water is delivered to Heron Reservoir via Willow Creek and released directly into the Rio Chama at the Dam's outlet works.

3.2.1.3 El Vado Dam and Reservoir

El Vado Dam is located on the Rio Chama about five miles downstream from Heron Dam. The reservoir is authorized to store both native and San Juan-Chama water primarily for the benefit of the Six Middle Rio Grande Pueblos and the Middle Rio Grande Conservancy District (MRGCD), but other entities, including the City of Santa Fe, store San Juan-Chama water there through a separate agreement with the MRGCD. Reclamation operates El Vado Dam.



3.2.1.4 Rio Chama from El Vado Dam to Abiquiu Reservoir

On November 7, 1988, Congress passed Public Law 100-633, which added two segments of the Rio Chama between El Vado and Abiquiu Reservoirs to the national Wild and Scenic River system. The two segments combined are approximately 25 miles in length.

3.2.1.5 Abiquiu Dam and Reservoir

Abiquiu Dam is located 32 river miles upstream from the confluence of the Rio Chama with the Rio Grande. Abiquiu Dam and Reservoir is operated primarily for flood and sediment control, as well as storage of San Juan-Chama water. The USACE Albuquerque District operates Abiquiu Dam.

3.2.1.6 Rio Chama from Abiquiu Dam to Rio Grande Confluence

Abiquiu Dam has regulated native Rio Chama flows below the dam since 1963, and beginning in 1971 has also regulated the added San Juan-Chama flows introduced into the system. Prior to the introduction of San Juan-Chama water, no significant reservoir storage accrued behind the dam. In 1981 Congress authorized the additional purpose of storing transbasin (San Juan-Chama) water in Abiquiu Reservoir. This has provided a significant flat water recreation resource as a result of storage of San Juan-Chama water through separate agreements with USACE and the City of Albuquerque. The releases from the dam support the production of salmonids for several miles downstream (USFS, 2004). Numerous acequias (irrigation ditches) exist along this stretch of the Rio Chama.

3.2.1.7 Rio Grande from Confluence with Rio Chama to Cochiti Reservoir

The Rio Grande flows approximately 15 miles from its confluence with the Rio Chama to the tailwaters of Cochiti Reservoir. This stretch of the Rio Grande is highly regulated due to Abiquiu Reservoir operations. The Rio Grande slopes approximately six feet per mile and has an average width of 300 feet through the subject reach.

The U.S. Geological Survey (USGS) Otowi gage is located about 10 miles below the confluence of the Rio Chama with the Rio Grande at the Otowi Bridge near San Ildefonso, New Mexico. The gage has recorded stream flows from February 1895 to December 1905 and from June 1909 to the present, making it one of the oldest stream flow records in the United States. Since 1963, after Abiquiu Dam was constructed, the average annual flow at the Otowi gage has been about 1,500 cubic feet per second (cfs). Seasonally, the average high-flow month has been May, with an average flow of about 3,400 cfs, and average flows from August through February typically range from about 800 to 1,000 cfs.

Much of the reach from the Otowi Bridge is confined within a canyon until it discharges into the Cochiti Reservoir pool. The bed material is dominated by sand, cobble, and some boulders. According to USGS flow records, the width of the river at Otowi Bridge is



about 120 feet and the flow velocity is typically on the order of 3 feet per second during average flow conditions (on the order of 1,500 cfs).

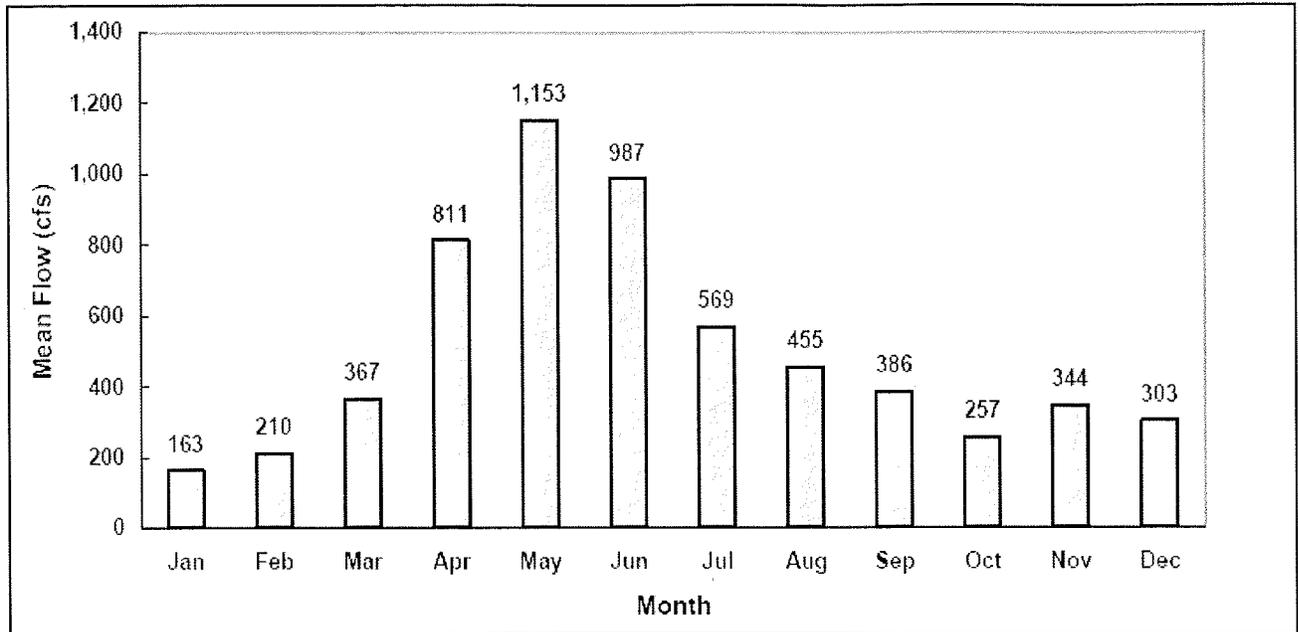
3.2.1.8 Cochiti Dam and Reservoir

Cochiti Dam was constructed pursuant to authorization of the Flood Control Act of 1960 and is located just downstream from White Rock Canyon near the confluence of the Santa Fe River and the Cañada de Cochiti. It is upstream of the confluence of the Rio Grande with the Jemez River. Cochiti Reservoir (lake) has a surface area at the top of the flood control pool that extends approximately 20 miles upstream into White Rock Canyon. USACE was authorized to include a permanent 50,000 acre-foot sediment retention and recreation pool provided the water was from outside the Rio Grande basin. The United States provides up to 5,000 ac-ft/yr of San Juan-Chama water to establish and maintain the pool.

3.2.2 Streamflow

Average monthly flows below Abiquiu Dam on the Rio Chama are illustrated in Figure 2. Since February 1963, when Abiquiu began operation, flows have varied greatly along this reach of the river from a high of 2,990 cfs, recorded in July 1965 to times when there has been no flow in the channel. Evacuation of San Juan-Chama water stored in Abiquiu Reservoir may be required when the snowmelt forecast indicates a need for flood capacity exceeding 302,000 ac-ft. In the Rio Chama below Abiquiu Dam, summer and fall flows are higher than natural due to increased reservoir releases, including releases of imported San Juan-Chama water and storage from Abiquiu Reservoir. The average annual flow in the Rio Chama below Abiquiu Dam was about 500 cfs from 1962 to 2001, but has ranged between a low of 201 cfs in 1964 to a high of 946 cfs in 1987.



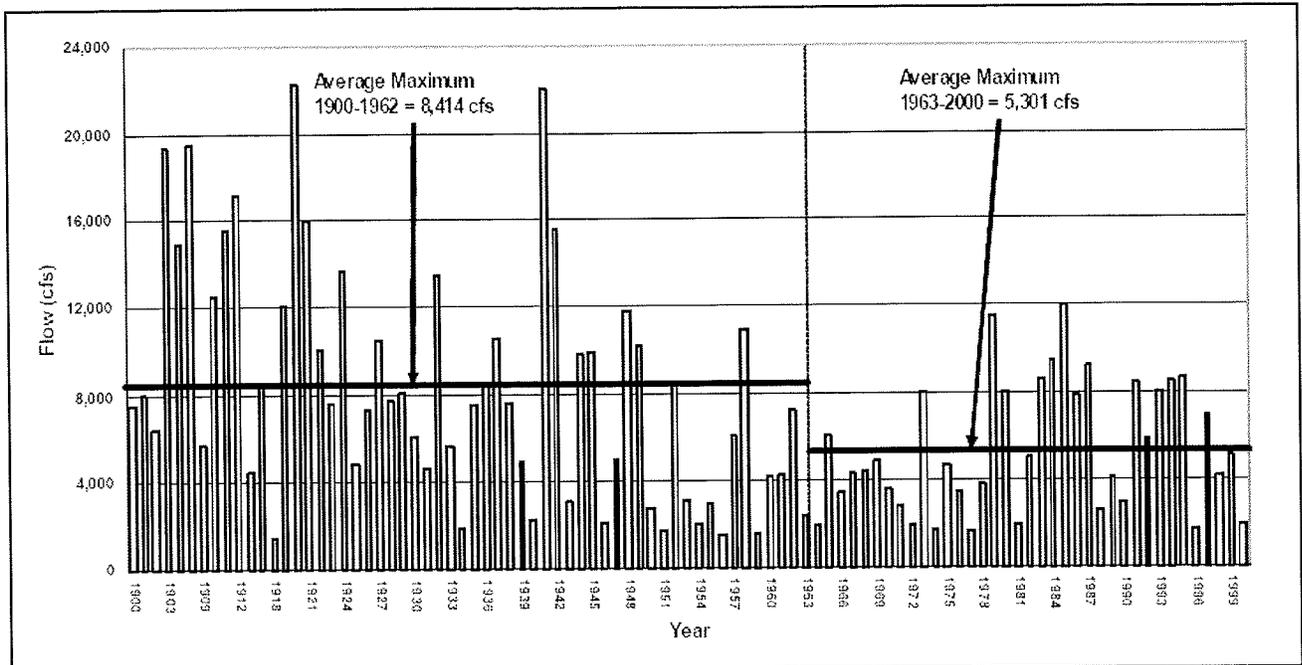


Source: USFS, 2004

Figure 2. Monthly Average Streamflows in Rio Chama Below Abiquiu Dam

Because the Otowi gage is located about 10 miles downstream from the confluence of the Rio Grande and the Rio Chama, it is useful for determining the effects of San Juan-Chama Project releases, which began in 1971, on Rio Grande flows. From 1971 to 1998, San Juan-Chama water increased flows at the Otowi gage by an average of 73 cfs, an increase of about 5 percent over non-San Juan-Chama flow. Figure 3 illustrates annual maximum daily flows in the Rio Grande at the Otowi gage from 1900 to 2000. The Otowi gage also is used to determine New Mexico's obligation to Texas under the Rio Grande Compact. In accordance with the Colorado and upper Colorado River and Rio Grande Compacts, the inflows from the San Juan-Chama Project are specifically excluded from native flows at the Otowi gage and are accounted for separately.

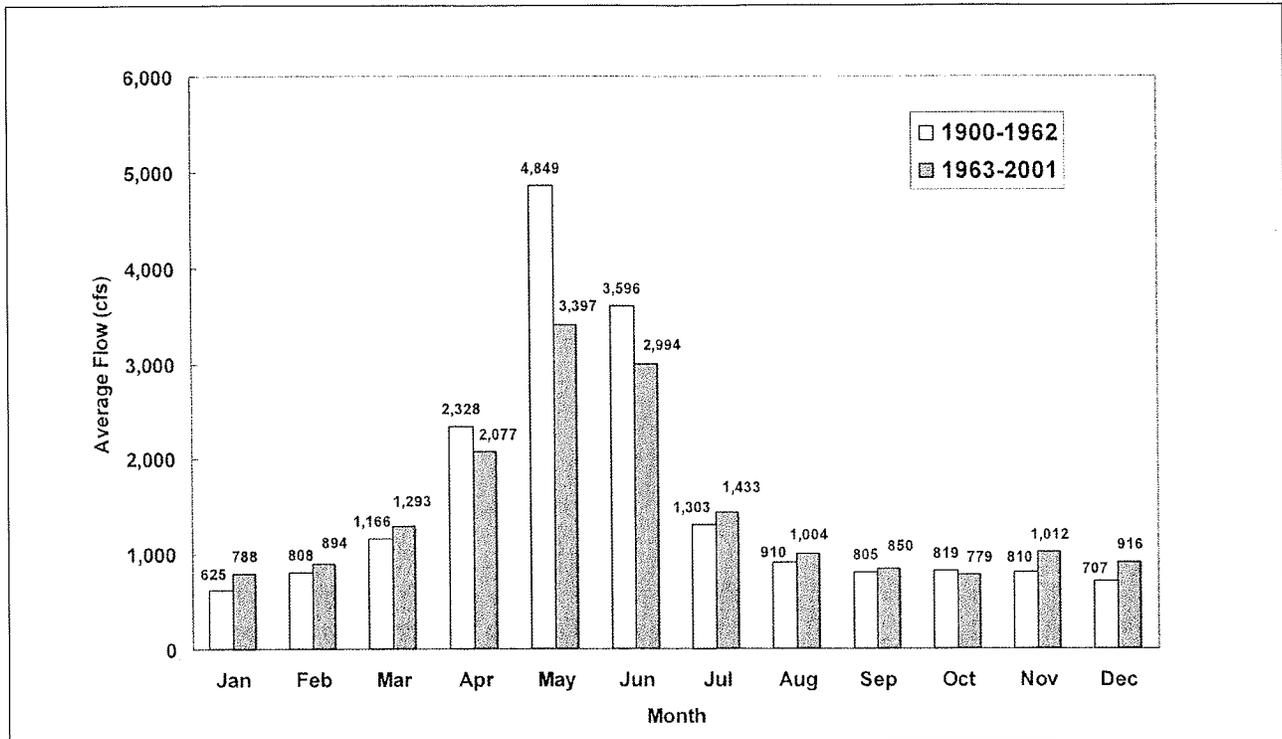
Flows in the Rio Grande at Otowi vary with the seasons as shown in Figure 2 and Figure 3. Figure 4 illustrates how average monthly flows have varied before and after the construction of Abiquiu Dam. Monthly average flows from August through February for the period 1963 to 2001 range from about 800 cfs to 1,000 cfs, whereas the average monthly flow for May for the same period is about 3,400 cfs.



Source: USFS, 2004

Figure 3. Maximum Daily Flows in Rio Grande at the Otowi Gage, 1900-2000





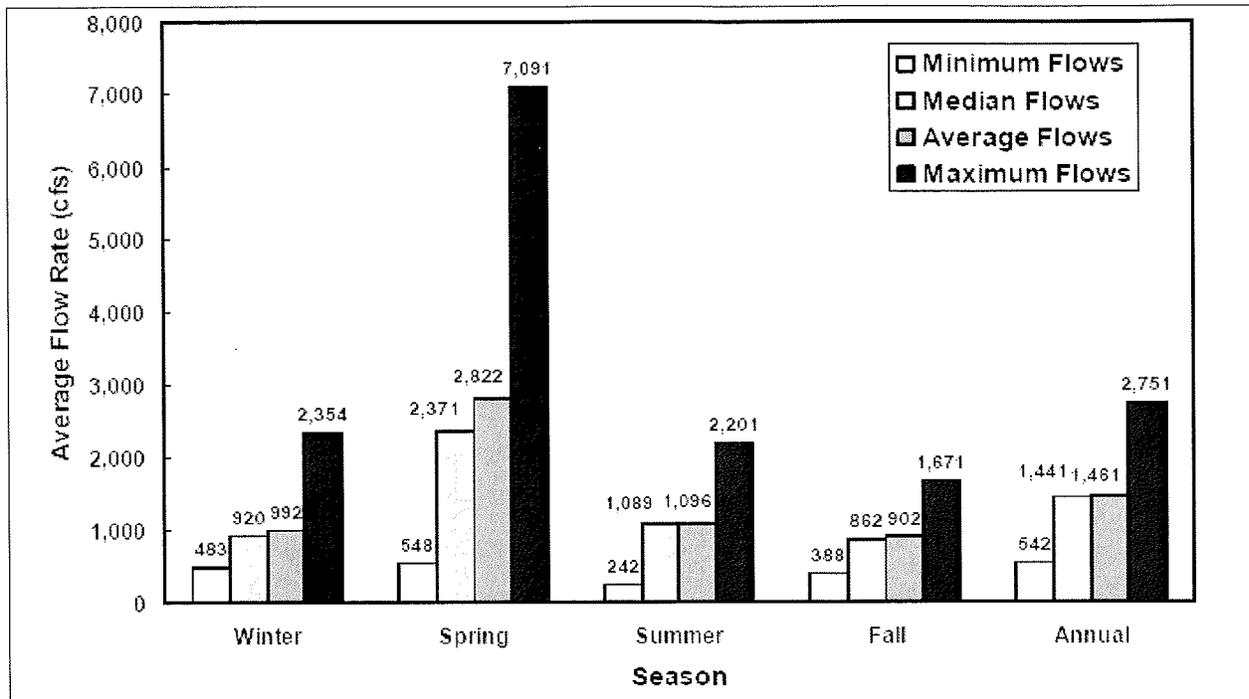
Source: USFS, 2004

Figure 4: Average Monthly Flow (cfs) at Otowi Gage (1990-1962 and 1963-2001)

Figure 5 illustrates the minimum, average, median, and maximum seasonal and annual flow variations between 1963 and 2001. The seasons include the following months:

- Winter = January through March
- Spring = April through June
- Summer = July through September
- Fall = October through December

From 1963 through September 2001, the average annual flow in the Rio Grande at this site ranged from 542 cfs (1964) to 2,751 cfs (1985). The average annual flow for the period from January 1963 through September 2001 was 1,461 cfs. Flow data gathered by the USGS and shown in these figures can be found at <http://waterdata.usgs.gov/nm/>.



Source: USFS, 2004

Figure 5: Average Seasonal Flow (cfs) at the Otowi Gage, 1963-2001

3.2.2.1 Surface Water Quality

Surface water quality within the Jemez y Sangre planning region (an area encompassing three northern New Mexico counties: Los Alamos, Rio Arriba, and Santa Fe) is generally good with respect to applicable water quality standards. Total dissolved solids (TDS) concentrations in surface waters typically fall below a value of 250 milligrams per liter (mg/L), which are substantially below the regulatory standard of 500 mg/L for this reach, and well below the 1,000 to 3,000 mg/L range that the Interstate Stream Commission uses to classify “slightly saline” waters. Surface waters in the study region also typically comply with other applicable water quality standards and guidelines.

Over most of the study region, the surface water is characterized as a calcium-bicarbonate type, although calcium-magnesium-bicarbonate and sodium bicarbonate types are occasionally observed. Most surface waters in the study region are classified as moderately hard to hard because of the concentrations of calcium and magnesium.

Nutrients (typically compounds with nitrogen or phosphorous) dissolved in surface waters of the region can occur from agricultural land uses, urbanization, and wastewater discharges. Contributions to dissolved nutrients on the main stem Rio Grande are made by agricultural sources from as far north as San Luis Valley in southern Colorado and the Rio Chama above El Vado Reservoir. Noticeable nutrient sources in and from tributaries include irrigated areas near Española, one of the more urbanized locales in the study

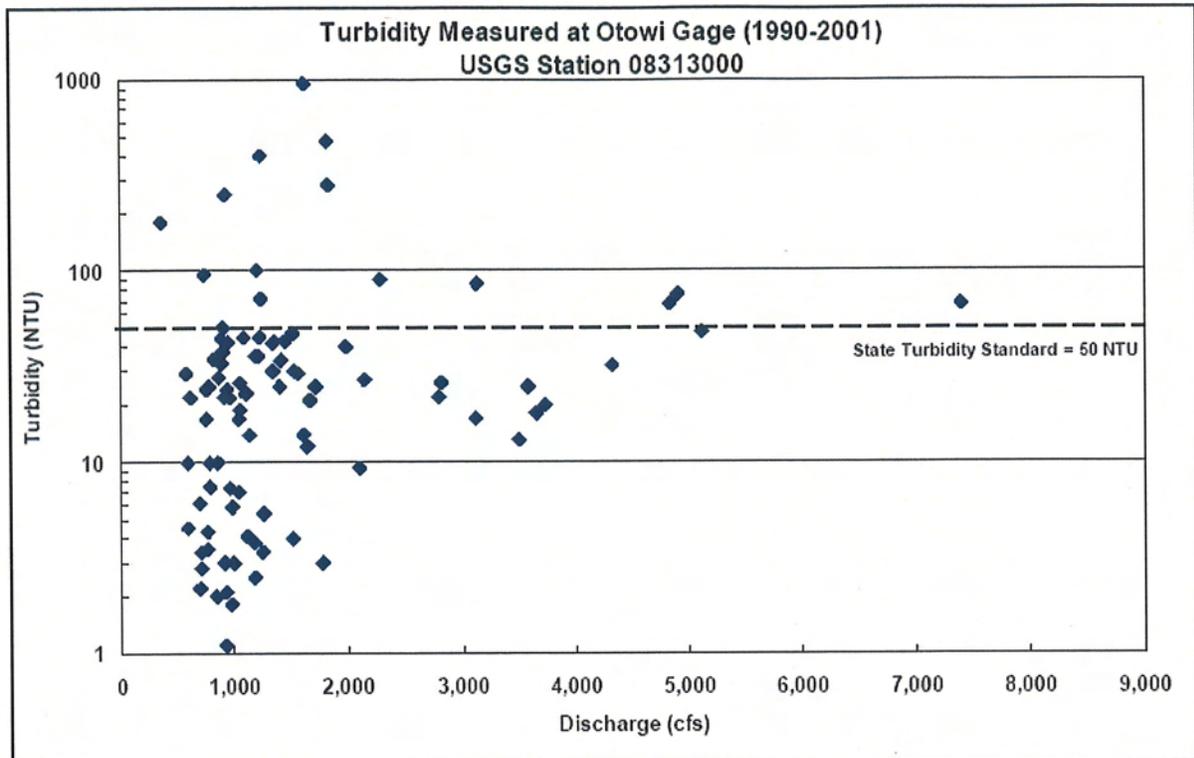


region, and along the lower Santa Fe River downstream of the City of Santa Fe. Surface water in the Pojoaque Valley occasionally contains elevated nutrient concentrations.

USGS conducted a National Water Quality Assessment (NAWQA) study of the Rio Grande Valley between 1993 and 1995. Monthly samples were gathered between April 1993 and September 1995. Several chemistry variables were examined that included dissolved solids, major inorganic constituents, and nutrients. The sampling found a median pH at Otowi Bridge of 8.1 with a median dissolved oxygen (DO) percent of saturation was 95. The average and maximum observed TDS concentrations were 186 and 221 mg/L, respectively. Hardness ranged from 95 to 140 mg/L as calcium carbonate, indicating moderately hard to hard water.

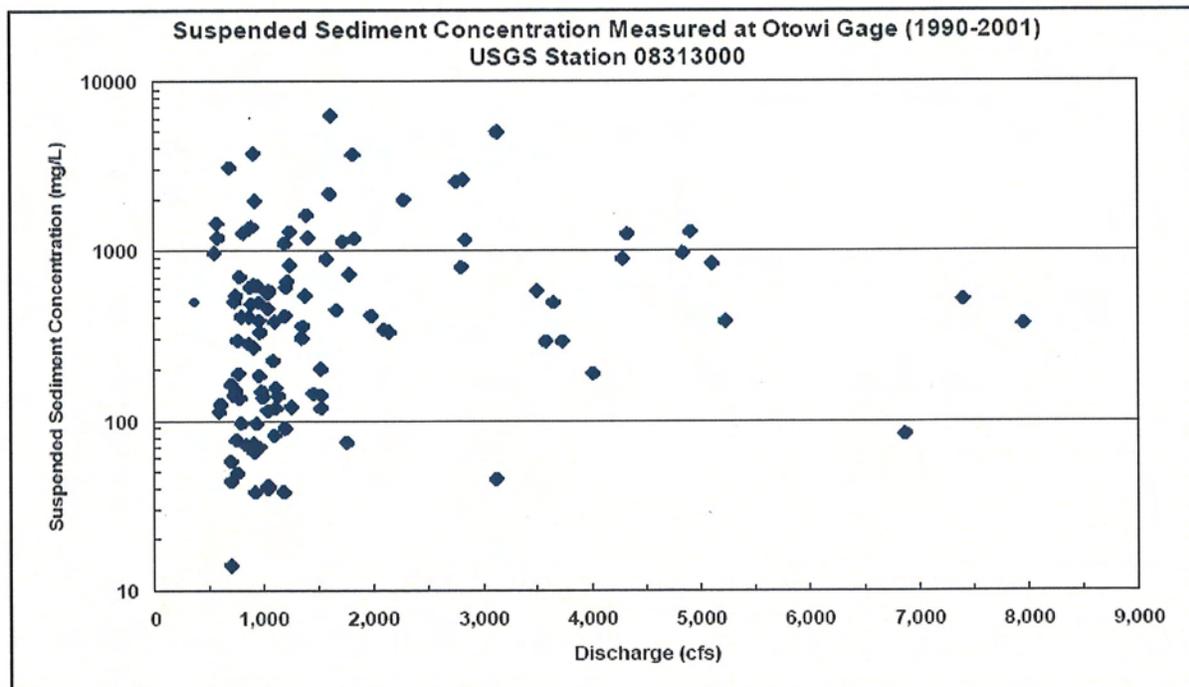
While nutrient levels are higher in the Rio Grande than the Rio Chama, nutrient concentrations in both rivers are still low. This is partially due to the tendency of both flows and nutrient concentrations to be somewhat higher on the main channel of the Rio Grande above Española than they are on the Rio Chama. During the NAWQA study, the Otowi median concentration of nitrite plus nitrate as nitrogen was 0.06 mg/L. This can be compared to the EPA Maximum Contaminant Level standard for drinking water of 10 mg/L.

The USGS recorded 98 turbidity samples (Figure 6) and 126 suspended sediment samples (Figure 7) between January 1990 and September 2001 at the Otowi gage. The samples were collected at a wide range of instantaneous discharges, from less than 500 cfs to over 8,000 cfs. About 15 percent of the turbidity samples were above the current State of New Mexico standard. The State has proposed removal of the site-specific 50 Nephelometric Turbidity Unit (NTU) turbidity standard as part of its 2003 Triennial Review Process.



Source: USFS, 2004

Figure 6: Turbidity Data Recorded at Otowi Bridge (Jan 1990-Sep 2001)



Source: USFS, 2004

Figure 7: Suspended Sediment Data Recorded at Otowi Bridge (Jan 1990-Sept 2001)



3.2.2.2 Water Use and Water Rights

Water use and water rights issues include surface water and groundwater. Water use and water rights for the City, County, and Las Campanas are discussed in detail in the City's Buckman Water Diversion Project DEIS (USFS, 2004).

The existing City water system is supplied from a variety of sources, and the City holds water rights for each of its sources of supply (Figure 8). The City has a permit issued by the New Mexico Office of the State Engineer (OSE) to pump and use water from the Buckman Well Field. This permit requires the City to offset stream depletions caused by the pumping, determined by OSE using groundwater modeling. Historically, the City has used a portion of its San Juan-Chama contract allocation to offset depletions to the Rio Grande, and water rights on the Rio Pojoaque and Tesuque Creek to offset depletions to those tributaries to the Rio Grande.

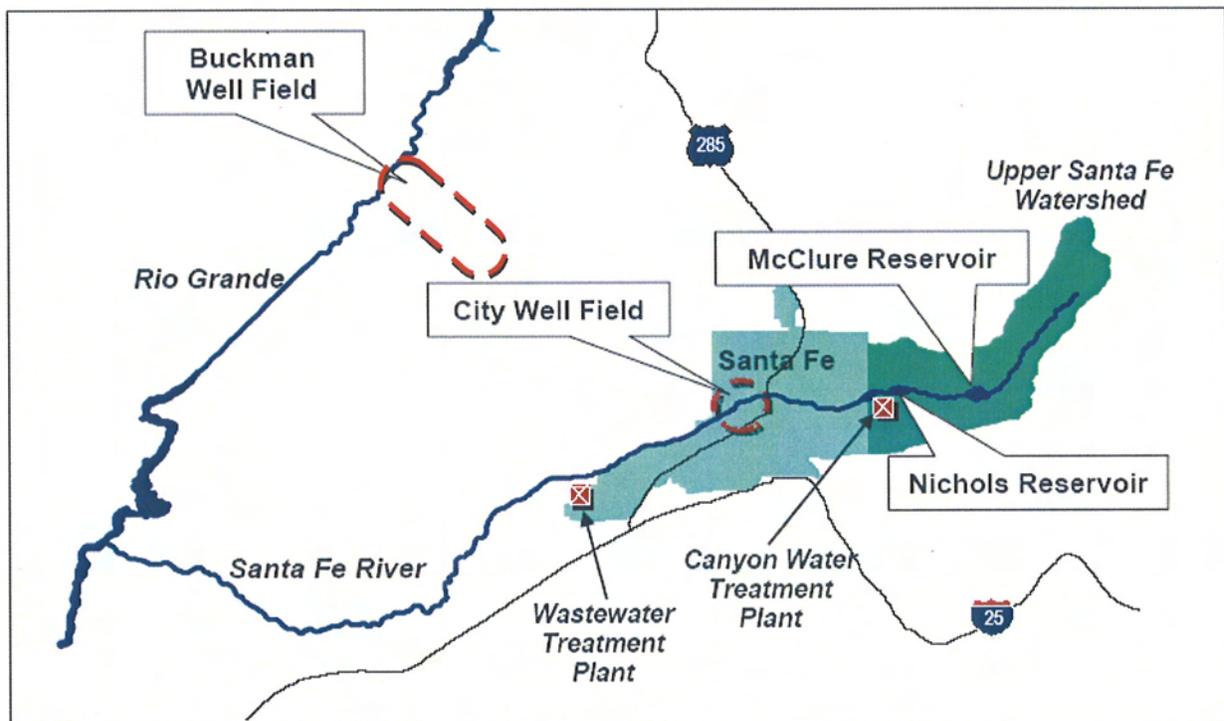


Figure 8: City of Santa Fe Existing Water System

3.2.2.3 Floodplain

Flood events within the Project Area have been reduced by the flood control reservoirs upstream. However, heavy rainfall events occasionally occur along this reach, resulting in higher than average discharge. Over time, high flow events have caused the river to reclaim an old meander channel near the terminus of Buckman Road. Subsequent flood events have removed the cobble bar and sand bars that are between the abandoned meander channel and the active channel. This suggests that high rates of sediment transport occur that move boulders, cobbles, sand, silt, and clay down the Rio Grande.



3.3 Groundwater Resources

The City of Santa Fe uses groundwater from the Buckman Well Field for a portion of its municipal water supply. The Buckman Well Field consists of 13 wells that currently normally supply about 40 to 60 percent of the water demand for the City in a normal precipitation year. The wells pump from the Ancha aquifer, part of the Tertiary-age Santa Fe Group of Rio Grande rift basin-fill sediments.

Pumping at the Buckman Well Field has resulted in a drawdown of the aquifer. Drawdown from the well pumping does not occur uniformly throughout the aquifer but rather occurs in the vicinity of the wells, forming a cone of depression. Since 1982, the measured drawdown at the Buckman Well Field has been approximately 200 feet and exceeds 300 feet in the portion of the aquifer where most of the pumping occurs. In close proximity to wells the drawdown can exceed 340 feet (USFS, 2004). OSE uses a numerical model to estimate the annual depletion of flow in the Rio Grande and its tributaries related to the drawdown resulting from pumping at the Buckman Well Field. Based on those model estimates the OSE requires offsets for water depletions in the Rio Grande and its tributaries up to 2,705 ac-ft/yr (through 2001) (USFS, 2004).

These Rio Grande depletions will not change rapidly regardless of whether or not the Buckman Well Field pumping is reduced following implementation of the Buckman Water Diversion Project. Because the City plans to annually divert all of its allocated San Juan-Chama Project water once the Buckman Water Diversion Project is operational, the City requires another source of water to offset the continued depletions of the Rio Grande caused by the Buckman Well Field. That is the City's primary reason for leasing 3,000 ac-ft/yr of water from the Jicarilla Apache Nation.

3.4 Biological Resources

3.4.1 Aquatic Communities

Aquatic habitat along the Rio Chama and Rio Grande consist of main channel runs and limited pool habitat. Gravel and cobble riffles and bars are also found within the Project Area. As a part of the Buckman Water Diversion Project DEIS (USFS, 2004), which includes the Rio Grande portion of the Project Area for this EA, fish sampling (electro-shock) was conducted in August 2002. In addition, silt, sand, gravel, cobble, boulder and vegetation substrates were sampled.

Electro-shocking near the proposed Buckman Water Diversion Project identified seven fish species (brown trout [*Salmo trutta*], white sucker [*Catostomus commersoni*], common carp [*Cyprinus carpio*], flathead chub [*Platygobio gracilis*], longnose dace [*Rhinichthys cataractae*], channel catfish [*Ictalurus punctatus*], and smallmouth bass [*Micropterus dolomieu*]). The white sucker and flathead chub were the most abundant fish collected, but only the flathead chub and longnose dace are native to the Rio Grande in New Mexico. Review of available literature related to past fisheries sampling indicates the historical presence of Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*),



Rio Grande sucker (*Catostomus plebeius*) and the Rio Grande chub (*Gila pandora*). These species are unlikely to be found in the area because the Rio Grande cutthroat trout prefers clear, silt-free water in cold streams and lakes with gravel beds, and the Rio Grande sucker is rarely found in waters with heavy loads of silt and organic detritus. The Rio Grande chub prefers impoundments and pools of small to moderate streams and is frequently associated with aquatic vegetation. These habitats are limited or absent at this time.

Field surveys (including the bank, pool habitat, and main channel of the Rio Grande) conducted for the Buckman Water Diversion Project DEIS did not find amphibians, including tadpoles. Water velocities in the main channel are too high to meet habitat requirements for relatively poor-swimming tadpoles. No appropriate frog habitat exists inland of the Rio Grande within the Project Area (USFS, 2004).

3.5 Riparian Resources

3.5.1 Plant Communities

Plant communities within the Project Area have been altered from their natural composition by a range of disturbances such as fire suppression, development, livestock grazing, off-road vehicle use, reduced surface water flow, and the invasion of exotic plant species. The dominant plant communities within the project region include the Floodplains-Plains Riparian along the Rio Grande and the Juniper Savanna that encompasses most of the remaining area (USFS, 2004).

The Juniper Savanna has been expanding within New Mexico in the last 150 years and is characterized by a relatively low density of trees (130/acre) within grassland. The canopy of this plant community is generally open, except for scattered clusters of closely spaced trees, particularly in the Diablo Canyon area and hillsides. Within the Project Area the groundcover averages about 60 percent.

Native and non-native riparian vegetation is found in a dense, narrow band along the rivers. Woody species within the Project Area include saltcedar (*Tamarix ramosissima*), cottonwood (*Populus deltoides*), Russian olive (*Elaeagnus angustifolia*), and coyote willow (*Salix exigua*). The understory is dominated by forbs and grasses such as field mint (*Mentha arvensis*), spreading dogbane (*Apocynum cannabinum*), and fescue grass (*Bromus catharticus*). Farther inland, plants are only partially dependent on near-surface groundwater, including New Mexico olive (*Forestiera neomexicana*), sweet clover (*Melilotus officinalis*, *M. alba*), New Mexico locust (*Robinia neomexicana*), camphorweed (*Heterotheca subaxillaris*), and lemonade bush (*Rhus trilobata*). The lower Cañada Ancha floodplain located southeast of the riparian and semi-riparian areas along the Rio Grande is a highly disturbed area as it is subjected to intense pressure from cattle grazing and human activities such as off-road driving, refuse dumping, and camping. This broad, open floodplain is dominated by rabbitbrush (*Ericameria nauseosa*, *E. depressus*) and snakeweed (*Gutierrezia sarothrae*). Other plants in the area include



Apache plume (*Fallugia paradoxa*), four-wing saltbush (*Atriplex canescens*), and two species of globemallow (*Sphaeralcea angustifolia*, *S. incana*). Outside of the floodplain, one-seeded juniper (*Juniperus monosperma*) becomes the most common tree species. Other woody vegetation includes piñon pine (*Pinus edulis*), yucca (*Yucca glauca*), tree cholla (*Opuntia imbricata*), sand sage (*Artemesia filifolia*), and rabbitbrush.

Two general types of washes are found in the area. The first type is a low-lying wash not subjected to recent flash floods and has denser vegetation, including juniper and rabbitbrush, than the surrounding upland areas. The second type of wash is the sandy, open, scoured arroyo. These areas support relatively few plants and only annuals such as scurfpea (*Psoraleidium lanceolatum*) and clammyweed (*Polanisia dodecandra*).

3.5.2 Non-Native Invasive Plant Species

New Mexico has delineated three distinct classes of weeds with separate management characteristics. Class A weeds are not native to an ecosystem and have a limited distribution. Class A weeds receive the highest priority management because the limited distribution pattern improves the chances of removing that species entirely and preventing reinfestation. Class B weeds are more dispersed but are limited to specific areas in New Mexico. Management emphasis is given to containing these weeds to their current range and keeping such plants from spreading into new areas. Class C weeds are widespread throughout New Mexico and require long-term programs that focus on management and suppression. Non-native invasive plant species present along with their New Mexico designation, if any, within the Project Area are listed in Table 2. The Santa Fe National Forest is analyzing a proposal to control, contain or eradicate invasive plant species throughout that Forest.

Table 2. Non-Native Invasive Plant Species

Scientific Name	Common Name	Management Class
Canada thistle	<i>Cirsium arvense</i>	Class A
Cheatgrass	<i>Bromus tectorum</i>	Class A
Dalmatian toadflax	<i>Linaria genistifolia</i> spp. <i>Dalmatica</i>	Class A
Yellow toadflax	<i>L. vulgaris</i>	Class A
Russian thistle	<i>Salsola kali</i>	Class C
Siberian elm	<i>Ulmus pumila</i>	Class C
Saltcedar	<i>Tamarix ramosissima</i>	Class C
Russian olive	<i>Elaeagnus angustifolia</i>	Class C

3.5.3 Wildlife

The Project Area is characterized by aquatic and riparian habitats along the Rio Grande and Rio Chama. In New Mexico, at least 80 percent of all animals use riparian areas at



some stage of their lives, with more than half of them considered to be riparian obligates (BLM, 1999). Additionally, the Rio Grande is a main corridor for migratory birds moving to and from wintering and breeding grounds. Riparian areas along the Rio Chama and Rio Grande provide suitable habitat for a more diverse population of avian species such as the southwestern willow flycatcher (*Empidonax traillii extimus*) and yellow-billed cuckoo (*Coccyzus americanus occidentalis*).

Inland from the river corridors are habitats for a variety of bird species, including raptors, and small game animals, such as jackrabbits (*Lepus californicus*). However, these species generally do not occur in high enough numbers for the area to be considered an important game region. Mammalian species that could be expected to utilize all undeveloped habitats are representative of the region. These species include: mule deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), jackrabbit, cottontail rabbits (*Sylvilagus* sp.), woodrats (*Neotoma* spp.), and deer mice (*Onychomys* spp.). Predatory species would include black bear (*Ursus americanus*), coyote, fox (*Vulpes* sp.), mountain lion (*Felis concolor*), and skunk (*Mephitis* sp.). Human activities and hunting pressure within the Rio Grande corridor have kept large and predatory mammal populations at fairly low levels. However, the region is still a very important refuge for large and small mammals in New Mexico (BLM, 1999).

3.6 Threatened And Endangered Species

As a part of the Buckman Water Diversion Project DEIS (USFS, 2004), an extensive literature review was completed, along with field surveys and consultation with state and federal agencies, to identify threatened and endangered and special status species within the Project Area. Because this Proposed Action extends beyond Santa Fe County, into Rio Arriba and Sandoval Counties, the search was expanded to determine the species of potential concern related to this proposed water subcontract.

Special status species are defined as plants and animals protected under the Federal Endangered Species Act, New Mexico state endangered and threatened species protected under the New Mexico Conservation Act, and lists maintained by BLM and USFS. Species status was based upon lists maintained by USFWS, BLM, USFS, New Mexico Department of Game and Fish, New Mexico Rare Plant Technical Council, and the New Mexico Natural Heritage Program (USFS, 2004). Species afforded consideration under the Migratory Bird Treaty Act of 1918 and Santa Fe National Forest Plan Management Indicator Species were also considered.

Twenty-six plant and 42 wildlife special status species are currently tracked by the New Mexico Natural Heritage Program (NMNHP, 2005), that may occur in Santa Fe County, Rio Arriba County or Sandoval County. Through a literature review and habitat assessments it was determined that one plant and 14 wildlife special status species could be potentially found within the riparian habitats of the Project Area (see Table 3). The

remaining species were determined not likely to occur in the Project Area based on the lack of suitable habitat or their known distribution.

Table 3. Threatened and Endangered Plants and Animals That Could Occur Within the Project Area

Common Name (Scientific Name)	Status		Species Information
	USFWS	NM	Habitat Requirements
PLANTS			
Parish's alkali grass (<i>Puccinellia parishii</i>)	-	E	Alkaline springs, seeps, and seasonally wet areas that occur at the heads of drainages or on gentle slopes at 2,600-7,200 ft range-wide. The species requires continuously damp soils during its late winter to spring growing period.
FISH			
Flathead chub (<i>Platygobio gracilis</i>)	-	-	Habitat requirements consist of turbid, alkaline waters with shifting substrates. This species is common in the Rio Grande.
Rio Grande sucker (<i>Catostomus plebeius</i>)	-	-	The Rio Grande sucker lives in small to large, middle elevation (2000-2600 m) streams usually over gravel and/or cobble, but also in backwaters and in pools below riffles. It is rarely found in waters with heavy loads of silt and organic detritus.
Channel catfish (<i>Ictalurus punctatus</i>)	-	-	The channel catfish is found in a wide range of warm to cool water habitats, from large rivers with low gradients to ponds and reservoirs.
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	E	E	The Rio Grande Silvery Minnow is a federal endangered species that requires silt and sand substrates with slow backwaters or eddies. It is potentially present from below Cochiti Dam to the headwaters of Elephant Butte Reservoir.
Rio Grande chub (<i>Gila pandora</i>)	-	S	Habitat requirements consist of impoundments in small to moderate streams. Although not collected in recent surveys, it is possible that the chub does occur at low densities or intermittently.
REPTILES AND AMPHIBIANS			
Desert kingsnake (<i>Lampropeltis getula splendida</i>)	-	-	The desert kingsnake prefers riparian and grassland habitats in New Mexico but is also found in piñon-juniper and low desert areas. This snake uses rock outcroppings or mammal burrows to escape mid-day heat. It is likely to occur in the Project Area.
Northern leopard frog (<i>Rana pipiens</i>)	-	-	This species is found along the entire length of the Rio Grande. It is mainly found in streams and rivers, but also occurs in marshes, ponds, and irrigation ditches.



Common Name (Scientific Name)	Status		Species Information
	USFWS	NM	Habitat Requirements
BIRDS			
Bald eagle (<i>Haliaeetus leucocephalus</i>)	T	T	The bald eagle is a winter migrant along the Rio Grande. Most of the preferred roost sites are in snags and cliffs along the river in the section between Bandelier National Monument and the Cochiti Reservoir delta.
Western yellow-billed cuckoo (<i>Coccyzus americanus occidentalis</i>)	C	–	The current preferred habitat of the cuckoo is areas of willow and cottonwood and is generally a riparian obligate.
American peregrine falcon (<i>Falco peregrinus anatum</i>)	–	T	American peregrine falcons are occasional migrants in the spring or fall and winter visitors. They breed along sandstone cliffs and may frequent riparian areas in search of their shorebird or waterfowl prey.
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	E	E	This species habitat consists of riparian areas with dense groves of willows, arrowweed, buttonbush, tamarisk, Russian olive, or other plants, often with a scattered overstory of cottonwood. Portions of the Project Area are proposed as critical habitat.
MAMMALS			
New Mexican jumping mouse (<i>Zapus latonius luteus</i>)	–	T	Preferred habitat for the meadow jumping mouse contains permanent streams, moderate to high soil moisture, and dense and diverse streamside vegetation consisting of grasses, sedges, and forbs. Such habitats include the edges of permanent ditches and cattail stands in the Rio Grande Valley
Big free-tailed bat (<i>Nyctinomops macrotis</i>)	–	–	This bat prefers coniferous and mixed woodland and depend on rocky cliffs for roosting. They have been found in cottonwood riparian habitats.
Long-legged myotis (<i>Myotis volans</i>)	–	–	This species is primarily montane, but is more common in lowland during migration. They have been found in cottonwood riparian habitats.
Western spotted skunk (<i>Spilogale gracilis</i>)	–	S	This species has been recorded in Santa Fe County and can occur in many habitats including lower montane, mixed shrub, sagebrush, piñon-juniper, wetland, and riparian areas. They generally use rocky areas for denning sites.

Status designations are: Endangered (E), Threatened (T), Sensitive (S), and Species of Concern (SC). Table designations in parentheses are listed by the agency for New Mexico, but not specifically for Santa Fe County.

(Source: New Mexico Game and Fish BISON-M, Biota Information System of New Mexico web site at <http://nrmnhp.unm.edu/bisonm/bisonquery.php>.)



Bald eagles (*Haliaeetus leucocephalus*), a federally listed threatened species, are known to be a winter migrant in the area. Critical habitat has recently been proposed along portions of the Rio Chama and Rio Grande for the southwestern willow flycatcher, a federally listed endangered species that has the potential to occur in the Project Area (Federal Register, October 12, 2004). The Rio Grande silvery minnow does not occur within the project vicinity; however, a discussion is provided below because of the proximity of silvery minnow critical habitat downstream from the Project Area.

The Santa Fe National Forest Plan identifies seven species as Management Indicator Species, which were selected to represent specific habitats and the species that use those habitats. These species are: Rio Grande cutthroat trout, piñon jay (*Gymnorhinus cyanocephalus*), wild turkey (*Meleagris gallopavo*), hairy woodpecker (*Picoides villosus*), Mexican spotted owl (*Strix occidentalis lucida*), mourning dove (*Zenaidura macroura*), elk (*Cervus elaphus nelsoni*), and Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*). Other than the Rio Grande cutthroat trout, which is not found within the Project Area, none of these species are considered riparian species and would, therefore, not be impacted by the proposed project.

3.6.1.1 Rio Grande Silvery Minnow

In February 2003, the USFWS issued a final ruling for the designation of critical habitat for the Rio Grande silvery minnow, which became effective March 21, 2003. The final rule states that the reach of the Rio Grande upstream of Cochiti Reservoir to the confluence of the Rio Chama is not designated as critical habitat due to the generally degraded and unsuitable habitat of the reach, and is not essential to the conservation of the silvery minnow (Federal Register, February 19, 2003). The Project Area is located above Cochiti Reservoir and is not considered critical habitat. No documentation of the silvery minnow above Cochiti Dam has occurred since the construction and operation of Cochiti Dam in the mid-1970s (BOR, 2004).

The presence of silvery minnow has only been documented in less than 5 percent of its historic range, and it is now restricted to the reach from Cochiti Dam to the tailwaters of Elephant Butte Reservoir.

3.6.1.2 Southwestern Willow Flycatcher

The southwestern willow flycatcher, a small passerine bird, is an insectivore generalist that feeds on various invertebrate terrestrial and aquatic insects. The flycatcher will forage within and occasionally above dense riparian vegetation, taking insects on the wing and gleaning them from foliage. The flycatcher is a Neotropical migrant, spending time from April to September in the United States, where it breeds in riparian areas along rivers, streams, or wetlands where relatively dense tree and/or shrub growth exist. They migrate statewide and are considered rare to fairly common. The flycatcher summers regularly in the San Juan, Rio Chama, Rio Grande, San Francisco and Gila valleys, and in the San Juan Mountains where dense groves of willows, arrowweed, buttonbush,



tamarisk, Russian olive, or other plants are present, often with a scattered overstory of cottonwood. These riparian communities provide nesting, foraging, and migratory habitat throughout the breeding range of the flycatcher. The rest of the year is spent in Mexico and Central and South America (Federal Register, October 12, 2004).

Human activity and its adverse impact on rivers and related riparian areas are the primary reasons for the reduction in population of willow flycatchers. Riparian habitat loss has also been precipitated by the introduction of invasive plant species, poor water quality and water management practices related to dam operations, water diversions, and groundwater pumping. River channelization, streambank stabilization, grazing, fire suppression, and recreation have also contributed to a denuded riparian habitat.

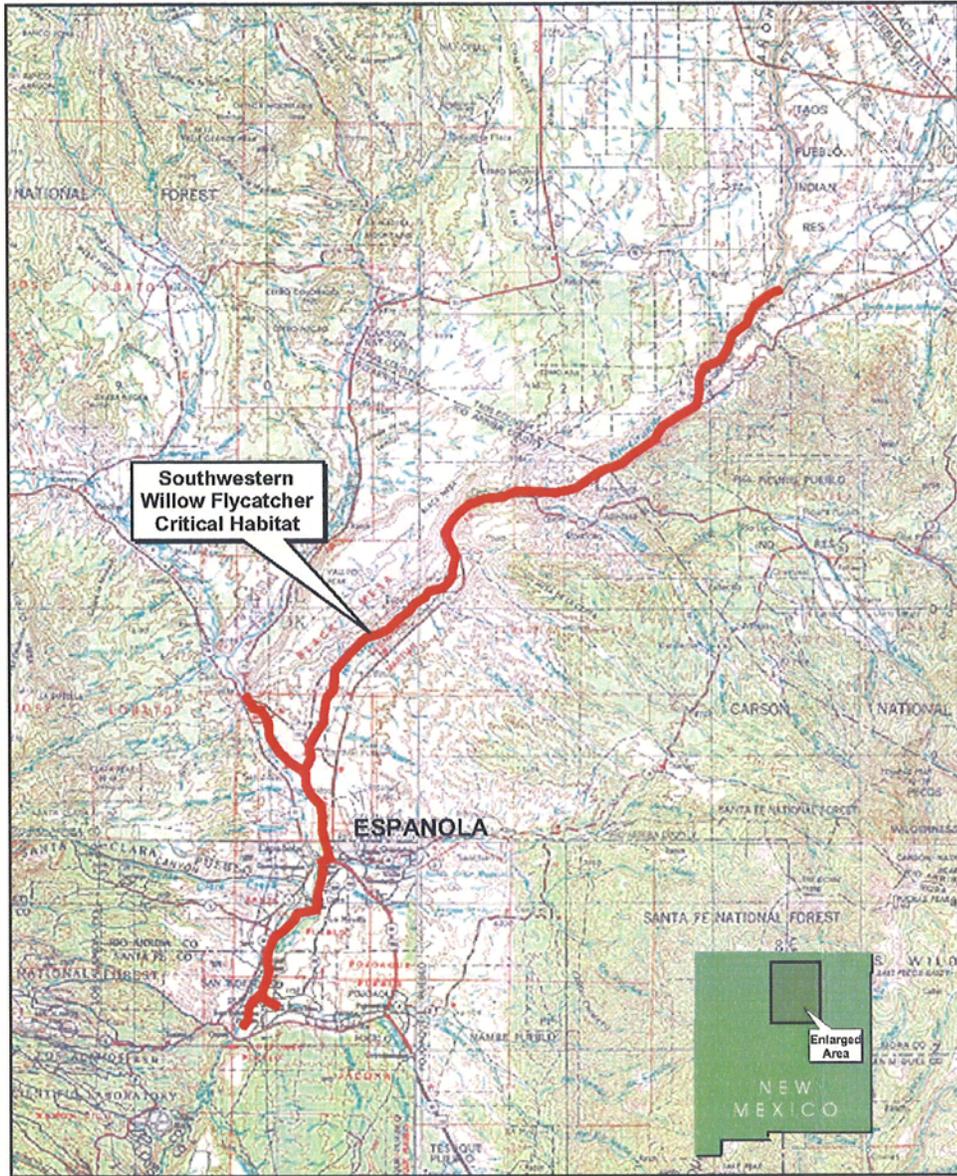
The southwestern willow flycatcher was listed as a federal endangered subspecies in February 1995, with critical habitat identified in July 1997 (Federal Register, October 12, 2004). In October 2004, USFWS proposed additional critical habitat for the southwestern willow flycatcher. Critical habitat areas were chosen based on “primary constituent elements,” or essential features of a dynamic riverine environment that “germinates, develops, maintains, and regenerates” the riparian areas the willow flycatchers use for nesting and foraging. All proposed critical habitat areas are within the willow flycatcher’s geographic range and have enough of the primary constituent elements to support the species (Federal Register, October 12, 2004). A portion of the Project Area is within the Rio Grande Recovery Area, which is broken into three river segments designated as willow flycatcher critical habitat. Of the three segments, only the upper Rio Grande segment (Figure 9) is within the Project Area. The upper Rio Grande segment extends approximately 46 miles from the Taos Junction Bridge (State Route 520) downstream to Otowi Bridge (State Route 502), and on the Rio Chama from its confluence with the Rio Grande upstream approximately eight miles.

3.7 Cultural Resources

The Proposed Action does not involve any construction or alteration of any facilities along the river system. Because no alteration or ground disturbance is proposed, cultural resources would not be affected and were not evaluated.



Figure 9: Southwestern Willow Flycatcher Critical Habitat



USGS 15 Minute Quadrangles: Aztec, New Mexico-Colorado 1954, Albuquerque, New Mexico 1983, Raton, New Mexico-Colorado 1954, Santa Fe, New Mexico 1954

Figure 9
Southwestern Willow Flycatcher Critical Habitat

 Scale - 1 : 375 000



3.8 Environmental Justice

U.S. Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations) directs Federal agencies to assess whether the Proposed Action or alternatives would have disproportionately high and adverse human health or environmental effects on minority and low-income populations. The Project Area is within the Rio Chama and Rio Grande river systems, located primarily within USFS and BLM rangelands that contain small isolated residential communities. The City of Española, a low income and largely Hispanic community, is located on the Rio Grande near the confluence with the Rio Chama. Several federally recognized Indian tribes are in the general area, including the Pueblo of San Ildefonso, located on the Rio Grande in the vicinity of the Otowi gage; the Pueblo of San Juan, located at the confluence of the Rio Chama and the Rio Grande; the Pueblo of Santa Clara, located south of the Pueblo of San Juan; and the Pueblo of Cochiti, upon whose lands Cochiti Reservoir is located. Portions of the San Juan-Chama Project are located on the Nation's lands and the subcontract involves water rights of the Nation.

3.9 Indian Trust Assets

Indian Trust Assets (ITAs) are "legal interests" in assets held in trust by the Federal Government for Indian tribes or individual Indians. Examples of things that can be ITAs are lands, minerals, water rights, hunting and fishing rights, other natural resources, money, or claims. A characteristic of an ITA is that it cannot be sold, leased, or otherwise alienated without the approval of the Federal government. Secretarial Order 3175 and Reclamation ITA procedures require Reclamation to assess the impacts of its projects on identified ITAs. Reclamation, in cooperation with American Indian Tribes impacted by a given project, must inventory and evaluate assets, then mitigate or compensate for adverse impacts to the assets held in trust for Federally recognized American Indian Tribes or Indian individuals.

As noted in Section 3.7 above, several Indian tribes are located within the Project Area. However, no ITAs, other than the water rights of the Jicarilla Apache Nation that will be leased under the Proposed Action, will be involved in the Proposed Action.

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

This chapter describes environmental effects associated with the No Action and Proposed Action alternatives. The direct, indirect, and cumulative environmental consequences are described for each of the various resources. The potential impacts of the alternatives are based, in large part, on the information and data found in the Buckman Water Diversion Project DEIS (USFS, 2004). While the proposed subcontract is independent of the Buckman Water Diversion Project, the potential effects associated with the Proposed Action would similarly affect many of the same natural resources.



4.1 Direct And Indirect Effects

4.1.1 Surface Water Resources

4.1.1.1 No Action

The City would need to continue to seek other methods (e.g., other water rights) to meet its near-term water supply needs for groundwater offsets and other water uses. The No Action Alternative is not expected to substantively change how the Nation's water is stored and released in the Rio Chama system.

Flows in the Rio Grande would still continue to be regulated by the OSE and the City would need to find alternative releases of San Juan-Chama or other water for offsets pursuant to existing permit requirements, therefore, the No Action Alternative would have no effect on surface water flows.

The No Action Alternative would not affect water quality or sediment transport in the river. Likewise, neither the floodplains nor the flood potential would be affected.

4.1.1.2 Proposed Action

The Proposed Action would have no significant impacts on the flow regime. Under foreseeable operating conditions for deliveries of subcontracted water, releases would typically be made in a manner that is consistent with the existing and post 1971 operations for delivery of San Juan-Chama Project water from Heron Dam to Cochiti Reservoir as called for by the project contractors, including the City. The range of the historic operations of the project has varied from storing all or part of the water released from Heron in El Vado and/or Abiquiu reservoirs for future use by contractors including the City to concentration of releases below Abiquiu Dam in short periods (60 to 90 days typically during low flow months in the summer), depending upon specific hydrologic and operational conditions or regulatory and operational needs of the contractors.

In most years, however, release patterns for the block of water covered by the subcontract will be performed to replace calculated effects on Rio Grande flows as a result of the pumping of the Buckman Well Field (offsets). Under this scenario, it is anticipated that releases will be made throughout the year and in small amounts, typically 2 to 8 cfs, to essentially "match" the pattern of depletions resulting from the pumping of the Buckman Well Field as calculated by the OSE. Alternately, releases of subcontract water for direct diversion to meet the City's water supply need may reflect the expected pattern of higher summer and lower winter municipal water supply demand fluctuation. In either case, the Proposed Action would cause a small and generally unidentifiable component of the total river flow at downstream river gages. See Section 2.2.

Under a scenario where releases are concentrated in two months, it is anticipated that flows would increase in the Rio Chama (below Abiquiu Dam, upstream of the proposed Buckman diversion) by up to approximately 25.2 cfs for 60 days, or 5.4 percent of the

average summer flow and on the Rio Grande, flows would increase by approximately 2.3 percent of the average summer flow, if all 3,000 ac-ft were released in August and September. In the event that all or a portion of the subcontract water is stored in upstream reservoirs, it is anticipated that flows below Abiquiu Dam will be reduced accordingly. Generally, storage for future use has occurred under two scenarios: the contractors do not have a use for the water in a given year or there are substantial native flows restricting the need for regulatory offset releases. In the foreseeable future, the City will need all of its San Juan-Chama water including the subcontracted 3,000 ac-ft/yr once the proposed Buckman diversion is in place so annual storage options will diminish with time. If, on the other hand, water is stored, future releases of these supplies will increase flows in subsequent years. The stream effects of these scenarios given the small volumes of water relative to the other flows in the subject reaches in either case is *de minimis*.

The Proposed Action would not affect water rights. The Nation would enter into a 50-year term subcontract with the City for the delivery of up to 3,000 ac-ft/yr. This subcontract would not affect the Nation's ownership of the water leased through the subcontract.

The Proposed Action is not expected to have noticeable effects on surface water resources. It is anticipated that release of water under the Proposed Action would increase river flows in the Rio Chama below Abiquiu Reservoir by no more than approximately 6.5 percent of average flow, even at a maximum release schedule of two months (August and September). In months when no subcontract water is released below Abiquiu Dam, it is anticipated that water flow would be affected to the extent that the concentrated release of 25.2 cfs for 60 days would supplant the typical release pattern of an average of approximately 5.6 cfs release over about 270 days for Buckman Well Field pumping offsets.

As stated above, the effects of storage of the water (in El Vado or Abiquiu Reservoir) by the City would be *de minimis* given that the City would utilize these existing reservoirs consistent with existing reservoir management. The release of the water from Heron Dam would not be new, though the schedule for release might be altered based on the City's needs. The release of the water from storage into the Rio Chama would be incorporated with other release schedules to maximize river benefits in the same manner as historical operations by Reclamation and USACE.

The release of 3,000 ac-ft/yr from Heron Dam would not have a noticeable effect on Heron Reservoir elevation or on El Vado and Abiquiu reservoirs downstream. The total maximum release, as proposed, would account for approximately 0.7 percent of Heron Reservoir total capacity. Increases in elevation in El Vado and Abiquiu Reservoirs would be minimal and would occur only if the additional release were stored in those reservoirs and not "passed through" the reservoirs. If the release from Heron Dam were not stored in El Vado and/or Abiquiu reservoirs, the pass-through would have no impact on reservoir heights. No impacts to Cochiti Reservoir are anticipated as the quantity of water



would likely be too small to measure relative to other flows, groundwater offsets, and evaporation losses.

The subcontract waters would not change flow volumes in a manner that is distinguishable from historic operations. Therefore, water quality and sediment transport will not be affected.

Flooding and floodplain conditions would not be affected, as the river channel (because of significant historical alterations) far exceeds flow requirements during the periods when the subcontract waters would be put into the Rio Chama and Rio Grande.

4.1.2 Groundwater Resources

4.1.2.1 No Action

Under the No Action Alternative, the Buckman Well Field would continue to provide about 40 to 60 percent of the City's water supply.

The City would still be required under existing permits to offset its groundwater depletions and reductions in streamflow in the Rio Grande and its tributaries attributed to the City's groundwater pumping. Therefore, the No Action Alternative would have no effect on groundwater resources.

4.1.2.2 Proposed Action

The Proposed Action would provide additional flows to help meet the requirements described in the City's permit from the OSE to operate the Buckman wells, specifically mitigation of groundwater and surface water depletions. Groundwater diversions from Buckman wells may be reduced to the extent that the Proposed Action is used to support new direct diversions. The City currently uses a part of its existing San Juan- Chama water to offset depletions. The Proposed Action would provide 3,000 ac-ft/yr for groundwater offsets and other legal and regulatory requirements, as well as for direct diversions.

4.1.3 Biological Resources

4.1.3.1 Aquatic Communities

4.1.3.1.1 No Action

The No Action Alternative would not effect aquatic communities. If the City is not able to acquire the Nation's subcontract water, the City is still required under its existing permits to offset the effects on surface water from its ground water depletions, and therefore aquatic communities would not be affected.

4.1.3.1.2 Proposed Action

The Proposed Action would make additional water available to the City to enhance the City's ability to offset calculated depletions on the Rio Grande as a result of Buckman



Well Field pumping and to mitigate potential impacts on fish and macroinvertebrate communities within the Project Area.

No adverse impacts to aquatic communities are anticipated as a result of the Proposed Action. Increases in river flows would amount to a maximum of about 6.5 percent on the Rio Chama and about 3 percent on the Rio Grande change in average summer flow volume if the entire 3,000 ac-ft of subcontract water were released over a two-month period (the maximum release schedule anticipated by the City). Under typical operations, the 5.6 cfs average release will have negligible effects on streamflow conditions. The additional water in either case is not anticipated to measurably increase turbidity and sediment load because of its relatively low volume.

4.1.4 Riparian Resources

4.1.4.1 No Action

The No Action Alternative would not remove or modify vegetation communities within the Project Area. As a condition of approval of regulatory permits, the City is required to monitor potentially impacted riparian/wetlands every five years and mitigate for effects to riparian areas as a result of Buckman Well Field pumping.

4.1.4.2 Proposed Action

The Proposed Action would not have an adverse effect on riparian areas along the Rio Chama and Rio Grande. Additional in-stream water may be available to offset flow reductions caused by groundwater depletions.

4.1.5 Threatened and Endangered Species

4.1.5.1 No Action

Under the No Action Alternative, there would be no disturbance of or change in threatened and endangered or special status species. Given the present state and federal regulatory interests (for example, Clean Water Act (CWA), Endangered Species Act (ESA)), it is not anticipated that further degradations of river resources will be allowed.

The No Action Alternative would not guarantee the availability of the Nation's water to Reclamation to supplement flows for the silvery minnow. The Nation is not obligated to enter into further subcontracts of its water to Reclamation for this purpose.

4.1.5.2 Proposed Action

The Proposed Action would have no adverse effect on threatened and endangered species of concern within the Project Area, including the flathead chub, Rio Grande chub, and northern leopard frog. The City's use of the water may increase flows during the drier months, but in any case would be a small and generally unidentifiable component of the total river flow. See Section 4.1.1.2. The Proposed Action is not anticipated to have an impact on the Rio Grande silvery minnow because the fish is no longer found above

Cochiti Reservoir. Under typical operations, the subcontract water will be co-mingled with other flows into Cochiti Reservoir as has historically occurred, and thus would not affect flows downstream of Cochiti.

The Nation's water is not subcontracted to Reclamation for any portion of the proposed subcontract term, and the Nation is under no obligation to subcontract its water to Reclamation. Consequently, the approval of the subcontract will not constitute reallocating water that would otherwise be allocated to supplement flows for the silvery minnow.

4.1.6 Cultural Resources

4.1.6.1 No Action

The Proposed Action would involve no construction or disturbance to cultural resources and therefore would have no cumulative effect on cultural resources.

4.1.6.2 Proposed Action

The Proposed Action does not involve any construction or alteration of any facilities along the river system. Because no alteration or ground disturbance is proposed, there would be no adverse effect on cultural resources.

4.1.7 Environmental Justice

4.1.7.1 No Action

If the No Action Alternative were selected, existing water rights and related uses would remain unchanged. The Nation would lose the benefit of the subcontract, resulting in the loss of revenue from the subcontract. The lost revenue would adversely impact the Nation's on-going efforts to provide human services and economic development opportunity to its people.

4.1.7.2 Proposed Action

Although the water delivered under the subcontract will flow in the Rio Chama and the Rio Grande through the lands of various tribes and the City of Española, as explained above, there will be no significant impact on surface water flows, reservoir levels or river corridor resources.

As explained in Chapter 1, the Proposed Action is needed to allow the Nation to benefit from subcontracting its water under the Federal Contract as intended by the United States Congress. The water supply subject to the subcontract is not currently needed for on-Reservation use and the Nation does not foresee a need for its use on-Reservation within the term of the subcontract. Accordingly, the water is available for subcontracting off-Reservation. The Legislative Council of the Nation has found that the subcontract with the City is for a term and contains conditions that will ensure the ability of the Nation to retrieve all or a portion of this water supply for its purposes at the expiration of the

subcontract if the Nation determines it has alternative uses, and that the terms and conditions of this subcontract will not jeopardize the ability of the Nation to utilize all or a portion of this water supply for on-Reservation development as needed upon expiration of the subcontract.

The Nation would increase its revenue stream, providing additional funds for human services, economic opportunity, and other benefits to the Nation's people. The loss of the Nation's use of the water for the subcontract period would not have an adverse impact upon the Nation or its members because it has been determined that this block of its future use San Juan-Chama water is not needed for on-Reservation uses for the term of the subcontract agreement.

Thus, the Proposed Action will benefit the Nation and not affect other minority and low income communities.

4.1.8 Indian Trust Assets

4.1.8.1 No Action

Under the No Action alternative, the Nation would not be able to enjoy the economic benefit of the subcontract it has negotiated with the City. This would be an adverse effect on the Nation's water rights as an Indian Trust Asset. The Nation has no current use for the water under the subcontract on the Reservation. Consequently, the Nation would not realize any offsetting benefit.

No Indian Trust Assets of other tribes would be affected except to the extent that the City's continuing groundwater depletions may affect available ground water to tribes in the area of the City's pumping or may affect water flows in the Rio Grande and thereby affect surface water availability to tribes.

4.1.8.2 Proposed Action

The Proposed Action does not involve the use of any Indian Trust Assets except the Nation's water rights that are the subject of the subcontract. The Nation has the right, under the Settlement Act and the Federal Contract, to subcontract this water to third parties for beneficial use outside of the Jicarilla Apache Indian Reservation when the Nation is not using the water on the Reservation. This not an issue of a third party using Indian Trust Assets without the consent of the Tribe. Rather, the Nation has negotiated this subcontract and seeks to use its own Indian Trust Assets in order to receive the economic benefits intended by the United States Congress when it enacted the Settlement Act.

The water covered by the subcontract is surplus to the Nation's needs for the term of the subcontract. In addition, the Legislative Council of the Nation has found that the subcontract with the City is for a term and contains conditions that will ensure the ability of the Nation to retrieve all or a portion of this water supply for its purposes at the



expiration of the subcontract if the Nation determines it has alternative uses. The Legislative Council has further determined that the terms and conditions of this subcontract will not jeopardize the ability of the Nation to utilize all or a portion of this water supply for on-Reservation development as needed upon expiration of the subcontract.

Thus, the Proposed Action would not have any adverse effect on the Nation's use and enjoyment of its water right, the Indian Trust Asset of concern. Moreover, the Proposed Action will have a positive benefit by facilitating the Nation's use of its Indian Trust Asset for an economic return to the Nation.

Although as noted in Section 3.7 the Project Area is within and near lands of other Indian tribes, the Proposed Action will not affect the Indian Trust Assets of any other tribe. The Proposed Action will not affect any riparian areas along the Rio Chama and the Rio Grande, and thus will not affect the riparian lands of other tribes. The Proposed Action does not involve construction or alteration of facilities along the river system, and therefore will not disturb or effect cultural resources of any tribe. The Proposed Action will not affect any water rights, including the water rights of any tribe. Water levels in Cochiti Reservoir would not be affected.

4.2 Cumulative Effects

4.2.1 General Considerations for Cumulative Effects

Discussions of cumulative effects for each resource are provided below. The Council of Environmental Quality (CEQ) regulations implementing the procedural provisions of the National Environmental Policy Act (NEPA) define 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 (Federal or non-Federal) or person undertakes such actions" (40 Code of Federal Regulations Part 1508.7). The regulations also state that "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." The cumulative effects analysis presented in each resource section is based on the effects of the No Action Alternative, and potential effects of the Proposed Action, added to past, present, and reasonably foreseeable future actions and their effects in the areas of influence for each resource category.

4.2.1.1 Past and Present Projects

The past and present projects that have most noticeably changed the characteristics of the Rio Chama and Rio Grande and river resources in the Project Area include the following:

- El Vado Dam and Reservoir were constructed on the Rio Chama in 1934-35. They are part of the Middle Rio Grande Project and are operated by Reclamation. Angostura Diversion Dam, Isleta Diversion, and San Acacia Diversion Dam are also

components of the Middle Rio Grande Project located downstream from Cochiti Dam.

- Congress authorized the San Juan-Chama Project in 1962 under PL87-483, Colorado River Storage Project Act of April 11, 1956. The San Juan-Chama Project consists of facilities that divert an average of 110,000 acre-feet per year of water from the San Juan Basin (part of the Colorado River Basin) in southern Colorado through 26 miles of tunnels beneath the Continental Divide to Willow Creek, a tributary of the Rio Chama in the Rio Grande Basin, in New Mexico.
- The U. S. Army Corps of Engineers completed construction of Abiquiu Dam and Reservoir in 1963 and Cochiti Dam in 1970. Both dams influence the characteristics of the Rio Grande in the vicinity of the City.
- The City's Buckman Well Field consists of an original eight wells constructed in the 1970s, and five others that were added during 2003.

4.2.1.2 Future Projects

Several examples of foreseeable future projects include the following:

- The City of Albuquerque proposes a diversion of 94,000 ac-ft/yr in order to fully consume its 47,000 ac-ft/yr of San Juan-Chama water and return 47,000 ac-ft/yr to the Rio Grande as treated effluent from its wastewater treatment process.
- The City of Española proposes a drinking water project that includes the diversion of 1,000 ac-ft/yr of San Juan-Chama water and approximately 1,000 ac-ft/yr of native water. San Juan-Chama water would be consumed and the native water would re-enter the Rio Grande at the wastewater treatment plant effluent outfall. Preparation of an environmental assessment is currently underway.
- Los Alamos County is conducting feasibility studies to determine if it can divert its 1,200 ac-ft/yr of San Juan-Chama water directly from the Rio Grande.
- The Pueblo of San Ildefonso is considering diverting a portion of its Rio Grande water rights from the river. San Ildefonso installed a single unit infiltration collector well as a pilot project in 2001.
- There is an ongoing cooperative effort between several agencies to identify, fund, implement, and monitor river restoration activities in and around this Project Area.
- Other projects may be undertaken for habitat improvements on the Rio Chama and Rio Grande for the silvery minnow, the southwestern willow flycatcher and other native species.
- The City of Santa Fe and Santa Fe County are establishing relationships with other entities responsible for the use and management of the surface water resources of the region and are active participants in workgroups and restoration activities (both planned and ongoing).



- Future changes in the Rio Grande and tributaries could also result from litigation settlement agreements, collaborative programs, and future legislation. These may include a settlement on the *Aamodt* litigation that could potentially result in the development of a Regional Water System to serve the Pojoaque Basin tributary to the Rio Grande above the Otowi gage, including development of future water rights in accordance with negotiated conditions.
- The City of Santa Fe, Santa Fe County, and Las Campanas propose construction of the Buckman Water Diversion Project, which would divert water for those entities' municipal needs. The majority of the water diverted would be the City and County's existing San Juan Chama contract allocation. A final environmental impact statement (EIS) for the Buckman Water Diversion Project is pending the lead federal agencies' changes of the draft EIS in response to public comments. The public comment period closed in February 2005.

4.2.2 Surface Water Resources

4.2.2.1 No Action

Under the No Action Alternative, the City would need to continue to seek other methods (e.g., other water rights) to meet its near-term water supply needs for groundwater offsets and other water uses. Flows in the Rio Grande would continue to be regulated by the OSE and the City would need to find alternative releases of San Juan-Chama or other water for offsets. Therefore, the No Action Alternative, taken together with past, present and future actions, would have no cumulative effect on surface water resources.

4.2.2.2 Proposed Action

Under the Proposed Action, releases of the subcontracted water from Heron Dam could have some effect on flows and on storage in the three reservoirs on the Rio Chama, but these effects would be minor and difficult to measure. Releases are expected to be integrated with other City, Reclamation, and other contractor releases of San Juan-Chama water as may be deemed beneficial for recreational, ecological, or other purposes, as such releases have been historically beneficial. The schedule for releases of San Juan-Chama water would be determined through a process involving the City, OSE, and Reclamation. Reclamation would maintain operational discretion to balance the timing of contractor deliveries with the other recreational and ecological objectives within the Wild and Scenic Reach between El Vado Dam and Abiquiu Reservoir.

The cumulative effect of the subcontract water on storage in the reservoirs would be minimal. Abiquiu Reservoir has a capacity of greater than 1.5 million ac-ft with almost 200,000 ac-ft available for storage of San Juan-Chama water. On a reservoir of this size, variations in storage over the course of a year of 5,605 ac-ft (i.e., the City and County's combined San Juan-Chama project annual water allocation) would affect the surface elevation by less than an inch (USFS, 2004).



The water that would be subcontracted through the Proposed Action would be commingled with much larger (of an order of magnitude) native flows making the addition essentially undetectable in these river reaches. Because this water would be used to offset pumping depletions or diverted for drinking water supply, it is anticipated that none of this water would reach Cochiti Reservoir on an annual net basis.

No effect on flows below Cochiti Dam would be expected. San Juan-Chama releases for offset purposes are managed to keep the Rio Grande conditions below the Otowi gage whole, including volume losses to the 3,000 ac-ft/yr, both natural (transpiration, evapotranspiration, etc) and by diversions (agriculture, etc.). Cumulative effects with projects in the Albuquerque area, including the Albuquerque diversion project, if all flows were released at the same time, are not anticipated because the river segments are separated by Cochiti Reservoir.

4.2.3 Groundwater Resources

4.2.3.1 No Action

Under the No Action Alternative, the Buckman Well Field would continue to provide about 40 to 60 percent of the City's water supply, however, the cumulative effects of groundwater depletions and reductions in streamflow in the Rio Grande and its tributaries attributed to the City would continue to require current mitigation (offsets) to satisfy OSE requirements.

If other proposed projects are constructed affecting groundwater depletions and associated stream depletions, such as the Buckman Water Diversion Project, the rate at which these groundwater depletions occur could be affected, constituting a cumulative effect. If the Buckman Water Diversion Project were constructed, pumping at the Buckman Well Field would probably be reduced on an average annual basis. This would have a beneficial impact on groundwater in the area, although surface water residual offsets would still be required to offset the continuing effects of historic pumping and reduced future pumping.

To the extent that future wells are proposed, the OSE will require appropriate mitigation for surface and groundwater protection. Therefore, no cumulative effects have been identified.

4.2.3.2 Proposed Action

The Proposed Action would provide additional flows to help meet the requirements from the OSE to operate the Buckman wells, specifically mitigating groundwater and surface water depletions, thereby causing no adverse cumulative effect on groundwater resources.



4.2.4 Biological Resources

4.2.4.1 Aquatic Communities

4.2.4.2 No Action

No Action Alternative would not effect aquatic communities, causing no cumulative effect. If the City is not able to acquire the Nation's subcontract water, the City is still required under its existing permits to offset the effects on surface water from its ground water depletions.

4.2.4.3 Proposed Action

The Proposed Action would not significantly change existing conditions for aquatic species above Cochiti Reservoir and therefore, would not have adverse cumulative effects. Other proposed water diversion projects, for agriculture or municipal uses will also be required to offset direct effects to keep flows whole at the Otowi gage with state and federal regulatory controls (for example, CWA, ESA) likely restricting such potential future degradations.

4.2.5 Riparian Resources

4.2.5.1 No Action

The No Action Alternative would not remove or modify vegetation communities within the Project Area. As a condition of approval of regulatory permits, the City is required to monitor potentially impacted riparian/wetlands every five years and mitigate for effects to riparian areas as a result of Buckman Well Field pumping. Therefore, the No Action Alternative, taken together with past, present and future actions, would have no cumulative effect on surface water resources.

4.2.5.2 Proposed Action

Under the Proposed Action, riparian habitat would not be negatively impacted along the Rio Chama and Rio Grande, given that the Proposed Action is consistent with existing operating conditions.

4.2.6 Threatened and Endangered Species

4.2.6.1 No Action

Under the No Action Alternative, there would be no disturbance of or change in threatened and endangered or special status species. Other proposed water diversion projects, for agriculture or municipal uses will also be required to offset direct effects to keep flows whole at the Otowi gage with state and federal regulatory controls (for example, CWA, ESA) likely restricting such potential future degradations. Therefore, there would be no cumulative adverse effect

4.2.6.2 Proposed Action

The Proposed Action will not significantly change river flows or riparian conditions within the Project Area and will, therefore, not have an adverse effect on threatened and endangered and special status species. Other proposed projects would be required to keep flow conditions at the Otowi gage whole with state and federal regulatory controls (for example, CWA, ESA) likely restricting such potential future degradations.

4.2.7 Cultural Resources

4.2.7.1 No Action

The Proposed Action would involve no construction or disturbance to cultural resources and therefore would have no cumulative effect on cultural resources.

4.2.7.2 Proposed Action

The Proposed Action does not involve any construction or alteration of any facilities along the river system. Because no alteration or ground disturbance is proposed, there would be no adverse effect on cultural resources.

4.2.8 Environmental Justice

4.2.8.1 No Action

Under the No Action Alternative, existing water rights and related uses would remain unchanged. The Nation would lose the benefit of the subcontract, resulting in the loss of revenue from the subcontract. The lost revenue would adversely impact the Nation's ongoing efforts to provide human services and economic development opportunity to its people, thereby causing an adverse cumulative effect.

4.2.8.2 Proposed Action

No adverse environmental justice cumulative effects are expected because of the Proposed Action.

4.2.9 Indian Trust Assets

4.2.9.1 No Action

Under the No Action alternative, the Nation would not be able to enjoy the economic benefit of the subcontract it has negotiated with the City. This would have an adverse effect on the Nation's water rights as an Indian Trust Asset. The Nation has no current use for the water under the subcontract on the Reservation. Consequently, the Nation would not realize any current and future offsetting benefit.

No Indian Trust Assets of other tribes would be affected. To the extent that the City's continuing groundwater depletions, together with other groundwater depletions in the region, may cumulatively affect available ground water to tribes in the area of the City's



pumping or may affect water flows in the Rio Grande, offsets would be required and therefore there would be no cumulative effect.

4.2.9.2 Proposed Action

As explained above, the Proposed Action does not involve the use of any Indian Trust Assets except the Nation's water rights that are the subject of the subcontract. The water covered by the subcontract is surplus to the Nation's current needs for the term of the subcontract.

Thus, the Proposed Action does not have a cumulative adverse effect on the Nation's use and enjoyment of its water right, the Indian Trust Asset of concern. In fact, the Proposed Action will have a positive cumulative effect by facilitating the Nation's use of its Indian Trust Asset for an economic return to the Nation.

Although as noted in Section 3.7 the Project Area is within and near lands of other Indian tribes, the Proposed Action, considered together with other river operations and water uses, will not have a cumulative effect the Indian Trust Assets of any other tribe. The Proposed Action will not affect any riparian areas along the Rio Chama and the Rio Grande, and thus will not affect the riparian lands of other tribes. The Proposed Action does not involve construction or alteration of facilities along the river system, and therefore will not disturb or effect cultural resources of any tribe. The Proposed Action will not affect any water rights, including the water rights of any tribe. Water levels in Cochiti Reservoir would not be affected.

4.3 Unavoidable Adverse Effects

Unavoidable adverse effects are environmental consequences of an action that cannot be avoided either by changing the nature of the action or through mitigation if the action is undertaken.

The change in the targeted use of the Nation's 3,000 ac-ft/yr of San Juan- Chama water would not have any unavoidable adverse effects because the water subcontracted from the Nation is surplus to their needs during the term of the subcontract and the amount to be released (3,000 ac-ft/yr) is expected to have no adverse impacts to surface water, groundwater, cultural, or biological resources.

4.4 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments are those that cannot be reversed except in the extreme long-term. Irretrievable commitments of resources are expenditures or consumption of resources that cannot be reversed or restored.

The Proposed Action would not constitute an irreversible commitment of resources. The rights to the water remain the Nation's rights. At the end of the subcontract, the Nation may use the water or subcontract it again as it sees fit. The release of 3,000 ac-ft/yr of



water from Heron Reservoir for the City's use would not constitute an irretrievable commitment of resources because the water will be annually replenished through natural hydrological processes.

CHAPTER 5. MITIGATION MEASURES

No adverse impacts that would warrant mitigation have been identified, therefore no mitigation measures are proposed.

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