



## CONTENTS

	Page
<b>Chapter I – Introduction</b>	
Purpose of and Need for the Proposed Project .....	I-1
The Proposed Project .....	I-1
Scope.....	I-3
The Proposed Project Area .....	I-4
Navajo Nation .....	I-4
Jicarilla Apache Nation.....	I-4
City of Gallup .....	I-4
Proposed Project Authorization, Related Agreements, and Resolutions.....	I-5
Reclamation .....	I-5
Water Resource Development Strategy of the Navajo Nation .....	I-6
City of Gallup and the Navajo Nation .....	I-6
Upper Colorado River Commission.....	I-7
State of New Mexico/Navajo Nation Negotiations .....	I-7
Jicarilla Apache Tribal Council Resolution(s).....	I-10
Cooperating Agencies, Public Involvement, and Scoping.....	I-10
Previous Studies.....	I-11
Other Projects and Actions in the San Juan River Basin .....	I-11
San Juan River Basin in New Mexico Navajo Nation Water Rights	
Settlement Agreement.....	I-12
Navajo Indian Irrigation Project .....	I-12
San Juan River Basin Recovery Implementation Program.....	I-13
Animas-La Plata Project .....	I-15
Navajo Reservoir Operations (Navajo Unit of the Colorado	
River Storage Project).....	I-16
San Juan-Chama Project .....	I-16
Other Related Actions.....	I-17
Water Rights Background.....	I-17
Indian Water Rights .....	I-17
Non-Indian Water Rights.....	I-18
Responsibilities and Compliance.....	I-19
Environmental.....	I-19
Cultural Preservation .....	I-20
American Indian.....	I-20
Other .....	I-20

	Page
<b>Chapter I – Introduction</b> (continued)	
Document Review.....	I-20
Document Organization.....	I-22
<b>Chapter II – Need for Action</b>	
Introduction.....	II-1
Navajo Nation and Gallup, New Mexico – Problem Identification.....	II-2
Navajo Nation .....	II-2
City of Gallup .....	II-2
Navajo Nation and Gallup, New Mexico – Problem Quantification .....	II-3
Population Projections .....	II-3
Water Resource .....	II-3
Water Infrastructure .....	II-11
City of Gallup .....	II-11
Jicarilla Apache Nation – Problem Identification.....	II-12
Jicarilla Apache Nation – Problem Quantification .....	II-13
Water Demand .....	II-14
<b>Chapter III – Opportunities/Resources and Constraints</b>	
Introduction.....	III-1
Proposed Project Water Opportunities/Resources and Issues .....	III-2
Proposed Project Water Supply in New Mexico .....	III-2
Acquisition of Private Water Rights .....	III-2
A San Juan River Water Contract with the U.S Department of the Interior.....	III-3
Contract Water from the Jicarilla Apache Nation.....	III-7
Navajo Indian Irrigation Project Water.....	III-7
Other Navajo Nation Water .....	III-9
Proposed Project Water Supply in Arizona .....	III-10
Central Arizona Project or Other Main Stem Arizona Lower Basin Colorado River Water.....	III-10
Arizona Upper Colorado River Basin Water .....	III-10
Navajo Nation .....	III-11
Existing Opportunities/Resources.....	III-11
Constraints .....	III-13
Jicarilla Apache Nation.....	III-13
Existing Opportunities/Resources.....	III-13
Constraints .....	III-14
City of Gallup .....	III-15
Existing Opportunities/Resources.....	III-15
Constraints .....	III-17

	Page
<b>Chapter IV – Alternatives</b>	
Introduction.....	IV-1
Plan Formulation Process .....	IV-2
The No Action Alternative.....	IV-3
Nonstructural Alternatives .....	IV-4
Water Conservation .....	IV-4
Water Reuse .....	IV-5
Structural Alternatives .....	IV-5
Introduction.....	IV-5
Basic Design Considerations .....	IV-6
Conjunctive Use of Groundwater and Aquifer Storage.....	IV-7
Delivery Data .....	IV-8
Commonalities of the Structural Alternatives.....	IV-9
Surface Water Diversions .....	IV-11
NIIP Alternatives .....	IV-11
San Juan River Alternatives.....	IV-11
Description of the Alternatives .....	IV-13
NIIP Moncisco Alternative .....	IV-13
NIIP Cutter Alternative.....	IV-14
NIIP Coury Lateral Alternative .....	IV-14
NIIP Amarillo Alternative .....	IV-15
SJRPNM Alternative .....	IV-15
San Juan River Infiltration Alternative .....	IV-16
Overall Operational Configuration .....	IV-16
Other Alternative Cost Attributes .....	IV-18
Land, Relocations, and Damages.....	IV-18
Environmental Mitigation.....	IV-19
Cultural Resources .....	IV-19
Screening Process .....	IV-19
The Principles and Guidelines .....	IV-20
The Four Tests of Viability.....	IV-20
The Four Accounts.....	IV-21
Comparative Total Costs of the Alternatives.....	IV-21
Alternatives Comparison and Weighting.....	IV-23
Comparison of Alternatives by All Factors .....	IV-24
Alternatives Considered but Eliminated .....	IV-27
Nonstructural Alternatives Eliminated .....	IV-27
Structural Alternatives Eliminated.....	IV-28
Preferred Alternative Selection.....	IV-29
<b>Chapter V – Affected Environment and Environmental Consequences</b>	
Introduction.....	V-1

	Page
<b>Chapter V – Affected Environment and Environmental Consequences (continued)</b>	
Setting .....	V-2
Navajo Reservoir Operations .....	V-4
Affected Resources .....	V-4
Water Uses and Resources.....	V-5
Water Uses and Resources – Affected Environment.....	V-5
Water Uses and Resources – Methodology .....	V-13
Water Uses and Resources – Impact Indicators.....	V-13
Water Uses and Resources – Impacts Analysis .....	V-14
Water Uses and Resources – Mitigation Measures.....	V-17
Water Resources and Uses – Summary of Impacts .....	V-18
Indian Trust Assets .....	V-18
Indian Trust Assets – Affected Environment.....	V-19
Indian Trust Assets – Methodology .....	V-30
Indian Trust Assets – Impacts Analysis.....	V-30
Indian Trust Assets – Mitigation Measures .....	V-32
Indian Trust Assets – Summary of Impacts .....	V-32
Water Quality.....	V-32
Water Quality – Affected Environment.....	V-33
Water Quality – Methodology .....	V-37
Water Quality – Impacts Analysis .....	V-39
Water Quality – Mitigation Measures.....	V-41
Water Quality – Summary of Impacts .....	V-42
Vegetation Resources.....	V-42
Vegetation Resources – Affected Environment.....	V-43
Vegetation Resources – Methodology .....	V-45
Vegetation Resources – Impacts Analysis.....	V-46
Vegetation Resources – Mitigation Measures .....	V-48
Vegetation Resources – Summary of Impacts .....	V-50
Wildlife Resources.....	V-50
Wildlife Resources – Affected Environment.....	V-51
Wildlife Resources – Methodology .....	V-53
Wildlife Resources – Impacts Analysis .....	V-53
Wildlife Resources – Mitigation Measures.....	V-55
Wildlife Resources – Summary of Impacts .....	V-56
Aquatic Resources .....	V-56
Aquatic Resources – Affected Environment.....	V-57
Aquatic Resources – Methodology .....	V-65
Aquatic Resources – Impacts Analysis.....	V-66
Aquatic Resources – Mitigation Measures .....	V-70
Aquatic Resources – Summary of Impacts .....	V-70
Special Status Species.....	V-70

	Page
<b>Chapter V – Affected Environment and Environmental Consequences (continued)</b>	
Special Status Species – Affected Environment.....	V-71
Special Status Species – Methodology .....	V-83
Special Status Species – Impacts Analysis .....	V-83
Special Status Species – Mitigation Measures.....	V-87
Special Status Species – Summary of Impacts .....	V-93
Recreation .....	V-93
Recreation – Affected Environment .....	V-94
Recreation – Methodology .....	V-99
Recreation – Impacts Analysis.....	V-100
Recreation – Mitigation Measures .....	V-104
Recreation – Summary of Impacts.....	V-104
Land Use .....	V-104
Land Use – Affected Environment .....	V-104
Land Use – Methodology.....	V-107
Land Use – Impacts Analysis .....	V-108
Land Use – Mitigation Measures .....	V-111
Land Use – Summary of Impacts.....	V-111
Hazardous Materials .....	V-111
Hazardous Materials – Affected Environment .....	V-112
Hazardous Materials – Methodology .....	V-112
Hazardous Materials – Impacts Analysis.....	V-113
Hazardous Materials – Mitigation Measures .....	V-113
Hazardous Materials – Summary of Impacts.....	V-114
Soils.....	V-114
Soils – Affected Environment.....	V-114
Soils – Methodology .....	V-116
Soils – Impacts Analysis.....	V-116
Soils – Mitigation Measures .....	V-118
Soils – Summary of Impacts.....	V-118
Geology.....	V-119
Geology – Affected Environment.....	V-119
Geology – Impacts Analysis .....	V-122
Geology – Mitigation Measures.....	V-122
Paleontologic Resources .....	V-122
Paleontologic Resources – Affected Environment .....	V-123
Paleontologic Resources – Methodology.....	V-123
Paleontologic Resources – Impacts Analysis .....	V-124
Paleontologic Resources – Mitigation Measures.....	V-124
Paleontologic Resources – Summary of Impacts.....	V-124
Air Quality and Noise .....	V-125
Air Quality and Noise – Affected Environment .....	V-126

	Page
<b>Chapter V – Affected Environment and Environmental Consequences</b> (continued)	
Air Quality and Noise – Methodology.....	V-126
Air Quality and Noise – Impacts Analysis .....	V-126
Air Quality and Noise – Mitigation Measures .....	V-128
Air Quality and Noise – Summary of Impacts.....	V-128
Socioeconomics .....	V-128
Socioeconomics – Affected Environment .....	V-129
Socioeconomics – Methodology .....	V-130
Socioeconomics – Impacts Analysis.....	V-130
Socioeconomics – Mitigation Measures .....	V-132
Socioeconomics – Summary of Impacts.....	V-133
Environmental Justice .....	V-133
Environmental Justice – Introduction .....	V-133
Environmental Justice – Affected Environment .....	V-134
Environmental Justice – Methodology .....	V-134
Environmental Justice – Impacts Analysis .....	V-134
Environmental Justice – Mitigation Measures.....	V-134
Environmental Justice – Summary of Impacts .....	V-134
Cultural Resources .....	V-134
Cultural Resources – Introduction .....	V-135
Cultural Resources – Affected Environment .....	V-135
Cultural Resources – Methodology .....	V-138
Cultural Resources – Impacts Analysis .....	V-139
Cultural Resources – Mitigation Measures .....	V-140
Cultural Resources – Summary of Impacts .....	V-142
Biodiversity and Sustainability .....	V-142
Climate Change.....	V-144
Other Impacts Considerations.....	V-145
Indirect Effects.....	V-145
Connected, Cumulative, and Related Actions .....	V-146
Navajo Reservoir Operations and the San Juan River Basin	
Recovery Implementation Program .....	V-147
Animas-La Plata Project .....	V-148
Navajo Indian Irrigation Project and San Juan River	
Irrigation Projects.....	V-148
Desert Rock Energy Project.....	V-150
Jicarilla Apache Nation Navajo River Water Supply Project.....	V-151
Cumulative Impacts .....	V-152
Operation of Navajo Dam.....	V-152
Animas-La Plata Project .....	V-153
Navajo Indian Irrigation Project .....	V-153
Desert Rock Energy Project.....	V-154

	Page
<b>Chapter V – Affected Environment and Environmental Consequences</b> (continued)	
Jicarilla Apache Nation Navajo River Water Supply Project .....	V-154
San Juan River Basin in New Mexico Navajo Nation Water Rights Settlement Agreement.....	V-154
Relationship Between Short-Term Uses and Long-Term Productivity .....	V-155
Long-Term Benefits and Productivity .....	V-155
Short-Term Uses of Resources .....	V-156
Irreversible and Irretrievable Commitments of Resources .....	V-157
Conclusions and Summary of Impacts .....	V-158
<b>Chapter VI – Environmental Commitments and Mitigation Measures</b>	
Introduction.....	VI-1
General Commitments .....	VI-1
Navajo Reservoir Operations .....	VI-2
Water Uses and Resources Commitments .....	VI-2
Navajo Depletion Guarantee .....	VI-3
Indian Trust Assets Commitments.....	VI-6
Water Quality Commitments .....	VI-6
Vegetation Commitments .....	VI-7
Wildlife Commitments.....	VI-7
Aquatic Resources Commitments.....	VI-8
Special Status Species Commitments .....	VI-8
Recreation Commitments.....	VI-9
Land Use Commitments .....	VI-9
Hazardous Materials Commitments.....	VI-10
Soils Commitments.....	VI-10
Geology Commitments .....	VI-10
Paleontologic Commitments.....	VI-10
Air Quality and Noise Commitments .....	VI-10
Socioeconomics Commitments.....	VI-11
Environmental Justice Commitments .....	VI-11
Cultural Resources Commitments .....	VI-11
<b>Chapter VII – Consultation and Coordination</b>	
Introduction.....	VII-1
Public Involvement .....	VII-1
Scoping Process .....	VII-1
Scoping Meetings.....	VII-1
Scoping Issues.....	VII-2
Public Review of the Planning Report and Draft Environmental Impact Statement .....	VII-3

	Page
<b>Chapter VII – Consultation and Coordination</b> (continued)	
Public Comments .....	VII-3
Public Hearings .....	VII-4
Agency Consultation and Coordination .....	VII-4
Coordination Activities .....	VII-4
Consultation Activities.....	VII-4
U.S. Fish and Wildlife Service .....	VII-4
Environmental Protection Agency/U.S. Army Corps of Engineers .....	VII-9
Cultural Resources .....	VII-9
Navajo-Gallup Steering Committee.....	VII-11
The Upper Colorado River Commission .....	VII-11
The Arizona Department of Water Resources .....	VII-12
San Juan River Basin Recovery Implementation Program.....	VII-12
Other Consultation/Coordination Functions .....	VII-12
Distribution List.....	VII-13

## **Chapter VIII – Permits, Approvals, and Regulatory Requirements**

Introduction.....	VIII-1
Endangered Species Act .....	VIII-2
Clean Water Act.....	VIII-2
Cultural Resource Laws and Policies .....	VIII-2
Other Regulatory Requirements .....	VIII-4

## **List of Preparers**

## **Bibliography**

## **Glossary**

## **Index**

## Tables

Table	Page
I-1 State of New Mexico schedule of anticipated Upper Basin depletions (May 2006).....	I-8
II-1 Projected population in the proposed project service area by basin .....	II-3
II-2 Municipal water demand by basin for the proposed project ( <b>2020</b> ) .....	II-4
II-3 Municipal water demand by basin for the proposed project ( <b>2040</b> ) .....	II-5
II-4 Chapter water demand for the proposed project ( <b>2020</b> ) .....	II-6
II-5 Chapter water demand for the proposed project ( <b>2040</b> ) .....	II-8
II-6 Projected municipal demand (excluding Navajo Agricultural Products Industry) in the proposed project service area by basin.....	II-10
II-7 Population projections for the Jicarilla Apache Nation .....	II-13
II-8 Projected water needs for the Jicarilla Apache Nation .....	II-14
III-1 Proposed project service area municipal water production during 2005 .....	III-12
IV-1 General summary of components .....	IV-10
IV-2 Gallup Regional System .....	IV-10
IV-3 Application of the viability tests .....	IV-21
IV-4 Present worth of alternatives (2001 \$) .....	IV-22
IV-5 Alternative selection criteria (May 14, 2003) .....	IV-25
IV-6 Alternative comparison for environmental factors (May 14, 2003) .....	IV-26
V-1 New Mexico permits held by the United States.....	V-8
V-2 Preliminary list of San Juan River water rights between Navajo Dam and the Animas River confluence .....	V-9
V-3 Baseline and current depletion summary in the Basin.....	V-11
V-4 Navajo Reservoir content and releases for the alternatives .....	V-16
V-5 Summary of major existing and future Tribal uses of Basin water .....	V-22
V-6 Historical (1950–98) water quality measurements on the San Juan River .....	V-35
V-7 Acres of affected vegetation within the proposed project area.....	V-47
V-8 Fishes documented in the Basin.....	V-58
V-9 Summary of flow statistics for the SJRPNM Alternative .....	V-67
V-10 Threatened or endangered species (section 7) .....	V-72
V-11 Estimated angler use below Navajo Reservoir .....	V-101
V-12 Land ownership within the project area.....	V-106
V-13 Land ownership within 1 mile and 500 feet of the SJRPNM Alternative pipeline route within the proposed project area.....	V-109
V-14 Land ownership within 1 mile and 500 feet of the NIIP Amarillo Alternative pipeline route within the proposed project area.....	V-110
V-15 Geologic formations within the proposed project area .....	V-121

Tables (continued)

<b>Table</b>		<b>Page</b>
V-16	Air quality criteria pollutants and regulatory limits.....	V-127
V-17	Summary of impacts .....	V-160
VI-1	Summary depletions for full proposed project development .....	VI-4
VII-1	Agencies and organizations that participated in the project consultation and coordination process .....	VII-5
VIII-1	Federal, State, local, and Tribal permit approval and consultation requirements.....	VIII-5
VIII-2	Contracts, legislation, and agreements that may apply to the proposed project.....	VIII-9

Figures

<b>Figure</b>		<b>Page</b>
I-1	Proposed project area.....	I-3
I-2	Colorado pikeminnow and razorback sucker.....	I-14
III-1	City of Gallup historic annual water demand .....	III-15
III-2	City of Gallup static water table .....	III-16
IV-1	NIIP Moncisco Alternative .....	follows IV-14
IV-2	NIIP Cutter Alternative.....	follows IV-14
IV-3	NIIP Coury Lateral Alternative .....	follows IV-14
IV-4	NIIP Amarillo Alternative .....	follows IV-16
IV-5	SJRPNM Alternative .....	follows IV-16
IV-6	San Juan River Infiltration Alternative .....	follows IV-16
V-1	River mile locations and gauging stations .....	V-3
V-2	Hydrograph of San Juan River at Shiprock .....	V-7
V-3	Gap analysis vegetation classification within the project service area.....	V-44
V-4	San Juan RM locations.....	V-60
V-5	Special status wildlife within the proposed project area.....	V-74
V-6	Special status plant species within the proposed project area.....	V-82
V-7	San Juan River segments and general recreation areas potentially affected by the proposed project .....	V-95
V-8	Land ownership within the proposed project area .....	V-105
V-9	General soil classifications within the proposed project area .....	V-115
V-10	Geologic formations within the proposed project area .....	V-120

## Attachments

### **Attachment**

- A** Memorandum of Agreement between the City of Gallup and the Navajo Nation to Cooperate on the Navajo-Gallup Water Supply Project (IGRF-33-98)
- B** Memorandum of Understanding between the Navajo Nation and the City of Gallup Concerning Water Supplies for the Navajo-Gallup Water Supply Project (October 2007)
- C** Resolution of the Resources Committee of the Navajo Nation Council
- D** Resolutions of the Navajo Nation Chapters
- E** Resolutions of the Upper Colorado River Commission
- F** Letter from Jicarilla Apache Tribe to the Bureau of Reclamation (February 16, 2001)
- G** Letter from Honorable Kelsey A. Begaye, President of the Navajo Nation, and Honorable John Peña, Mayor of the city of Gallup, to Eluid Martinez, Commissioner of the Bureau of Reclamation (November 22, 2000)
- H** Letters from Eluid L. Martinez, Commissioner of the Bureau of Reclamation (December 26, 2000), and Rick L. Gold, Regional Director, Upper Colorado Regional Office, to Honorable Kelsey A. Begaye, President of the Navajo Nation, and Honorable John Peña, Mayor of the city of Gallup (June 13, 2001)
- I** Preferred Alternative
- J** Screening Report
- K** Vegetation
- L** List of Wildlife Found in the Project Area and Habitat Associations
- M** Soil and Geology Descriptions
- N** Hydrologic Determination, 2007, Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico

Attachments (continued)

**Attachment**

- O** Principles for Conducting Endangered Species Act Section 7 Consultations on Water Development and Water Management Activities Affecting Endangered Fish Species in the San Juan River Basin
- P** Northwestern New Mexico Rural Water Projects Act (Public Law 111-11, title X, subtitle B)

*Under separate cover:*

- Volume II** Technical Appendices for the Planning Report and Final Environmental Impact Statement
- Volume III** Comments and Responses for the Planning Report and Final Environmental Impact Statement