

**FINAL ENVIRONMENTAL
ASSESSMENT
FOR THE
JICARILLA APACHE NATION
WATER SUBCONTRACT**

**(FORMERLY CALLED THE USBR/PNM
WATER CONTRACT RENEWAL AND EXTENSION)**

**US BUREAU OF RECLAMATION,
WESTERN COLORADO AREA OFFICE**



SEPTEMBER 2001



United States Department of the Interior

BUREAU OF RECLAMATION

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To: Interested Agencies, Indian Tribes, Organizations, and Individuals

Subject: Finding of No Significant Impact: Jicarilla Apache Nation Water Subcontract
(formally called the USBR/PNM Water Contract Renewal and Extension)

Enclosed for your information is a copy of the subject Finding of No Significant Impact (FONSI). The FONSI represents final compliance with the National Environmental Policy Act on the approval of an agreement between the Public Service Company of New Mexico (PNM) and the Jicarilla Apache Nation. This signifies that the agreement is cleared from an environmental compliance perspective for future approval by the Secretary of the Interior through Bureau of Reclamation. The agreement will allow the Jicarilla Apache Nation to supply and deliver 16,200 acre-feet (AF) of water per year to PNM for use in the operation of the San Juan Generating Station. The water that will be used by the Jicarilla Apache Nation is water made available to them through the Jicarilla Nation Water Rights Settlement Act.

A Draft Environmental Assessment was released to the public on July 31, 2001, for public review and comment. Only minor comments were received on the Draft Environmental Assessment; therefore, no Final Environmental Assessment will be printed and distributed. An addendum showing where changes were made to the Draft Environmental Assessment is enclosed. A complete document of the Final Environmental Assessment can be found on Reclamation's web site at <http://www.uc.usbr.gov/envdocs>

If you have any questions on the FONSI, the Final Environmental Assessment, or the contracting process, please contact Errol Jensen at (970) 385-6589.

Sincerely,

Carol DeAngelis
Area Manager

Enclosures

United States Department of the Interior
Bureau of Reclamation
Western Colorado Area Office

FINDING OF NO SIGNIFICANT IMPACT
JICARILLA APACHE NATION WATER SUBCONTRACT
(FORMERLY CALLED THE USBR/PNM WATER CONTRACT
RENEWAL AND EXTENSION)

Introduction

In accordance with the National Environmental Policy Act of 1969, as amended, the Bureau of Reclamation (USBR) has determined that approval by the Secretary of the Interior, through USBR, of an agreement between the Public Service Company of New Mexico (PNM) and the Jicarilla Apache Nation (formerly called the Jicarilla Apache Tribe) for the supply and delivery of 16,200 acre-feet (AF) of water per year for use in the operation of the San Juan Generating Station (SJGS) would not result in a significant impact on the human environment and does not require preparation of an environmental impact statement.

The environmental assessment was prepared by USBR using existing resource information and information from discussions with agencies and water users associated with this action.

Recommended Action

The Jicarilla Apache Nation Water Subcontract is a proposed subcontract from the Jicarilla Apache Nation to Public Service Company of New Mexico for 16,200 acre feet of water to operate the San Juan Generating Station, an electric power generation facility located in San Juan County, New Mexico. The Jicarilla Apache Nation Water Subcontract's term would begin January 1, 2006 and end December 31, 2027

Background

Currently 16,200 AF per year of water is supplied to the SJGS through a contract between PNM and the USBR. A draft environmental assessment (EA) was issued by the USBR in June 1995 that analyzed the renewal of that contract; however, an ongoing assessment of Indian Trust Asset issues kept the document under review and a final EA was not issued. Since that time, the Jicarilla Apache Nation expressed an interest in entering into subcontracts with third parties for use of water that has been made available to the Nation through the Jicarilla Apache Water Rights Settlement Act. The Jicarilla Apache Nation and PNM have developed an agreement for a water subcontract. SJGS operations will not change as a result of the Jicarilla Apache Nation Water Subcontract. The amount of water to be supplied to the SJGS remains at 16,200 AF per year.

Alternatives Considered

Three alternatives were considered, the proposed action (Recommended Plan), alternative sources of water and a no action alternative. The assumptions that USBR used in the assessment of the proposed action include the following:

- There will continue to be a strong demand by SJGS customers for electrical energy.
- The amount of water subject to the Jicarilla Apache Nation Water Subcontract and currently contracted waters obtained from Broken Hill Proprietary Ltd. (8,000 AF per year) is the minimum required to allow SJGS to meet the increased demand over the length of the contract.

The proposed action involves establishing a contract between the Jicarilla Apache Nation and PNM for consumption of 16,200 AF of water per year from the San Juan River beginning January 1, 2006 and ending December 31, 2027. No new construction or electric power generation operation activities are proposed by this action and no new impacts on environmental, cultural, or socioeconomic resources are anticipated as a result of this proposed action. The location and method of depletions would not change from current operations. The Jicarilla Apache Nation Water Subcontract would allow PNM to continue to consume 16,200 AF per year from the San Juan River through 2027, an extension of an existing activity.

Two other sources of water were considered in this analysis: (1) purchase of existing irrigation water rights and conversion to industrial use and (2) development of groundwater. Purchase of existing irrigation water rights or the development of groundwater were judged too costly and technically infeasible, or inappropriate. The alternatives to acquire other sources of water were determined not to be reasonable alternatives and were not considered further.

Adoption of the no action alternative would likely result in shutdown of the SJGS, resulting in the loss of electrical generating capacity and disruption of electrical service to PNM's customers and to the customers of the other owners of the SJGS. Significant socioeconomic effects to the region would ensue. Environmental impacts would be associated with the removal of the power plant and the weir for a period of years as well. Other impacts would include the direct loss of a significant number of jobs in San Juan County and an indirect loss of many more jobs. In addition, loss of tax revenues and coal royalties from the plant and associated coal mines to San Juan County, the State of New Mexico, and the federal government would occur.

Additional project commitments are designed to support the recovery of two endangered fish species in the San Juan River Basin. As part of the SJRRIP, PNM has agreed to support and participate in implementation of mitigation for the Jicarilla Apache Nation Water Subcontract. The mitigation will alleviate jeopardy to the species through modifications of the PNM diversion weir across the San Juan River to allow fish passage. These modifications have been federally funded. The SJRRIP Biology Committee specified a selective passage system to be operated for the life of the recovery program. The Biology Committee has recommended operation of the fish passage from March through October every year. The USBR will address the fish passage system in a separate environmental assessment

A draft and final EA were completed on the proposed action. Minor comments were received on the draft and changes have been incorporated into the Final EA.

Environmental Impacts

Hydrology, Streamflows, and Water Quality—Implementation of proposed action would create no new impacts on the hydrology, water quality, or sediment quality of the project area or downstream or the area. In addition, the best available information indicates that the current operations, which would continue as a result of implementation of the proposed action, are not causing significant impacts to the hydrology, water quality, or sediment quality, either in the project area or downstream.

Fish and Wildlife Resources--The proposed action should have little effect on fish and wildlife resources. Conditions at SJGS would be expected to remain similar to the current situation. Some temporary grassland and shrub/grass habitat loss would occur at the locations where coal is mined to fuel the power plant over the life of the contract.

The weir now used to divert water to the power plant presents a potential obstruction. This will be corrected by the construction of a fish passage, through the San Juan River Basin Recovery Implementation Program (SJRRIP), which will allow fish access to upstream habitat.

Threatened and Endangered Species--The Service has issued a biological opinion on the proposed Contract. It concluded the Mancos milk-vetch, Knowlton's cactus, Mesa Verde cactus, Mexican spotted owl, bald eagle, and black-footed ferret would not be affected. The Service also concurs that approval of the water subcontract may affect, but is not likely to adversely affect the southwestern willow flycatcher, Colorado pikeminnow, and razorback sucker. This concurrence is based on the commitment of the SJRRIP to fund the construction and operation of a selective fish passage at the SJGS weir, USBR's commitment to operation of Navajo Dam in a manner that will mimic the natural hydrograph, and USBR's participation in the SJRRIP.

Indian Trust Assets—Four Native American Tribes have adjudicated and nonadjudicated water right claims to waters of the San Juan River. They are the Jicarilla Apache Nation, the Navajo Nation, the Ute Mountain Ute Tribe, and Southern Ute Indian Tribe. Throughout the process of completing the environmental assessment for this subcontract approval, consultation has taken place with the tribes. All four tribes have expressed their support of the subcontract between the Jicarilla Nation and PNM. As part of the process of consultation on ITA issues between the Navajo Nation, PNM, and USBR, the parties identified certain concerns about potential impacts to downstream Navajo irrigation projects from continued diversion by PNM. An agreement has been finalized whereby PNM will make certain mitigation payments to the San Juan Dineh Water Users for improvements to their irrigation projects and Reclamation will provide a limited amount of funding through the Native American Affairs program for studies on system improvements.

Environmental Justice--Within the area of effect for this project, there are two minority Hispanic populations (Bloomfield, New Mexico, and Mancos, Colorado); however, neither of those populations is affected by the operations of SJGS and neither is competing for use of the SJGS depletions.

Social and Economic Factors--Since the proposed action would enable SJGS to continue current operations, social-economic conditions would essentially remain the same.

Cultural Resources--Because of the nature of the proposed action and the implementation of the proposed action would be confined to the existing infrastructure, there would be no significant impacts to cultural Resources.

Commitments

The following commitments have been made with respect to the approval of the PNM-Jicarilla Apache Subcontract approval:

- The SJRRIP will fund the construction and operation of a selective fish passage at the SJGS weir.
- USBR will operate Navajo Dam and Reservoir in a manner that will mimic the natural hydrograph.
- USBR's continued participation in the SJRRIP.
- PNM will make certain mitigation payments to the San Juan Dineh Water Users that will be used for improvements to the irrigation projects. Reclamation will provide a limited amount of funding through the Native American Affairs program for studies to identify where system improvements are needed.

Conclusion

Approval by the Secretary of the Interior, through the U. S. Bureau of Reclamation, of an agreement between the Public Service Company of New Mexico and the Jicarilla Apache Nation for the supply and delivery of 16,200 acre-feet (AF) of water per year for use in the operation of the SJGS would not result in a significant impact on the human environment and does not require preparation of an environmental impact statement.

Concur:

Rob Waldman

Environmental Specialist
Western Colorado Area Office

9/12/01

Date

Susan J. Meyer

Area Manager
Western Colorado Area

9-11-01

Date

for

**Revisions to the Environmental Assessment
Jicarilla Apache Nation Water Subcontract
(Formerly called the USBR/PNM Water Contract
Renewal and Extension)**

September 2001

The following revisions to the Draft EA have been made based on comments received by USBR during the comment period August 1 through August 31, 2001. First, the text is shown as it appeared in the Draft EA, and is then followed by the revisions made to the Final EA. The revisions to the document are underlined.

REVISION 1:

Page 1, title, Draft EA text reads:

**REVISED DRAFT
ENVIRONMENTAL ASSESSMENT
JICARILLA APACHE NATION WATER SUBCONTRACT
(FORMERLY CALLED THE USBR/PNM WATER CONTRACT
RENEWAL AND EXTENSION)**

JULY 2001

Page 1, title, Final EA text reads:

**FINAL
ENVIRONMENTAL ASSESSMENT
JICARILLA APACHE NATION WATER SUBCONTRACT
(FORMERLY CALLED THE USBR/PNM WATER CONTRACT
RENEWAL AND EXTENSION)**

SEPTEMBER 2001

REVISION 2:

Page 1, Section 1.1, 1st paragraph, Draft EA text reads:

Water leased under the subcontract would be used at SJGS. The SJGS is located near Waterflow, in San Juan County, New Mexico, approximately 15 miles west of the city of Farmington. The withdrawal point on the San Juan River is a weir and pump station located at river mile (RM) 166.1, in the southwest quarter of the southwest quarter of Section 3, township 29 north, range 15 west (Figure 1). The river mile location is a point as measured by the San Juan River Basin Recovery Implementation Program

(SJRRIP). The SJRRIP is a cooperative effort among entities interested in the dual goals of endangered fish recovery and additional water development in the San Juan River Basin. The weir and pump station are located approximately 4 miles from the SJGS on the San Juan River (Figure 2).

Page 1, Section 1.1, 1st paragraph, Final EA text reads:

Water leased under the subcontract would be used at SJGS. The SJGS is located near Waterflow, in San Juan County, New Mexico, approximately 15 miles west of the city of Farmington. The withdrawal point on the San Juan River is a weir and pump station located at river mile (RM) 166.1, in the southwest quarter of the southwest quarter of Section 3, township 29 north, range 15 west (Figure 1). The river mile location is a point as measured by the San Juan River Basin Recovery Implementation Program (SJRRIP). The SJRRIP is a cooperative effort among entities interested in the dual goals of endangered fish recovery and continued water development in the San Juan River Basin. The weir and pump station are located approximately 4 miles from the SJGS on the San Juan River (Figure 2).

REVISION 3:

Page 5, Section 4.1, 2nd paragraph, Draft EA text reads:

Additional project commitments are designed to support the recovery of two endangered fish species in the San Juan River Basin. As part of the SJRRIP, PNM has agreed to support and participate in implementation of mitigation for the Jicarilla Apache Nation Water Subcontract. The mitigation will alleviate jeopardy to the species through modifications of the PNM diversion weir across the San Juan River to allow fish passage. These modifications have been federally funded. The SJRRIP Biology Committee specified a selective passage system to be operated for the life of the recovery program. The Biology Committee has recommended operation of the fish passage from March through October every year (Pfeifer 2000). The USBR will address the fish passage system in a separate environmental assessment.

Page 5, Section 4.1, 2nd paragraph, Final EA text reads:

Additional project commitments are designed to support the recovery of two endangered fish species in the San Juan River Basin. As part of the SJRRIP, PNM has agreed to support and participate in implementation of mitigation for the Jicarilla Apache Nation Water Subcontract. The mitigation will alleviate jeopardy to the species through modifications of the PNM diversion weir across the San Juan River to allow fish passage. Federal funds are available for these modifications. The SJRRIP Biology Committee specified a selective passage system to be operated for the life of the recovery program. The Biology Committee has recommended operation of the fish passage from March through October every year (Pfeifer 2000). The USBR will address the fish passage system in a separate environmental assessment.

REVISION 4:

Page 30, Section 6.5.2, 4th paragraph, Draft EA text reads:

The Navajo Nation has substantial quantities of water resource ITAs in the San Juan River Basin, based on historic use and reserved water rights (Winters Doctrine rights); however, reserved rights have not been quantified in the New Mexico courts. Baseline reservation usage is 301,499 AF per year (including 280,600 AF per year for the Navajo Indian Irrigation Project, 12,100 AF per year for the Hogback Project, 7,898 AF per year for the Fruitland Project, and 900 AF per year for the Cudei Project). There are 2,340 AF per year for the Navajo Nation included in the baseline depletions for the Animas-La Plata Project.

Page 30, Section 6.5.2, 4th paragraph, Final EA text reads:

The Navajo Nation has substantial quantities of water resource ITAs in the San Juan River Basin, based on historic use (including claims related to historic use for irrigation projects and municipal use) and reserved water rights (Winters Doctrine rights); however, reserved rights have not been quantified in the New Mexico courts. Baseline reservation usage is 301,499 AF per year (including 280,600 AF per year for the Navajo Indian Irrigation Project (NIP), 12,100 AF per year for the Hogback Project, 7,898 AF per year for the Fruitland Project, and 900 AF per year for the Cudei Project). Included in the baseline usage is approximately 16,000 AF per year transferred to NIP from other downstream Navajo irrigation projects. There are 2,340 AF per year for the Navajo Nation included in the baseline depletions for the Animas-La Plata Project.

REVISION 5:

Page 32, Section 6.6.2, 4th paragraph, Draft EA text reads:

The Navajo population described above is in need of additional water. The City of Gallup and the Navajo Nation in concert with USBR have proposed a water supply system (Navajo-Gallup Water Supply System) that will provide approximately 37,000 AF per year of water to those areas from a diversion source on the San Juan River. Currently, depletions for this quantity of water are not included in the baseline depletion for the SJRRIP; however, USBR is working with the Navajo Nation and the City of Gallup to identify adequate sources of water for the Navajo-Gallup Water Supply Project and other development projects in the San Juan River Basin.

Page 32, Section 6.6.2, 4th paragraph, Final EA text reads:

The Navajo population described above is in need of additional water. The City of Gallup and the Navajo Nation in concert with USBR have proposed a water supply system (Navajo-Gallup Water Supply System) that will provide approximately 37,000 AF per year of water to those areas from a diversion source on the San Juan River. Currently, depletions for this quantity of water are not included in the baseline depletion for the SJRRIP; however, USBR is working with the Navajo Nation and the City of Gallup to identify adequate sources of water for the Navajo-Gallup Water Supply System and other development projects in the San Juan River Basin. The Navajo-Gallup Water Supply System may not address 100 percent of the Navajo municipal demand, which may be met with other alternatives not yet identified or quantified at this time.

REVISION 6:

Page 33, Section 6.7.1, 2nd paragraph, Draft EA text reads:

County population estimates have been updated by the Census Bureau. The total population estimate for San Juan County as of July 1, 1999 was 109,899 (USDOC 2000). Native American population was at 39 percent with non-Native American estimates at 61 percent. Population projections for San Juan County in the year 2020 are estimated to be 145,072 (BBER 1997).

Page 33, Section 6.7.1, 2nd paragraph, Final EA text reads:

County population estimates have been updated by the Census Bureau. The total population estimate for San Juan County as of July 1, 1999 was 109,899 (USDOC 2000). Native American population was at 39 percent with non-Native American estimates at 61 percent. Population projections for San Juan County in the year 2020 are estimated to be 145,072 (BBER 1997). The Navajo Nation has expressed concerns that the BBER population projections may have underestimated Navajo population counts.

REVISION 7:

Page 45, Section 8.0, 2nd paragraph, Draft EA text reads:

Other water resource activities in the San Juan River Basin that would be connected or have cumulative impacts with the Jicarilla Apache Nation Water Subcontract include the construction of the endangered fish passage at the SJGS Diversion Weir (Diversion Weir), implementation of an agreement between the Navajo Nation, PNM, the San Juan Dine Water Users, and USBR that would allow funds supplied by PNM to go toward the rehabilitation of certain mainstem Navajo Nation irrigations projects, operation of Navajo Dam, implementation of the Animas-La Plata Project, completion of the Navajo Indian Irrigation Project (NIIP), implementation of the Navajo River Water Development Plan, continued San Juan Basin coalbed methane gas development, and development of future Indian water development projects.

Page 45, Section 8.0, 2nd paragraph, Final EA text reads:

Other water resource activities in the San Juan River Basin that would be connected or have cumulative impacts with the Jicarilla Apache Nation Water Subcontract include the construction of the endangered fish passage at the SJGS Diversion Weir (Diversion Weir), implementation of an agreement between the Navajo Nation, PNM, the San Juan Dineh Water Users, and USBR that would allow funds supplied by PNM to go toward the rehabilitation of certain mainstem Navajo Nation irrigations projects, operation of Navajo Dam, implementation of the Animas-La Plata Project, completion of the Navajo Indian Irrigation Project (NIIP), implementation of the Navajo River Water Development Plan, continued San Juan Basin coalbed methane gas development, and development of future Indian water development projects.

REVISION 8:

Page 46, Section 8.1, 5th paragraph, Draft EA text reads:

An environmental assessment (EA) is being prepared that will address providing endangered fish passage at the Diversion Weir. USBR is preparing this EA in cooperation with the USFWS to comply with the National Environmental Policy Act, Endangered Species Act, and related U.S. Department of the Interior

policies and regulations. If, based on this analysis, USBR concludes the proposed action would have no significant impact on the human environment, preparation of an Environmental Impact Statement would not be required before the action could be implemented.

Page 46, Section 8.1, 5th paragraph, Final EA text reads:

An environmental assessment (EA) has been prepared that addresses providing endangered fish passage at the Diversion Weir. USBR is preparing this EA in cooperation with the USFWS to comply with the National Environmental Policy Act, Endangered Species Act, and related U.S. Department of the Interior policies and regulations. If, based on this analysis, that USBR concludes the proposed action would have no significant impact on the human environment, preparation of an Environmental Impact Statement would not be required before the action could be implemented.

REVISION 9:

Pages 46 and 47, Section 8.2, title and 1st paragraph, Draft EA text reads:

8.2 Agreement between the Navajo Nation, PNM, USBR, and the San Juan Dine Water Users

As part of the process of consultation on ITA issues between the Navajo Nation, PNM, and USBR, the parties identified certain concerns about potential impacts to downstream Navajo irrigation projects from continued diversion by PNM. The Navajo Nation, PNM, USBR, and the San Juan Dine Water Users anticipate finalizing an agreement whereby PNM will make certain mitigation payments to Navajo farmers that will be available for improvements to the irrigation projects. This agreement is subject to approval by various committees of the Navajo Nation Council.

Pages 46 and 47, Section 8.2, title and 1st paragraph, Final EA text reads:

8.2 Agreement between the Navajo Nation, PNM, USBR, and the San Juan Dineh Water Users

As part of the process of consultation on ITA issues between the Navajo Nation, PNM, and USBR, the parties identified certain concerns about potential impacts to downstream Navajo irrigation projects from continued diversion by PNM. The Navajo Nation, PNM, USBR, and the San Juan Dineh Water Users have entered into an agreement whereby PNM will make certain mitigation payments to the San Juan Dineh Water Users that will be available for improvements to the irrigation projects. This agreement has been approved by various committees of the Navajo Nation Council and signed on behalf of the Navajo Nation president.

REVISION 10:

Page 51, Section 9.2.6.1, 1st paragraph, Draft EA text reads:

A meeting was held on September 16, 1994, at the offices of the Water Resources Department. The attendees were Teresa Showa (Director, Water Resources Management), Michael Johnson and George Roussos (Water Resources Department), Stanley Pollack (Navajo Nation), Cindy Murray and Henry Townsend (PNM), and Jens Deichmann (Resource Science Group [RSG]). The purpose of the meeting

was to (1) advise the Navajo Nation representatives of the proposed action, (2) solicit information on concerns the Navajo Nation might have regarding the proposed action and (3) solicit any help the Nation could provide in identifying possible ITAs which should be addressed in the environmental assessment. Issues raised in the meeting relevant to the proposed action included:

Page 51, Section 9.2.6.1, 1st paragraph, Final EA text reads:

A meeting was held on September 16, 1994, at the offices of the Water Resources Department. The attendees were Teresa Showa (Director, Water Resources Management), Michael Johnson and George Roussos (Water Resources Department), Stanley Pollack (Navajo Nation), Cindy Murray and Henry Townsend (PNM), and Jens Deichmann (Resource Science Group [RSG]). The purpose of the meeting was to (1) advise the Navajo Nation representatives of the proposed action, (2) solicit information on concerns the Navajo Nation might have regarding the proposed action and (3) solicit any help the Nation could provide in identifying possible ITAs which should be addressed in the environmental assessment. Issues raised in the meeting relevant to the proposed action (and later referenced in comments provided by the Navajo Department of Water Resources in connection with the previous draft EA of June 1995) included:

REVISION 11:

Not part of the Draft EA, but added to the Final EA after Appendix B:

APPENDIX C

AGREEMENT BETWEEN THE NAVAJO NATION, SAN JUAN RIVER DINEH WATER USERS, INC., PNM, AND THE BUREAU OF RECLAMATION

SOUTHERN UTE INDIAN TRIBE LETTER

UTE MOUNTAIN UTE TRIBE LETTER

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RENEWAL AND EXTENSION)**

SEPTEMBER 2001

EXECUTIVE SUMMARY

The proposed action is the approval by the Secretary of the Interior, through the U.S. Bureau of Reclamation (USBR), of an agreement between the Public Service Company of New Mexico (PNM) and the Jicarilla Apache Nation (formerly called the Jicarilla Apache Tribe) for the supply and delivery of 16,200 acre-feet (AF) of water per year for use in the operation of the San Juan Generating Station (SJGS). Currently, water for SJGS is supplied through a contract between PNM and the USBR for 16,200 AF per year. A draft environmental assessment (EA) was issued by the USBR in June 1995 that analyzed the renewal of that contract; however, an ongoing assessment of Indian Trust Asset issues kept the document under review and a final EA was not issued. Since that time, the Jicarilla Apache Nation expressed an interest in entering into subcontracts with third parties for use of water that has been made available to the Nation through the Jicarilla Apache Water Rights Settlement Act. The Jicarilla Apache Nation and PNM have developed an agreement for a water subcontract. The decision was made to reissue the draft EA as it pertains to this contract. The only difference between the proposed action of this draft EA and the proposed action of the 1995 draft EA is the change in supplier from USBR to the Jicarilla Apache Nation. SJGS operations will not change as a result of the Jicarilla Apache Nation Water Subcontract. The amount of water to be supplied remains 16, 200 AF per year.

1.0 INTRODUCTION

The Jicarilla Apache Nation Water Subcontract is a proposed subcontract from the Jicarilla Apache Nation to Public Service Company of New Mexico for 16,200 acre feet of water to operate the San Juan Generating Station, an electric power generation facility located in San Juan County, NM. The Jicarilla Apache Nation Water Subcontract's term would begin January 1, 2006 and end December 31, 2027.

1.1 Proposed Action Location

Water leased under the subcontract would be used at SJGS. The SJGS is located near Waterflow, in San Juan County, New Mexico, approximately 15 miles west of the city of Farmington. The withdrawal point on the San Juan River is a weir and pump station located at river mile (RM) 166.1, in the southwest quarter of the southwest quarter of Section 3, township 29 north, range 15 west (Figure 1). The river mile location is a point as measured by the San Juan River Basin Recovery Implementation Program (SJRRIP). The SJRRIP is a cooperative effort among entities interested in the dual goals of endangered fish recovery and continued water development in the San Juan River Basin. The weir and pump station are located approximately 4 miles from the SJGS on the San Juan River (Figure 2).

FIGURE 1

Regional Maps

February 2001

Based on USBR 1995 (No Scale) and
USGS 1:100,000 Farmington (Scale: 1 inch = 8000 feet)

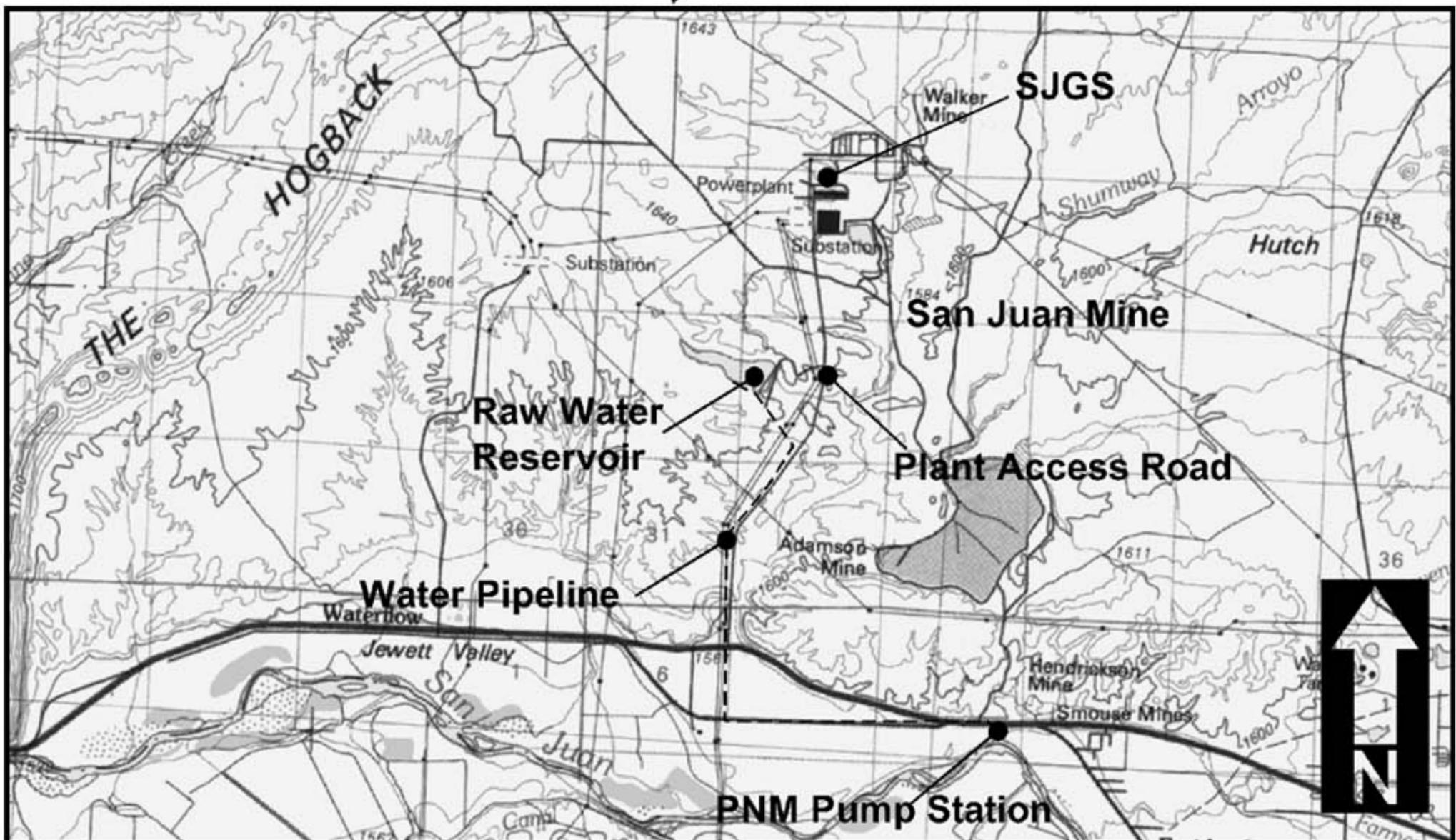
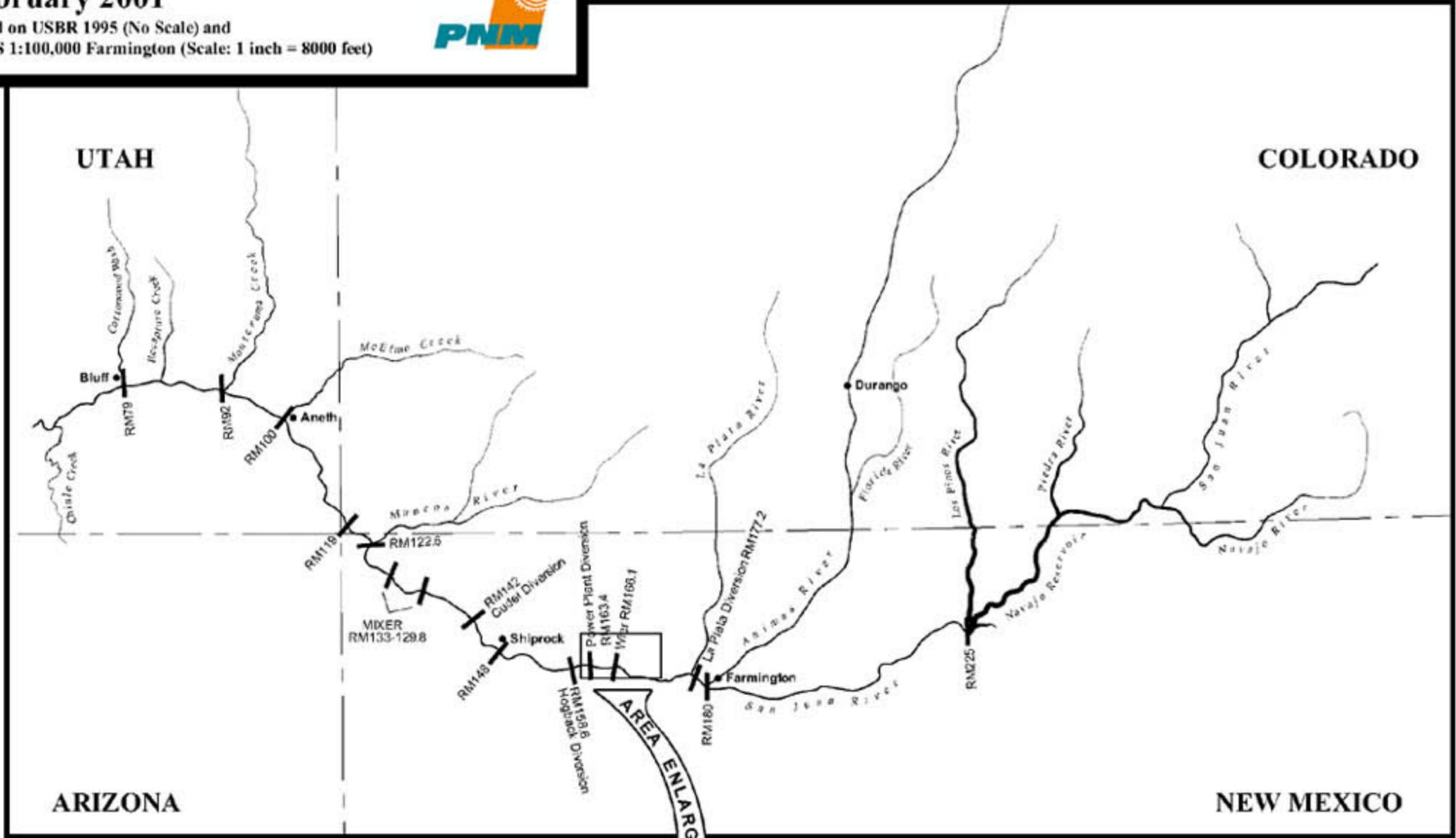


FIGURE 2

Location Map

February 2001

Date of Photography: November 26, 1997
Scale: 1 inch = 2500 feet



SJGS
Cooling Towers
Evaporation Ponds

San Juan Mine

Raw Water Reservoir

Plant Access Road

Water Pipeline

Weir
(See Figure 3)

US 64

San Juan Riv



2.0 PROPOSED ACTION HISTORY

SJGS currently has the ability to obtain 16,200 AF of its existing water supply annually from a contract with the USBR from Navajo Reservoir (USBR contract), contract #14-04-400-4821 and Office of the NM State Engineer file #3258. PNM had initially requested USBR to renew and extend the USBR contract upon its expiration on December 31, 2005. In connection with the Endangered Species Act (ESA) Section 7 consultation for the USBR contract (then Consultation #2-22-00-I-469), the Jicarilla Apache Nation requested that the U. S. Fish & Wildlife Service (USFWS) include the tribe in the consultation in accordance with Secretarial Order 3206. At that juncture, PNM began discussions with the Jicarilla Apache Nation for an alternative water supply to the USBR contract.

As a result of the Jicarilla Apache Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237, the Jicarilla Apache Nation and the United States entered into a contract dated December 8, 1992 (the Federal Contract). The Settlement Act and the Federal Contract authorize the Jicarilla Apache Nation to divert up to 40,000 AF of water per year from the San Juan River, 25,500 AF of which may be depleted from the Navajo Reservoir Supply as it is defined in the Federal Contract. When this water is not being used by the Nation, the Settlement Act and Federal Contract permit the Jicarilla Apache Nation to enter into subcontracts with third parties, subject to the approval of the Secretary of the Interior.

The amount of water requested under the Jicarilla Apache Nation Water Subcontract is the same as is provided by the existing USBR Contract, 16,200 AF per year. Furthermore, PNM's depletions will continue to occur in the same manner as current depletions by the SJGS at its weir. The only difference will be that the Jicarilla Apache Nation, and not USBR, will be acting as the supplier of the water for those depletions.

3.0 PURPOSE AND NEED

As described above, the Jicarilla Apache Nation has the right to deplete up to 25,500 AF from the Navajo Reservoir Supply. The hydrologic modeling used in recent consultations with the USFWS under Section 7 of the Endangered Species Act, including the consultation on the Animas-La Plata Project (ALP) completed in June 2000, suggests that only 5,000-6,000 AF per year of water can be developed in the San Juan River Basin consistent with conservation measures imposed by USFWS for the benefit of endangered fish. The calculation of this amount of water available for development assumed an environmental baseline consisting of water use by various existing water users, including the 16,200 AF per year used by SJGS, and the development of certain projects such as ALP. The Jicarilla Apache Nation has disputed some of the depletion figures in that baseline and other assumptions in the hydrologic modeling, but has not challenged the validity of the existing SJGS depletion.

Although the environmental baseline used in the past ESA Section 7 consultations does not establish the environmental baseline for future ESA Section 7 consultations, the USFWS may continue to make the same assumptions about what is included in the baseline. USBR's approval of the Jicarilla Apache Nation Water Subcontract would allow the Nation to exercise 16,200 AF of its depletion rights under the Federal Contract and Settlement Act by becoming the supplier for the existing SJGS depletion.

The SJGS generates electrical power for wholesale and retail customers in New Mexico and four other western states. The generating station is operated by PNM on behalf of itself and eight other owners.

The other owners include the City of Farmington, New Mexico; Los Alamos County, New Mexico; Utah Associated Municipal Power Systems; the M-S-R Public Power Agency, a joint agency composed of the Modesto Irrigation District and the cities of Santa Clara and Redding, California; the City of Anaheim, California; Southern California Public Power Authority; Tucson Electric Power Company; and Tri-State Generation and Transmission Cooperative, Inc. These owners, or their constituents, are regulated utilities, cooperatives, or governmental entities located in the states of New Mexico, Utah, Arizona, Colorado, and California. The continued production of electricity by PNM for these entities requires a dependable supply of water for steam production, cooling, pollution control, washdown, and general processes. There has been a consistent increase in demand for additional electrical energy throughout the southwestern United States over the past 10 years (2 percent to 4 percent per year) and this rate of increase is not expected to decline over the next 10 years.

The Jicarilla Apache Nation Water Subcontract will allow PNM to continue to withdraw 16,200 AF of water annually. Withdrawal of the 16,200 AF of water varies throughout the year driven by generation and load needs within New Mexico and other markets including service territories of other SJGS owners. Monthly diversion would occur, at a minimum, similar to the last ten years of diversion shown in the Biological Assessment (Appendix A of this document) Appendix B (of the Biological Assessment), Table 1. PNM has requested the Jicarilla Apache Nation Water Subcontract now to ensure the availability of water for SJGS through its contractual commitments.

4.0 PROPOSED ACTION AND ALTERNATIVES

Three alternatives were considered:

- Proposed Action
- Alternative Sources of Water
- No Action

4.1 Proposed Action: The Jicarilla Apache Nation Water Subcontract

The proposed action involves establishing a contract between the Jicarilla Apache Nation and PNM for consumption of 16,200 AF of water per year from the San Juan River beginning January 1, 2006 and ending December 31, 2027. The USBR will be the action agency charged with approval of the Jicarilla Apache Nation Water Subcontract for the U.S. Department of the Interior. No new construction or electric power generation operation activities are proposed by this action and no new impacts on environmental, cultural, or socioeconomic resources are anticipated as a result of this proposed action. The location and method of depletions would not change from current operations. The Jicarilla Apache Nation Water Subcontract would allow PNM to continue to consume 16,200 AF per year from the San Juan River through 2027, an extension of an existing activity.

Additional project commitments are designed to support the recovery of two endangered fish species in the San Juan River Basin. As part of the SJRRIP, PNM has agreed to support and participate in implementation of mitigation for the Jicarilla Apache Nation Water Subcontract. The mitigation will alleviate jeopardy to the species through modifications of the PNM diversion weir across the San Juan River to allow fish passage. Federal funds are available for these modifications. The SJRRIP Biology Committee specified a selective passage system to be operated for the life of the recovery program. The Biology Committee has recommended operation of the fish passage from March through October every

year (Pfeifer 2000). The USBR will address the fish passage system in a separate environmental assessment.

The assumptions that USBR is including in its assessment of the proposed action include the following:

- There will continue to be a strong demand by SJGS customers for electrical energy.
- The amount of water subject to the Jicarilla Apache Nation Water Subcontract and currently contracted waters obtained from BHP (8,000 AF per year) is the minimum required to allow SJGS to meet the increased demand over the length of the contract.
- Alternative nonriver water sources or management practices are insufficient to provide the amount and quality of water required for efficient operation of SJGS.

4.2 Alternative Sources of Water

Two other sources of water were considered in this analysis: (1) purchase of existing irrigation water rights and conversion to industrial use and (2) development of groundwater. These alternatives were also considered but ultimately rejected as part of the analysis in the 1977 environmental impact statement (EIS) for development of the SJGS (USBR 1977).

4.2.1 Irrigation Water

Purchase of existing irrigation water rights would require changing the waters designated for irrigation to municipal and industrial (M&I) waters. This could result in the immediate loss of numerous agricultural jobs in the local area, as well as loss of agricultural production and support services. Use of water currently being diverted for irrigation is not feasible and inappropriate since conversion of agricultural water to M&I water is subject to public interest criteria under the NM 1985 amendment to water rights transfer statutes. Also, since PNM does not have the power to condemn water rights, this alternative may not be possible or financially feasible and, therefore, may not provide an adequate amount of water rights and a reliable water supply for SJGS.

4.2.2 Groundwater

Studies conducted to consider development of groundwater indicate that such an alternative would result in high costs for water treatment, would not provide a sufficient quantity of water, and would adversely affect other users of the groundwater resources. Groundwater quality in the vicinity of SJGS has been found to range from 1,500 to 25,000 milligrams per liter (mg/L) total dissolved solids (TDS) (USBR 1977). Feasibility studies conducted by PNM have demonstrated that the cost of treating water containing such high levels of TDS would make its use prohibitively expensive.

With respect to the available quantity of groundwater, the 1977 EIS states that recoverable groundwater in the first 100 feet of aquifer in the vicinity of the SJGS would be no more than 300 AF per square mile (USBR 1977). Based on that estimate, the area required to extract the required 16,200 AF could be as much as or more than 54 square miles. This also would make the use of groundwater impractical. These sources of water would be identified as a non-Federal action and are administered through the New Mexico State Engineer's Office. Utilization of groundwater would have a significant impact on the existing San Juan Basin groundwater availability.

Because of these limitations, the alternatives to acquire other sources of water were determined not to be reasonable alternatives and were not considered further.

4.3 No Action Alternative

In the event that the Jicarilla Apache Nation Water Subcontract for consumption of 16,200 AF per year of water from the San Juan River is not approved (the no action alternative), and PNM is unable to acquire sufficient alternate water supplies to allow it to continue operation of the SJGS, electrical generation at SJGS would cease after December 31, 2005, along with the numerous support activities currently being provided. However, the electrical power currently being supplied to PNM's customers and to the other participants of the SJGS would have to be replaced from alternative sources, either from one location or multiple sources. This alternative examines the impacts and far-reaching consequences of SJGS ceasing operations. Removal of the power plant and the weir would create subsequent environmental impacts as well. This alternative also examines the impacts on the Jicarilla Apache Nation if the USBR denies approval of the Subcontract.

Adoption of the no action alternative would likely result in shutdown of the SJGS, resulting in the loss of electrical generating capacity and disruption of electrical service to PNM's customers and to the customers of the other owners of the SJGS. Significant socioeconomic effects to the region would ensue. Environmental impacts would be associated with the removal of the power plant and the weir for a period of years as well. Other impacts would include the direct loss of a significant number of jobs in San Juan County and an indirect loss of many more jobs. In addition, loss of tax revenues and coal royalties from the plant and associated coal mines to San Juan County, the State of New Mexico, and the federal government would occur.

For the purposes of this assessment, it has been assumed that PNM would not be able to acquire sufficient alternative sources of water by December 31, 2005 to continue operation of SJGS.

4.4 Summary of Alternatives

Three alternatives were considered, the proposed action, alternative sources of water, and no action. The proposed action would allow the *status quo* to continue; i.e., continued operation of the SJGS consuming 16,200 AF of water per year diverted from the San Juan River.

Alternative sources of water were considered but were judged too costly and technically infeasible, or inappropriate. Sources that were considered included groundwater and water currently being diverted from the San Juan River for irrigation. The alternatives to acquire other sources of water were determined not to be reasonable alternatives and were not considered further.

The no action alternative would likely result in the shutdown of SJGS.

5.0 DESCRIPTION OF CURRENT SJGS OPERATIONS

The present water supply for SJGS is obtained from the San Juan River under two separate, unrelated contracts, one with the USBR and the other with Utah International Inc. (now Broken Hill Proprietary Ltd. [BHP]). The primary source of water is a contract dated April 11, 1968, as amended in 1976 and 1977, between USBR and PNM. The USBR contract authorizes the consumptive use of 16,200 AF of water per year and requires PNM to pay an annual fee to the USBR regardless whether PNM takes any or all of the water. In addition, an agreement between BHP and PNM gives PNM a contractual right to consume up to 8,000 AF of water per year under New Mexico State Water Permit No. 2838. Such right

continues as long as the four electrical generation units of SJGS are in operation and using coal from San Juan Coal Company (SJCC) as their fuel source.

As a result of these two contracts, the combined total water currently available for consumptive use by SJGS is 24,200 AF per year. Although SJGS has not required the total 24,200 AF available so far, it has used most or all of the 16,200 annual AF of USBR water over the last 10 years (Table 1). With current and rising capacity factors shown in Table 1, PNM expects to require, at a minimum, all of the water from the Jicarilla Apache Nation Water Subcontract as well as BHP water.

The majority of the water consumed by SJGS is used for cooling purposes. Cooling is essentially accomplished through the evaporation of the water. Consequently, consumption of water is closely related to the generation of electrical power; i.e., the more electrical power generated, the more water is consumed.

In addition to the water pumped by PNM for use at SJGS, PNM also diverts water for the BHP-owned coal mine under BHP's separate water permit. This is not part of PNM's 24,200 AF. This arrangement is part of the fuel supply agreement between PNM and BHP.

5.1 Current Operation of Diversion and Pump Station

The SJGS weir is a broad concrete structure that extends from shore to shore across the river (Figure 3). During high water flow in the river (over 8,000 cubic feet per second [cfs]) there is bypass flow around the south side of the weir. Water has been diverted for use at SJGS continuously since 1973.

The weir is 3.5 feet high in the middle where water is spilled into a stilling basin created by a concrete apron between the weir and a 1-ft. retaining wall 32 feet downstream (Figure 4). The stilling basin is the width of the river. The presence of the basin results in a maximum 2.5 feet that must be ascended in order for fish to go over the weir. As flows increase, the difference in water levels is reduced. For example, with flows of approximately 1,000 cfs the depth of the basin is 2 feet, reducing the height difference to 1.5 feet. Although higher flows reduce the height difference, the water velocity also increases. The weir provides an unquantified impediment to upstream fish movement. Studies conducted as part of the SJRRIP have shown that some fish are able to move upstream past the weir but their specific method of movement is not known and the number of fish dissuaded from upstream movement by the presence of the weir is not known. There is also a sluice tunnel 4 feet by 6 feet in the weir on the north side of river. This tunnel is used to sluice the inlet structure of sediment. Normal operation is to have the sluice gate open 8 to 12 inches.

Trash screens and isolation gates are located at the point of diversion. A concrete channel approximately 490 feet long delivers diverted river water to the pump house or returns it to the river. Water to be used by SJGS moves from the concrete channel through traveling nonimpingement screens to three pumps capable in combination of pumping a maximum of 17,000 gallons per minute (37 cfs) to a 110-acre storage reservoir. From the storage reservoir, the water is pumped to SJGS. A polymer storage and feed system is located at the river pumping station to feed a high molecular weight polymer to the pump discharge line (to the raw water reservoir). Addition of the polymer to the water improves settling of suspended solids in the reservoir and is used only during periods of high river turbidity. No polymer reaches the San Juan River.

Table 1

Total Annual Consumptive Use at San Juan Generating Station

1989-1999 (AF per year)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
USBR Water Usage ¹	16,200	15,892	13,676	14,796	16,200	16,200	16,200	16,200	16,200	16,200	16,200
BHP Water Usage ²	3,067	0	0	0	2,807	1,905	2,159	5,096	4,693	1,462	3,337
Total SJGS Usage ³	19,267	15,892	13,676	14,796	19,007	18,105	18,359	21,296	20,873	17,662	19,537
SJGS Capacity Factor (%)	74	67	54	65	68	73	71	81	82	80	82

1/ SJGS Consumption of Navajo Reservoir Contract water (Contract number 14-06-400-4821)

2/ SJGS Consumption of BHP water (State Engineer file number 2838)

3/ SJGS Total Water Consumption Consumption at SJGS equals the amount pumped from the river plus the inflow to the (raw water) reservoir minus the seepage from the (raw water) reservoir plus or minus the change in (raw water) reservoir storage minus delivery to San Juan Coal Company



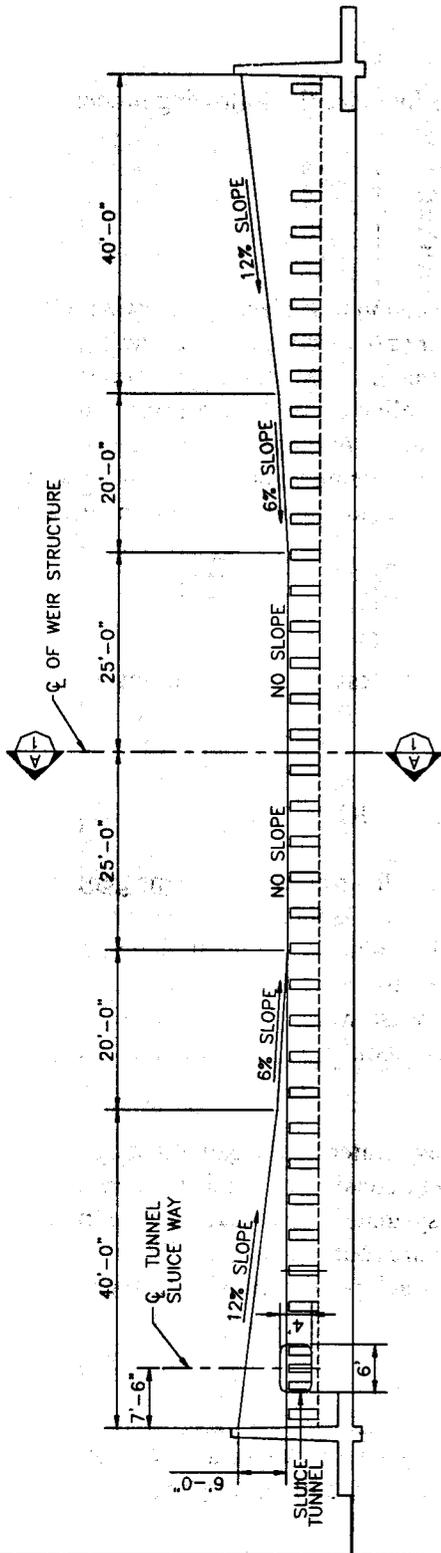
FIGURE 3

SJGS Weir & Pump Station

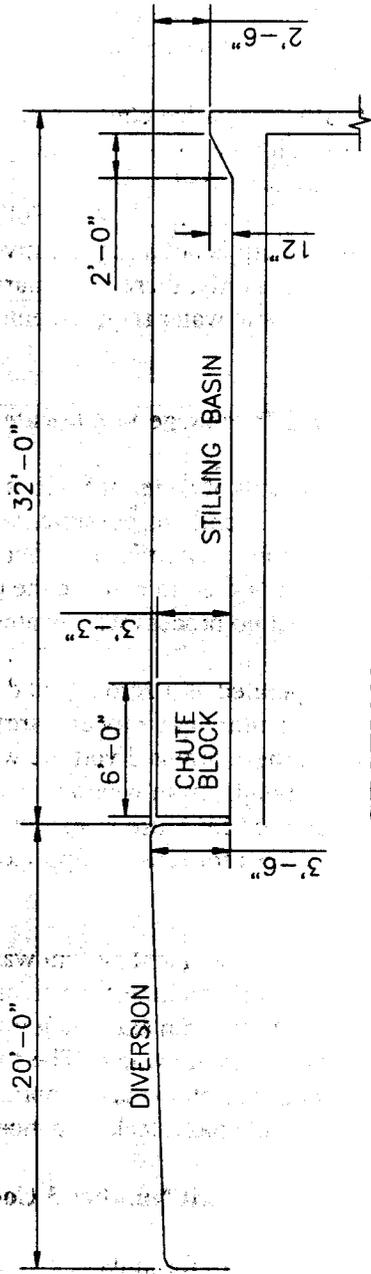
February 2001

Date of Photography: November 26, 1997
Scale: 1 inch = 200 feet





SECTION OF WEIR
N.T.S.



SECTION A-A
SCALE: 1/8" = 1'-0"

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PUBLIC SERVICE COMPANY OF NEW MEXICO

WEIR SECTIONS
SAN JUAN GENERATING STATION

DR: JWD

DATE: 03/03/99

ACAD- WEIRO3

APP:

WEIR-03

FIGURE 4

5.2 Sulfur Dioxide Removal Equipment

The flue gas desulfurization (FGD) system in operation at SJGS includes the following processes:

- Limestone preparation and feed area
- Absorber cells – three per unit
- Gypsum filter and load-out area

In 1996, after a detailed engineering analysis, PNM made the decision to replace the existing Wellman-Lord sulfur dioxide (SO₂) removal system with a limestone SO₂ removal system. After the existing air permits were modified by the New Mexico Environment Department, PNM started construction of the limestone system in April 1997. Full operation began in 1999. Unlike the Wellman-Lord system, the limestone system is not a regenerative system. The limestone removal process produces gypsum as a final byproduct. Presently, there is no market for gypsum. The gypsum is being trucked to the mine and used as fill material. The water requirements for the limestone system are equivalent to the Wellman-Lord system.

5.3 Zero Discharge Wastewater Treatment

The management of water at SJGS involves a series of complex processes that make it possible to use this resource as efficiently as possible. Water is reused, some as much as 100 times, before it is ultimately evaporated either as part of the plant cooling system, FGD process, or from the series of zero liquid discharge ponds used to manage the process wastewater generated by SJGS. Zero liquid discharge refers to the fact that no process wastewaters are discharged off site from SJGS.

SJGS has operated as a zero liquid discharge facility since 1983. All wastewater streams generated at SJGS, both sanitary and process, are collected in a system of drains. Depending on the source of the wastewater, these drains divert the wastewater to one of several high density polyethylene-lined holding and settling ponds, from where it is pumped to the wastewater treatment system. Following treatment, the water is returned for reuse in various SJGS water systems. The wastewater treatment system at SJGS treats and allows for reuse of approximately 400 million gallons (about 1,371 AF) of wastewater annually.

The wastewater treatment system was installed to handle the wastewater that is generated by the operating units, towers, and the limestone areas. This wastewater treatment consists of two brine concentrators (BCs) rated at 500 gpm and 350 gpm. The product from these systems is also used for demineralizer and cooling tower makeup water. The final wastes from the system are routed to one of the solar evaporation ponds that have a total area of approximately 75 surface acres. Each pond is lined with high density polyethylene and has a leak detection system (Figure 5).

5.4 SJGS Unit Number 3 Cooling Tower Retrofit

The cooling towers for units 1, 2 and 4 are wet systems which rely on the evaporation of water to provide the required cooling capacity. The unit 3 cooling tower was originally built as a hybrid wet/dry system designed to minimize the amount of water lost through evaporation while running the generating unit. Two of the ten cooling cells which make up unit 3 cooling tower have been converted to wet systems. This has been necessitated by limitations of the hybrid wet/dry cells to provide adequate cooling at unit generating capacities now being achieved. This has especially been a limitation to generation during the

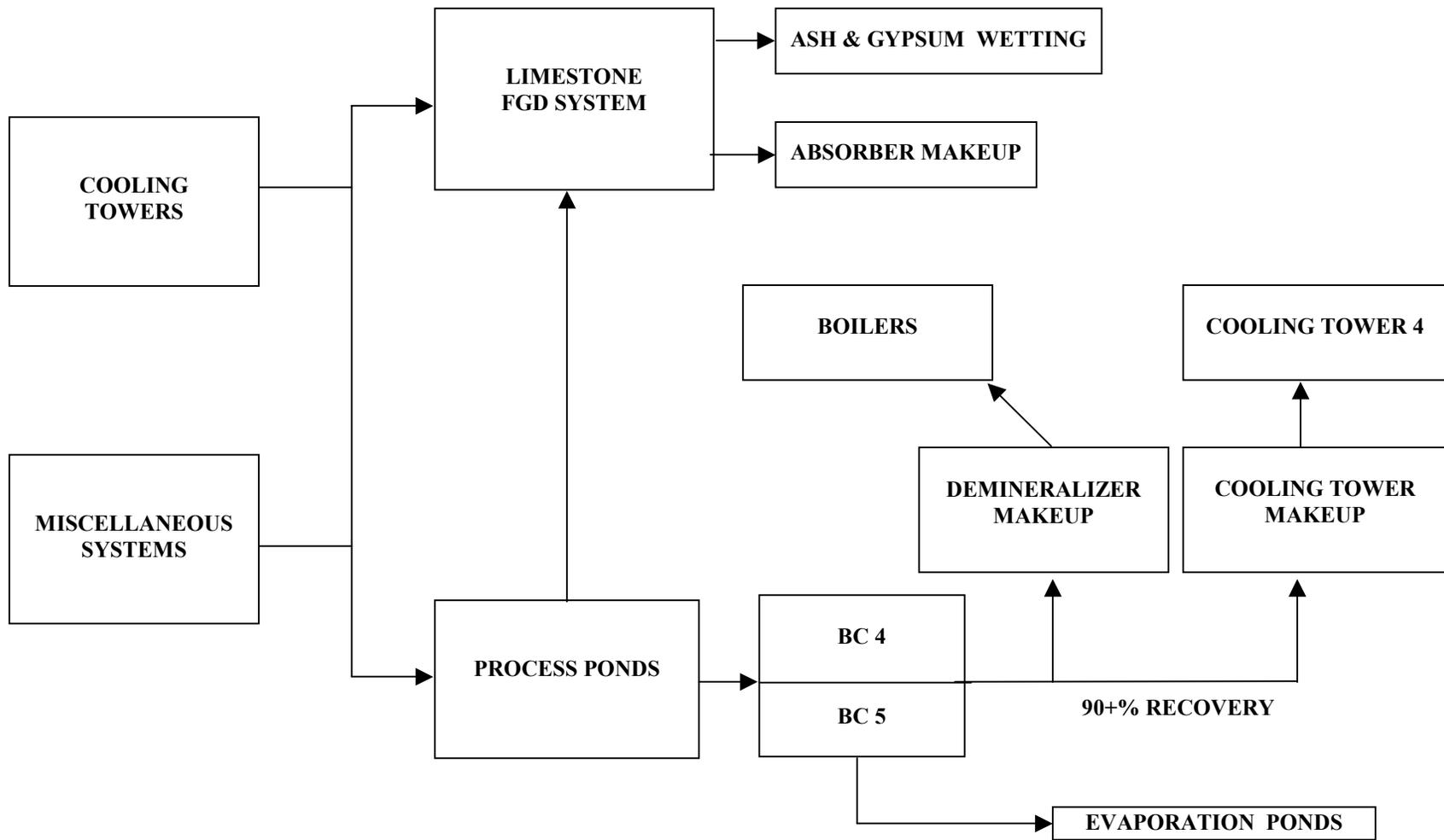


FIGURE 5

WATER TREATMENT

hot summer months when demand for electricity typically peaks. Depending on the results of the retrofit, PNM may decide to convert an additional two cells from wet/dry to wet, which would be an additional increase of water consumption by an estimated 1,477 AF per year. Despite the increased water usage projected for the unit 3 cooling tower, PNM expects to have sufficient water available for its operations when the contract amount of 16,200 AF is combined with the 8,000 AF available from BHP. Therefore, no change in contracted water usage is proposed.

5.5 Ash Handling System

Fly ash and bottom ash continue to be handled as described in the 1977 EIS. Ash is fed from collection bins into trucks and hauled to the coal mine, where it is buried in the open mine pits, backfilled, and reclaimed (USBR 1977).

5.6 Gypsum Handling System

Gypsum, (calcium sulfate) is the byproduct from the new limestone FGD system (sulfur dioxide + calcium carbonate) It is processed through a filter press to obtain dry product and then conveyed to a pile for storage. The gypsum is then hauled by truck to the coal mine where it is buried in the open mine pits, backfilled, and the surface reclaimed.

6.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section provides descriptions of components of the environment potentially affected by the proposed action, and discussions of possible consequences. The areas addressed by this environmental assessment contain no portions of scenic or wild and scenic rivers, portions of rivers placed on the nationwide river inventory, refuges, wilderness areas, wilderness study areas, or prime or unique farmlands.

6.1 Air Quality

SJGS operates in compliance with all applicable state and federal air quality regulations. These regulations include, but are not limited to, the following:

- Air Quality Construction Permit
- Operating Permit Program
- SO₂, NO_x, and Particulate Emission Regulations
- Acid Rain Program
- New Source Performance Standards

6.1.1 Description of Current Air Emissions Control Equipment

The principal components of the air emission controls include the limestone SO₂ removal equipment and particulate removal equipment. A complete description of the particulate removal equipment in operation at SJGS is provided in the 1977 SJGS EIS. No significant changes in particulate removal equipment have been made since that time.

The new FGD system is a limestone-based, flue gas scrubbing system designed to remove sulfur dioxide from the flue gas produced by Units 1 through 4 of SJGS. The FGD system is a limestone throwaway system. Limestone is the reactant for the chemical reaction between the SO₂ and the calcium carbonate

contained in the limestone. Briefly, the process involves spraying the reactive slurry into the gas stream. The SO₂ in the gas stream reacts with the water and calcium carbonate, forming solid particles of calcium sulfite and calcium sulfate. With the addition of oxygen, the calcium sulfite is force oxidized to calcium sulfate. These particles are constantly removed in the form of waste slurry. Supporting systems to prepare and feed fresh limestone slurry, thicken and dewater the waste slurry, and disposal of the solid waste are provided, resulting in a total FGD system. The FGD system is designed to scrub up to 100 percent of the flue gas, although bypass capability is necessary due to boiler and electrostatic precipitator (ESP) design.

The FGD system includes: limestone handling system, absorbent preparation system, absorber system, primary and secondary dewatering system, and gypsum handling system.

6.1.2 Current Information on Emissions

Table 2 summarizes the SJGS air emission limits.

6.1.3 Impacts of the Proposed Action

Under the proposed action, air emissions by the SJGS would continue subject to current and future federal and state air quality regulations and standards, through the projected life-of-plant. SJGS is in compliance with the terms and conditions of all applicable air regulations. SGJS has not had a particulate emissions notice of violation (NOV) since 1985 brought on by mechanical difficulties with the Unit 4 precipitator. These difficulties were repaired, retested, and SJGS has demonstrated compliance ever since.

6.1.4 Impact of the No Action Alternative

If the proposed action is not implemented and if PNM is unable to acquire sufficient alternative water supplies to allow it to continue to operate SJGS, operations at SJGS would cease. Under this scenario, emissions of SO₂, NO_x, and particulates would cease and air quality could correspondingly improve from the cessation of those emissions.

6.1.5 Mitigation Measures for the Proposed Action Alternative

Air pollution control equipment has already been installed at SJGS that allows the plant to continue to meet applicable federal and state air emission standards.

6.2 Hydrology/Water Quality/Sediment Quality

The operation of the SJGS and ancillary facilities theoretically could have the potential to affect the San Juan River, a large perennial stream upon which the SJGS relies for its water supply, and Shumway Arroyo and its tributary, Westwater Arroyo. Shumway Arroyo discharges into the San Juan River from the north approximately 4.5 miles downstream of the pump station.

The San Juan River is characterized by large spring snowmelt peak flows, low summer and winter base flows, and high magnitude, short duration summer and fall storms. The completion of Navajo Dam in 1963 reduced the spring snowmelt peak by about 50 percent and increased the base flow during the months of August through February by about 170 percent. Minimum flows were also elevated, and near-

TABLE 2
SJGS EMISSION LIMITS

<u>unit</u>	<u>NO_x</u> ¹	<u>SO₂</u> ³	<u>total suspended particulate⁵</u> <u>(TSP), fine particulate⁴</u>
All units	9,000 lb/hr	13,000 lb/hr 0.46 lb/MMBTU ⁵ 0.55 lb/MMBTU	
Units 1,3, 4	0.45 lb./MMBTU ²	1.2 lb/MMBTU	0.05 lb/MMBTU TSP or 0.02 lb/MMBTU fine particulate 20% opacity
Unit 2	0.7 lb/MMBTU	72% SO ₂ removal	0.05 lb/MMBTU TSP or 0.04 lb/MMBTU fine particulate

¹ 9,000 lb/hr is averaged over a rolling 24-hour period. The lb/MMBTU numbers are averaged over a 3-hour period.

² MMBTU = one million British thermal units

³ The 13,000 lb/hr and the 1.2 lb/MMBTU are averaged over a 3-hour period. The 0.55 lb/MMBTU is averaged over a 30-day period. The 72% removal is averaged over any 30-day period. The 0.46 lb/MMBTU is a plant-wide annual average. The 13,000 lb/hr, 1.2 lb/MMBTU, and the 72% removal numbers are applicable prior to and after full operation of the limestone system.

⁴ The 0.05 lb/MMBTU, the 0.02 lb/MMBTU and the 0.04 lb/MMBTU are averaged over a 3-hour period.

⁵ Total Suspended Particulate is defined as particulate matter as measured by the method described in 40CFR, Part 50, Appendix B.

zero flow periods were eliminated (Holden 1999). Implementation of the SJRRIP flow recommendations are intended to restore flows in the river to pre-Navajo Dam characteristics. The average annual flow of the San Juan River as measured at Shiprock, NM is about 1.5 million AF per annum.

Shumway Arroyo discharges into the San Juan River No water from SJGS is discharged into Shumway Arroyo. The upper end flows in response to precipitation falling in its watershed. The lower end is a perennial stream fed by irrigation return flow as well as precipitation.

6.2.1 San Juan River Water and Sediment Quality

The only impact on water quality from SJGS is the depletion of the San Juan River. No water is discharged from SJGS into the San Juan River.

6.2.1.1 Effect of Diversion on San Juan River Water Selenium Concentrations

Concern was raised by representatives of the Navajo Nation and Southern Ute Indian Tribe that consumption of San Juan River water by the SJGS contributes to the problem of high selenium concentrations in the river by withdrawing water that would otherwise be available for dilution of the element. In order to address this concern, calculations were made using several pumping volume scenarios in order to determine if it was likely that the amount of water diverted by SJGS had an appreciable impact on selenium concentrations downstream of the SJGS weir. The calculations relied on a number of assumptions as well as empirical data taken from Blanchard *et al.* (1993). The assumptions and calculations are provided in Appendix B of this document. The result of the calculations demonstrates that, given the assumptions involved, the amount of water diverted by SJGS has no significant effect on downstream selenium concentrations.

Data on dissolved selenium concentrations in the San Juan River acquired since the collection of data used in the Blanchard report are included in the Final Supplemental Environmental Impact Statement (FSEIS) for the Animas-La Plata Project (USBR 2000). FSEIS Technical Appendix 3, Water Quality Analysis, tabulates historic water quality measurements in the San Juan River (Table 3-7, p. 3-14).

The average selenium concentration in 277 samples taken from the San Juan River at Shiprock is 1.0 ($\mu\text{g/l}$ as dissolved Se). The study in Appendix B of this document is based on three samples taken at the Shiprock station, which are not substantially different from the data contained in the FSEIS. The data in Table 3.7 of the FSEIS indicate that the long-term levels of dissolved selenium at Shiprock are similar to the selenium levels collected for the Blanchard report, which would confirm the validity of the data used in the Blanchard report and support the conclusions in the study in Appendix B of this document.

6.2.1.2 History of Past Discharges

Until May 1983, SJGS discharged wastewaters to the Shumway Arroyo via an outfall permitted by the EPA under the National Pollutant Discharge Elimination System (NPDES). The wastewaters contained a variety of wastes from the plant pollution control and process operations. The wastewaters discharged to the Shumway Arroyo ultimately flowed into the San Juan River, approximately 3 miles south of the SJGS.

6.2.1.3 Current Conditions

Since May 1983, SJGS has operated as an NPDES permitted zero liquid discharge facility. All wastewaters are pumped to lined solar evaporation ponds, and no wastewater leaves the facility except through evaporation.

6.2.2 Streamflow Regime

The two principal tributaries flowing past the SJGS into the San Juan River are the Shumway and Westwater Arroyos. Both flow through the facility property and south to the San Juan River. The San Juan River is the major hydrologic feature of the area, and is the site of the SJGS weir and diversion structure.

6.2.2.1 Shumway Arroyo

The Shumway Arroyo is an ephemeral stream that flows principally in response to rainfall. North of SJGS it is an ephemeral stream and becomes intermittent between the storage reservoir and the San Juan River. At the lower end, where it crosses through irrigated fields, it carries irrigation return flows during the growing season and occasionally ground-water seepage resulting from snowmelt in the winter and spring.

The State of New Mexico Environment Department collected benthic macroinvertebrate samples on December 16, 1993 from Shumway Arroyo at the point where it intersects with the SJGS access road. The analysis resulted in the identification of 149 organisms in 21 taxa; the majority of taxa were dipterans (true flies). In addition, a sensitive taxon, the stonefly *Cultis aestivalis*, was collected. The sample analysts determined that the diversity represented by the 1993 sample sharply contrasted with the paucity of specimens in collections from the same location in April 1982.

Water samples were collected in June 1994 and sediment samples were collected in August 1994 by PNM for analysis of metals and polycyclic aromatic hydrocarbon (PAH) content. Samples were collected from below the storage reservoir, in Westwater Arroyo, Shumway Arroyo, and the San Juan River. Those samples were analyzed using standard U.S. Environmental Protection Agency analytical protocols. Metals were detected in all sediment samples, although selenium, arsenic, and mercury were not detected in any samples. Metal concentrations generally ranged from relatively low in the Westwater Arroyo to relatively high in the San Juan River, both above the SJGS weir and below the mouth of Shumway Arroyo. No PAHs were detected.

Concentrations of metals in water were generally low. Concentrations of calcium, iron, sodium, and nitrates were elevated in water collected from immediately below the storage reservoir, although not above water quality standards. The water below the storage reservoir is pumped from a point approximately 30 feet below the sample location back to the reservoir. Therefore, these constituents do not reach Shumway Arroyo or the San Juan River. Constituents in water samples collected approximately 1.5 miles downstream in Shumway Arroyo were similar in content to the remaining Shumway Arroyo and San Juan River samples.

Because selenium, arsenic, mercury, and PAHs were not detected in the samples analyzed with standard methods, additional sediment and water samples were collected by PNM from four locations in January 1995 to be analyzed for those constituents. The samples were collected from Westwater Arroyo,

Shumway Arroyo just above its confluence with the San Juan River, the San Juan River above the SJGS weir, and the San Juan River below the Shumway Arroyo (Figure 6).

The analytical procedures used were EPA methods with much lower detection limits than the standard EPA analytical methods. Analyses of the second set of water samples did not detect any PAHs, arsenic, or mercury. Selenium was estimated at 1.0 microgram per liter ($\mu\text{g/L}$) in the sample from the San Juan River above the weir, which is at the low end of the concentration range of 1 to 3 $\mu\text{g/L}$ currently identified as a concern for aquatic life by USFWS (Waddell 1995), and well below the standard for drinking water of 50 $\mu\text{g/L}$. Selenium was not detected in the sample from the San Juan River collected downstream.

Analyses of this second set of sediment samples identified PAHs in samples from all locations, all at concentrations below the detection limit of the original analysis. All PAH analytes were identified in the sediment sample from Westwater Arroyo. Benzo(b)fluoranthene was detected in sediment samples from all other locations. The presence of benzo(g,h,i)perylene was estimated for the sediment samples from the San Juan River below Shumway Arroyo and from Shumway Arroyo. Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected in sediment samples from both San Juan River samples. In addition, benzo(g,h,i)perylene was detected in the sample from the San Juan River below Shumway Arroyo. Sediment quality criteria have not been developed for these constituents to provide a basis of comparison.

The presence of selenium was identified in sediment samples from all locations, with concentrations estimated at less than 0.5 milligram per kilogram (mg/kg) for all samples, which is less than the USFWS identified concentrations of concern of 2 mg/kg in sediment (Waddell 1995). Arsenic was also detected in sediment samples from all locations, with a maximum concentration of 3.1 mg/kg in the sample taken from Shumway Arroyo. Mercury was not detected in any of the sediment samples.

6.2.2.2 Westwater Arroyo

The Westwater Arroyo typically only flows in response to off-site stormwater runoff, which occurs principally during the months of July and August.

6.2.2.3 San Juan River

The San Juan River carries approximately 1.5 million AF of water per year past the SJGS weir. The major impact on flow is the Navajo Dam, which has the capacity of releasing up to 5,000 cubic feet per second cfs through its main outlet works. Important contributors to flow are stormwater runoff and snowmelt into the river itself, flow from the Animas and La Plata rivers, a variety of irrigation return flows, and groundwater seepage along the length of the river.

The SJGS does not pump water from the San Juan River to its storage reservoir on a regular schedule. Rather, pumping schedule and rates are managed on the basis of demand for water and river water quality. Consequently, pumping rates are typically lowest during the spring when water consumption by SJGS is relatively low, and when river water turbidity is high. Alternately, pumping is at its highest during the summer months when plant water consumption peaks and river water turbidity is relatively low.

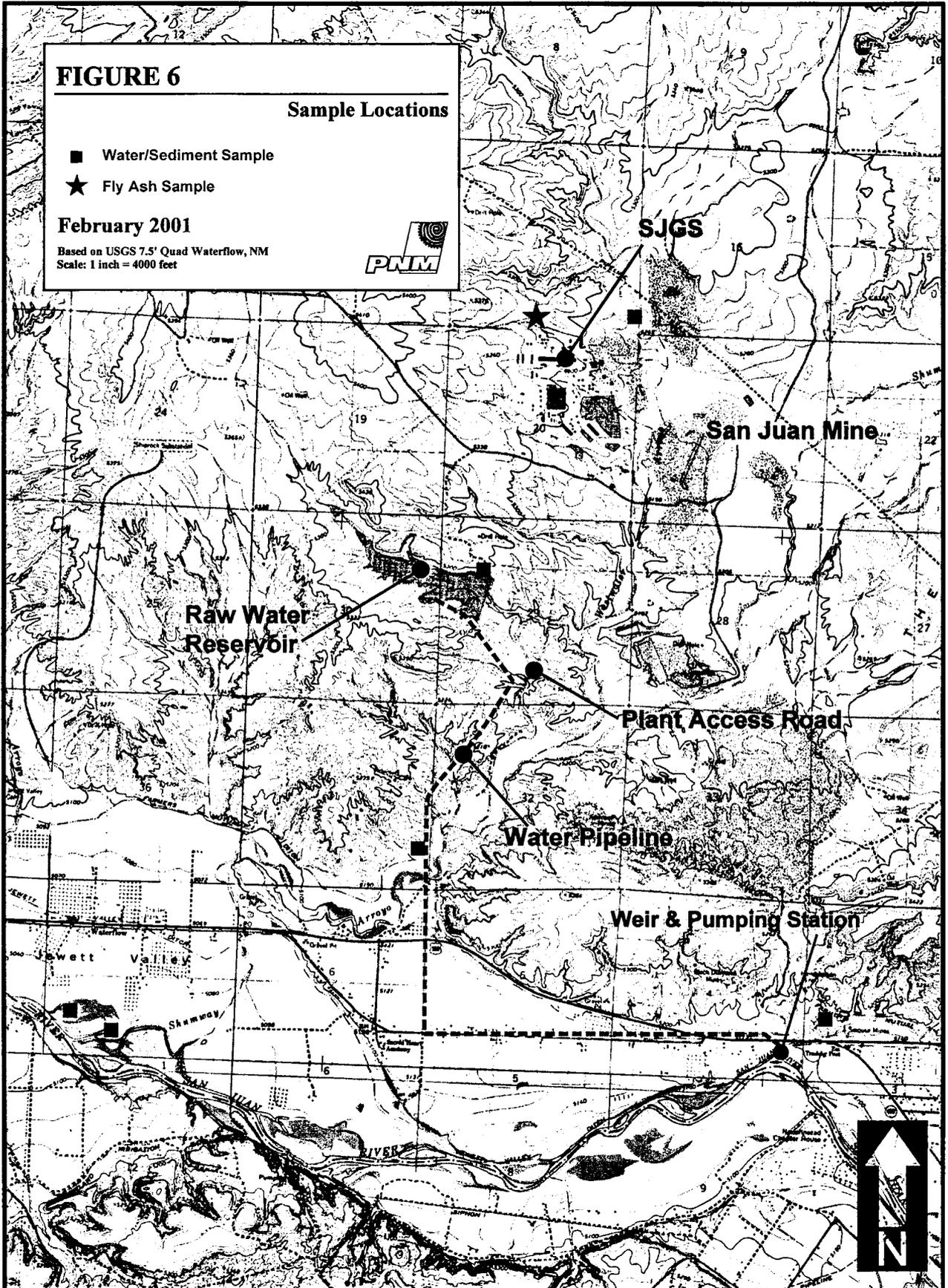
FIGURE 6

Sample Locations

- Water/Sediment Sample
- ★ Fly Ash Sample

February 2001

Based on USGS 7.5' Quad Waterflow, NM
Scale: 1 inch = 4000 feet



6.2.3 Impacts of the Proposed Action

Implementation of the proposed action would create no new impacts on the hydrology, water quality, or sediment quality of the project area or downstream of the area. In addition, the best available information indicates that the current operations, which would continue as a result of implementation of the proposed action, are not causing significant impacts to the hydrology, water quality, or sediment quality, either in the project area or downstream.

6.2.4 Impacts of the No Action Alternative

In the event that the Jicarilla Apache Nation Water Subcontract was not approved for the consumption of 16,200 AF by SJGS, that PNM was unable to acquire the same amount from other sources, and that SJGS was consequently forced to cease operating, there would be minimal impacts on the hydrology, water quality, or sediment quality. In such an event, the following would be expected to occur:

- The weir, diversion structure, and pumping facility would be removed and reclaimed. Any sediments held behind the weir would be released downstream.
- The 16,200 AF of water now being diverted under the USBR/PNM contract would not be used for power generation, and would thus be available for some other use, either upstream or downstream of the project site.

It should be noted that under this scenario, while use of the water by PNM for the operation of SJGS might cease, the subject water could be released for other uses. Those uses could include those by facilities similar to SJGS.

6.2.5 Mitigation Measures for the Proposed Action Alternative

No mitigation measures are proposed since there is no evidence that the amount of water proposed for consumption by SJGS is sufficient to have an adverse impact on the water quality or sediment quality of the San Juan River, nor is the amount being consumed sufficient to affect the use of the river by others under current normal flow conditions.

6.3 Fish And Wildlife

Fish and wildlife resources identified in the vicinity of SJGS are discussed in the following section, as well as the environmental conditions that provide habitat to the wildlife.

6.3.1 Existing Environment

The SJGS is located within the Shumway Arroyo tributary drainage to the San Juan River (Figure 1). The weir and pump station are located directly on the San Juan River, which is a perennial stream (Figure 3).

The majority of the Shumway Arroyo drainage basin is broad alluvial fans and flats. The area includes occasional sandstone-capped mesas and cuestas within the alluvial flats. The surficial soils in the area range from sandy loams in the upper part of the basin to clayey loams in the lower parts (BHP 1992).

The SJGS is located primarily in grassland and shrub/grass habitats. Grasses of the area include galleta (*Hilaria jamesii*), Indian ricegrass (*Oryzopsis hymenoides*), alkalai sacaton (*Sporobolus airoides*), fescues

(*Festuca* spp.), little barley (*Hordeum pusillum*), and cheatgrass (*Bromus tectorum*). Shrubs include greasewood (*Sarcobatus vermiculatus*), four-wing saltbush (*Atriplex canescens*), shadscale (*A. confertifolia*), and sagebrush (*Artemisia* spp.) (BHP 1992). The area around the weir and along the river supports Russian olives (*Eleagnus angustifolia*), bulrushes (*Scirpus* sp.), cattails (*Typha latifolia*), and sedges (*Carex* sp.). A small wetland, located immediately downstream from the pump station, contains willows, bulrushes, cattails, and sedges. A small wetland that has formed below the toe of the storage reservoir supports an established stand of cattails, bulrushes, and grasses. Most of the seepage water that feeds this wetland is collected and pumped back to the reservoir. SJGS reports seepage of 0.8 acre foot per month to the State of New Mexico.

A variety of mammals, birds, reptiles, amphibians, and fish have been observed in the vicinity of SJGS. Mammal, bird, reptile, and amphibian species observed in a survey conducted in 1992 are listed in Table 3 (BHP 1992).

The 110-surface-acre storage reservoir provides aquatic habitat for several fish species that have been introduced into the reservoir and habitat for a significant number of waterfowl, ducks, geese, and shorebirds. A 1990 survey of the reservoir (Ecosystem Research Institute 1990) collected seven species of fish in the reservoir, only one of which was native (flannelmouth sucker [*Catostomus latipinnis*]). Channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), and common carp (*Cyprinus carpio*) were the most abundant species collected (Table 3). Water is pumped to the reservoir from the San Juan River and from the reservoir to SJGS through buried pipelines. While water seeps through the toe of the dam resulting in the creation and maintenance of a wetland (approximately 3 acres in size) below the reservoir, the water is pumped back into the reservoir from immediately below the wetland. Water is not allowed to overtop the reservoir. Consequently, fish in the reservoir cannot move from the reservoir back into the Shumway Arroyo or to the San Juan River.

The SJGS weir is located on the San Juan River that historically has provided a warmwater habitat to the aquatic community. Since Navajo Dam began operation in 1962, releases of the water from the bottom of the reservoir have changed the character of the river to a coldwater habitat from the dam to Farmington. The river at the SJGS weir has returned to warmwater. Surveys of the fish community in the vicinity of the SJGS weir have been made as part of studies for SJRRIP for endangered fish in the river. The most abundant species collected in the reach of river from Farmington to the SJGS weir are the same as those collected in downstream reaches which include: flannelmouth sucker, bluehead sucker (*C. discobolus*), common carp, speckled dace (*Rhinichthys osculus*), and channel catfish (Ryden and Pfeifer 1994). Fathead minnows (*Pimephales promelas*) and red shiners (*Cyprinella lutrensis*) are also known from the San Juan River in the vicinity of the SJGS weir (NMGFD 1995) (Table 3).

The SJGS weir is located within an area designated as critical habitat for the Colorado pikeminnow (formerly known as the Colorado squawfish) and upstream from critical habitat for the razorback sucker. USBR, the USFWS, the Bureau of Indian Affairs (BIA), the States of New Mexico and Colorado, the Southern Ute Tribe, the Ute Mountain Ute Tribe, and the Jicarilla Apache Nation have signed a memorandum of understanding to establish the SJRRIP. At the conclusion of the SJRRIP seven-year study, recommendations were developed regarding flows and habitats required for recovery of the fish.

TABLE 3**FISH AND WILDLIFE OBSERVED IN THE VICINITY OF SJGS**

	<u>common name</u>	<u>scientific name</u>
Mammals	Western pipistrelle	<i>Pipistrellus hesperus</i>
	Townsend's big-eared bat	<i>Plecotus townsendii</i>
	Pallid bat	<i>Antrozous pallidus</i>
	Desert cottontail	<i>Sylvilagus auduboni</i>
	Black-tailed jackrabbit	<i>Lepus californicus</i>
	Silky pocket mouse	<i>Perognathus flavus</i>
	Ord's kangaroo rat	<i>Dipodomys ordii</i>
	Deer mouse	<i>Peromyscus maniculatus</i>
	Northern grasshopper mouse	<i>Onychomys leucogaster</i>
	Bushy-tailed woodrat	<i>Neotoma cinerea</i>
	House mouse	<i>Mus musculus</i>
	Coyote	<i>Canis latrans</i>
	Long-tailed weasel	<i>Mustela frenata</i>
	Badger	<i>Taxidea taxus</i>
	Bobcat	<i>Lynx rufus</i>
	Mule deer	<i>Odocoileus hemionus</i>
	Pronghorn	<i>Antilocapra americana</i>
Birds	Mourning dove	<i>Zenaida macroura</i>
	Western kingbird	<i>Tyrannus verticalis</i>
	Say's phoebe	<i>Sayornis saya</i>
	Horned lark	<i>Eremophila alpestris</i>
	Barn swallow	<i>Hirundo rustica</i>
	Cliff swallow	<i>Petrochelidon pyrrhonota</i>
	Violet-green swallow	<i>Tachycienta thalassina</i>
	Bewick's wren	<i>Thyromanes bewickii</i>
	Rock wren	<i>Salpinctes obsoletus</i>
	Canyon wren	<i>Catherpes mexicanus</i>
	Mockingbird	<i>Mimus polyglottos</i>
	Sage thrasher	<i>Oreoscoptes montanus</i>
	Bendire's thrasher	<i>Toxostoma bendirei</i>
	Loggerhead shrike	<i>Lanius ludovicianus</i>
	Yellow warbler	<i>Dendroica petechia</i>
	Western meadowlark	<i>Sturnella neglecta</i>
	Red-winged blackbird	<i>Agelaius phoeniceus</i>
	Brewer's blackbird	<i>Euphagus cyanocephalus</i>
	Northern oriole	<i>Icterus galbula</i>
	Blue grosbeak	<i>Guiraca caerulea</i>
	House finch	<i>Carpodacus mexicanus</i>
	Green-tailed towhee	<i>Papilo chlorura</i>

<u>common name</u>	<u>scientific name</u>
Birds (continued)	
Lark sparrow	<i>Chondestes grammacus</i>
Black-throated sparrow	<i>Amphispiza billineata</i>
Brewer's sparrow	<i>Spizella brewerei</i>
Scaled quail	<i>Callipepla squamata</i>
Gambel's quail	<i>Lophortyx gambelii</i>
Ring-necked pheasant	<i>Phasianus colchicus</i>
Roadrunner	<i>Geococcyx californianus</i>
Killdeer	<i>Charadrius vociferus</i>
Canada goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Shoveller	<i>Spatula clypeata</i>
Pintail	<i>Anas acuta</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Amphibian	
Tiger salamander	<i>Ambystoma tigrinum</i>
Reptiles	
Lesser earless lizard	<i>Holbrookia maculata</i>
Collared lizard	<i>Crotaphytus collaris</i>
Northern plateau lizard	<i>Sceloporus undulatus</i>
Northern sagebrush lizard	<i>Sceloporus graciosus</i>
Side-blotched lizard	<i>Uta stansburiana</i>
Little striped whiptail	<i>Cnemidophorus inornatus</i>
Northern whiptail	<i>Cnemidophorus tigris</i>
Striped whitesnake	<i>Masticophis taeniatus</i>
Gopher snake	<i>Pituophis melanoleucus</i>
Fish	
Common carp	<i>Cyprinus carpio</i>
Speckled dace	<i>Rhinichthys osculus</i>
Fathead minnow	<i>Pimephales promelas</i>
Red shiner	<i>Cyprinella lutrensis</i>
Flannelmouth sucker	<i>Catostomus latipinnus</i>
Bluehead sucker	<i>Catostomus discobolus</i>
Channel catfish	<i>Ictalurus punctatus</i>
Largemouth bass	<i>Micropterus salmoides</i>

6.3.2 Impacts of the Proposed Action

PNM is entering the Jicarilla Apache Nation Water Subcontract with the intent of continuing its operation of the SJGS weir, diversion structure, and pump station on the San Juan River. Continued obstruction of fish passage to upstream habitats would also result. Conditions at SJGS would be expected to remain similar to the current situation. Some temporary loss of grassland and shrub/grass habitat loss would occur at BHP's San Juan and La Plata mines during mining operations over the subcontract period (BHP 1992). The mined area would be reclaimed behind mining operations and wildlife habitat restored according to the mine reclamation plans. Although the mines are not part of SJGS operations, they supply the coal needed for electrical generation.

The weir presents a potential obstruction to upstream movement of fish during periods when the diversion channel is closed to allow pumping. The nonimpingement traveling screens on the pump station are designed to prevent the entrainment and impingement of fish, thereby minimizing injury to river fish and the intake of fish into the pumps. New fish passage construction through the SJRRIP and possible modified weir operations for the Jicarilla Apache Nation Water Subcontract may allow fish access to upstream habitat. The construction period is expected to be short (less than one season) and the loss of habitat would be minor, especially when compared with access to upstream areas. The proposed SJRRIP action would have a positive impact on the movement of the San Juan River fish community.

The small wetland downstream from the weir was evaluated as habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*). The wetland was found to be narrow and less dense than the flycatcher's preferred habitat. Surveys of the SJGS weir area did not identify any southwestern willow flycatchers (Ecosphere 1999, 2000). Construction of the fish passage by the SJRRIP should avoid or minimize effects on possible breeding southwestern willow flycatchers or their habitat. The Jicarilla Apache Nation Water Subcontract is not expected to adversely affect the southwestern willow flycatcher.

6.3.3 Impacts of the No Action Alternative

Assuming that PNM is unable to acquire sufficient alternative sources of water to operate SJGS, the no action alternative would require cessation of electricity production by SJGS after December 31, 2005. Decommissioning, dismantling, and reclamation of the SJGS would require approximately 3 years following cessation of operations. It is anticipated that those activities would involve considerable disruption of all wildlife at SJGS as structures were demolished and hauled away. Demolition of the storage reservoir, weir, diversion channel, and pump station would be expected to be especially disruptive to wildlife during the reclamation period and existing wildlife habitat would be lost during that period. These activities would result in the temporary loss of terrestrial habitat and the permanent loss of the storage reservoir and the wetland created by seepage from the reservoir. Goose, duck, and shorebird use would be eliminated.

Following decommissioning and dismantling of the SJGS, land surfaces would be recontoured to be compatible with the surrounding landscape. The area would be revegetated with species native to the area and returned to wildlife habitat. The aquatic habitat provided by the storage reservoir and the wetland habitat created by seepage from the storage reservoir would be gone and the entire area would be returned to the rangeland habitat of the surrounding area. Sediments deposited behind the storage reservoir dam would wash down the Shumway Arroyo with subsequent runoff. Removal of the weir and pump station would cause considerable disruption of the fish community during that period. It is expected that the river would flush any sediments settled behind the weir downstream during a readjustment period and

eventually the river would return to a free flowing state. The river would be open to fish movement throughout the weir stretch.

6.3.4 Mitigation Measures

If the proposed action is implemented, construction of a fish passage will allow upstream movement of special status and other fish species past the SJGS weir.

Few, if any, special status species would be affected by the no action alternative, although removal of the weir would eventually allow free access to upstream habitat. The greatest impact would be the loss of the reservoir and wetlands to the species that utilize this area. Possible mitigation would be selling or deeding the reservoir and pump station to either USFWS, New Mexico State Park system, or NMGFD to provide for their continued existence. However, a water right or contract right to water would be necessary for the continued existence of the reservoir since the existing contract for water for SJGS terminates in 2005.

6.4 Threatened and Endangered Species

A biological assessment was prepared pursuant to Section 7 of the Endangered Species Act of 1973, as amended. The USFWS provided a list of endangered, threatened, and candidate species that may be affected by this subcontract. The biological assessment for this subcontract is provided in Appendix A (Consultation No. 2-22-00-I-469).

6.4.1 Discussions of Special Status Species

The species identified under federal classifications as threatened or endangered are addressed in the biological assessment (BA) (Appendix A of this document) and are listed in Table 4.

6.4.2 Other Special Status Species

Several species that receive protection as special status species, such as threatened or endangered species, are not considered likely to be affected by continued operation of the SJGS, primarily because there is no appropriate habitat or the actual range of the species does not include the SJGS. Therefore, they have not been evaluated. These species include the black-footed ferret, Mexican spotted owl, and Knowlton's cactus.

6.4.3 Impacts of the Proposed Action

No new or additional specific impacts to any special status species were identified in connection with implementation of the Jicarilla Apache Nation Water Subcontract. The weir will continue to impede movement of fish upstream. Water will continue to be removed from the San Juan River for SJGS activities. Through the SJRRIP, construction of a fish passage and possible modification of weir operations for the Jicarilla Apache Nation Water Subcontract may allow fish access to upstream habitat. The construction period is expected to be less than one season. No changes in SJGS operation are proposed that would result in new contact with special status species or affect any current use of the SJGS by those species.

TABLE 4

**FEDERAL THREATENED AND ENDANGERED SPECIES
EVALUATED IN THE
JICARILLA APACHE NATION WATER SUBCONTRACT
BIOLOGICAL ASSESSMENT**

<u>common name</u>	<u>scientific name</u>	<u>status</u> ¹
Bald eagle	<i>Haliaeetus leucocephalus</i>	T
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E
Razorback sucker	<i>Xyrauchen texanus</i>	E
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	T
Mancos milkvetch	<i>Astragalus humillimus</i>	E

¹ E federal endangered
T federal threatened

The USBR has consulted with the USFWS on the effects of water depletion under the Subcontract on threatened and endangered species pursuant to Section 7 of the Endangered Species Act. By memorandum of February 15, 2001, the USFWS concluded, “Based on the information in the BA and additional information received by the U.S. Fish and Wildlife Service (Service [USFWS]), the JATWS [(Jicarilla Apache Tribe Water Subcontract)] will not change depletions in the San Juan Basin. The Service [USFWS] concurs with the [USBR] BOR determination of “no effect” on the black-footed ferret (*Mustela nigripis*), Mexican spotted owl (*Strix occidentalis lucida*), bald eagle (*Haliaeetus leucocephalus*), Knowlton’s cactus (*Pediocactus knowltonii*), Mesa Verde cactus (*Sclerocactus mesae-verdae*) and Mancos milkvetch (*Astragalus humillimus*). The Service [USFWS] also concurs with “*may affect, not likely to adversely affect*” the southwestern willow flycatcher, Colorado pikeminnow, and razorback sucker. This concurrence is based on the commitment of the San Juan Basin Recovery Implementation Program to fund the construction and operation of a selective fish passage at the SJGS weir, BOR’s [USBR’s] commitment to operation of Navajo Dam in a manner that will mimic the natural hydrograph, and BOR’s [USBR’s] participation in the SJRRIP.”

6.4.3.1 The San Juan Weir

The SJRRIP has studied the requirements of the razorback sucker and the Colorado pikeminnow. Additional project commitments regarding weir modifications are being designed to support the recovery of these endangered fish species in the San Juan River Basin. As part of the SJRRIP, PNM has agreed to support and implement mitigation for the Jicarilla Apache Nation Water Subcontract that will alleviate jeopardy to the species through modifications of the PNM weir across the San Juan River to allow fish passage. The SJRRIP Biology Committee specified a selective passage system to be operated for the life of the recovery program. The Biology Committee has recommended operation of the fish passage from March through October every year (Pfeifer 2000). The USBR will address the fish passage system in a separate environmental assessment.

6.4.3.2 Depletion Impact

Current critical habitat designations for the Colorado pikeminnow and razorback sucker in the San Juan River include the existing withdrawals under the USBR contract. Although no specific impacts have been identified, the Jicarilla Apache Nation Water Subcontract may affect the critical habitat of the endangered fish as a result of cumulative depletions in the San Juan Basin. The maximum annual depletion under the Jicarilla Apache Nation Water Subcontract would be 16,200 AF, which is a small fraction of the total volume of water that flows past the SJGS weir annually. In addition, the amounts diverted on a monthly basis vary with SJGS capacity factor and river water turbidity, resulting in an historic pumping pattern that complements the intent of the SJRRIP and the USBR to operate the Navajo Dam in such a manner as to mimic a natural hydrograph.

On August 6, 1991, the USFWS issued an updated Recovery Plan for the Colorado pikeminnow that identified the San Juan River from Farmington, New Mexico to Lake Powell as a recovery area. Following this update, the USFWS issued a final biological opinion for the Animas-La Plata Project on October 25, 1991. The reasonable and prudent alternative for the opinion included several measures that would be undertaken to aid in the research and recovery of the endangered fish in the San Juan River and also, as a result of the reasonable and prudent alternative, the SJRRIP was formulated in 1992. The SJRRIP was initiated in October 1992 to address recovery needs for the two endangered fish, while allowing for water development in the basin in compliance with Federal and State laws, interstate

compacts, Supreme Court decrees, and Federal trust responsibility to the Southern Ute Indian Tribe, the Ute Mountain Ute Tribe, the Jicarilla Apache Nation, and the Navajo Nation. Several Section 7 Endangered Species Act consultations have been completed in the San Juan River Basin since the initiation of the SJRRIP. Data used in these consultations included a depletion base (environmental baseline used by the USFWS). Those baseline depletions include the 16,200 AF currently consumed by SJGS under the contract with USBR. With the proposed action, the Jicarilla Apache Nation will supply the water to PNM rather than USBR. Therefore, the proposed action is only a contractual change between water suppliers and the depletions will remain unchanged.

6.4.4 Impacts of the No Action Alternative

Implementation of the no action alternative would require cessation of approximately 2,000 megawatts of electric power generation by SJGS after December 31, 2005. This electric power is already allocated to an existing customer base and, by the year 2005, would need to be replaced and expanded upon by other facilities, either locally or in the region.

While the area would be returned to general wildlife habitat, a minimum of 3 years would be required to decommission, dismantle, and reclaim the SJGS site. This would involve the temporary loss of rangeland habitat and the permanent loss of the aquatic habitat provided by the storage reservoir and the wetland created by seepage from the storage reservoir. The weir would be removed from the river and eventually allow free movement of the fish community in that area. During the period of decommissioning, dismantling, and reclamation, all wildlife use of the SJGS area, including special status species, would be disrupted significantly until reclamation was complete. Those species that rely on reservoirs would be displaced entirely.

6.5 Indian Trust Assets

The United States has a trust responsibility to protect and maintain rights reserved by or granted to American Indian Tribes or Indian individuals by treaty, statutes and executive orders. This trust responsibility requires that agencies such as USBR take actions reasonably necessary to protect Indian trust assets (ITAs). The USBR ITA policy states that this agency will carry on its activities in a manner that protects ITAs and avoids adverse impacts when possible. When USBR cannot avoid adverse impacts, it will provide appropriate mitigation or compensation. The terms used in this analysis are defined as follows:

- ITAs are legal interests in assets held in trust by the federal government for federally recognized Indian tribes or individuals.
- Assets are anything owned that has monetary value. The assets need not be owned outright, but could be some other type of property interest, such as a lease or right to use something. Assets can be real property, physical assets, or intangible property rights.
- A trust has three components: the trustee, the beneficiary and the trust asset(s). The beneficiary also is referred to as the beneficial owner of the trust assets. In the trust relationship, title to ITAs is held by the United States (trustee) for the benefit of an Indian tribe or individual (beneficiary).

- ITAs cannot be sold, leased, or otherwise alienated without the United States approval. While most ITAs are located on the reservation, they also can be located off-reservation. Examples of things that could be ITAs include lands, minerals, water rights, hunting and fishing rights, other natural resources, money or claims. In addition, Native American Graves Protection and Repatriation Act (NAGPRA) cultural items and other cultural property may be considered ITAs.
- Legal interest means there is a property interest for which a legal remedy, such as compensation or injunction, may be obtained if there is improper interference. ITAs do not include things in which a tribe or individuals have no legal interest. For example, off-reservation sacred sites in which a tribe has no legal property interest are generally not considered ITAs.

6.5.1 Significance Criteria for ITAs

An action that will impact the value, use of, or enjoyment of an ITA is considered significant. For example, actions that result in interference with the exercise of a reserved water right or in degradation of water quality where there is a water right, reduce the value or alter tribal lands, impact hunting and fishing rights or impact cultural resources on Trust lands would be significant impacts to ITAs.

6.5.2 Impacts of the Proposed Action

Using the above definitions, water rights and the use of those rights for tribal purposes are the primary ITAs potentially being affected by this water subcontract. These are discussed below.

Four Native American Tribes have adjudicated and nonadjudicated water right claims to waters of the San Juan River. They are the Jicarilla Apache Nation, the Navajo Nation, the Ute Mountain Ute Tribe, and Southern Ute Indian Tribe.

Under a partial final decree in the San Juan River adjudication, the Jicarilla Apache Nation has a reserved water right for historic and existing uses not to exceed an annual diversion of 5,682.92 AF or the quantity of water necessary to supply a depletion of 2,194.58 AF, whichever is less, and a net evaporation of 2,187.16 AF. In addition, the 1992 Jicarilla Apache Tribe Water Rights Settlement Act authorizes 25,500 AF per year depletion from the Navajo Reservoir Supply and 6,500 AF per year depletion from the San Juan-Chama Project. The Act allows the Jicarilla Apache Nation to market water through third party contracts. Consistent with the Act, the Department of Interior has obligated itself to work with the Tribe to find sufficient San Juan River water to meet future use needs and contracts of the Tribe. Only the reserved water rights for historic and existing uses and San Juan-Chama Project water are within the environmental baseline (baseline) used by the USFWS in recent Section 7 consultations in the San Juan River Basin.

The Navajo Nation has substantial quantities of water resource ITAs in the San Juan River Basin, based on historic use (including claims related to historic use for irrigation projects and municipal use) and reserved water rights (Winters Doctrine rights); however, reserved rights have not been quantified in the New Mexico courts. Baseline reservation usage is 301,499 AF per year (including 280,600 AF per year for the Navajo Indian Irrigation Project (NIIP), 12,100 AF per year for the Hogback Project, 7,898 AF per year for the Fruitland Project, and 900 AF per year for the Cudei Project). Included in the baseline usage is approximately 16,000 AF per year transferred to NIIP from other downstream Navajo irrigation projects. There are 2,340 AF per year for the Navajo Nation included in the baseline depletions for the Animas-La Plata Project.

Colorado Ute Tribes' water rights have been quantified with the exception of water from the Animas and La Plata Rivers. The Colorado Ute Settlement Act Amendments of 2000 (Animas-La Plata Project) specify how adjudication of rights will be finalized on these two rivers. Provisions of the Colorado Ute Indian Water Rights Settlement Act of 1988 can be found in Chapter 1 of the Final Supplemental Environmental Impact Statement for the Animas-La Plata Project (USBR 2000).

The Jicarilla Apache Nation Water Subcontract allows the Jicarilla Apache Nation to exercise a portion of its water rights using a depletion that is in the environmental baseline for recent Section 7 consultations. The existing baseline depletion is now being used for a water service contract for water from Navajo Reservoir between PNM and USBR. This contract will end December 31, 2005. An agreement between the Navajo Nation, PNM, and USBR will allow funds supplied by PNM to go toward the rehabilitation of certain mainstem irrigation projects owned by the Navajo Nation along the San Juan River. The Department of Interior has pledged within the record of decision issued as part of the FSEIS on the ALP that it will work with all four Tribes within the San Juan River Basin to find water to meet tribal claims and needs.

6.5.3 Impacts of the No Action Alternative

No Action would have significant impacts on the Jicarilla Apache Nation's use and enjoyment if its water rights and would be inconsistent with the United States' trust responsibility to the Jicarilla Apache Nation. As explained in Section 3.0, hydrologic modeling used in recent consultations under Section 7 of the Endangered Species Act suggests that only 5,000-6,000 AF of water can be developed in the San Juan River Basin consistent with the conservation measures imposed by the USFWS. USBR's approval of the Subcontract would allow the Nation to exercise 16,200 AF of its depletion rights under the Federal Contract and Settlement Act by becoming the supplier for the existing SJGS depletion. So long as the USFWS continues to apply the baseline depletion and hydrologic modeling assumptions used in recent Section 7 consultations, the Nation's ability to lease or to develop its water rights with any federal involvement that requires a Section 7 consultation would be limited to the amount assumed available by the hydrologic modeling. As a result, the denial of approval for the Subcontract would deprive the Nation of the use and enjoyment of the bulk of its depletion rights under Federal Contract and Settlement Act.

6.6 Environmental Justice

As part of the NEPA process, agencies are required to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income communities. Executive Order 12898 requires that "the responsibilities set forth shall apply equally to Native American programs." Therefore, when minority and low-income populations are discussed, Indian populations may also be included. Six principles are followed:

- Identify minority and low-income populations in the area affected by the project.
- Consider relevant public health data and industry data regarding potential multiple and cumulative exposure of minority and low-income populations to human health or environmental hazards.
- Recognize interrelated cultural, social, occupational, historical, or economic factors that could amplify environmental effects of the project.

- Develop effective public participation strategies that overcome linguistic, cultural, institutional, geographic and other barriers.
- Assure meaningful community representation in the process.
- Seek tribal representation consistent with the government-to-government relationship between the US and tribal governments.

6.6.1 Significance Criteria

Significance criteria include actions that create disproportionately high and adverse human and environmental effects on minority populations, such as if an action reduced available water supplies for low income, minority and/or tribal populations.

A “minority population” exists where either a) the population of minorities in an affected area exceeds (community) 50 %; or b) minority population percentage of the affected area is meaningfully (1.5 times) greater than the minority population percentage in the general population surrounding area (for example, the county) (CEQ 1997). This is determined by multiplying the percentage of minorities in the surrounding area by 1.5. If the resulting figure exceeds the total percentage of the minority population in the community, the community is not a minority population for the purposes of environmental justice assessments.

6.6.2 Impacts of the Proposed Action

Data pertaining to minority populations and Indian tribes utilized for this analysis were taken from a Bureau of Land Management draft document (BLM 2000). Within the area of effect for this project, there are two minority Hispanic populations (Bloomfield, New Mexico and Mancos, Colorado) however, neither of those two populations is affected by the operations of SJGS and neither is competing for use of the SJGS depletions.

Two low income Indian/tribal populations are identified as being within the area of effect of this water subcontract: the Jicarilla Apache Nation located in Dulce, New Mexico and the Navajo Nation located in northwestern New Mexico along the US-666 corridor and around Gallup and northeastern Arizona in the vicinity of Window Rock.

The town of Dulce on the Jicarilla Apache Reservation is in need of a new water supply system. The proposed project at Dulce will rely on a historic depletion from the Navajo River which is within the baseline usage for the San Juan River Basin and does not conflict with the depletion and water usage proposed in this new water subcontract at SJGS.

The Navajo population described above is in need of additional water. The City of Gallup and the Navajo Nation in concert with USBR have proposed a water supply system (Navajo-Gallup Water Supply System) that will provide approximately 37,000 AF per year of water to those areas from a diversion source on the San Juan River. Currently, depletions for this quantity of water are not included in the baseline depletion for the SJRRIP; however, USBR is working with the Navajo Nation and the City of Gallup to identify adequate sources of water for the Navajo-Gallup Water Supply System and other development projects in the San Juan River Basin. The Navajo-Gallup Water Supply System may not

address 100 percent of the Navajo municipal demand, which may be met with other alternatives not yet identified or quantified at this time.

6.6.3 Impacts of the No Action Alternative

No Action would have significant impacts on the Jicarilla Apache Nation's use and enjoyment of its water rights and would be inconsistent with the United States' trust responsibility to the Jicarilla Apache Nation. These impacts are discussed in Sections 6.5.3 and 6.7.5.3.

6.7 Socioeconomics

Impacts of the proposed action and no action alternatives are discussed as they relate to the social and economic environment in San Juan County and the Four Corners region. Since the proposed action would promote continuation of the *status quo* in terms of the operation of the SJGS, significant negative impacts would occur to San Juan County and the surrounding region as a result of accepting the no action alternative.

6.7.1 Population

In order to get a sense of population growth in San Juan County over the last 20 years, it is useful to compare population figures for 1970 and 1990. The population of San Juan County has grown since the construction of the SJGS in the 1970s. Table 5 shows the historic population for Native Americans and non-Native Americans in San Juan County. In 1990, the total county population was estimated at 91,605, of which approximately 37 percent was Native American and 63 percent non-Native American. County population estimates have been updated by the Census Bureau. The total population estimate for San Juan County as of July 1, 1999 was 109,899 (USDOC 2000). Native American population was at 39 percent with non-Native American estimates at 61 percent. Population projections for San Juan County in the year 2020 are estimated to be 145,072 (BBER 1997). The Navajo Nation has expressed concerns that the BBER population projections may have underestimated Navajo population counts.

The Native American population has increased by 15,964 (90.5 percent) since 1970 due to both natural increase and to increased employment opportunities outside the reservation. The total birthrate in San Juan County in 1990 was at 21.3 (births per 1,000 population), while the state birthrate was 18.0. For Native Americans in San Juan County the birthrate was 29.6, while for non-Native Americans it was 16.4. Economic growth in the Four Corners region has caused an in-migration of non-Native Americans, increasing their population by 23,124 (66.3 percent) since 1970. While both populations have increased since 1970, the Native American population is growing at a faster rate due to a significantly higher birthrate and to improved socioeconomic conditions for this group.

6.7.2 Economic Indicators

Labor force, employment, and income statistics are standard measures of economic health in a designated region. The figures for San Juan County show growth in all of these areas in the period between 1970 and 1990. There are, however, marked differences between Native American and non-Native American populations. Historically, the differences reflect the disparity between the traditional Native American nonmarket economy based on subsistence agriculture and the industrialized capitalist market economy existing outside the reservation. This, however, is changing. With a growing Native American population working on a fixed land base, more are becoming employed in a wider variety of industries.

Table 5

**NATIVE AND NON-NATIVE AMERICAN POPULATION
IN SAN JUAN COUNTY, NEW MEXICO
ACTUAL POPULATION 1960-1990**

<u>Year</u>	<u>Total</u>	<u>Native American</u>		<u>Non-Native American</u>	
		<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
1960	53,306	14,232	26.7	39,074	73.3
1970	52,517	17,649	33.6	34,868	66.4
1990	91,605	33,613	36.7	57,992	63.3

Sources: Data for 1960-1970 from the U.S. Bureau of the Census: Characteristics of the Population, New Mexico, 1960-1990.

Data for 1990 is from the U.S. Bureau of the Census: Social and Economic Characteristics, New Mexico, 1990.

6.7.2.1 Income

On average, residents of San Juan County earn less than other New Mexico residents. Table 6 shows that in 1989, approximately 10,299 families (35.3 percent) in San Juan County earned less than \$15,000 per year. State averages for persons living below the poverty level are at 20.6 percent, whereas 28.3 percent of all persons residing in San Juan County live below the poverty level. Nearly one in four families in San Juan County (24.1 percent) lives below the poverty level while State figures are at 16.5 percent. Another indicator of poverty is per capita income. The per capita income for San Juan County in 1989 was \$8,900 while for the State it was \$11,246 (USDOC 1992).

Approximately 54 percent of all Native American families in San Juan County make less than \$15,000 per year. The average income of Native American families (\$13,329) is well below half of the average income of non-Native American families (\$31,680) (USDOC 1992). However, records show significant improvement in levels of income for Native American families since 1970; in 1970, nearly two-thirds lived below the poverty level. This was attributed to a lack of opportunity and partly to their desire to maintain their traditional way of life on their land (USBR 1977). This has changed, since large numbers of Native Americans have sought work in employment sectors other than agriculture (Table 7). With increasingly diversified employment options have come increases in average income. SJGS payroll for 1999 was \$33,826,643. In 1999, BHP had a total payroll for the San Juan and La Plata mines of \$26,370,000. This income is infused back into the local economy, contributing to its overall growth.

Right-of-way fees and other proposed land selection activities augment tribal income for Ute Mountain Utes and the Navajo Nation as well as employment income to individuals.

6.7.2.2 Labor Force and Employment

The employment boom San Juan County experienced in the 1950s as a result of the discovery of major oil and gas deposits declined during the 1960s and 1970s. The total labor force participation rate fell from 51.7 percent in 1960 to 49.5 percent in 1970. The male participation rate fell from 77.2 percent in 1960 to 66.7 percent in 1970. Alternately, the female participation rate increased from 25.5 percent to 33.6 percent (USBR 1977). Since 1970, the overall labor force participation rate has risen. In 1990 it was at 59.3 percent, with the male rate increasing to 71.2 percent and the female rate rising to 48.4 percent. While unemployment rates were still high in the region in 1990 (11.5 percent), the incremental gains in labor force participation reflect sustained economic growth in San Juan County between 1970 and 1990 (USDOC 1992). Contributing factors to increases in labor force participation include the development of coal resources, new construction projects, and the operation of SJGS and the Four Corners Generating Station.

There were distinct differences in employment between Native American and non-Native American populations in the years between 1970 and 1990 in San Juan County. While Native Americans in general had lower labor force participation rates than non-Native Americans, both groups exhibited higher participation rates in 1990 than in 1970. In 1970, Native Americans participated in the labor market at a rate of 38.0 percent, while non-Native Americans were at 59.6 percent (USBR 1977). In 1990, figures for Native Americans rose to 49.3 percent and for non-Native Americans, 64.4 percent. (USDOC 1992).

Among all persons in San Juan County, the greatest increase in employment between 1960 and 1970 was in the durable goods category which increased from 278 employees in 1960 to 1,025 employees in 1970. This represents a 278.7 percent gain. The following industries showed significant declines in

Table 6

**NUMBER OF NATIVE AND NON-NATIVE AMERICAN FAMILIES, BY INCOME LEVEL IN
SAN JUAN COUNTY, NEW MEXICO, 1970 AND 1989**

Number of Families

	1970						1989					
	<u>Total</u>		<u>Native American</u>		<u>Non-Native American</u>		<u>Total</u>		<u>Native American</u>		<u>Non-Native American</u>	
	<u>number</u>	<u>percent</u>	<u>number</u>	<u>percent</u>	<u>number</u>	<u>percent</u>	<u>number</u>	<u>percent</u>	<u>number</u>	<u>percent</u>	<u>number</u>	<u>percent</u>
ALL FAMILIES	11,789	100	2,985	100	8,804	100	23,047	100	7214	100	15,860	100
Less than \$999...	842	7.2	627	21	215	2.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Less than \$4,999...	2,510	21.3	1,149	38.5	1,361	15.5	2,444	10.6	1,679	23.3	765	4.8
\$5,000-\$9,999...	4,248	36	932	31.2	3,316	37.7	2,282	9.9	1,306	18.1	976	6.2
\$10,000-\$14,999...	2,750	23.3	217	7.3	2,533	28.8	2,490	10.8	886	12.3	1,604	10.1
\$15,000-\$24,999...	1,169	9.9	44	1.5	1,125	12.8	4,210	18.2	1,219	16.9	2,991	18.9
\$25,000 and over	270	2.3	16	0.5	254	2.8	11,648	50.5	2,124	29.4	9,524	60.1
Median Income	8,150		4,015		9,621		25,289		13,329		31,680	
Mean Income	9,160		4,966		10,318		30,042		18,788		36,420	

Source: US Bureau of the Census: Fourth County Summary Computer Tapes, 1970. Data for 1989 taken from US Bureau of the Census: Social and Economic Characteristics, New Mexico, 1990.

Table 7

**EMPLOYMENT, BY INDUSTRY, OF NATIVE AND NON-NATIVE AMERICANS
IN SAN JUAN COUNTY, NEW MEXICO
1970 AND 1990**

INDUSTRY	Native American				Non-Native American			
	1970		1990		1970		1990	
	number	percent of total	number	percent of total	number	percent of total	number	percent of total
Total Employed	2,907	100.0%	7,705	100.0%	12,252	100.0%	24,575	100.0%
Agriculture, Forestry and Fisheries	156	5.4%	491	6.4%	237	1.9%	256	1.0%
Mining	191	6.6%	718	9.3%	2,056	16.8%	2,935	11.9%
Construction	273	9.4%	819	10.6%	1,090	8.9%	1,915	7.8%
Manufacturing	769	26.5%	400	5.2%	659	5.4%	989	4.0%
Durable	745	25.6%	323	4.2%	280	2.3%	595	2.4%
Non-durable	24	0.8%	77	1.0%	379	3.1%	394	1.6%
Transportation, Communications, Utilities and Sanitary Services	155	5.3%	846	11.0%	1,006	8.2%	2,701	11.0%
Trade	237	8.2%	1,260	16.4%	2,741	22.4%	5,999	24.4%
Wholesale	17	0.6%	100	1.3%	485	4.0%	949	3.9%
Retail	220	7.6%	1160	15.1%	2,256	18.4%	5,050	20.5%
Finance, Insurance and Real Estate	13	0.4%	142	1.8%	463	3.8%	1105	4.5%
Services*	787	27.1%	2,436	31.6%	3,307	27.0%	7,628	31.0%
Public Administration	326	11.2%	593	7.7%	693	5.7%	1,047	4.3%

*Includes business and repair services, personal services, entertainment and recreation services, and professional and related services.

Source: Data for 1970 is from US Bureau of the Census: Fourth Count Summary Tapes, 1970. Data for 1990 is from US Bureau of the Census, Social and Economic Characteristics, New Mexico, 1990.

employment during the 1960 to 1970 period: agriculture, forestry and fisheries (-46.0 percent); construction (-33.5 percent); and manufacture of non-durable goods (-46.7 percent) (USBR 1977).

Table 7 shows gains in all areas of employment between 1970 and 1990 with the exception of durable goods, which showed a decline of 10.4 percent. The declining trend in employment between 1960 and 1970 reversed itself in most areas by 1990 with sizable gains in the following areas: agriculture, forestry and fisheries (120.4 percent); mining (62.6 percent); construction (102.1 percent); transportation, communications, utilities and sanitary services (205.5 percent); trade (143.8 percent); finance, insurance and real estate (162.0 percent); and services (145.8 percent) (USDOC 1992).

Currently, SJGS has 439 full-time employees of which 63 are Native American (14.0 percent). BHP, including SJCC, currently employs 400 at La Plata and San Juan mines which supply SJGS with coal. Of BHP's total, 75 percent of their employees are Native American (BHP 1999).

6.7.2 Taxes

A major portion of San Juan County's revenue is linked to the energy industry and to SJGS in particular. SJGS paid \$7.2 million in property taxes in 1998 with \$6.8 million going directly to San Juan County (Hampton 1999). In addition, La Plata and San Juan mines together paid property taxes of \$2,180,203, severance tax of \$6,140,450, gross receipts tax at \$9,994,347, and the Conservation and Resource Excise tax of \$1,380,067 for a combined total for the mines of \$19,695,067 for 1999 to the State of New Mexico. Coal royalties in 1999 paid to the State of New Mexico totaled \$5,652,510; royalties paid to the federal government on federal coal leases were \$4,744,376 in 1999 (BHP 2000).

6.7.3 Local Infrastructure

This section provides information on the transportation system in San Juan County, the education system, sources for health care, and government agencies.

6.7.3.1 Transportation

Automobiles and trucks provide the primary means for passenger and freight movement in San Juan County. The hard-surfaced highway network includes federal and Indian designated routes as well as some which are unnumbered. The major roads within San Juan County are: U.S. 666, 550 and 64; NM 44, 170; and Indian Route 1. Traffic is often heavy on the major highways, especially on U.S. Route 64 between Shiprock and Farmington, which is a modern, four-lane highway.

6.7.3.2 Education

San Juan County is served by a public school system made up of four independent school districts: Aztec, Bloomfield, Central, and Farmington. Total enrollment for these four districts in the 1998-1999 academic year was 24,798. There are also BIA schools which serve only Native American students in addition to a number of private and parochial schools. Total enrollment for private schools in San Juan County was 2,342 for the 1998-1999 academic year (NM Department of Education 1998). Institutions for higher education include the Navajo Community College in Shiprock and San Juan College in Farmington. Technical-vocational schools include Crownpoint Institute of Technology, Farmington Vo-Tec

Appliance and Refrigeration School, Jujac School of Business, and New Mexico Trade School (New Mexico Department of Education 1998).

6.7.3.3 Health Services

The three main sources for health care in San Juan County are: private medical care, public health services through the State and County, and the Indian Health Service of the U.S. Public Health Service. The largest medical facility is the San Juan Regional Medical Center, an independent, non-profit organization providing health care for all. This is a regional referral center as designated by the federal government. Suncrest Hospital is a full service 54 bed psychiatric and chemical dependency hospital. Clinics include the Urgent Care Center and the Dialysis Clinic provided by Presbyterian Medical Services. The San Juan County Health Department offers free immunization programs and family planning clinics (City of Farmington Planning and Economic Development Department 1989).

6.7.3.4 Government Agencies

Government agencies in San Juan County consist of municipal, county, state, tribal and federal offices. San Juan County has three police jurisdictions administering law enforcement: the Navajo Police Department, Shiprock Agency is primarily responsible for the reservation; the San Juan County Sheriff's Office has jurisdiction over rural county areas; and the municipal police forces in Aztec, Bloomfield and Farmington are responsible for these communities. Fire protection is provided by the San Juan County Fire Department. State offices include among others the Division of Vocational Rehabilitation, the Employment Security Department, the Food Stamp Office, Department of Human Resources, the Bureau of Revenue, the State Police and the Transportation Department. Tribal offices are primarily offices of the Navajo Nation. Federal offices in San Juan County include the Welfare Department and the Department of the Interior, including offices of the BIA, USBR, BLM and National Park Service (NPS) for the region (City of Farmington Planning and Economic Development Department 1989).

6.7.4 Impacts of the Proposed Action

With the implementation of the proposed action, there would be no significant socioeconomic impacts on the following areas:

- labor force and employment
- population
- income
- taxation
- local infrastructure

Since the proposed action would enable SJGS to continue current operations, existing socioeconomic conditions would essentially remain the same.

6.7.5 Impacts of the No Action Alternative

An uninterrupted source of water is critical to the operation of SJGS. Without an adequate water supply, SJGS would be forced to halt its operations. If this were to happen, SJCC, which is dependent upon SJGS as an assured purchaser of its coal, would also experience losses since two of the three mines owned by SJCC serve SJGS exclusively.

Approximately 49 percent of the SJGS is owned by entities outside New Mexico. More than 30 western utilities, municipalities, and cooperatives are dependent to some degree on the operation at SJGS to provide reliable and economic electric energy to their customers. For at least one of the owners of SJGS other than PNM, this individual resource represents as much as 20 percent of its total generating resources. If SJGS were to halt operations, all owners of the plant would be required to seek alternative sources of electricity to meet the needs of their customers, quite possibly at higher costs.

SJGS represents a major investment for PNM and its other owners, and the electricity produced by SJGS represents a significant source of revenues. If an adequate future water supply cannot be assured, adverse financial impacts to the owners could be expected to occur over time. For example, the credit ratings of the owners, which in turn affect their ability to obtain future financing or refinancing of their obligations, may be adversely impacted. The ability of the owners to sell their interests, as well as the ability of potential purchasers to obtain financing, may also be adversely affected.

PNM and the other owners must plan years in advance for changes in customers' demand for electricity, life of plant and how it might be economically extended, and the cost of the electric energy produced at SJGS. Uncertainty regarding such a critical component as water can have a significant impact on the ability of planners and decision-makers to prepare for future needs at SJGS and other generating resources in the western United States.

In addition to negatively affecting owners and customers in a five state area, the no action alternative would have adverse effects on the local economy of San Juan County.

6.7.5.1 Population

If the local economy could not absorb displaced workers employed by both SJGS and SJCC, the Four Corners region would likely experience a loss of an important segment of its work force to other regions of the state or country.

6.7.5.2 Labor Force and Employment

The coal mining industry would be particularly affected by losing SJGS as one of its customers. The coal market in the west and southwest is very competitive with spot market sales driving prices downward, and the trend is toward incremental pricing (as opposed to long-term) contracts for coal mining operations. Because of the lack of transportation infrastructure, the cost of trucking the coal to another market would add sufficient incremental costs that it could not be sold in a competitive market. If SJGS ceased operations, area coal mining operations would be curtailed as well. The continued presence of both SJGS and Four Corners Power Plant with their long-term requirements brings essential support for the coal mining industry in San Juan County.

If SJGS were to cease operations, the 439 employees at SJGS would lose their jobs. Also, a portion of the 400 BHP jobs at the San Juan and La Plata mines would be lost. Jobs related to the utility and mining industry would also be impacted possibly affecting as many as three related jobs in San Juan County for every SJGS or BHP job eliminated.

In addition to the 63 Native Americans that SJGS currently employs, an even larger number of Native Americans employed by the San Juan and La Plata mines would lose their jobs if SJGS were to halt operations.

6.7.5.3 Income

Income levels in the region would decline under the no action alternative. The Jicarilla Apache Nation would not realize the income from supplying water to PNM under the Subcontract. The loss of any major employer, such as SJGS, could have significant negative impacts on local income levels.

6.7.5.4 Taxes

Local and state governments would face a significant loss of revenue if SJGS and SJCC were to halt operations. PNM and SJCC were the top two taxpayers in San Juan County in 1999; BHP was the seventh highest taxpayer (San Juan County Assessor's Office 2000). The loss of revenue would have a devastating impact on San Juan County and significant impacts on the State of New Mexico and the federal government.

6.7.5.5 Infrastructure

The unemployment caused by implementation of the no action alternative would likely cause increased demands on local government agencies such as unemployment support services, government welfare programs, mental health facilities, and domestic violence and drug and alcohol treatment programs. Also, since fewer people would be likely to be able to afford private medical care, there would be more stress placed on subsidized government health programs.

Primary and secondary education systems would experience declining enrollments if closing SJGS and the mines was to cause a large movement of workers to move out of the county. However, displaced workers from the mines and SJGS who would remain in the county may also seek retraining at either vocational-technical institutions or at community colleges in the area, causing enrollments at these institutions to rise.

6.7.6 Mitigation Measures for the Proposed Action Alternative

No significant impacts of the proposed action alternative on the socioeconomic environment were identified since the proposed action would act to continue the current status of employment, income, and social services. Consequently, no mitigation measures are proposed.

6.8 Land Use

The major use of land surrounding SJGS and the La Plata and San Juan mines is coal mining. The historic and designated postmining use of lands currently being mined is livestock grazing. Following successful reclamation, the land will be returned to that use. Other uses include wildlife habitat and recreation.

6.8.1 Recreation

The only recreational activity determined to take place on the San Juan River in the area under consideration is sport fishing for catfish. In addition, there is scattered recreational water use by canoeists and rafters in the area. Fishermen have been known to utilize the existing weir and the turbulent waters below it for fishing. Limited fishing is also available to PNM employees at the SJGS storage reservoir.

6.8.2 Prime and Unique Farmland

The SJCC conducted an investigation of the area under consideration to determine whether lands within the area may be prime or unique farmland. The investigation resulted in several findings. First, it was determined that the area has not historically been used as cropland. Furthermore, it is not irrigated or naturally subirrigated and has no developed water supply that is dependable or of adequate quality; the area contains only minor, intermittent drainages. The average annual precipitation is less than 10 inches. On the basis of a soil survey conducted by the U.S. Soil Conservation Service, no soil map units within the area were designated prime farmland. In short, no prime or unique farmland is located in the area of SJGS or the San Juan or La Plata mines.

6.8.3 Wildlife Habitat

Pasture, meadows, and other areas that are covered with grasses, herbs, shrubs and vines, provide habitat for openland wildlife. Woodland wildlife habitat occurs only along the San Juan River and consists of areas containing deciduous trees and shrubs, along with grasses, legumes and wild herbaceous plants. Habitat for rangeland wildlife includes areas of shrubs and wild herbaceous plants and grasses. Limited croplands occur along the San Juan River. These provide foraging areas in the fall and spring for migratory waterfowl.

Lake habitat occurs at the SJGS storage reservoir providing nesting and foraging areas for waterfowl and shorebirds. Wetland habitat occurs both at the weir area and below the reservoir dam. These areas provide habitat for marsh birds, ducks, geese, and aquatic mammals.

6.8.4 Impacts of the Proposed Action

The proposed action would have minimal overall impact on current land use in the SJGS area. The proposed action would have no impact on recreational activities on the San Juan River. It would, however, have an impact on wildlife uses since the mines would continue to temporarily remove habitat from areas to be mined.

6.8.5 Impacts of the No Action Alternative

In the event that the Jicarilla Apache Nation Water Subcontract was not approved for the consumption of 16,200 AF by SJGS, that PNM was unable to acquire the same amount from other sources, and that SJGS was consequently forced to cease operating, the weir and diversion structure would be removed. Removal of the weir might provide new opportunities for river rafting and other recreational water activities, but would have little effect on fishing in the area. If mining at San Juan and La Plata mines were forced to cease as a result of a shutdown of SJGS, the temporary removal of wildlife habitat as a result of mining would also cease.

6.8.6 Mitigation Measures

Because no adverse impacts are expected as a result of the proposed action, no mitigation measures are suggested.

6.9 Cultural Resources

Cultural resources are physical or other expressions of human activity or occupation. Such resources (hereby referred to as historic properties) include culturally significant landscapes, prehistoric and historic archeological sites and isolated artifacts or features, historic structures, human burials, sacred sites and traditional cultural properties (TCPs). TCPs are sites or areas of important cultural value to existing communities. Historic Properties that are eligible for inclusion in the National Register of Historic Places (NRHP) are protected under the National Historic Preservation Act of 1966, as amended in 1992 (NHPA), and may also be protected under the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), and Executive Order 13007, Protection of Native American Sacred Sites, and other state, agency, or tribal laws and policies.

6.9.1 Existing Environment

The SJGS lies in the San Juan Basin, an area well known for its archeology and contemporary/historical Native American culture. Nearby cultural/archeological features include Mesa Verde National Park, Aztec Ruins National Monument, Salmon Ruins, and the Navajo and Ute Mountain Indian Reservations.

Known cultural traditions around the SJGS include the Archaic (3,000 to 500 B.C.), the Anasazi (A.D. 1-1300), the Navajo/Ute Settlement Period (A.D. 1450-1870) and Euroamerican settlement (A.D. 1870-Present).

A number of contemporary Native American tribes have ancestral and traditional ties to the San Juan Basin. Archeological data provide some information about prehistoric and historic aboriginal use of the region; however, each tribe has its own account of the tribe's traditional use of the area. There is a high likelihood of encountering TCPs and human remains during project planning, archeological excavation, or construction activities.

6.9.2 Significance Criteria

For cultural resources, a significant environmental effect occurs when the proposed project will disrupt or adversely affect a prehistoric or historic archeological site or a property of historic interest or cultural significance to a community or ethnic or social group. Adverse impacts to cultural resources could include destruction, disturbance, inundation or vandalism to significant resources. These impacts were considered significant if they would occur to cultural resource sites that are eligible or listed for inclusion on the NRHP. It should be noted that while significant impacts to cultural resources may be "resolved" through treatment measures of encountered resources such as data recovery in compliance with applicable regulations and guidelines, in some cases, impacts would remain significant or are unavoidable. Other adverse impacts which may be significant include disturbance to graves and cultural items protected under NAGPRA, and destruction of, or preventing access to, sacred sites protected under Executive Order 13007.

6.9.3 Impacts of the Proposed Action

Because of the nature of the proposed action, there would be no significant impacts to cultural resources. The Jicarilla Apache Nation Water Subcontract is simply a change in water supplier (from USBR to Jicarilla Apache Nation), and a continuation of ongoing activities. The implementation of the proposed action will be confined to the existing infrastructure described elsewhere in this document.

Mitigation measures described for other resource categories may require further cultural resource review, however. For instance, the planning and construction of the fish passage (described in section 6.4.3.1) will undergo cultural resources review in consultation with the New Mexico State Historic Preservation Officer and/or Navajo Nation Tribal Historic Preservation Officer, as appropriate.

6.9.4 Impacts of Other Alternatives

The implementation of any one of the other alternatives described in this document, the Alternative Sources of Water (Section 4.2) or the No Action Alternative (Section 4.3) could result in significant impacts to cultural resources. The conversion of water from irrigation to M&I (as described in Section 4.2.1) could impact cultural landscapes and traditional lifeways in the area. The development of groundwater sources (as described in Section 4.2.2) could result in ground-disturbing activities with the potential to affect archeological resources. Under the No Action Alternative, ground-disturbing activities associated with power plant and weir removal (and appurtenant features) has the potential to affect historic properties.

6.9.5 Mitigation Measures for the Proposed Action Alternative

No mitigation measures are proposed since the nature of the proposed action is such that there is no potential to cause effects to historic properties. This recommended determination will be submitted to the New Mexico State Historic Preservation Officer for concurrence. USBR will also consult with the Jicarilla Apache Nation, the Navajo Nation, through its Tribal Historic Preservation Officer, and other tribes who may have a cultural affiliation with the area. Consultation in regards to activities such as fish passage construction (Section 6.9.3) will occur as a separate undertaking from the Proposed Action Alternative.

7.0 IRREVERSIBLE AND IRRETRIEVABLE RESOURCE COMMITMENTS

A number of human and natural resources would continue to be affected if the Jicarilla Apache Nation Water Subcontract is approved. The irreversible and irretrievable nature of each of these is discussed in the following subsections. Because no new construction is proposed as part of the proposed action, no new irreversible and irretrievable commitments of land, biota, archeology, or paleontology will be made.

7.1 Water

Although water is considered a renewable resource, water consumed as a result of the proposed action would be lost to alternative uses for the life of the subcontract. At the termination of the Subcontract, the amount of water that had been used annually will be available for other uses.

7.2 Coal

Coal extracted at the adjoining San Juan Mine and nearby La Plata Mine would continue to be consumed by the SJGS. Approximately 6.6 million tons of coal were burned by SJGS in 1999. Future years' consumption will vary in proportion to the capacity factor. Once burned, the coal is irretrievable.

7.3 Electric Energy

The electric energy generated through the burning of coal would be consumed by a variety of users. Once used, electric energy is irretrievable.

7.4 Air Quality

The continued burning of coal by the SJGS would result in air quality in the affected airshed that is of a lower quality than if no combustion of coal had taken place. Air quality as a resource is not irretrievably lost in that once combustion of coal is terminated, air quality could theoretically return to the preproject state.

8.0 CONNECTED, CUMULATIVE, AND SIMILAR ACTIONS AND CUMULATIVE IMPACTS

Regulations of the Council on Environmental Quality implementing NEPA define connected actions as closely related actions, such as actions that cannot or will not proceed unless other actions are taken previously or simultaneously. Similar actions have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. Cumulative actions are actions which, when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement. Cumulative impact is the impact on the environment which results from the environmental 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.

Other water resource activities in the San Juan River Basin that would be connected or have cumulative impacts with the Jicarilla Apache Nation Water Subcontract include the construction of the endangered fish passage at the SJGS Diversion Weir (Diversion Weir), implementation of an agreement between the Navajo Nation, PNM, the San Juan Dineh Water Users, and USBR that would allow funds supplied by PNM to go toward the rehabilitation of certain mainstem Navajo Nation irrigations projects, operation of Navajo Dam, implementation of the Animas-La Plata Project, completion of the Navajo Indian Irrigation Project (NIIP), implementation of the Navajo River Water Development Plan, continued San Juan Basin coalbed methane gas development, and development of future Indian water development projects.

8.1 Construction of the Endangered Fish Passage at the San Juan Generating Station Diversion Weir

A need has been identified by the SJRRIP to restore endangered fish passage upstream past the Diversion Weir. The purpose of establishing fish passage would be to protect and recover native Colorado pikeminnow (*Ptychocheilus lucius*) and razorback sucker (*Xyrauchen texanus*) populations in the San Juan Basin while water development proceeds in compliance with all applicable Federal and State laws, including fulfillment of Federal trust responsibilities to the Southern Ute Indian Tribe, Ute Mountain Ute Tribe, Jicarilla Apache Tribe and the Navajo Nation. In addition, other native fish species would benefit from restored passage.

The Diversion Weir was constructed in 1971. The 3.25-foot high weir is located on the San Juan River about 12 miles downstream of Farmington, New Mexico near the town of Fruitland at River Mile 166.6.

Facilities at the diversion include a concrete weir, a series of screened intake structures, an intake channel, a settling channel, and a pump house.

Water flows over the weir into a stilling basin created by a concrete apron. The stilling basin is the width of the river. The presence of the weir and the basin creates a barrier to upstream fish movement. As flows increase, the difference in the upstream and downstream water levels is reduced. Although water levels are reduced, velocities increase and the weir provides an impediment to upstream fish movement. Studies conducted as part of the SJRRIP have shown that some fish are able to move upstream past the weir but their specific method of movement is not known and the number of fish dissuaded from upstream movement by the presence of the weir is also unknown. One possible method of upstream movement could occur during high river flows. When the flow in the San Juan River is above 7,000 cfs, some of the flow goes around the weir. It appears that it would be possible for fish movement to occur at these higher flows.

A 4-foot by 6-foot sluiceway in the weir located on the north side of the river, is used to sluice the inlet structure of sediment. Normal sluice gate operations have the sluice gate open between 8 and 12 inches. Trash racks and isolation gates are located at the point of diversion. A concrete settling channel about 490 feet long conveys river water to the pump house or returns it to the river. Diverted water moves through traveling screens to three pumps capable in combination of pumping a maximum of 17,000 gallons per minute (37 cfs) to a 110-acre storage reservoir. From the storage reservoir, the water is pumped to the SJGS.

An environmental assessment (EA) has been prepared that addresses providing endangered fish passage at the Diversion Weir. USBR is preparing this EA in cooperation with the USFWS to comply with the National Environmental Policy Act, Endangered Species Act, and related U.S. Department of the Interior policies and regulations. If, based on this analysis, that USBR concludes the proposed action would have no significant impact on the human environment, preparation of an Environmental Impact Statement would not be required before the action could be implemented.

Under the preferred alternative, USBR acting on behalf of the Recovery Program, would construct fish passage around the PNM Diversion weir on the south bank of the San Juan River using boulders to create a riffle and pool sequence (Figure 3). The fish passage would be about 400 feet in length. The fish passage entrance would be located downstream of the dam's stilling basin and existing wingwall about 20 to 30 feet below the white water. The fish passage exit would be located about 200 feet upstream of the dam. The passage would consist of a channel with placed boulders to create a series of boulder drops and stilling pools.

The preferred alternative also includes sorting facilities consisting of a trap, crane, storage shed, and sorting table. Portable power would be used to operating the crane and fish sorting facilities. A security system including fencing would also be required.

8.2 Agreement between the Navajo Nation, PNM, USBR, and the San Juan Dineh Water Users

As part of the process of consultation on ITA issues between the Navajo Nation, PNM, and USBR, the parties identified certain concerns about potential impacts to downstream Navajo irrigation projects from continued diversion by PNM. The Navajo Nation, PNM, USBR, and the San Juan Dineh Water Users have entered into an agreement whereby PNM will make certain mitigation payments to the San Juan Dineh Water Users that will be available for improvements to the irrigation projects. This agreement has

been approved by various committees of the Navajo Nation Council and signed on behalf of the Navajo Nation president.

8.3 Navajo Operations Environmental Impact Statement

USBR has committed to operation of Navajo Dam to mimic the natural hydrograph of the San Juan River. The pattern of the natural hydrograph was defined by the SJRRIP as part of the 7-year study and is a commitment to operate Navajo Reservoir for the benefit of endangered fish in the San Juan River Basin. Navajo Reservoir is the primary control on flows in the San Juan River to its mouth at Lake Powell. The original PNM water contract is included in the baseline of activities on the San Juan River. USBR has initiated the environmental compliance process for Navajo Reservoir operation.

Navajo Dam and Reservoir are owned, operated, and maintained by USBR. Navajo Dam is located on the San Juan River approximately 44 miles upstream from Farmington, New Mexico. The Navajo Unit is a storage unit of the Colorado River Storage Project (CRSP) and is subject to the terms of the Upper Colorado River Basin Compact and the CRSP Acts of 1956 and 1962 authorizing the San Juan-Chama Project and NIIP. Congress has also authorized the diversion of 33,500 AF per year and depletion of 25,500 AF per year from the Navajo Reservoir Supply, as defined in the Federal Contract, to fulfill a portion of the Jicarilla Apache Nation water rights settlement. Following completion of the Navajo Unit in 1963, releases of water were focused primarily on providing consistent flows and maintaining a maximum pool in Navajo Reservoir. The operation of the unit to mimic the natural hydrograph by implementing the SJRRIP flow recommendations is intended to support recovery of the endangered fish species and to allow water development to continue in the basin. The unit provides water for irrigation, municipal and industrial uses, recreation, hydropower, and fish and wildlife habitat. The unit also provides flood control. In 1991, USBR agreed to prepare an EIS before initiating a permanent change in the operation of the Navajo Unit under the SJRRIP. The USBR plans to complete the EIS before reducing flows below 500 cfs in the future, with the exception of short duration test flows to collect data for assessing impacts. Public scoping meetings were held during November 1999. The draft EIS is scheduled to be released in February 2002 with a final EIS scheduled to be released in July 2002.

8.4 Animas-La Plata Project

USBR has been approved to develop a modified ALP in the San Juan River Basin of Colorado and New Mexico. This project would deplete an average of 57,100 AF from the basin annually for municipal and industrial uses. Recipients of project water include the Colorado Ute Tribes, Navajo Nation, Animas La Plata Water Conservancy District, La Plata Conservancy District, and the San Juan Water Commission. The Final Supplemental Environmental Impact Statement was completed in July 2000 and a Record of Decision (ROD) was signed September 25, 2000. Legislation in both the House and Senate has been enacted. On December 21, 2000, the President signed the Omnibus Consolidated Appropriations Act (P.L. 106-554), which includes the "Colorado Ute Settlement Act Amendments of 2000". The legislation states that "There is authorized to be appropriated to the Colorado Ute Settlement Fund such funds as are necessary to complete the construction of the facilities described in section 6(a)(1)(A) (which is Ridges Basin, Durango Pumping Plant and the Inlet Conduit) and 15(b) (which is Navajo Nation Municipal Pipeline) within 7 years of the date of enactment of this section. Such funds are authorized to be appropriated for each of the first 5 fiscal years beginning with the first full fiscal year following the date of enactment of this section."

8.5 Navajo Indian Irrigation Project

The NIIP was authorized by the Act of June 13, 1962, Pub. L. No. 87-483, 76 Stat. 96. Its purpose is to provide irrigation for 110,630 acres of land owned by the Navajo Nation in northwestern New Mexico. Water is delivered from Navajo Dam through a series of tunnels, canals, and pipelines to the sprinkler systems that irrigate the agricultural land. The project began operation in 1976 with the first of 11 blocks. It was scheduled for completion in 1986, but has been postponed because of funding delays. Construction of the project through Block 8, for a total of 76,481 acres, will be completed by 2002. Completion through Block 11 for all 110,630 acres, requiring the use of 280,600 AF of San Juan River water, was cleared in 1999 with completion of a biological assessment and letter of concurrence from USFWS. Construction is expected to be completed by 2012, with irrigation of the entire 110,630 acres by 2022. Water use is expected to be reduced to 270,000 AF annually as return flows reach equilibrium. In addition, obstructions created by two diversion structures on the San Juan River will be removed. The Cudei diversion will be removed and the Hogback diversion is in the process of being rebuilt with fish passage to allow access to upper reaches of the San Juan River by the fish community, including endangered species.

8.6 Jicarilla Apache Tribe Water Rights Settlement Act

The Jicarilla Apache Tribe Water Rights Settlement Act of 1992 provides the right for the Nation to divert 6,500 AF of San Juan Chama water from Heron Reservoir and the right to divert 33,500 AF (25,500 depletion) from Navajo Reservoir Supply, as defined in the Federal Contract, annually. The tribe can also market this water through third-party contracts outside their reservation, subject to approval of the Secretary of the Interior and requirements and conditions of state law, any applicable federal law, interstate compact, and international law as apply to the exercise of water rights held by nonfederal, non-Native American entities. The Jicarilla Apache Nation Water Subcontract is such a water subcontract. While this subcontract accounts for 16,200 AF depletion annually during the term of the Subcontract, the remainder is available to the Nation.

8.7 Navajo River Water Development Plan

One use that the Jicarilla Apache Nation may develop is the Navajo River Water Development Plan. This would use an existing diversion on the Navajo River to divert a maximum of 12,000 AF annually from the San Juan River Basin. The water would be transported by pipeline and pumping system to two existing reservoirs on the Jicarilla Apache Reservation. This project would enhance recreation and fisheries of the reservoirs and provide water for irrigation water for approximately 2,400 acres, with a consumptive use of 6,000 AF.

8.8 Navajo-Gallup Water Supply Project

The proposed Navajo-Gallup Water Supply Project would provide domestic, municipal, and industrial water to portions of the Navajo Nation in northwestern New Mexico and northeastern Arizona, including the reservation communities of Fort Defiance and Window Rock, Arizona, and the nonreservation town of Gallup, New Mexico, and more than 20 Navajo chapters. Although funding for project construction is not currently authorized, feasibility studies for the project were authorized by Congress in 1971. The project would supply a safe, reliable, and sustainable municipal and domestic water supply to replace or augment existing groundwater supplies and provide water to some areas of the reservation which do not currently have a domestic water supply. Alternatives for the project are currently being identified and

evaluated. NEPA compliance activities have been initiated, with public scoping meetings held in April and May 2000. Specific water rights for this project have not yet been identified.

8.9 Coalbed Methane Gas Industry

The San Juan Basin has been the site of a rapidly enlarging coalbed methane gas industry over the last several years. The basin currently has more than 3,000 Fruitland formation coalbed methane gas wells. More than 700 additional wells have been proposed for the basin. Production requires the extraction of groundwater to induce gas flow from the Fruitland formation. Although this groundwater has not been historically considered to be tributary to the San Juan River, it is possible the wells are hydrologically connected to the shallow groundwater systems. The shallow groundwater systems are a source of recharge for surface water. Groundwater extraction from the existing and proposed new wells could result in depletion of 280 AF annually of surface water.

8.10 Conclusion

The Subcontract would continue river diversions, depletions, and impacts to other natural resources associated with the existence and operations of San Juan Generating Station and the San Juan and La Plata Coal mines. Consequently, cumulative adverse impacts to resources from existing conditions would continue, but would be mitigated to some extent through the planned fish passage around the SJGS diversion dam, certain payments by PNM to Navajo farmers for improvements to irrigation projects, and continued rehabilitation of mined lands.

Because there would be no new changes in the amount, timing, or location of water diversions and depletions, no new ground disturbance, no change in air emissions, no change in employment and no change in land use, there would be no additional significant adverse impacts caused by the proposed action of simply changing the administrator of the contract, and therefore, no additional contributing factors to adverse cumulative impacts.

9.0 CONSULTATION AND COORDINATION

This section provides details regarding efforts to solicit agency and public concerns and information during scoping, as well as specific concerns to be addressed by this environmental assessment. Representatives of the USBR, PNM, and third party contractors met with, or otherwise advised, interested parties in a series of one-on-one communications and public scoping meetings.

9.1 Record of Public Involvement Activities

Section 10.0 provides a chronology of all attempts made to solicit public and agency comments, suggestions, and concerns.

The following subsections briefly describe the contacts and consultation with various interested parties as they relate to the first draft EA.

9.2 Consultation with Other Federal, State, and Local Agencies

In addition to the written notifications provided to the agencies by USBR, the following agencies were contacted by PNM representatives regarding PNM's request for the original proposed action.

9.2.1 USFWS

USFWS was advised of the proposed action. A meeting was held at PNM's headquarters on October 11, 1994, to discuss the proposed action, any concerns on the part of the USFWS, and specific issues the USFWS wished to have addressed in the environmental assessment. In attendance were: Christine Karas (USBR); Jennifer Fowler-Propst (USFWS); Scott Berger, Jimmy Gonzales, Kathy Maddux, and David Huffman (PNM); Terry Ruitter (PRC); and Jens Deichmann (RSG). Specific recommendations provided by Ms. Fowler-Propst included:

- Include in the section on threatened and endangered species those species listed by the USFWS as candidates for listing (subsequently requested to be deleted by USBR and USFWS).
- Discuss impacts of the proposed alternative and the other alternatives on migratory bird species.
- Discuss impacts of continuing operations at SJGS for an additional 20 years on special status species.
- Identify alternative water supplies, if any.
- Discuss the potential of nonnative fish species located in SJGS storage reservoir to escape to the San Juan River.
- Describe the relationship between the operation of SJGS beyond the current water contract extension date of December 31, 2005, and the operation of the San Juan and La Plata Coal mines beyond that date.

Coordination and discussions are continuing to take place with USFWS.

9.2.2 U.S. Bureau of Indian Affairs (BIA)

Mr. Leo Soukup was contacted by PNM to advise him of the proposed action.

9.2.3 National Park Service (NPS)

NPS was contacted by Scott Berger, PNM, on February 16, 1995 and notified of the proposed action. Jan Schmitt, Environmental Coordinator, stated that the NPS may have an interest in reviewing and commenting on the environmental assessment.

9.2.4 New Mexico Game and Fish Department (NMGFD)

By letter dated January 24, 1995, Terry Ruitter, PRC, advised Mr. Jerry Maracchini, Director NMGFD, of the proposed action and requested information on New Mexico special status species in San Juan County.

9.2.5 San Juan Water Commission

Cindy Murray and Scott Berger of PNM advised Randy Kirkpatrick of the San Juan Water Commission of the proposed action and the scoping meetings being planned.

9.2.6 Native American Tribes

One of the principal concerns of the USBR in preparation of this environmental assessment was the need to address potential impacts of the proposed action on any ITAs. Four tribes were contacted by USBR (Navajo Nation, Jicarilla Apache Nation, Southern Ute Indian Tribe, and the Ute Mountain Ute Indian Tribe) and potential effects of this project on their water rights were discussed. Support for and concurrence of this project was received from each of the tribes during negotiations which resolved specific tribal water right trust issues for those tribes. No other ITA issues were seen as potentially being affected by this project and, therefore, no further consultation was initiated.

9.2.6.1 Water Resources Department, Navajo Nation

A meeting was held on September 16, 1994, at the offices of the Water Resources Department. The attendees were Teresa Showa (Director, Water Resources Management), Michael Johnson and George Roussos (Water Resources Department), Stanley Pollack (Navajo Nation), Cindy Murray and Henry Townsend (PNM), and Jens Deichmann (Resource Science Group [RSG]). The purpose of the meeting was to (1) advise the Navajo Nation representatives of the proposed action, (2) solicit information on concerns the Navajo Nation might have regarding the proposed action and (3) solicit any help the Nation could provide in identifying possible ITAs which should be addressed in the environmental assessment. Issues raised in the meeting relevant to the proposed action (and later referenced in comments provided by the Navajo Department of Water Resources in connection with the previous draft EA of June 1995) included:

- Impact of the water diversion weir on the recent designation of the San Juan River as critical habitat for the Colorado pikeminnow.
- The effect of withdrawal of water from the San Juan River on the already reportedly high concentration of selenium in the river. (It was recognized that the high selenium levels west of the Hogback are due in large part to naturally high levels in the surrounding soils.)
- The impact of PNM's and other non-Native American withdrawals from the river on the ability of the Navajo Nation to withdraw water without affecting the ability of other Indian tribes to do likewise.

No other specific ITAs were identified.

9.2.6.2 Southern Ute Indian Tribe

A meeting was held at the offices of the Southern Ute Energy Resource Division (ERD) on September 23, 1994. In attendance were: Robert Santistevan (Director, ERD); Michael Frost (Director, Environmental Program); John Washington (Natural Resources Division); Janice Sheftel (Maynes, Bradford, Shippo and Sheftel, representing the Southern Ute Tribe); Cindy Murray, David Huffman, and Henry Townsend (PNM); and Jens Deichmann (RSG). The purpose of the meeting was to advise the Southern Ute representatives of the proposed action, and to solicit information on concerns the Southern Utes might have regarding the proposed action and any help the tribe could provide in identifying possible ITAs which should be addressed in the environmental assessment. The only issue raised in the meeting that related to the proposed action was concern over elevated selenium levels in the San Juan River. No ITAs were identified by the Southern Ute representatives as potentially at risk as a result of the proposed action.

9.3 Public Scoping Meetings

Three public scoping meetings were held in the region surrounding the SJGS operations. The meetings were held during the evenings of October 4, 5, and 6, 1994 in Farmington, New Mexico, Shiprock, New Mexico, and Ignacio, Colorado, respectively.

10.0 CHRONOLOGICAL DOCUMENTATION OF CONSULTATION AND COORDINATION ACTIVITIES

Efforts were made to ensure full participation in the scoping process by all interested government agencies, Native American tribes, and the public. USBR or PNM took the following steps to help ensure meaningful input by all potentially interested parties:

August 17, 1994	Meeting of PNM with David Redhorse, USBR-Denver representative regarding USBR ITA policy
August 31, 1994	Initial contact of PNM with Les Taylor, Jicarilla Apache Nation representative
September 12, 1994	Publication of Federal Register Notice (p. 46867) by USBR providing notice of the upcoming scoping meetings in Farmington, New Mexico, Shiprock, New Mexico, and Ignacio, Colorado, and soliciting input to the process
September 13, 1994	Date of press release regarding upcoming scoping meetings to local and regional newspapers and radio stations; agencies; local, state and federal officials; and members of the September 16, 1994 Meeting in Ft. Defiance, Arizona, between representatives of the Navajo Nation Water Resources Department, PNM, and RSG
September 19, 1994	Letter faxed by PNM to Eric Stein, Ute Mountain Ute Tribe representative, advising him of the proposed action and the upcoming scoping meetings
September 23, 1994	Meeting in Ignacio, Colorado, between representatives of the Southern Ute Tribe, PNM, and RSG
October 4, 1994	Public scoping meeting at the City Council Chambers in Farmington, New Mexico
October 5, 1994	Public scoping meeting at the Central Consolidated School Administration Office boardroom in Shiprock, New Mexico
October 6, 1994	Public scoping meeting at the City Hall Community Room in Ignacio, Colorado
October 11, 1994	Meeting between representatives of USBR, USFWS, PNM, PRC, and RSG at PNM headquarters in Albuquerque, New Mexico, to discuss USFWS concerns and requirements regarding the proposed action and its potential impacts on special status species of concern
November 3, 1994	End of 30-day public comment period
January 24, 1995	Letter from Terry Ruiten, PRC, to Jerry Maracchini, Director NMGFD, advising him of the proposed action and requesting information on special status species in San Juan County

February 9, 1995	Letter from Terry Ruitter, PRC, to Marilyn Altenbach, Nature Conservancy, requesting information on plant species of special concern in the vicinity of SJGS
February 16, 1995	Contact by PNM with Jan Schmitt, NPS, to advise of the proposed action
July 1996-July 1999	Numerous discussions between PNM, USBR and Navajo Nation to discuss potential impact to Navajo ITAs and possible mitigation
July 21, 1999	Meeting with USBR, PNM, Jicarilla Apache Nation and Navajo Nation to discuss ITA issues and possible mitigation
September 15, 1999	Meeting with USBR, PNM, Jicarilla Apache Nation and Navajo Nation to discuss ITA issues and possible mitigation
November 1999- June 2000	Discussions with USBR and Jicarilla Apache Nation regarding a PNM/Jicarilla water subcontract
June 30, 2000	Water subcontract approved by Jicarilla Apache Nation
July 17, 2000	Water subcontract signed by PNM and Jicarilla Apache Nation
July 2000- October 2000	Discussions between PNM, USBR, and the Navajo Nation regarding mitigation for potential ITA impacts

11.0 PREVIOUS DRAFT ENVIRONMENTAL ASSESSMENT

The Draft USBR/PNM Water Contract Renewal and Extension Environmental Assessment was issued June 8, 1995. Copies of the DEA were distributed to agencies and individuals. Since that time, the Jicarilla Apache Nation and PNM have developed an agreement for a water subcontract, therefore, the decision was made to reissue the draft EA as it pertains to this subcontract.

12.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES

San Juan Generating Station operates under several environmental protection permits issued by federal and New Mexico agencies. These permits regulate activities related to air and water quality and management of hazardous wastes.

12.1 Air Quality

12.1.1 Current Air Quality Permits

All of the SJGS units operate under revised air quality construction permit 63-M-2 issued by the New Mexico Environment Department in accordance with the New Mexico Air Quality Control Act, Title 74, Article 2 (NMS), the New Mexico Air Quality Standards, and the New Mexico Air Quality Control Regulations. Permit 63-M-2, issued on January 22, 1997, supercedes all previous permits.

12.1.2 Operating Permit Program

SJGS is a major source under the Federal and State Operating Permit Program and requires an operating permit. The operating permit application was submitted to the NMED in June 1995 and the operating permit #P062 was issued on August 12, 1998. The permit must be renewed every five years.

The Operating Permit Program was established by the 1990 Amendments to the Clean Air Act. The intent of the program is to clarify, in a single document, all the air quality requirements that apply to a source. The operating permit enables the source, the regulators, and the public to better understand the requirements to which the source is subject, and whether the source is meeting those requirements. The Operating Permit Program does not impose substantive new regulatory requirements on a source.

12.2 Water Quality

SJGS operates under water quality permits issued by the EPA, Region 6, and the NMED pursuant to the following laws and regulations:

- The Clean Water Act (CWA) (33 U.S.C., Sec. 1251-1387)
- New Mexico Water Quality Control Act, Article 6 (NMS)
- New Mexico Water Quality Control Commission (WQCC) Regulations
- New Mexico Water Quality Standards for Interstate and Intrastate Streams

Two NPDES permits have been issued to SJGS by the EPA pursuant to the CWA. Each permit expires 5 years from the date of issuance, and is renewable upon application. SJGS achieved zero liquid discharge status on May 13, 1983.

<u>permit</u>	<u>permit no.</u>	<u>effective date</u>	<u>expiration date</u>
NPDES Zero Liquid Discharge	NM0028606	6/1/00	5/31/05
NPDES Stormwater (general) (notice of intent to renew filed with EPA; renewal pending EPA approval)	NMR00A056	10/31/98	9/30/00

Permits issued by the NMED allow the operation of a variety of ponds at SJGS.

<u>permit</u>	<u>permit no.</u>	<u>issue date</u>	<u>expiration date</u>
Process Ponds 1 and 3 (renewal pending NMED approval)	DP287	9/2/93	9/1/98
Coal Pile Runoff Basins 1 and 2	DP157	6/11/97	6/11/02
South Evap. Ponds and Process Pond 2 (renewal pending NMED approval)	DP239	11/16/99	11/16/04
Solid Waste Pit Pond (renewal pending NMED approval)	DP306	7/31/95	6/30/00
Coal Pile Runoff Basins 3 and 4	DP176	9/23/97	9/23/02
North Evaporation Ponds	DP143	7/20/98	7/20/03

SJGS complies with all requirements of the listed permits. No compliance issues are outstanding.

12.3 Waste Management

Hazardous wastes generated at SJGS are managed in accordance with requirements of the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. SJGS is classified as a small quantity generator (SQG) because it generates less than 1,000 kilograms of hazardous wastes per month. SJGS has been issued RCRA generator identification number NMD069424323.

Because SJGS is located more than 200 miles from the nearest EPA-permitted treatment, storage, and disposal (TSD) facility, it is permissible under RCRA generator regulations to store hazardous wastes generated at the plant for up to 270 days before shipment. While wastes are accumulated prior to shipment, they are managed in accordance with RCRA generator requirements, including proper record-keeping, inspections, and storage facilities.

Hazardous wastes generated by SJGS include chloride and ignitable, corrosive, and lead-contaminated materials (principally paint and sand-blasting materials).

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LIST OF ACRONYMS

AF	Acre feet
AIRFA	American Indian Religious Freedom Act of 1978
ALP	Animas-La Plata Project
ARPA	Archeological Resources Protection Act of 1979
BC	Brine concentrator
BHP	Broken Hill Proprietary, Ltd.
BLM	United States Bureau of Land Management
CAA	Clean Air Act, as amended
CAAA	Clean Air Act Amendments of 1990
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CRSP	Colorado River Storage Project
CWA	Clean Water Act, as amended
DSM	Demand side management
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERD	Southern Ute Energy Resource Division
ESA	Endangered Species Act of 1973
ESP	Electrostatic precipitator
FGD	Flue gas desulfurization
FSEIS	Final supplemental environmental impact statement
gpm	Gallons per minute
ITA	Indian trust asset
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
M&I	Municipal and industrial
MMBTU	One million British thermal units
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act of 1969

NHPA	National Historic Preservation Act of 1966
NIIP	Navajo Indian Irrigation Project
NMED	New Mexico Environment Department
NMGFD	New Mexico Game and Fish Department
NOV	Notice of violation
NO_x	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
PAH	Polycyclic aromatic hydrocarbon
PNM	Public Service Company of New Mexico
PRC	PRC Environmental Management, Inc.
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RM	River mile
RO	Reverse osmosis
RPA	Reasonable and prudent alternative pursuant to ESA
RSG	Resource Sciences Group
Se	Selenium
SJCC	San Juan Coal Company
SJGS	San Juan Generating Station
SJRRIP	San Juan River Recovery Implementation Program
SO₂	Sulfur dioxide
Special status species	Species given special protection under the ESA
SQG	Small quantity generator
TCP	Traditional cultural property
TDS	Total dissolved solids
TSD	Treatment, storage and disposal facility
TSP	Total suspended particulate
UAMPS	Utah Associated Municipal Power Systems
µg	Microgram
µg/L	Microgram per liter
USBR	United States Bureau of Reclamation

USFWS

United States Fish and Wildlife Service

USGS

United States Geological Survey

WQCC

New Mexico Water Quality Control Commission

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APPENDIX A

**BIOLOGICAL ASSESSMENT
FOR THE
JICARILLA APACHE TRIBE WATER SUBCONTRACT
(Consultation No. 2-22-00-I-469)**

October 2000



United States Department of the Interior

FISH AND WILDLIFE SERVICE
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February 15, 2001

Cons. # 2-22-00-I-469

Memorandum

To: Area Manager, U.S. Bureau of Reclamation, Durango, Colorado

From: Field Supervisor, New Mexico Ecological Services Field Office, Albuquerque, New Mexico

Subject: Endangered Species Consultation on Biological Assessment for the Jicarilla Apache Tribe Water Subcontract

This memorandum responds to your October 11, 2000, request to the U.S. Fish and Wildlife Service (Service) for consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*). A Biological Assessment (BA) was submitted by the Bureau of Reclamation (BOR) for the Jicarilla Apache Tribe Water Subcontract (JATWS) for the use of 16,200 acre feet per year (afy) at the Public Service Company of New Mexico (PNM) San Juan Generating Station (SJGS). This consultation concerns the effects of water depletions on the Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), and the southwestern willow flycatcher (*Empidonax traillii extimus*) and their critical habitat.

Proposed Action Area

The SJGS is located near Waterflow in San Juan County, New Mexico, approximately 15 miles west of Farmington. The point of diversion on the San Juan River is located at river mile (RM) 166.1 as measured by the San Juan River Basin Recovery Implementation Program (SJRBRIP). The existing topography is riverine and rolling short grassland or shrub/grassland.

The SJGS generates electric power for wholesale and retail customers in New Mexico and four other western states. The SJGS is operated by PNM on the behalf of itself; the City of Farmington, NM; Los Alamos County, NM; Utah Associated Municipal Systems; the M-S-R Public Power Agency, a joint agency composed of the Modesto Irrigation District and the cities of Santa Clara and Redding, California; the City of Anaheim, California; Southern California Public Power Authority; Tucson Electric Power Company; and the Tri-State Generation and Transmission Cooperative, Inc.

Proposed Action

The Public Service Company of New Mexico currently leases 16,200 afy stored in Navajo Reservoir from the BOR for use at the SJGS, which is in the San Juan River Basin depletion baseline. However, pursuant to the Jicarilla Apache Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237, allows the tribe to divert up to 40,000 afy from the San Juan River, 25,500 afy of which may be diverted from Navajo Reservoir Supply as it is defined in the Federal Contract. This contract permits the tribe to enter into subcontracts with third parties, which are subject to approval by the Secretary of the Interior.

Conclusions

The amount of water requested under JATWS is for 16,200 afy, which is equal to what BOR had previously supplied to PNM. In the future, the Jicarilla Apache tribe will supply water to PNM and not the BOR. Therefore, this is only a contractual change between the water suppliers and will not change the total depletion. Additionally, the 16,200 afy depletion will not be available to the BOR for the life of the contract, which is January 1, 2006 - December 31, 2027. The Public Service Company of New Mexico depletions will continue to occur in the same manner as current depletions at the SJGS and there will be no revised electricity generation operations as a result of this action.

Based on the information in the BA and additional information received by the U.S. Fish and Wildlife Service (Service), the JATWS will not change depletions in the San Juan Basin. The Service concurs with the BOR determination of "no effect" on the black-footed ferret (*Mustela nigripis*), Mexican spotted owl (*Strix occidentalis lucida*), bald eagle (*Haliaeetus leucocephalus*), Knowlton's cactus (*Pediocactus knowltonii*), Mesa Verde cactus (*Sclerocactus mesae-verdae*) and Mancos milkvetch (*Astragalus humillimus*). The Service also concurs with "may affect, not likely to adversely affect" the southwestern willow flycatcher, Colorado River pikeminnow, and razorback sucker.

This concurrence is based on the commitment of the San Juan Basin Recovery Implementation Program to fund the construction and operation of a selective fish passage at the SJGS weir, BOR's commitment to operation of Navajo Dam in a manner that will mimic the natural hydrograph, and BOR's participation in the SJRBRIP.

Please contact the Service to verify the above determinations and concurrence is still valid if: 1) future surveys find threatened or endangered species in areas where they have not been previously observed; 2) the project is changed or new information reveals effects of the actions to the listed species or their habitat to an extent not considered in the biological assessment; or 3) a new species is listed that may be affected by these projects.

In future communications regarding this memorandum or the proposed project, please refer to Consultation #2-22-00-I-469. If we can be of further assistance, please contact Jude R. Smith of my staff at (505) 346-2525, extension 104.



Joy E. Nicholopoulos

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WCD-EJensen
ENV-6.00

MEMORANDUM

To: Ms. Joy Nicholopoulos, Field Supervisor, US Fish and Wildlife Service, 2105 Osuna NE, Albuquerque, New Mexico 87113

From: Errol Jensen, Chief
Environmental and Planning Group
Four Corners Division *Errol Jensen*

Subject: Biological Assessment for the Jicarilla Apache Tribe Water Subcontract (Consultation No. 2-22-00-1-469)

Pursuant to Section 7 of the Endangered Species Act (ESA), the Bureau of Reclamation (Reclamation), Western Colorado Area Office (WCAO), formerly submits to your office the document, Biological Assessment for the Jicarilla Apache Tribe Water Subcontract (BA). The BA discusses the proposed annual contract for 16,200 acre feet year (afy) from water stored in Navajo Reservoir to be sold by the Jicarilla Apache Tribe (JAT) to the Public Service Company of New Mexico (PNM). Reclamation is the action agency charged with approval of the JAT Water Subcontract, development of NEPA documentation, and compliance with the Endangered Species Act pursuant to the Jicarilla Apache Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237.

Currently, PNM contracts with Reclamation for an equivalent quantity (16,200 afy) of water that is utilized at the PNM San Juan Generating Station (SJGS) for steam generation, pollution control, washdown, and general processing activities. This new proposed contract will replace the contract with Reclamation, and be in effect from January 1, 2006, through December 31, 2027.

The BA evaluates the effects of this new water contract on Threatened and Endangered Species including the bald eagle, southwestern willow flycatcher, Colorado pikeminnow, razorback sucker, Mancos milkvetch, and Mesa Verde cactus. This document concludes that "No changes in operations are proposed for electricity generation that would result in new contact with special status species or affect current use of the SJGS. However, existing depletions that are proposed to continue and the existing weir may affect but are not likely to adversely affect the continued existence of the southwestern willow flycatcher and endangered fish species, and also may affect but are not likely to adversely affect critical habitat for the fish."

Effects of the existing SJGS weir on endangered fish will be ameliorated through the future construction of a selective fish passage. This modification at the weir has been committed to by the San Juan River Basin Recovery Implementation Program (SJRBRIP) which will provide funding, manage construction, and fund long-term operations at the passage. PNM has cooperatively participated in the weir modification through providing permission for utilization of the weir site for the SJRBRIP, and providing funding for the design of the selective fish passage. Reclamation will be the action agency for developing NEPA documentation and compliance with ESA for the weir project.

Reclamation concludes that this proposed new water contract is not likely to adversely affect the continued existence of the endangered birds and fish, and not likely to adversely affect critical habitat for the endangered fish. Reclamation has committed to operate Navajo Dam to mimic the natural hydrograph and provide flows to benefit the endangered fish, and the SJRBRIP has committed to construct and operate a selective fish passage at the SJGS weir. Please provide us with a concurrence letter if you agree with these conclusions.

If you have any questions or need additional information in regard to this subcontract, please contact RobWaldman in Durango at (970) 385-6567.

cc: Matt Lavery
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Area Manager, Grand Junction CO

**BIOLOGICAL ASSESSMENT
FOR THE
JICARILLA APACHE TRIBE
WATER SUBCONTRACT**

**prepared for
U.S. Bureau of Reclamation
Western Colorado Area Office**

**prepared by
Gannett Fleming, Inc.
Denver, CO**

October 2000

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APPENDIX A: Endangered Species List for NM, April 10, 2000

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BIOLOGICAL ASSESSMENT
JICARILLA APACHE TRIBE WATER SUBCONTRACT
October 2000

1.0 INTRODUCTION

This biological assessment was prepared pursuant to Section 7 of the Endangered Species Act of 1973, as amended (ESA). The U.S. United States Fish and Wildlife Service (USFWS) provided a list on April 10, 2000 of endangered, threatened, and candidate species that may be present in the area affected by a proposed subcontract for water between the Jicarilla Apache Tribe and Public Service Company of New Mexico (PNM) in San Juan County, New Mexico, for operation of the San Juan Generating Station (SJGS).

SJGS currently obtains 16,200 acre-feet (AF) of its existing water supply annually from Navajo Reservoir through a contract (USBR Contract) with the United States Bureau of Reclamation (USBR) from Navajo Reservoir (USBR Contract). PNM had initially requested USBR to renew and extend the USBR Contract upon its expiration on December 31, 2005. In connection with the Section 7 Consultation for the USBR Contract pursuant to the Endangered Species Act, the Jicarilla Apache Tribe requested that the United States Fish & Wildlife Service include the Tribe in the consultation pursuant to Secretarial Order 3206. At that juncture, PNM began discussions with the Jicarilla Apache Tribe for an alternative water supply to the USBR Contract.

Pursuant to the Jicarilla Apache Water Rights Settlement Act of October 23, 1992, 106 Stat. 2237, the Jicarilla Apache Tribe and the United States entered into a contract dated December 8, 1992, (the Federal Contract) permitting the Jicarilla Apache Tribe to divert up to 40,000 AF of water per year from the San Juan River, 25,500 AF of which may be depleted from the Navajo Reservoir Supply as it is defined in the Federal Contract (Jicarilla Contract Rights from Navajo Reservoir). The Federal Contract permits the Jicarilla Apache Tribe to enter into subcontracts with third parties, subject to the approval of the Secretary of the Interior.

PNM proposes to enter into a subcontract with the Jicarilla Apache Tribe (Jicarilla Water Subcontract) for 16,200 AF of Jicarilla Apache Tribe Contract Rights annually from Navajo Reservoir on terms mutually agreed to by the parties for a term beginning January 1, 2006 and ending December 31, 20227. The USBR will be the action agency charged with approval of the Jicarilla Water Subcontract for the U.S. Department of the Interior. The Jicarilla Water Subcontract will allow PNM to continue to withdraw 16,200 AF of water annually from the San Juan River for consumptive use in steam production, cooling, pollution control, washdown, and general processes. This biological assessment will evaluate the potential effects of the Jicarilla Water Subcontract on listed threatened and endangered species identified April 10, 2000, and their habitat.

2.0 PROJECT LOCATION AND DESCRIPTION

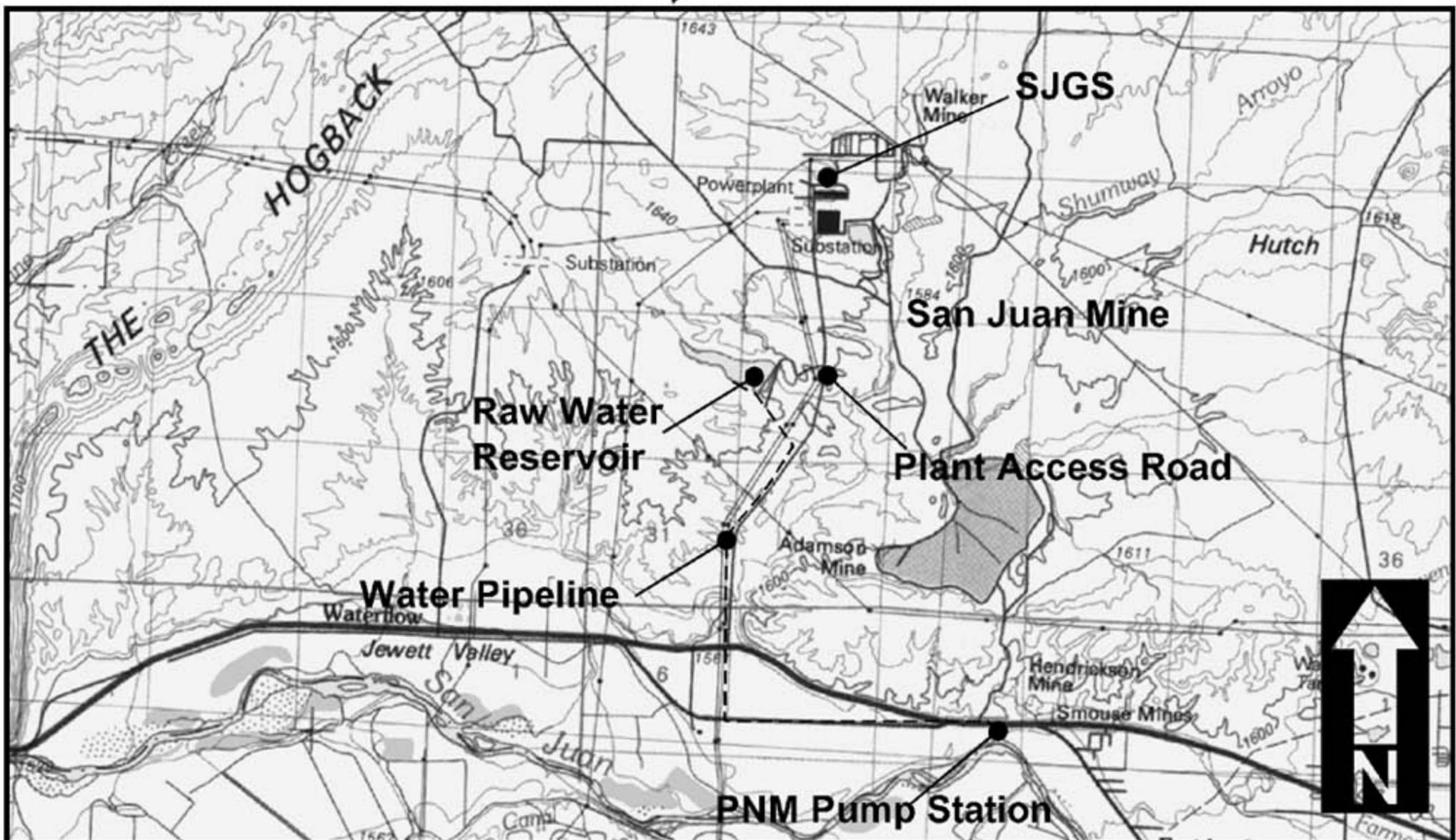
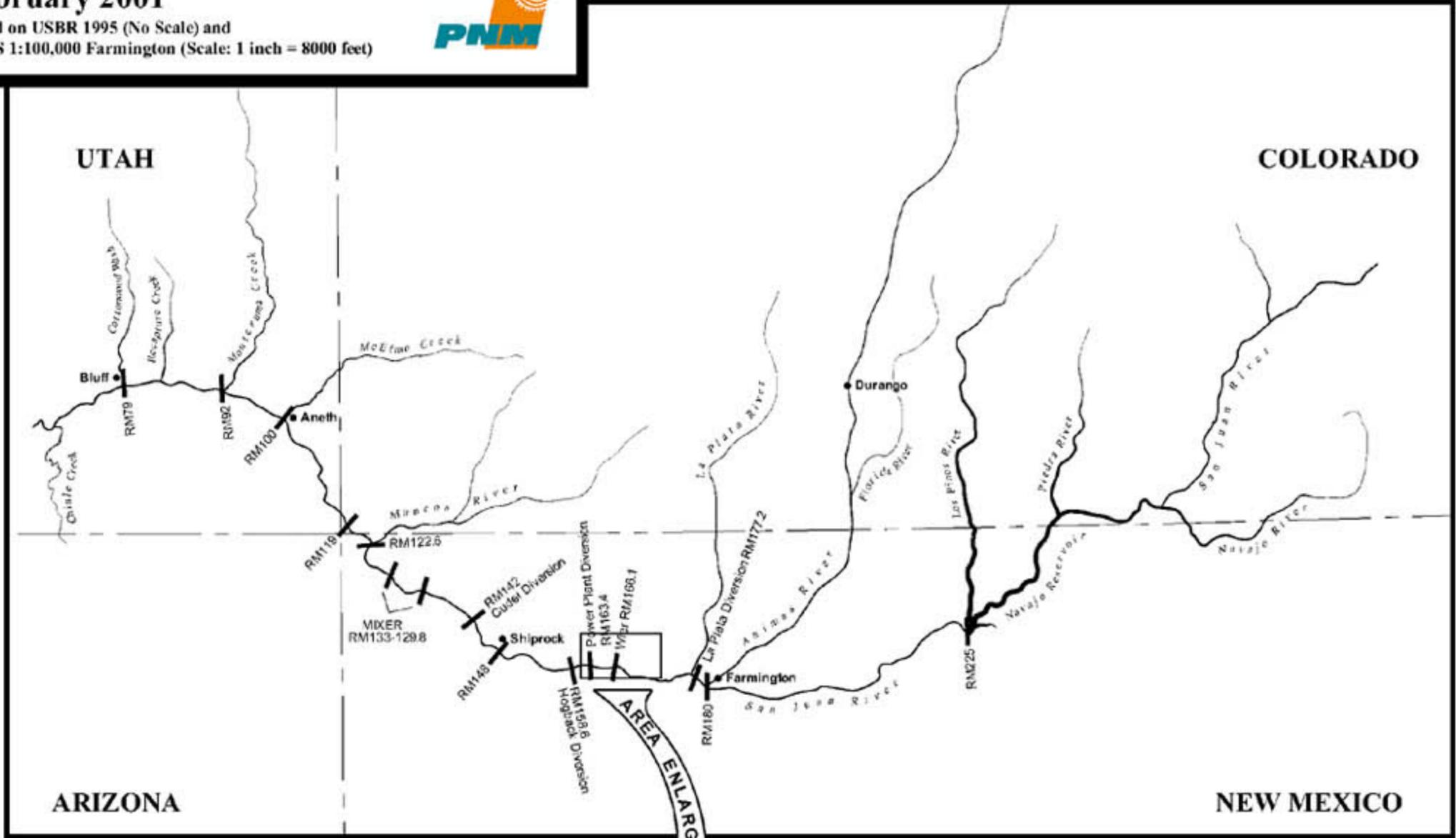
The SJGS is located near Waterflow in San Juan County, New Mexico, approximately 15 miles west of Farmington in rolling short grassland or shrub/grassland. The withdrawal point on the San Juan River is a weir and pump station located at river mile (RM) 166.1, as measured by the San Juan River Basin Recovery Implementation Program (SJRBRIP) for endangered fish in the river (Figure 1), in the southwest quarter of the southwest quarter of section 3, township 29 north, range 15 west. The SJRBRIP is intended to provide the basis for recovery of the endangered fishes of the San Juan River, the Colorado pikeminnow and razorback sucker (USFWS 1994a). The SJGS generates electrical power for wholesale and retail customers in New Mexico and four

FIGURE 1

Regional Maps

February 2001

Based on USBR 1995 (No Scale) and
USGS 1:100,000 Farmington (Scale: 1 inch = 8000 feet)



other western states. The generating station is operated by PNM on behalf of itself and eight other owners. These other owners are the City of Farmington, New Mexico; Los Alamos County, New Mexico; Utah Associated Municipal Power Systems; the M-S-R Public Power Agency, a joint agency composed of the Modesto Irrigation District and the cities of Santa Clara and Redding, California; the City of Anaheim, California; Southern California Public Power Authority; Tucson Electric Power Company; and Tri-State Generation and Transmission Cooperative, Inc. The continued production of electricity by PNM for these entities requires a dependable supply of water.

The SJGS currently obtains 16,200 AF of its existing water supply annually from Navajo Reservoir through a contract with USBR. The amount of water requested under the Jicarilla Water Subcontract is the same as is provided by the existing USBR Contract, 16,200 AF per year. The 16,200 AF that is in the San Juan River Basin depletion baseline for the water service contract that now exists between PNM and USBR will be used for the Jicarilla Water Subcontract between PNM and the Jicarilla Apache Tribe during the life of the Jicarilla Water Subcontract. The 16,200 AF baseline depletion will not be available for USBR to use during the life of the Jicarilla Water Subcontract. Furthermore, PNM's depletions will continue to occur in the same manner as current depletions by the SJGS at its weir. The only difference will be that the Jicarilla Apache Tribe, and not USBR, will be acting as the supplier of the water for those depletions.

PNM has requested the Jicarilla Water Subcontract now to ensure the availability of water for SJGS through its contractual commitments. No revised electricity generation operations are part of the proposed action. The location and method of depletions will not change from current operations. The proposed action will, however, include additional project commitments designed to support the recovery of two endangered fish species in the San Juan River Basin. In conjunction with the proposed action, PNM has proposed modification of its weir across the San Juan River to allow Connected with this action is a commitment on the part of the SJRBRIP to fund the construction and operation of a selective fish passage at the SJGS weir. PNM has agreed to allow the SJRBRIP to utilize the weir and has provided funding for design of the fish passage. Specific design criteria have been approved by the SJRBRIP Biology Committee specified a. The selective passage system to be operated for the life of the recovery program. The Biology Committee has recommended operation of the fish passage will be operated from March through October every year annually (Pfeifer 2000). USBR provided support for compliance with NEPA and ESA for the fish passage project.

PNM will continue its policy of training all employees in environmental law, regulations, and requirements. PNM also will continue its prohibition of the possession or use of privately owned firearms on any of its facilities.

SJGS currently uses water obtained under two separate contracts: one with the USBR for 16,200 AF annually and one with Utah International Inc. (now Broken Hill Proprietary Ltd. [BHP]) for 8,000 AF of San Juan River water under New Mexico State Water Permit 2838. The BHP agreement is effective as long as the four units of SJGS are in operation and requires consumption of the 16,200 annual AF of USBR prior to use of the BHP water. Although SJGS has not required the total 24,200 AF available so far, it has used most or all of the 16,200 annual AF of USBR water over the last 10 years. With current and rising capacity factors, PNM expects to require all of the water from the Jicarilla Water Subcontract as well as BHP water.

The weir and pump station are located approximately 3 miles from the SJGS on the San Juan River. The weir is a broad concrete structure that extends from shore to shore across the river. During high water flow in the river (over 8,000 cubic feet per second [cfs]) there is bypass flow around the south side of the weir. Water has been diverted for use at SJGS continuously since 1973.

The weir is 3.5 feet high in the middle where water is spilled into a stilling basin created by a concrete apron between the weir and a 1-foot retaining wall 32 feet downstream. The stilling basin is the width of the river. The presence of the basin results in a maximum 2.5 feet that must be ascended in order for fish to go over the weir. As flows increase, the difference in water levels is reduced. For example, with flows of approximately 1,000 cfs the depth of the basin is 2 feet, reducing the height difference to 1.5 feet. Higher flows reduce the height difference, although the water velocity also increases (see Figure 2). The weir provides an unquantified impediment to upstream fish movement. Studies conducted as part of the SJRRIP have shown that some fish are able to move upstream past the weir but their specific method of movement is not known and the number of fish dissuaded/dissuade from upstream movement by the presence of the weir is not known. There is also a sluice tunnel 4 feet by 6 feet in the weir (north side of river). This tunnel is used to sluice the inlet structure of sediment. Normal operation is to have the sluice gate open 8 to 12 inches.

Trash screens and isolation gates are located at the point of diversion. A concrete channel approximately 490 feet long delivers diverted river water to the pump house or returns it to the river. Water to be used by SJGS moves from the concrete channel through traveling nonimpingement screens to three pumps capable in combination of pumping a maximum of 17,000 gallons per minute (37 cfs) to a 110-acre storage reservoir. From the storage reservoir, the water is pumped to SJGS. A polymer storage and feed system at the pump station feeds high molecular polymer to the pump discharge line to improve settlement of suspended solids in the reservoir during periods of high turbidity.

SJGS will continue to operate as a zero liquid discharge facility, as it has since 1983. Wastewater streams are collected, treated, and reused in various SJGS water systems. The wastewater treatment system at SJGS treats approximately 1 billion gallons (3,000 AF) of wastewater annually. When water can no longer be treated to allow its continued use, it is routed to solar evaporation ponds.

3.0 DISCUSSION OF THREATENED AND ENDANGERED SPECIES

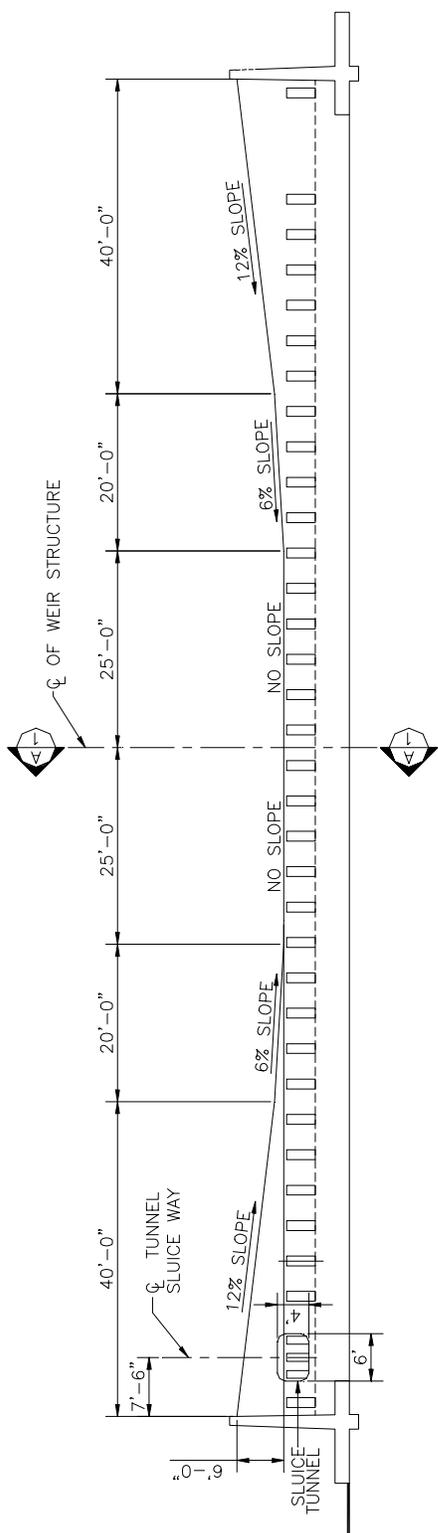
The species identified as endangered or threatened addressed in this biological assessment include the bald eagle (*Haliaeetus leucocephalus*), southwestern willow flycatcher (*Empidonax traillii extimus*), Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), Mancos milkvetch (*Astragalus humillimus*), and Mesa Verde cactus (*Sclerocactus mesae-verdae*). Threatened and endangered species addressed in this biological assessment, and the status of each species, are listed in Table 1. The species listed are based on the April 10, 2000 listing from the USFWS (Appendix A).

3.1 SPECIES NOT EVALUATED IN DETAIL

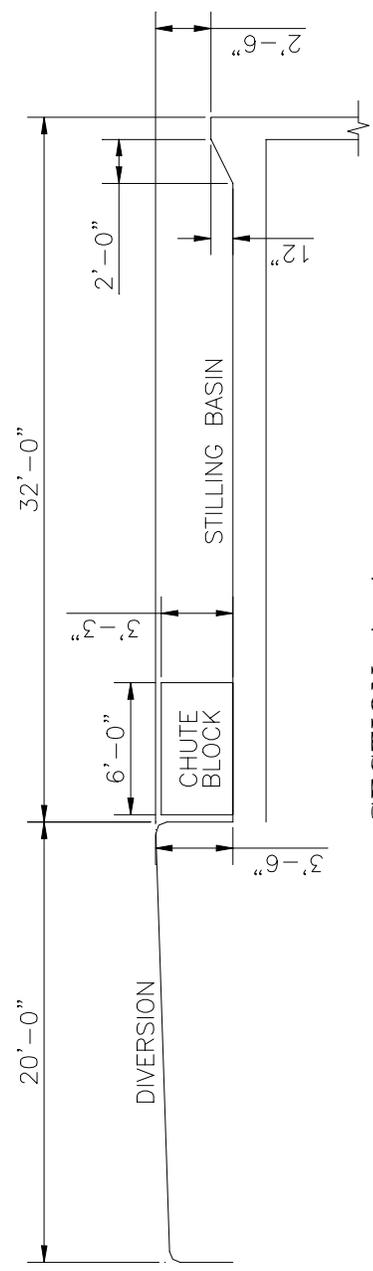
Several special status species would not be affected by continued operation of the SJGS, therefore, they have not been evaluated in detail. These species include the black-footed ferret, Mexican spotted owl, and Knowlton's cactus.

The black-footed ferret's (*Mustela nigripes*) presence is associated with prairie dog colonies. No prairie dog colonies are located at SJGS. The nearest colony is a mile from SJGS. The colony has been surveyed for black-footed ferrets by both PNM and BHP (BHP 1992). No ferrets were

Insert Figure 2 here



SECTION OF WEIR
N.T.S.



SECTION A-A
SCALE: 1/8" = 1'-0"

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PNM PUBLIC SERVICE COMPANY OF NEW MEXICO

WEIR SECTIONS
SAN JUAN GENERATING STATION

DR: JWD	DATE: 03/03/99	WEIR-03
ACAD- WEIR03	APP:	

FIGURE 4

TABLE 1

**FEDERAL THREATENED AND ENDANGERED SPECIES
EVALUATED IN THE
JICARILLA WATER SUBCONTRACT
BIOLOGICAL ASSESSMENT**

<u>common name</u>	<u>scientific name</u>	¹ <u>status</u>
Bald eagle	<i>Haliaeetus leucocephalus</i>	T
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E
Razorback sucker	<i>Xyrauchen texanus</i>	E
Mesa Verde cactus	<i>Sclerocactus mesae-verdae</i>	T
Mancos milkvetch	<i>Astragalus humillimus</i>	E

¹E federal endangered

T federal threatened

observed in either survey. Therefore, the proposed Jicarilla Water Subcontract would have no effect on the black-footed ferret.

The Mexican spotted owl (*Strix occidentalis lucida*) was listed as threatened by the USFWS on March 6, 1993, and critical habitat was designated on December 7, 1994. The SJGS is not located in any of the areas identified as critical habitat for the owl in New Mexico. In addition, the SJGS is located in a region of open grasslands and shrublands and is not near forests, woodlands, or cool canyons required by the species. Therefore, the proposed Jicarilla/PNM Water Subcontract would have no effect on the Mexican spotted owl.

The known populations of Knowlton's cactus (*Pediocactus knowltonii*) are located well east of SJGS. PNM surveyed SJGS during the spring of 1994 for the cactus and found none. In addition, no new ground-disturbing activities are included in the proposed action. Therefore, the proposed Jicarilla Water Subcontract would have no effect on Knowlton's cactus.

3.2 LISTED SPECIES

3.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles were classified as endangered in 43 of the 48 contiguous United States on February 14, 1978. Bald eagles in Minnesota, Wisconsin, Michigan, Oregon, and Washington were classified as threatened on the same date (USFWS 1982). Their status was improved to threatened throughout the lower 48 United States on July 12, 1995. Bald eagles in Alaska and Canada are not considered to be threatened or endangered.

3.2.1.1 Distribution and Abundance

The historic range of the bald eagle was Alaska to southeastern Quebec and Newfoundland and south to Baja California, Arizona, New Mexico, and Texas to Florida (Terres 1980). The 1978 listing of the bald eagle was based on significant population declines resulting from habitat destruction (including felling of nesting or roosting trees), reproductive impairment from exposure to pesticides and heavy metals, collisions with high tension power lines, shooting, and human encroachment. Banning of DDT and related pesticides has been instrumental in the recovery of the eagle (Ehrlich et al. 1992). Eagle populations have increased significantly in the past 15 years to the point where the USFWS downlisted its status from endangered to threatened in the United States.

The bald eagle was reported in New Mexico by early recorders. At the time the southwestern bald eagle recovery plan was developed, no bald eagle nests were known to exist in the state. Bald eagles currently winter in small numbers in northwestern New Mexico and along the San Juan River (BIA 1999; USBR 2000). Overwintering bald eagles arrive in mid-November and leave by late March or early April. Overwintering bald eagles concentrate at reservoirs and along streams.

3.2.1.2 Life History

Bald eagles in central Arizona occupy home ranges larger than 2 miles by 0.5 mile along a river adjacent to their nest sites, although individual use patterns by each pair result in variations in home ranges. Nests are located in trees, on cliffs, or on pinnacles. Nest sites generally command a view, with shade and exposure apparently having significant roles in nest site selection. Proximity to water is also important (USFWS 1982).

Bald eagles are large raptors ranging in body length from 34 to 43 inches with a 6 to 7.5 foot wingspread. The adult has a white head and tail; brownish-black body; yellow bill, eyes, and feet; and unfeathered legs (Terres 1980).

Breeding bald eagles in the southwestern United States (as represented by central Arizona) usually begin nesting activities during November and December. Nest building or refurbishing continues into January. Eggs are laid from January to March and hatch from February to April. Eaglets usually spend 10 to 12 weeks on the nest prior to fledging and remain in their parent's home range another 4 to 6 weeks prior to dispersing (USFWS 1982). Individuals in captivity have lived to 48 years (Terres 1980).

The bald eagle in this area primarily eats carrion. It also eats fish, crippled waterfowl, muskrats, squirrels, rabbits, and snakes (Terres 1980).

3.2.1.3 Impacts of the Proposed Action

Bald eagle use of the area around the SJGS is not expected to be great even during the winter. The San Juan River in the vicinity of the weir and the storage reservoir may provide fishing habitat. Riparian vegetation at the weir is not likely to provide adequate perches for foraging, shade, or roosting. Individual trees along the San Juan River could provide nest or roosting locations. A cliff near the upper end of the reservoir could provide perches. No site features are currently known to be used by bald eagles, although the presence of the storage reservoir presents a desirable feature for the species. Continued operations at the SJGS would not change to increase the potential for contact with eagles. Personal firearms will continue to be banned from the SJGS and all PNM facilities. If bald eagles are observed using the SJGS area, PNM will notify USFWS immediately. The Jicarilla Water Subcontract would not affect the continued existence of the bald eagle.

3.2.2 Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered by the USFWS on February 27, 1995 (USFWS 1995). Final designation of critical habitat was July 22, 1997.

3.2.2.1 Distribution and Abundance

The southwestern willow flycatcher is one of four subspecies of the willow flycatcher. Its breeding range includes southern California, Arizona, New Mexico, extreme southern portions of Nevada and Utah, and western Texas. It may also breed in southwestern Colorado and Baja California. It is thought to winter in Mexico, Central America, and northern South America. Although there is no trend to clearly define the reasons, the population numbers of the southwestern willow flycatcher are clearly much smaller than 50 years ago (USFWS 1993a). Extensive habitat loss and invasion of the brown-headed cowbird are the principal causes of the population decline of the southwestern willow flycatcher (Ehrlich et al. 1992).

In 1997 and 1998, willow flycatcher surveys were conducted within selected San Juan River riparian areas from Navajo Dam to the confluence of Lake Powell. These presence/absence surveys identified numerous singing male willow flycatchers, including 12 to 14 in 1997 and 21 in 1998 within the New Mexico portion of the river. These willow flycatchers were identified during the first and second survey periods and, therefore, could not be identified to subspecies level. Most significantly, in 1998, 4 to 5 adult and 4 to 5 fledged southwestern willow flycatchers were confirmed during the third survey period. The breeding southwestern willow flycatchers and their nests were found several miles downstream of Shiprock, New Mexico near the Malpais Arroyo on the Navajo Reservation (Ecosphere 1999). No surveys were conducted near the PNM weir in 1997 or 1998. An additional survey was conducted on the San Juan River in 1999 according to USFWS protocols that included the SJGS intake area. No flycatchers were observed near the SJGS property. Overall, the area was determined to have poor to marginal nesting habitat (Ecosphere 2000).

3.2.2.2 Life History

The southwestern willow flycatcher is approximately 5.75 inches long. It has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. It has two wingbars with a faint or absent eye ring. The upper mandible is dark and the lower mandible is light (USFWS 1993a).

The southwestern willow flycatcher occurs in riparian habitats along rivers, streams, or other wetlands. The habitat in these areas consists of dense growths of willows. Arrowweed, tamarisk, Russian olives, or other plants are present, often with a scattered overstory of cottonwoods. The flycatcher uses these riparian communities for both nesting and foraging. Throughout the range of the southwestern willow flycatcher, these riparian habitats tend to be rare, small or linear, and separated by large areas of arid land (USFWS 1993a).

The southwestern willow flycatcher invariably nests near surface water in late May or early June. The plant community of the nest site is a thicket of trees and shrubs that are even-aged, dense, and structurally homogeneous, ranging from 13 to 23 feet tall. The nest is a compact cup of fiber, bark, and grass, typically rimmed with feathers and lined with a layer of grass or silky plant material constructed in a fork or on a horizontal branch of a medium-sized bush or small tree. Three or four eggs are laid at 1-day intervals and incubation begins when the clutch is complete. The female incubates the eggs approximately 12 days. The young flycatchers fledge approximately 13 days after hatching. One brood is typically raised per year (USFWS 1993a).

The southwestern willow flycatcher is an insectivore. It takes insects from the wing as well as from foliage, and forages in and around dense riparian vegetation (USFWS 1993a).

3.2.2.3 Impacts of the Proposed Action

The pump station is located in an area that could provide possible habitat for the southwestern willow flycatcher, although it is narrow and less dense than the preferred habitat. Surveys for southwestern willow flycatchers during the 1999 season did not result in any observations of flycatchers in the vicinity of SJGS. The Jicarilla Water Subcontract, although continuing to deplete flow in the San Juan River, would not be expected to affect willow flycatchers or wetland/riparian habitats. The volume of water depleted from the river is expected to be offset by reoperation/modified operation of Navajo Dam to more closely mimic natural flow patterns. The USBR has committed to operation of the reservoir to mimic the natural hydrograph through past consultations with the USFWS. Furthermore, the flow recommendations of the SJRBRIP including its assumptions that the historic/existing depletion amount by PNM will not affect the flow recommendations formulated for recovery from being met. Implementation of the flow recommendations of the SJRBRIP will result in reduced or increased flows from those that have been implemented since the construction of Navajo Dam. Although the Jicarilla Apache tribe is on record disputing some depletion figures used in the underlying hydrologic modeling for the SJRBRIP flow recommendations, the Jicarilla Apache tribe supports the flow recommendations and has not challenged the validity of the historic/existing PNM depletion. A more natural flow regime would provide conditions for natural vegetative recruitment within the riparian zone and would recharge needed groundwater upslope of the river that is used by older stands of riparian vegetation. Therefore, the Jicarilla Water Subcontract may affect but is not likely to adversely affect the southwestern willow flycatcher.

In April 1999, the SJRBRIP formally recommended that a selective fish passage be constructed near the SJGS weir to allow for the movement of native fishes, including the federally protected Colorado pikeminnow and razorback sucker, to move upstream past the weir. The selective fish passageway under the SJRBRIP will be designed and constructed in such a manner to avoid or minimize effects to possible breeding southwestern willow flycatchers or their habitat. Based on the proposed methods to avoid breeding birds and their habitat, as well as the operation of Navajo Reservoir to mimic a natural

hydrograph, the Jicarilla Water Subcontract may affect, but is not likely to adversely affect the southwestern willow flycatcher.

3.2.3 Colorado Pikeminnow (*Ptychocheilus lucius*)

The Colorado pikeminnow (formerly known as Colorado squawfish) was listed as endangered by the USFWS on March 11, 1967. Critical habitat was designated March 21, 1994 (USFWS 1994a). Much of the current literature and status of the Colorado pikeminnow was compiled by the USBR (1995) and that compilation is used to a large degree in this biological assessment.

3.2.3.1 San Juan River Recovery Implementation Program

The USBR agreed to fund in part a 7-year research program and develop a recovery implementation program for the endangered fish of the San Juan River as a result of the October 25, 1991, biological opinion on the Animas-La Plata Project. A memorandum of understanding was signed on October 24, 1991 by USFWS, USBR, the Bureau of Indian Affairs (BIA), the states of New Mexico and Colorado, the Ute Mountain Ute Tribe, the Southern Ute Indian Tribe, and the Jicarilla Apache Tribe to set forth certain agreements and establish the San Juan River Basin Recovery Implementation Program (SJRBRIP). The SJRBRIP is intended to provide the basis for recovery of the endangered fishes of the San Juan River, the Colorado pikeminnow and razorback sucker (USFWS 1994a).

The research program focused on biological responses of endangered fish to habitat conditions resulting from test flows from Navajo Dam. Based on the results of the research program, the SJRBRIP has recommended specific flow requirements to USBR and USFWS. The USBR has agreed to modify the operation of Navajo Dam to provide a more natural hydrograph if the research demonstrated such a hydrograph is beneficial to the recovery of the endangered fish. If specified habitat and flow requirements cannot be provided by Navajo Dam operations, additional sources of water to meet those requirements will be identified case-by-case.

Flow recommendations have been developed with the intent of mimicking the natural hydrograph of the San Juan River that existed prior to construction and operation of Navajo Dam. The general appearance of the natural annual hydrograph is low winter flows that increase through the spring to peak between mid May and mid June and fall off rapidly through late June and July to return to low flows through the winter. Flow spikes occur throughout the summer and fall as a result of local thunderstorms. The 7-year research program has evaluated the effects of flows and variations in hydrographs on habitat condition and availability. The results of the study indicate a variety of flow regimes is required to provide and maintain the variety of habitats required by Colorado pikeminnows over their lives. The flow recommendations include variations in peak flow, the ascending and descending limbs of the hydrograph around the peak, and the duration of high flows. Unregulated parts of the San Juan River basin (most notably the Animas River) and summer thunderstorms provide natural variation to regulated flow regimes. While the 7-year research program identified the need for certain levels of flow at specific times of the year to allow development of habitat, the flow recommendations are based on historic flows and the periodic recurrence of those flows.

Critical habitat was designated for four Colorado River basin fishes on March 21, 1994. The San Juan River provides critical habitat for the Colorado pikeminnow from Lake Powell to Farmington at the New Mexico Route 371 bridge. Critical habitat designation is primarily intended to identify the habitat needed for survival and recovery. The designation of critical habitat in an area can result in additional protection for that area through administration of Section 7 of the ESA (USFWS 1993c). The SJGS weir is above the Hogback diversion and below Farmington. As the critical habitat designation was written, existing withdrawals from the San Juan River by SJGS are included in the baseline flow projections for critical habitat (USFWS 1994).

3.2.3.2 Distribution and Abundance

The Colorado pikeminnow is the largest of the four members of the genus *Ptychocheilus* and is the largest member of the minnow family (Cyprinidae) native to North America. Although the Colorado pikeminnow was once abundant throughout the Colorado River basin, it is now restricted to the upper basin of the river (Jordan and Evermann 1902, USFWS 1994a). Factors suspected to be responsible for the decline of the species include alteration of natural streamflows and temperature regimes, habitat fragmentation and loss, water quality, and the introduction of nonnative fish species. The species occurs in the Colorado mainstem, Green, Yampa, White, Gunnison, Duchesne, and San Juan River basins of the upper Colorado River basin (USBR 1995).

In the San Juan River basin, the historic distribution of Colorado pikeminnow included the entire mainstem San Juan River to the area now occupied by Navajo Reservoir in New Mexico, and probably the Animas River to approximately Durango, Colorado. Seasonal use of small tributaries was likely. A small population has persisted in the San Juan River since the closure of Navajo Dam in 1962. Preliminary information from recent research indicates the Colorado pikeminnow is reproducing and recruiting in the San Juan River to some degree (USBR 1995).

Because the population of Colorado pikeminnow in the San Juan River is so small, it is difficult to evaluate habitat use, especially for young fish. In order to provide the fish for a habitat use study, 100,000 young-of-year Colorado pikeminnow were released in the San Juan River in 1996, an additional 116,878 were released in 1997, and 10,571 were released in 1998. Young fish used a variety of low velocity habitats (Holden and Masslich 1997; SJRBRIP Biology Committee 1999, Archer et al. 2000).

In addition, adult Colorado pikeminnow were released in the San Juan River in 1997. These fish included several with radio tags. Survival does not appear as high as with the young, although some fish seem to be surviving in the habitats available in the San Juan River (Ryden 1998).

3.2.3.3 Life History

The Colorado pikeminnow is a streamlined riverine fish. It can reach a length of 6 feet. Fish that are 6 feet long are estimated to be more than 50 years old. Colorado pikeminnow reach 100 to 200 millimeters (mm) in total length in their second or third year of life (Holden and Masslich 1997). The fish is characterized by very small scales and a large terminal mouth (Page and Burr 1991, Tyus 1991).

The Colorado pikeminnow evolved in the Colorado River system and is adapted to seasonally variable flows, high silt loads and turbulence, low food bases, and changing riverine systems. The fish uses a variety of habitats during different stages of its life history. It evolved as a top predator in the Colorado River system and probably preyed on all of the native fishes in the system. Young Colorado pikeminnows may have been preyed on by native chubs; however, cannibalism of young fish by larger pikeminnows probably also occurred (USBR 1995). In addition to fish, Colorado pikeminnows may consume Mormon crickets, mice, birds, and rabbits (Tyus 1991).

Adult fish have been observed to migrate 100 kilometers or more to spawn. Adult fish are 400 mm long and larger. The large size may be necessary to provide an energy base to make long distance migrations. Pikeminnows exhibit fidelity to specific spawning reaches. The lack of apparently suitable spawning substrates does not appear limiting in the Green River. Spawning behavior may be cued by a combination of flow spikes, water temperatures, and photoperiod (SJRBRIP Biology Committee 1999) Pikeminnows remain in deep pools or eddies, then move abruptly to cobble to spawn, then return to the pools or eddies. Spawning grounds for pikeminnows have been difficult to identify because the fish are so rare (Tyus 1991). Colorado pikeminnow may have historically spawned in upstream or downstream reaches now disconnected by dams (SJRBRIP Biology Committee 1999).

Colorado pikeminnows hatch in 3.5 to 6 days at 20 to 22 degrees Celsius and emerge from the cobble soon after hatching. Young fish seem to look for warmer and more productive habitats as they grow (Tyus 1991, SJRBRIP Biology Committee 1999).

3.2.3.4 Impacts of the Proposed Action

The 7-year research program identified the SJGS weir as probably the most significant impediment to fish movement upstream on the San Juan River (Ryden and Pfeifer 1994). Results from the 7-year study indicate the weir may bar access in particular to potential Colorado pikeminnow spawning and nursery areas. The amount of impediment has not been quantified.

Because Colorado pikeminnows are so rare in the San Juan River, the 7-year research program has used other native fish species, primarily flannelmouth suckers (*Catostomus latipinnis*) and bluehead suckers (*C. discobolus*) as surrogates for research on the endangered species. These species evolved in the San Juan River together and are adapted to the flow patterns and silt loads of the river. They are all main channel fishes. To determine whether the SJGS weir is a complete barrier to fish movement, USFWS tagged fish collected between Farmington and downstream of Cudei diversion. Fish collected above the SJGS weir were marked with yellow tags and those collected below the SJGS weir received red tags. The location, tag numbers and fish lengths and weights were recorded. When tagged fish were collected during subsequent sampling trips, the location, tag number, and fish length and weight were again recorded. Comparisons were then made between the original tagging and recapture information to determine whether the fish had moved and in what direction. Ten flannelmouth suckers tagged below the SJGS weir were recaptured above the weir in subsequent sampling. It is not known whether these fish moved around the weir in the intake channel, moved through the sluice channel in the weir itself, or moved over the top of the weir during high water. Although the weir obstructs some movement of fish, an unquantifiable number of fish are able to move past the weir to upstream reaches of the San Juan River.

In an additional sampling effort, PNM personnel set a cage at the upstream end of the sluice channel in the weir. After opening the gate on the channel 18 inches for 1 hour, the gate was closed and the trap removed from the water. Forty-eight flannelmouth suckers had been collected, indicating that the sluice channel can provide a route through the weir for native fish movement upstream under at least some operational conditions. Reoperation of the sluice channel could provide a method of additional access for fish upstream.

The primary issue with the Jicarilla Water Subcontract is the continuation of impaired fish passage upstream by continued operation of the SJGS weir. Construction of a limited access fish passage is expected to improve fish access to upstream habitat. The SJRBRIP Biology Committee recommended and the SJRBRIP Coordination Committee approved construction of a selective fish passage around the weir in October 1999 and construction is currently scheduled for FY2001.

In order to expedite the evaluation and construction process, USBR will work with PNM and the SJRBRIP on the weir modification to be undertaken by the SJRBRIP. PNM proposes implementation of a 5-step process involving: 1) analysis of fish passage technologies; 2) engineering design of the preferred fish passage; 3) identification of funding options for construction; 4) permitting and construction; and 5) post-construction study. The passage technology analysis was initiated in 1999 and the draft report was provided in June 2000 (Norman 2000). The Biology Committee of the SJRBRIP reviewed the draft report and recommended a particular structure to the Coordination Committee of the SJRBRIP. The design incorporates selective passage adjacent to PNM's operations at the weir (Pfeifer 2000).

The possibility that PNM's annual withdrawal of water could possibly result in increased concentrations of selenium in the San Juan River downstream from the SJGS weir was evaluated. The subcontract is not

expected to result in selenium concentrations that exceed levels of concern for aquatic life. The likelihood of impacts from the withdrawals was evaluated, using empirical data and three assumptions:

1. Flow in the San Juan River above the SJGS weir equals the flow in the San Juan River at Farmington below the Animas River plus the flow in the La Plata River at Farmington.
2. Net inflow to the San Juan River between the SJGS weir and Shiprock includes groundwater inflow and discharge, irrigation return flows, Chaco Wash and other tributary inflows, and other inflows and discharges (calculated using the law of conservation of mass to equal 26,000 AF per year).
3. There is no exchange between the dissolved selenium in the water and selenium in sediments (calculated using the law of conservation mass).

Based on USGS studies of chemical concentrations in the San Juan River (Blanchard et al. 1993), the average selenium concentration upstream from the SJGS weir at a sampling location 0.5 mile downstream from the Fruitland bridge is 0.5 part per billion (ppb). If no water were diverted by PNM, the selenium concentration below the weir at the Shiprock municipal diversion would be 0.796 ppb. With a diversion of 16,200 AF annually by PNM, the downstream concentration was calculated to be 0.799 ppb. With a diversion of 24,200 AF, the concentration would be 0.801 ppb. USFWS currently has identified water concentrations of selenium greater than 3 ppb as a cause of concern for aquatic life (Waddell 1995). The evaluation of the effects of PNM withdrawals on San Juan River concentrations of selenium indicates that withdrawals up to 24,200 AF would not result in concentrations that are a concern for aquatic life.

Water depletions have been identified by the USFWS as a negative impact to endangered fish in the San Juan River basin. Water quantity has been identified as a constituent of critical habitat. In that sense, any depletion, including the Jicarilla Water Subcontract, could affect the continued existence of the Colorado pikeminnow through continuing a current depletion. The effects of the Jicarilla Water Subcontract diversions on flows of the San Juan River have been modeled (Appendix B). These diversions would have less than a 2 percent effect on the river's flows under any historic flow conditions.

Because the SJGS water withdrawals are a continuation of an existing depletion, the only change being that the Tribe will be acting as the supplier of the water for that depletion, the proposed action may affect, but is not likely to adversely affect the continued existence of the Colorado pikeminnow. A more natural flow regime would provide conditions more favorable for the continued existence of the Colorado pikeminnow. The USBR has committed to operate Navajo Reservoir to mimic the natural hydrograph. The flow recommendations of the SJRBRIP include the assumption that the existing diversion by PNM will not affect the flow recommendations for recovery of the fishes. Although the Jicarilla Apache Tribe is on record disputing some depletion figures used in the underlying hydrologic modeling for the SJRBRIP flow recommendations, the tribe supports the flow recommendations and has not challenged the validity of the existing PNM diversion. Because the reoperation/modified operation of Navajo Dam is expected to mimic the natural hydrograph, the Jicarilla Water Subcontract may affect, but is not likely to adversely affect the Colorado pikeminnow.

3.2.4 Razorback Sucker (*Xyrauchen texanus*)

The razorback sucker was listed as endangered by the USFWS on October 23, 1991. Critical habitat was designated on March 21, 1994. Much of the current literature regarding razorback suckers has recently been compiled by USBR (1995). That compilation is used frequently in this biological assessment.

3.2.4.1 San Juan River Recovery Implementation Program

The razorback sucker is included in the SJRBRIP described in Section 3.2.3.1. Critical habitat for the razorback sucker was designated from Lake Powell to the Hogback Diversion (RM 158.6), 7.5 miles downstream from the SJGS weir on the San Juan River. Wild razorback suckers have not been observed in the San Juan River in New Mexico during recent studies. As a result, USFWS implemented experimental stocking of razorback suckers in the San Juan River within its designated critical habitat. Subsequent tracking of the stocked suckers indicates they are surviving using the available habitats and gaining weight (Ryden 1998). Preliminary results from 1998 sampling indicate that stocked razorback suckers may be reproducing in the San Juan River with the recovery of three larval fish (Platania 1998).

3.2.4.2 Distribution and Abundance

The razorback sucker is one of the endemic Colorado River fish species. It was once common throughout the Colorado River basin, primarily in the mainstem and major tributaries (Jordan and Evermann 1902). The species' decline is speculated to have resulted from dam building, habitat alteration and destruction, water quality degradation, and, especially, predation by nonnative fishes (Minckley et al. 1991). Recent studies indicate that predation of larval fish in backwaters by odonate nymphs (damselflies and dragonflies) may also affect the ability of razorback suckers to recover (Horn et al. 1994).

The historic distribution of the razorback sucker in the San Juan River is not well documented. The fish probably used the mainstem of the San Juan River from its confluence with the Colorado River upstream to the Animas River (Minckley et al. 1991).

The formerly large populations of razorback suckers in the lower basin have been extirpated from riverine habitats and the remaining fish are currently restricted to populations in Lake Mohave and Lake Mead. The largest number of razorback suckers in the upper basin is found in the upper Green River, between the Duchesne and Yampa Rivers. Adults are the primary life form collected. Razorback suckers still inhabit the Grand Valley of the mainstem Colorado River in low numbers (Minckley et al. 1991, USBR 1995, SJRBRIP Biology Committee 1999).

The current distribution of razorback suckers in the San Juan River, including introduced fish, is from the San Juan arm of Lake Powell to the vicinity of the Hogback (RM 158.6). Wild razorback suckers have not been collected from the San Juan River in Colorado or New Mexico during recent sampling programs. Experimental introductions of razorback suckers to the San Juan River were initiated in 1994, with the intent of gaining information on movement and habitat use from a known group of fish (USFWS 1993b). A more formal augmentation plan was developed and implemented in 1997. Eight ripe stocked male razorback suckers were collected in the San Juan River in May 1997 (USFWS 1993b, SJRBRIP Biology Committee 1999). Preliminary results from 1998 collections of larval fish indicate stocked razorback suckers may be spawning in the San Juan River (Platania 1998).

3.2.4.3 Life History

Razorback suckers show some sexual dimorphism. Males are smaller and slimmer than females, with larger fins and a more exaggerated predorsal keel. Females have thicker bodies and smaller fins and, frequently, a shorter, broader predorsal keel. Both sexes of breeding adults are dark brown to black dorsally and yellow ventrally with a lateral band that can be orange, reddish, or violet. These colors are found most commonly in late winter and spring (Minckley et al. 1991).

Razorback suckers occupy a variety of habitats during their lives. Specific habitat preferences have been difficult to identify because of the small number of fish. In general, the species seems to prefer calmer, flatwater river reaches over higher velocity whitewater or canyon reaches (Minckley et al. 1991). Specific habitat use in the San Juan River is not well documented and is assumed to be the same as that for the mainstem Colorado, Green, and Yampa Rivers.

Spawning has been documented in lower basin reservoirs and ripe individuals have been observed in the Green and Colorado river systems (SJRBRIP Biology Committee 1999). A female sucker is accompanied by several males over a spawning area to a location she selects. The males surround her and all fish convulse rapidly while in contact with each other and eggs and sperm are released simultaneously. The fish appear to go through the spawning ritual at several locations and in different groups. Ripe adults are found in Lake Mohave between November and June. Spawning may be later in the upper basin than in the lower basin (Minckley et al. 1991). Razorback suckers are thought to spawn in the San Juan arm of Lake Powell from mid March to early April (Lashmett 1998). Riverine population spawning is linked to the ascending limb of the hydrograph, generally during May or June in the upper Colorado River basin (Minckley et al. 1991).

Spawning locations appear to consist of gravel and cobble substrates swept clean of fine materials. Depressions that are 20 centimeters or more deep are created by the activities of the fish. Spawning is most common near shore at depths less than 0.6 meter, although it may go to 3.45 meters. In rivers, known spawning locations are all in broad, flatwater areas (Minckley et al. 1991).

Young fish may remain along shorelines, in embayments, or in tributary mouths and then disperse into channels or larger backwaters. Juveniles appear to move downstream to those habitats (Minckley et al. 1991).

3.2.4.4 Impacts of the Proposed Action

The principal impact on the razorback sucker with the Jicarilla Water Subcontract is fish passage. The SJGS weir at the San Juan River intake structure provides an unquantified deterrent to fish movement (Ryden and Pfeifer 1994, Bliesner 1994), as discussed in Section 3.2.3.4. USBR and PNM have committed to work with SJRBRIP to develop a selective fish passage around the weir to allow fish to move upstream.

The possibility of PNM diversions resulting in increased concentrations of selenium in San Juan River water is discussed in Section 3.2.3.4. The Jicarilla Water Subcontract is not expected to result in selenium concentrations that exceed levels of concern for aquatic life.

Water depletions have been identified by USFWS as a negative impact to endangered fish in the San Juan River basin. The flow recommendations of the SJRBRIP include the assumption that the existing depletion by PNM will not affect the flow recommendations for recovery. Although the Jicarilla Apache Tribe is on record disputing some depletion figures used in the underlying hydrologic modeling for the SJRBRIP flow recommendations, the tribe supports the flow recommendations and has not challenged the validity of the existing PNM depletion, because the Jicarilla Water Subcontract is a continuation of that depletion. A more natural flow regime resulting from reoperation of the modified operation of Navajo Dam would provide conditions more favorable to the continued existence of the razorback sucker and would mitigate impacts from water depletions. Overall, the Jicarilla Water Subcontract may affect, but is not likely to adversely affect the razorback sucker.

3.2.5 Mesa Verde Cactus (*Sclerocactus mesae-verdae*)

The Mesa Verde cactus was listed as threatened on October 30, 1979 (USFWS 1984b).

3.2.5.1 Distribution and Abundance

The Mesa Verde cactus has been found in five populations on the eastern edge of the Navajoan Desert in Montezuma County, Colorado, and San Juan County, New Mexico, with a total of 5,000 to 10,000 plants. One of those populations is east of the Hogback and north of Waterflow, New Mexico, on Bureau of Land Management (BLM) and state of New Mexico land (USFWS 1984b). A population of the cactus is located under a PNM transmission line. No other *Sclerocactus mesae-verdae* populations are known in the

vicinity of SJGS. The Mesa Verde cactus population has been reduced because of collection and habitat destruction.

3.2.5.2 Life History

The Mesa Verde cactus (*Sclerocactus mesae-verdae*) usually consists of single globose stems, although clusters of as many as 15 stems 1.5 to 3 inches tall and with equal diameter may sometimes be found. The plants have radial spines, and bear 0.75-inch cream to yellow flowers and green fruit that turns brown with age (USFWS 1984b).

Sclerocactus mesae-verdae is generally restricted to the Mancos and Fruitland Shale Formations. These formations erode easily to form badlands with sparse vegetation. The formations are highly alkaline, gypsiferous, and have shrink-swell properties that make them harsh sites for plant growth. The Mesa Verde cactus is most frequently found on the tops of hills or benches, slopes of hills, and rarely on level ground between hills or benches at 5,232 to 6,540 feet elevation. The annual precipitation in these areas ranges from 3 to 8 inches (USFWS 1984b).

3.2.5.3 Impacts of the Proposed Action

The Jicarilla Water Subcontract is not expected to affect the known population of *Sclerocactus mesae-verdae* under the PNM transmission line. Transmission line construction is complete. PNM monitors the population regularly and schedules maintenance activities to avoid contact with the plant. If any other populations are discovered at SJGS, PNM will immediately notify USFWS of their presence.

3.2.6 Mancos Milkvetch (*Astragalus humillimus*)

The Mancos milkvetch was listed as endangered on June 27, 1985 by the USFWS (USFWS 1989).

3.2.6.1 Distribution and Abundance

The Mancos milkvetch is known from northwestern New Mexico and southwestern Colorado in scattered populations between Towaoc, Colorado, and the Chaco River in New Mexico, primarily on Navajo Nation and Ute Mountain Ute lands. The remaining known populations are on New Mexico State Trust or BLM administered lands. Thirteen sites are currently known, 10 of which are in San Juan County, New Mexico. Field counts of 4 of the 13 populations resulted in the identification of 10,407 plants on 44.5 acres, with an average density of 233 plants per acre (USFWS 1989).

3.2.6.2 Life History

The Mancos milkvetch is a small, tufted perennial that forms clumps to 12 inches in diameter. The top is a dense aggregation of persistent, spiny leaf stalks. Leaves are to 1.6 inches long each with 7 to 11 oval leaflets. Flowers are lavender to purplish with a conspicuous lighter-colored spot in the throat of the corolla tube. Fruits are egg-shaped and each contains four to nine seeds (USFWS 1989).

Mancos milkvetch is known only from remote semiarid sandstone rimrock ledges and mesa tops of northwestern New Mexico and southwestern Colorado. Because the plant is associated with highly localized sandstone outcrops in the Four Corners area, it is likely that its current and historic ranges are similar. The plant is restricted to small, poorly defined tan colored units of the Point Lookout sandstone, which is part of the larger Mesa Verde stratigraphic series that is the edge of a retreating Mesozoic seacoast. The high specificity of the Mancos milkvetch to this substrate indicates the presence of some element in the rock is required by the plant for normal growth. The plant is generally found on large, nearly flat sheets of sandstone, clustered along the margins of bowl-like depressions in the bedrock. It can also be found in cracks or fissures in the sandstone or at the base of gentle slickrock inclines. The substrate is characterized by exfoliation, which may be an important distribution factor (USFWS 1989).

The mean elevation of the known 13 populations is approximately 5,650 feet, with a range from 5,275 feet for the southernmost population to 6,000 feet for the northernmost population. The area receives 8 to 9 inches of rainfall annually, with about 150 days without a killing frost. The Mancos milkvetch flowers in late April through early May (USFWS 1989).

3.2.6.3 Impacts of the Proposed Action

PNM has surveyed the SJGS area for Mancos milkvetch. No Mancos milkvetch plants are known from the SJGS. The closest population is located on the Hogback. The Jicarilla Water Subcontract is not expected to affect the continued existence of the Mancos milkvetch.

4.0 CONCLUSIONS

No changes in operations are proposed for electricity generation that would result in new contact with special status species or affect current use of the SJGS. However, existing depletions that are proposed to continue and the existing weir may affect but are not likely to adversely affect the continued existence of the southwestern willow flycatcher and endangered fish species and also may affect but are not likely to adversely affect critical habitat for the fish.

The SJRBRIP has committed to fund and construct a selective fish passage at the SJGS weir, which is expected to fully remediate the barriers to fish passage as identified in this assessment. USBR, in conjunction with the SJRBRIP Biology Committee, has initiated the design of a selective passage structure, as recommended by the Biology Committee in its March 12, 1999 letter to USFWS and approved by the Coordination Committee in October 1999. The SJRBRIP Coordination Committee, with input from the Biology Committee, will have final approval of the fish passage design. This new federal action will comply with all federal laws including completing necessary NEPA compliance and consultation under ESA. Construction of the fish passage will be scheduled to avoid potential breeding activities of the southwestern willow flycatcher. The SJRBRIP has committed to provide long-term funding for the operation and maintenance of the selective fish passage, subject to the future approval of funds. It is expected that the fish passage will be constructed in FY2001.

Any depletion impact is expected to be mitigated by 1) USBR's reoperation/modified operation of Navajo Dam to implement the flow recommendations of the SJRBRIP, or a reasonable alternative to them to benefit the endangered fishes and 2) USBR's participation in the SJRBRIP.

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APPENDIX A

**ENDANGERED SPECIES LIST FOR NEW MEXICO
APRIL 10, 2000**

**US FISH & WILDLIFE SERVICE
SOUTHWEST REGION ECOLOGICAL SERVICES**

APPENDIX A

ENDANGERED SPECIES LIST FOR NEW MEXICO APRIL 10, 2000

US FISH & WILDLIFE SERVICE SOUTHWEST REGION ECOLOGICAL SERVICES

Bernalillo County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Rio Grande silvery minnow</u>	<i>Hybognathus amarus</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Catron County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Gila chub</u>	<i>Gila intermedia</i>	Candidate
<u>Gila trout</u>	<i>Oncorhynchus gilae</i>	Endangered
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Loach minnow</u>	<i>Rhinichthys cobitis</i>	Threatened
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Spikedace</u>	<i>Meda fulgida</i>	Threatened
<u>Zuni (=rhizome) fleabane</u>	<i>Erigeron rhizomatus</i>	Threatened

Chaves County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Koster's tryonia</u>	<i>Tryonia kosteri</i>	Candidate
<u>Kuenzler hedgehog cactus</u>	<i>Echinocereus fendleri kuenzleri</i>	Endangered
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Pecos (= puzzle) sunflower</u>	<i>Helianthus paradoxus</i>	Threatened
<u>Pecos assiminea snail</u>	<i>Assiminea pecos</i>	Candidate
<u>Pecos bluntnose shiner</u>	<i>Notropis simus pecosensis</i>	Threatened
<u>Pecos gambusia</u>	<i>Gambusia nobilis</i>	Endangered
<u>Pecos pupfish</u>	<i>Cyprinodon pecosensis</i>	P/Endangered
<u>Roswell springsnail</u>	<i>Pyrgulopsis roswellensis</i>	Candidate
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Cibola County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Pecos (= puzzle) sunflower</u>	<i>Helianthus paradoxus</i>	Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Zuni (=rhizome) fleabane</u>	<i>Erigeron rhizomatus</i>	Threatened

Colfax County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Piping plover</u>	<i>Charadrius melodus</i>	Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Curry County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened

<u>Pecos bluntnose shiner</u>	<i>Notropis simus pecosensis</i>	Threatened
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

DeBaca County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Pecos bluntnose shiner</u>	<i>Notropis simus pecosensis</i>	Threatened
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Dona Ana County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Sneed pincushion cactus</u>	<i>Coryphantha sneedii sneedii</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Eddy County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Gypsum wild-buckwheat</u>	<i>Eriogonum gypsophilum</i>	Threatened
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Kuenzler hedgehog cactus</u>	<i>Echinocereus fendleri kuenzleri</i>	Endangered
<u>Lee pincushion cactus</u>	<i>Coryphantha sneedii leei</i>	Threatened
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Pecos bluntnose shiner</u>	<i>Notropis simus pecosensis</i>	Threatened
<u>Pecos gambusia</u>	<i>Gambusia nobilis</i>	Endangered
<u>Pecos pupfish</u>	<i>Cyprinodon pecosensis</i>	P/Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Grant County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Chihuahua chub</u>	<i>Gila nigrescens</i>	Threatened
<u>Chiricahua leopard frog</u>	<i>Rana chiricahuensis</i>	P/Threatened
<u>Gila chub</u>	<i>Gila intermedia</i>	Candidate
<u>Gila springsnail</u>	<i>Pyrgulopsis gila</i>	Candidate
<u>Gila topminnow</u>	<i>Poeciliopsis occidentalis occidentalis</i>	Endangered
<u>Gila trout</u>	<i>Oncorhynchus gilae</i>	Endangered
<u>Loach minnow</u>	<i>Rhinichthys cobitis</i>	Threatened
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>New Mexico hotspring snail</u>	<i>Pyrgulopsis thermalis</i>	Candidate
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Spikedace</u>	<i>Meda fulgida</i>	Threatened
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Guadalupe County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Pecos (= puzzle) sunflower</u>	<i>Helianthus paradoxus</i>	Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Harding County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Hidalgo County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Chiricahua leopard frog</u>	<i>Rana chiricahuensis</i>	P/Threatened
<u>Jaguar</u>	<i>Panthera onca</i>	Endangered
<u>Lesser long-nosed bat</u>	<i>Leptonycteris curasoae yerbabuena</i>	Endangered
<u>Loach minnow</u>	<i>Rhinichthys cobitis</i>	Threatened
<u>Mexican long-nosed bat</u>	<i>Leptonycteris nivalis</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened

<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>New Mexico ridge-nosed rattlesnake</u>	<i>Crotalus willardi obscurus</i>	Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Spikedace</u>	<i>Meda fulgida</i>	Threatened

Lea County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Lincoln County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Kuenzler hedgehog cactus</u>	<i>Echinocereus fendleri kuenzleri</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered

Los Alamos County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Luna County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Beautiful shiner</u>	<i>Cyprinella formosa</i>	Threatened
<u>Chiricahua leopard frog</u>	<i>Rana chiricahuensis</i>	P/Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

McKinley County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Zuni (=rhizome) fleabane</u>	<i>Erigeron rhizomatus</i>	Threatened

Mora County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate

Otero County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Kuenzler hedgehog cactus</u>	<i>Echinocereus fendleri kuenzleri</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Sacramento Mountains thistle</u>	<i>Cirsium vinaceum</i>	Threatened
<u>Sacramento prickly poppy</u>	<i>Argemone pleiacantha pinnatisecta</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Todsen's pennyroyal</u>	<i>Hedeoma todsenii</i>	Endangered

Quay County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Arkansas River shiner</u>	<i>Notropis girardi</i>	Threatened
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Boreal western toad</u>	<i>Bufo boreas boreas</i>	Candidate
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Rio Arriba County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Boreal western toad</u>	<i>Bufo boreas boreas</i>	Candidate
<u>Colorado pikeminnow</u>	<i>Ptychocheilus lucius</i>	Endangered
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Roosevelt County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

San Juan County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Colorado pikeminnow</u>	<i>Ptychocheilus lucius</i>	Endangered
<u>Knowlton cactus</u>	<i>Pediocactus knowltonii</i>	Endangered
<u>Mancos milk-vetch</u>	<i>Astragalus humillimus</i>	Endangered
<u>Mesa Verde cactus</u>	<i>Sclerocactus mesae-verdae</i>	Threatened
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Razorback sucker</u>	<i>Xyrauchen texanus</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered

San Miguel County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Holy Ghost ipomopsis</u>	<i>Ipomopsis sancti-spiritus</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Sandoval County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Rio Grande silvery minnow</u>	<i>Hybognathus amarus</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Santa Fe County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Sierra County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Chiricahua leopard frog</u>	<i>Rana chiricahuensis</i>	P/Threatened
<u>Gila trout</u>	<i>Oncorhynchus gilae</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Todsen's pennycuial</u>	<i>Hedeoma todsenii</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Socorro County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Alamosa springsnail</u>	<i>Tryonia alamosae</i>	Endangered
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Chupadera springsnail</u>	<i>Pyrgulopsis chupaderae</i>	Candidate
<u>Interior least tern</u>	<i>Sterna antillarum</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Northern aplomado falcon</u>	<i>Falco femoralis septentrionalis</i>	Endangered
<u>Piping plover</u>	<i>Charadrius melodus</i>	Threatened
<u>Rio Grande silvery minnow</u>	<i>Hybognathus amarus</i>	Endangered
<u>Socorro isopod</u>	<i>Thermosphaeroma thermophilus</i>	Endangered
<u>Socorro Springsnail</u>	<i>Pyrgulopsis neomexicana</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered

Whooping crane

Grus americana

Endangered

Taos County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Torrance County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened

Union County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Black-tailed prairie dog</u>	<i>Cynomys ludovicianus</i>	Candidate
<u>Lesser prairie-chicken</u>	<i>Tympanuchus pallidicinctus</i>	Candidate
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Swift fox</u>	<i>Vulpes velox</i>	Candidate
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

Valencia County

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>
<u>Bald eagle</u>	<i>Haliaeetus leucocephalus</i>	Threatened
<u>Black-footed ferret</u>	<i>Mustela nigripes</i>	Endangered
<u>Mexican spotted owl</u>	<i>Strix occidentalis lucida</i>	Threatened
<u>Mountain plover</u>	<i>Charadrius montanus</i>	P/Threatened
<u>Rio Grande silvery minnow</u>	<i>Hybognathus amarus</i>	Endangered
<u>Southwestern willow flycatcher</u>	<i>Empidonax traillii extimus</i>	Endangered
<u>Whooping crane</u>	<i>Grus americana</i>	Endangered

REPORT ON THE HYDROLOGIC IMPACT OF DIVERSION
FROM THE
SAN JUAN RIVER FOR THE SAN JUAN GENERATING STATION
WITH
WATER SUPPLIED UNDER CONTRACT WITH THE JICARILLA APACHE TRIBE.

APPENDIX B

JUNE, 2000



REPORT ON THE HYDROLOGIC IMPACT OF DIVERSION
FROM THE
SAN JUAN RIVER FOR THE SAN JUAN GENERATING STATION
WITH
WATER SUPPLIED UNDER CONTRACT WITH THE JICARILLA APACHE TRIBE.

APPENDIX B

JUNE, 2000

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REPORT ON THE HYDROLOGIC IMPACT OF DIVERSION FROM THE SAN JUAN RIVER FOR
THE SAN JUAN GENERATING STATION WITH WATER SUPPLIED UNDER
CONTRACT WITH THE JICARILLA APACHE TRIBE.

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Report on the Hydrologic Impact of Diversion from the San Juan River for the
San Juan Generating Station with Water Supplied Under
Contract with the Jicarilla Apache Tribe.

1. Introduction.

This Report is an analysis of the impacts to the hydrology of the San Juan River due to the diversion of 16,200 acre-feet of water per annum by the Public Service Company of New Mexico (PNM) from the San Juan River for use at the San Juan Generating Station (SJGS). This analysis reports on the historic use at SJGS and the results of hydrologic modeling of the flow of the San Juan River. The RiverWare model of the San Juan River is used to simulate future flows with and without the SJGS diversion, and to determine if under the “with-diversion” condition, the San Juan River Basin Recovery Implementation Program (SJRRIP) endangered fish flow recommendations can be satisfied. Hydrologic conditions used are based on the historic streamflow data from the 1929-1993 period, and the model is configured as in the Animas La-Plata Project Draft Supplemental Environmental Impact Statement, without the proposed Gallup-Navajo Project. The results of the modeling show that the hydrologic impact of the diversion on streamflow is insignificant and the SJRRIP flow recommendation criteria can be met with a depletion of 16,200 acre-feet of water per annum at the SJGS.

2. Location and Description of Use.

PNM diverts water from the San Juan River at a point about 14 miles downstream from Farmington, NM for use at the SJGS for cooling, coal mining and other purposes related to the generation of electric power. The diversion is made by a broad-crested weir that spans the river in the SW $\frac{1}{4}$, SW $\frac{1}{4}$, of Section 3, T.29 N., R. 15 W. The historic water supply for these uses has been provided under PNM’s existing contract for water from Navajo Reservoir (16,200 acre-feet per annum, State Engineer File no. 3258), and under an agreement to lease BHP-Utah International’s private water right. (8,000 acre-feet per annum, State Engineer File no. 2838). PNM and the Jicarilla Apache Tribe are negotiating an agreement that would provide for a continued supply of up to 16,200 acre-feet per annum from the Navajo Reservoir Supply after the term of the existing Navajo Reservoir contract expires on December 31, 2005. The water diverted at the SJGS weir under these two permits is fully consumed and no flow returns to the San Juan River. Water has been diverted for use at SJGS continuously since 1973. Table 1 is a tabulation of the total diversion from the San Juan River at the SJGS weir from 1992 through 1999.

3. Hydrologic Model.

The hydrologic impact of the diversion by PNM on the flow of the San Juan River may be assessed by utilizing the RiverWare hydrologic computer model. RiverWare is a generic, data driven, variable time-step hydrologic model that has been implemented in the San Juan River basin since 1998 in support of assessing the relationship between flow recommendations for endangered fish in the San Juan River and water development.

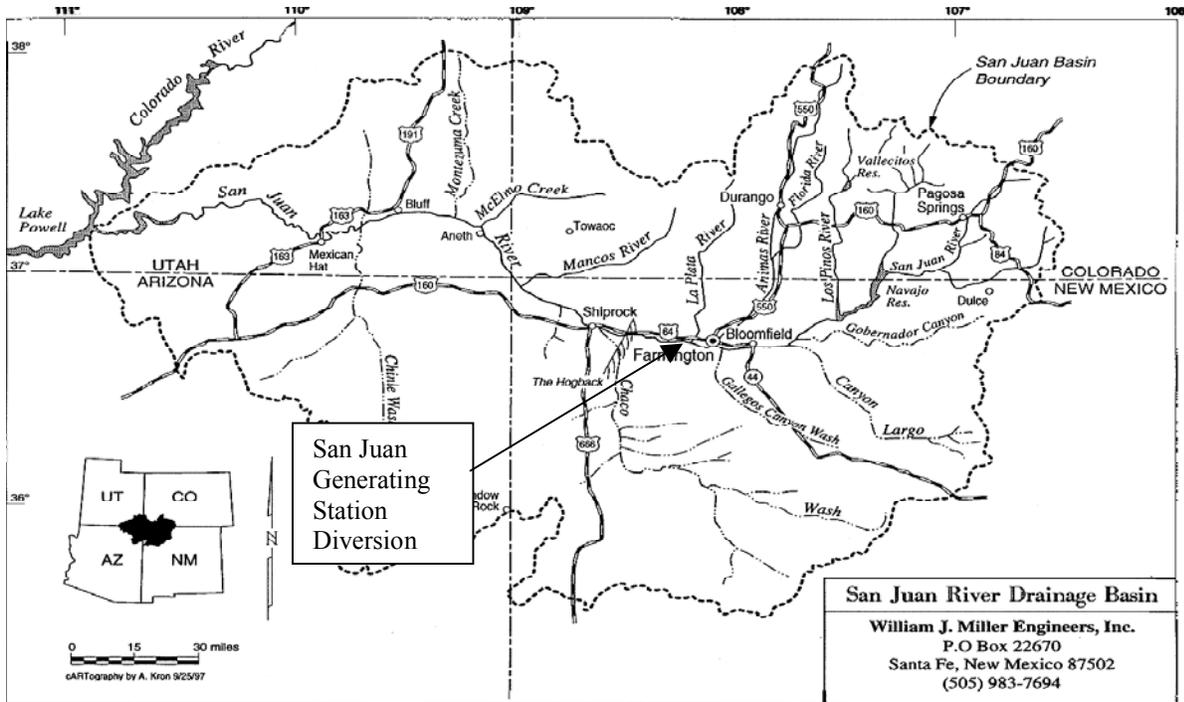


Figure 1. Location of San Juan Generating Station Diversion

After running the model, the simulated flow data output from the RiverWare model are run through a post-processor that determines if SJRRIP recommended flow criteria can be achieved. RiverWare has also been used in the June 11, 1999 Navajo Indian Irrigation Project Biological Assessment and the 1999 Animas-La Plata Draft Supplemental Environmental Impact Statement.

Table 1. Monthly Diversion (acre-feet) from San Juan River at SJGS Weir, 1992-1999.

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Σ
1992	1194	929	1160	1228	739	1450	2155	1008	1652	1154	1811	778	15258
1993	2110	985	1116	1623	2140	1345	2175	2321	1501	790	1830	1848	19784
1994	1788	902	1531	1651	1352	2053	1867	1721	1574	1796	1497	1254	18986
1995	1078	858	1583	1195	1098	1701	2054	1974	1902	2226	1755	1720	19144
1996	1308	1709	1432	1996	1961	1675	1792	1746	2136	2121	2035	1654	21165
1997	2169	1886	1773	1662	1951	1699	1910	1768	1741	1970	2149	1613	22291
1998	1759	1249	1539	1328	1455	1679	1388	1495	1606	1121	1397	1601	17617
1999	2014	1748	1895	1444	1739	1748	1525	1523	1900	1804	1957	1708	21005
Avg.	1678	1283	1504	1478	1542	1669	1858	1695	1752	1623	1804	1522	19406

(Source: Public Service Co. of New Mexico)

The RiverWare model run in this analysis, made March 25, 2000, was configured to simulate future flows in the San Juan River with and without diversion by PNM at the SJGS weir in monthly time-steps. Under both conditions, all other current depletions, all depletions that could occur without further federal actions and all depletions for which favorable biological opinions have been issued are modeled. These depletions are the same as those found in Table 2-2 of the Animas-La Plata Project Draft Supplemental EIS, Technical Appendix 2, Hydrologic Modeling Analysis.

4. Future Conditions Analysis.

The SJGS weir is located approximately 14 miles downstream from the USGS stream gage San Juan River at Farmington, NM, and about 22 miles upstream from the gage San Juan River at Shiprock, NM. The simulation of the flow of the San Juan River at these two locations is the basis for the evaluation of the hydrologic impacts. Simulated streamflow at these two gages are compared under dry, normal and wet year scenarios, both with and without diversion of water at the SJGS weir. The model used an annual depletion of the San Juan River for SJGS of 16,200 acre-feet, distributed in equal monthly amounts throughout the year.

The simulated flow of the San Juan River in this reach is also influenced by other diversions, return flow and channel losses. (See Figure 2.) Simulated flow in this reach is influenced by diversion for the Fruitland Canal, the Jewett Valley Canal, the Four-Corners Power Plant and the Hogback Canal, return flow from NIIP, Fruitland and Jewett Valley, as well as discharge from the La Plata and Chaco Rivers. The diversion and return flow values used in the model are not changed in this analysis; therefore, the difference in simulated flow between the “with-SJGS diversion” and the “without-SJGS diversion” conditions should be the result of the diversion at the SJGS weir and the resulting change in operation of Navajo Reservoir.

The operation of Navajo Dam is also simulated using RiverWare to evaluate the impacts of the SJGS diversion on storage levels in Navajo Reservoir. When base flow releases from Navajo Dam or intervening flows between the Dam and the SJGS diversion are not sufficient to meet the demands at the SJGS weir for contract water, releases from Navajo Dam would be made to supplement flow to meet the demand. In the simulated “without-diversion” condition, releases from Navajo Dam are not required and the water remains in storage until released for other purposes.

5. Impacts on Water Supply.

The hydrologic impacts on the San Juan River above the SJGS weir may be evaluated by examining the simulated flow of the river at the gaging station San Juan River at Farmington, both with and without the SJGS diversion. Table 2 compares the flow of the San Juan River above the SJGS weir, with and without SJGS diversion, under dry, average and wet conditions represented by the years shown in Table 2. All other hydrologic conditions in the reach between Farmington and Shiprock are unchanged.

Table 2. Monthly Flow of the San Juan River at Farmington, NM with and without San Juan Generating Station Diversion.

Month	With SJGS Diversion			Without SJGS Diversion		
	Dry (1951)	Avg. (1935)	Wet (1949)	Dry (1951)	Avg. (1935)	Wet (1949)
January	33,778	32,281	32,281	32,421	32,281	32,281
February	30,234	29,157	29,157	29,157	29,157	29,157
March	33,875	32,879	36,872	32,518	32,879	36,872
April	33,955	43,148	87,963	32,595	43,148	87,963
May	57,187	137,260	479,631	57,187	137,260	479,631
June	81,502	357,035	520,038	81,502	357,932	520,200
July	33,648	71,411	121,637	32,281	71,411	121,637
August	32,472	33,154	33,505	32,281	32,281	32,281
September	31,240	31,240	31,839	31,240	31,240	31,240
October	32,281	32,281	32,812	32,281	32,281	32,281
November	31,432	31,240	31,965	31,240	31,240	31,240
December	33,931	33,032	33,701	32,632	32,281	32,402
Total	465,535	864,118	1,471,401	457,334	863,390	1,467,183

(Source: Bureau of Reclamation)

Table 2 shows that the SJGS diversion results in about a 2 % increase in annual flow above the SJGS weir during the dry year and less than 1 % increase in the average and wet year. The increase in flow upstream of SJGS diversion is due to the infrequent release of water from Navajo Dam.

The impact of the proposed action on the San Juan River downstream of the SJGS weir may be evaluated by examining the simulated flows of the San Juan River at the Shiprock gaging station. Table 3 compares the flow of the San Juan River below the SJGS weir, with and without the SJGS diversion, under dry, average and wet conditions represented by the years shown in Table 3. All other hydrologic conditions in the reach between Farmington and Shiprock are unchanged.

Table 3 shows that the SJGS diversion results in a reduction of the simulated flow of the San Juan River downstream of the SJGS weir by about 2% during the dry and average years, and by about 1% during the wet year.

The simulated flow below Navajo Dam and storage in Navajo Reservoir would change under the “without-SJGS diversion” condition because there is no demand on Navajo Reservoir for the SJGS diversions requirements, resulting in a simulated storage amount in Navajo greater that would have occurred with the demands at the SJGS weir in place. The accumulated simulated storage triggers additional releases under the modeled Navajo Dam operations for the endangered fish flow recommendations, resulting in less storage in some years under the simulated “without-SJGS diversion” condition.

The SJGS diversion reduces the average annual Navajo Reservoir storage contents from 1,291,500 acre-feet to 1,280,600 acre-feet, and increases the minimum monthly Navajo Reservoir content from 734,600 acre-feet to 797,700 acre-feet. See Figure 3 for a graph of the end-of-month reservoir contents under the with and without SJGS diversion conditions.

Table 3. Monthly Flow of the San Juan River at Shiprock, NM with and without San Juan Generating Station Diversion.

Month	<i>With SJGS Diversion</i>			<i>Without SJGS Diversion</i>		
	Dry (1951)	Avg. (1935)	Wet (1949)	Dry (1951)	Avg. (1935)	Wet (1949)
January	33,323	33,375	33,603	33,323	34,731	34,959
February	30,098	30,999	31,292	30,375	32,354	32,646
March	33,612	34,651	39,960	33,612	36,008	41,316
April	34,139	49,245	92,741	34,139	50,605	94,100
May	55,596	145,452	488,062	56,965	146,820	489,430
June	82,168	364,461	537,236	83,544	366,733	538,773
July	32,281	70,827	124,529	32,291	72,205	125,907
August	32,281	32,281	32,281	33,466	32,784	32,433
September	33,439	34,046	31,240	34,805	35,412	32,007
October	33,302	33,680	33,062	34,609	34,987	33,839
November	32,248	32,534	32,248	33,357	33,836	32,825
December	33,323	33,323	33,323	33,323	33,872	33,323
Total	465,809	894,874	1,509,576	473,808	910,346	1,521,558

(Source: Bureau of Reclamation)

6. Impact on SJRRIP Flow Recommendation.

The results of the modeling and the post processing of the simulated flow data demonstrate that the both the primary and secondary SJRRIP flow recommendations are always met with diversion of 16,200 acre-feet annually from the San Juan River for SJGS. Table 4 is a comparison of hydrograph statistics for two levels of development i.e., without and with 16,200 acre-feet of depletions for PNM.

7. Conclusion.

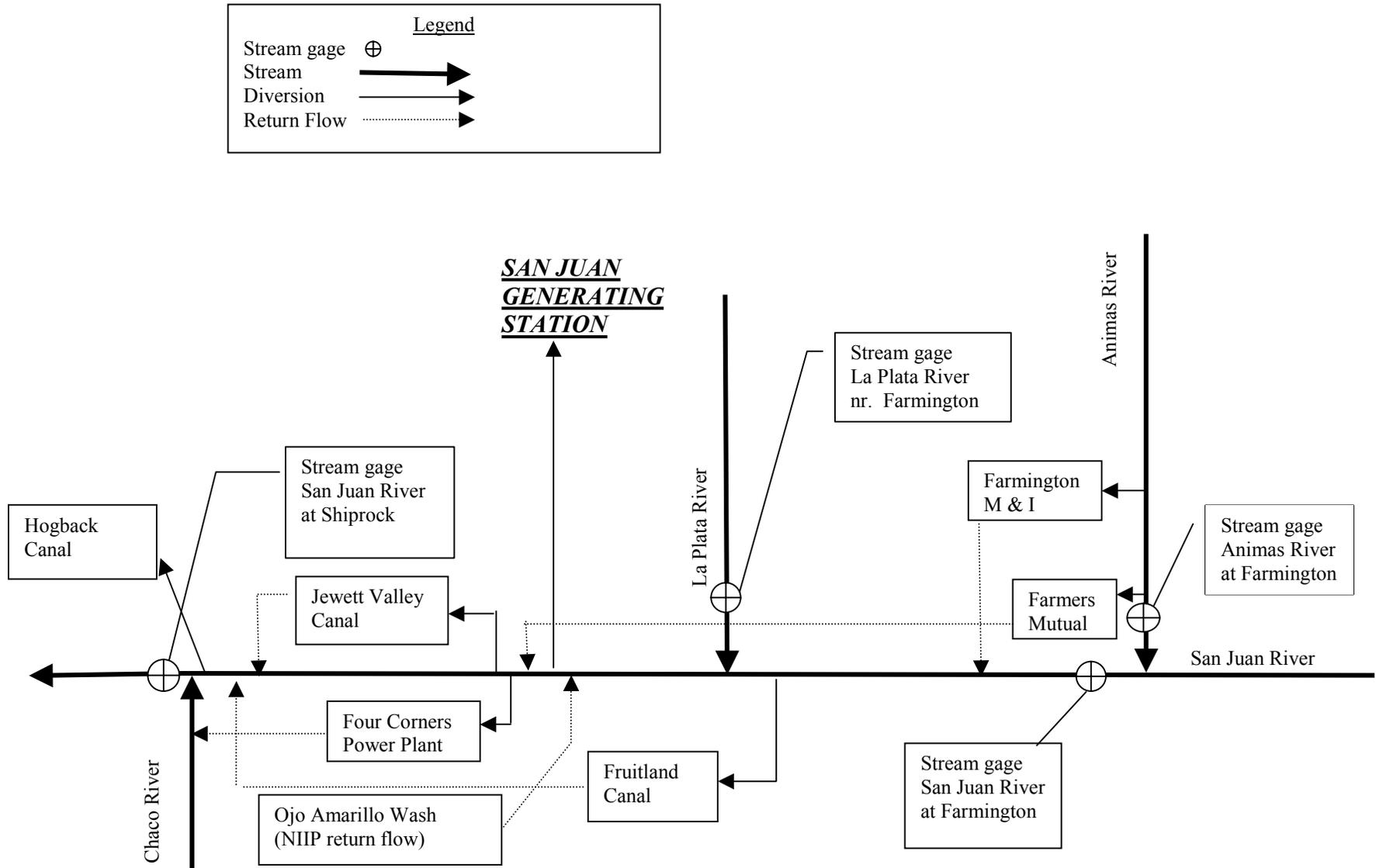
Based on the assumptions and data used in the RiverWare hydrologic computer model and described in this report, the hydrologic impact of the diversion of 16,200 acre-feet per annum at the SJGS weir on the streamflow of the San Juan River is insignificant and the primary and secondary SJRRIP flow recommendation criteria can be met.

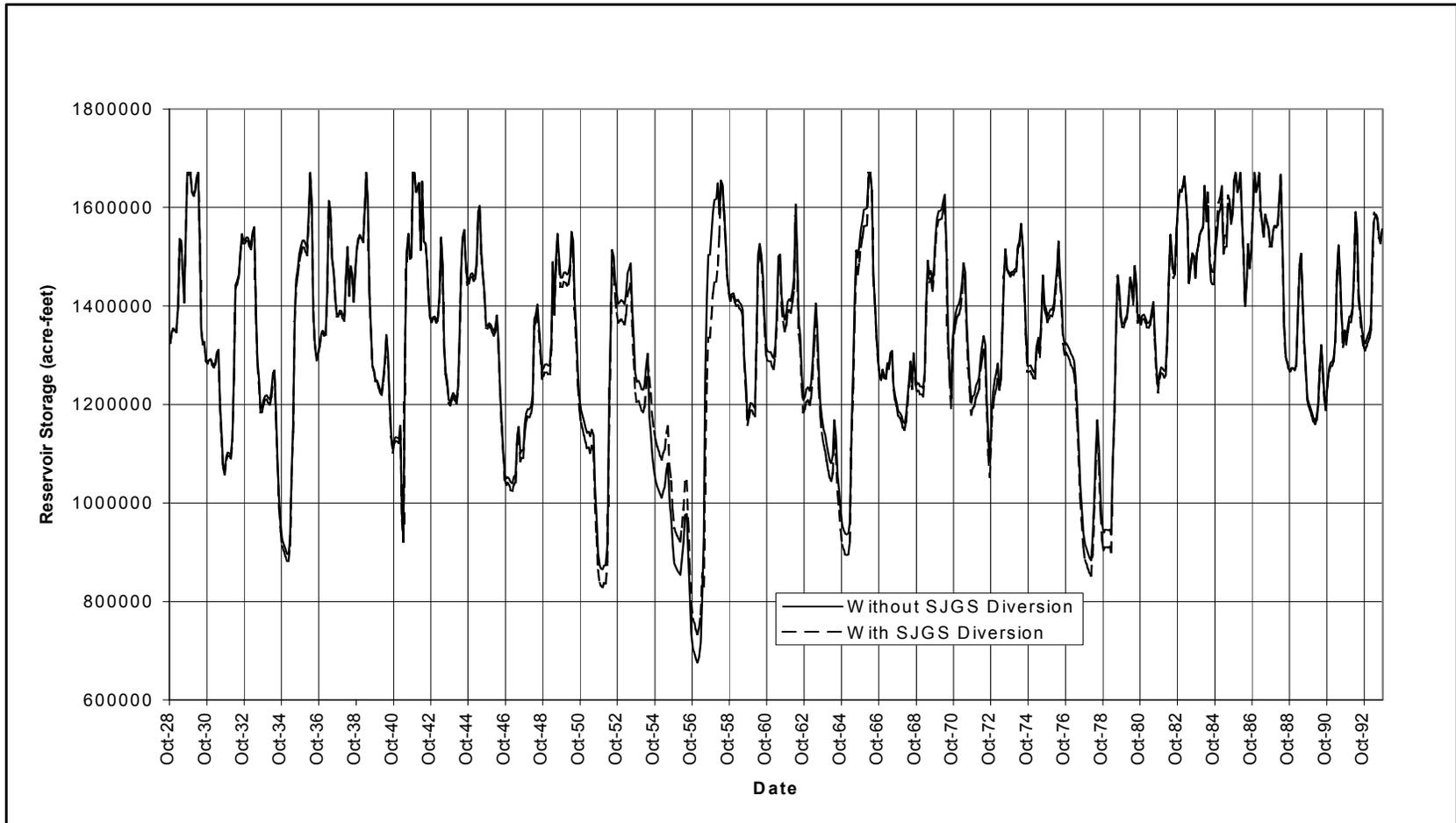
Table 4. Comparison of Hydrograph Statistics for SJRRIP Flow Recommendations under Two Levels of Development.

Required Average Frequency Criteria	STATUS	Discharge	Criteria Category	<i>Without SJGS</i>	<i>With SJGS</i>
				Calculated Avg. Frequency	Calculated Avg. Frequency
20.0%	<u>OK</u>	>10,000 cfs for 5-days	Primary	27.7%	27.7%
33.0%	<u>OK</u>	>8,000 cfs for 10-days	Primary	40.0%	40.0%
50.0%	<u>OK</u>	>5,000 cfs for 21-days	Primary	55.4%	56.9%
80.0%	<u>OK</u>	>2,500 cfs for 10-days	Primary	81.5%	81.5%
30.0%	<u>OK</u>	>10,000 cfs for 1-days	Secondary	38.5%	38.5%
20.0%	<u>OK</u>	>10,000 cfs for 5-days	Primary	27.7%	27.7%
10.0%	<u>OK</u>	>10,000 cfs for 10-days	Secondary	20.0%	18.5%
5.0%	<u>OK</u>	>10,000 cfs for 15-days	Secondary	7.7%	7.7%
40.0%	<u>OK</u>	>8,000 cfs for 1-days	Secondary	61.5%	60.0%
35.0%	<u>OK</u>	>8,000 cfs for 5-days	Secondary	47.7%	46.2%
33.0%	<u>OK</u>	>8,000 cfs for 10-days	Primary	40.0%	40.0%
30.0%	<u>OK</u>	>8,000 cfs for 15-days	Secondary	33.8%	33.8%
20.0%	<u>OK</u>	>8,000 cfs for 20-days	Secondary	27.7%	27.7%
10.0%	<u>OK</u>	>8,000 cfs for 30-days	Secondary	15.4%	15.4%
65.0%	<u>OK</u>	>5,000 cfs for 1-days	Secondary	75.4%	75.4%
60.0%	<u>OK</u>	>5,000 cfs for 5-days	Secondary	72.3%	72.3%
58.0%	<u>OK</u>	>5,000 cfs for 10-days	Secondary	67.7%	67.7%
55.0%	<u>OK</u>	>5,000 cfs for 15-days	Secondary	60.0%	60.0%
50.0%	<u>OK</u>	>5,000 cfs for 20-days	Primary	56.9%	56.9%
40.0%	<u>OK</u>	>5,000 cfs for 30-days	Secondary	47.7%	47.7%
30.0%	<u>OK</u>	>5,000 cfs for 40-days	Secondary	30.8%	30.8%
20.0%	<u>OK</u>	>5,000 cfs for 50-days	Secondary	27.7%	26.2%
15.0%	<u>OK</u>	>5,000 cfs for 60-days	Secondary	18.5%	18.5%
5.0%	<u>OK</u>	>5,000 cfs for 80-days	Secondary	12.3%	9.2%
90.0%	<u>OK</u>	>2,500 cfs for 1-days	Secondary	96.9%	96.9%
82.0%	<u>OK</u>	>2,500 cfs for 5-days	Secondary	87.7%	87.7%
80.0%	<u>OK</u>	>2,500 cfs for 10-days	Primary	81.5%	81.5%
70.0%	<u>OK</u>	>2,500 cfs for 15-days	Secondary	78.5%	78.5%
65.0%	<u>OK</u>	>2,500 cfs for 20-days	Secondary	75.4%	75.4%
60.0%	<u>OK</u>	>2,500 cfs for 30-days	Secondary	67.7%	66.2%
50.0%	<u>OK</u>	>2,500 cfs for 40-days	Secondary	60.0%	60.0%
45.0%	<u>OK</u>	>2,500 cfs for 50-days	Secondary	49.2%	49.2%
40.0%	<u>OK</u>	>2,500 cfs for 60-days	Secondary	43.1%	43.1%
25.0%	<u>OK</u>	>2,500 cfs for 80-days	Secondary	32.3%	32.3%

(Source: Bureau of Reclamation)

Figure 2. Diagram of Diversions and Return Flows from San Juan River between Farmington and Shiprock, NM.





(Source: Bureau of Reclamation)

Figure 3. Simulated Navajo Reservoir End-of-Month Contents with and without SJGS Diversion.

APPENDIX B

**POTENTIAL IMPACTS OF PNM SAN JUAN STATION DIVERSIONS
FROM THE SAN JUAN RIVER ON SELENIUM CONCENTRATIONS IN THE RIVER
AT SHIPROCK, NM**

FEBRUARY 1995

**POTENTIAL IMPACTS OF
PNM SAN JUAN STATION DIVERSIONS
FROM THE SAN JUAN RIVER ON
SELENIUM CONCENTRATIONS IN THE RIVER AT
SHIPROCK, NEW MEXICO**

**PREPARED FOR
RESOURCE SCIENCES GROUP, INC.
ALBUQUERQUE, NEW MEXICO**

**PREPARED BY
METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO**

FEBRUARY 1995

**POTENTIAL IMPACTS OF
PNM SAN JUAN STATION DIVERSIONS
FROM THE SAN JUAN RIVER ON
SELENIUM CONCENTRATIONS IN THE RIVER AT
SHIPROCK, NEW MEXICO**

INTRODUCTION

An evaluation of Public Service Company of New Mexico's diversions from the San Juan River to the San Juan Generating Station was conducted to determine potential impacts on selenium concentrations in the San Juan River at Shiprock, New Mexico. The evaluation was conducted using available secondary data and a mathematical model based on the Law of Conservation of Mass.

METHOD

Cruz, 1994 lists average annual runoff volumes for the San Juan River at Farmington, La Plata River at Farmington, and the San Juan River at Shiprock. For the period from the 1930's to 1993 the average annual runoff volumes are presented in TABLE 1. The average annual runoff volume in the San Juan River just upstream from the PNM diversion was assumed to equal the sum of the runoff volumes of the San Juan River at Farmington and the La Plata River at Farmington (see TABLE 1) which equals 1,543,000 AF/YR. It was additionally assumed that the PNM diversion has historically averaged 20,000 AF/AN.

In order to complete the water balance, a "Net Inflow to River in Reach" volume was computed (see FIGURE 1), using the Law of Conservation of Mass as follows:

$$\text{Inflow} = \text{Outflow}$$

$$1,543,000 \text{ AF/YR} + \text{"Net Inflow to River in Reach"} = 20,000 \text{ AF/YR} + 1,549,000$$

$$\text{"Net Inflow to River in Reach"} = 20,000 + 1,549,000 - 1,543,000 = 26,000 \text{ AF/YR}$$

"Net Inflow to River in Reach" includes groundwater inflow and discharge, irrigation diversions and return flows, Chaco wash and other tributary inflows, and any other inflows and discharges.

Blanchard, 1993 lists dissolved selenium concentrations measured at two stations on the San Juan River during 1990 (see TABLE 2). The dissolved selenium concentrations determined by the model are based on the assumption that there is no exchange between the dissolved selenium in the water and the selenium associated with the sediments in the San Juan River. The dissolved selenium concentration associated with the "Net Inflow to River in Reach" was also computed (see FIGURE 1) using the Law of Conservation of Mass as follows:

$$\text{Inflow} = \text{Outflow}$$

$$2097 \text{ lb. Se/YR} + \text{"Net Inflow to River in Reach"} = 27 \text{ lb. Se/YR} + 3368 \text{ lb. Se/YR}$$

$$\text{"Net Inflow to River in Reach"} = 27 + 3368 - 2097 = 1298 \text{ lb. Se/YR}$$

FIGURE 1 represents the average historic water and selenium balance for the reach of the San Juan River from the PNM diversion to Shiprock, New Mexico.

RESULTS

A total of four separate scenarios were modeled. They include:

- No PNM Diversion
- Only USBR Contract Diversion
- Average Historic Diversion
- Maximum PNM Diversion

The resulting dissolved selenium concentrations for each scenario are presented in FIGURES 1 through 4 and are summarized in TABLE 3. It can be seen from TABLE 3 that varying the PNM diversion from 0 AF/YR to a maximum of 24,200 AF/YR changes the dissolved selenium concentration in the San Juan River at Shiprock by only 0.005 ug/l or about 0.6%

TABLE 1
AVERAGE ANNUAL RUNOFF

(Cruz, 1994)

STATION	PERIOD OF RECORD	AVERAGE ANNUAL RUNOFF VOLUME (AF/YR)
San Juan River @ Farmington	1931-1993	1,522,000
La Plata River @ Farmington	1938-1993	<u>21,000</u>
		1,543,000
San Juan River @ Shiprock	1935-1993	1,549,000

$Q = 1,543,000$ AF/YR (Cruz, 1994)
 $Se = 0.5$ ppb (Blanchard, 1993)
 $= 2097$ lb Se/YR

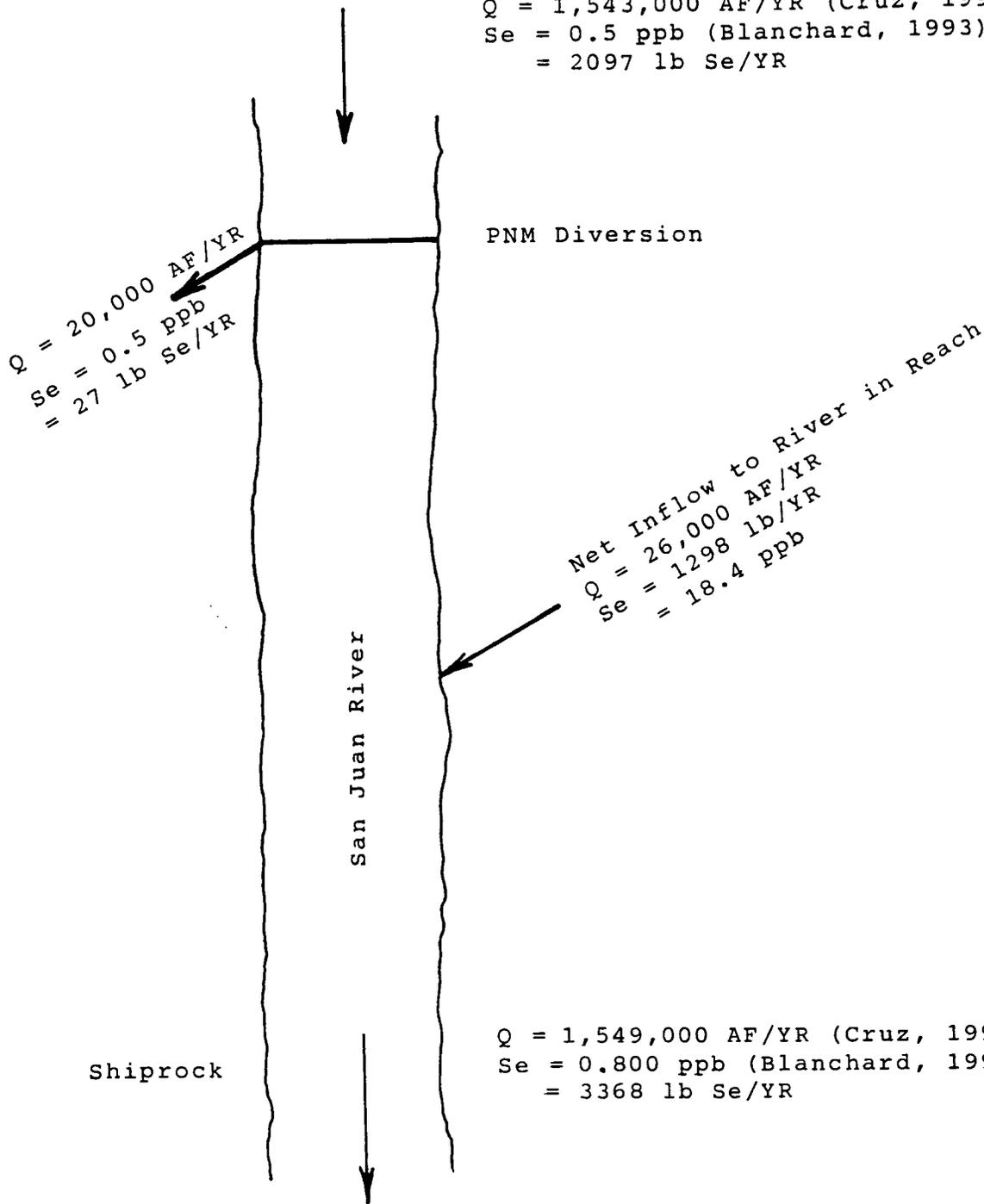


FIGURE 1

WATER AND SELENIUM BALANCE WITH
PNM DIVERSION AT 20,000 AF/YR
AVERAGE HISTORIC DIVERSION

TABLE 2
SELENIUM CONCENTRATION

(Blanchard, 1993)

STATION	DATE	SELENIUM DISSOLVED (ug/l)	AVERAGE ¹ (ug/l)
R-5 ²	4-28-90	<1	
	8-2-90	<1	
	11-16-90	<1	0.5
R-10 ³	4-29-90	<1	
	8-2-90	1	
	12-2-90	1	0.8

¹ For calculating Average, values less than the detection limit were assumed to be 1/2 of the detection limit.

² R-5 San Juan River 1/2 mile downstream from Fruitland Bridge.

³ R-10 San Juan River at Shiprock Municipal diversion.

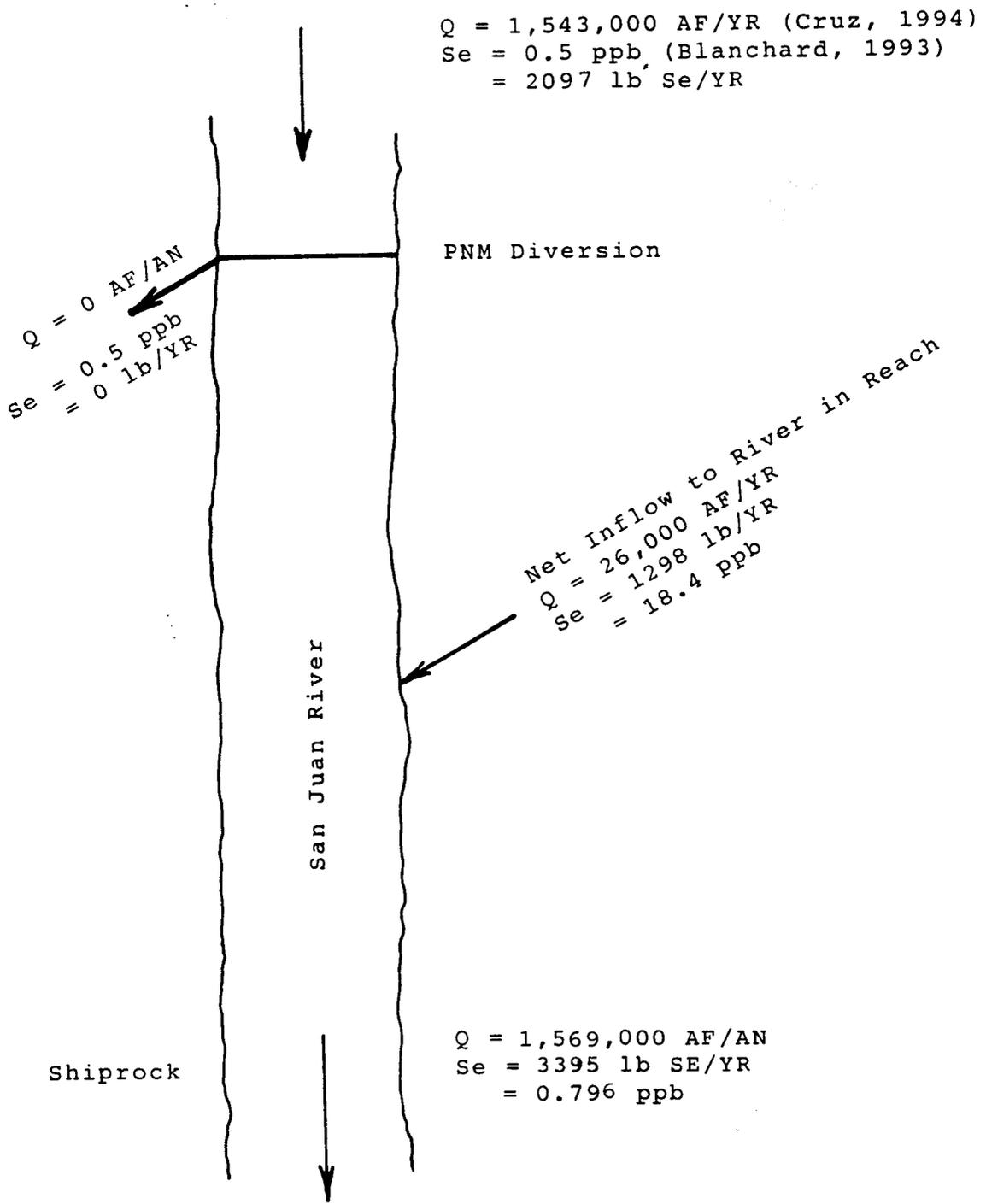


FIGURE 2

WATER AND SELENIUM BALANCE WITH
 PNM DIVERSION AT 0 AF/YR
 NO PNM DIVERSION

$Q = 1,543,000 \text{ AF/YR}$ (Cruz, 1994)
 $Se = 0.5 \text{ ppb}$ (Blanchard, 1993)
 $= 2097 \text{ lb Se/YR}$

$Q = 16,200 \text{ AF/AN}$
 $Se = 0.5 \text{ ppb}$
 $= 22 \text{ lb/YR}$

PNM Diversion

Net Inflow to River in Reach
 $Q = 26,000 \text{ AF/YR}$
 $Se = 1298 \text{ lb/YR}$
 $= 18.4 \text{ ppb}$

San Juan River

Shiprock

$Q = 1,552,800 \text{ AF/AN}$
 $Se = 3373 \text{ lb Se/YR}$
 $= 0.799 \text{ ppb}$

FIGURE 3

WATER AND SELENIUM BALANCE WITH
PNM DIVERSION AT 16,200 AF/YR
ONLY USBR CONTRACT DIVERSION

$Q = 1,543,000$ AF/YR (Cruz, 1994)
 $Se = 0.5$ ppb (Blanchard, 1993)
 $= 2097$ lb Se/YR

$Q = 24,200$ AF/AN
 $Se = 0.5$ ppb
 $= 33$ lb/YR

PNM Diversion

Net Inflow to River in Reach
 $Q = 26,000$ AF/YR
 $Se = 1298$ lb/YR
 $= 18.4$ ppb

San Juan River

Shiprock

$Q = 1,544,800$ AF/AN
 $Se = 3362$ lb Se/YR
 $= 0.801$ ppb

FIGURE 4
WATER AND SELENIUM BALANCE WITH
PNM DIVERSION AT 24,200 AF/YR
MAXIMUM DIVERSION

TABLE 3
PNM DIVERSION vs. SELENIUM
CONCENTRATION IN THE SAN JUAN RIVER
AT SHIPROCK

PNM DIVERSION (AF/YR)	DISSOLVED SELENIUM CONCENTRATION AT SHIPROCK (ug/l or ppb)	SCENARIO
0	0.796	No PNM Diversion
16,200	0.799	Only USBR Contract Diversion
20,000	0.800	Average Historic Diversion
24,200	0.801	Maximum PNM Diversion

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Cruz, R.R. et al. 1994. Water Resources Data, New Mexico. U.S. Geological Survey Water-Data Report. Prepared in cooperation with the State of New Mexico and with other agencies.

APPENDIX C

**AGREEMENT BETWEEN THE NAVAJO NATION, SAN JUAN RIVER DINEH
WATER USERS, INC., PNM, AND THE BUREAU OF RECLAMATION**

SOUTHERN UTE INDIAN TRIBE LETTER

UTE MOUNTAIN UTE TRIBE LETTER

E. Jensen

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Reply to Santa Fe Office

March 21, 2001

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Dick G.			
Rob W.			

Errol Jensen
Bureau of Reclamation
835 East 2nd Ave
Suite 300
Durango, CO 81301

**Re: Agreement between the Navajo Nation, San Juan River Dinch
Water Users, Inc., PNM and the Bureau of Reclamation**

Dear Mr. Jensen:

Please find enclosed a copy of a resolution of the Jicarilla Apache Nation Legislative Council regarding the above-referenced agreement. This resolution responds to your question regarding whether the Jicarilla Apache Nation has any objection to the agreement. As stated on page 2 of the resolution, "the Jicarilla Apache Nation has no objection to the proposed agreement . . . provided that the revisions stated [in the resolution] are incorporated into the agreement" (emphasis added). Please call me if you have any questions.

Sincerely,

NORDHAUS, HALTOM, TAYLOR,
TARADASH & BLADH, LLP

Susan G. Jordan

Susan G. Jordan

**NORDHAUS HALTOM TAYLOR
TARADASH & BLADH, LLP**

ATTORNEYS AT LAW

Mr. Jensen
March 21, 2001
Page 2

SGJ:sab

Enclosures: 1. Jicarilla Apache Nation Resolution No. 2001-R-115-03. "Agreement Between the Navajo Nation, San Juan River Dineh Water Users, Inc., Public Service Company of New Mexico and the United States Bureau of Reclamation," and said agreement attached as Attachment A.

cc (w/encl.): Stanley M. Pollack, Esq., Water Rights Counsel, Navajo Nation Department of Justice
Cindy Murray, Esq., PNM
Mike Hamman, Water Administrator, Jicarilla Apache Nation
Joe Muniz, Director, Department of Natural Resources, Jicarilla Apache Nation
Kurt Sandoval, Chairman, Water Commission, Jicarilla Apache Nation
Lester K. Taylor, Esq.



THE JICARILLA APACHE TRIBE

P.O. BOX 507 • DULCE, NEW MEXICO 87528

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RESOLUTION OF THE LEGISLATIVE COUNCIL

NATURAL RESOURCES/WATER ADMINISTRATION AND COMMISSION

Re: Agreement Between the Navajo Nation, San Juan River Diné Water Users, Inc.,
Public Service Company of New Mexico and the United States Bureau of
Reclamation

Resolution No. 2001-R-115-03

WHEREAS, Article XI, Section 1(a)(3) of the Revised Constitution of the Jicarilla Apache Nation (1987) ("Revised Constitution") authorizes the Legislative Council to manage the development of the Nation's natural resources for the general welfare of the Nation as a whole; and

WHEREAS, the Jicarilla Apache Tribe Water Rights Settlement Act, Pub. L. No. 102-441, 106 Stat. 2237 (1992), as modified by Pub. L. No. 104-261, 110 Stat. 3176 (1996) and Pub. L. No. 105-256, 112 Stat. 1896 (1998) ("Settlement Act") authorized a contract between the Jicarilla Apache Tribe and the United States; and

WHEREAS, as more specifically stated in the Settlement Act, the Nation has an adjudicated right to divert 33,500 acre-feet per year ("afy") of water from the San Juan River and 6,500 afy from the San Juan-Chama Project for its future use; and

WHEREAS, Section 7 of the Settlement Act provides that the Nation may enter into subcontracts with third parties for the sublease of these future use water rights outside of the Jicarilla Apache Indian Reservation, subject to the approval of the Secretary of the Interior and consistent with applicable law; and

WHEREAS, the Public Service Company of New Mexico ("PNM") has a contract with the United States for the right to deplete and use in the operation of the San Juan Generating Station 16,200 afy of water from the San Juan River through December 31, 2005; and

WHEREAS, while PNM was seeking to renew and extend the term of its contracts with the United States, PNM and the Nation entered into water leasing negotiations; and

WHEREAS, on June 30, 2000, by Resolution Number 2000-R-248-06, the Legislative Council authorized the President to execute a Water Supply Agreement between the Jicarilla Apache Nation and PNM for the sublease of 16,200 afy of the Nation's Settlement Act water rights through the year 2027 (the "Subcontract"); and

**RESOLUTION OF THE LEGISLATIVE COUNCIL
NATURAL RESOURCES/WATER ADMINISTRATION AND COMMISSION**

**Re: Agreement Between the Navajo Nation, San Juan River Dineh Water Users, Inc., Public Service Company of New Mexico and the
United States Bureau of Reclamation**

Resolution No. 2001-R-115-03

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**WHEREAS, the Nation is awaiting the Secretary of Interior's approval of the Subcontract;
and**

**WHEREAS, the Navajo Nation submitted to the United States Bureau of Reclamation
written objections to PNM's proposal to extend and renew its contract; and**

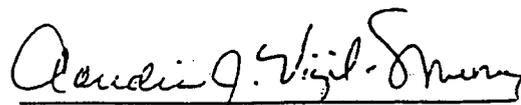
**WHEREAS, under a proposed agreement between the Navajo Nation, San Juan River Dineh
Water Users, Inc., Public Service Company of New Mexico and the United States Bureau of
Reclamation (attached hereto as "Exhibit A"), Reclamation would fund studies and improvements to
certain Navajo irrigation projects on the San Juan River, PNM would make payments to a mitigation
fund for the benefit of the Dineh Water Users, and the Navajo Nation would agree to "not object to
the continuation of (PNM's contract with the United States) through December 31, 2005, or to the
approval by the Secretary, or his designee, or to any other federal or state approvals necessary for the
Jicarilla Subcontract, or depletions there under PNM; and**

**WHEREAS, the phrase in Section 2.1 of Exhibit A "for so long as PNM is able to take full
delivery of water under the Jicarilla Subcontract" may be misleading because delivery of water to
PNM under the Subcontract is subject to applicable shortage sharing requirements.**

**NOW, THEREFORE, BE IT RESOLVED by the Legislative Council of the Jicarilla
Apache Nation that, the Jicarilla Apache Nation requests the Navajo Nation, San Juan River
Dineh Water Users, Inc., Public Service Company of New Mexico and the United States
Bureau of Reclamation to revise the tenth whereas clause of their proposed agreement
attached to this resolution as Attachment A by changing the words "deplete up to 32,000 AF"
to "divert up to 33,500 AF".**

**BE IT FURTHER RESOLVED by the Legislative Council of the Jicarilla Apache
Nation that, the Jicarilla Apache Nation requests the above mentioned parties to revise Section
2.1 of their proposed agreement by striking the word "full" in the phrase "for so long as PNM
is able to take full delivery of water under the Jicarilla Subcontract."**

**BE IT FURTHER RESOLVED by the Legislative Council of the Jicarilla Apache
Nation that, the Jicarilla Apache Nation has no objection to the proposed agreement between
the Navajo Nation, San Juan River Dineh Water Users, Inc., Public Service Company of New
Mexico and the United States Bureau of Reclamation attached to this resolution as Attachment
A, provided that the revisions stated above are incorporated into the agreement.**



Claudia J. Vigil-Muniz, President

RESOLUTION OF THE LEGISLATIVE COUNCIL
NATURAL RESOURCES/WATER ADMINISTRATION AND COMMISSION

Re: Agreement Between the Navajo Nation, San Juan River Dineh Water Users, Inc., Public Service Company of New Mexico and the
United States Bureau of Reclamation

Resolution No. 2001-R-115-03

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CERTIFICATION

The foregoing Resolution was enacted by the Legislative Council of the Jicarilla Apache Nation on the 1st day of March, 2001, by a vote of 7 for, 0 against, and 0 abstaining, at a duly-called meeting at which a quorum of the Legislative Council members was present.

ATTEST:



Tribal Secretary



SOUTHERN UTE INDIAN TRIBE

E. J. ...
MAR 13 '01

CLASS			
FOUNDER	11/17/03		
PROJECT	NW 1039		
CONTROL #	1000 509		
NAME	DATE	INITIAL	CYS
<i>David</i>			1
<i>David</i>			
<i>E. J. ...</i>			

March 8, 2001

Mr. Pat Schumacher
 Four Corners Division Manager
 Department of the Interior
 Bureau of Reclamation
 835 East 2nd Street, Suite 300
 Durango, Colorado 81301-5475

Re: Jicarilla Apache Tribe Subcontract with PNM

Dear Mr. Schumacher:

I am writing to advise you that the Southern Ute Indian Tribe ("Tribe") supports the subcontract between the Jicarilla Apache Tribe ("JAT") and the Public Service Company of New Mexico ("PNM") under which the JAT will supply PNM with 16,200 acre feet per year of water allocated to the JAT under the terms of the JAT water rights settlement. The Tribe's support is based on the understanding that this arrangement is acceptable to the Navajo Nation and the Ute Mountain Ute Indian Tribe.

Please contact me or Scott McElroy, the Tribe's special counsel for water right matters, if you have further questions about this issue.

Sincerely,
 SOUTHERN UTE INDIAN TRIBE

Leonard C. Burch
 Leonard C. Burch
 Chairman

cc: Sam Maynes
 Scott McElroy



OFFICE OF THE CHAIRMAN

Ernest House, Sr.
Chairman
Ute Mountain Ute Tribe

P.O. Box JJ
Towaoc, CO 81334
(970) 564-5601
(970) 564-5613 Fax
e-mail address: ehous@utemountain.org

August 31, 2001

Pat Schumacher
Bureau of Reclamation
825 East 2nd Street, Ste 300
Durango, CO 81301

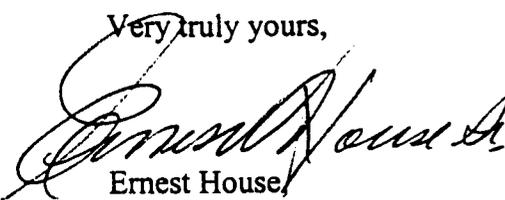
Re: Jicarilla Apache Tribe Sub-contract with PNM

Dear Mr. Schumacher:

The Ute Mountain Ute Tribe supports the sub-contract between the Jicarilla Apache Tribe and Public Service Company of New Mexico under which the Apache Tribe will supply PNM with 16,200 af of water per year allocated under the terms of the Jicarilla 1992 Water Rights Settlement.

The Ute Mountain Ute Tribe's support is based on our understanding that this arrangement is acceptable to the Navajo Nation and the Southern Ute Tribe. Our support is also subject to the following condition. The Tribe has water rights in Colorado with an 1868 priority which does not yet have an ESA depletion. At the same time the Tribe has water right claims in New Mexico which pre-date the 1955 and 1956 priority date of the Jicarilla Apache Tribe water supply. The Tribe, must, accordingly reserve its right at some future time to assert both ESA and New Mexico water right claims against the Jicarilla Apache Tribe contract in the event that this contract becomes an obstacle to satisfaction of the Tribal claims. We are hopeful that such a conflict will not occur, but we are compelled to include this condition to our support.

Very truly yours,


Ernest House,
Chairman
Ute Mountain Ute Tribe

cc: David Liberman, Esq.
Dan Israel, Esq.