

Animas-La Plata Project

Colorado-New Mexico

Draft Supplement to the 1980 Final
Environmental Statement



October 1992

United States
Department of the Interior



Bureau of Reclamation



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MISSION STATEMENTS

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural and cultural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting citizen participation in their care. The Department also has a major responsibility for American Indian Reservation Communities and for people who live in Island Territories under U.S. Administration.

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

Draft Supplement to the Final Environmental Statement

Animas-La Plata Project

La Plata and Montezuma Counties, Colorado
and San Juan County, New Mexico

Prepared by the: U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Region

This document presents supplemental environmental information to the 1980 Final Environmental Statement for the Animas-La Plata Project (INT FES 80-18) (1980 FES). The document is prepared in compliance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and U.S. Bureau of Reclamation (Reclamation) NEPA procedures. The draft Supplement addresses information on design and other refinements since 1980, including phasing of construction, and new or updated information relevant to environmental concerns and project impacts that has become available since 1980. It also describes changed requirements for the certification of project lands for potential toxic or hazardous irrigation return flows, and it is intended to satisfy requirements for an exemption to the permitting process under Section 404(r) of the Clean Water Act (CWA). Reclamation is pursuing an exemption of additional project features from the requirement to obtain a CWA-section 404 permit for construction activities resulting in discharges of dredged or fill material into the waters of the United States. The Supplement includes a 404(b)(1) evaluation of additional project features that were described in the recommended plan but not included in the original 404(b)(1) evaluation attached to the 1980 FES.

The project would use flows of the Animas and La Plata Rivers for irrigation, municipal, and industrial uses and would also provide measures for fish and wildlife, recreation, and cultural resources. It would satisfy a portion of the water rights claims under the Colorado Ute Indian Water Rights Final Settlement Agreement of 1988.

Certain provisions of applicable statutory and regulatory requirements to be satisfied by this document include: Section 404(r), Clean Water Act; Endangered Species Act; Colorado River Basin Salinity Control Act; Archeological Resource Protection Act, 16 USC et seq.; Fish and Wildlife Coordination Act; National Historic Preservation Act; National Environmental Policy Act; Indian Self-Determination and Education Assistance Act; Colorado Ute Indian Water Rights Settlement Act (Public Law 100-585); Native American Graves Protection and Repatriation Act; and Public Laws 172 and 99-294, concerning land classification and potential hazardous materials.

For further information, please contact the Regional Director, Bureau of Reclamation, 125 South State Street, PO Box 11568, Salt Lake City, Utah 84147, or call (801) 524-5580.

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ANIMAS-LA PLATA PROJECT

COLORADO - NEW MEXICO

**DRAFT SUPPLEMENT TO THE
FINAL ENVIRONMENTAL STATEMENT**

October 1992

United States Department of the Interior

Bureau of Reclamation

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3	Environmental Commitment Plan
4	Final Draft Planning Aid Memorandum

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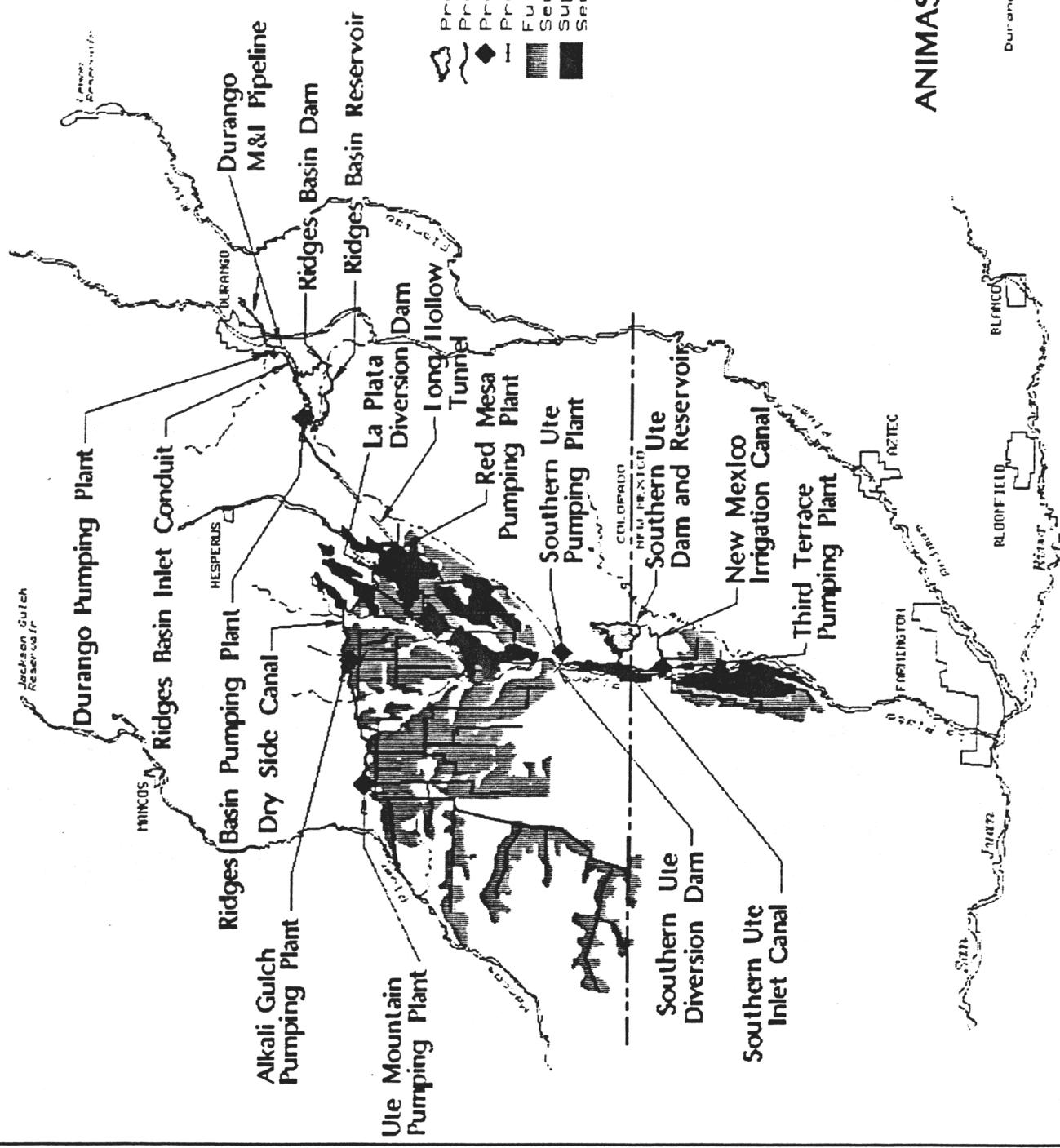
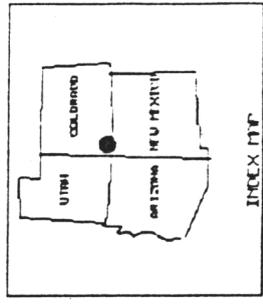
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PROJECT FEATURES

- Proposed Dam and Reservoir
- Proposed Canal
- Proposed Pumping Plant
- Proposed Pipeline
- Full Irrigation
- Service Land
- Supplemental Irrigation
- Service Land

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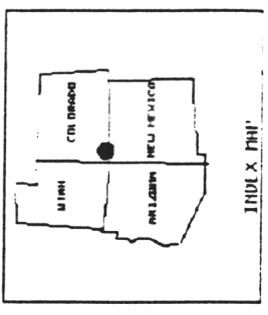
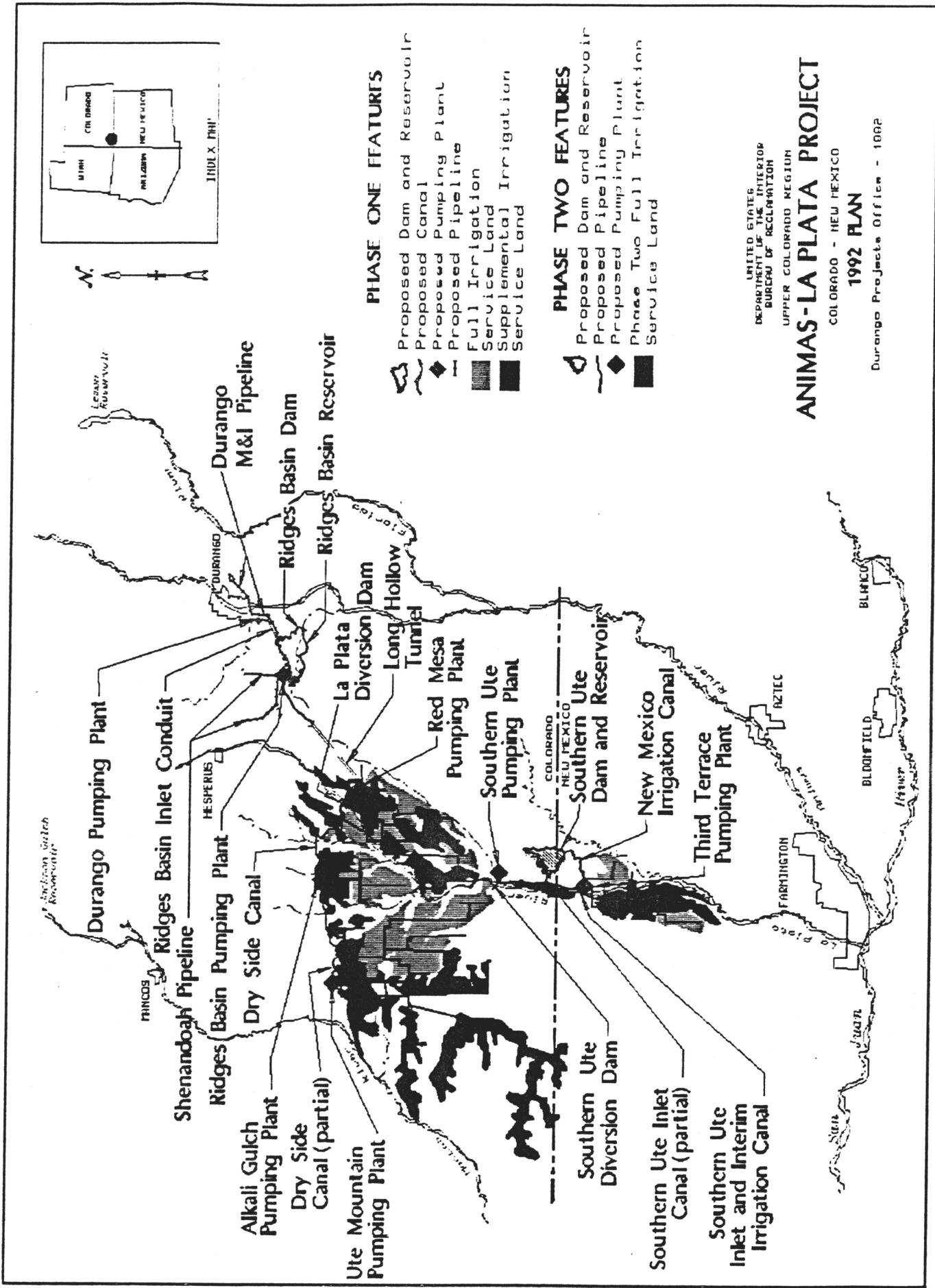
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1980 FFS PLAN

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PHASE ONE FEATURES

- Proposed Dam and Reservoir
- Proposed Canal
- Proposed Pumping Plant
- Proposed Pipeline
- Full Irrigation
- Service Land
- Supplemental Irrigation
- Service Land

PHASE TWO FEATURES

- Proposed Dam and Reservoir
- Proposed Pipeline
- Proposed Pumping Plant
- Phase Two Full Irrigation
- Service Land

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ANIMAS-LA PLATA PROJECT
1992 PLAN

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SUMMARY

Introduction

The Animas-La Plata Project (Project), located in La Plata and Montezuma Counties in southwestern Colorado and in San Juan County in northwestern New Mexico, was described in a 1979 Definite Plan Report and in the 1980 Final Environmental Statement (INT FES 80-18) (1980 FES). The Project would divert flows of the Animas and La Plata Rivers for irrigation, municipal, and industrial uses. It would also provide for fish and wildlife preservation, recreation facilities, and a cultural resources program. The Project purpose of providing a viable means to meet those identified needs remains unchanged. However, at present and in addition to providing agricultural, municipal, and industrial water, the Project also satisfies a portion of the Colorado Ute Indian water rights claims as specified by the Colorado Ute Indian Water Rights Settlement Agreement of 1988.

The Project was authorized for construction by the Colorado River Basin Project Act of September 30, 1968 (Public Law 90-537), as a participating project under the Colorado River Storage Project (CRSP) Act of April 11, 1956 (Public Law 84-485). The authorization was based on the feasibility report of the Secretary of the Interior transmitted to the U.S. Congress on May 4, 1966.

The purpose of this draft supplement (Supplement) to the 1980 FES is to provide additional information concerning environmental effects initially described in the 1980 FES. The supplemental information describes changes in the Project's environmental effects since 1980 as a result of design refinements, new information, or additional compliance requirements. The Bureau of Reclamation (Reclamation) is undertaking this Supplement to analyze new information and determine if refined, additional, or new environmental mitigation measures are needed for construction of the Project. The document also is intended to provide information for compliance with Project land certification requirements and Clean Water Act provisions.

The new or updated information included relates to vegetation, geology, soils, water quality, the Animas and La Plata Rivers aquatic resources, elk habitat, threatened and endangered species, wetlands and riparian habitat, cultural resources, recreation, and social/economic effects.

1992 Proposed Action

In summary, the Project would store water pumped from the Animas River in Ridges Basin Reservoir and would store water diverted from the La Plata and Animas Rivers in Southern Ute Reservoir. Irrigation water for lands in Colorado would be pumped from Ridges Basin Reservoir and conveyed through Dry Side Canal and/or diverted from the La Plata River from an existing or constructed diversion structure. Irrigation water for New Mexico would be stored in Southern Ute Reservoir, released to the New Mexico irrigation canal, and distributed through a piped lateral system.

Municipal and industrial (M&I) water for Durango would be pumped at the Durango Pumping Plant or released from Ridges Basin Reservoir and would be conveyed

through the Durango M&I pipeline or, for west subdivisions, the Shenandoah M&I pipeline. Water for the Ute Mountain Ute Tribe would be available from the Dry Side Canal and for the Southern Ute Indian Tribe from Southern Ute Reservoir.

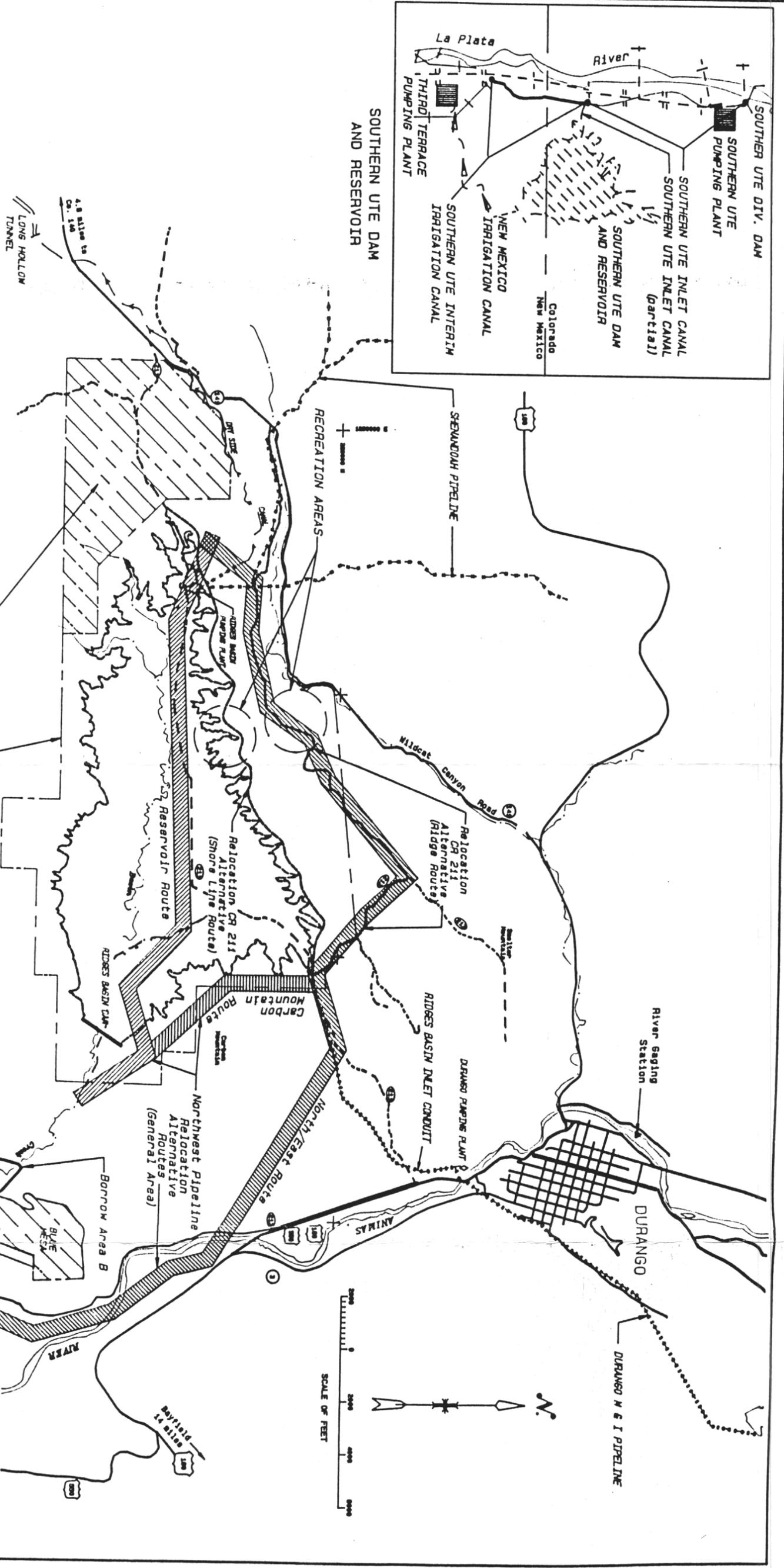
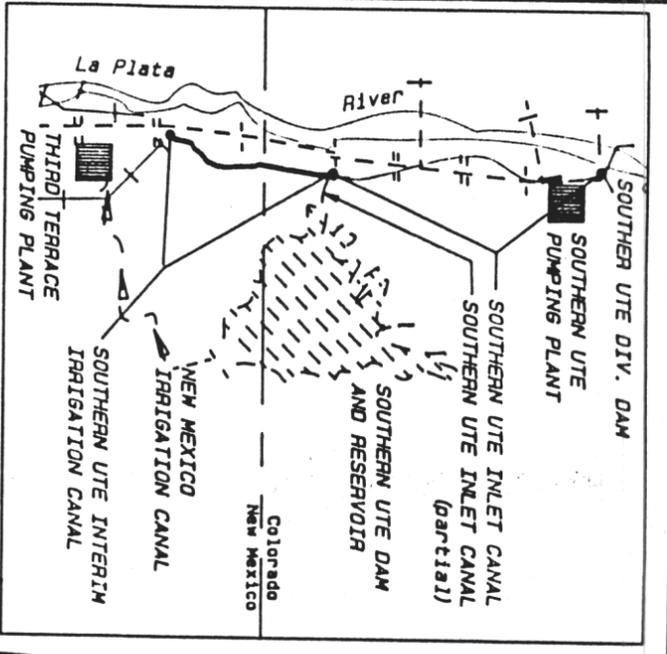
The total Project water supply would average 195,400 acre-feet for irrigation, municipal, and industrial use annually. About 115,300 acre-feet of the water supply would be used for irrigating 17,650 acres of Indian and non-Indian land presently being irrigated and 49,810 acres of Indian and non-Indian land now dry farmed or not under cultivation. An average annual M&I water supply of 40,000 acre-feet would be made available for communities in Colorado and New Mexico. An average annual supply of industrial water totaling 40,100 acre-feet would be provided to the Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and Navajo Nation.

Reclamation would proceed with construction of the three project features (Durango Pumping Plant, Ridges Basin Inlet conduit, and Ridges Basin Dam) in accordance with the Reasonable and Prudent Alternative (RPA).¹ Reclamation believes it is reasonably foreseeable that successful implementation of the RPA would lead to development and use of the full Project water supply. However, if future consultations with the Fish and Wildlife Service under Section 7 of the Endangered Species Act result in less than full Project water development, Reclamation would redesign the Project to utilize the allowable water supply. At that time, additional environmental analysis would be conducted, and National Environmental Policy Act compliance completed.

The Supplement discusses the following: relocations of Northwest and Mid-American Pipeline Company Pipelines and County Road 211; changes in the Durango area municipal water users delivery system; design refinements of the Durango Pumping Plant; interim extension of Southern Ute Inlet canal; realignment of Ridges Basin Inlet conduit; change in alignment and configuration of Ridges Basin Dam and features; construction materials access and sources changes; and modifications in recreation development at Ridges Basin Reservoir. Features are shown on figure S-1.

Because the Project would deliver water to lands or communities in two States and on three Indian Reservations (the Navajo Nation, Southern Ute Indian Tribe, and Ute Mountain Ute Tribe), a Project coordinating committee would be established under terms specified in the Project repayment contracts. The committee would consist of Reclamation and representatives from the Animas-La Plata Water Conservancy District, Colorado, and the La Plata Conservancy District, New Mexico; the San Juan Water Commission; and the three Indian Tribes. The committee would ensure that the respective water users coordinate closely in operation and maintenance (O&M) of Project facilities and in the most efficient and equitable use of Project water.

¹ The RPA was included in the Fish and Wildlife Service's October 25, 1991, Final Biological Opinion to preclude the likelihood of jeopardy to endangered fish species from the Project.



Archaeological Study Boundary
 Archaeological area excluded from project

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 REFINEMENTS SINCE 1980
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Figure S-1

Indian Water Rights Settlement, Cost-Sharing, and Project Phasing

Need for the Colorado Ute Indian Water Rights Settlement.—The present Project is related to issues concerning Indian water rights under the Winters Doctrine² between the two Colorado Ute Indian Tribes and non-Indian water users in southwestern Colorado.

The Southern Ute Indian Tribe and the Ute Mountain Ute Tribe, headquartered in Ignacio and Towaoc, respectively, have reservation lands within the Animas and La Plata River drainages, as well as in drainage basins of other streams tributary to the San Juan River in New Mexico. Because the Ute Reservations were created prior to non-Indian settlement in the San Juan River basin, the water rights of the tribes on local rivers would likely receive a higher priority than those of non-Indian water users. For a number of years, the Ute Tribes pursued an equitable settlement of their water rights claims in these river drainages.

The State Engineer of Colorado, projecting the potential impact of Ute Indian claims on non-Indian water users, determined that, on those streams and rivers with high water use, tribal claims could have a severe impact on area non-Indian water users. For example, in the Mancos and La Plata River drainages, all non-Indian irrigation could be eliminated if tribal water rights under the Winters Doctrine were exercised, and even then tribal claims would only be partially satisfied. The city of Durango's municipal water supply from the Florida River (the city's primary source) could be significantly reduced if tribal claims were exercised, and on the Animas River, the water rights of the city are even less reliable. During years of water shortage, the tribes could well have had rights to virtually all available water on numerous streams and rivers in the San Juan River basin, where more than 34,000 acres held by non-Indian irrigators could be affected if no settlement had been reached on the tribal water rights claims. The settlement agreement calls for availability of Project water by January 1, 2000, to avoid potential litigation or renegotiation of the tribal water right claims.

Cost-Sharing and Project Phasing.—On August 15, 1985, the U.S. Congress in Public Law 99-88 appropriated \$1 million for design and construction of the Project. The use of those funds was contingent upon the completion by June 30, 1986, of a binding, Federal/non-Federal cost-sharing agreement satisfactory to the Secretary of the Interior. Consequently, in late 1985, the Project proponents and the States of Colorado and New Mexico entered into negotiations for a cost-sharing agreement.

In March 1986, the State of Colorado was successful in reaching an Agreement in Principle with the two Ute Indian Tribes on their water rights claims and on a proposed cost-sharing agreement for the Project. This proposal, however, did not meet

² The Winters or reserved water rights doctrine arose in an Indian water rights case, *Winters v. United States*, 207 U.S. 564 (1968). The judicially created doctrine, based in Federal proprietary interests and constitutional powers, provides that when the United States sets aside a Federal reservation from public land holdings at large, the amount of water necessary for the primary purposes of the reservation is impliedly reserved for use on the reservation.

all the Federal needs to resolve the Ute Indian Tribes' water rights claims or to satisfy the economic criteria for a suitable cost-sharing agreement. After continued negotiations, the parties signed the final cost-sharing agreement on June 30, 1986, and the settlement agreement on December 10, 1986. Provisions of the latter are codified in the Colorado Ute Indian Water Rights Settlement Act of November 3, 1988 (Public Law 100-585).

A principal element of the cost-sharing agreement and the Indian water rights settlement was dividing construction of the Project into two phases, Phases I and II, and associated cost-sharing obligations. The cost-sharing agreement also establishes a tribal development fund and other Project financial arrangements. It specifies that the tribes, under provisions of Federal law, can lease or temporarily dispose of water to the extent also permitted by State and Federal laws, interstate compacts, and international treaties. Features of Project phasing are shown on figures S-2 and S-3.

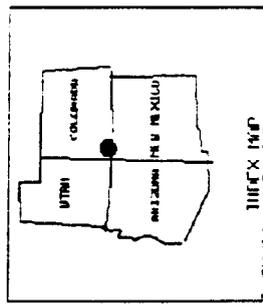
Environmental Considerations and Regulatory Compliance

Lands.—Reclamation's classification of the Project lands was completed in the early 1970's and recognized three arable (suitable for farming) land classes. On January 19, 1982, the Secretary of the Interior certified that Reclamation had completed an adequate soil survey and classification of lands to be served by the Project. On May 12, 1986, former legislation was amended by Public Law 99-294; the law mandated an investigation of soils characteristics which might result in toxic or hazardous irrigation return flows. In January 1992, Reclamation determined that a supplement to the 1982 arable lands classification was required for the Project in order to fulfill this requirement.

Accordingly, in early 1992, Reclamation conducted further investigations of soils characteristics to comply with the requirements of the 1986 amendment. Those investigations included the collection of soil, sediment, ground water, surface water, and biological samples from Project lands and surface streams in the La Plata and Mancos River drainages and the Ridges Basin Reservoir and Southern Ute Reservoir areas. The investigations did not disclose levels of contaminants that would cause hazardous or toxic return flows.

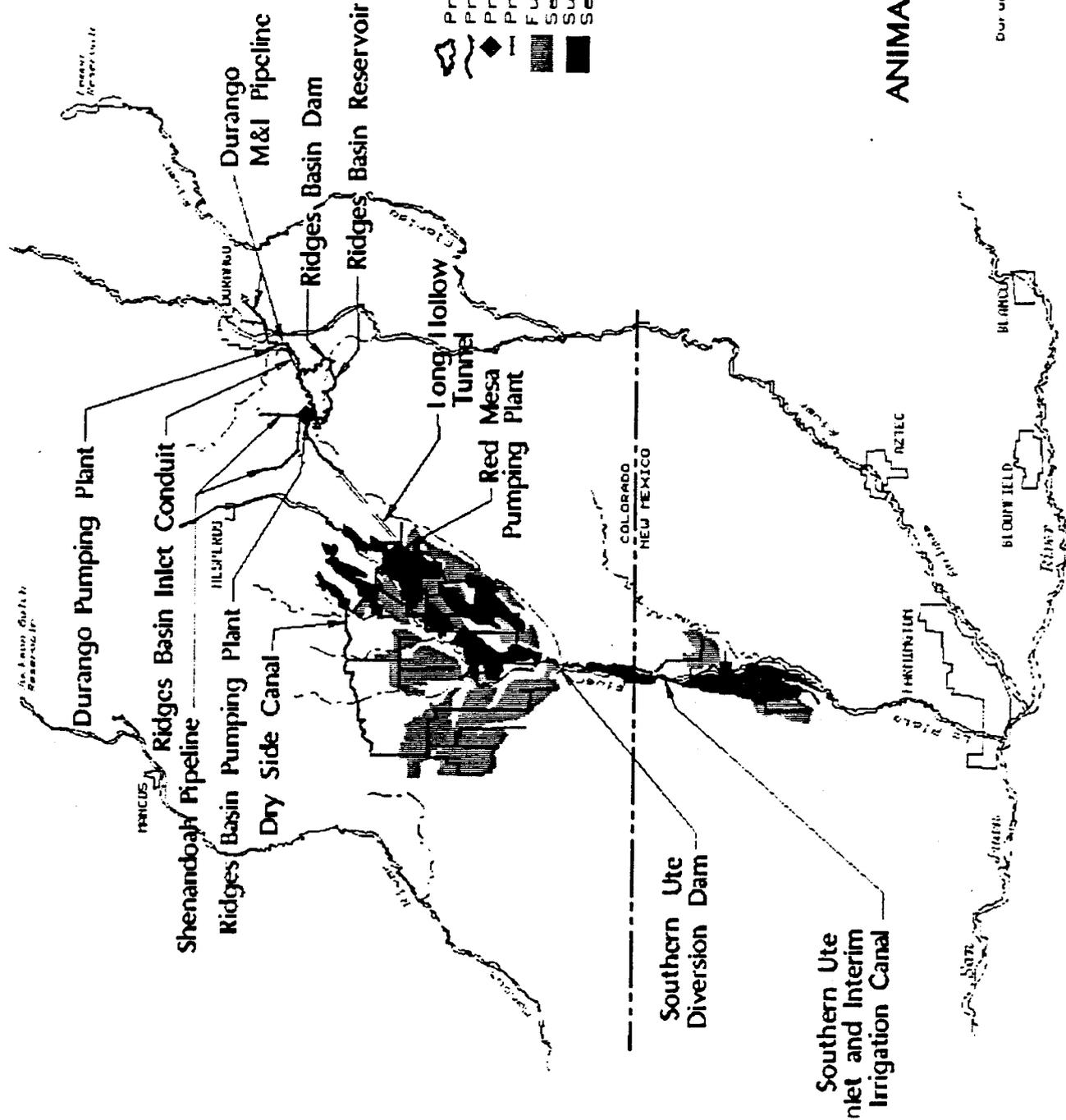
Clean Water Act (CWA).—Reclamation seeks exemption of Project features from the requirement to obtain a CWA-section 404 permit for construction activities resulting in discharges of dredged or fill material into waters of the United States. An exemption for certain Project features was obtained based upon the 404(b)(1) analysis, attached to the 1980 FES. Reclamation intends to expand the existing 404(r) exemption to include all Project features through additional compliance. A new 404(b)(1) evaluation in compliance with the Environmental Protection Agency's section 404(b)(1) requirements under 40 CFR part 230 is included as an attachment to this document.

Environmental Measures and Mitigation.—Reclamation proposes an extensive mitigation plan that includes clarifications, revisions, and additions to environmental considerations and commitments incorporated into the proposed action since 1980.



PHASE ONE FEATURES

-  Proposed Dam and Reservoir
-  Proposed Canal
-  Proposed Pumping Plant
-  Proposed Pipeline
-  Full Irrigation
-  Service Land
-  Supplemental Irrigation



Southern Ute
inlet and Interim
Irrigation Canal

Southern Ute
Diversion Dam

BLANCO
RIVER
BLOOMFIELD
AZTEC

COLORADO
NEW MEXICO

Long Hollow
Tunnel

Red Mesa
Pumping Plant

Dry Side Canal

Ridges Basin Pumping Plant

Durango Pumping Plant

Durango
M&I Pipeline

Ridges Basin Dam
Ridges Basin Reservoir

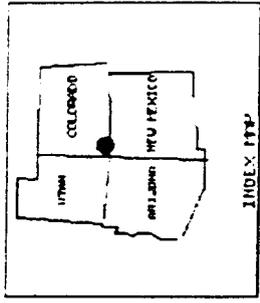
ANIMAS-LA PLATA PROJECT

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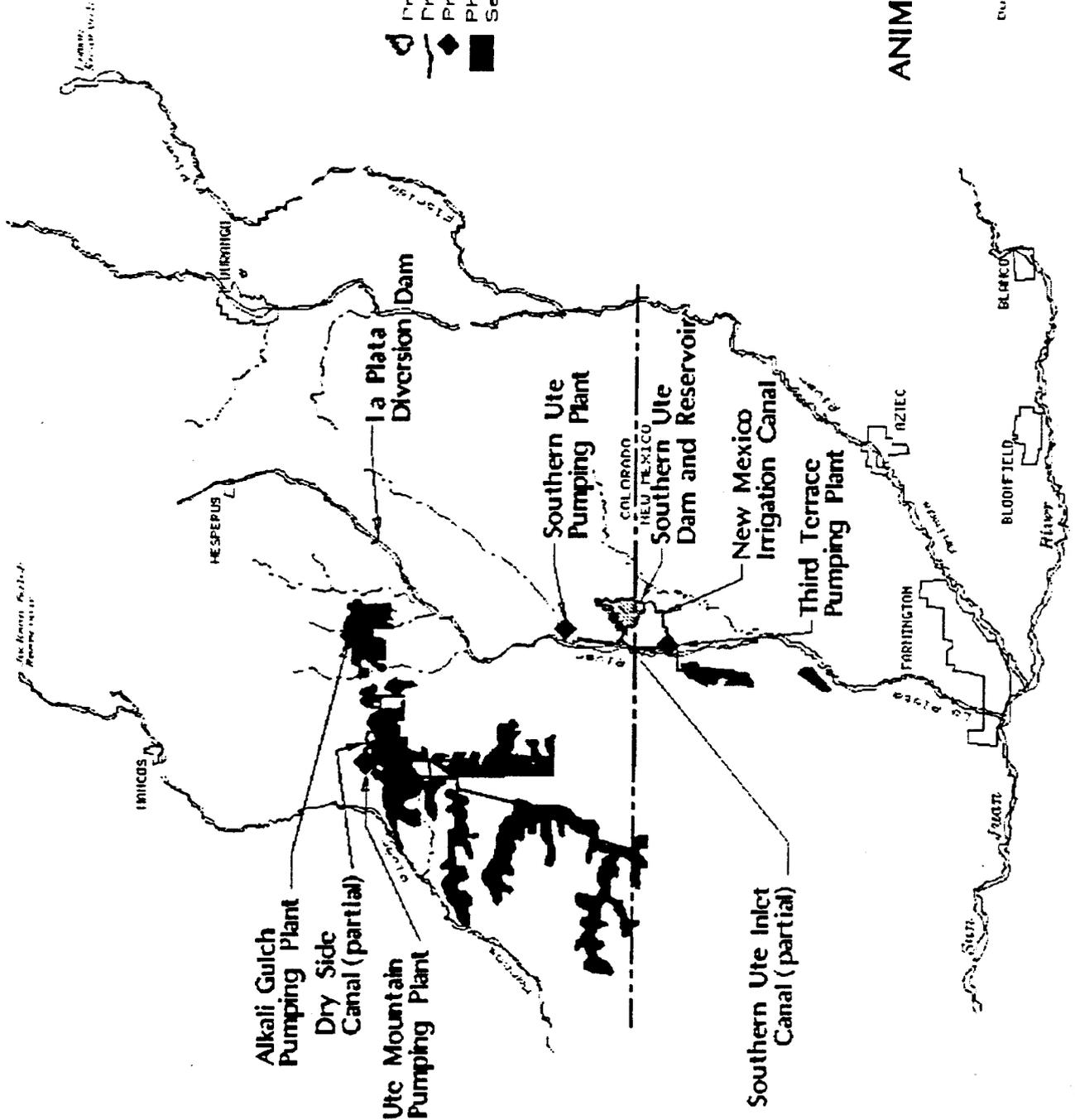
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Figure 5-2



PHASE TWO FEATURES

- Proposed Dam and Reservoir
- Proposed Pipeline
- Proposed Pumping Plant
- Phase Two Full Irrigation
- Service Land



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ANIMAS-LA PLATA PROJECT

UPPER COLORADO REGION
COLORADO - NEW MEXICO
GENERAL MAP
PHASE II

1992
Durango Projects Office - 1992
Figure S-3

The Environmental Commitment Plan (ECP) for the Project, incorporated in attachment 3 of this document, contains the complete list of environmental commitments for the entire Project, including those items which have not changed since 1980. The ECP is a document used by Reclamation to summarize environmental commitments for construction and O&M activities. The mitigation measures would be implemented in one or more of three ways: by Reclamation through incorporation into construction contracts; through separate contracts by Reclamation or other entities; or through Reclamation or other agency personnel.

Measures include replacement of the full Colorado Division of Wildlife (CDOW)-owned Bodo Wildlife Area (about 7,500 acres) with an area of equal monetary value; acquisition of elk habitat; a bald eagle management plan; replacement of wetland acreage; wetland mitigation; establishment of a trout fishery in Ridges Basin and Southern Ute Reservoirs (enhancement); native fish analyses and a variety of additional studies; and other significant measures.

As noted, Reclamation is also committed to implementation of an RPA to avoid jeopardy to the continued existence of endangered fish, as contained in the final biological opinion and chapter IV of this draft.

A summary of environmental effects is presented in table S-1.

Table S-1.—Summary of impacts and comparison of resource/issues described in 1980 FES and 1992 plan

Impact/resource	1980 FES	1992 plan	Difference
VEGETATION LOSSES (acres)			
Project features			
Permanent	68	164	+96
Temporary	57	113	+56
Full service lands	48,620	49,810	+1,190
Supplemental	21,480	17,650	-3,830
GEOLOGY			
Axis of Ridges Basin Dam	Located on Basin Creek 2 miles upstream from Animas River	Same location, but left abutment moved upstream 800 feet	Left abutment moved upstream about 800 feet
Borrow material for Ridges Basin Dam:			
Location of source	Animas River terrace 3.5 miles from dam location	Existing borrow area used by DOE ¹ for UMTRA ² 1.5 miles from dam location	Borrow area 2.0 miles closer to dam
Volume of materials (cy)	8.6 million	9.9 million	1.3 million
Area of source (acres)	75	75	0
WATER QUALITY			
Ground water			
Irrigation return flow	Increased salinity, trace elements-no change	Same	None
Durango Pumping Plant	Not addressed	Monitoring, no effect	None
Streams and rivers			
Animas	Slight increase in salinity, trace elements	Same	None
La Plata	Slight increase in salinity, trace elements	Same	None
Mancos	Slight increase in salinity, trace elements	Same	None
San Juan	Slight increase in salinity, trace elements	Same	None
Colorado	Salinity at Imperial increased by 17.9 mg/L	Same	None
Reservoirs			
Ridges Basin	Mesotrophic, accumulate metals	Same	None
Southern Ute	Eutrophic, accumulate metals and pesticides	Same	None

¹ Department of Energy.

² Uranium Mill Tailings Remedial Action.

Table S-1.—Summary of impacts and comparison of resource/issues described in 1980 FES and 1992 plan—continued

Impact/resource	1980 FES	1992 plan	Difference
SOILS			
Toxic characteristics	Not investigated	Nontoxic	None
ANIMAS RIVER TROUT FISHERY			
Trout biomass/acre (lbs)			
Durango to Purple Cliffs	6.5 to 9.8	65 to 90	+58 to 80
Purple Cliffs to Bondad	8.5	17	+8.5
Predicted impact trout	None	Reduction in trout biomass	Reduction in biomass
Mitigation	None	Stocking program in Animas River from Purple Cliffs to Bondad, CO	Stocking program in Animas River
NATIVE FISHERY			
Animas River	10 percent population reduction	10 percent population reduction	None.
La Plata River	Native fishery was not identified	Native fishery may be present	Native fishery may be present
Impact	Undefined	Anticipated reduction in total population	Anticipated reduction in total population
Mitigation	Undefined	Reclamation will conduct a study to determine extent and composition of native fishery, if one is present	Study
ELK HABITAT			
Bodo Wildlife Area	4,000 acres needed for Project purposes; 4,000 acres replaced by Reclamation	Entire area (7,500 acres) would be adversely impacted by Project; entire area replaced by Reclamation	+3,500 acres
Elk Habitat impacted in Hermosa Herd Unit	2,230 acres; 2,500 acres acquired and improved by Reclamation as mitigation	3,650 acres; 3,586 acres acquired and improved by Reclamation as mitigation	+1,086 acres
THREATENED AND ENDANGERED SPECIES			
Colorado squawfish			
Status	Endangered	Endangered	None
Biological opinion	No jeopardy	Jeopardy with reasonable and prudent alternative	Jeopardy with reasonable and prudent alternative
Razorback sucker			
Status	Not listed	Endangered	Change in status
Biological opinion	N/A	Jeopardy with reasonable and prudent alternative	Jeopardy with reasonable and prudent alternative
Bald eagle	Threatened	Threatened	Same

Table S-1.—Summary of impacts and comparison of resource/issues described in 1980 FES and 1992 plan—continued

Impact/resource	1980 FES	1992 plan	Difference
THREATENED AND ENDANGERED SPECIES - Continued			
Mexican spotted owl	Not listed	Proposed for listing threatened; Reclamation conducted surveys in 1992; no effect	Proposed for listing threatened; Reclamation conducted surveys in 1992; no effect
Ute ladies-tresses	Not listed	Threatened; Reclamation will conduct surveys in 1993 of Project lands	Threatened; Reclamation will conduct surveys in 1993 of Project lands
WETLANDS AND RIPARIAN AREAS			
Losses (acres)			
Existing canal system on supplemental water service lands	550	223	-327
Ridges Basin and along Basin Creek	0	121	+121
Gains (acres)			
Dry Side Canal	124	0	-124
Southern Ute Diversion Dam	15	15	0
Exiting canals north of Dry Side Canal	Unquantified gains	0	Undefined
Outlet channels of Project drains	Unquantified gains	0	Undefined
Ridges Basin and Southern Ute Reservoirs	3,630 lacustrine wetland	3,630 lacustrine wetland	0
Along La Plata and Mancos Rivers	Unquantified gains	Unquantified gains	0
Mitigation	0	121	+121
CULTURAL RESOURCES			
Number of sites mitigated through data recovery	175	350	+175
Funding for cultural resources mitigation	1% of total Project cost	4% of total Project cost	Additional 3% available for mitigation
Total number of sites	3,500	Unquantified	Unquantified
RECREATION			
Rafting and water sports use in Animas River:			
Total recreation days affected:			
Private	10,500	14,122	+3,622
Commercial	7,200	22,419	+15,219

Table S-1.—Summary of impacts and comparison of resource/issues described in 1980 FES and 1992 plan—continued

Impact/resource	1980 FES	1992 plan	Difference
RECREATION - Continued			
Competitive events	900	5,000	+4,100
No. of days lost due to flows <450 ft ³ /s			
Private	40	50	+10
Commercial	40	32	-8
Competitive events	0	0	0
Ridges Basin Reservoir:			
Area affected by recreation development	43 acres	128 acres	+85 acres
Recreation days of use	290,000	331,000	+41,000
ELIGIBILITY OF SAN JUAN RIVER AS WILD AND SCENIC RIVER	San Juan River not on Nationwide Rivers Inventory	San Juan River remains eligible	None
SOCIAL EFFECTS			
Population growth	Neutral	No impact	None
Employment (jobs):			
Direct	1,150	4,635	+3,485
Indirect	1,950	3,117	+1,167
Agricultural value (annual)	\$18,593,000	\$24,618,000	+6,025,000
Recreation and tourism (annual):			
River	\$ Not measured	-\$205,000	Undefined ³
Reservoir	\$ Not measured	+\$500,000	Undefined ³

³ Values not quantified in 1980.

Overview: This chapter discusses supplemental information concerning the purpose and need for the Animas-La Plata Project as initially described in the 1980 Final Environmental Statement. The chapter introduces topics that will be analyzed, changes in environmental impacts since 1980, and evaluation of those changes for their possible significance in terms of mitigation.

CHAPTER I - PURPOSE AND NEED

PURPOSE, NEED, AND PROJECT AUTHORIZATION

A need for additional domestic and agricultural water was the impetus for the Animas-La Plata Project (Project), as described in the first chapter of the 1980 Final Environmental Statement (INT FES 80-18) (1980 FES). The Project is to divert flows of the Animas and La Plata Rivers for agricultural irrigation, municipal, and industrial uses. It would also provide for fish and wildlife preservation, recreation facilities, and a cultural resources program. The Project purpose of providing a viable means to meet those identified needs remains unchanged. However, at present and in addition to providing agricultural, municipal, and industrial water, the Project also satisfies a portion of the Colorado Ute Indian water rights claims as specified by the Colorado Ute Indian Final Settlement Agreement of 1988.

The Project was authorized for construction by the Colorado River Basin Project Act of September 30, 1968 (Public Law 90-537) as a participating project under the Colorado River Storage Project (CRSP) Act of April 11, 1956 (Public Law 84-485). Subsequent authorization for the construction, operation, and maintenance of the Project was authorized by title V of the Colorado River Basin Project Act and the Colorado Ute Indian Water Rights Settlement Act of 1988 (Public Law 100-585).

The Project is located in La Plata and Montezuma Counties in southwestern Colorado and in San Juan County in northwestern New Mexico, as shown on frontispiece maps. The Project would include two off-stream dams and reservoirs, Ridges Basin and Southern Ute Dams and Reservoirs; two major pumping plants; three major water conveyance systems; and two diversion dams on the La Plata River, all as described in the 1980 FES. The Project would be constructed in two phases.

The total Project water supply would average 195,400 acre-feet for irrigation, municipal, and industrial use annually. About 115,300 acre-feet of the water supply would be used for irrigating 17,650 acres of Indian and non-Indian land presently being irrigated and 49,810 acres of Indian and non-Indian land now dry farmed or not under cultivation. An average

annual municipal and industrial (M&I) water supply of 40,000 acre-feet would be made available for communities in Colorado and New Mexico. An average annual supply of industrial water totaling 40,100 acre-feet would be provided to the Southern Ute Indian Tribe, Ute Mountain Ute Tribe and Navajo Nation.

PURPOSE AND SCOPE OF SUPPLEMENT

Purpose of Supplement

The purpose of this draft supplement (Supplement) to the 1980 FES is to provide additional information concerning environmental effects initially described in the 1980 FES. The supplemental information describes changes in the Project's environmental effects since 1980 as a result of design refinements, new information, or additional compliance requirements. The Bureau of Reclamation (Reclamation) is undertaking this Supplement to analyze new information and determine if refined, additional, or new environmental mitigation measures are needed for construction of the Project. The document also is intended to provide information for compliance with Project land certification requirements and Clean Water Act provisions.

This Supplement has been prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality Implementing Regulations for NEPA, Department of the Interior NEPA policy, Reclamation's NEPA Handbook, and Reclamation Instructions and policies for compliance with the procedural requirements of NEPA. It is tiered to the 1980 FES in that it adopts and incorporates by reference the relevant environmental analyses from that document. When an element of the Project has not changed measurably from conditions described in the 1980 FES, no detailed description is provided in this Supplement; reference is made to the original discussion in the 1980 FES.

Reclamation prepared and filed the 1980 FES for the Project with the Environmental Protection Agency (EPA) on July 1, 1980, and executed a record of decision on August 18, 1980, to proceed with the recommended plan for the Project as described in the September 1979 Definite Plan Report (DPR). A record of decision would be prepared after completion of the final Supplement. The 1980 FES incorporated the DPR by reference.

Those who wish to review the 1980 FES in conjunction with this document may contact Reclamation to request a copy of the 1980 FES or review it at its offices. In addition, copies of the 1980 FES and 1979 DPR are available in public libraries in the Project area, as noted at the end of the chapter, and in locations on the distribution list in chapter V.

Scope of Supplement

This draft Supplement to the 1980 FES specifically addresses information on the following issues (full discussion of the information is included in chapters II through IV):

- Design and other refinements since 1980, including phasing of construction.
- New or updated information relevant to environmental concerns and Project impacts that has become available since 1980.
- Changed requirements for certification of Project lands for potential toxic or hazardous irrigation return flows.
- Exemption of additional Project features from the requirement to obtain a Clean Water Act section 404 permit for construction activities resulting in discharges of dredged or fill material into the waters of the United States. The Supplement includes a 404(b)(1) evaluation of additional Project features that were described in the recommended plan but not included in the original 404(b)(1) evaluation attached to the 1980 FES.

A formal scoping program has not been conducted for this Supplement. Since 1980, Reclamation has received a great deal of input on the Project, including a public referendum; nevertheless, information was solicited from interested individuals, organizations, and agencies, as discussed in chapter V.

This document does not address the 1980 FES plan in detail, since a full description of the plan is contained in both the 1979 DPR and 1980 FES. Further, this document does not address or include any discussion about reformulation of the Project, including reformulation or consideration of alternatives to the Project. Reclamation believes that Project planning requirements were fully met in the 1979 DPR, the feasibility report, and 1980 FES, and, accordingly, that other alternatives to the Project were evaluated adequately in the 1980 FES.¹ It does not analyze alternative plans related to the Colorado Ute Tribes' potential water marketing. Whether the Colorado Ute Indians ultimately market their allocated Project water is outside the scope of Reclamation functions and responsibilities.

Also excluded from the scope of this Supplement is a detailed analysis of the operation of Navajo Dam, located on the San Juan River in northwest

¹ However, Reclamation has included, as part of the 404(b)(1) analysis, evaluation of alternatives for each of the features covered in the analysis.

New Mexico. Reclamation has determined that analysis of current Navajo Dam operation and associated research are not within the scope of this documentation because a separate, future NEPA process and document will be prepared on its future long-term operation criteria. That NEPA compliance will be completed at the conclusion of the ongoing endangered fish research program on the San Juan River, estimated to be completed in 1997 when a decision concerning long-term operation of the dam will be made.

The Department of the Interior would complete future site-specific NEPA compliance as appropriate on any Federal actions related to the use of the Southern Ute Indian Tribe and Ute Mountain Ute Tribe supply of Project water. The U.S. Department of Energy (DOE), Western Area Power Administration would, in the future, comply with NEPA requirements after completing an alternative study on the design of the power transmission facilities for the Project.

HISTORY OF PROJECT SINCE 1980

Introduction

The current Project plan represents the culmination of design refinements since the 1980 FES, as well as a phased construction schedule in accordance with the cost-sharing agreement, as discussed in general terms below and more specifically in chapter II. Additional Section 7 consultation with the Fish and Wildlife Service (Service) is also discussed.

Colorado Ute Indian Water Rights Settlement

The present Project is related to issues concerning Indian water rights under the Winters Doctrine² between the two Colorado Ute Indian Tribes and non-Indian water users in southwestern Colorado.

The Southern Ute Indian Tribe and the Ute Mountain Ute Tribe, headquartered in Ignacio and Towaoc, respectively, have reservations within the Animas and La Plata River drainages, as well as in drainage basins of other streams tributary to the San Juan River in New Mexico. Because the

² The Winters or reserved water rights doctrine arose in an Indian water rights case, *Winters v. United States*, 207 U.S. 564 (1968). The judicially created doctrine, based in Federal proprietary interests and constitutional powers, provides that when the United States sets aside a Federal reservation from public land holdings at large, the amount of water necessary for the primary purposes of the reservation is impliedly reserved for use on the reservation.

Ute Reservations were created prior to non-Indian settlement in the San Juan River basin, the water rights of the tribes on local rivers would likely receive a higher priority than those of non-Indian water users. For a number of years, the Ute Tribes pursued an equitable settlement of their water rights claims in these river drainages.

The State Engineer of Colorado, projecting the potential impact of Ute Indian claims on non-Indian water users, determined that, on those streams and rivers with high water use, tribal claims could have a severe impact on area non-Indian water users. For example, in the Mancos and La Plata River drainages, all non-Indian irrigation could be eliminated if tribal water rights under the Winters Doctrine were exercised, and even then tribal claims would only be partially satisfied. The city of Durango's municipal water supply from the Florida River (the city's primary source) could be significantly reduced if tribal claims were exercised, and on the Animas River, the water rights of the city are even less reliable. During years of water shortage, the tribes could well have had rights to virtually all available water on numerous stream and rivers in the San Juan River basin, where more than 34,000 acres held by non-Indian irrigators could be affected if no settlement had been reached on the tribal water rights claims. The settlement calls for delivery of Project waters by January 1, 2000, to avoid potential litigation or renegotiation of the tribal water right claims.

Related Water Right Claims and Waivers

On December 19, 1991, the final consent decree, which implemented certain provisions of the previously described tribal water rights documents, was signed in District Court for Water Division No. 7, State of Colorado. With the consent decree in place, the Ute Tribes waive any and all claims to water rights in the State of Colorado not expressly identified in the decree. However, there are certain requirements that must be met before the tribes are legally required to relinquish their claims. A portion of the tribe's water claims are developed in McPhee Reservoir as part of the Dolores Project. Waiver of claims to the Mancos River will not be effective until the Towaoc-Highline Canal, a feature of the Dolores Project, is completed to make delivery of Dolores Project water to the Ute Mountain Ute Reservation. That canal is presently under construction and is anticipated to be completed in 1994. Its impacts were addressed in the Final Supplement to the 1977 Dolores Project FES (INT FES 77-12), dated March 24, 1989. When that canal is completed, all of the tribe's water right claims would be met, with exception of those in the Animas and La Plata Rivers. Final settlement of the tribal claims on those rivers would be completed by construction of the Project for storage of their allocated Project water in Ridges Basin Reservoir by the year 2000.

Cost-Sharing and Project Phasing

On August 15, 1985, the U.S. Congress in Public Law 99-88 appropriated \$1 million for design and construction of the Animas-La Plata Project. The use of those funds was contingent upon the completion by June 30, 1986, of a binding, Federal/non-Federal cost-sharing agreement satisfactory to the Secretary of the Interior. Consequently, in late 1985, the Project proponents and the States of Colorado and New Mexico entered into negotiations for a cost-sharing agreement.

In March 1986, the State of Colorado was successful in reaching an Agreement in Principle with the two Ute Indian Tribes on their water rights claims and on a proposed cost-sharing agreement for the Project. This proposal, however, did not meet all the Federal needs to resolve the Ute Indian Tribes' water right claims or to satisfy the economic criteria for a suitable cost-sharing agreement. After continued negotiations, the parties signed the final cost-sharing agreement on June 30, 1986, and the settlement agreements on December 10, 1986. Provisions of the latter are contained in the Colorado Ute Indian Water Rights Settlement Act of November 3, 1988 (Public Law 100-585).

A principal element of the cost-sharing agreement and the Indian water rights settlement was dividing construction of the Project into two phases, Phases I and II, as also described in chapter II. The cost-sharing agreement also establishes a tribal development fund and other Project financial arrangements. It specifies that the tribes, under provisions of Federal law, can lease or temporarily dispose of water to the extent also permitted by State and Federal laws, interstate compacts, and international treaties.

The Leavitt Act of July 1, 1932 (42 Stat. 564), as amended, states that the tribes' irrigation construction costs are deferred for as long as the land remains in Indian ownership. Repayment of operation, maintenance, and replacement costs for the irrigation water of the Southern Ute Indian Tribe and Ute Mountain Ute Tribe would be deferred until this water is leased or otherwise used. For the tribes, the amount in excess of payment capacity would be paid by apportioned revenues over 30 years.

Additional Studies

From 1980 to the present, Reclamation has conducted further site-specific design and data collection activities at locations of Project facilities to be constructed, principally at the sites of the Durango Pumping Plant, the Ridges Basin Inlet conduit, and Ridges Basin Dam and Reservoir. These activities include geologic and ground-water quality investigations, cultural

resource surveys, borrow source investigations, acquisition of lands for Project features, and other final design activities in preparation for award of Project construction contracts.

At the request of the Service, Reclamation participated in additional studies of endangered fish in the San Juan River downstream from Farmington, New Mexico, to Lake Powell from 1987 through 1989. Those studies yielded information about the endangered Colorado squawfish in the San Juan River not previously considered in the 1979 biological opinion. In February 1990, Reclamation reinitiated an Endangered Species Act-Section 7 consultation with the Service based upon the new endangered fish information.

From June 1990 through March 1991, Reclamation consulted with Federal, State, and private experts and agencies to develop a Reasonable and Prudent Alternative (RPA) that would offset jeopardy and allow construction of the Project to begin. On March 24, 1991, Reclamation sent a biological assessment, with the RPA discussed in chapters III and IV, to the Service. On October 25, 1991, a Final Biological Opinion was issued by the Service that included an RPA which permitted construction to begin and which allowed initial Project water depletions of 57,100 acre-feet per year while continued research on endangered fish in the San Juan River was conducted through a 7-year study. The Commissioner of Reclamation signed a memorandum that same day authorizing the Regional Director of Reclamation's Upper Colorado Region to begin construction of the Project.

On October 22, 1991, Reclamation received from the Sierra Club Legal Defense Fund, Inc. (SCLDF) a notice of its intent to file suit regarding alleged violations of the Clean Water Act and NEPA. On February 24, 1992, SCLDF filed a lawsuit in the U.S. District Court for the District of Colorado for declaratory and injunctive relief on some of its allegations. At about the same time, Reclamation undertook studies that would be useful to determine if significant new circumstances or information existed relevant to environmental concerns and bearing on the proposed action or its impacts.

On April 18, 1992, Reclamation announced its decision to prepare a Supplement to the 1980 FES. The notice of intent to prepare a draft Supplement was published in the *Federal Register* on April 29, 1992. In addition, on April 23, 1992, the Commissioner of Reclamation withdrew the authorization to initiate construction. Data collection and design activities, which have been in progress since 1974, were allowed to continue. Cultural resource activities were also directed to continue.

RELATIONSHIPS TO OTHER ACTIVITIES/PROJECTS

The Project is related both directly and indirectly to other Federal projects in the area in providing water for multiple purposes, including units and participating projects of the CRSP, and is part of the Colorado Ute Indian water rights settlement, as noted earlier.

Dolores Project

The Dolores Project (INT FES 77-12), west of the Animas-La Plata Project area, provides a water supply of about 126,600 acre-feet for various uses, including an average of 22,900 acre-feet to the Ute Mountain Ute Tribe for irrigation on 7,500 acres of tribal land. The State of Colorado has constructed the Towaoc M&I Pipeline and domestic distribution system to deliver Dolores Project M&I water to the tribal headquarters of Towaoc and the Ute Mountain Ute Reservation. In addition, a portion of Ute Tribal water claims are developed in the project's McPhee Reservoir.

Uranium Mill Tailings Remedial Action Disposal Cell

Radioactive tailings and contaminated alluvial deposits have been removed under DOE supervision at the Durango Pumping Plant site as a result of Uranium Mill Tailings Remedial Action (UMTRA) cleanup (*Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Durango, Colorado, UMTRA-DOE/AL, November 1990*). The uranium mill tailings were placed in an UMTRA containment cell located about 0.25 mile outside the north arm of proposed Ridges Basin Reservoir in the Bodo/South Creek drainage. Since preparation of the 1980 FES, cleanup of the tailings site has resulted in removal of the contaminated material from the area of the proposed pumping plant. The DOE remedial action plan, cited above, concluded that the reservoir would not impact the cell; the plan addressed seepage potential, ground-water movement, and seismic stability.

La Plata Coal Mine

Coal mining has occurred downstream from the left abutment at the proposed Southern Ute Reservoir Dam site, and is moving away from the site, continuing to the southwest (*Proposed Mining Plan and Transportation Corridor Plan, La Plata Mine, San Juan County, New Mexico, Final Environmental Impact Statement OSM-EIS-17, September 1985*). As a result, the mining activity would not affect the dam and reservoir.

Durango Sewage Treatment Plant Upgrade

The Durango sewage treatment plant is located just upstream of the inlet to the proposed Durango Pumping Plant, but the sewage treatment outfall would be relocated to a point downstream from the pumping plant's intake structure. The 1980 FES stated that the sewage treatment plant would be upgraded in about 3 years. The plant was upgraded in 1985 from a capacity of 2 million gallons per day (Mgal/d) to 3 Mgal/d. The plant essentially serves the Durango municipal area, with a few outlying areas, or a population of about 17,000 people.

Operation of Navajo Dam

On July 30, 1991, Reclamation requested consultation with the Service on the effects on endangered species from operation of Navajo Dam. The request for consultation was initiated because of new information from the San Juan Basin which indicated the importance of the river for recovery of the endangered fish. Also, the operation of Navajo Dam and Reservoir is believed to be critical for many aspects of the Recovery Implementation Plan for endangered fish species in the Upper Colorado Basin.

Under Section 7(a)(2) of the Endangered Species Act and 50 CFR 402.14(d), Reclamation has the responsibility to obtain and provide information needed for a biological opinion. To facilitate the collection of biological information, Reclamation committed to release flows for research purposes. The research or test flows would be within current standard operating criteria (maintaining minimum and maximum releases), while maintaining the original Project purposes of water conservation and storage. Future consultation in the basin is dependent on the research.

At the end of the research period, the Service will provide Reclamation with a final biological opinion on the operation criteria of Navajo Dam. Once a final biological opinion on the operation criteria for Navajo Dam and Reservoir is issued, Reclamation will produce the necessary documents to comply with NEPA.

Reclamation determined that changes within the existing operational criteria for the purposes of collecting information necessary for a biological opinion can be implemented under existing authorities, provided existing standard operating criteria are met, and as provided pursuant to section 7(a)(1) and 7(a)(2) of the Endangered Species Act.

Navajo Indian Irrigation Project

The Navajo Indian Irrigation Project (NIIP) is located in an area south of Farmington in San Juan County, New Mexico. The Project and its impacts

were described in the *Navajo Indian Irrigation Project Final Environmental Statement* (INT FES 76-52) prepared by the Bureau of Indian Affairs. The NIIP lies south of the Animas-La Plata Project area, and construction is approximately 50 percent complete. It is related to this Project because the Navajo Nation has received an allocation of Animas-La Plata water, and the NIIP results in a depletion of water to the San Juan River, as does the Animas-La Plata Project.

DOCUMENT REFERENCE

For those who wish to read the 1980 FES and 1979 DPR in conjunction with this Supplement, copies are available in the libraries and Reclamation Offices cited below and at other sites listed in the Consultation and Coordination section of this document. Technical supporting material is maintained at Reclamation's Denver Office (address on page I-16).

Libraries

City libraries in the following communities and at other locations as cited in the distribution list in chapter V:

- Cortez, Colorado
- Durango, Colorado
- Aztec, New Mexico
- Bloomfield, New Mexico
- Farmington, New Mexico

- Fort Lewis College Library, Durango, Colorado
- University of Colorado Library, Boulder, Colorado
- Colorado State University Library, Fort Collins, Colorado
- San Juan College Library, Farmington, New Mexico
- Navajo Community College Library, Shiprock, New Mexico

Bureau of Reclamation Offices

Bureau of Reclamation
Environmental Officer
Upper Colorado Regional Office
Federal Building
125 South State Street
Salt Lake City UT 84147
Telephone: (801) 524-5580

Bureau of Reclamation
Public Affairs Office
Interior Building
1849 C Street, NW
Washington DC 20240
Telephone: (202) 208-4662

CHAPTER I

PURPOSE AND NEED

Bureau of Reclamation
Denver Office - Building 67
Library—1st Floor
Denver Federal Center
Denver CO 80225
Telephone: (303) 236-0511

Bureau of Reclamation
Environmental Office
Durango Projects Office
835 East Second Avenue
Durango CO 81302-0640
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Overview. This discussion describes the current Project in terms of design and other refinements, new or updated information, and changes in environmental regulations since preparation of the 1980 Final Environmental Statement.

CHAPTER II—PROPOSED ACTION

INTRODUCTION

This chapter describes the current plan and information in the following areas:

- Design and other refinements, including phasing of construction, to the Animas-La Plata Project (Project) since 1980. Refinements in the design of the water distribution facilities are necessary to serve Project water users under phasing of construction, while other refinements have become necessary as the result of final design and changing local conditions, as is customary for projects of this magnitude.
- Changed requirements for certification of Project lands for potential toxic or hazardous irrigation return flows. Although classification of Project lands and adequate soil surveys have been completed, in 1986 the U.S. Congress amended existing land certification legislation to include investigations of soils characteristics which might result in toxic or hazardous irrigation return flows from Project lands.
- Exemption of all Project features not specifically covered in the 1980 Final Environmental Statement (INT FES 80-18) (1980 FES) from the requirement to obtain a Clean Water Act (CWA)-Section 404 permit for construction activities resulting in discharges of dredged or fill material into the waters of the United States. Attachment 1 to the Supplement to the Final Environmental Statement (Supplement) is a 404(b)(1) evaluation of Project features included in the 1980 FES recommended plan but not included in the 404(b)(1) analysis attached to that document.

New or updated information and/or supplemental disclosure relevant to environmental concerns and Project impacts has become available since 1980. That information relates to vegetation, geology, soils, water quality, the Animas and La Plata Rivers aquatic resources, elk habitat, threatened and endangered species, wetlands and riparian habitat, cultural resources, and social/economic issues.

A discussion of the effects of this and other information is included in Chapter III, Affected Environment and Environmental Consequences.

1992 PROPOSED ACTION

Except for the features described in the design refinements section, the proposed action, while accomplished in two phases, is as it was described in the 1979 Definite Plan Report (DPR)/1980 FES, as shown on the frontispiece maps and as summarized in tabular form in attachment 2.

The Project would store water pumped from the Animas River in Ridges Basin Reservoir and would store water diverted from the La Plata and Animas Rivers in Southern Ute Reservoir. Irrigation water for lands in Colorado would be pumped from Ridges Basin Reservoir and conveyed through Dry Side Canal and/or diverted from the La Plata River from an existing or constructed diversion structure. Irrigation water for New Mexico would be stored in Southern Ute Reservoir, released to the New Mexico irrigation canal, and distributed through a piped lateral system. Water for the Ute Mountain Ute Tribe would be available from the Dry Side Canal, and for the Southern Ute Indian Tribe from Southern Ute Reservoir.

Municipal and industrial (M&I) water for Durango would be pumped at the Durango Pumping Plant or released from Ridges Basin Reservoir and would be conveyed through Durango M&I pipeline or, for west subdivisions, Shenandoah M&I pipeline. Also included in the Project are recreation facilities at the reservoirs, fish and wildlife measures, and a cultural resources plan.

Phase I would provide a reliable water supply available at Ridges Basin Reservoir for the two Ute Tribes, construct irrigation facilities to serve most of the non-Indian Project area and some Indian lands, and provide the entire non-Indian M&I water supply. Phase II would be constructed to deliver Project water to the remainder of the Project area. (See accompanying tables II-1 and II-2 and figures S-2 and S-3.)

The Bureau of Reclamation (Reclamation) would proceed with construction of the three Project features (Durango Pumping Plant, Ridges Basin Inlet conduit, and Ridges Basin Dam) in accordance with the Reasonable and Prudent Alternative (RPA). Reclamation believes it is reasonably foreseeable that successful implementation of the RPA would lead to development and use of the full Project water supply. However, if future Section 7 consultations with the Fish and Wildlife Service (Service) result in less than full Project water development, Reclamation would redesign the Project to utilize the allowable water supply. At that time, additional environmental analysis would be conducted and NEPA compliance completed.

Table II-1.—Project features to be constructed under Phase I and Phase II

Feature	Phase I	Phase II
Dams and reservoirs		
Ridges Basin Dam and Reservoir	X	
Southern Ute Dam and Reservoir		X
La Plata Diversion Dam		X
Southern Ute Diversion Dam	X	
Pumping plants		
Durango Pumping Plant	X	
Ridges Basin Pumping Plant	X	
Red Mesa Pumping Plant	X	
Alkali Gulch pumping plant		X
Ute Mountain pumping plant		X
Southern Ute pumping plant		X
Third Terrace pumping plant		X
Canals and pipelines		
Ridges Basin Inlet conduit	X	
Dry Side Canal	24.3 miles	2 miles
Long Hollow Tunnel	X	
Southern Ute Inlet and interim irrigation canal	5.4 miles	0.6 mile
New Mexico irrigation canal		X
Durango M&I pipeline	X	
Shenandoah M&I pipeline	X	
Laterals		
Red Mesa laterals	X	
Alkali Gulch laterals	13.8 miles	9.6 miles
Dry Side laterals	29.1 miles	2.5 miles
Ute Mountain laterals		X
Southern Ute laterals		X
La Plata laterals	21.6 miles	9.5 miles
Drains		
Red Mesa drains	X	
Alkali Gulch drains ¹	X	X
Dry Side drains ¹	X	X
Ute Mountain drains		X
La Plata drains ¹	X	X
Other		
Transmission facilities ²	X	X
Permanent operating facilities ³	X	X
Recreation facilities		
Ridges Basin Reservoir recreation	X	
Southern Ute Reservoir recreation		X
Wildlife mitigation measures⁴		
Ridges Basin Reservoir mitigation	X	X
Southern Ute Reservoir mitigation		X
Cultural resource measures	X	X

¹ If drainage problems occur after Project lands are irrigated, adequate drains would be installed as required.

² Transmission facilities would be constructed along with those facilities needing a power supply.

³ Permanent operating facilities would be constructed along with other Project features which require monitoring and operation and maintenance.

⁴ Wildlife mitigation would be implemented proportionately and concurrently with the phased construction.

Table II-2.—Project water supply and irrigated lands under Phase I and Phase II

	Phase I	Phase II	Total Project
Water supply (acre-feet)			
Municipal and industrial water			
Colorado			
City of Durango	2,500		2,500
Durango rural	2,000		2,000
La Plata area rural	2,000		2,000
Animas-La Plata Water Conservancy District	2,700		2,700
Southern Ute Indian Tribe	26,500		26,500
Ute Mountain Ute Tribe	6,000		6,000
Subtotal	<u>41,700</u>		<u>41,700</u>
New Mexico			
San Juan Water Commission	30,800		30,800
Navajo Tribe, Shiprock area	7,600		7,600
Subtotal	<u>38,400</u>		<u>38,400</u>
Total Project M&I water	<u>80,100</u>		<u>80,100</u>
Irrigation water			
Colorado			
Non-Indian full service	37,900	18,900	56,800
Non-Indian supplemental service ¹	15,300		14,400
Southern Ute Indian Tribe full service	2,600	² 700	3,300
Ute Mountain Ute Indian Tribe full service		² 25,500	25,500
Subtotal	<u>55,800</u>	<u>45,100</u>	<u>100,000</u>
New Mexico			
Non-Indian full service	6,900	5,000	11,900
Non-Indian supplemental service ¹	3,000		2,500
Ute Mountain Ute Indian Tribe full service		² 900	900
Subtotal	<u>9,900</u>	<u>5,900</u>	<u>15,300</u>
Total Project irrigation	<u>65,700</u>	<u>51,000</u>	<u>115,300</u>
Total Project supply (both M&I and irrigation)	<u>145,800</u>	<u>51,000</u>	<u>195,400</u>
Irrigated lands (acres)			
Colorado			
Non-Indian full service	21,122	10,378	31,500
Non-Indian supplemental service	14,000	0	14,000
Southern Ute Indian Tribe full service	1,413	387	1,800
Ute Mountain Ute Indian Tribe full service		11,600	11,600
Subtotal	<u>36,535</u>	<u>22,365</u>	<u>58,900</u>
New Mexico			
Non-Indian full service	2,630	1,900	4,530
Non-Indian supplemental service	3,650		3,650
Ute Mountain Ute Indian Tribe full service		380	380
Subtotal	<u>6,280</u>	<u>2,280</u>	<u>8,560</u>
Total Project irrigated lands	<u>42,815</u>	<u>24,645</u>	<u>67,460</u>

¹ Phase I would provide gravity irrigation supply to 375 acres in Colorado and 264 acres in New Mexico which would be provided pressurized water in Phase II. The respective increase in gravity water requirements over sprinkler requirements is 900 acre-feet and 500 acre-feet.

² Full service irrigation water for the Southern Ute and Ute Mountain Ute Indian Tribes deferred to Phase II would be available in Phase I at Ridges Basin Reservoir for an interim use.

OPERATIONAL REFINEMENTS

The Project would be operated as described in the 1980 FES and DPR, except as modified by the design refinements described in this chapter. During Phase I construction, Ridges Basin Pumping Plant, Dry Side Canal, Long Hollow Tunnel, and Southern Ute Inlet canal would be sized to accommodate future pumping capacities under Phase II. The additional pumps, however, would not be installed in Ridges Basin Pumping Plant at this time. Also, because Southern Ute Reservoir would not be constructed in Phase I, an interim extension of the Southern Ute Inlet canal would be constructed to service the irrigated land in New Mexico. This interim extension would be approximately 2.7 miles in length and roughly parallel to La Plata Highway—State Highway 140 in Colorado and State Highway 170 in New Mexico. During Phase I, supplemental service land in New Mexico, which would be served by the Southern Ute pumping plant in Phase II, would be provided a full gravity irrigation supply through existing irrigation facilities. Construction of Southern Ute Reservoir is required to irrigate lands in Phase II.

La Plata River flows that would be diverted to Southern Ute Reservoir for storage and regulation under Phase II would remain in the La Plata River during Phase I. This operation of the Project is based on the assumption that M&I water supplies of the Ute Mountain Ute and Southern Ute Indian Tribes would be pumped to Ridges Basin Reservoir and the tribes would develop and market their water at the reservoir.

DESIGN REFINEMENTS OF PROJECT FEATURES

This discussion includes the following design refinements: relocations of Northwest and Mid-American Pipeline Company (MAPCO) Pipelines and County Road (CR) 211; changes in the Durango area municipal water users delivery system; design refinements of the Durango Pumping Plant; interim extension of Southern Ute Inlet canal; realignment of Ridges Basin Inlet conduit; change in alignment and configuration of Ridges Basin Dam and features; construction materials access and sources changes; and modifications in recreation development at Ridges Basin Reservoir. Because these Project refinements relate to construction of Project features, they have been grouped together. (See figure S-1.)

RELOCATIONS

Northwest Pipeline and MAPCO Pipeline

The 1980 FES (page A-31) described the relocation of Northwest Pipeline Corporation's existing 26-inch natural gas pipeline from Ridges Basin to the south side of the proposed Ridges Basin Reservoir. This utility relocation must be completed prior to construction of Ridges Basin Dam because the pipeline lies under the dam site. As Reclamation began final design of this utility relocation, it became apparent that the 1980 FES relocation route posed several difficulties in terms of topography, geology, visual effect, and land ownership.

Reclamation, in coordination with Northwest Pipeline, evaluated alternative alignments for the relocation. Three alternative routes to the 1980 FES route have been identified (see figure S-1):

- Carbon Mountain route.—Beginning at the west end of the proposed reservoir, the route first extends to the north of Ridges Basin Reservoir, then to the east of the reservoir on the west side of Carbon Mountain, then near the left abutment of the dam, and then joins the existing pipeline just downstream from the dam (this is the proposed action).
- Northeast route.—This route begins at the west end of the proposed reservoir, then extends to the north of Ridges Basin Reservoir, then to the east of the reservoir, going just west of Bodo Industrial Park, then south crossing the Animas River twice, and then joins the existing pipeline—for the most part, the route would coincide with existing utility corridors.
- Reservoir route.—The present pipeline would be replaced with a new pipeline arrangement that remains below the maximum high water line of the reservoir except for a short segment to route the pipeline around the left abutment of the dam.

In addition, a MAPCO line would be relocated at MAPCO expense, adjacent to the relocated Northwest Pipeline and in a right-of-way provided by Reclamation. A comparison of the three routes with the 1980 FES route follows in table II-3.

Table II-3.—Alternative pipeline alignment routes

	1980 FES route	Carbon Mountain route	Northeast route	Reservoir route
Length (miles)	5.7	5.5	8.6	4.4
Right-of-way width (feet)	75	75	75	75
Surface area affected (acres)	51.7	49	78.6	40.2
Landowners affected on Reclamation acquired lands	Several, including the Southern Ute Indian Tribe	None; pipeline on Reclamation- acquired lands	Numerous private landowners	None; pipeline on Reclamation- acquired lands
River crossings	None	None	Two; across Animas River	None

Relocation of CR 211

The 1980 FES (page A-9) stated that about 3.6 miles of CR 211 would be inundated by the filling of Ridges Basin Reservoir. In 1980, based upon indications from La Plata County, Reclamation did not propose to relocate CR 211 around the reservoir. However, recent discussions between Reclamation and local interests, including La Plata County, Colorado, and the Project sponsors, have identified a desire by the county and other local interests for Reclamation to relocate the road. They believe relocation of the road is needed to alleviate future traffic impacts on the Wildcat Canyon Road (CR 141) due to recreation development at Ridges Basin Reservoir and to provide access for recreation users from areas to the south and east of the reservoir. Reclamation policy for relocations generally requires replacement with a road similar or equivalent to that road now in use; the relocated CR 211 would be brought to county standards.

To assist with local and Federal decisionmaking processes, Reclamation initially evaluated two routes for the relocation—the ridgetop route (proposed action) and shoreline route, as shown on table II-4 and on figures II-1 and S-1. The ridgetop route would likely use a portion of CR 212 and traverse an area of steep terrain near the existing utility corridor to the north of the reservoir. The shoreline route would be substantially longer than the ridgetop route because it follows the reservoir shoreline and connects with the westernmost portion of existing CR 211. The design of the relocated road would maintain controlled access to the recreation area.

Table II-4.—Relocation routes for CR 211

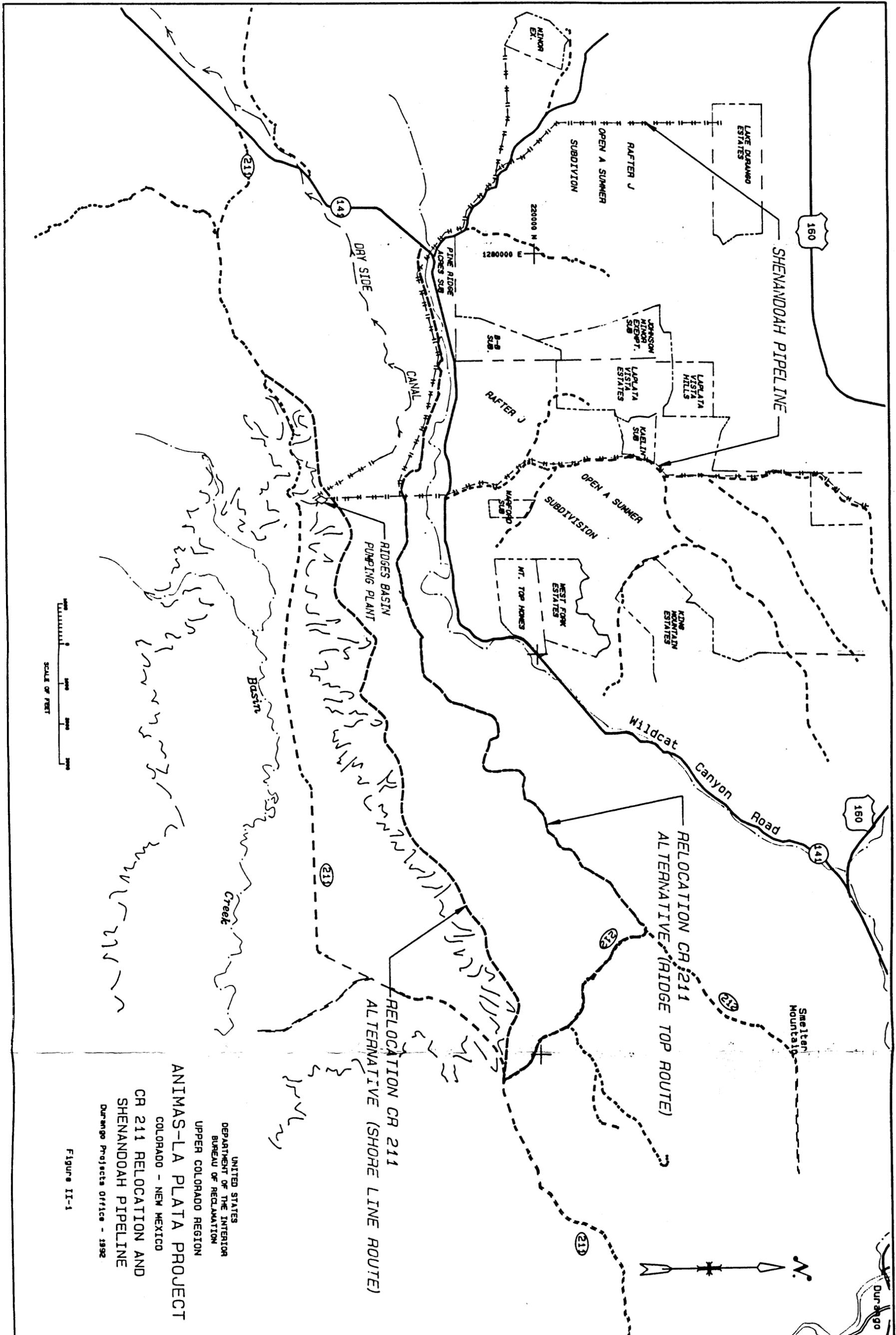
	Ridgetop route (proposed action)	Shoreline route
Location	North of the reservoir following an existing road and trail (see figure II-1)	North of the reservoir following the north shoreline (see figure II-1)
Length	12,000 feet	32,000 feet
Right-of-way	60 feet wide	60 feet wide
Acres affected	17 acres	44 acres
Landowners affected	Colorado Division of Wildlife (CDOW), State, and Reclamation-acquired lands for reservoir	On Reclamation-acquired lands for reservoir

Durango Area Municipal Water Users Delivery System

The 1980 FES (page A-9) stated that raw water from the Project would be treated by a new water treatment plant to be constructed by the Project water users. Treated Project water would be delivered to the city of Durango's distribution system by the proposed Durango M&I pipeline. The city's system would be used to distribute the treated water to nearby users, including the three subdivisions west of the city—Rafter J, Shenandoah, and Durango West—as well as to the city proper. The pipeline was to have been about 2.3 miles long with 29 cubic feet per second (ft³/s) capacity. Subsequently, Durango decided to limit the use of its transmission system to its own water supply area.

Durango M&I Pipeline

After the 1980 FES, Durango requested that its 2,500 acre-feet of Project water be delivered directly to its present water treatment plant. The pipeline to convey Project water has been realigned and extended to the city's existing reservoir and treatment plant. The line has been increased in length from 2.3 miles to 3.2 miles and has been downsized from 29 ft³/s to 11 ft³/s capacity. The right-of-way is 25 feet for the M&I pipeline.



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 COLORADO - NEW MEXICO
 CR 211 RELOCATION AND
 SHENANDOAH PIPELINE
 Durango Projects Office - 1992

Figure IX-1

Shenandoah M&I Pipeline

Reclamation is now proposing to construct a new M&I pipeline system to deliver Project water to a treatment plant for the three subdivisions and any other potential rural domestic water users. Water would be delivered to an existing treatment plant or to a privately constructed treatment plant. The three west area subdivisions would be served by the new 7.8-mile-long, 6-ft³/s capacity Shenandoah M&I pipeline, which would be installed adjacent to existing roads in 25 feet of right-of-way and on disturbed areas. (See figure II-1.) The new pipeline would convey water pumped from Ridges Basin Reservoir by the Ridges Basin Pumping Plant.

Durango Pumping Plant and Intake Structure

As a result of further geologic, hydraulic, and sedimentation studies, the design of Durango Pumping Plant has been revised since the 1980 FES was published. (See figure II-2.)

As a result of ground-water investigations conducted in 1990, a determination was made that a ground-water problem existed along a fault through the site. The investigations show that adequate foundation conditions exist for pumping plant construction on either side of the fault; however, to avoid the possibility of encountering contaminated ground water that has been detected within the fault, the plant would be constructed entirely on the northwest, upgradient side of the fault.

Locating the plant entirely on the northwest side of the fault limits design alternatives by confining the construction limits of the plant and intake structure. As a result, the plant has been moved closer to the bank of the Animas River, and the 300-foot-long intake structure and 870-foot-long settling basin have been replaced with a 230-foot-long intake structure and culminating at a 200-foot by 90-foot sand trap. The area needed for construction of the pumping plant would be reduced from 26 acres to 14 acres.

The 1980 FES (page A-6) stated that the pumping plant would have the capacity to deliver water at a rate of 430 ft³/s through a maximum static lift of 525 feet (full reservoir). Since 1980, the rated capacity of the pumping plant has been changed to 431 ft³/s. As the water level in the reservoir drops, the pumps would have less static head to overcome allowing them to pump at a higher rate (up to 526 ft³/s) when water is available in the Animas River.

Interim Extension of Southern Ute Inlet Canal

With phasing of the Project, Southern Ute Reservoir would be constructed in Phase II and thus would be unavailable to deliver water to Project lands in New Mexico in Phase I. A 100-ft³/s interim extension to the Southern Ute Inlet canal would be constructed to provide water to the two New Mexico gravity pressurized laterals. The interim canal would service these lands until the reservoir was available and would be eliminated after it was no longer in use. This earth-lined canal would be approximately 2.7 miles in length and would run roughly parallel to the La Plata Highway (State Highway 140) in Colorado and State Highway 170 in New Mexico, as shown on figure S-2. After Phase II the canal would be recontoured and revegetated to preexisting conditions with native species.

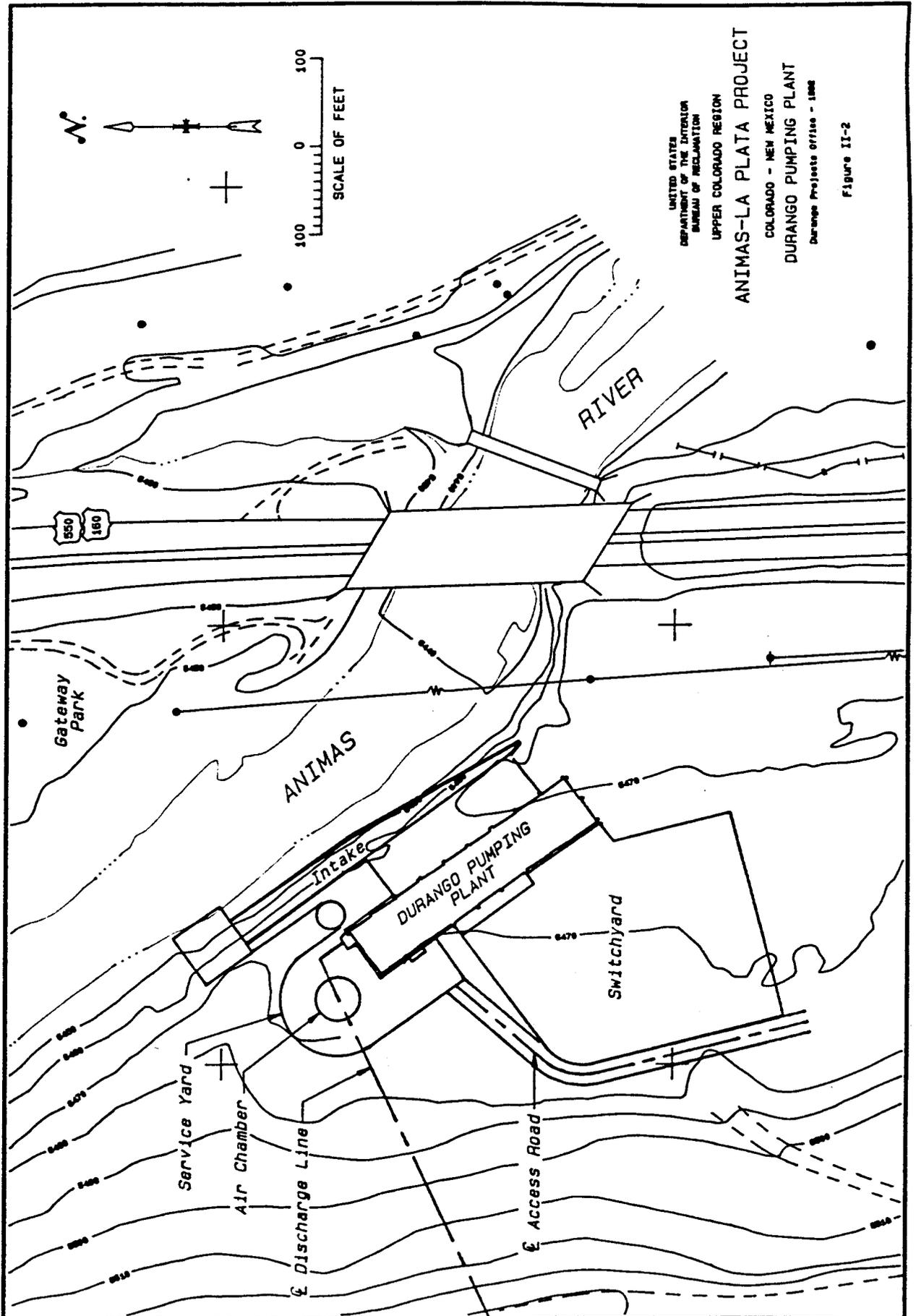
Realignment of Ridges Basin Inlet Conduit

The 1980 FES (page A-6) stated that the conduit would parallel CR 211 and would convey water from Durango Pumping Plant to Ridges Basin Reservoir. Recent design data, including geological considerations, now indicate a route up to one-third mile south of CR 211 is preferred. Reclamation proposes to construct the inlet conduit in this preferred location, which would help avoid potential geologic problems, avoid resultant cost impacts, and avoid placing large quantities of fill material in Bodo Creek.

Alignment and Configuration of Ridges Basin Dam and Related Features

Since 1980, numerous alignment configurations have been studied. Currently, the right abutment of the proposed Ridges Basin Dam has been relocated upstream about 800 feet (see figure II-3) to avoid most of the right abutment contact with coal beds. The change would also move the embankment away from an area where natural gas seeps from the Fruitland Formation through alluvial deposits. The rotation of the dam axis would reduce the uncertainties associated with the extent of required excavation, foundation stability, and treatment for the coal beds. This design refinement was a result of further dam safety investigations and considerations that were discussed in the 1980 FES (page D-4). The over-excavation of the dam's foundation is a result of Reclamation's changes in requirements for dam safety and of state-of-the-art construction since the 1980 FES. This refinement is currently being investigated for final design. The geologic design data report will be completed in late 1992.

The 1979 DPR called for an auxiliary spillway to be placed in the saddle in the northeast edge of the reservoir. Studies of the hydrologic conditions



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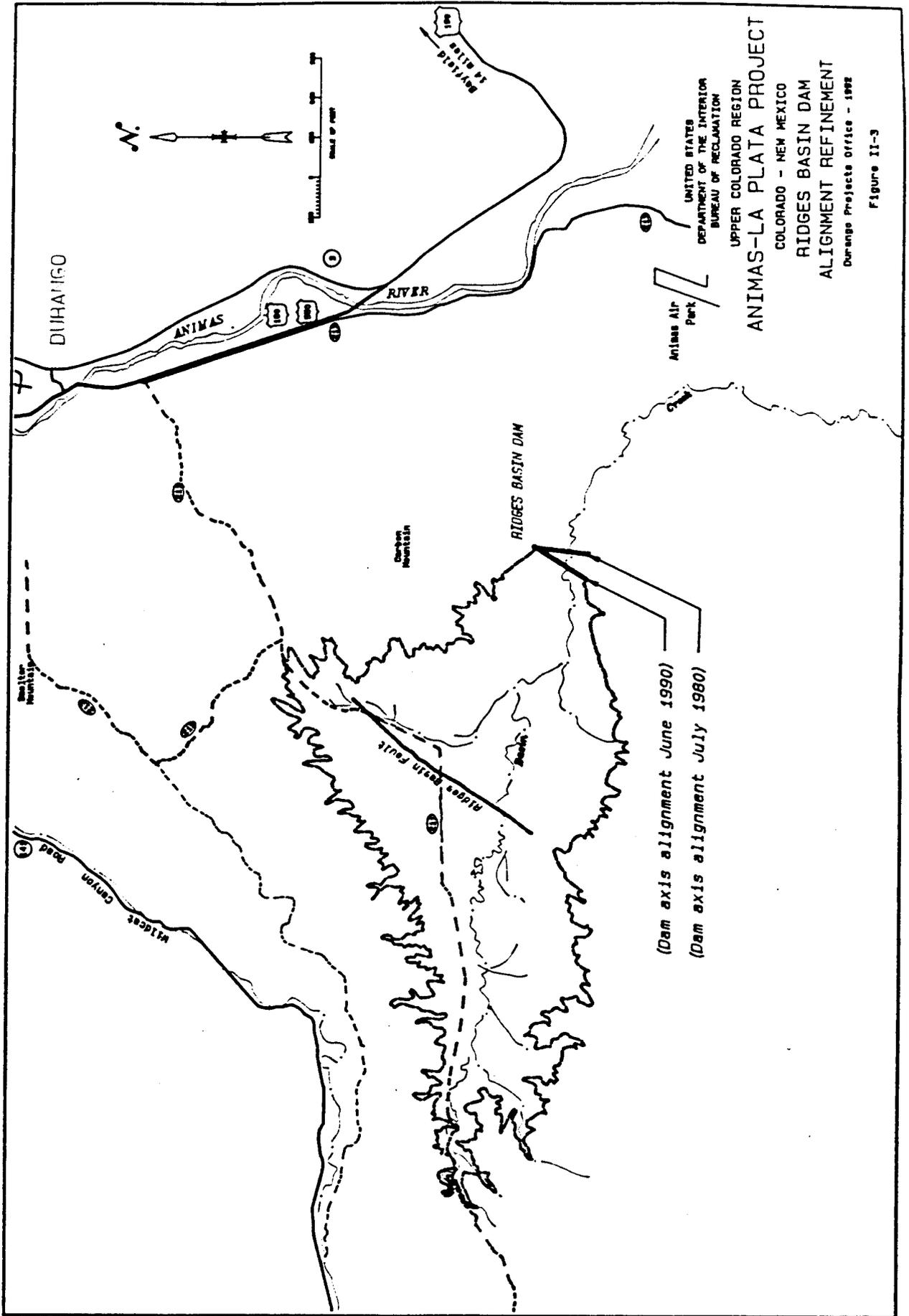
ANIMAS-LA PLATA PROJECT

COLORADO - NEW MEXICO

DURANGO PUMPING PLANT

Damage Projects Office - 1968

Figure II-2



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ANIMAS-LA PLATA PROJECT

COLORADO - NEW MEXICO

RIDGES BASIN DAM

ALIGNMENT REFINEMENT

Durango Projects Office - 1982

Figure II-3

have shown that there is ample space in the reservoir to store the probable maximum flood. This, and the fact that Ridges Basin Dam is an offstream storage facility, eliminate the requirement for an emergency spillway.

Construction Access and Material Sources

Ridges Basin Dam

The 1980 FES (pages A-26 to 29) described the volume and source of pervious material for Ridges Basin Dam. The material would have been obtained from gravel deposits along the Animas River 3.5 miles southeast of the dam site or from terrace gravels along Long Hollow about 5 or 6 miles west of the dam site. The source for pervious material is now identified as borrow area B, 1.5 to 2.5 miles southeast of the dam site. (See figure S-1.) A portion of borrow source B is an existing gravel pit that was used by the Department of Energy (DOE) for the Durango Uranium Mill Tailings Remedial Action (UMTRA) project.

Because borrow area B is located closer to the dam site and the UMTRA project constructed a haul road through the dam site to this borrow area, a shorter construction access road would be required. A 4,000-foot construction access road would follow the approximate alignment of an existing unimproved road between CR 213 and the south edge of borrow area B. Other alignments are described in 1980 FES (page A-9). At the completion of the dam construction, this road, along with a road through the reclaimed borrow area B and the existing haul road, would be used as the dam operation and maintenance (O&M) access road. The proposed access route is in lieu of a 3.5-mile road improvement and upgrade.

The specification level design refinements of Ridges Basin Dam since 1980 have resulted in changes in quantities (cubic yards) of construction material required to construct the dam, as shown in table II-5, below. The increase is the result of axis rotation causing increased crest length (1,600 feet to 1,900 feet) and additional foundation excavation for dam safety considerations. These design changes, in turn, require a greater volume of embankment material. Impervious embankment volume would double because of increased crest length, additional foundation excavation, and current design philosophy for using material closer to the dam (borrow area A). Pervious material (borrow area B) would be reduced because of this design philosophy.

Soil cement would be used as slope protection on Ridges Basin Dam instead of riprap. The refinements result in an increase of about 22 percent in total pervious and impervious material required for construction.

Table II-5.—Changes in estimated quantities of Ridges Basin Dam construction materials

Material	Estimated quantity needed (cubic yards)	
	1980	¹ 1992
Impervious	3,000,000	5,600,000
Pervious	5,600,000	4,200,000
Riprap	29,000	5,000
Soil cement	0	80,000

¹ Quantities are approximate and are based on the design data available as of August 1992.

Riprap

The potential source of riprap for construction of Ridges Basin and Southern Ute Dams and La Plata and Southern Ute Diversion Dams is now proposed to be one of the following: an existing quarry located about 5 miles north of Lemon Dam; an existing quarry at Jackson Gulch Reservoir; borrow area B terrace gravel deposits 1.5 to 2.5 miles southeast of Ridges Basin Dam; a quarry at the English Ranch, located about 16 miles north of Durango; or material excavated for the foundation of the above Project features.

Durango Pumping Plant

Other changes in material resources/access include an increase in length from 1,000 feet to 2,300 feet for the access road for construction and O&M of Durango Pumping Plant as a result of intersecting the access at CR 211 rather than Highways 550/160.

Recreation Development at Ridges Basin Reservoir

The 1980 FES recreation facilities would have been constructed at Ridges Basin Reservoir to help meet existing and projected needs in fishing, camping, boating, swimming, picnicking, sightseeing, and hiking opportunities. The proposed recreation development would have been concentrated at a location on the north shore of the reservoir to reduce wildlife impacts at other locations. The point of access to the recreation area would be controlled by a single entrance station and a new paved entrance road via CR 141 at the northwest end of the reservoir. Reclamation would develop and administer the recreation facilities.

In the 1992 plan, the recreation development for Ridges Basin Reservoir is proposed for Phase I of the Project. The Colorado Division of Parks and Outdoor Recreation (CDPOR) has indicated interest in managing recreation at the reservoir, pending a formal agreement. Reclamation and CDPOR agree that changes in the recreation plan are necessary to address current recreation demands and development standards. Accordingly, the maximum level of development, as described in the 1979 DPR, would be reasonable and foreseeable in relation to estimated visitation. Reclamation and CDPOR would refine the recreation plan within the scope of the 1979 DPR and requirements of the 1980 FES.

The refined recreation plan would address the relocation of CR 211, which is proposed to join the recreation area road network. The refined plan would integrate the relocation of CR 211 by maintaining controlled access to the recreation area.

RECLASSIFICATION OR OTHER PROJECT LANDS REFINEMENTS

Since 1980, changes in the Project plan have affected approximately 3,800 acres. About 1,200 acres previously classified as supplemental service land have been reclassified as full service lands, and 2,640 acres of supplemental land have been deleted from the plan at the request of landowners.

REGULATORY COMPLIANCE

Investigations of Soils Characteristics

Reclamation's classification of the Animas-La Plata Project lands was completed in the early 1970's and recognized three arable (suitable for farming) land classes. On January 19, 1982, the Secretary of the Interior certified that Reclamation had completed an adequate soil survey and classification of lands to be served by the Project. On May 12, 1986, former legislation was amended by Public Law 99-294; the law mandated that all soil surveys and certifications for Reclamation projects must now include an investigation of soil characteristics which might result in toxic or hazardous irrigation return flows. In January 1992, Reclamation determined that a trace element analysis supplement to the 1982 arable lands classification was required for the Project to fulfill the requirement. Those investigations included the collection of soil, sediment, ground water, surface water, and biological samples from Project lands and surface streams in the La Plata and Mancos River drainages, and the Ridges Basin and Southern Ute Reservoir areas. Results are described in chapter III.

Additional Compliance With Section 404(r) of the Clean Water Act

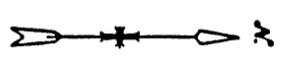
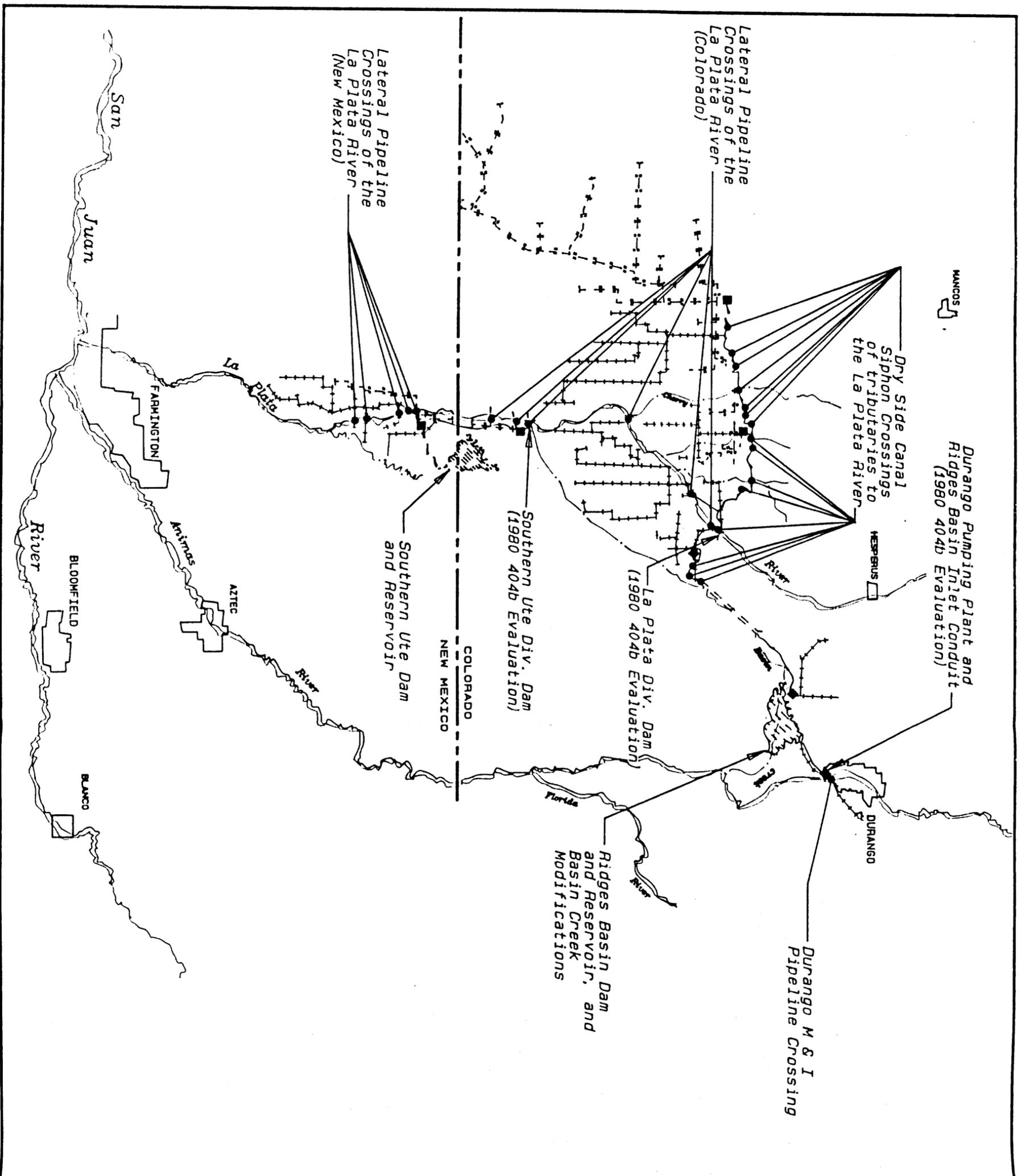
In the 1980 FES (page A-1), Reclamation stated that it intended to pursue, under the conditions of section 404(r) of the Clean Water Act, an exemption from the requirement to obtain a section 404 permit for discharge of dredged or fill material into the waters of the United States. To satisfy the conditions of section 404(r), Reclamation submitted the 1980 FES with its attached 404(b)(1) evaluation to Congress on September 26, 1980. The 404(b)(1) evaluation described the following Project features:

- The intake structure of the Durango Pumping Plant in the Animas River.
- The La Plata Diversion Dam in the La Plata River.
- The Southern Ute Diversion Dam in the La Plata River. (See figure II-4).

In 1980, Reclamation intended to construct other Project features using section 404, nationwide permits as they were then constituted. Those Project features included:

- Ridges Basin Dam and Reservoir on Basin Creek, a tributary of the Animas River.
- Southern Ute Dam and Reservoir on Cinder Gulch-McDermott Arroyo, a tributary of the La Plata River in New Mexico.
- Durango M&I pipeline crossing of the Animas River near the Durango Pumping Plant.
- Dry Side Canal siphon crossing of the La Plata River in Colorado.
- Dry Side Canal siphon crossings of tributaries of the La Plata River in Colorado.
- An estimated 11 pipeline crossings of the La Plata River in Colorado and New Mexico.

In 1980 and 1986, the section 404, nationwide permits were changed so that Project features such as Ridges Basin and Southern Ute Dams could not be constructed under nationwide permits. Reclamation intends to expand the 404(r) exemption to include all Project features through additional compliance with section 404(r). A new 404(b)(1) evaluation of the above features has been prepared in compliance with the Environmental



PHASE ONE FEATURES

- Proposed Dam and Reservoir
- Proposed Canal
- Proposed Pumping Plant
- Proposed Pipeline

PHASE TWO FEATURES

- Proposed Dam and Reservoir
- Proposed Pumping Plant
- Proposed Pipeline
- Proposed Canal

UNITED STATES
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ANIMAS-LA PLATA PROJECT
 COLORADO - NEW MEXICO
FEATURES ADDRESSED IN THE
404(b) (1) EVALUATION
 Durango Projects Office - 1992
 Figure II-4

Protection Agency (EPA) section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Materials (40 CFR Part 230) and is included in this document as attachment 1.

In addition to the above features, Reclamation has proposed additional Project-related construction activities that would require discharge of dredged or fill material into the waters of the United States. Those additional activities are the modification of the channel of Basin Creek within the Ridges Basin Dam and Reservoir site to facilitate dam construction and borrow activities. These activities are also included in the 404(b)(1) evaluation, attachment 1.

ENVIRONMENTAL CONSIDERATIONS, ANALYSIS ASSUMPTIONS, AND MITIGATION MEASURES INCORPORATED INTO THE PROPOSED ACTION

The proposed action incorporates the environmental considerations, analysis assumptions, and mitigation measures described in chapters III and IV. The items described are clarifications, revisions, and additions to environmental considerations and commitments incorporated into the proposed action since 1980. The Environmental Commitment Plan (ECP), attachment 3, contains the list of environmental commitments for the Project described in the 1980 FES. The ECP is a document used by Reclamation to summarize environmental commitments for construction and O&M activities. A comparative display of effects is presented in table S-1.

The mitigation measures would be implemented by Reclamation. Commitments for preconstruction activities would generally be completed by Reclamation or by contract prior to the construction specifications and activities. Environmental commitments to be implemented by another agency are so identified. Some commitments, such as monitoring or additional studies, could continue beyond completion of construction of Project features. The measures and commitments are included in detail in chapters III and IV.

FINANCIAL ISSUES

Phasing of Construction and Cost Sharing

As noted in chapter I, a key element of the cost-sharing agreement and Indian Water Rights settlement was to construct the Project in two phases, features of which are shown in tables II-1 and II-2 and figures S-2 and S-3. Two-phase construction was proposed as a means of increasing the

necessary cost-share contributions made by sponsors, while still providing a water supply for the two Ute Tribes. Phase I would supply water for the two Ute Tribes at Ridges Basin Reservoir, construct irrigation facilities to serve most of the non-Indian Project area and some Indian lands, and provide the full non-Indian M&I water supply. Phase I would be funded from Federal and cost-shared sources. The Project cost-sharing partners would contribute a total of \$68,202,000 toward Phase I construction.

Phase II would be constructed to deliver Project water to the remainder of the Project area. It would be entirely funded by cost-sharing sources.

The cost-sharing agreement provided settlement of the Indian water rights claims and provided a binding agreement for cost sharing. The signatory parties to the cost-sharing agreement were the Department of the Interior, Animas-La Plata Water Conservancy District (District) (Colorado), Southern Ute Indian Tribe, Ute Mountain Ute Indian Tribe, the State of Colorado, Colorado Water Resource and Power Development Authority, New Mexico Interstate Streams Commission (New Mexico), and Montezuma County (Colorado).

Reclamation Project cost sharing traditionally has been in the form of repayment contracts between the U.S. and the participating non-Federal entity, which pays reimbursable costs over a certain time period with or without interest, depending on the authorizing legislation. The 1986 cost-sharing agreement for the Project prescribed advance funding, in which portions of the construction costs are funded concurrently with Project construction.

Since 1980, the non-Indian New Mexico M&I entities—the cities of Farmington, Aztec, Bloomfield, the smaller rural communities, and the county—have organized into the San Juan Water Commission. This commission, as a single entity, would contract for the total M&I water originally allocated to each separate municipal water user.

Tribal Development

As a part of the cost-sharing regulations, the Southern Ute Indian Tribe and Ute Mountain Ute Tribe would not be able to make immediate use of all water allocated to them from the Project. In order to initiate the earliest repayment of the Project costs and also enhance tribal revenue opportunities, the final settlement agreement recognized that the Ute Tribes contemplated leasing or temporary off-reservation disposition of tribal water as permitted by applicable Federal and State laws, compacts, and treaties.

Negotiation of the water rights and cost-sharing agreements led to establishment of a tribal development fund for each tribe. These funds

would enable the tribes to develop and operate facilities to use their water supplies and natural resources on the reservations. The funds would be in addition to and separate from the Project financing and would require the U.S. Congress to appropriate a total of \$49.5 million to be made in three annual payments to the tribes. The State of Colorado would also appropriate and deposit \$5 million in these funds. The State has already spent \$6 million for the construction of the Towaoc Pipeline and domestic distribution system to deliver Dolores Project M&I water to the Ute Mountain Ute Reservation. That \$6 million has been credited towards the development fund requirements. Of the total \$60.5 million fund, \$20 million would be for the Southern Ute Indian Tribe and \$40.5 million would be for the Ute Mountain Ute Tribe. Table II-6 provides a breakdown of the development funds that each tribe would receive from the various parties.

Table II-6.—Development fund allocation
(millions of dollars)

	Year 1	Year 2	Year 3	Total
Ute Mountain Ute Tribe				
Federal	12.0	10	10	32.0
State	2.5	-	-	2.5
Towaoc Pipeline ¹	6.0	-	-	6.0
Subtotal	20.5	10	10	40.5
Southern Ute Indian Tribe				
Federal	7.5	5	5	17.5
State	2.5	-	-	2.5
Subtotal	10.0	.5	5	20.0
Total	30.5	15	15	60.5

¹ The Towaoc Pipeline is a domestic pipeline and distribution system completed in 1990 to Towaoc on the Ute Mountain Ute Indian Reservation, a town which now receives potable water from the Dolores Project. Funds for the construction of the pipeline were provided by the Colorado General Assembly.

ADMINISTRATION AND MAINTENANCE

Because the Project area would be located in two States and on three Indian Reservations (the Navajo Nation, the Southern Ute Indian Tribe, and the Ute Mountain Ute Tribe), a Project coordinating committee would be established under terms specified in the Project repayment contracts. The committee would consist of Reclamation and representatives from the District, Colorado, and the La Plata Conservancy District, New Mexico; the San Juan Water Commission; and three Indian tribes (the Navajo Nation, Southern Ute Indian Tribe, Ute Mountain Ute Tribe). The committee would

ensure that the respective water users coordinate closely in O&M of Project facilities and in the most efficient and equitable use of Project water.

After Phase I construction, the District in Colorado would operate and maintain the Durango and Ridges Basin Pumping Plants, Ridges Basin Inlet conduit, Ridges Basin Dam and Reservoir, and Dry Side Canal. Within its jurisdiction, the District would also operate and maintain the Red Mesa Pumping Plant and the laterals, gravity turnouts, and drains in Colorado. Because the Project land belonging to the Southern Ute Indian Tribe is scattered among the non-Indian land, the tribe would likely contract with the District to share in the costs of O&M of the facilities providing water to this land. The city of Durango would operate and maintain the Durango M&I pipeline, and the District or a subcontractor would operate and maintain the Shenandoah M&I pipeline. The San Juan Water Commission, New Mexico, would contract with the District for its share of the O&M of the Durango Pumping Plant, Ridges Basin Inlet conduit, and Ridges Basin Dam and Reservoir. The CDPOR has expressed interest in managing recreation at Ridges Basin Reservoir, pending a formal agreement.

After the construction of Phase I, the La Plata Conservancy District would be responsible for the O&M of the Southern Ute Diversion Dam, Southern Ute Inlet canal, gravity turnouts, laterals, and drains for the Project land in New Mexico. An O&M headquarters for the La Plata Conservancy District would be located in the Project area. Because adequate housing is available in the area, none would be provided for District personnel. After Phase I construction, the O&M headquarters for the La Plata Conservancy District would likely be located in the community of La Plata, New Mexico.

Overview: This discussion provides an overview of environmental effects which were not addressed in the 1980 FES but which have occurred in the decade since its publication because of new information or project refinements.

CHAPTER III - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the environmental consequences not previously identified in the 1980 Final Environmental Statement (INT FES 80-18) (1980 FES), but projected to occur as a result of the information described in chapter II, and new or updated information. The discussion does not address resource areas for which impacts have not changed as a result of the information, including air quality and noise levels, scenery and vectors, and related problems (1980 FES, pages C-44 to 46). A description of the impacts originally identified for the entire Animas-La Plata Project (Project) is provided in the 1980 FES (chapter C).

After a discussion of vegetation impacts of feature relocations or additions, information in this chapter is arranged by the following format: for each parameter, the 1980 condition—the baseline—is summarized briefly, followed by new or updated information, if any, occurring in the decade since publication of the 1980 FES. That, in turn, is followed by a discussion of the impacts of the current proposed action described in chapter II and by an analysis of mitigation refinements, if any, as a result of the current impacts.

The information is described under the following parameters: vegetation, geology, soils, water quality, Animas and La Plata Rivers aquatic resources, elk habitat, threatened and endangered species, wetlands and riparian habitat, cultural resources, recreation, and social/economic effects.

VEGETATION

1980 Baseline

Vegetative types in the Project-affected area were described in the 1980 FES (pages B-44 through B-47), and the analysis of impacts on those vegetation types as a result of Project construction was described in chapter C. Table C-9 (page C-39) of the 1980 FES displayed the vegetative changes by acre and vegetative type resulting from the Project.

New or Updated Information

Since 1980, there have been refinements in the design of Project features, as described in chapter II of this document. The design refinements have resulted in changes in impacts to the different vegetative types found in the Project area. Wetland vegetation has been identified in Ridges Basin and along Basin Creek which was not described in the 1980 FES. The description of Project impacts on wetlands and riparian areas is discussed separately in the subsequent wetlands and riparian habitat discussion in this Supplement to the Final Environmental Statement (Supplement). The Ute ladies' tresses (*Spiranthes diluvialis*) was listed as a threatened plant species in 1992 and may occur in the Project area. Protective measures are described in the section on threatened and endangered species.

Impacts of 1992 Proposed Action

The impacts of the proposed action are shown in table III-1. The table compares the present impacts to vegetation with the impacts described in the 1980 FES. In summary, an additional 96 acres of vegetation would be lost as a result of Project construction. In addition, 1,210 acres would be changed from sagebrush/rabbitbrush to cropland. Approximately 56 acres would be temporarily disturbed during construction of pipelines and the interim extension of Southern Ute Inlet Canal. After construction, disturbed acres would be revegetated to naturally occurring plant species. The 42 acres of vegetation loss described in the 1980 FES would not now occur because of design refinements of the Durango Pumping Plant and the Ridges Basin Dam construction access road since 1980. An additional 1,085 acres, primarily mountain shrub, would be affected as mitigation for elk habitat losses. Approximately 3,800 acres of existing irrigated land would not receive supplemental Project irrigation water. Approximately 121 acres of upland vegetation would be altered to wetland vegetation as a result of mitigation for the wetland losses in Ridges Basin and along Basin Creek.

GEOLOGY

1980 Baseline

The 1980 FES (pages A-26 through A-29 and C-19 and C-20) described the geology of the Project area, the seismic conditions and risks associated with the operation at the Ridges Basin and Southern Ute Reservoirs, methane gas development, and construction material sources. Attachment 4 of the 1980 FES (Considerations for Safety of Dams) indicated additional geologic

Table III-1.—Comparison of vegetation impacts described in the 1980 FES
and in the present proposed action
(Units - acres)

Project feature	1980 FES	1992		Vegetation type
		Proposed action	Difference	
Ridges Basin Reservoir ^{1,2}	4,830	4,830	0	
Durango Pumping Plant	26	14	-12	sagebrush/ rabbitbrush
Ridges Basin access road	42	12	-30	mountain shrub
County Road (CR) 211	0	17	+17	mountain shrub
Wildlife area	3,500	4,586	+1,086	mountain shrub
Operation and maintenance headquarters	3	3	0	
Dry Side Canal ³	648	648	0	
Southern Ute Inlet Canal ⁴	107	107	0	
Interim extension of Southern Ute Inlet Canal	0	33	+33	pinyon/juniper
Southern Ute Reservoir ²	2,822	2,822	0	
New Mexico Irrigation Canal	107	107	0	
Shenandoah pipeline	0	24	+24	mountain shrub
Durango M&I pipeline	5	7	+2	grassland
Laterals	1,791	1,791	0	
Powerline easement	503	503	0	
Ridges Basin Inlet conduit	22	22	0	
Full-service lands	48,620	49,810	1,190	sagebrush/ rabbitbrush
Supplemental service ⁵	21,480	17,650	-3,830	cropland
Wildlife area relocation ⁶	4,000	7,500	+3,500	mountain shrub
Northwest Pipeline relocation	52	49	-3	mountain shrub
Wetland development	0	321	+321	wetland

¹ An estimated 121 acres has been identified as wetland vegetation that was previously identified as cropland and grassland.

² The area of borrow and spoil acreage is included in this feature.

³ The La Plata Diversion Dam acreage is included in this feature.

⁴ The 2.7 mile interim extension of the canal would be eliminated after Phase II is operational.

⁵ Supplemental land acreage (2,640 acres) has been deleted from the Project since the 1980 FES.

⁶ Replacement of the Bodo Wildlife Area would be based upon economic value of the area, not acreage.

studies and investigations would occur during design data gathering to evaluate Ridges Basin Reservoir and Dam and additional seismic studies required for safety of dam purposes.

New or Updated Information

As discussed in chapter II, the location for the right abutment has been moved 800 feet upstream as a result of additional geologic investigations since 1980. The location is to minimize increased costs in foundation abutment treatment due to an exposed coal-bearing unit of the Fruitland Formation.

Seismic studies have been completed which affirm previous estimates that minimal risk is associated with dam construction and reservoir operation. The dam is being designed to withstand a maximum credible earthquake of 6.5 magnitude at a distance of approximately 8.7 miles (14 km). (U.S. Bureau of Reclamation, 1992[d]).

Methane gas development has increased in the area since 1980. Three producing gas wells have been drilled within 1 mile of the Ridges Basin Dam site. Gas production methods (pumping ground water) may lower the ground-water table near the dam. Dewatering at Ridges Basin dam site during construction may increase the amount of gas seeping to the surface in the Fruitland Formation downstream from the toe of the dam; however, methane is not considered a problem, because concentrations would not be sufficient to pose a safety problem.

Construction material sources for pervious materials for Ridges Basin Dam have been identified as borrow area B, located 1.5 to 2.5 miles southeast of the dam site. (See figure S-1). This existing gravel pit was used by the Department of Energy (DOE) for the Durango Uranium Mill Tailings Remedial Action project, described in chapter I. Soil cement has now been identified for the face of the dam in lieu of riprap material. Pervious fill for the Southern Ute Dam would now consist only of material borrowed from the river terrace deposits (located above the La Plata River) and would not include those deposits identified in the La Plata River flood plain.

Impacts of 1992 Proposed Action

The dam alignment was moved to minimize increased costs in foundation abutment treatment due to coal of the Fruitland Formation, but moving the alignment would increase the amount of borrow material needed to complete the dam by about 20 percent.

Seismic studies have been completed at the Ridges Basin Dam site. These studies indicate that the potential for reservoir-induced seismic activity is negligible, based on reservoir depth and volume, lack of geologically recent fault activity, and local seismicity.

The commercial development of methane gas near the reservoir area would not affect the integrity of the dam or reservoir holding capability. The potential increase in methane gas seeping to the surface from the Fruitland Formation immediately downstream from the toe of the dam would be temporary and would occur only during construction. During construction, safety measures would be taken to monitor for methane gas.

The construction material source for the pervious fill material for the Ridges Basin Dam would be an existing gravel pit, which would be enlarged. This would disturb less area than that identified in the 1980 FES and would keep activity out of the Animas River flood plain. Pervious fill for the Southern Ute Dam would be borrowed from existing terrace deposits located above the La Plata River. This would also disturb less area than that identified in the 1980 FES and would keep activity out of the La Plata River flood plain.

Mitigation Refinements

None.

SOILS

1980 Baseline

A detailed soil survey was performed for the 1979 Definite Plan Report (DPR). The lands were determined to have been properly classified and, as a result, in January 1982, an arable land classification was certified under the provisions of applicable Public Law 172. A study to determine toxic or hazardous irrigation return flows was not required at that time. The discussion of soil characteristics in the DPR and the summarized information in the 1980 FES were accurate.

New or Updated Information

A trace element study was completed on the arable land area in 1992 to evaluate the potential for toxic or hazardous irrigation return flows from Project lands, as newly required by Public Law 99-294. A detailed

discussion of the trace element study can be found in the *Animas-La Plata Project Trace Element Analysis* (U.S. Bureau of Reclamation, 1992[a]).

Twenty-six soil sample sites were selected to represent all landforms within the Project area. Soil samples (a total of 226) were collected and analyzed for total and soluble concentrations of trace elements. The total trace element content of the Project soils was within the common range found in Western States soils. (See table III-2).

Soil saturation extract analysis indicated that water soluble concentrations of trace elements were a potential source of water quality problems (mercury, silver, copper, and selenium). Weighted averages of soluble concentrations of these five elements within the soil profiles were computed. The additional analysis indicated selenium was the element of greatest concern.

Elevated levels of selenium were not found in the root zone of the Project landform areas with the exception of one isolated area. Two other isolated areas were identified with elevated levels of selenium below the root zone.

Selenium problems have been identified with the geologic formations in the San Juan basin of southwest Colorado, but these formations are insignificant in the Project area.

Impacts of 1992 Proposed Action

Project irrigation would leach some trace elements bound to the soil and increase ground-water concentrations of these elements, particularly in the first few years. The ground water would travel to open drainages or drains where dilution and chemical processes would alter the concentration of the trace elements in the water.

The irrigation return flow trace element concentrations are expected to be similar to the present concentration levels on irrigated lands in the Project area. The soils currently being irrigated with La Plata River water would become progressively less saline and the trace element levels lower as a result of irrigating with water supplied from Ridges Basin Reservoir. The dryland soils, following irrigation development, would gradually decrease in salinity and trace element concentrations until equilibrium is reached with the irrigation water. The irrigation of Project lands under average management conditions would not adversely affect the environment.

Table III-2.—Comparison of total element analysis for
Western States and Animas-La-Plata

Element Unit of measure (% or ¹ parts per million [ppm])	Baseline soil data for Western States		Animas-La Plata Project	
	Mean	Range	Mean	Range
Aluminum, %	5.8	1.5-23	5.0	3.0-6.6
Arsenic, ppm	5.5	1.2-22	5.8	1.9-9.6
Boron, ppm	23	5.8-91	Not Analyzed	
Barium, ppm	580	200-1,700	569	210-990
Beryllium, ppm	0.68	0.13-3.6	1.08	0.5-2.0
Calcium, %	1.8	0.19-17	8.0	0.32-16
Cadmium, ppm	0.06	² 0.01-0.7	All values reported as <2.0	
Cerium, ppm	65	22-190	54	32-69
Cobalt, ppm	7.1	1.8-28	8.3	4-13
Chromium, ppm	41	8.5-200	56	19-91
Copper, ppm	21	4.9-90	17	7-67
Iron, %	2.1	0.55-8.0	2.0	0.9-3.8
Gallium, ppm	16	5.7-45	11	7-16
Mercury, ppm	0.046	0.0085-0.25	Not calculated	<0.01-0.04
Potassium, %	1.8	0.38-3.2	1.7	0.9-25
Lanthanum, ppm	30	8.4-110	30	18-41
Lithium, ppm	22	8.8-55	27	16-76
Magnesium, %	0.74	0.15-3.6	0.72	0.31-1.5
Manganese, ppm	380	97-1,500	300	68-870
Molybdenum, ppm	0.85	0.18-4.0	All values reported <2	
Sodium, %	0.97	0.26-3.7	0.68	0.21-1.5
Neodymium, ppm	36	12-110	25.5	17-35
Nickel, ppm	15	3.4-66	14.2	7-28
Phosphorus, %	0.032	0.0059-0.17	0.045	0.02-0.09
Lead, ppm	17	5.2-55	16	8-22
Scandium, ppm	8.2	2.7-25	6.3	9-10
Selenium, ppm	0.23	0.039-1.4	0.20	<0.01-1.1
Strontium, ppm	200	43-930	183	74-520
Titanium, %	0.22	0.069-0.70	0.24	0.14-0.32
Thorium, ppm	9.1	4.1-20	8.5	5-12
Uranium, ppm	2.5	1.2-5.3	All values reported as <100	
Vanadium, ppm	70	18-270	58.7	41-110
Yttrium, ppm	22	8.0-60	16.6	9-24
Ytterbium, ppm	2.6	0.98-6.9	1.7	1-2
Zinc, ppm	55	17-180	51	29-92

¹ Values chosen to represent an expected 95 percent range.
From a suite of randomly selected soils, 95 percent are expected to occur within plus or minus two standard deviations. Values in the range are defined as common.

² Environmental Protection Agency's measurement standard.

Mitigation Refinements

Elevated selenium levels were found in three isolated areas, and the extent of these areas would be further studied and delineated as Project development occurs.

Areas with probable toxicity problems would not be irrigated and would be deleted from the Project. Additional land may be found to replace these lost areas.

WATER QUALITY

1980 Baseline

The water quality information in the 1980 FES remains appropriate and accurate. Some heavy metals and certain trace elements including selenium, copper, and mercury were present in the La Plata and Mancos Rivers. Studies of the effects of nutrients and heavy metals diverted to Ridges Basin and Southern Ute Reservoirs were summarized in the 1980 FES. An extensive salinity study was also conducted.

New or Updated Information

Additional water quality data have been collected since 1980. Additional studies have been conducted to comply with new regulations and greater concern for such trace elements as selenium and mercury. The following information has been summarized from a Bureau of Reclamation *Technical Memorandum on Water Quality of the Animas-La Plata Project*, 1992[e].

River and Stream Systems

Animas River

Water quality collection and analysis have taken place on the Animas River from 1989 through 1991. During this time, the peak river flows were lower than earlier data collection periods reported in the 1980 FES. The recent information indicates a less significant contamination of the river from trace elements than that described in the FES. Arsenic, cadmium, copper, mercury, and lead have all generally been below detection limits for this period.

La Plata River

Recent (1992) Bureau of Reclamation (Reclamation) sampling indicates that several trace elements (zinc, cadmium, copper, manganese, selenium and mercury) are present in the La Plata River. Mercury levels in the La Plata River from the Colorado-New Mexico State line south range from < 0.2 (detection limit) to 0.25 micrograms per liter ($\mu\text{g/L}$). Selenium is currently slightly elevated (5 $\mu\text{g/L}$) in the least one short reach of the La Plata River when flows are totally dependent on irrigation return flow. None of the trace elements limit existing agricultural or domestic uses.

Mancos River

Recent data have been collected by the U.S. Geological Survey (USGS) on the Mancos River and indicate salinity and trace metals are similar to those levels observed previously. Selenium is the only trace element that approached its water quality standard.

San Juan River

Additional data have been collected for the San Juan River at the Shiprock gauging station (the 1980 FES based much of the information on the data collected farther downstream at the USGS's Bluff, Utah, gauging station). Total dissolved solids (TDS) at this station ranged from 210 to 680 milligrams per liter (mg/L) during 1991. Most trace elements were found to be at or below detectable levels. Mercury is occasionally detected at 0.2 $\mu\text{g/L}$, which exceeds the chronic aquatic life criterion. The other trace elements seldom exceed the maximum contaminant levels for drinking water or for the protection of aquatic life.

Proposed Project Reservoirs

Water quality in the proposed Ridges Basin and Southern Ute Reservoirs can be estimated only by indirect methods. Soil samples collected from Ridges Basin Reservoir indicate soluble selenium concentrations of about 10 $\mu\text{g/L}$. Soil samples from Southern Ute Reservoir did not indicate soluble selenium.

Fish tissue studies were conducted on Ridgway Reservoir, some 80 miles northwest of the Ridges Basin Dam site location. This information is helpful to determine if mercury concentrations could become a potential problem with fish in Project reservoirs. In the existing Ridgway Reservoir, inflows have similar heavy metal geochemistry, reservoir basin

geochemistry, TDS concentrations, and hydrogen-ion concentration (pH) as the inflows expected for Ridges Basin Reservoir. Tissue samples in Ridgway Reservoir indicated mercury concentrations in fish were generally below 0.2 parts per million (ppm) (unpublished data, Reclamation). Mercury concentrations at these levels are not generally considered a health risk. Mercury in Southern Ute Reservoir has a potential for elevated concentrations because of the abundance of organic nutrients.

Ground Water (Durango Pumping Plant)

The uranium mill raffinate ponds material which was located at the proposed Durango pumping plant site has been removed. A ground-water study was initiated by Reclamation in coordination with the DOE and Colorado Department of Health to determine potential ground-water problems in relation to construction of the Durango Pumping Plant. Results of the study indicated that there was a major difference in ground-water quality (elevated trace elements) southeast of the fault that bisects the site.

Due to the ground-water studies, the site location has been moved to northwest of the fault line because of the improved ground-water quality.

Toxicity Studies for Irrigation Return Flows

New legislation now requires that soil surveys on Federal water projects include an investigation of soil characteristics which might result in toxic or hazardous irrigation return flow (Public Law 99-294). The detailed studies of irrigation return flows are in the Animas-La Plata Project *Trace Element Analysis Report* (Reclamation, 1992[a]) and *Technical Memorandum of Water Quality* of the Animas-La Plata Project, (Reclamation, 1992 [e]).

Fish Tissue Sample Results

Fish tissue samples from the La Plata River drainage were analyzed for trace elements as an indicator of irrigation return flow conditions already present within the Project area. Fish tissue samples from the La Plata River and its major tributaries indicated bioaccumulation of selenium was not sufficient to cause human health or ecological impacts on endangered fish, migratory birds, or other wildlife species. Selenium, a required trace element at less than 0.7 ppm in fish, can become toxic to animals at higher concentrations. The lowest concentrations of selenium known to cause reproductive impairments to fish are about 3.0 ppm. None of the fish tissue samples from the La Plata River basin exceeded 3.0 ppm.

Copper, cadmium, and mercury (in one fish) occur at elevated levels in the fish from the La Plata River, but there is no evidence that the concentrations are at harmful levels to the fish or wildlife.

Water Sample Results

Small drainages, shallow wells, and agricultural drains were sampled to determine baseline levels of trace elements associated with present irrigation return flows. Shallow ground-water samples representative of return flows were difficult to locate on all of the Project area due to dry conditions. The results indicate most trace elements are below their respective standards with selenium, silver, and mercury occasionally exceeding their standards.

Soil Sample Results

Results of soil tests on Project lands indicate total concentrations of trace elements in the soil samples were within the common range found in Western States soils. Soils are generally regarded as seleniferous if concentrations of total selenium exceed 1.0 ppm. The mean concentration of 0.2 ppm total selenium on all Project soil samples compares favorably with the Western United States mean of 0.23 ppm.

Soil samples from Project lands were analyzed to determine if the soils contained unusual or potentially toxic concentrations of trace metals.¹ Soluble and total concentrations were obtained for 38 trace elements, including arsenic, copper, mercury, and selenium. The saturation extract (soluble concentration) is an approximation of the actual field concentrations that would contribute to irrigation return flows. The total concentration is the soil's potential to contribute trace elements over time. If both concentrations are high, then the soil sample has the characteristics to produce a toxic irrigation return flow.

Irrigation Return Flow

For purposes of this study, the following very conservative criteria for selenium were used to identify potential sources for toxic irrigation return flows. Soil samples with soluble concentrations greater than 15 ug/l and total concentrations greater than 0.3 ppm were identified as levels of concern. Five of 114 samples exceeded these criteria. The five samples

¹ Total acid digestion and water extraction of soil samples were used to determine the potential for Project irrigated soils to release toxic trace elements.

came from three separate areas. Two areas were identified with selenium levels above the criteria in their soil profile below the root zone and above the drainage barrier. One area had selenium levels above the criteria within the root zone.

Impacts of 1992 Proposed Action

River and Stream Systems

None of the new or updated information resulting from recent studies indicates a significant change from the analysis of impacts completed for the 1980 FES on the upper Animas, La Plata, Mancos, or San Juan Rivers. A heavy metal problem exists on the Animas River, primarily as a result of early century mining activities and seasonal high flows which cause erosion of mine tailings into the river system. Toxicity analysis of future irrigation return flows indicates that the potential for increased selenium is low in the La Plata, Mancos, and San Juan Rivers.

Selenium data from fish tissue samples in the La Plata River indicate that even in water containing 5 to 11 $\mu\text{g/L}$ selenium (shallow pools in a river system nearly completely dewatered from irrigation diversions), concentrations in fish did not exceed 3 ppm. These samples represent long-term biomagnification potential from the existing irrigation return flows. The baseflow water quality conditions that now exist should not be significantly changed as a result of the Project; therefore, no changes in selenium concentrations to fish are expected with the irrigation of Project lands in Mancos and La Plata River drainages.

Proposed Project Reservoirs

Selenium concentration is expected to range from less than 1 $\mu\text{g/L}$ to a maximum of 3 $\mu\text{g/L}$ in Ridges Basin and Southern Ute Reservoirs. This estimate is based upon the water and soils analysis which indicates selenium would assume insoluble mineral forms in the reservoir sediment.

Mercury concentrations are not expected to cause any adverse effects to fish and wildlife in Ridges Basin or Southern Ute Reservoirs.

Ground Water (Durango Pumping Plant)

Construction of the Durango Pumping Plant would require foundation dewatering during construction. This ground water would have some slightly elevated trace elements. However, the flow would be extremely

small in relation to the dilution capacity of the Animas River. All construction dewatering would be treated as required under a Clean Water Act, Section 402 permit. Discharge into the Animas River, if permitted, would be within current water quality standards. With complete removal of all mill and raffinate tailings material from the area, there is no longer any concern for impacts due to operation of the pumping plant.

Moving the site location of the pumping plant site would have the benefits of reducing the size of the site from 26 to 14 acres.

Toxicity Studies for Irrigation Return Flow

Newly irrigated lands should produce return flows of similar quality as the existing irrigated lands within the Project. Project irrigation would leach some trace elements bound to the soil and increase ground-water concentrations, particularly during the first few years. However, there are no projected biological impacts due to irrigation return flows for the Mancos, La Plata, or San Juan Rivers. The long-term toxicity potential from irrigation return flows is low in the Project area.

Mitigation Refinements

Mitigation for water quality is consistent with the mitigation described in the 1980 FES with the following exception: additional irrigation drainage toxicity studies would be completed primarily on full-service irrigation lands to further define potential problems with selenium. These studies would include further information on surface water drainage, ground water, soils, and plant indicator species.

The Durango Pumping Plant is being designed to allow for the continued unrestricted movement of ground water on the site. Ground-water levels and quality are also being monitored under an agreement between the DOE and the State of Colorado.

AQUATIC RESOURCES

Animas River Trout Fishery

1980 Baseline

The 1980 FES (page C-34) stated that Project operation would result in a reduction in flow in the Animas River downstream from the Durango Pumping Plant. The predicted effect on streamflow was shown in table C-5

of the 1980 FES. Based on fishery studies conducted in the mid-1970's, the estimated standing crop of trout in the Animas River from Durango to the Colorado-New Mexico State line, a river distance of about 23 miles, ranged from 6.5 to 9.8 pounds per acre. Trout growth within this fishery was considered excellent. Aquatic macroinvertebrates, the primary food supply of trout, existed in large numbers and biomass from Durango to the Colorado-New Mexico boundary.

This trout fishery was created and sustained by the Colorado Division of Wildlife (CDOW) through the stocking of fingerling (2 to 4 inches) brown and rainbow trout and catchable-size (8 inches and up) rainbow trout. Catchable-size trout were stocked to provide immediate fishing opportunities, because the stocked fingerlings had a low survival rate. The low survival rate was attributed to the physical and chemical conditions to which these fish were subjected in the Animas River. Because little or no successful natural reproduction by trout was occurring, the CDOW concluded that the existing limited trout fishery was dependent on stocking. Creel studies conducted in 1976 estimated 4,523 days of angler use on this section of river. Most of this use was occurring near Durango. No trout biomass or angler use estimate was made within New Mexico.

In 1980, Reclamation determined that the aquatic conditions limited the trout population and limited angling use in the Animas River within New Mexico (fish and wildlife and recreation appendix to the 1979 DPR).

Seasonal minimum bypass flows of 160 cubic feet per second (ft^3/s) in the winter (October-March) and 250 ft^3/s in the summer (April-September) in the Animas River were recommended by the United States Fish and Wildlife Service (Service) to maintain the existing aquatic habitat for fish resources. (U.S. Fish and Wildlife Service, *Animas-La Plata Project Report*, 1979). This recommendation was not adopted by Reclamation because of the limited population of trout downstream, the nature of the fishery (maintained through stocking), and the added cost of modifying and operating the Durango Pumping Plant to accommodate higher minimum bypass flows. However, the Service disagreed with Reclamation's assessment of the potential of the lower sections of the Animas River to support a trout fishery. Reclamation agreed to review the need for additional aquatic studies in New Mexico. Reclamation agreed to install fish screens on the pumps in the Durango Pumping Plant to prevent removal of fingerling and larger trout from the Animas River.

New or Updated Information

Since 1980, the trout fishery has been improved significantly in some portions of the Animas River from that described in the 1980 FES. Trout

standing crop estimates made by the CDOW in 1991 show that 65 to 90 pounds per acre of trout biomass exist in the river from Durango to about 5 miles downstream. This section of the river now meets the CDOW criteria for designation as a Gold Medal stream. This designation has not been recommended by the CDOW. However, the portion of the Animas River from the Lightner Creek confluence to the Purple Cliffs, a distance of 3 miles, has been recommended by the CDOW to the Colorado State Wildlife Commission for adoption of special fishing regulations. These special regulations would restrict the number and/or size of trout kept as well as the methods by which anglers could legally catch fish. In 1990, a CDOW creel survey estimated 5,000 angler days within this reach of the river. No updated estimate of angling use is available for the Animas River further downstream. A trout biomass estimate was not made for the reach of the river for which the special regulations are proposed prior to the 1980 FES. However, Reclamation agrees with the CDOW that, because of improved stocking techniques, this reach of the Animas River presently provides a much better fishery than was described in the 1980 FES.

A trout standing crop estimate was made in 1992 for the reach of the Animas River described in the 1980 FES from Purple Cliffs to the Colorado/New Mexico State line. The results of that study indicate trout biomass has increased to about 17 pounds per acre, about twice the trout biomass that existed prior to 1980. Most of the river in this area lies within the boundaries of the Southern Ute Indian Tribal Reservation and has not been stocked by the CDOW. The CDOW believes the majority of the increase in trout biomass has resulted from trout drifting downstream from the portion of the river that is stocked. The New Mexico Department of Game and Fish (NMDGF) is not interested in establishing trout fishery in the Animas River in New Mexico.

The overall improvement in the Animas River trout fishery since 1980 is attributed principally to more effective CDOW stocking techniques. These include stocking larger fingerling brown and rainbow trout (3 to 5 inches), acquiring hardier strains of "wild" (Colorado River rainbow) trout, and distributing the fish evenly in relatively high concentrations (300 fish per acre) throughout the river by raft. Catchable size rainbow trout continue to be stocked through the Durango area to accommodate fishing demand. Overall water quality in the Animas River downstream from Durango has also improved since 1980. Specifically, the Durango wastewater treatment plant has been upgraded. However, it is unknown if the improved water quality has had a beneficial effect on aquatic life in the Animas River. Successful natural reproduction by trout in the Animas River remains negligible.

Impacts of 1992 Proposed Action

Fishery biologists representing various resource management agencies were consulted to assist in developing methods to determine the impacts of Project operation on the Animas River trout fishery. It was generally agreed among biologists that depletion of flow in the Animas River would have an adverse impact on the present trout fishery and habitat. During the early stages of assessing impacts to existing resources, Reclamation, in cooperation with the CDOW, recommended that a fish standing crop estimate and an evaluation of the potential of extending the trout fishery further downstream be made on the Animas River downstream from the Durango Pumping Plant. The results of that study were discussed in the previous section.

Reclamation has evaluated the potential effect of the pumping rate of the Durango Pumping Plant on the aquatic resources of the Animas River. There would be little or no adverse impact on the trout fishery by allowing the pumping rate to exceed 431 ft³/s under certain reservoir conditions. Specifically, when the pumping rate of the Durango Pumping Plant is allowed to go above 431 ft³/s, the rate exceeds 431 ft³/s less often (22.5 percent compared to 23.1 percent) than when the pumping rate is restricted to 431 ft³/s. Table III-3 presents the percent of operating time the pumping plant would pump at the various rates. The pumping plant would not operate approximately 10 percent of the time under either pumping scenario because of flow restrictions, or Ridges Basin Reservoir being full.

Table III-3.—Pumping rate at Durango Pumping Plant
percent of time at each rate

Pumping rate (ft ³ /s)	Limit pumping to 431 ft ³ /s	Allow pumping to go over 431 ft ³ /s
0 < 430	76.9	77.5
430 < 440	¹ 23.1	7.2
440 < 450	0	4.6
450 < 460	0	2.6
460 < 470	0	2.3
470 < 480	0	2.2
480 < 490	0	1.8
490 < 500	0	1.0
500 < 510	0	0.7
510 < 520	0	0.1
520 < 530	0	0

¹ Pumping is limited to 431 ft³/s.

Allowing the pumping plant to exceed 431 ft³/s would effect the flow rates in the Animas River below the pumping plant. The flows would average approximately 5 to 10 ft³/s greater during the period October 15 through the end of March 5, to 15 ft³/s less from April through August, and 5 ft³/s less from September through October 15.

Mitigation Refinements

To offset expected reduction in both trout habitat and associated loss in trout due to operation of the Project, Reclamation would provide financial assistance in providing trout to be stocked downstream from Purple Cliffs. Both fingerling brown and rainbow trout would be stocked annually in the Animas River from Purple Cliffs to Bondad, Colorado, a distance of about 17 river miles, dependent on acquisition of public access. The fish species, strain, and size stocked, as well as the timing of the stocking effort, would be similar to what the CDOW currently practices upstream in the Animas River. Also, an evaluation of the potential of improving fish habitat to increase trout carrying capacity would be done on sections of the Animas River. These activities would be coordinated between Reclamation, the Service, CDOW, and the Southern Ute Indian Tribe.

Reclamation, in coordination with the Service, CDOW, and Southern Ute Indian Tribe, would assist in developing and conducting a monitoring study of the downstream trout fishery. This study would primarily focus on trout populations, although native fish populations would be monitored as well. This study would be conducted from Durango to the New Mexico-Colorado State line. It is anticipated the study would encompass a period of 8 years, 4 prior to operation of the Durango Pumping Plant, and 4 afterwards. Based on the results of this study, Reclamation would evaluate whether additional mitigation measures may be warranted for impacts on the fishery.

Native Fish

1980 Baseline

Native fish communities were described in the 1980 FES (pages C-34 and C-35). It was concluded that nongame or rough fish, mostly native sucker populations in the Animas River, would be adversely impacted by Project-related reduced flows. An estimated overall reduction of 10 percent in the rough fish population was predicted. This loss was based on an expected reduction in wetted acreage associated with wintertime Project operation when flows bypassed the Durango Pumping Plant would be at their lowest levels. Reclamation concluded that native fish populations in the San Juan

River downstream from Farmington, New Mexico, would be reduced slightly due to lower flows. In addition, Reclamation concluded nongame fish populations in the La Plata and Mancos Rivers might benefit from the Project due to augmented flows in those rivers. There was no discussion of the only federally-protected native fish, the Colorado squawfish, known to inhabit the lower reaches of the San Juan River. This species was subsequently addressed during formal Section 7 consultation on endangered species with the Service for the Animas-La Plata Project (1979). Following consultation, the Service issued a biological opinion for the Project (December 28, 1979), determining no jeopardy for the Colorado squawfish.

New or Updated Information

Currently, fishery biologists representing State and Federal agencies believe preserving and protecting Colorado River native fish populations are more important than was considered in the 1980 FES. In particular, the NMDGF has requested that Reclamation fund studies with an objective of protecting native fishes in those rivers affected by the Project. The NMDGF is particularly concerned about the mottled sculpin and the roundtail chub, both of which are considered very rare in New Mexico. Mottled sculpin are very common in the headwaters of the Animas and La Plata Rivers where habitat conditions are more favorable. The headwaters occur exclusively within Colorado. Roundtail chubs have been reported in the La Plata, Animas, Mancos, and San Juan Rivers within the San Juan River drainage downstream from Navajo Dam. It is not known if this species successfully reproduces in any of the major tributaries of the San Juan River. It has been verified they reproduce in Navajo Wash (a small tributary to the Mancos River) in the upper La Plata River drainage, upstream from the New Mexico-Colorado State line, and it may be successfully reproducing in the lower Florida River, a tributary of the Animas River.

The Service does not consider the mottled sculpin to be threatened in the foreseeable future; however, the roundtail chub and the flannelmouth sucker are listed as Federal candidate, category II species.² Within the San Juan River basin, flannelmouth sucker populations do not appear to be immediately threatened, but based on historical accounts, roundtail chub populations have declined sharply over the last 30 years. The roundtail chub is a State-listed endangered species in New Mexico. Other Colorado River native fish species occurring in the San Juan River basin in relatively large numbers include the bluehead sucker and the speckled dace.

² The Service defines species in this category as "candidates for which the Service has information indicating the possible appropriateness of listing, but for which further information is still needed."

Impacts of 1992 Proposed Action

As described in the 1980 FES, native fish populations in the Animas River would probably be reduced due to flow depletions caused by operation of the Durango Pumping Plant. Based on existing information, Reclamation still believes that an estimated 10 percent reduction in native fish populations would occur in the Animas River downstream from the Durango Pumping Plant. This conclusion was based on the assumption that the reduction in flow and associated reduction in wetted acreage would also reduce the amount of native fish habitat.

The La Plata River native fish population downstream from the Southern Ute Diversion Dam may be adversely affected to a greater degree than was described in the 1980 FES. At present, very little information exists on the status of this population and its species composition; therefore, the degree of impact cannot be reliably predicted at this time. The reach of the La Plata River between the La Plata Diversion Dam and the Southern Ute Diversion Dam would be augmented with Project water throughout the irrigation season. It is expected this increase in flow would be beneficial to the existing native fishery, possibly offsetting impacts to the fishery that may occur downstream from the Southern Ute Diversion Dam.

Mitigation Refinements

Reclamation, in coordination with the Service, is conducting studies to assess mitigation needs of native fish populations. According to provisions in the Endangered Species Act (Act), only those federally listed fish species, in this case the Colorado squawfish and razorback sucker, require a Federal agency to avoid impact to their populations and habitats. These two species were addressed through endangered species consultation in 1991. However, Reclamation recognizes its responsibility as a Federal agency to assist, when practicable, the Service in keeping species of concern from being upgraded to a federally protected status. Specifically, because roundtail chub populations within the San Juan River basin appear to have declined significantly over the last several years, Reclamation would fund a 1-year study to better identify their occurrence and factors limiting their populations. This study would be limited to the La Plata River from Highway 160 to a point 3 miles downstream from the Colorado-New Mexico boundary. The detailed study design would be developed in coordination with the CDOW, NMDGF, and the Service.

ELK HABITAT

1980 Baseline

Elk and their habitat were considered one of the important wildlife resources directly affected by the Project due to construction of a major Project feature, Ridges Basin Dam and Reservoir. Construction of the dam, reservoir, and appurtenant facilities would require the acquisition of about 4,000 acres lying within the boundaries of the CDOW-owned Bodo Wildlife Area, acquired in 1974 by the CDOW principally as elk winter range. The entire wildlife area encompassed 7,503 acres. Inundation of the reservoir would directly cause the loss of 2,230 acres of elk habitat. Two elk herds within the Hermosa herd management unit were identified in the 1980 FES (page B-47) as being within the Project area. One, a migratory herd consisting of 1,700 to 2,000 elk, ranged from high elevations north of Durango in the San Juan Mountains (summer range) to areas of lower elevations, including the Project area during the winter. The other, a resident herd, was described as occurring evenly throughout an area south of Highway 160 on the Southern Ute Indian Reservation. Further, the Ridges Basin Reservoir site was identified as maintaining a winter concentration of about 200 elk, both resident and migratory (1980 FES, page B-52).

Reclamation concluded in the 1980 FES (page C-40) that about 150 head of elk would be displaced due to the area inundated by Ridges Basin Reservoir. To compensate for this loss, Reclamation committed to acquiring 2,500 acres of suitable elk winter range and funding the development of the area, through chaining and burning, to increase its elk carrying capacity. At the time, areas located north of Highway 160 and west of the Ridges Basin Reservoir site were identified as potential elk mitigation land. Only the land needed for Project purposes, about 4,000 acres, would have been acquired from the CDOW. Reclamation would have replaced the 4,000 acres with land of comparable monetary value and transferred it to the State of Colorado.

A recreation area was planned to be built adjacent to the reservoir with an estimated annual use of 290,000 recreation days. Access to the area would have been limited to one road from the west, ending at the recreational facilities. The additional recreational use of the area would have caused avoidance of recreational sites by elk.

New or Updated Information

In 1991, Reclamation acquired 3,995 acres of the Bodo Wildlife Area for Project purposes, leaving the CDOW 3,508 acres to manage. In addition,

elk numbers within the Project area have increased substantially since 1980. Current estimates are that 100 elk now reside in the Bodo Wildlife Area year-round and about 400 migratory elk use the area during winter periods. Also, design changes to the Project are planned, including relocation of a pipeline through a portion of CDOW land and relocating a county road to allow potential year-round access through the basin. While current recreation use in the reservoir area is light, similar to that described in 1980, Reclamation has recently estimated that up to 331,000 recreational days of use would occur annually in the reservoir area, an increase of up to 41,000 more days than were described in the 1980 FES. In addition, the Service predicts a larger zone of avoidance occurring around all roads and recreation sites, thereby eliminating those areas as elk habitat.

Impacts of 1992 Proposed Action

The impacts of the proposed action are described in detail in the Service's Final Draft Planning Aid Memorandum (attachment 4). In summary, the action would result in the loss of 10,042 habitat units of elk habitat, primarily mountain shrub vegetation. Up to 500 elk would now be adversely affected by the construction of Ridges Basin Dam and Reservoir, appurtenant Project features, and other design refinements such as the Northwest Pipeline Corporation (Northwest) and (Mid-American Pipeline Company (MAPCO) pipeline relocations and the CR 211 relocation. The Bodo Wildlife Area would be significantly adversely impacted, because use of the area by elk as important summer and winter habitat would be severely diminished due to habitat alteration and human disturbance.

Mitigation Refinements

Based on the above changes to the Project plan and the increase in the number of elk within the Project area, the Service has recommended Reclamation compensate the CDOW for the entire Bodo Wildlife Area by acquiring the remaining 3,508 acres. Reclamation recognizes the diminished value of their remaining land as elk habitat and proposes to compensate the CDOW for the monetary value of the remaining CDOW land. This land would remain under CDOW ownership. In addition, the Service has requested that Reclamation mitigate for the loss of approximately 10,000 elk habitat units as a result of Project impacts to elk habitat. These habitat units would be compensated for by acquiring mitigation land on a willing seller basis and, if possible, within the winter range of the elk herd impacted by the Project. If this mitigation were applied to lands with predominantly mountain shrub lying north of Highway 160, a total of 3,586 acres of land would need to be acquired and

developed to increase its carrying capacity by 40 percent. This would fully compensate for the lost 10,042 habitat units. Overall effects to elk are described in the Planning Aid Memorandum, Attachment 4. Reclamation would also investigate the need for seasonal road closures, in coordination with other responsible agencies, to motorized vehicles to minimize disturbance to wildlife.

THREATENED AND ENDANGERED SPECIES

1980 Baseline

The Service identified the bald eagle, peregrine falcon, and Colorado squawfish as possibly occurring within the Project area. The biological opinion prepared by the Service under formal Section 7 - Endangered Species Act consultation with Reclamation concluded that the Project would neither jeopardize the Colorado squawfish nor destroy habitat essential to its survival. The Service also concluded that the Project would not likely jeopardize the continued existence of the bald eagle or peregrine falcon.

New or Updated Information

As part of the 1979 biological opinion, Reclamation was to conduct surveys for the endangered fish prior to construction activities. These surveys were conducted from 1987 to 1989. Based upon new information from those surveys, Reclamation then requested reinitiation of the Section 7 consultation in 1989 concerning the Colorado squawfish.

After interaction with Project sponsors, the States of Utah, Colorado, and New Mexico, the Service, and Reclamation, the Service issued a final biological opinion for the Project on October 25, 1991. The biological opinion was issued for the following federally listed species and proposed species, which would be affected by the construction of the Project:

Bald eagle	<i>Haliaeetus leucocephalus</i>
Colorado squawfish	<i>Ptychocheilus lucius</i>
Razorback sucker	<i>Xyrauchen texanus</i>

The final biological opinion concluded that construction and operation of the Project was likely to jeopardize the continued existence of the Colorado squawfish and razorback sucker, but it included a Reasonable and Prudent Alternative to avoid jeopardy and allow for construction of the Project, as discussed below and in chapter IV. (On October 23, 1991, the status of the razorback sucker had changed from proposed for listing to listed as endangered.) A conference report, addressing the potential impacts of the

Project on the razorback sucker, was included as part of the final biological opinion. The reasonable and prudent alternative for construction of the Project fully offsets the jeopardy conditions for both the Colorado squawfish and razorback sucker. Modification to the 1979 the biological opinion for the bald eagle is discussed below.

New Species

The Ute ladies' tresses (*Spiranthes diluvialis*) was listed as a threatened species on January 17, 1992. This species occurs below 6500 feet in elevation in Colorado, Nevada, and Utah. The habitat requirements of species are not fully understood, but priority habitat sites are believed to be within the Project area.

Since issuance of the biological opinion, no other species listed as threatened or endangered under the Endangered Species Act have been identified by the Service as being affected by the Project. However, on November 4, 1991, the Mexican spotted owl *Strix occidentalis lucida* was proposed for listing as threatened. The range of this species includes the San Juan Mountains in southern Colorado, and the Mexican spotted owl is therefore potentially affected by the Project. Reclamation, in conjunction with the Service, conducted a field survey designed to detect any Mexican spotted owls in the area. None were found, and it was determined that the species would not be affected by construction of the Project. The Service has concurred with this finding in an August 3, 1992, memorandum.

Section 7 Consultation

Bald Eagle

The Service determined that the Project is not likely to jeopardize the continued existence of the bald eagle. However, because water for the reservoir would be pumped from the Animas River, which is located in an area where selenium contamination could occur, the Service's biological opinion included a conservation recommendation for a bald eagle management plan to be developed and implemented concurrent with the design and construction of the Project.

Colorado Squawfish and Razorback Sucker

The Service determined that depletion of flow in the Animas River caused by the Project would jeopardize the continued existence of the Colorado squawfish and razorback sucker in the San Juan River. Depletions to the

river system would appreciably reduce the likelihood of both the survival and recovery of the species in the wild by further reducing numbers of individuals, reproduction, and distribution. The Service addressed both the razorback sucker and the Colorado squawfish in the same biological opinion, and felt that, when fully implemented, the reasonable and prudent alternative would fully offset jeopardy to both species. Elements of the reasonable and prudent alternative are listed in the mitigation measures discussed in chapter IV.

Impacts of 1992 Proposed Action

Successful implementation of the reasonable and prudent alternative for the endangered fish and developments and implementation of the management plan for the bald eagle would provide additional information to be used in a Section 7 consultation for the balance of construction and operation of the proposed Project. Reclamation believes it is reasonably foreseeable that successful implementation of the reasonable and prudent alternative, subject to further Section 7 consultations, will ultimately lead to the annual depletion of the full 154,800 acre-feet for the entire proposed Project.

Mitigation Refinements

The December 28, 1979, biological opinion recommended a bald eagle reservoir management plan be developed for the reservoirs. The refined October 25, 1991, biological opinion recommended a bald eagle management plan not limited to reservoirs. It further recommended that the plan be developed and implemented concurrent with Project design and construction, and that the plan be jointly developed by Reclamation, the affected States, and the Service. Specific surveys would be designed to identify possible communal roost sites and nest sites and methods to protect them. The Service further refined the recommendation to include assessment and monitoring, with corrective measures if necessary regarding bio-accumulation of contaminants.

The 1979 biological opinion conservation recommendations for the Colorado squawfish were to survey the native fish populations in the San Juan River, determine environmental needs of the species, attempt to meet those needs by adjusting the projects in the San Juan River Drainage, and for Reclamation to provide and fund artificial facilities to spawn and rear Colorado squawfish until suitable habitats could be developed and maintained in the San Juan River. Refinements of conservation measures for the endangered Colorado squawfish and razorback sucker are to implement all of the elements of the reasonable and prudent alternative. These elements are detailed in chapters IV and V.

Reclamation has committed to survey Project lands containing suitable habitat for the Ute ladies' tresses prior to impact by construction, and to enter into formal consultation if any individuals are located. Special consideration would be given to the species and its habitat needs in the design of wetland mitigation for Ridges Basin.

WETLANDS AND RIPARIAN HABITAT

1980 Baseline

The 1980 FES (pages C-37 and 38) described the Project's effects on wetlands and riparian areas. These areas were identified using the *Classification of Wetlands and Deepwater Habitats of the United States* (United States Department of Interior, Service, 1979). The wetlands losses were along 140 miles of existing irrigation canals and laterals that would have been eliminated or replaced by the Project's buried pipeline lateral system. This would have resulted in a loss of about 550 acres of marginal riverine wetland habitat, which was the only wetland loss described in the 1980 FES.

The 1980 FES described wetlands created by the Project to offset the predicted loss. These wetlands included: (1) about 124 acres of riverine wetland habitat along the proposed Dry Side Canal; (2) potential increases in riverine wetland habitat along some open canals and laterals north of the Dry Side Canal and along the Mancos and La Plata Rivers in certain sections because of increases in flow attributable to the Project; (3) wetlands near the outlet channels on 66 miles of Project drains; (4) about 3,630 acres of lacustrine (lake and reservoir) wetland habitat which would have been created by Ridges Basin and Southern Ute Reservoirs and; (5) the potential for creating about 15 acres of palustrine (marsh) habitat as a result of Southern Ute Diversion Dam.

In summary, Reclamation estimated that 526 acres of marginal riverine wetland habitat would have been created by the Project in addition to the lacustrine and palustrine habitats described above. The 1980 FES described the Project as resulting in a net increase in wetland habitat. A summary of the 1980 FES wetlands impacts is shown in table III-4. No mitigation for wetland impacts was described in the 1980 FES.

New or Updated Information

Since 1980, Reclamation has identified wetlands in Ridges Basin and along Basin Creek within the area to be impacted by construction of Ridges Basin Dam and Reservoir. (See figure III-1.) In addition, as a result of

Table III-4.—1980 FES impacts on wetland and riparian habitat

	Loss	Creation
Elimination of 140 miles of existing canals and laterals	550 acres marginal riverine wetland	None
Dry Side Canal	None	124 acres riverine wetland
Existing open canals and laterals north of Dry Side Canal	None	Potential increase due to increases in riverflow
Along La Plata and Mancos Rivers	None	Potential increase due to increases in flow in these rivers with the Project in operation
Outlet channels of Project drains (66 miles)	None	Potential increase
Ridges Basin and Southern Ute Reservoirs	None	3,630 acres of lacustrine wetland
Southern Ute Diversion Dam	None	15 acres palustrine wetland

coordination with the Service, a concern and potential impact regarding wetlands and riparian areas along the Animas and La Plata Rivers was identified. The NMDGF identified a high quality riparian area from the Colorado-New Mexico State line to a point about 3 miles downstream. This appears to be the only reach of the La Plata River in New Mexico that supports perennial flows. Reclamation is currently mapping wetland and riparian vegetation along the La Plata River from the Southern Ute Diversion Dam to a point 3 miles downstream from the Colorado-New Mexico State line. The mapping will be used by Reclamation to determine if the predicted Project impacts on the La Plata River wetland and riparian areas are different from those described in the 1980 FES (those results were not available for the draft Supplement). Reclamation has also conducted an overall assessment of predicted Project impacts on wetlands and riparian areas.

Impacts of 1992 Proposed Action

The Project impacts on wetland and riparian habitat (Reclamation, 1992) are summarized in table III-5. The Project would result in the long-term loss of 121 acres of wetlands in Ridges Basin and along Basin Creek due to construction of Ridges Basin Dam and Reservoir. Reclamation would fully mitigate this loss by replacing the lost wetlands with areas of equal or greater value. The short-term losses of wetlands adjacent to the Animas and La Plata Rivers due to pipeline and canal crossings would be mitigated

Table III-5.—Summary of impacts of proposed action (1992) on
wetlands and riparian habitat

Proposed action	Impact
Construction of Ridges Basin and Southern Ute Dams and Reservoirs	Permanent loss of 121 acres of wetland habitat in Ridges Basin and Basin Creek.
Construction of Dry Side Canal	Temporary loss of 5 acres of wetland habitat due to construction of canal siphons under the La Plata River and its tributaries
Construction of La Plata River pipeline lateral crossings	Temporary loss of 3 acres of emergent channel wetland
Elimination of 122 miles of existing canals and laterals	Permanent loss of 223 acres of irrigation-induced wetland and riparian habitat
Existing canals and laterals north of Dry Side Canal	Enhancement of value of existing riverine wetland and riparian habitat due to increases in flow
Depletion of flows in Animas River	No impact on wetlands or riparian habitat along the Animas River
Additional flows in La Plata River between La Plata and Southern Ute Diversion Dams	Unquantified beneficial impacts due to the increases in flow in the river
Depletion of flows in La Plata River downstream from Southern Ute Diversion Dam	An estimated 200 acres of wetland/riparian habitat may be affected by dewatering. Potential adverse impacts of approximately 200 acres of riparian/wetland habitat
Increased flows in Mancos River due to irrigation return flows	No effect
Outlet channels of Project drains (66 miles)	Enhancement of existing wetland and riparian habitat value
Southern Ute Diversion Dam	Creation of 15 acres of wetland habitat
Durango M&I pipeline	Temporary loss 1/2 acre

¹ Mid-American Pipeline Company.

through worksite restoration, revegetation, and use of construction methods to minimize or avoid impacts. The loss of 223 acres of irrigation-induced wetland habitat due to elimination of 122 miles of existing irrigation canals and laterals would not be mitigated by Reclamation. Reclamation considers the value of this irrigation-induced wetland habitat—which is subject to routine and recurring removal or loss due to existing operation and maintenance activities in the canals—as not subject to mitigation. This same rationale is the reason Reclamation does not take credit for creation of 124 acres of wetland habitat in the Dry Side Canal, as it did in the

1980 FES. However, Reclamation would investigate opportunities and implement actions to mitigate the loss of riparian habitat value, particularly cottonwoods, associated with elimination of the existing canals and laterals.

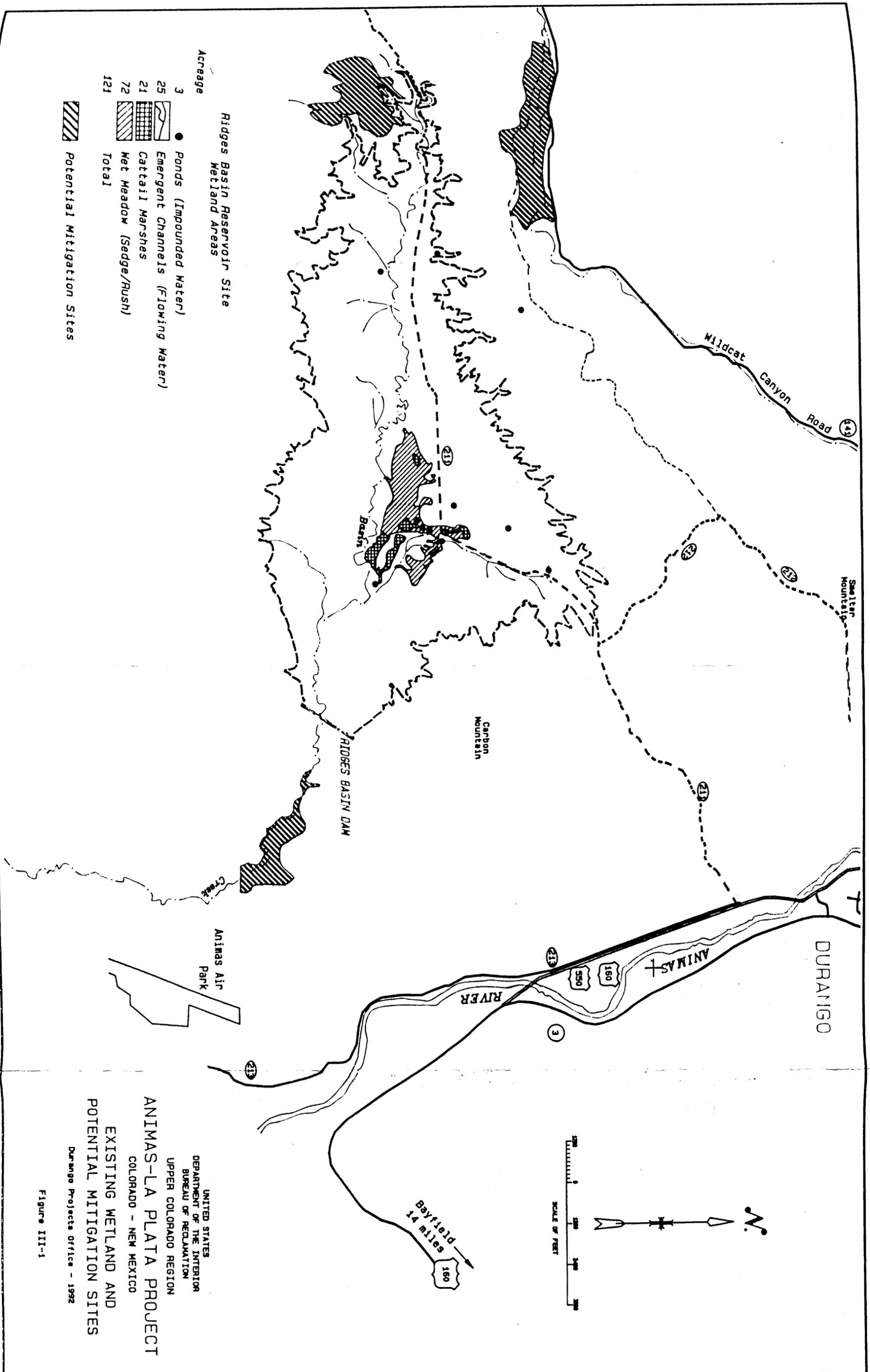
Up to 200 acres of wetland/riparian habitat may be affected along the La Plata River; however, Reclamation is presently conducting detailed surveys of those wetland/riparian areas to quantify the extent of the areas and potential impact. After analysis, Reclamation has determined that flow depletions on the Animas River below the Durango Pumping Plant would not have a measurable adverse impact on wetland/riparian vegetation within the flood plain.

The entrenchment of the river, the gaining nature of the stream, the return flows from adjacent irrigated land, and the variable annual high flow all make the depletion relatively insignificant.

Mitigation Refinements

The following goals and measures would be implemented by Reclamation as mitigation for impacts on wetlands and riparian habitat:

1. The overall goal of the Project's wetlands mitigation would be to replace the wetlands functions and values lost due to construction of the Project. This would be accomplished through development and implementation of a wetland mitigation plan designed to create, restore, and/or enhance wetlands.
2. Reclamation would coordinate and cooperate with other agencies in determining appropriate wetlands mitigation.
3. Wetlands would be replaced in-basin to the extent practicable. Priority for replacement would be given to mitigation sites in the same basin as the loss.
4. Reclamation would replace the 121 acres of wetlands lost in Ridges Basin and along Basin Creek due to construction of Ridges Basin Dam and Reservoir. These wetlands and other wetland losses would be replaced in kind to the extent practicable. Three potential wetland mitigation sites (totaling about 90 acres) have been identified and are shown in figure III-1.



UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 UPPER COLORADO REGION
ANIMAS-LA PLATA PROJECT
 COLORADO - NEW MEXICO
 EXISTING WETLAND AND
 POTENTIAL MITIGATION SITES
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5. Reclamation would coordinate mitigation of the loss of riparian habitat value, particularly cottonwoods, along the 122 miles of existing canal and laterals with the Service to develop and implement suitable mitigation for this loss.
6. Studies to define the riparian/wetland impacts on the La Plata River below Southern Ute Diversion Dam would be conducted and appropriate mitigation implemented after consultation with the Service and appropriate State agencies.

CULTURAL RESOURCES

1980 Baseline

The 1980 FES described a cultural resources program to compensate for the losses to archeological sites as a result of Project construction. This would have included archeological excavations and publications for mitigation, and enhancement in the form of curation, storage, educational programs, and visitor access. It was estimated in the 1980 FES that as many as 3,500 archeological sites might be within Project lands, based on very preliminary data, in a generalized, hypothetical "La Plata Archeological District" which stretches from Durango to south of the Colorado-New Mexico border (all lands affected by the proposed Project). The FES described the cultural resources in that district.

The FES also stated that Reclamation would conduct more detailed archeological studies to more specifically determine mitigation needs as the Project developed. As many as 175 of those sites (or 5 percent of the 3,500) would have been mitigated over a 7-year period. The FES stated that Reclamation would seek Congressional authorization to exceed the normal limitation (1 percent) of total Project costs to mitigate cultural resources affected by the Project and to provide for enhancement. Enhancement would have included the construction of a facility for the curation, storage, and display of cultural resource materials recovered as part of the Project.

New and Updated Information

Detailed cultural resource surveys have been conducted of the Project area since 1980 and continue to the present. Those further surveys have resulted in a refinement of the number of identified sites that would be affected by the Project. Current surveys have concentrated on particular aspects of Phase I of the Project: the Ridges Basin pool area and takeline,

proposed borrow areas, the inlet conduit location, and the proposed construction access road. The Phase I archeological study area is shown in figure S-1.

The surveys recorded approximately 265 archeological or historical sites. The sites are more numerous than indicated previously for the limited geographical area and cover a wider time-range (several time frames from the late Archaic (ca. 1000 B.C.) through to early 20th century Euro-American mining and homesteading) than described in the 1980 FES. As a result, the area in and around Ridges Basin has been determined eligible for inclusion to the National Register of Historic Places as an Archeological District. The Ridges Basin Archeological District constitutes a small portion of the area originally envisioned as the "La Plata Archeological District" in the 1980 FES.

Since 1980, Reclamation has received Congressional authorization to expend up to 4 percent of total Project costs on cultural resources and enhancement.

The Native American Graves Protection and Repatriation Act of 1990 requires Federal agencies to consult with appropriate American Indian tribes concerning the treatment of human remains which may be encountered during Project activities. Such consultation has begun.

Impacts of 1992 Proposed Action

It has been determined that approximately 190 of the sites within the Ridges Basin Archeological District could be either indirectly or directly impacted by the primary features of Phase I of the proposed Project.

Impacts of the latter stages of Phase I and Phase II of the Project are difficult to discern since detailed archeological surveys have yet to be completed. The FES indicates that approximately 230 archeological sites could be affected. However, recent investigations for the La Plata Coal Mine and the La Plata Highway, adjacent to proposed latter Phase I and Phase II lands, indicate the probability of higher site densities. Also, a portion of Phase II lands are located within the Ute Mountain Ute Tribal Park, which was set aside for its archeological values (the Ute Mancos Canyon Historic District, described in the 1980 FES, is now a part of the Tribal Park).

Mitigation Refinements

In 1991, a programmatic agreement was signed by and among Reclamation, the Advisory Council on Historic Preservation, the Colorado State Historic

Preservation Officer, and the New Mexico State Historic Preservation Officer. It states the procedures and stipulations used to satisfy Reclamation's responsibilities under section 106 of the National Historic Preservation Act, in order to mitigate the adverse effects the Project development would have upon cultural resources.

Reclamation has initiated consultation with the Hopi, Zuni, and other Pueblo Indian Tribes, along with the Ute Mountain Utes and Southern Utes, concerning the treatment of human remains that may be disturbed by archeological mitigation or Project construction. This is to satisfy the requirements of the Native American Graves and Repatriation Protection Act of 1990.

In 1992, a cultural resources data recovery contract was awarded to Northern Arizona University. Its purpose is to mitigate the adverse effects of the primary features of Phase I of the proposed Project (approximately 150 sites over a 5-year period) and to enhance the base of knowledge concerning the prehistory of the Durango area. A study of the historic Euro-American occupation of the Ridges Basin area is also in progress.

Mitigation of the effects of the latter phases of Phase I and Phase II of the Project would be developed as the Project progresses and would be subject to the conditions of the programmatic agreement. The programmatic agreement stipulates that historic properties be identified, investigated, and treated through avoidance, data recovery, and/or mitigation in full consultation with the respective State Historic Preservation Officers. It is anticipated that as many as 350 sites (twice that of the 1980 figure) would eventually be mitigated through data recovery.

Federal regulations governing the curation of federally owned and administered archeological collections were revised in 1991 (36 CFR 79). They set rigid standards concerning proper storage and curation of archeological collections. Reclamation is in the planning and design phase for the construction of a facility in the Durango area to house and display materials recovered from the Project. This is to meet these regulations and enhancement objectives as described in the 1980 FES.

RECREATION

1980 Baseline

Recreation Development at Ridges Basin Reservoir

Recreation facilities would have been constructed at Ridges Basin Reservoir to help meet existing and projected needs in fishing, camping, boating,

swimming, picnicking, sightseeing, and hiking opportunities. The proposed recreation development would have been concentrated at a location on the north shore of the reservoir to reduce wildlife impacts at other locations. The point of access to the recreation area would have been controlled by a single entrance station and a new paved entrance road via CR 141 at the northwest end of the reservoir. The recreation plan would have required 43 acres and would have accommodated approximately 1,800 people at one final and 290,000 recreation days annually. Reclamation was to develop and administer the recreation facilities.

Recreation impacts in the Ridges Basin Reservoir area would have consisted of a loss of hunting and nature observation, congestion on CR 141 due to reservoir recreation traffic, and an increased need for law enforcement because of the increased number of people using the area. Recreation facilities could have been visually unattractive to some people, as could the exposure of foreshore due to reservoir drawdown.

Rafting and Water Sports Use on the Animas River

Recreation losses would primarily have been in rafting and kayaking. Losses would have been in the form of reduced quality and loss of some days, not in total elimination. About 10,500 of the total annual 10,900 recreation days of private use and the total annual 7,200 recreation days of commercial use would have been affected by the Project. With the Project, 40 days of floatable flows were estimated to be lost, with a delay of 15 days in the spring and ending 25 days sooner.

New or Updated Information

Recreation Development at Ridges Basin Reservoir

The recreation development for Ridges Basin Reservoir is proposed for Phase I of the Project. The Colorado Division of Parks and Outdoor Recreation (CDPOR) has indicated interest in managing recreation at the reservoir, pending a formal agreement. Reclamation and CDPOR agree that changes in the recreation plan are necessary to address current recreation demands and development standards. Accordingly, the maximum level of development as described in the 1979 DPR would be reasonable and foreseeable in relation to estimated visitation. Reclamation and CDPOR will refine the recreation plan within the scope of the 1980 FES. The refined plan would require 128 acres and accommodate approximately 3,000 people at one time and 331,000 recreation days annually. The refined plan would also address the relocation of CR 211 to maintain controlled access to the recreation area.

Rafting and Water Sports Use on the Animas River

Rafting and water sports use have changed since the 1980 FES and become an established component of the Durango tourism industry. The changes in river recreation are in terms of amount, timing, and types of use. River recreation includes four groups: commercial rafters; private kayakers, canoers, and rafters; competitive events and water festivals; and innertubers, waders, and swimmers.

Private use has increased from an estimated 10,900 recreation days in 1980 to a current level of 17,477 recreation days, and occurs throughout the year with a majority of use from April through September. Commercial use has increased from an estimated 7,200 recreation days in 1980 to a current level of 22,419 recreation days, and occurs during the summer tourism season from Memorial Day in late May through Labor Day in early September. The Animas River is also used for competitive events and water festivals. Competitive events and water festivals have increased from an estimated 900 recreation days in 1980 to a current level of 5,000 recreation days, and occur in April, May, and June. Innertubers, waders, and swimmers use the river during the summer season; however, there are no data available on this river recreation group.

Rafting and water sports use information for both 1980 baseline and current conditions were obtained from local participants and water sports dealers. Annual private use was determined by month based on estimated rates of floaters per day on weekdays and weekend days. Annual commercial use was calculated based on the average number of floaters per day in 1989 and 1990. Annual competitive use was estimated based on the number of annual events, estimates of observations of attendance at the 1992 Animas River Days, and survey data collected for the 1991 Champion International Whitewater Kayak Slalom Race. Due to lack of specific data, it is important to note that rafting and water sports use upstream of the proposed Durango Pumping Plant is not differentiated from use downstream of the pumping plant and, therefore, is included in the total estimated use. Table III-6 provides a summary comparison between the 1980 baseline and current conditions.

Impacts of 1992 Proposed Action

Recreation Development at Ridges Basin Reservoir

Recreation impacts in the Ridges Basin Reservoir area would consist of a loss of big game habitat, hunting and nature observation, congestion on CR 141 due to reservoir recreation traffic, and an increased need for law

Table III-6.—Rafting and water sport use on Animas River
through Durango, Colorado¹

	Private		Commercial		Competitive ²	
	1980 baseline ³	New/updated information	1980 baseline ³	New/updated information	1980 baseline ³	New/updated information
Total recreation days ⁴	10,900	17,477	7,200	22,419	⁵ 900	5,000
Recreation days affected by Project operation ⁶	10,500	14,122	7,200	22,419	⁵ 900	5,000
Flow <450 ft ³ /s (lost days with Project)	40	50	40	32	0	0

¹ Source: Bureau of Reclamation. 1992. Recreation Technical Memorandum.

² Competitive events, as defined in 1980 FES and 1979 DPR, include spectators and other unidentified groups.

³ Numbers given as reported in 1980 FES and 1979 DPR, attachment F.

⁴ Recreation day is defined as the counted number of users per day aggregated over a year.

⁵ Number of days is based on 5 percent of private and commercial recreation use reported in 1979 DPR, appendix F.

⁶ Recreation days affected refers to losses in recreation experience in the form of reduced quality and losses of some days, not total elimination.

enforcement because of the increased number of people using the area. Recreation facilities could be visually unattractive to some people, as could the exposure of foreshore due to reservoir drawdown.

Hunting and nature observation use in the Ridges Basin Reservoir area has increased from an estimated annual use of 5,520 recreation days in 1980 to a current level of 7,000 recreation days. Based on discussions with CDOW, the annual loss of hunting would be an estimated 3,500 recreation days. Nature observation was assumed to be enhanced by the Project due to diversification of opportunities, and therefore no loss would occur.

Reservoir recreation traffic would cause congestion on CR 141. The relocation of CR 211 would provide year-round access through the reservoir area and increase the impact to big game habitat and require further refinement of the recreation plan to maintain controlled access to the recreation area.

An increased need for law enforcement would occur because of the increased number of people using the area. Such need for law enforcement would also include traffic problems related to the proposed relocation of CR 211 through the reservoir area.

Rafting and Water Sports Use on the Animas River

Recreation losses would primarily affect rafting and water sports, dependent upon riverflow at or above 450 ft³/s, or "floatable flows." The losses would be in the form of reduced quality of experience, number of floatable days, and economic impacts, not in total elimination. Innertubers, waders, and swimmers are not dependent on floatable flows and, therefore, would not be affected by the Project.

The 1979 DPR method of evaluating recreation experience impacts to rafting and water sports provides the basis for this analysis. However, many of the assumptions used in the DPR analysis are no longer valid in relation to new or updated information on timing and amount of use. The estimations of total and affected recreation days and loss of floatable days are based on the assumption that the value of a river recreation experience is dependent upon the quality of water in terms of speed and turbulence, and that rafting and water sports are dependent upon floatable flows. (Reclamation, 1992[b], *Recreation Technical Memorandum*).

To determine how the Project would impact the recreation experience, the difference in recreation experience value between average historic flows with the Project was estimated for each calendar day and corresponding number of recreation days of use. The loss of floatable days was estimated by determining the number of days of average historic floatable flows that were reduced to less than 450 ft³/s with the Project. It was found that the average length of time the river would be at or above 450 ft³/s would be reduced by 50 days with the Project (see table III-6). This estimate includes 7 days in April, 31 days in August, and 12 days in September. Thus private recreationists could lose 50 days per year, because use now occurs throughout the year. Commercial rafting would lose 32 days, the entire month of August through Labor Day weekend in September, because use occurs only during the summer tourism season. The loss of recreation days is not anticipated for competitive events if the timing of the events remains unchanged from past schedules. However, competitive events may experience some reduction in recreation quality due to lower flow rates.

Mitigation Refinements

Recreation Development at Ridges Basin Reservoir

The 1980 FES recreation development plan for Ridges Basin Reservoir would be refined to address current recreation demand and development standards. The refinement would reflect management by CDPOR and the maximum level of development within the scope of the 1979 DPR and

requirements of the 1980 FES. The refinement would also address the proposed relocation of CR 211 to maintain controlled access to the recreation area.

Rafting and Water Sports Use on the Animas River

It is important to note that by creating reservoir recreation opportunities, losses to river recreation are not mitigated, because entirely different user groups are involved. As discussed in chapter IV, Reclamation would mitigate the impact on the trout fishery and recreation use caused by reductions in flow in the Animas River by participating in funding to implement a program of acquiring public access to the river to provide opportunities for private recreationist to access the reach of the river where the trout fishery would be established and where recreation use occurred.

Eligibility of the San Juan River as a Wild and Scenic River

1980 Baseline

The eligibility of the San Juan River as a Wild and Scenic River was not addressed in 1982.

New or Updated Information

In 1982, the Nationwide Rivers Inventory of the National Park Service determined the segment of the San Juan River extending from U.S. Highway 160 to Lake Powell had high-quality rafting opportunities in early summer, unique geologic features, and habitat for bald and golden eagles. This segment of the San Juan River qualifies for designation as a Wild and Scenic River based on these features and the absence of impoundments.

Impacts of 1992 Proposed Action

The Project would not impound the segment of the San Juan identified by the Nationwide Rivers Inventory, nor affect its most outstanding values, the geology and scenery. Nor would construction of the Project significantly impact bald or golden eagles, as indicated in the biological opinion. The defined river segment continues to qualify as a national Wild and Scenic River under at least two of the three classifications—wild and scenic, and is still being studied by the Bureau of Land Management (BLM) for designation. Classification as recreational would depend on the adequacy of flows and access.

Mitigation Refinements

None.

SOCIAL AND ECONOMIC EFFECTS

1980 Baseline

The 1980 FES discussion and analysis of social and economic conditions is on pages B-1 to B-21 and C-1 to C-18 of the FES.

The Project area economically relied on the three diverse industries of mineral extraction, tourism, and agriculture. Agriculture was an underlying and stabilizing economic effect in the area.

The Southern Ute and Ute Mountain Ute Tribes sought economic self-sufficiency and relied heavily on their natural resources to develop their economic base. Both tribes looked to the water resource; Southern Ute and Ute Mountain Ute Tribes sought ways to ascertain their water rights and made claims for water allocations to support the social and economic developments of their reservations.

New or Updated Information

Since the 1980 FES, Project refinements and negotiations with local water agencies, cooperating States, and Indian Tribes have resulted in the decision to phase Project construction. Congress enacted the "Colorado Ute Indian Water Rights Settlement Act of 1988," to ratify the negotiated agreements, as described in chapters I and II. Congress provided for employing and contracting Indian resources and people to the greatest extent feasible that may enhance the economic and social viability of these communities.

The principal effects on the local and tribal economies related to the phased use of tribal labor and goods are found in the duration of construction impacts and the completion of the features of the Project which provide for the delivery of irrigation water to Project lands. Although all features of the Project are to be built, the length of time or duration of the construction impacts is different than originally planned in the FES due to the proposed phasing. Accompanying this are the impacts to recreation in the area from new facilities (Ridges Basin Reservoir) and the reduction in flows of the Animas River. Irrigation of the 67,460 acres of Project lands would be impacted by providing water to 41,402 acres of non-Indian land and

1,413 acres of Southern Ute Indian Tribe land initially, with the remaining 24,645 acres of Indian and non-Indian land receiving water in Phase II of the Project. As this Project is being built, more Ute Tribal members would have opportunities to work on the Project.

Employment

Employment in the mineral extraction industries (natural gas, oil, and coal) provides about one-third of the jobs in the Farmington, New Mexico, area. In Durango, the tourism industry and its related retail sales continue to provide about a third of the jobs. Tourism has expanded in the area as more of the natural scenic areas have developed into year-round recreation areas, providing a diverse recreation experience and reducing some of the cyclical seasonal employment for workers in the area. Agriculture provides jobs for about 9 percent of the population in La Plata County and about 3 percent in San Juan County.

Tribal Jobs and Income

A significant part of the Southern Ute and Ute Mountain Ute populations is actively seeking work. In February 1992, the Southern Ute Tribe estimated that 107 tribal members were not employed and looking for work. It is possible that a portion of these job seekers either possess sufficient skills to work on the Project or would be able to acquire the needed skills. Ute Mountain Utes would also find job opportunities with this Project. According to 1990 BIA's estimates on the labor force, 267 Ute Mountain Ute Tribal members are seeking work.

Both Southern Ute Indian and Ute Mountain Ute Tribes have established companies to participate in the regional construction activities and employ tribal members. Moache Capote Construction Authority of the Southern Ute Indian Tribe has taken part in building road and highways. Weeminuche Construction Authority, an enterprise of the Ute Mountain Ute Tribe, is participating in the construction of the Towaoc Canal that will deliver water from the Dolores Project to farmlands on the Ute Mountain Ute Reservation.

The 1980 median incomes of Southern Ute Indian and Ute Mountain Ute Tribes households are below the 1980 national household median income of \$25,426. Southern Ute Indian households earned a median income of \$10,187; and Ute Mountain Ute Households earned \$4,223.

Mineral Resources

The mineral extraction industry continues to be of major economic importance in the area, producing over 15 percent of the region's mineral production value. Increases are due mainly to coal and natural gas production in the area. (See table III-7).

Table III-7.—Mineral production in San Juan County, New Mexico,
and La Plata County, Colorado
(1,000's)

Year	Petroleum (barrels)		Natural gas (million cubic feet)		Coal (tons)	
	San Juan County, New Mexico	La Plata County, Colorado	San Juan County, New Mexico	La Plata County, Colorado	San Juan County, New Mexico	La Plata County, Colorado
1990	2,238	66	260,541	34,793	15,150	139

Tribal Mineral Resources***Southern Ute Reservation***

Presently, approximately 900 gas wells and 50 oil wells produce within and adjacent to the reservation. Southern Ute mineral ownership consists of approximately 166,000 acres of leased and producing oil and gas properties.

Tribal coal ownership, a separate mineral estate from oil and gas, is 520,000 acres and contains over 16 billion short tons of high-volatile bituminous and medium-volatile bituminous Fruitland Formation coal. This coal is not currently being produced.

Many of the geologic conditions that are favorable for coal-bed methane generation and production are found within the reservation. Estimated are over 14.5 trillion cubic feet of gas within the deeply buried (greater than 500 feet) Fruitland coals. Assuming a very conservative recovery factor of 25 percent, tribal coal-bed methane reserves are estimated at 326 billion cubic feet. More than 200 coal bed methane wells have been successfully drilled.

Oil and gas exploration, development, and production contribute to a substantial portion of the Southern Ute Tribe's economic and social environment.

Ute Mountain Ute Reservation

The oil and gas reserves of the Ute Mountain Utes are approaching depletion. Recoverable reserves of this area could range above 5 million barrels of oil and 10 million cubic feet of gas, based on production from the geologic zones, anticipated sizes, and typical oil-to-gas ratios.

Significant coal reserves exist on reservation lands. All reserves are high-volatile, bituminous coal. Strippable coal reserves for the Ute Mountain Ute Reservation are 39 million tons, with 11,604 million tons of deeper coal for underground and in situ methods. There are no coal recovery operations on the reservation at this time.

Agriculture

Agriculture continues to be a stabilizing influence by employing approximately 9 percent of the labor force in La Plata County and about 3 percent in San Juan County. Agriculture value, production, and acreage are displayed in table III-8.

Tribal Agriculture

Farming on the Southern Ute Reservation consists of both irrigated and nonirrigated agriculture. Hay crops consisting of alfalfa and grass are by far the most important irrigated crops; however, corn for silage, oats, and barley are also grown. In 1988, \$850,000 worth of hay and pasture crops were grown on irrigated tribal lands.

The Southern Ute Tribe owns and operates a custom farm operation, which makes farming feasible for many small operators of tribal assignments.

Cattle and horses are the principal livestock on the reservation. There are about 1,200 head of cattle, with individual units varying from as few as 10 head of cattle to as many as 150 head. Sheep numbers have decreased in the last 10 years due to management economics and the additional labor involved.

Table III-8.—Agricultural statistics¹

	La Plata County		San Juan County	
	1974	1987	1974	1987
Farms and farmland				
Farm (number)	527	687	407	650
Average farm size (acres)	1,122	900	4,698	2,857
Irrigated acres per farm	176	116	86	136
Value of products sold (dollars)				
Livestock and products (dollars)	\$6,134,000	\$13,214,000	\$2,888,000	\$7,590,000
All crops	1,751,000	16,040,000	5,585,000	15,747,000
Total	\$7,885,000	\$29,254,000	\$8,473,000	\$23,337,000
Livestock (number)				
Cattle and calves	39,740	34,266	23,301	24,821
Sheep and lambs	13,624	6,991	42,183	39,799
Acreage and production				
Small grains (wheat, barley) (acres)	13,293	10,530	845	1,150
Corn (all) (acres)	2,034	404	3,773	550
Hay (acres)	32,968	34,991	15,904	23,955

¹ U.S. Department of Commerce, Bureau of the Census, 1987 Census of Agriculture, Geographic area series, Colorado and New Mexico. July 1989.

When the Towaoc Canal (a feature of the Dolores Project) is completed in 1994, the Ute Mountain Ute Tribe will be able to irrigate 7,500 acres. The Ute Mountain Ute Tribe has established a farm and ranch enterprise to operate these newly serviced agricultural lands.

Recreation and Tourism

With the rich scenic qualities and the abundance of cultural resources in the region, recreation and tourism make a substantial contribution to the Project area's economy. Durango continues to be the hub for visitors entering the area, and the local economy is dependent on tourism. As a result, the area continues to develop and enhance recreational opportunities for both the local population and visitors. The river recreation industry has taken advantage of increased interest in rafting, kayaking, and canoeing, and these activities have become substantial contributors to the economy of the area, as noted in the recreation section of this chapter. Visitations continue to increase at the region's major attractions, as displayed in table III-9.

Table III-9.—Recreation and tourist visitation

Attractions	Visits	
	1976	1990
Mesa Verde National Park	677,000	678,000
Durango-Silverton Narrow Gauge Railroad	120,000	210,000
San Juan National Forest	1.8 million	9.125 million
Purgatory Ski Area	195,000	300,000
Archeology and Cultural National Monuments in New Mexico	98,720	171,400

Tribal Recreation and Tourism

The Ute Mountain Ute Tribe operates a tribal enterprise within the Mancos Canyon Tribal Park. This tribal enterprise provides tour administration, ruin stabilization, and park development and maintenance. The Ute Mountain Tribal Park has the potential to produce revenues for the tribe and to employ tribal members in park operations. The Ute Mountain Ute Tribe opened a casino in Towaoc to also produce revenues and employ Tribal members.

The Southern Ute Tribe operates several enterprises to serve recreation and tourism. The tribe manages Sky Ute Lodge, a 38-unit, full-service hotel, along with Sky Ute Restaurant. Indian heritage dancers are provided by the tribe for ceremonial and social and entertainment purposes, and several scheduled tribal social events, including the Bear Dance Pow-Wow, occur with frequency. Capote Lake and associated facilities are maintained for camping, fishing, and recreational vehicle parking.

Impacts of 1992 Proposed Action

Part of the social and economic impact analysis in the FES was completed using the Bureau of Reclamation Economic Assessment Model. This model is no longer used; instead, regional impacts (on output, employment, and earnings) were determined using the Department of Commerce, Bureau of Economic Analysis, Regional Input-Output Modeling system (RIMS II). Regional multipliers representing La Plata County, Colorado, and San Juan County, New Mexico, were determined and used to measure the impact on the local economy of expenditures for construction, net farm income, and recreation. The analysis of the impacts on agriculture is based on an analysis completed for the cost-sharing agreement of June 30, 1986, including farm budgets based on October 1985 prices.

The following analysis of the Project envisions the Project in two periods: Phase I (1992 to 2002) and Phase II (beyond 2002). Project construction impacts are considered to be short term, while long-term impacts are the result of Project developments.

The Project area would continue to rely economically on the three diverse industries of mineral extraction, tourism, and agriculture. This economic diversity has been maintained, based on a continuing development of the energy resource reserves in the area, as well as the abundance of natural, scenic, and cultural attractions which have expanded tourism in the area. Agriculture continues to be a less significant industry, but has a stabilizing economic effect in the area.

Since the construction of Ridges Basin Dam would be in the immediate vicinity of Durango, most social and economic impacts would occur in this area. Because of the proximity to the work, the majority of the workers would probably choose to reside in Durango, where these new residents would require housing, schools, and other basic services. These impacts were fully described in the 1980 FES.

Other areas where impacts are likely to occur are on the Southern Ute and Ute Mountain Ute Reservations. The need to enhance the depressed social and economic conditions of the Southern Ute and Ute Mountain Ute Tribes

on these reservations has been partially treated by Congressional legislation. The Colorado Ute Indian Water Rights Settlement Act of 1988 includes provisions that invoke the application of the Indian Self-Determination and Education

Assistance Act to the design and construction of the Project.³ The employment needs and labor force impacts of this Project are consequently reviewed with this Congressional intent as background.

Employment

The short-term direct effects of Project construction on employment would be the creation of about 3,374 direct and 2,269 indirect jobs during Phase I. Beginning in 1993, when the first major construction contracts will be awarded, 83 direct and 55 indirect jobs would be created, peaking in 1999 then decreasing to 72 direct and 49 indirect jobs in the final year of Phase I construction in the year 2002. As a result of this employment, there would be an expected decrease in the unemployment rate in the region. The major industrial sectors—in particular the construction and related business and service industries—would experience increases in employment opportunities attributable to the construction of the Project, but most of these would be short term in duration. Most of the long-term employment would continue to result from growth and development in the area. However, when Phase II construction begins (which could be immediately after Phase I, and the length of which is yet to be determined), another 1,261 direct and 848 indirect jobs would be created. Extending the construction period would result in longer term, beneficial employment impacts.

As Towaoc Canal work nears completion and when Ridges Basin Dam construction begins, many of the Ute Mountain Ute Tribal members would likely work on the Project.

The following are conservative projected numbers of Native Americans, largely members of the Ute Tribes, who may become employed in the Project, should each Ute Tribe become actively involved with skill enhancement and placement. (See table III-10). These projections are based on both tribes' available labor force, tribal employment participation, and tribal members' willingness to commute to work sites. These estimates should not be used as limits on numbers of Native Americans available to

³ The Indian Self-Determination Act has requirements for utilizing, to the greatest extent feasible, Indian resources and people in employment and contracting. These provisions also refer to preferences and opportunities for training and employment, and preferences in the award of work to Indian owned enterprises.

Table III-10.—Generated employment for Native Americans¹

Year	Ute Mountain		Total	Indirect
	Southern Ute	Ute		
1	1	1	2	1
2	8	4	12	3
3	34	15	49	13
4	44	22	66	18
5	44	22	66	18
6	44	22	66	18
7	50	25	75	20
8	50	25	75	20
9	50	25	75	20
10	50	25	75	20
11	38	14	52	12

¹ Should these minimum numbers of tribal members be employed, the tribes' perennially high unemployment rate would be lowered by about 10 percentage points.

work; the numbers are used only to discuss the kinds of impacts on the Project due to the intent to employ as many tribal members as the Project schedule may allow.

Agriculture

Most of the employment impact in agriculture would occur after the development of Phase I and in Phase II when lands receiving Project water are fully developed.

With completion of Phase I and the resulting provision of water to Project lands, agricultural production would increase. Annual gross agricultural production would be increased by \$15,509,000 in Phase I. A \$9,109,000 annual increase in agricultural production would be attributable to Phase II. Net farm incomes would also increase under each phase, with \$9,205,000 from Phase I and \$5,576,000 from Phase II. This would, in turn, affect the local economy by increasing total annual output by \$16 million (Phase I) and \$10 million (Phase II). With the increased spending from net farm incomes under Phase I and Phase II, long-term regional employment would increase by 203 jobs and 123 jobs, respectively. As was previously mentioned, the cropping mix would remain the same, but higher percentages of alfalfa, corn, and wheat would be expected with the increased water supply and additional acres of land.

Recreation and Tourism

The Project would help meet recreation needs in the area by the construction of recreation facilities at Ridges Basin Reservoir in Phase I and Southern Ute Reservoir under Phase II. Needed recreation opportunities for fishing, boating, and water skiing, as well as sightseeing, picnicking, and camping, would be provided.

Ridges Basin Reservoir at maximum development would provide an estimated 331,000 recreation days annually. This increase in visitation would not necessarily be equally distributed in its impact on the local economy, as not all visitors would be from out of State. Local residents would take advantage of the recreation opportunities, but their impact would be minor on the local economy, assuming additional spending on recreation by local residents would be accompanied by a decrease in spending on other types of entertainment.

Recreational expenditures generated by as many as 331,000 recreation days are needed in order to estimate the direct and indirect impacts from recreation provided by the reservoir. For every dollar spent by a recreationist it is estimated that there would be a resulting \$1.64 of regional output. For every \$27,600 spent one job would be created locally, and household incomes are estimated to increase 44 cents for every dollar spent.

The addition of another reservoir in the area would add to the overall recreation available and would help in providing added incentive for nonresident visitation to the area. The loss of 32 days of commercial rafting would have the most significant negative impact on the local economy. With the total number of recreation days lost estimated at 6,141, the resulting direct economic loss would amount to approximately \$125,000 (Reclamation, 1992[b], *Recreation Technical Memorandum*). Indirect economic losses would result from this direct loss as retailers, the hotel and lodging industry, and eating and entertainment businesses would be impacted by the loss of expenditures from visitors. Total direct and indirect impact loss was estimated to be \$205,000 annually.

Mitigation Refinements

None.

Short-Term and Long-Term Effects and Unavoidable Adverse Effects

The Project's short-term and long-term effects and unavoidable adverse effects remain generally as described in the 1980 FES (chapters E and F) with the following changes:

There would be an unavoidable loss of about 3,750 acres of wildlife habitat, principally elk winter and summer range. Up to 321 acres of wetlands not previously identified could be permanently lost or adversely affected, but would be replaced through creation or enhancement of wetlands as mitigation. The 550 acres of riverine wetland vegetation loss would be reduced to 223 acres due to refined analysis. An additional 96 acres of vegetation would be lost due to design refinements of Project facilities. An additional 175 archeological sites would be impacted by data recovery and mitigation activities. There would be a short-term adverse effect on the Animas River trout fishery due to operation of the Durango Pumping Plant, but it would be offset by implementation of a stocking program that would result in a long-term improvement in the trout fishery.

Cumulative Effects

The following discussion and tables address changes in the Project's role in the assumed cumulative impacts to area resources. The incremental changes between the 1980 and 1992 analysis are considered insignificant. Since 1960, 29 water resources projects have been built or are under construction by Reclamation in the Upper Colorado River Basin. Cumulative resource issues affected by this Project have the potential to add to the cumulative effects within the region and beyond. These issues include vegetation changes, fisheries, threatened and endangered species, and water resources, use and quality. The analysis conducted for the Supplement has resulted in identification of changes in cumulative effects on those resource issues. Table III-11 compares cumulative effects to the above issues described in the 1980 FES to the impacts of the 1992 proposed action.

Table III-12 displays the Reclamation projects included in the cumulative impact analysis. These projects are all within the Colorado River Basin. Table III-13 displays the cumulative impact of the Reclamation projects in the Colorado River Basin on stream depletions and salinity. Tables III-14 and III-15 display the estimated loss of habitat for endangered fish in the Upper Colorado River Basin and the known locations of endangered fish habitat. Table III-16 displays the major terrestrial wildlife habitat changes resulting from Reclamation projects in the Upper Colorado River Basin.

Table III-11.—Cumulative effects of 1980 plan and 1992 proposed plan

Resource	1980 FES	1992 proposed action
Vegetation:		
Riparian/wetland	No loss identified	-321 acres (est)
Aspen-conifer	-420 acres	Same
Desert shrub, brushland, pinyon-juniper	-4,746 acres	-5,000 (est)
Grassland	-3,246 acres	Same
Specific wildlife developments	3,500 acres	4,585 acres
Fisheries:		
	27 percent reduction of average annual flows in Animas River—minimum effect on poor sport fishery in Animas	Same reduction in flows; some effect on high quality sport fishery in Animas; Undefined effect on native fishery in La Plata River
Threatened and Endangered Species:		
Biological opinion	No jeopardy	Jeopardy, with reasonable and prudent alternative, San Juan River
Eliminated by inundation	None	None
Loss due to water quality change	None	None
Water Resources, Use, and Quality:		
Depletions	154,900 acre-feet per year	Same
Change in salt loading	6,470 tons per year	Same

Table III-12.—Developments included in cumulative impact analysis

Development and location (State)	Actual or estimated completion date
CRSP storage units	
Wayne N. Aspinall Unit, Colorado	1977
Flaming Gorge Unit, Wyoming and Utah	1963
Glen Canyon Unit, Utah and Arizona	1965
Navajo Unit, Colorado and New Mexico	1963
CRSP participating projects	
Florida Project, Colorado	1963
Paonia Project, Colorado	1962
Silt Project, Colorado	1966
Smith Fork Project, Colorado	1963
Hammond Project, New Mexico	1975
Central Utah Project, Utah	
Bonneville Unit	1992
Jensen Unit	1989
Vernal Unit	1961
Emery County Project, Utah	1965
Lyman Project, Wyoming	1980
Seedskadee Project, Wyoming	1964
Navajo Indian Irrigation Project, New Mexico	1987
San Juan-Chama Project, New Mexico	1976
Bostwick Park Project, Colorado	1971
Dallas Creek Project, Colorado	1989
Dolores Project, Colorado	1995
Fryingpan-Arkansas Project, Colorado	1977
Grand Valley Unit, Colorado (Colorado River Basin Salinity Control Project)	2006
Paradox Valley Unit, Colorado (Colorado River Basin Salinity Control Project)	1995
Animas-La Plata Project, Colorado and New Mexico (CRSP)	undefined
Ruedi Reservoir Round 2 Water Sale, Colorado (Fryingpan-Arkansas Project)	1986
Lower Gunnison Basin Unit, Colorado (Colorado River Water Quality Improvement Program)	1995
Uinta Basin Unit, Utah (Colorado River Water Quality Improvement Program)	1998
Dolores Project Modifications	1996

Table III-13.—Stream depletions and salinity changes

Project or unit	Depletions ¹ (acre-feet/ year)	Change in salt loading ² (tons/year)	Range of individual project salinity impacts for 1941-2040 ¹ (mg/L)	
			Minimum	Maximum
Wayne N. Aspinall Unit	9,000	0	0.4	1.7
Flaming Gorge Unit	65,000	0	2.6	12.1
Glen Canyon Unit	525,000	0	20.8	91.2
Navajo Unit	26,000	0	1.1	4.9
Florida Project	14,000	11,500	1.1	4.1
Paonia Project	10,000	4,700	.6	2.5
Silt Project	6,000	13,200	.8	2.8
Smith Fork Project	6,000	2,800	.4	1.5
Hammond Project	10,000	7,900	.7	2.9
Central Utah Project				
Bonneville Unit	166,000	-21,600	5.8	27.7
Jensen Unit	15,000	33,200	2.0	7.1
Vernal Unit	12,000	27,700	1.7	5.9
Emery County Project	8,000	0	.3	1.5
Lyman Project	10,000	0	.4	1.9
Seedskadee Project	281,000	0	11.3	50.6
Navajo Indian Irrigation Project	267,000	220,000	20.0	75.7
San Juan-Chama Project	110,000	-16,000	3.8	18.3
Bostwick Park Project	4,000	11,200	0.6	2.2
Dallas Creek Project	17,000	9,800	1.1	4.5
Dolores Project	81,000	50,650	5.4	21.5
Fryingpan-Arkansas Project	69,000	-3,500	2.7	12.4
Paradox Valley Unit	1,500	-180,000	-7.7	-23.2
Animas-La Plata Project	195,400	6,470	6.0	27.6
Ruedi Reservoir Round 2 Water Sale	49,000	-15,000	1.3	7.3
Lower Gunnison Basin Unit	-2,000	-141,000	-6.1	-18.7
Grand Valley Unit	0	-166,000	-7.2	-21.7
Uinta Basin Unit		³ -25,500	-1.1	-3.3
Dolores Project Modifications		-32,000	-1.4	-4.2
Total	1,914,500	-202,610	⁴	⁴

¹ Maximum annual range of salinity impact at Imperial Dam as predicted by the Colorado River Simulation System (CRSS) computer model developed by the Bureau of Reclamation. The range of effects considers the uncertainty of the hydrosalinity analysis as well as a wide range of hydrologic and development conditions. The maximum annual range represents the widest variation in salinity impacts possible by a project in any 1 year of operation. The average impact would fall approximately midway between these extremes.

² Salt loading is reduced for projects with transmountain diversion because the amount of water is reduced; however, concentration is increased at Imperial Dam.

³ Mean of 21,000 to 30,000 tons of reduction expected from unit.

⁴ Salinity impacts of the individual developments cannot be added directly because of synergistic effects.

Table III-14.—Loss of river habitat for endangered fish species¹
in Upper Colorado River Basin from Reclamation projects
(unit—miles)

Project and river	Eliminated by inundation	Loss due to water quality change	Total
Wayne N. Aspinall Unit Gunnison River		50	50
Flaming Gorge Unit Green River	72	65	137
Glen Canyon Unit Colorado River	186	¹ 293	479
San Juan River	71		71
Navajo Unit San Juan River	35	40	75
Total	364	448	812

¹ Colorado squawfish, razorback sucker, humpback chub, and bonytail chub.

Table III-15.—Location of known endangered fish habitat

Development	Feature	Location	Miles from Animas-La Plata project
Grand Valley Unit	Irrigation systems improvements	Colorado River at Grand Junction, Colorado	175
Paradox Valley Unit	Brine well field	Colorado River at mouth of Dolores River, Utah	150
Animas-La Plata Project	Ridges Basin and Southern Ute Reservoirs	San Juan River near Aneth, Utah ²	0
Ruedi Reservoir Round 2 Water	Sale of reservoir water	Colorado River at Grand Junction, Colorado	175
Lower Gunnison Basin Unit	Irrigation system improvements	Gunnison River downstream from Delta, Colorado	125
Uinta Basin Unit	Irrigation system improvements	Green River above and below mouth of Duchesne River, Utah	230
Dolores Project Modifications	Irrigation system improvements	San Juan River confluence with McElmo Creek	45

¹ Altered habitat in Lower Basin caused by Glen Canyon Dam.

² One juvenile squawfish collected in 1978.

CHAPTER III

AFFECTED ENVIRONMENT AND
ENVIRONMENTAL CONSEQUENCESTable III-16.—Major terrestrial wildlife habitat changes
from Reclamation projects in the Upper Colorado River Basin
(units—acres)

	Riparian ¹	Aspen- conifer	Desert shrub, brushland, pinyon- juniper ²	Grassland	Cropland- pasture ³	Specific wildlife develop- ments
Key habitat in Upper Colorado River Basin ⁴	200,000	6,648,900	29,987,300	1,064,700	3,720,700	Not determined
CRSP changes ⁵						
Wayne N. Aspinall Unit	-430	-1,010	-6,000	-270	-2,070	7,620
Flaming Gorge Unit	-1,730	-800	-34,970		-940	7,530
Glen Canyon Unit ⁶	-90		-2,930			7,530
Navajo Unit	-150		-12,190		-4,000	3,060
Florida Project	-10	-100	-5,930	-300	5,730	
Paonia Project	-5		-2,430	-100	2,230	
Silt Project	-10	-15	-2,320		1,920	
Smith Fork Project	-10		-1,590		1,290	
Hammond Project			-3,030		3,900	
Central Utah Project						
Bonneville Unit Collection						
System	-105	-412	-4,590	-4,213		23,260
Jensen Unit	-40		-680	-230	380	500
Vernal Unit			-580		-300	600
Emery County Project	-10		-2,160		770	2,030
Lyman Project	-260		-1,190	-260		1,880
Seedskaadee Project	-2,860		-3,660		-2,310	22,000
Navajo Indian Irrigation Project			-100,000		100,000	
Bostwick Park Project		-20	-1,400	-190	1,320	
Dallas Creek Project	-100		-920		-600	1,160
Dolores Project	-870		-2,500	-8,800	4,900	9,050
Fryingpan-Arkansas Project changes	-200	-100			-840	
Grand Valley Unit	-790		-1,177		1,000	2,090
Paradox Valley Unit	2/50		-3800	200		3,700
Animas-La Plata Project	-250	-420	-5,953	-3,246	18,310	4,586
Lower Gunnison Basin Unit	-2,547					2,100
Uinta Basin Unit	-609		384		200	610
Dolores project modifications	-304					770
Total remaining habitat in basin	188,671	6,645,923	29,776,984	1,047,241	3,851,540	91,936
Percent change	-5.7	-0.01	-0.04	-0.3	+0.5	+16.4

¹ Data on quantity of riparian habitat are scarce. Habitat losses were estimated on the basis of miles of stream inundated, with the exception of Flaming Gorge, Wayne N. Aspinall, and Glen Canyon Units where habitat figures were available from preimpoundment studies.

² Includes pinyon-juniper woodland, mountain brush, salt desert shrub, and northern and southern desert shrub types.

³ Net change.

⁴ Derived from the 1971 Upper Colorado Region Comprehensive Framework Study (1965 data) adjusted to reflect habitat changes due to CRSP units constructed prior to 1965.

⁵ Figures shown are estimates for land either inundated or placed under full service irrigation.

⁶ A total of 153,290 primarily barren acres was inundated at Glen Canyon; of these, only 3,020 were considered key habitat.

Overview: This section describes environmental protection measures in addition to those environmental commitments included in the 1980 FES for the Animas-La Plata Project. The full Environmental Commitment Plan is included in this Supplement as attachment 3.

CHAPTER IV - ENVIRONMENTAL COMMITMENTS

INTRODUCTION

The new, additional, or clarified environmental commitments in this chapter have been identified as a result of the environmental analyses performed for this document. The commitments in this chapter are from several sources:

- Commitments made during the planning process and incorporated into the proposed action
- National Environmental Policy Act (NEPA) compliance procedures
- Endangered Species Act-Section 7 consultation(s)
- Recommendations from the Final Draft Planning Aid Memorandum
- Section 404(b)(1) Evaluation
- Other applicable Federal, State, and local environmental laws and regulations as stated in construction specifications.

Environmental mitigation commitments were previously discussed in chapter D of the 1980 FES. The 1980 FES commitments are summarized in the Environmental Commitment Plan (ECP) in attachment 3.

The commitments would be implemented by Reclamation. Commitments for preconstruction activities would generally be completed by Reclamation or by contract prior to the construction specifications and activities. Environmental commitments to be implemented by another agency would be so identified. Some commitments, such as monitoring or additional studies, could continue beyond completion of construction of project features.

Cost estimates for all environmental commitments have not been derived. Reclamation has made a preliminary estimate of the cost of certain new mitigation measures. They are shown in parentheses at the end of the discussion of those measures.

ENVIRONMENTAL COMMITMENTS

General

In addition to the environmental commitments described in the 1980 FES and Supplement, management practices would be employed during construction activities to minimize environmental effects and would be included in construction specifications. Those specifications include sections on public safety, dust abatement, air pollution, noise abatement, water pollution abatement, waste material disposal, erosion control, archeological and historic resources, vegetation, and wildlife. An updated ECP would be developed to insure implementation of environmental commitments and adherence to the management practices.

During construction of Ridges Basin Dam, safety measures would be taken to monitor for methane gas.

If the proposed action changes or the environmental effects of the project change significantly based on detailed information collected prior to construction, additional environmental analyses and NEPA compliance would be carried out.

Reclamation would enter into an agreement with the non-Federal Project cost sharing entities to establish commitments for responsibility for implementation, funding, and long-term operation and maintenance responsibility for environmental mitigation commitments for both Phases I and II of the Project.

Water Supply

Operation of the Durango Pumping Plant would be regulated by the amount of water in the Animas River and downstream demands. The flows in the Animas River allowed to bypass the pumping plant would be determined by (in order of priority):

- Bypassing flows needed to meet the downstream nonproject water demands by water users with senior water rights in Colorado and New Mexico, then;
- Bypassing Project water needed to meet demands for municipal and industrial use in New Mexico, then;
- Regulating the pumping plant operation to bypass flows of either 125 ft³/s during the fall/winter (October 1 to March 30) or 225 ft³/s during the spring/summer (April 1 to September 30) or natural river flow, whichever is less.

Water Quality

Material discharged into waters of the United States would be prevented from adversely affecting the water.

- Best management practices and construction schedule techniques would be implemented to minimize adverse water quality impacts.
- Measures would be implemented to time construction activity to coincide with periods of low flow and measures to capture sediment would be employed.
- The duration of placement of fill materials would be minimized to as short a period of time as practicable to reduce the duration of turbidity.
- Temporary cofferdams/berms would be used to contain fine materials and placement of fill material during periods of low water flows in Basin Creek and the Animas and La Plata Rivers.
- Stockpiles of fill materials would be placed above ordinary high water mark and protected by measures to prevent erosion of those materials into the waters of the United States.
- During installation of the Dry Side Canal Siphon, wastewater pumped from the pipe trench would be pumped to an area where it would not return to the La Plata River.
- Silt screens or other appropriate methods would be used in the Animas River to confine suspended particulates and turbidity to small areas where settling or removal can occur.
- The Durango pumping plant would be designed to allow for the continued unrestricted movement of ground water on the site. Ground-water levels and quality are also being monitored at a series of wells on the site as agreed with DOE and the State of Colorado in conjunction with Reclamation's special use permit for the site.

Soils

The extent of areas with elevated selenium levels would be further studied and delineated as development occurs. Areas with probable toxicity problems would not be irrigated and would be deleted from the project lands. Additional land may be found to replace these lost acres.

Vegetation

Native plant species would be used for reseeded disturbed areas.

Utility and road relocations north of Ridges Basin Reservoir would be located to minimize disturbance to mature ponderosa pine.

Elk Habitat

Reclamation would replace the entire Colorado Division of Wildlife (CDOW)-owned Bodo Wildlife Area (about 7,500 acres) with an area of equal monetary value. The priority for the location of the replacement area would be: (1) within the same herd unit; (2) within the region; or, (3) statewide, as agreed to by the CDOW. (Estimated cost: \$3.8 million.)

Reclamation would mitigate the loss of 10,042 habitat units for elk through acquisition and improvement of 3,586 acres of land, preferably north of U.S. Highway 160, within the range of the Hermosa elk herd. To achieve the required mitigation, the land would require an improvement in habitat carrying capacity of 40 percent. If adequate mitigation land cannot be acquired within the desired area, alternate areas may be acquired in coordination with the the CDOW and Service. (Estimated cost: \$4.3 million.)

Reclamation would investigate the need for seasonal road closures to motorized vehicles, in coordination with other responsible agencies, to minimize disturbance to wildlife.

Raptor Nesting

Reclamation would coordinate construction activities at Ridges Basin Dam with the Service to identify and implement measures to minimize effects on existing raptor nest(s) on Carbon Mountain near the site of the proposed dam. Those measures may include relocating the existing nest to an alternative site on Carbon Mountain subject to less construction or human disturbance if the direct impact of the dam construction cannot be avoided. (Estimated cost: \$1,000.)

Wetlands and Riparian Habitat

Reclamation would mitigate the loss of 121 acres of wetlands within Ridges Basin and along Basin Creek due to construction of Ridges Basin Dam and Reservoir. Reclamation would coordinate with other agencies, as indicated below, to determine appropriate mitigation. These wetland losses would be

replaced in-kind and in-basin to the extent practicable with areas of equal or greater value. Wetland mitigation locations would be selected and created/enhanced to replace the same vegetative communities lost. Three potential mitigation sites (totaling about 90 acres) have been identified and are shown in figure III-1. If out-of-basin mitigation sites are necessary, alternative sites would be selected in coordination with the Service, EPA, and the CDOW. (Estimated cost: \$2.7 million.)

Reclamation would investigate opportunities and implement actions to mitigate the loss of riparian habitat value, particularly cottonwoods, associated with elimination of the existing canals and laterals.

A wetland mitigation plan would be developed by Reclamation in coordination with the Service, EPA, NMDGF, and CDOW. The Corps of Engineers (Corps) would be included when the waters of the United States are affected. The wetland mitigation plan would describe timing of mitigation, mitigation prescribed for each type of wetland loss, and long-term management responsibility of mitigation sites.

Reclamation would fund and participate in mapping the wetland and riparian habitat adjacent to the La Plata River. The La Plata River would be mapped from the proposed Dry Side Canal crossing to 3 miles downstream from the New Mexico-Colorado stateline. The mapping would include the location, extent, and habitat of wetland and riparian habitat along the river. Reclamation would use the mapping to predict, in coordination with the Service, the impacts of depletions from the river on the wetlands and riparian habitat. (Estimated cost: \$35,000.) Up to 200 acres of wetland/riparian habitat may be affected along the La Plata River; however, Reclamation is presently conducting detailed surveys of those wetland/riparian areas to quantify the extent of the areas and potential impact.

The short-term losses of wetlands adjacent to the Animas and La Plata Rivers due to pipeline and canal crossings would be mitigated through worksite restoration, revegetation, and use of construction methods to minimize or avoid impacts.

Material discharged into waters of the United States would be prevented from adversely affecting wetlands.

- Pipeline and siphon crossing alignments of the Animas and La Plata Rivers would be selected to ensure minimum effect on waters of the United States and adjacent wetlands.
- The crossings of the Animas and La Plata Rivers would be designed to minimize the area of disturbance within the waters of the United States.

- Reclamation would implement measures to minimize adverse effects on wetlands from the proposed discharge activities. Those measures would include:
 - (1) Specific locations of the proposed discharge activities would be in areas to avoid wetlands to the extent practicable;
 - (2) Reclamation would fully mitigate the wetland functions and values lost due to the proposed discharge activities.
 - (3) The type and amount of mitigation for wetlands losses would be agreed to by Reclamation, Corps, Service, and Environmental Protection Agency (EPA); and
 - (4) The overall goal of wetland mitigation would be to replace in-basin the wetland functions and values lost.
- The EPA, Service, and Corps would be consulted and an agreement would be implemented to mitigate wetlands losses.

Aquatic Habitat

Material discharged into waters of the United States would be prevented from adversely affecting aquatic habitat.

- Methods of discharging fill material, such as containment levees or berms, would be employed to reduce potential for erosion of materials into the surrounding aquatic ecosystem.
- Disturbed areas would be restored to as close to their pre-disturbance condition as practicable.
- Discharges would be timed to avoid spawning seasons for trout and other species of concern. Those seasons and other critical periods for fish and wildlife would be identified and coordinated with the appropriate Federal, state, or tribal wildlife agencies prior to the discharge.
- All discharges would be designed and constructed to avoid any changes in water current and circulation patterns.

Reservoir Fisheries

Reclamation would provide funds to purchase and stock salmonids in Ridges Basin and Southern Ute Reservoirs. Sources, species, strains, and stocking rates would be developed in coordination with the CDOW, NMDGF, and Southern Ute Indian Tribe. This may require expanding an existing hatchery facility, building a new hatchery, or acquiring a hatchery facility to provide fish if existing hatchery capacity cannot be found within the Colorado River Storage Project (CRSP) hatchery facilities. If needed, Reclamation would investigate opportunities to provide fish and attempt to acquire an existing hatchery facility near the Project area. (Estimated cost: \$2 million.) If Reclamation has to construct a hatchery, the cost would be substantially higher.

Animas River Trout Fishery

Reclamation would mitigate the impact on the trout fishery and recreation use caused by reductions in flow in the Animas River by participating in funding to:

- Implement a program of acquiring public access to the Animas River, in coordination with the CDOW, Southern Ute Indian Tribe, and other landowners, to provide opportunities for private recreationists (principally anglers and rafters) to access the reach of the river where the trout fishery has been established.
- Once public access has been accomplished, stock trout in the Animas River from the Purple Cliffs area downstream to the Colorado-New Mexico boundary near Bondad, Colorado—those efforts would include a trout stocking program similar to the CDOW's near Durango. (Estimated cost: \$20,500 per year.)
- Investigate opportunities for habitat improvement in the Animas River downstream from Durango to the Bondad area, in coordination with the Southern Ute Indian Tribe, CDOW, and Service. (Estimated cost: \$10,000.)

Reclamation, in coordination with the Service, CDOW, NMDGF, Southern Ute Indian Tribe, and Bureau of Indian Affairs (BIA), would develop and participate in a multiyear monitoring study (4 years pre-operation of Durango Pumping Plant and 4 years post-operation) of the Animas River trout fishery from Durango to Bondad, Colorado. (Estimated total cost: \$100,000.)

La Plata River Native Fishery

Reclamation would fund and participate in a one-year study of the population and habitat of native fish (primarily roundtail chub) in the La Plata River. The study would be completed prior to depletion of water from the river for Project purposes. The intent of the study would be to determine the status of the native fishery and establish a baseline of the resource that would be used to accurately assess impacts of Project on the native fishery. The area of this study would be the La Plata River from Highway 160 downstream to a point about 3 miles downstream from the Colorado-New Mexico State line. The study would be coordinated with the CDOW, NMGFD, Southern Ute Indian Tribe, and Service. (Estimated cost: \$20,000 for 1-year study.)

Threatened and Endangered Species

Reclamation would conduct surveys for Ute ladies-tresses (a Federally-listed threatened plant) on Project lands using the Service guidelines for such surveys. The surveys would be conducted from July 20 to August 31, 1993. (Estimated cost: \$10,000.)

Reclamation is committed to implementation of the following five elements of the *Reasonable and Prudent Alternative* (RPA) from the October 25, 1991, Final Biological Opinion to preclude the likelihood of jeopardy from the Project:

1. After reviewing current hydrological conditions and the way in which Reclamation could operate the Navajo Dam to mimic the natural hydrograph (described further below), the Service determined that an initial depletion of 57,100 acre-feet for the Project is not likely to jeopardize the continued existence of the Colorado squawfish, assuming implementation of all elements of the RPA. This depletion is that portion of the project water supply available from construction of Ridges Basin Dam and Reservoir, Durango Pumping Plant, and Ridges Basin Inlet Conduit, as those features are defined by the 1979 DPR. Therefore, only those project facilities which result in a net annual depletion not to exceed 57,100 acre-feet would be constructed and operated pursuant to the biological opinion.
2. Reclamation will fund approximately 7 years of research effort on the San Juan River and its tributaries with emphasis on observing a biological response in the endangered fish population and habitat conditions. This research will be conducted by knowledgeable endangered species and habitat experts and will allow for testing of hypotheses. The ultimate goal of this research is to characterize those factors which limit native fish populations in the San Juan

River and to provide management options to conserve and restore the endangered fish community. Approval for study design shall jointly rest with the Service and Reclamation. (Estimated cost: \$2.1 million.)

3. Reclamation will operate Navajo Dam under study guidelines developed under the second element, above, for the research period so that releases mimic a natural hydrograph. Test flows will be provided to recreate a wide range of flow conditions including high flows similar to 1987, which are hypothesized to benefit reproduction and recruitment in the endangered fish community. Release schedules will be determined by the Service and Reclamation based on research studies and with the available water supply after meeting baseline depletions. These release schedules shall meet the limitations on the outlet works facilities and safe routing of hydrological events in the Upper Colorado River Basin.
4. At the end of the approximately 7-year research period, the Navajo Dam will be operated to mimic a natural hydrograph for the life of the Project based on the research.
5. There shall be binding agreement(s) that the reservoir releases (for both the study period and for the life of the project) are legally protected to and through the endangered fish habitat to Lake Powell. This agreement will include a commitment for the appropriate parties to develop and implement a recovery implementation program for the San Juan River within 1 year.

A permit which would include measures to reduce incidental take of endangered species would be obtained in accordance with Section 10 of the Endangered Species Act.

A Bald Eagle Management Plan would be developed jointly by Reclamation, the Service, and the affected States. Specific surveys would be conducted to identify possible communal roost sites and nest sites and methods to protect them. Potential contaminant bioaccumulation in the food chain would be assessed and monitored, with corrective measures implemented by Reclamation as necessary.

Cultural Resources

A programmatic agreement has been signed among Reclamation, the Advisory Council on Historic Preservation, the Colorado State Historic Preservation Officer, and the New Mexico State Historic Preservation

Officer. It states the procedures and stipulations to mitigate adverse effects on cultural resources under section 106 of the National Historic Preservation Act.

Consultation with the Ute Mountain Utes, Southern Utes, and Hopi, Zuni, and other Pueblo Indian Tribes has been initiated concerning treatment of human remains that may be disturbed by archeological mitigation or project construction.

Cultural resources data recovery for Phase I and a study of the historic Euro-American occupation of the Ridges Basin area are in progress.

Mitigation of the effects of the later phases of Phase I and Phase II would be developed as the project progresses and would be subject to the conditions of the programmatic agreement. It is anticipated that as many as 350 sites would eventually be mitigated through data recovery.

A facility would be constructed in the Durango area to house and display materials recovered from the project in accordance with 36 CFR 79.

Recreation

A program would be implemented of acquiring public access to the Animas River, in coordination with the CDOW, Southern Ute Indian Tribe, and other landowners, to provide opportunities for private recreationists (principally anglers and rafters) to access the reach of the river where the trout fishery has been established. (Cost to be determined.)

Placement of fill materials in the waters of the United States during construction would be timed to occur during periods and at locations when little or no interference with recreational water users would occur.

Overview. This section describes the way in which Reclamation worked with other agencies and individuals in preparing this document, and it discusses further stages of public participation.

CHAPTER V - CONSULTATION AND COORDINATION

PUBLIC INVOLVEMENT

The Bureau of Reclamation (Reclamation) announced its decision to prepare a Supplement to the 1980 FES on April 17, 1992. The Notice of Intent (NOI) to prepare a draft Supplement was published in the *Federal Register* on Wednesday, April 29, 1992. In addition to publication in the *Federal Register*, Reclamation mailed the NOI to the people on the distribution list at the end of this chapter. The NOI stated that those wishing to provide information with respect to the Supplement should submit that information to Reclamation by June 5, 1992.

Reclamation received 98 letters from interested or affected individuals, organizations, and agencies in that period. Reclamation reviewed those letters, along with the input received since 1980, prior to preparation of the draft Supplement. The concerns raised by the commentors in the letters were noted by Reclamation. Reclamation has addressed some of the concerns in the draft Supplement, while other concerns were noted but determined to be outside the scope of the Supplement. The general areas of concern from the commentors are summarized below.

1. The economics (costs and benefits) of the Animas-La Plata Project (Project) should be evaluated in terms of benefit:cost ratio, cost efficiency of the Project, power, water, and repayment costs.¹
2. The Project's effect on water quality in the Animas River and Ridges Basin Reservoir, and in municipal and industrial water supplies should be evaluated.
3. Reclamation should develop and rigorously evaluate new alternatives to the Project in the Supplement.¹
4. The Project's effect on senior downstream water rights and downstream water users should be thoroughly addressed in the Supplement.¹

¹ Concern or issue determined by Reclamation to be outside the scope of this document.

5. The Supplement should evaluate the effects of settlement of Indian water rights claims and Indian use of Project water.
6. The Project's effect on recreation, especially rafting and kayaking on the Animas River, should be evaluated.
7. The Project's effect on threatened and endangered species should be evaluated.
8. Reclamation should conduct a formal scoping program for the Supplement.¹
9. The Project's effect on wetlands along the Animas River, the La Plata River, and throughout the Project area should be evaluated.
10. The Project's effect on flows in the Animas River should be evaluated, especially minimum flows bypassed the Durango Pumping Plant.¹
11. The Project's effect on wildlife habitat should be evaluated.
12. The Project's effect on riparian vegetation and habitat, especially cottonwood trees along Animas River, should be evaluated.
13. Population projections and growth in the Project area, as stated in the 1980 FES, are inaccurate and should be evaluated.¹
14. The cumulative effects of the Project should be evaluated because of the effects of coal-bed methane development in the San Juan River basin since 1980.¹
15. Additional compliance with the Clean Water Act-section 404 or a section 404 permit is needed prior to construction of the Project.

Public Hearings

Public hearings will be conducted in Durango and Denver, Colorado, and Farmington, New Mexico, during the review and comment period. The

¹ Concern or issue determined by Reclamation to be outside the scope of this document.

purpose of these hearings is to receive public comments regarding the Supplement. Letters of comments will be included, considered, and responded to in the final Supplement. Notice of the hearings will be published in the *Federal Register* and in area news media at least 30 days before the hearings.

Coordination With Other Agencies

Reclamation is the lead agency for preparation of this draft Supplement to the 1980 final environmental statement (FES). Reclamation used a team of interdisciplinary resource specialists in preparation of the Supplement (see list of preparers).

In addition, other State and Federal agencies participated with the interdisciplinary team during preparation of the Supplement. They include the Fish and Wildlife Service (Service), Colorado Division of Wildlife (CDOW), and New Mexico Department of Game and Fish (NMDGF). The team met regularly and conducted numerous field trips and investigations to collect data and observe conditions relevant to the issues addressed in the Supplement.

Reclamation consulted with the Service under Section 7 of the Endangered Species Act. The Service issued a final biological opinion for the Project on October 25, 1991, and an amendment to that opinion for razorback sucker, a new species listed as endangered, after issuance of the final biological opinion. Reclamation also conferenced with the Service regarding the Mexican spotted owl, a species recently proposed for listing as threatened. Reclamation has also informally consulted with the Service concerning Project effects on Ute ladies' tresses.

Reclamation coordinated with the Service on Project effects on fish and wildlife resources in the Project area. The Service prepared a Draft Planning Aid Memorandum that superseded the 1979 Planning Aid Memorandums for the Project. The Service and Reclamation coordinated with the CDOW, NMGFD, and Southern Ute Indian Tribe during preparation of the report. Reclamation has coordinated with the Environmental Protection Agency (EPA) regarding Project effects on wetlands and with EPA and the Corps of Engineers on consideration of the EPA section 404 (b)(1) guidelines.

Reclamation has coordinated and would continue to coordinate and consult with the State Historic Preservation Officers of New Mexico and Colorado (NMSHPO and CSHPO) regarding potential Project effects on significant prehistoric or historic archeological resources. A Programmatic Memorandum of Agreement (PMOA) was executed on December 31, 1991, by and among Reclamation, NMSHPO, CSHPO, and the Advisory Council

on Historic Preservation. The PMOA sets forth the procedures Reclamation must follow in order to meet the requirements of the National Historic Preservation Act in regard to the Animas-La Plata Project.

Western Area Power Administration (Western), in a meeting with Reclamation September 16, 1986, was designated lead National Environmental Policy Act (NEPA) compliance agency for the power transmission system for the Project.

Reclamation's Response to the Draft Planning Aid Memorandum

Reclamation agrees to implement, to the extent practicable, all recommendations included in the Service's Final Draft Planning Aid Memorandum, September 15, 1992, with the exception of those listed below. As the Project has undergone refinements, so has the mitigation. In some cases, such as riverine wetlands, the dynamics of natural systems make it necessary to base current impact assessment on recently collected data. Reclamation is committed to mitigate for Project-related impacts as they are identified and enumerated through results of ongoing investigations and the studies recommended by the Service. Reclamation is continuing to coordinate with the Service, CDOW, and NMDGF to further refine mitigation measures. Reclamation would coordinate with the appropriate agencies during implementation of recommendations.

1. *Bodo Wildlife Area* - Reclamation would provide monetary replacement for the entire Bodo Wildlife Area, but the CDOW would maintain ownership of the 3,508 acres of lands within the Bodo Wildlife Area which are not needed for Project purposes.

2. *Elk Mitigation* - Reclamation would provide the initial capital costs to enhance the carrying capacity of lands acquired for this purpose. The maintenance of the existing elk habitat within the Bodo Wildlife Area without the Project is the responsibility of the CDOW and should remain so on the replacement lands. Reclamation's intent is to satisfy the recommendation for replacement of Bodo Wildlife Area and elk mitigation within the range of the existing elk herd, to the extent possible. The first priority for mitigation lands would be north of Highway 160, as recommended.

3. *Flood Plain Wetlands and Riparian Zones* - Baseline data on wetlands and riparian zones along the La Plata River, from the Dry Side Canal crossing to the confluence of the San Juan River, would be investigated and quantified using aerial photography and digitizing techniques. This data would then be used to determine Project effects on wetland and riparian habitat and determine the appropriate mitigation, if needed, including

consideration of Project operations. This analysis is under way, and results will be included in the final Supplement. All efforts would be coordinated with the Service, CDOW, and NMDGF as appropriate. Mitigation and implementation plans would be prepared based on this data as it is developed. Reclamation intends to include the completed plan in the final Supplement. Reclamation does not agree with the Service's assessment that there would be impacts to riparian vegetation along the Animas River. The Animas River is an entrenched and gaining stream. Depletions during the months of April, May, and June would average 315 cubic feet per second (ft³/s) of the average peak spring flows of 9,300 ft³/s. The results of this small depletion of the spring runoff on riparian vegetation would be negligible. Reclamation would further investigate the need and feasibility of providing modeling of the river channel.

4. *Canal Irrigation Delivery System* - As compensation for losses of cottonwood trees growing along the canals which would be lined during Phase I, Reclamation intends to enhance the riparian corridor along the La Plata River. Other mitigation would be pursued if this effort could not be successfully accomplished. Mitigation and implementation plans would be prepared and developed in conjunction with the other agencies. These plans would be included in the Supplement as they are completed.

5. *Animas River, New Mexico* - Reclamation would develop a study plan in conjunction with NMDGF and provide funding to collect baseline data on native fish for 1 year, with emphasis on the roundtail chub. Reclamation would investigate the need and feasibility of a modeling study of the Animas River. Alteration of flow may not be significant enough to detect changes in channel morphology.

6. *La Plata River* - Reclamation agrees on a one-time baseline study on the La Plata River to determine the status of the native fishery, emphasizing the roundtail chub, to determine distribution, abundance, and habitat availability and other pertinent factors to its viability. Long-term monitoring studies do not seem to be warranted at this time. Reclamation would continue appropriate monitoring on the La Plata River for potential irrigation-induced contaminants in accordance with the National Irrigation Water Quality Program and Reclamation Instructions.

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- State Department of Agriculture
- State Historical Preservation Office
- State Historical Society
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- Colorado Water Resources and Power Development
- State Engineer's Office and Division 7 Office

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- Division of Wildlife, Durango, Grand Junction, and Montrose

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- Energy, Minerals and Natural Resources Department
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Overview. The following materials may have been used in document preparation, as direct source material, or background for the Supplement; accordingly, all citations may not appear in the text.

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ABBREVIATIONS/ACRONYMS

a-f	acre-feet
1980 FES	1980 Final Environmental Statement (INT FES 80-18)
BIA	Bureau of Indian Affairs
BREAM	Bureau of Reclamation Economic Assessment Model
CDOW	Colorado Division of Wildlife
CDPOR	Colorado Division of Parks and Outdoor Recreation
Corps	United States Army Corps of Engineers
CR	County Road
CRSP	Colorado River Storage Project
CWA	Clean Water Act
District	Animas-La Plata Water Conservancy District
DOE	Department of Energy
DPR	Definite Plan Report
EPA	Environmental Protection Agency
ft ³ /s	cubic feet per second
IFIM	instream flow incremental methodology
kV	kilovolt
kW	kilowatt
kWh	kilowatthour
M&I	municipal and industrial
MAPCO	Mid-American Pipeline Company
Mgal/d	million gallons per day
mg/L	milligrams per liter
NCBP	National Contaminants Biomonitoring Program

NEPA	National Environmental Policy Act
NIIP	Navajo Indian Irrigation Project
Northwest	Northwest Pipeline Corporation
NMDGF	New Mexico Department of Game and Fish
NOI	Notice of Intent
O&M	operation and maintenance
PPM	parts per million
Project	Animas-La Plata Project
Reclamation	Bureau of Reclamation
RIMSII	Department of Commerce, Bureau of Economic Analysis, Regional Input-Output Modeling System
Service	United States Fish and Wildlife Service
Supplement	Supplement to the Final Environmental Statement
TDS	total dissolved solids
Tri-State	Tri-State Generation and Transmission Association, Inc. (formerly Colorado-Ute Electric Association)
UMTRA	Uranium Mill Tailings Remedial Action
USGS	United States Geological Survey
Western	Western Area Power Administration
µg/L	micrograms per liter

GLOSSARY

Abutment.—The part of a dam that contacts the riverbank.

Accretion.—Process of growth whereby material is added to the outside of nonliving matter.

Alkaline.—Having a pH 7.0 or above.

Alluvial.—Material transported and deposited by the action of flowing water, such as clay, silt, sand, and gravel.

Arable.—Suitable for farming.

Base flow.—Ground-water inflow to the river. Portion of stream discharge that is derived from natural storage.

Berm.—A wall of earth along a dam.

Bioassimilation.—The accumulation of a substance within a habitat.

Bioaccumulation.—The uptake and retention of nonfood substances by a living organism from its environment, resulting in a build-up of the substances in the organism.

Biological opinion.—Document which states the opinion of the U.S. Fish and Wildlife Service as to whether a Federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat.

Biomagnification.—The enhancement of a substance (usually a contaminant) in a food web such that the organisms eventually contain higher concentrations of the substance than their food sources.

Borrow.—Material excavated from one area to be used as fill material in another area.

Cofferdam.—A temporary, watertight enclosure around a construction site in a body of water. Water is removed from the cofferdam so that construction work can go on "in the dry."

Coliform.—Organisms common to the intestinal tract of humans and animals; the organisms' presence in waste water is an indicator of pollution.

Containment levee.—A dike or embankment to contain stream flow.

Depletion.—To permanently remove water from a system for a specific use.

Diversion.—A process which, having return flow and consumptive use elements, turns water from a given path.

Endangered species.—A species which is in danger of extinction throughout all or a significant portion of its range.

Environment.—All biological, chemical, and physical factors to which organisms are exposed.

Ephemeral creek.—A creek that carries water only during and immediately after rainfall or snowmelt.

Escarpment.—A cliff or steep slope that separates two level or gently sloping areas.

Eutrophic.—A body of water which has become, either naturally or by pollution, rich in nutrients and often seasonally deficient in dissolved oxygen.

Floatable days.—The number of days during the recreation season on which it is safe to allow floating activities on recreation facilities.

Floatable flows.—River flows which make rafting and other floating recreation possible.

Flowage.—Water that floods onto an adjacent land.

Flowage easement.—The right or easement to overflow, submerge, or flood certain lands; a right to prohibit building on certain floodways.

Foreshore.—The shore between the ordinary high-and low-watermarks and generally crossed by the tide each day.

Full irrigation service land.—Irrigable land now receiving, or to receive, its sole and generally adequate water supply through facilities which have been or are to be constructed by, rehabilitated by, or replaced by Reclamation.

Habitat unit.—A numerical value derived from multiplying the index of suitable habitat for a given species by the size of the area available for that species. The habitat unit is a means of communicating the gains and losses in habitat resulting from the management activities and project implementation.

Heavy metal.—A metallic element of high atomic weight (greater than 45) with a density greater than 5 grams per cubic centimeter (that is, more than 5 times the density of water).

Hydric.—Characterized by, or thriving in, an abundance of moisture.

Hydrogeochemistry.—Chemistry of ground and surface waters.

Hydrograph.—A graph showing, for a given point on a stream or conduit, the stage, velocity, flow or other property of water with respect to time.

Hydrography.—Science that deals with the physical aspects of all waters on the Earth's surface.

Hydrostatic head.—The height of a vertical column whose weight (measured by a cross-section unit) equals the hydrostatic pressure at a given point.

Hydrostatic pressure.—The pressure that water exerts in any given point in a body of water at rest.

Impervious.—Not permeable; not allowing liquid to pass through.

Inflow.—Water that flows into a body of water.

Ion.—An atom or molecule that has lost or gained one or more electrons.

Lacustrine habitat.—Lake and reservoir wetland habitat.

Limnology.—Study of freshwater lakes.

Limnological conditions.—Conditions on freshwater lakes.

Lineament.—A rectilinear topographic feature.

NPDES.—A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act (33 USC 1251 et seq.) may be required if water quality is potentially affected by such proposed actions or construction of wastewater treatment plants, or other structures.

Nutrients.—Animal, vegetable, or mineral substances which sustain individual organisms and ecosystems.

Palustrine habitat.—Marsh habitat.

Pervious.—Permeable; having openings that allow water to pass through.

pH.—Indicator of acidity.

Record of Decision.—A record of decision (ROD) is a written document which states the decision made, describes the environmental factors considered, the preferred plan, and the alternatives considered in the environmental impact statement (EIS).

Riffle and pool complex.—A water habitat composed of riffles (characterized by water flowing rapidly over a coarse substrate) and pools (deeper areas of water associated with riffles).

Riparian.—Living on or adjacent to a water supply such as a riverbank, lake, or pond.

Riprap.—Stones placed on the face of dams, stream banks, or other land surfaces to protect the surface from erosion.

Root zone.—The area where a low-angle thrust fault steepens and descends into the crust.

Rough fish.—A nonsport fish.

Salmonids.—The family of fish which includes trout, salmon, and char.

Seep.—A spot where ground water oozes slowly to the surface, usually forming a pool.

Seismotectonic.—Of, relating to, or designating structural features of the earth which are associated with or revealed by earthquakes.

Shear zone.—An area where the rock mass has moved along the plane of contact which often becomes a channel for ground water.

Siphon.—A pipe connecting two canals.

Soil cement.—A mixture of water, cement, and natural soil, usually processed in a tumble and mix to a specific consistency, then placed in lifts and rolled to compact.

Stratigraphy.—Geology that deals with the origin, composition, distribution, and succession of strata (layers of rock).

Substrate.—The base on which an organism lives; a substance acted upon.

Supplemental irrigation service land.—Irrigable land now receiving, or to receive, an additional or reregulated supply of water through facilities constructed by or to be constructed by Reclamation. This water, together with that obtained from nonproject sources, generally will constitute an adequate supply.

Swale.—A wide, shallow ditch, usually grassed or paved.

Threatened.—A legal classification for a species which is likely to become endangered within the foreseeable future.

Topography.—Physical shape of the ground surface.

Total dissolved solids (TDS).—Total amount of dissolved material, organic and inorganic, contained in water.

Toxin.—Poisonous substance, generally from a plant or animal.

Trace element.—A trace element is one that is usually only present in "trace" or barely measurable amounts. When the name was developed, analytical chemistry was in its infancy and incapable of quantifying the amount or concentration of naturally occurring elements in soil or water other than the most common ones such as calcium, magnesium, sodium, potassium, chloride, carbon, and sulfur.

Turbidity.—The scattering and absorption of light that makes the water look murky. Caused by the content and shape of matter suspended in the water.

Water Management Plan.—A plan developed during construction to help assure water quality compliance for both point and nonpoint pollution sources.

Wetlands.—Lands including swamps, marshes, bogs, and similar areas such as wet meadows, river overflows, mud flats, and natural ponds.

Jurisdictional - subject to regulation under the Clean Water Act.

Nonjurisdictional - subject to consideration under the Fish and Wildlife Coordination Act.

Wetted perimeter.—The distance along the bottom and sides of a stream, creek, or channel in contact with the water.

Wild and Scenic Rivers Act (Public Law 90-542).—The policy of this act selects certain rivers possessing remarkable scenic, recreational, geologic, fish and wildlife, historic, or other similar values, for preservation in free-flowing conditions. Those selected under recreational criteria may have undergone some diversion or impoundment in the past. Selected rivers and streams have been placed into the National Rivers Inventory by Acts of Congress; others are proposed for inclusion into the system.

Winter's Doctrine.—Holds that an implied right exists to the amount of water from streams on Indian Reservations necessary to accomplish the primary purposes of the reservations. Upheld by the U.S. Supreme Court.

ATTACHMENT 1

**DRAFT SECTION 404(b)(1) EVALUATION
OF CERTAIN FEATURES
OF THE
ANIMAS-LA PLATA PROJECT**

**Colorado and New Mexico
United States Department of the Interior
Bureau of Reclamation**

INTRODUCTION AND BACKGROUND

This evaluation has been prepared to identify and discuss potential impacts resulting from discharges of dredged or fill material into the waters of the United States as a result of construction and operation of the Animas-La Plata Project (hereafter referred to as the Project). The Bureau of Reclamation (Reclamation) is seeking an exemption, under Section 404(r) of the Clean Water Act, from the requirement to obtain either a dredge and fill permit or a State water quality certification for the Project. This evaluation has been prepared in compliance with:

1. Section 404(b)(1) of the Federal Water Pollution Control Act (or Clean Water Act, Public Law 92-500, as amended).
2. Environmental Protection Agency Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230).
3. Final Rule for Regulatory Programs of the U.S. Army Corps of Engineers (33 CFR Parts 320 through 330).
4. Section 404(r) of the Clean Water Act (Public Law 92-500 as amended).

Reclamation previously prepared a 404(b)(1) evaluation and obtained a Section 404(r) exemption for three Project features. The previous 404(b)(1) analysis was attached to the Project's 1980 Final Environmental Statement (INT FES 80-18), hereafter referred to as the 1980 FES, filed with the Environmental Protection Agency on July 1, 1980. The three features described in the 1980 FES 404(b)(1) evaluation were the: (1) Durango Pumping Plant intake structure in the Animas River; (2) La Plata Diversion Dam in the La Plata River and; (3) Southern Ute Diversion Dam in the La Plata River. This evaluation covers the remaining features and does not address the three features covered in the 1980 FES. Reclamation submitted the 1980 FES and 404(b)(1) analysis features to Congress on September 26, 1980.

This evaluation has been prepared to provide specific information regarding Project construction activities by Reclamation which may result in discharges of dredged or fill material into the waters of the United States. The intent of this analysis is to provide additional information to assist Congress in making a compliance determination according to Section 404(r) and the Section 404(b)(1) Guidelines.

ENVIRONMENTAL AND PUBLIC INTEREST FACTORS CONSIDERED

A. PURPOSE AND NEED FOR THE PROJECT

The purpose of the Project is to commit to beneficial uses part of the stream flows allocated to Colorado and New Mexico by the Colorado River Compact of 1922 and the Upper Colorado River Basin Compact of 1948. The Project would use flows of the Animas and La Plata Rivers for agricultural irrigation, municipal, and industrial uses. In addition to providing water for those purposes, the Project satisfies Colorado Ute

Indian water rights claims as specified by the Colorado Ute Indian Final Settlement Agreement of 1986 and the Colorado Ute Indian Water Rights Settlement Act of 1988 (Public Law 100-585).

B. ALTERNATIVES TO THE PROJECT

Alternatives to the proposed Project were evaluated in the 1980 FES (chapter H). Since 1980, no new Project alternatives have been formulated or evaluated by Reclamation. Alternatives to the Project described in the 1980 FES were:

No Action - This alternative was the "without project development" plan (pages H-1 to 4 of the 1980 FES). This alternative described reasonably foreseeable actions that would be taken by Indian and non-Indian water users to individually develop agricultural, municipal, and industrial water uses.

Other Project Designs - Three other alternatives, that accomplished all purposes of the proposed plan, were described and evaluated in the 1980 FES:

Plan at Authorization - This plan (pages H-5 to 10 of the 1980 FES) would utilize a reservoir near Silverton, Colorado, for primary storage of Project water and a 48-mile-long system of canals, tunnels, and siphons to convey Animas River water to the La Plata River drainage. This plan would have significant environmental impacts because the Animas River would be seriously depleted at the point of diversion; serious environmental problems would be associated with the primary reservoir and conveyance system; and an excessive amount of salinity would be contributed to the Colorado River from some of the Project lands to be irrigated.

Teft Diversion Plan - This plan (pages H-10 to 14 of the 1980 FES) would divert water at the same location as described in the Plan at Authorization, but Howardsville Reservoir and the land that contributed excessive salinity were removed from consideration. This plan would have significant environmental impacts associated with depleting the Animas River north of Durango, Colorado.

Bondad Diversion Plan - This plan (pages H-14 to 17 of the 1980 FES) would involve construction of a dam and reservoir on the Animas River for flood control and a municipal and industrial water supply for the New Mexico communities. It would be located on the Animas River near the Colorado-New Mexico State line. Water for irrigation would be pumped from the reservoir to the La Plata River drainage. The most significant impacts of this plan would be inundation and elimination of 10 miles of river habitat, relocation of people living in the reservoir basin, and the energy required for pumping water from the reservoir to the La Plata River drainage.

C. PROPOSED DISCHARGES TO THE WATERS OF THE UNITED STATES AND ALTERNATIVES TO AVOID OR MINIMIZE THE DISCHARGES

The Project is described in detail in the 1979 Animas-La Plata Project Definite Plan Report, the 1980 FES, and chapter II of the draft supplement to the 1980 FES (hereafter referred to as the Supplement). Alternatives to the proposed discharges of dredged or fill material are described in this section of the evaluation. The proposed Project-related construction activities that may result in discharges of dredged or fill material into the waters of the United States include:

1. CONSTRUCTION OF RIDGES BASIN DAM AND RESERVOIR ON BASIN CREEK, A TRIBUTARY OF THE ANIMAS RIVER IN COLORADO (Figure 6 of Supplement)

Excavation of outlet works tunnel, inlet channel, and structures - The total excavation quantities would be approximately 7,500 cubic yards (ft³) of tunnel excavation; 12,000 yd³ of open rock excavation, and 230,000 yd³ of common excavation (200,000 yd³ in the inlet channel). This excavated material would not be used for construction of the dam embankment. Material would be placed in a designated waste area within the reservoir basin and below the active water surface of the reservoir. Some of this material could be used in the construction of the temporary Basin Creek diversion dams described below.

Basin Creek diversion dams - Several temporary diversion dams would be constructed at the dam site and upstream of the dam foundation to divert Basin Creek, its tributaries, and storm runoff around the work areas. The diversion dams would be constructed from materials close to its alignment, however, waste excavation material could be used. Riprap may be placed into the channel in critical areas for temporary creek channel protection.

Construction access crossings of Basin Creek - Access across Basin Creek at the site of Ridges Basin Dam would be needed to transport borrow material from both upstream and downstream of the dam. These crossings would likely consist of a large culvert and fill material (estimated 50 ft³) placed in the creek to pass flows and permit access to work activities, such as placement of dam embankment material.

Foundation excavation - Approximately 2,000,000 ft³ of material would be excavated from the dam foundation. Of this volume: 800,000 ft³ would be used in the dam embankment; 600,000 yd³ would be wasted in the reservoir basin; and 600,000 ft³ would be placed in the reservoir basin for potential reuse. Dewatering would be required during some phases of the foundation excavation process. The dewatering could involve pumping and/or cutting drainage trenches in the foundation area.

Dam embankment - Approximately 9,500,000 ft³ of material would be placed in Ridges Basin Dam. Of this volume: 5,500,000 ft³ would be excavated within the reservoir basin (borrow area A) and the balance would come from borrow area B. Some dewatering (drainage trenches) and rerouting of Basin Creek would be required during the borrow area A excavation. The diversion dam would be in place when most

of the dam embankment material is placed. Aggregate processing in borrow area B would require construction of settling ponds and stockpile areas. A water holding pond may also be required in this area.

Alternatives to Ridges Basin Dam:

The purpose of Ridges Basin Dam is to store water during high stream flow and release water for use when stream flows cannot provide sufficient capacity for Project purposes. The Project water from Ridges Basin Dam would be used for: (1) irrigation of Indian and non-Indian lands in Colorado and New Mexico; (2) municipal and industrial (M&I) use by the Ute Tribes, the city of Durango, Colorado, and water users in New Mexico (cities of Farmington, Bloomfield, and Aztec). The alternatives to Ridges Basin Dam studied in the 1980 FES included construction of dams at different locations (both on-stream and off-stream) from the Ridges Basin site and different methods of construction.

- A. On-Stream Dam Sites** - An on-stream dam is located directly on its major water source. For the purposes of this analysis, this means placement of a dam across the Animas River. Two on-stream alternative dam sites to Ridges Basin Dam were described in the 1980 FES: (1) the proposed Howardsville Dam site and (2) the Bondad Dam site. The Howardsville Dam, a feature of the Project Plan at Authorization, would be located on the Animas River upstream from Silverton, Colorado. It was not included in the Teft Diversion Project Plan because of potential water quality problems that could develop in the reservoir and in the Animas River downstream from the dam site. In addition, significant water depletions would occur in the Animas River downstream from the dam site. The Bondad Dam, located on the Animas River about 20 miles downstream from Durango, Colorado, was a feature of the Bondad Diversion Project Plan. This dam site would result in a loss of 10 miles of riverine aquatic ecosystem, a major relocation of people, and high energy costs to pump water to the La Plata River drainage for project purposes. The reservoirs created by these dams would inundate significant aquatic and terrestrial ecosystems.
- B. Off-Stream Dam Sites** - An off-stream dam is located on a minor drainage where the major source of water must be imported. There is generally less adverse effect on the environment from off-stream dams than from on-stream dams. For purposes of this analysis, this means placement of fill material for a dam across tributaries of the Animas and La Plata Rivers. Two off-stream alternative dam sites to Ridges Basin Dam were described in the 1980 FES: (1) a smaller Ridges Basin Dam and Reservoir and (2) Hay Gulch Dam. Both dams would obtain their water supply by diverting flows from the Animas River. The tributary drainages where these two dams would be placed have an average annual flow of less than 5 cubic feet per second (ft³/s) and do not support significant aquatic ecosystems. The smaller Ridges Basin Reservoir would be about 1/10 the size of the present proposed reservoir and would impact less upland habitat. The smaller Ridges Basin Reservoir would

effect as many acres of wetland/riparian habitat as the dam in the present plan. The proposed Hay Gulch Dam site is located about 23.5 miles west of Durango, Colorado, on Hay Gulch, a tributary of the La Plata River. Its reservoir would have a capacity of 53,000 acre-feet.

- C. ***Design and Construction Method Alternatives*** - The present design for Ridges Basin Dam is a rolled, earth-filled structure using borrow material from the proposed borrow areas A (upstream from dam site) and B (downstream from dam site). Other designs and construction methods for the dam have been considered. They include: (1) construction of a rock-filled dam on the dam axis described in the 1980 FES; (2) a roller-compacted concrete dam on the 1980 FES dam axis; (3) an earth-filled dam on the present dam axis using only borrow material from borrow area B; (4) an earth-filled dam on the present dam axis using only borrow material from borrow area A and; (5) an earth-filled dam on the present dam axis using borrow material from both borrow areas A and B (same as the present plan).

Except for the type and volumes of borrow materials needed to construct the dam, the environmental impacts of all five dam construction alternatives are similar. For all structure types and construction methods, the stream and other surface flows must be diverted around all work areas, ground water in excavations must be controlled, areas must be cleared of vegetation, roads must be built for access, and fill and other materials/supplies must be obtained and disposed of.

POTENTIAL IMPACTS OF RIDGES BASIN DAM AND RESERVOIR

1. PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. ***Substrate*** - The substrate of the aquatic ecosystem underlies open waters of the United States and constitutes the surface of wetlands. It consists of organic and inorganic solid materials and includes water and other liquids or gases that fill the spaces between solid particles. The proposed discharge activities would have an adverse effect on the physical/chemical substrate characteristics of Basin Creek after construction of the dam and reservoir is complete. The substrate of Basin Creek would be substantially altered because of removal of material and channel changes necessary to construct Ridges Basin Dam. Further, about 3.3 miles of Basin Creek would be inundated when Ridges Basin Reservoir is filled.

The on-stream dam sites would both have a significantly greater impact on the substrate of the Animas River. The off-stream dam sites and the

smaller Ridges Basin Dam would have less effect on the substrate of Basin Creek, and Hay Gulch Reservoir would have similar impacts as the smaller Ridges Basin Reservoir. However, Hay Gulch reservoir was eliminated from further consideration because of increased cost and associated significant adverse impacts. The design and construction method alternatives would have similar impacts to the proposed discharge.

- B. *Suspended Particulate/Turbidity*** - Levels of suspended particulates would be increased during construction activities at the locations of the proposed discharge activities due to dewatering activities and installation of temporary diversion works. However, these impacts would be temporary, localized, and minor. Activities that may increase levels of suspended particulates would be subject to Federal, State, and local water quality standards and subject to NPDES permit conditions and standards.

The on-stream dam sites, off-stream dam sites, and design and construction method alternatives would have similar effects to the proposed discharge.

- C. *Water*** - The proposed discharge activities would result in temporary, short-term, and localized adverse impacts to water quality at the sites of the proposed discharge activities. Best management practices and scheduling of construction would be implemented to minimize adverse water quality impacts. Long-term, indirect or secondary impacts on water quality are addressed in the 1980 FES (page C-25) and chapter III of the Supplement. The cumulative impacts on water quality are presented in the 1980 FES (page C-66) and chapter III of the Supplement.

The Howardsville dam site would have a significantly greater impact on water quality because it would be located closer to potential sources of water contamination arising in the Animas River drainage near Silverton, Colorado. The Bondad, off-stream dam sites, and the design and construction method alternatives would have similar impacts to the proposed discharge.

- D. *Current Patterns and Water Circulation*** - The proposed discharge activities at Ridges Basin Dam and Reservoir would alter existing currents, circulation or drainage patterns in Basin Creek upstream and downstream from the structures. The reservoir would replace some existing stream patterns with open water circulation patterns.

The on-stream dam sites would significantly alter the water circulation in the Animas River downstream from both dams. The off-stream dam sites and design and construction method alternatives would have similar effects on current patterns and water circulation as the proposed discharge.

- E. Normal Water Fluctuations** - The proposed discharge would alter seasonal normal water fluctuations in Basin Creek downstream from the dam. The on-stream dam sites would significantly alter normal water

fluctuations in the Animas and San Juan Rivers. The off-stream and design and construction method alternatives would have similar effects to the proposed discharge.

- F. Salinity Gradients** - The proposed discharge and alternatives to it would not have an impact on salinity gradients.

2. BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. Threatened and Endangered Species** - The effects of the proposed discharge activities on endangered or threatened species are identified and addressed in the October 25, 1991, final biological opinion for the Animas-La Plata Project and chapter III of the Supplement.

The Bondad Dam site would eliminate 10 miles of stream that provides habitat for roosting, feeding, and nesting for bald eagles in addition to effects on endangered fish in the San Juan River. The Howardsville Dam site, off-stream dam sites, and design and construction method alternatives would have similar effects to the proposed discharge on threatened and endangered species.

- B. Fish, Crustaceans, Mollusks, and Other Aquatic Organisms** - The proposed discharge activities would have temporary, localized, minor adverse impacts at the sites during placement of fill material as described in Chapter C of the 1980 FES and Chapter 3 of the Supplement. There would be temporary increases in turbidity caused by disturbance of the physical substrate during actual placement of discharged material. Measures would be implemented to time construction activity to coincide with periods of low flow and measures to capture sediment would be employed. Within the proposed reservoir, stream populations of fish and aquatic organisms would be lost and replaced by populations of fish and other aquatic organisms that can survive in large bodies of open water.

The Bondad dam site would result in the loss of 10 miles of riverine aquatic ecosystem in the Animas River and its associated fishery. The Howardsville dam site would result in the loss of a stream fishery. The Hay Gulch off-stream dam site would result in a significant loss of the Animas River fishery downstream from the Teft diversion dam. The design and construction method alternatives would have similar impacts to the proposed discharge.

- C. Other Wildlife** - The effects of the proposed discharge activities on wildlife habitat, principally elk habitat, are described in the 1980 FES (chapter C) and chapter III of the Supplement. Mitigation measures for wildlife impacts are described in chapter IV of the Supplement.

The on-stream dam sites and Hay Gulch dam site would have significantly less adverse effect on elk habitat in Ridges Basin because they avoid it. The smaller Ridges Basin Reservoir would impact less elk habitat than the proposed discharge. The design and construction method alternatives would have similar impacts to the proposed discharge.

3. SPECIAL AQUATIC SITES

- A. **Sanctuaries and Refuges** - Sanctuaries and refuges consist of areas designated under State and Federal laws or local ordinances to be managed principally for the preservation and use of fish and wildlife resources. The Colorado Division of Wildlife-owned Bodo Wildlife Area in and adjacent to Ridges Basin and Basin Creek would be eliminated by the proposed discharge activities.

The on-stream dam sites, off-stream dam sites, and the design and construction method alternatives would not impact or loss of values to this special aquatic site.

- B. **Wetlands** - Wetlands consist of areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The discussion of the Project's effect on wetlands is found in the 1980 FES (page C-37 and 38) and in chapter III of the Supplement. The proposed discharge activities would destroy wetland habitat and adversely affect the productivity and value of wetlands due to inundation, removal, or altering physical substrates as a result of construction activity. The proposed discharge activities would result in a loss of up to 28 acres of wetlands associated with the waters of the United States. Reclamation will implement specific mitigation measures to minimize adverse effects on wetlands from the proposed discharge activities. Those measures will include: (1) locations of the proposed discharge activities would be in areas to avoid wetlands to the extent practicable; (2) Reclamation would fully mitigate the wetland lost due to the proposed discharge activities; (3) the type and amount of mitigation for wetlands losses would be agreed to by Reclamation, the Corps of Engineers, the Fish and Wildlife Service, and the EPA; (4) the overall goal of wetland mitigation would be to replace in-basin the wetland functions and values lost—potential in-basin wetland mitigation sites have been identified and are shown in chapter III of the Supplement.

The Howardsville dam site would result in a losses of wetlands associated with the waters of the United States similar to the proposed discharge. The Bondad dam site would result in a greater loss of wetlands than the proposed discharge, principally wetlands adjacent to the Animas River, because they would be inundated by the reservoir.

The off-stream dam sites and design and construction method alternatives would have similar impacts to the proposed discharge.

- C. **Mud Flats** - Mud flats are broad flat areas along the sea coast and in coastal rivers to the head of tidal influence and in inland lakes, ponds, and riverine systems. The substrate of mud flats contains organic material and particles smaller in size than sand. They are either unvegetated or vegetated only by algal mats. No mud flats have been identified in the inundated areas of Ridges Basin Dam and Reservoir or the on-stream and off-stream dam sites. There would be no impact or loss of values to this special aquatic site from the proposed discharge activities.
- D. **Vegetated Shallows** - Vegetated shallows are permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as turtle grass and eelgrass in estuarine or marine systems as well as a number of freshwater species in rivers and lakes. No vegetated shallows have been identified in the areas affected by the proposed discharge activities or the alternatives. There would be no impact or loss of values to this special aquatic site.
- E. **Coral Reefs** - Coral reefs consist of the skeletal deposit, usually of calcareous or siliceous materials, produced by the vital activities of anthozoan polyps or other invertebrate organisms present in growing portions of the reef. No coral reefs exist in the area. There would be no impact or loss of values to this special aquatic site from the proposed discharge activities or the alternatives.
- F. **Riffle and Pool Complexes** - Riffle and pool complexes are characteristic of steep gradient sections of a river or stream. Riffles are characterized by the rapid movement of water over a coarse substrate resulting in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas of water associated with riffles. They are characterized by a slower stream velocity, a streaming flow, a smooth surface, and a finer substrate. Riffle and pool complexes are particularly valuable habitat for fish and wildlife.

The proposed discharge activities could affect riffle and pool complexes in the Animas, La Plata, and Mancos Rivers. The direct impacts of proposed discharge activities would be temporary, short-term reductions in streamflows during actual placement of fill material. These short-term impacts can be minimized by timing the discharge activities to coincide with periods of naturally occurring low stream flows.

The indirect or cumulative effects of the proposed discharge activities on riffle and pool complexes are related to operation of the entire Project, which the proposed discharge activities will facilitate. Those effects are primarily reducing the flows of the Animas River due to diversions of water from the river and increasing flows in the La Plata and Mancos Rivers due to augmentation of flows and/or irrigation return flows.

The Project's effect on the Animas River, including riffle and pool complexes, was evaluated in the 1980 FES (p. C-34 and 35) and Appendix F-Fish and Wildlife Resources of the 1979 DPR. At that time, certain minimum streamflow criteria were established for flow recommendations for the river. The criteria used were wetted perimeter, velocity, and average minimum depth. All these criteria were based on information gathered from a standard U.S. Geologic Survey midpoint cross-sectional method at selected "critical" riffle areas in the river. "Critical" riffle areas are where most of the physical and biological limiting factors apply to salmonid species in a stream. For the Animas River, all of the criteria are met with the proposed 125 ft³/s minimum flow, with the exception of average minimum depth. In the Animas River, the average depth would be reduced from 0.80 foot to 0.72 foot, a decrease of 0.08 foot (1980 FES, p.C-35) (Reclamation 1979). However, the minimum percentage wetted perimeter and the average velocity requirements would be met at the reduced flow in the Animas River with the Project in operation.

Reclamation predicts an estimated loss of 68 acres of wetted perimeter between the Durango Pumping Plant and the San Juan River confluence (Reclamation, 1979). The reduction in wetted perimeter would limit the amount of available area for aquatic plant growth and invertebrate production. However, neither of these parameters is limited in the Animas River. Reclamation predicts that a slight reduction in their numbers should not have a significant effect on other aquatic life.

The flows in the La Plata River between the La Plata and Southern Ute Diversion Dams would be significantly increased due to operation of the Project. The average annual increase would be 40 ft³/s, or 120 percent, over existing flows (Reclamation 1979). The flows in the Mancos River, downstream from the confluence with Lewis Creek, would be increased 6 to 10 ft³/s, or 30 percent, over existing flows (Reclamation, 1979). Reclamation predicts that these flow increases would enhance riffle and pool habitat in the effected reaches of the La Plata and Mancos Rivers.

The on-stream dam sites, off-stream dam sites, and design and construction method alternatives would have impacts similar to the proposed discharge.

4. HUMAN USE CHARACTERISTICS

- A. *Municipal and Private Water Supplies* - Municipal and private water supplies consist of surface water or ground water which is directed to the intake of a municipal or private water supply system. A description of the potential effects of Ridges Basin Dam and Reservoir on municipal water supplies is given in chapter II of the Supplement. There will be no loss of values to municipal and private water supplies. Project features would enhance the values of the water supplies which are affected by providing supplemental municipal water to the town of

Durango, Colorado. The outfall from the city of Durango sewage treatment plant would be relocated to a point downstream from the intake of the Durango Pumping Plant. There would be no loss of values to municipal and private water supplies due to the proposed discharge activities.

The on-stream dam sites, off-stream dam sites, and design and construction method alternatives would have impacts similar to the proposed discharge.

- B. *Recreational and Commercial Fisheries*** - No recreational or commercial fishery exists in Basin Creek. The proposed discharge activities would indirectly affect the recreational fishery of the Animas River. However, the adverse impacts of the Project on the Animas River fishery has been addressed in chapter III of the Supplement, and implementation of the mitigation measures described in chapter IV of the Supplement would minimize impacts on the recreational fishery of the Animas River.

The on-stream dam sites would have direct adverse impacts on the Animas River recreational fishery. Those impacts would be greater than the proposed discharge. The off-stream dam sites and design and construction method alternatives would have similar impacts to the proposed discharge.

- C. *Water-Related Recreation*** - Water-related recreation encompasses activities undertaken for amusement and relaxation. Activities encompass two broad categories of use: consumptive, e.g., harvesting resources by hunting and fishing; and nonconsumptive, e.g., rafting and sightseeing. A description of the potential indirect effects of Ridges Basin Dam and Reservoir on water-related recreation (rafting and water-related sports) in the Animas River is described in the 1980 FES and chapter III of the Supplement. The reservoir would create up to 290,000 recreation days of reservoir-related recreation activities.

The Bondad dam site would result in less impact on commercial and private rafting on the Animas River because its reservoir would be located downstream from the area of high rafting use on the Animas River. The off-stream dam sites and design and construction method alternatives would have similar impacts to the proposed discharge.

- D. *Aesthetics*** - Aesthetics associated with aquatic ecosystems consist of the perception of beauty by one or a combination of the senses of sight, hearing, touch, and smell. Aesthetics of aquatic ecosystems apply to the quality of life enjoyed by the general public and property owners. The potential effects of Ridges Basin Dam and Reservoir on aesthetics was described in the 1980 FES. There will be no loss of aesthetic values due to the proposed discharge activities.

The Howardsville dam site would result in a significant visual impact because of its disturbed appearance in a relatively semiprimitive

undeveloped, mountainous setting. The Bondad dam site, off-stream dam sites, and design and construction method alternatives would have similar impacts to the proposed discharge.

- E. *Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves*** - These preserves consist of areas designated under Federal and State laws or local ordinances to be managed for their aesthetic, educational, historical, recreational, or scientific value. The proposed discharge activities will not directly impact any such preserves. There are archeological sites listed, or eligible to be listed, on the National Register of Historic Places under the National Historic Preservation Act (16 USC Section 469) in Ridges Basin. The effects of the proposed discharge on these sites are described in the 1980 FES and chapter III of the Supplement. There would be an adverse effect on archeological sites due to the proposed discharge. Mitigation measures will be implemented to minimize the adverse effects of construction of the Project on these sites. Those actions are described in chapter IV of the Supplement.

The Howardsville dam site would inundate the old mining townsite of Howardsville which is eligible to be listed on the National Register of Historic Places. The Bondad dam site, off-stream dam sites, and design and construction method alternatives would have similar impacts to the proposed discharge.

CONSTRUCTION OF SOUTHERN UTE DAM AND RESERVOIR ON CINDER GULCH/MCDERMOTT ARROYO, TRIBUTARY TO THE LA PLATA RIVER IN COLORADO AND NEW MEXICO (Figure 6 of Supplement)

Foundation excavation - Approximately 150,000 ft³ of foundation excavation would be required.

Embankment placement - Approximately 2,700,000 ft³ of material would be placed in the dam embankment. Most of this material would come from a borrow area within the reservoir basin, and the balance of the material (pervious) would come from a borrow area north of the dam site. It is anticipated that a borrow area within the La Plata River flood plain would not be required.

Diversion Dams - As needed, diversion dams (20 ft³ each) would be placed into affected streams to divert flows around work areas.

Alternatives to Southern Ute Dam:

The purpose of Southern Ute Dam would be to store water during high stream flow and release water for use when stream flows cannot provide sufficient capacity for Project purposes. The Project water would be used for irrigation of non-Indian lands

in New Mexico and M&I use by the Southern Ute Indian Tribe. The alternatives to Southern Ute Dam described in the 1980 FES included construction of dams at different locations from the present Southern Ute Dam site.

- A. **Off-Stream Dam Sites** - All dam sites evaluated in the 1980 FES were off-stream dams (see section A.2.B. for definition of off-stream dams). The present, Teft, and Bondad Diversion Project Plans all included identical designs for a Southern Ute Dam. However, the project plan at authorization included: (1) Three Buttes dam and reservoir (one-half the size but at the same site as present Southern Ute Reservoir) and Ute Meadows dam and reservoir (one-quarter the size of Southern Ute Reservoir but located about 20 miles northwest of Farmington, New Mexico. The purpose of these two dams would be to provide irrigation water to land in New Mexico. In addition, Three Buttes reservoir would provide the Southern Ute Indian Tribe's industrial water.

- B. **Design and Construction Method Alternatives** - The present design for Southern Ute Dam is a rolled, earth-filled structure using borrow material from below the maximum water elevation in the reservoir and nearby La Plata River terrace deposits. No other designs or construction methods for the dam have been considered.

POTENTIAL IMPACTS OF SOUTHERN UTE DAM AND RESERVOIR

1. PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. **Substrate** - The substrate of the aquatic ecosystem underlies open waters of the United States and constitutes the surface of wetlands. It consists of organic and inorganic solid materials and includes water and other liquids or gases that fill the spaces between solid particles. The proposed discharge activities would have an adverse effect on the physical/chemical substrate characteristics of Cinder Gulch/McDermott Arroyo, a tributary of the La Plata River, after construction of the dam and reservoir is complete. The substrate of Cinder Gulch would be substantially altered because of removal of material and channel changes necessary to construct Southern Ute Dam. About 1.7 miles of Cinder Gulch would be inundated when Southern Ute Reservoir is filled. The construction of Southern Ute Dam would permanently cover the substrate and benthos populations below the structure. The off-stream dam sites would have similar impacts to the proposed discharge although they would occur at a different location.

- B. **Suspended Particulate/Turbidity** - Levels of suspended particulates would be increased during construction activities at the locations of the proposed discharge activities due to dewatering activities and installation of temporary diversion works. However, these impacts would be temporary, localized, and minor. Activities that may increase

levels of suspended particulates would be subject to Federal, State, and local water quality standards and subject to NPDES permit conditions and standards. The other off-stream dam sites would have similar impacts to the proposed discharge.

- C. ***Water (temperature, salinity patterns, and other parameters)*** - The proposed discharge activities would result in temporary, short-term, and localized adverse impacts to water quality at the sites of the proposed discharge activities. Best management practices and scheduling of construction would be implemented to minimize adverse water quality impacts. Long-term, indirect or secondary impacts on water quality are addressed in the 1980 FES (page C-25) and chapter III of the Supplement. The cumulative impacts on water quality are discussed in the 1980 FES (page C-66) and chapter III of the Supplement. The other off-stream dam sites would have similar impacts to the proposed discharge.
- D. ***Current Patterns and Water Circulation*** - The proposed discharge activities at Southern Ute Dam and Reservoir would alter existing currents, circulation, or drainage patterns upstream and downstream from the structures. The reservoir would replace some existing stream patterns with open water circulation patterns. The alternatives would have similar impacts to the proposed discharge.
- E. ***Normal Water Fluctuations*** - The proposed discharge and off-stream dam sites would affect normal water fluctuations in the La Plata River. Operation of the dam and reservoir would affect normal water fluctuations in the La Plata River in the future as described in the 1980 FES.
- F. ***Salinity Gradients*** - The proposed discharge and off-stream dam sites would not have an impact on salinity gradients.

2. BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. ***Threatened and Endangered Species*** - The effects of the proposed discharge activities on endangered or threatened species are identified and addressed in the October 25, 1991, final biological opinion for the Animas-La Plata Project and chapter III of the Supplement. The off-stream dam sites would have similar impacts to the proposed discharge.
- B. ***Fish, Crustaceans, Mollusks, and Other Aquatic Organisms*** - The proposed discharge activities would have temporary, localized, minor adverse impacts at the sites during placement of fill material as described in chapter C of the 1980 FES. There would be temporary increases in turbidity caused by disturbance of the physical substrate during actual placement of discharged material. Measures would be implemented to time construction activity to coincide with periods of low flow and measures to capture sediment would be employed. No stream

populations of fish and aquatic organisms would be directly impacted by Southern Ute Dam and Reservoir. The other off-stream dam sites would have similar impacts to the proposed discharge.

- C. *Other Wildlife* - The effects of the proposed discharge activities on wildlife habitat are described in the 1980 FES (chapter C). Appropriate mitigation measures are described in chapter IV of the Supplement. The other off-stream dam sites would have similar impacts to the proposed discharge.

3. SPECIAL AQUATIC SITES

- A. *Sanctuaries and Refuges* - No sanctuaries or refuges have been designated in the areas affected by the proposed discharge activities and the off-stream dam sites. There will be no impact or loss of values to this special aquatic site.
- B. *Wetlands* - The discussion of the Project's effect on wetlands is found in the 1980 FES (page C-37 and 38) and in chapter III of the Supplement. The proposed discharge activities would not destroy wetland habitat. The other off-stream dam sites would have similar impacts to the proposed discharge.
- C. *Mud Flats* - No mud flats have been identified in the inundated areas of Southern Ute Reservoir. There would be no impact or loss of values to this special aquatic site from the proposed discharge or off-stream dam sites.
- D. *Vegetated Shallows* - No vegetated shallows have been identified in the areas affected by the proposed discharge activities or off-stream dam sites. Therefore, there will be no impact or loss of values to this special aquatic site.
- E. *Coral Reefs* - No coral reefs exist in the inundated area of Southern Ute Reservoir. Therefore, there will be no impact or loss of values to this special aquatic site from the proposed discharge or off-stream dam sites.
- F. *Riffle and Pool Complexes* - The proposed discharge activities could indirectly affect riffle and pool complexes in the La Plata River. The indirect or cumulative effects of the proposed discharge activities on riffle and pool complexes are related to operation of the entire Project, which the proposed discharge activities will facilitate. Those indirect effects would be reducing the flows of the La Plata River due to diversions of water from the river to the reservoir. However, flows in the La Plata River between the La Plata and Southern Ute Diversion Dams would be significantly increased due to operation of the Project. The average annual increase would be 40 ft³/s, or 120 percent, over existing flows (Reclamation, 1979). The flows in the Mancos River, downstream from the confluence with Lewis Creek, would be increased 6

to 10 ft³/s, or 30 percent, over existing flows (Reclamation, 1979). Reclamation predicts that these flow increases would enhance riffle and pool habitat in the effected reaches of the La Plata and Mancos Rivers. The other off-stream dam sites would have similar impacts to the proposed discharge.

4. HUMAN USE CHARACTERISTICS

- A. ***Municipal and Private Water Supplies*** - Municipal and private water supplies consist of surface water or ground water which is directed to the intake of a municipal or private water supply system. There would be no loss of values to municipal and private water supplies due to the proposed discharge or off-stream dam sites. Project features would enhance the values of the water supplies which are affected by providing municipal water. There is no delivery of M&I water from Southern Ute Reservoir.
- B. ***Recreational and Commercial Fisheries*** - The proposed discharge activities or the other off-stream dam sites would not adversely effect any recreational or commercial fisheries. A recreational fishery would be created by the reservoir.
- C. ***Water-Related Recreation*** - The potential beneficial effects of Southern Ute Dam and Reservoir on water-related recreation was described in the 1980 FES. Up to 97,500 recreation days of water-related recreation would be created by the reservoir. The impact of the other off-stream dam sites would be similar to the proposed discharge.
- D. ***Aesthetics*** - The potential effects of Southern Ute Dam and Reservoir on aesthetics was described in the 1980 FES. This evaluation shows that there will be no loss of aesthetic values due to the proposed discharge or the off-stream dam sites.
- E. ***Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves*** - The proposed discharge activity or the off-stream dam sites would not impact any such preserves. There are archeological sites listed, or eligible to be listed, on the National Register of Historic Places under the National Historic Preservation Act (16 USC Section 469) in the area of the reservoir. The effects of the Project on these sites was described in the 1980 FES. There would be an adverse effect on archeological sites due to the Project. Mitigation measures will be implemented to minimize the adverse effects of construction of the Project on these sites. Those actions are described in chapter IV of the Supplement.

CONSTRUCTION AND INSTALLATION OF THE CITY OF DURANGO MUNICIPAL AND INDUSTRIAL WATER PIPELINE CROSSING OF THE ANIMAS RIVER
(Figure 6 of Supplement)

An 11-inch diameter pipeline would cross the Animas River just downstream of the Durango Pumping Plant intake structure. The crossing of the river would be approximately 200 feet long. About 100 ft³ of fill may be required to construct a cofferdam and for use as pipe-bedding material for installation of the pipeline.

Alternatives to the proposed discharge:

The proposed pipeline could be placed in an overhead or aerial crossing over the river, thus avoiding any discharge of fill material. This could include a separate overhead crossing facility or attaching the proposed pipeline to the nearby existing Highway 160-550 bridge.

Additional site-specific analysis of the proposed discharge would be conducted. If information becomes available as the result of future investigations and design activities that indicates a practicable alternative exists to the proposed discharge, Reclamation would evaluate the feasibility of that alternative in accordance with the 404(b)(1) guidelines. Reclamation would implement that alternative to the proposed discharge if it is determined to be the least damaging practicable alternative that does not have other significant adverse environmental effects.

POTENTIAL IMPACTS OF DURANGO M&I PIPELINE

1. PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. Substrate** - The proposed discharge activity would have a temporary adverse effect on the physical/chemical substrate characteristics of the Animas River. The substrate of the Animas River at the crossing point would be substantially altered during construction of the pipeline because of removal of material. This would be a temporary change since the excavated material will be replaced once the pipeline is laid. It is expected that the physical and chemical substrate would return to its original condition in a short period of time, because the crossing would be designed to minimize the area of disturbance and aid restoration of disturbed areas to as close to their preproject condition as possible.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects on the substrate would occur.

- B. Suspended Particulate/Turbidity** - Levels of suspended particulates would be increased during construction activities at the location of the proposed pipeline crossing of the Animas River by the city of Durango M&I

pipeline, due to dewatering activities and installation of temporary diversion works. However, these impacts would be temporary, localized, and minor. If this activity increases the level of suspended particulates, it would be subject to Federal, State, and local water quality standards and subject to NPDES permit conditions and standards.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango

M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects due to suspended particulates/turbidity would occur.

- D. *Water*** - The proposed discharge activity would result in temporary, short-term, and localized adverse impacts to water quality at the site of the pipeline crossing. Best management practices and scheduling of construction during low flow would be implemented to minimize adverse water quality impacts. There would be no long-term impacts to water quality as a result of placing the city of Durango M&I pipeline in the riverbed.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects due to water quality would occur.

- E. *Current Patterns and Water Circulation*** - The proposed discharge activities associated with the placing of the city of Durango M&I pipeline across the Animas River would temporarily alter existing currents and water circulation at the site of the crossing. These changes would result from placing temporary cofferdams in the river to facilitate excavation of the pipeline trench. These changes would be temporary, and the patterns and circulation would return to preproject conditions when construction is completed and the cofferdams removed.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects due to current patterns and water circulation would occur.

- F. *Normal Water Fluctuations*** - The proposed discharge activity and the alternatives to this activity would affect normal water fluctuations.

- G. *Salinity Gradients*** - The proposed discharge activity and the alternatives to this activity would not have an impact on salinity gradients.

2. BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. *Threatened and Endangered Species* - There would be no impacts on threatened and endangered species by the proposed discharge or the alternatives to the discharge.
- B. *Fish, Crustaceans, Mollusks, and Other Aquatic Organisms* - The proposed discharge would be temporary and localized, and have minor adverse impacts on habitat for fish and other aquatic organisms at the site during excavation and placement of fill material during construction. There would be temporary increases in turbidity caused by disturbance of the physical substrate during actual excavation and placement of the substrate material. Measures would be implemented to time construction activity to coincide with periods of low flow, and measures to capture sediment would be employed.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects to aquatic organisms would occur.

- C. *Other Wildlife* - The effects of the proposed discharge and alternatives to the proposed discharge would be temporary and localized, and have minor adverse impacts at the site during excavation and placement of fill material during construction. There would be temporary increases in turbidity caused by disturbance of the physical substrate during actual excavation and placement of the substrate material. Measures would be implemented to time construction activity to coincide with periods of low flow, and measures to capture sediment would be employed.

3. SPECIAL AQUATIC SITES

- A. *Sanctuaries and Refuges* - No sanctuaries or refuges have been designated in the areas affected by the proposed discharge activity or any of the alternatives. Therefore, there would be no impact or loss of values to this special aquatic site.
- B. *Wetlands* - The discussion of the Project's effect on wetlands is found in the 1980 FES (page C-37 and 38) and in chapter III of the Supplement. The proposed discharge activity would temporarily destroy 1/2-acre wetland habitat. Some riparian habitat (less than 1 acre) may be removed temporarily during construction of the pipeline crossing. This habitat would be restored after construction of the crossing was completed.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects to wetlands would occur.

- C. **Mud Flats** - No mud flats have been identified in the area of the proposed discharge or the alternatives to the discharge. There would be no impact or loss of values to this special aquatic site from the proposed discharge activities or alternatives.
- D. **Vegetated Shallows** - No vegetated shallows have been identified in the area affected by the proposed discharge activity or any of the alternatives. Therefore, there would be no impact or loss of values to this special aquatic site.
- E. **Coral Reefs** - No coral reefs exist at the location of the proposed discharge or any of the alternatives. Therefore, there would be no impact or loss of values to this special aquatic site from the proposed discharge activities.
- F. **Riffle and Pool Complexes** - Riffle and pool complexes in the vicinity of the pipeline crossing would be temporarily disrupted due to construction activities. When construction was completed, these complexes would return to their preconstruction state.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects to riffle and pool complexes would occur.

4. HUMAN USE CHARACTERISTICS

- A. **Municipal and Private Water Supplies** - The analysis shows that there would be no loss of values to municipal and private water supplies by the proposed discharge or the alternatives. This Project feature would enhance the value of the city of Durango water supply by providing supplemental municipal water to the town. However, construction of this feature would not foster water conservation by the city of Durango, which presently has one of the highest levels of water use per capita in the State of Colorado.
- B. **Recreational and Commercial Fisheries** - The proposed discharge would temporarily affect the recreational fishery of the Animas River. The pipeline crossing of the Animas River would be located within the reach of the river recently proposed by the CDOW for special fishing regulations intended to maintain the significantly improved sport fishery since 1980. However, the overall long-term effects of the project on the Animas River fishery have been addressed in chapter III of the Supplement, and implementation of the mitigation measures described in Chapter IV of the Supplement would minimize impacts on the recreational fishery of the Animas River.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects to recreational fishery would occur.

- C. **Water-Related Recreation** - The pipeline crossing would be located within the reach of the Animas River used extensively by both private and commercial water sports users (primarily rafters and kayakers). The proposed discharge activities would be timed to occur during periods when little or no interference with recreational water users would occur. There would be no long-term loss of values to water-related recreation due to the proposed discharge.

Using the existing highway bridge over the Animas River just south of the Durango Pumping Plant or other overhead crossing for the Durango M&I pipeline would avoid placement of fill material into the Animas River. No adverse effects to water-related recreation would occur.

- D. **Aesthetics** - This evaluation shows that there would be no long-term loss of aesthetic values due to the proposed pipeline crossing. A temporary disturbance of aesthetic values would occur during construction activities.

A new, separate from the existing highway bridge, aerial pipeline crossing of the Animas River would have a long-term adverse impact on aesthetic values. This would result from the pipeline spanning the river creating a visually unappealing view.

- E. **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves** - The proposed discharge or the alternative pipeline crossings would not impact any such preserves.

CONSTRUCTION AND INSTALLATION OF THE DRY SIDE CANAL SIPHON CROSSING OF THE LA PLATA RIVER IN COLORADO (Figure 6 of Supplement)

Two 108-inch diameter reinforced concrete pipe siphons would be installed under the La Plata River. Their total length would be 430 feet and would require 4,200 yd³ of excavation. A wasteway, designed to protect the canal structures and divert water from Ridges Basin reservoir to Southern Ute reservoir, would be constructed east of the La Plata River drainage. For each crossing, about 200 yd³ of fill may be required to construct cofferdams and for pipe-bedding material.

Alternatives to the Proposed Discharge:

All alternatives to the Project and the present Project plan include construction of a crossing of the La Plata River by the Dry Side Canal to deliver Project water to the

full and supplemental service irrigated lands and for M&I uses in Colorado. This crossing is needed because of design of Project water delivery system. The crossing could either be a siphon under the streambed or an overhead crossing above the streambed. Generally, the environmental impacts of installing siphons are temporary and the disturbed area would recover in a short time. The construction of an overhead crossing would have less of an impact on the river but would have additional permanent visual impacts, be more costly, and pose additional operation and maintenance problems.

Alternatives to this feature could include changing the type of pipe used and constructing an aerial crossing above the La Plata River. There are no practical alternatives to using cofferdams for river siphon installation. The type of pipe currently included in construction specifications would not have a significant environmental impact. An overhead crossing could have environmental impacts when power is supplied to operate the water pumps. An above-ground electrical supply would require power lines, power poles and transformers. In addition, the visual impacts of an overhead crossing could be significant and it would attract people to the crossing creating safety problems. When impacts of the present plan and alternatives are considered, an overhead crossing would have more long-term impacts than the siphon crossing.

Additional site-specific analysis of the proposed discharge would be conducted. If information becomes available as the result of future investigations and design activities that indicates a practicable alternative exists to the proposed discharge, Reclamation would evaluate the feasibility of that alternative in accordance with the 404(b)(1) Guidelines. Reclamation would implement that alternative to the proposed discharge if it is determined to be the least damaging practicable alternative that does not have other significant adverse environmental effects.

POTENTIAL IMPACTS OF DRY SIDE CANAL SIPHON

1. PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. *Substrate* - The work would be constructed within the existing riverbed and have significant short-term impacts on the substrate. About 4,200 yd³ of material excavated from the river bed would be used to form the cofferdams to divert flow around the work area. Imported fill material may be placed into the trench as pipe bedding or covering. After the pipe has been placed into the trench, the trench would be backfilled with materials from the cofferdam. Cofferdam material not needed for backfilling would be removed from the river and wasted on an upland site. The river substrate would return to near pre-project conditions in a short time and the vegetation in the disturbed areas would be restored.

Less impact to the substrate would be expected from an overhead crossing provided the abutments and power requirements are placed outside the waters of the United States.

- B. *Suspended Particulate/Turbidity*** - During construction and removal of cofferdams, an increase of suspended solids and turbidity would occur in the La Plata River. The impact should be short-term and would occur only when the riverbed outside the cofferdam area is disturbed. Riverbed material would be used for the cofferdams and would have less fine material than that obtained from an upland area. There would be less overall impact using material from the river. The work would be performed during low flows in the river which would minimize the amount of fine material displaced from the cofferdam construction.

There would not be an impact on suspended particulate/turbidity with an overhead crossing provided the construction is outside the waters of the United States.

- C. *Water*** - As discussed in the previous section, installation of the siphon would have a temporary adverse affect on water quality in terms of suspended solids and turbidity. The contractor would be required install a dewatering system in the pipe trench so the siphon pipe can be placed properly. The contractor would be required to pump wastewater to an area where it would not return to the river or obtain the appropriate permits for the wastewater discharges. The impacts on water quality would be short-term and minor.

There would not be an impact on water quality with an overhead crossing provided the crossing is placed outside the river.

- D. *Current Patterns and Water Circulation*** - The proposed discharge would have a temporary impact on water circulation while cofferdams are in place to install the siphon pipes. There would not be an impact on current patterns and water circulation with an overhead crossing provided the crossing is placed outside the river.

- E. *Normal Water Fluctuations*** - There would be no impact on water fluctuations.

- F. *Salinity Gradients*** - There would be no impact on salinity gradients.

2. BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. *Threatened and Endangered Species*** - There would be no impacts to threatened and endangered species.

- B. *Fish, Crustaceans, Mollusks, and other Aquatic Organisms*** - The construction of the siphon would have a short-term impact on fish and aquatic ecosystems at the construction site and for a short distance downstream. The disturbed areas would be unavailable for fish and other aquatic plants and animals. In addition, some impacts to fish and other aquatic animals would be expected from the increased turbidity

levels downstream from the construction site. An overhead crossing would not have an impact on fish and other aquatic organisms provided work is excluded from the river.

- C. *Other Wildlife* - There would be a permanent loss of wildlife habitat where the Dry Side Canal and other above-ground structures would be constructed. That impact was described in the 1980 FES. An overhead crossing would have similar impacts to the proposed discharge.

3. SPECIAL AQUATIC SITES

- A. *Sanctuaries and Refuges* - No impacts would occur to sanctuaries and refuges from the proposed discharge.
- B. *Wetlands* - The construction of the siphon would result in a loss of about 1 acre of wetland within the construction right-of-way. The contractor would be required to leave the disturbed areas in a condition that would aid the establishment of vegetation. The EPA, Fish and Wildlife Service, and the Corps of Engineers would be consulted and an agreement would be implemented to mitigate for this wetland loss.

The locations of siphons that move water by gravity depend on canal alignments and canal elevations at the siphon portals. This limits the sites available for location of a siphon. The siphon is engineered so that water flowing down the canal at the required rate will have sufficient velocity to pass through it to the other side of the canal. Due to these design requirements, the location of the Dry Side Canal siphon must remain relatively unchanged. However, if practicable, the centerline of the canal and siphon may be relocated short distances to avoid wetlands.

The present plan combines two siphons at one location rather than constructing the siphons at different locations. The present plan would impact vegetation and most other environmental conditions less than constructing two siphons at different locations.

An overhead crossing would affect a smaller area of wetlands than the proposed discharge because such a crossing could be located to avoid or minimize adverse effects on wetlands adjacent to the river.

- C. *Mud Flats* - There would be no impacts to mud flats from the proposed discharge.
- D. *Coral Reefs* - There would be no impacts to coral reefs from the proposed discharge.
- E. *Vegetated Shallows* - There would be no impacts to vegetated shallows from the proposed discharge.

- F. *Riffle and Pool Complexes* - Existing riffle and pool complexes within the construction zone would be eliminated for a short period of time during installation of the siphon. The impact would be temporary and after construction, the river system would be restored to establish similar pre-construction complexes. An overhead crossing would not have an impact on riffle and pool complexes provided work is excluded from the river.

4. HUMAN USE CHARACTERISTICS

- A. *Municipal and Private Water Supplies* - The proposed discharge or alternatives to it would not have an impact on water supplies.
- B. *Recreational and Commercial Fisheries* - There would be no impact to recreational or commercial fisheries by the proposed discharge.
- C. *Water-Related Recreation* - There would be no impact to water-related recreation by the proposed discharge.
- D. *Aesthetics* - The proposed discharge would have a temporary visual impact on the scenery during construction activities. There would not be a long-term impact on aesthetic values.

An overhead crossing would have a long-term impact on the riverine system aesthetics. Two concrete crossings and large pipe/aqueduct would be visible above the river and would detract from the surrounding scenery.

- E. *Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves* - No impacts are expected from this feature.

DRY SIDE CANAL SIPHON CROSSINGS OF TRIBUTARIES OF THE LA PLATA RIVER (Figure 6 of Supplement)

Fifteen siphon structures would be constructed to cross tributaries of the La Plata River such as Cherry Creek, Rattlesnake Gulch, Hay Gulch, and other small unnamed tributaries. These siphons would be similar in size to the La Plata River siphon. For each crossing, about 200 yd³ of fill may be required to construct cofferdams and for pipe bedding material.

Alternatives to the Proposed Discharge:

To deliver Project water in a gravity-flow canal such as the Dry Side Canal, tributaries of the La Plata River must be crossed to maintain viable canal invert elevation differences to allow water to flow to designated delivery points. The tributary crossings could be either siphons or overhead crossing. These crossings would be similar than the proposed La Plata River and thus the impacts should be similar.

Generally, the environmental impacts of installing siphons are temporary and the area would recover in a short time. The construction of overhead crossings have less of an impact on tributary streams but would result in additional permanent visual impact, higher cost, and pose additional operation and maintenance problems.

Alternatives and impacts of the alternatives of this feature are similar to the alternatives discussed in the previous Dry Side Canal Siphon section. The tributaries to the La Plata River are individually smaller than the La Plata River and there would be less impact per crossing. However, cumulatively the impacts of the proposed discharges are equal to, or greater, than the impact of the La Plata River siphon crossing.

Additional site-specific analysis of the proposed discharge would be conducted. If information becomes available as the result of future investigations and design activities that indicates a practicable alternative exists to the proposed discharge, Reclamation would evaluate the feasibility of that alternative in accordance with the 404(b)(1) Guidelines. Reclamation would implement that alternative to the proposed discharge if it is determined to be the least damaging practicable alternative that does not have other significant adverse environmental effects.

POTENTIAL IMPACTS OF DRY SIDE CANAL SIPHON CROSSINGS OF TRIBUTARIES OF THE LA PLATA RIVER

1. PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

The proposed discharges or alternatives to the overhead crossings would have similar impacts to those described for the Dry Side Canal Siphon.

2. BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

The proposed discharges and alternative overhead crossings would have similar impacts to those described for the Dry Side Canal Siphon.

3. SPECIAL AQUATIC SITES

The proposed discharges and alternative overhead crossings would have similar impacts to those described for the Dry Side Canal Siphon except for:

Wetlands - The proposed discharge activities would result in a cumulative short-term loss of about 4 acres of wetlands associated with the waters of the United States.

4. HUMAN USE CHARACTERISTICS

The proposed discharges and alternative overhead crossings would have similar impacts to those described for the Dry Side Canal Siphon.

CONSTRUCTION AND INSTALLATION OF AN ESTIMATED 11 PIPELINE CROSSINGS OF THE LA PLATA RIVER IN COLORADO AND NEW MEXICO (Figure 6 of Supplement)

There are eleven proposed Project pipeline lateral crossings of the La Plata River. The pipelines would vary in size from 6 to 63 inches in diameter and range in capacity from 0.8 to 171 ft³/s. A typical pipeline crossing would temporarily disturb an average of 1/4 acre per crossing of the La Plata River. For each crossing, an average of 100 yd³ of fill may be placed to construct cofferdams and for pipe bedding material.

Alternatives to the Proposed Discharge:

To install the Project water delivery system, the La Plata River must be crossed at certain locations. The crossings could either be by siphon or overhead crossing. These pipelines would be much smaller than the La Plata River Dry Side Canal siphon crossing, therefore the individual construction impact of each pipeline crossing would be less than the La Plata River siphon. In most instances, river crossings would be preferable to having the lateral pipelines parallel the river particularly where sensitive environmental areas adjacent to the river could be impacted. These water flow through these pipelines would be either pressurized or gravity-flow. Reclamation would have more flexibility to locate pressurized pipelines to avoid or minimize impacts to sensitive areas such as wetlands or riparian zones associated with the waters of the United States. The environmental impacts of installing pipeline crossings are temporary and the disturbed areas would be restored in a short time. The construction of an overhead crossing would have less of an impact on the river but would have additional permanent visual impacts, be more costly, and pose additional operation and maintenance problems.

Alternatives to these proposed discharges would include using a different type of pipe or constructing overhead crossings above the La Plata River. There are no practicable alternatives to using cofferdams for pipeline installations in rivers. Some of the pipeline crossings would deliver irrigation water under pressure for sprinkler systems. In addition, the visual impacts of an overhead crossing are greater than buried crossings and would attract people creating potential safety problems. When the impacts of the proposed discharge and alternatives to it are compared, the overhead crossing would have more long-term impacts than the siphon crossings.

Additional site-specific analysis of the proposed discharge would be conducted. If information becomes available as the result of future investigations and design activities that indicates a practicable alternative exists to the proposed discharge, Reclamation would evaluate the feasibility of that alternative in accordance with the 404(b)(1) Guidelines. Reclamation would implement that alternative to the proposed discharge if it is determined to be the least damaging practicable alternative that does not have other significant adverse environmental effects.

POTENTIAL IMPACTS OF PIPELINE LATERAL CROSSINGS OF LA PLATA RIVER

1. PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. **Substrate** - The pipeline crossings would be installed within the existing riverbed and have significant short-term impacts on the substrate. Each crossing would place about 100 yd³ in the La Plata River and approximately 50 yd³ of material excavated from the riverbed would be used to place cofferdams to divert flow around the work area. Imported material may be placed into the trench as pipe-bedding or covering. After the pipe has been placed into the trench, the trench would be backfilled with materials from the cofferdam. Cofferdam material not needed for backfilling would be removed from the river and wasted on an upland site. The river substrate would return to near pre-project conditions in a short period of time and the vegetation in the disturbed areas should become re-established in 1-2 years.

Less impact to the substrate would result from an overhead crossing provided the appurtenant features are placed outside the waters of the United States.

- B. **Suspended Particulate/Turbidity** - During construction and removal of cofferdams used to install the crossings, an increase of suspended solids and turbidity would occur in the river. The impact should be short-term and would occur only when the riverbed outside the cofferdam area is disturbed. Riverbed material would be used for the cofferdams, the material would have fewer fines than material obtained from an upland area. There should be less of an overall impact using material from the river. The work could be performed during low flows in the river which would minimize the amount of fines lost from the cofferdams construction.

There would not be an impact on suspended particulate/turbidity with an overhead crossing provided the construction is outside the waters of the United States.

- C. **Water** - As discussed in the previous section, installation of the pipeline crossings would have a temporary adverse impact on water quality in terms of suspended solids and turbidity. The contractor would be required install a dewatering system in the pipe trench so the siphon pipe can be placed properly. The contractor would be required to pump wastewater to an area where it would not return to the river or obtain the appropriate permits for the wastewater discharges. The impacts on water quality would be short-term and minor.

There would not be an impact on water quality with an overhead crossing provided the crossing is placed outside the river.

- D. **Current Patterns and Water Circulation** - The proposed discharge would have a temporary impact on water circulation while cofferdams are in place to install the siphon pipes. There would not be an impact on current patterns and water circulation with an overhead crossing provided the crossing is placed outside the river.
- E. **Normal Water Fluctuations** - There would be no impacts to water fluctuations.
- F. **Salinity Gradients** - There would be no impacts to salinity gradients.

2. BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM

- A. **Threatened and Endangered Species** - There would be no impacts to threatened and endangered species from the proposed discharge.
- B. **Fish, Crustaceans, Mollusks, and other Aquatic Organisms** - The proposed discharges would have a direct short-term impact on fish and aquatic ecosystems at the construction site and for short distances downstream. The disturbed areas would be unavailable for fish and other aquatic plants and animals. In addition, some impacts to fish and other aquatic animals would be expected from the increased turbidity levels downstream from the construction site. An overhead crossing would not have an impact on fish and other aquatic organisms provided work is excluded from the river.
- C. **Other Wildlife** - There would be a permanent loss of wildlife habitat where the Dry Side Canal and other above-ground structures would be constructed. That impact was described in the 1980 FES. An overhead crossing would have similar impacts to the proposed discharge.

3. SPECIAL AQUATIC SITES

- A. **Sanctuaries and Refuges** - No impacts would occur to sanctuaries and refuges from the proposed discharge.
- B. **Wetlands** - The proposed discharges would result in a loss of about 3 acres of wetlands associated with the waters of the United States. The contractor would be required to leave the disturbed areas in a condition that would aid the establishment of vegetation. The EPA, Fish and Wildlife Service, and the Corps of Engineers would be consulted and an agreement would be implemented to mitigate for the loss of these wetlands.

The locations of the pipeline crossings depend on associated lateral pipeline alignments. The water flow through the pipelines would be either pressurized or gravity-flow. Reclamation would have more flexibility to locate pressurized pipelines to avoid or minimize impacts to

sensitive areas such as wetlands or riparian zones associated with the waters of the United States. Due to design requirements, the locations of the pipeline crossings would be relatively unchanged. If practicable, the pipeline crossings may be relocated short distances to avoid or minimize adverse impacts to wetlands.

- C. **Mud Flats** - No impacts would result from the proposed discharge.
- D. **Vegetated Shallows** - No impacts would result from the proposed discharge.
- E. **Coral Reefs** - No impacts would result from the proposed discharge.
- F. **Riffle and Pool Complexes** - Existing riffle and pool complexes within the construction zone would be eliminated for a short period of time during installation of the siphon. The impact would be temporary and after construction, the river system would be restored to establish similar pre-construction complexes. An overhead crossing would not have an impact on riffle and pool complexes provided work is excluded from the river.

4. HUMAN USE CHARACTERISTICS

- A. **Municipal and Private Water Supplies** - The proposed discharge would not have an impact on water supplies.
- B. **Recreational and Commercial Fisheries** - There would be no impact to recreational or commercial fisheries by the proposed discharge.
- C. **Water-related Recreation** - There would be no impact to water-related recreation by the proposed discharge.
- D. **Aesthetics** - The proposed discharges would have a temporary visual impact on the scenery during construction activities. There would not be a long-term impact on aesthetic values.

Overhead pipeline crossings would have a long-term impact on the riverine system aesthetics. Overhead pipelines and appurtenant features would be visible above the river and would detract from the surrounding scenery.

- E. **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves** - There would be no impacts from the proposed discharges.

ACTIONS TO MINIMIZE ADVERSE EFFECTS (40 CFR 230-Subpart H)

Reclamation is committed to implementing the environmental commitments described in Chapter IV of the Supplement. In addition to those commitments, Reclamation would implement the following actions to minimize adverse effects of the proposed discharges:

A. *Actions concerning the location of the discharge*

1. Pipeline and siphon crossing alignments of the Animas and La Plata Rivers will be selected to ensure minimum effect on waters of the United States and adjacent wetlands.
2. Additional site-specific analysis of the proposed discharge would be conducted. If information becomes available as the result of future investigations and design activities that indicates a practicable alternative exists to the proposed discharge, Reclamation would evaluate the feasibility of that alternative in accordance with the 404(b)(1) Guidelines. Reclamation would implement that alternative to the proposed discharge if it is determined to be the least damaging practicable alternative that does not have other significant adverse environmental effects.
3. The crossings of the Animas and La Plata Rivers would be designed to minimize the area of disturbance within the waters of the United States.

B. *Actions concerning material to be discharged*

1. The proposed discharge activities would be prevented from adversely affecting the water by using temporary cofferdams/berms to contain fine materials and placement of fill material during periods of low water flows in Basin Creek and the Animas and La Plata Rivers. Stockpiles of fill materials would be placed above the ordinary high water mark and protected by measures to prevent erosion of those materials into the waters of the United States.
2. Measures would be implemented to time construction activity to coincide with periods of low flow and measures to capture sediment would be employed.

C. *Actions controlling the material after discharge*

1. Methods of discharging fill material will be employed to reduce potential for erosion of materials into the surrounding aquatic ecosystem, such as containment levees or berms.

2. Disturbed areas will be restored to as close to their pre-disturbance condition as practicable.

D. *Actions affecting the method of dispersion*

1. Silt screens or other appropriate methods will be used in the Animas River to confine suspended particulates and turbidity to small areas where settling or removal can occur.
2. The duration of placement of fill materials will be minimized to as short a period of time as practicable to reduce the duration of turbidity.

E. *Actions related to technology*

1. Best management practices and construction schedules techniques would be implemented to minimize adverse water quality impacts. A water quality management plan would be prepared and implemented by the contractor after review and approval by Reclamation.

F. *Actions affecting plant and animal populations*

1. Reclamation will implement measures to minimize adverse effects on wetlands from the proposed discharge activities. Those measures would include: (1) specific locations of the proposed discharge activities would be in areas to avoid wetlands to the extent practicable; (2) Reclamation would fully mitigate the wetland functions and values lost due to the proposed discharge activities; (3) the type and amount of mitigation for wetlands losses would be agreed to by Reclamation, the Corps of Engineers, the Fish and Wildlife Service, and EPA; (4) the overall goal of wetland mitigation would be to replace in-basin the wetland functions and values lost—potential in-basin wetland mitigation sites have been identified and are shown in figure III-1 of the supplement to the 1980 FES.
2. The timing of discharges will be to avoid spawning seasons for trout and other species of concern. Those seasons and other critical periods for fish and wildlife will be identified and coordinated with the appropriate State, Federal, or tribal wildlife agencies prior to the discharge occurring.
3. All discharges will be designed and constructed to avoid any changes in water current and circulation patterns.

G. Actions affecting human use

1. Discharge activities would occur during periods and at locations when little or no interference with recreational water users would occur.

H. Other actions

1. Reclamation will continue to participate in studies to identify sources of water quality problems in the Animas River upstream from the Durango Pumping Plant, consistent with Reclamation's authority and responsibility to improve long-term water quality in the Animas River and Project reservoirs. Further, it will participate in efforts to correct those sources of water quality problems after they are identified, consistent with its authority to participate in such efforts, to provide long-term improvement of water quality in the Animas River.

OTHER AUTHORIZATIONS NEEDED

Water Quality Certification - Reclamation does not intend to apply for, or acquire, State water quality certifications from Colorado or New Mexico under Section 401 of the Clean Water Act because Reclamation is pursuing the 404(r) exemption. However, Reclamation will submit information to the appropriate State agencies to provide assurances that it will comply with State water quality standards because Reclamation can not violate those standards under section 308 of the Clean Water Act. Reclamation does intend to obtain the necessary State water quality certifications that may be necessary for the required section 402 permits it will apply for and acquire for Project construction activities.

Coastal Zone Management Consistency Determination - This determination does not apply to the proposed discharge activities.

State and/or Local Authorizations - None are known to be required.

COMPLIANCE WITH THE 404(B)(1) GUIDELINES (40 CFR-Subpart B)

1. FACTUAL DETERMINATIONS

Reclamation has evaluated the potential short- and long-term impacts of the discharges of dredged or fill material on the physical, chemical, and biological components of the aquatic environment and has made the following determinations:

- A. **Physical Substrate Determinations** - The impacts are discussed in subpart C and other parts of the b(1) analysis. There should not be any significant negative impacts on the physical substrate associated with the discharge of dredged or fill material that have not been mitigated.
- B. **Water Circulation Fluctuations, and Salinity Determinations** - The impacts are discussed in subpart C and other parts of the b(1) analysis. There should not be any significant negative impacts on water circulation fluctuations, and salinity associated with the discharge of dredged or fill material that have not been mitigated.
- C. **Suspended Particulate/Turbidity Determinations** - The impacts are discussed in subpart C and other parts of the b(1) analysis. There should not be any significant negative impacts on suspended particulate/turbidity associated with the discharge of dredged or fill material that have not been mitigated.
- D. **Determination of Biological Availability of Possible Contaminants in Dredged or Fill Material** - Testing and analysis of materials found within the project area indicate that no contaminants would be encountered during, or made biologically available by the proposed discharge activities. A full discussion of water quality and investigations of soils characteristics is found in the 1980 FES (chapter C) and chapter III of the Supplement.
- E. **Aquatic Ecosystem and Organism Determinations** - The impacts are discussed in subpart D and other parts of the b(1) analysis. There should not be any significant negative impacts on the aquatic ecosystem and organisms associated with the discharge of dredged or fill material that have not been mitigated.
- F. **Proposed Disposal Site Determinations** - The impacts are found throughout the b(1) analysis. There should not be any significant negative impacts on the proposed disposal sites associated with the discharge of dredged or fill material that have not been mitigated.
- G. **Determination of Cumulative Effects on the Aquatic Ecosystem** - Cumulative effects are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. The proposed discharge activities would result in a loss of up to 36.5 acres of wetlands associated with the waters of the United States. The cumulative effect of the actual proposed discharge activities to the aquatic ecosystem in the La Plata River drainage where an estimated 26 pipeline or siphon crossings would occur resulting in a temporary impact on up to 8 acres of the waters of the United States. Mitigation measures described in the 1980 FES (pages D-1 to 7) and the mitigation measures in the Supplement (chapter IV) would minimize the adverse cumulative effects of the proposed discharge activities. The cumulative effects for the entire Project were described on pages C-66 to 94 of the 1980 FES. The Supplement describes an update of the Project's cumulative effects in chapter III.

- H. *Determination of Secondary Effects on the Aquatic Ecosystem*** - Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill material, but do not result from the actual placement of the dredged or fill material. Reclamation has evaluated the potential for secondary effects on water quality in the La Plata and San Juan Rivers and Ridges Basin Reservoir resulting from storage of project water or delivery of project water to lands previously not irrigated. The potential for toxic or hazardous irrigation return flows from project lands has been determined to be insignificant. The results of Reclamation's investigations regarding irrigation return flows are discussed in detail in the chapter III of the Supplement. The proposed discharge activities and operation of the project would result in a secondary effect of increasing the baseflow in the La Plata River because of the diversion of water from the Animas River. Other secondary effects on the aquatic ecosystem were previously discussed in the 1980 FES; chapter C (pages C-20 to C-40). There would not be any significant negative secondary effects on the aquatic ecosystem associated with the discharge of dredged or fill material that have not been mitigated.
- I. *Findings of Compliance or Non-Compliance with the Restrictions on Discharge*** - On the basis of the 404(b)(1) Guidelines (40 CFR 230 subparts C through G), the proposed discharge sites for the discharge of dredged or fill material is in compliance with the requirements of the guidelines with the inclusion of appropriate and practicable discharge conditions (subpart H) to minimize pollution or adverse effects to the affected aquatic ecosystems. Reclamation has determined that the proposed discharges constitute the least damaging practicable alternative for the discharges that does not have other significant adverse environmental consequences. These findings are set forth in writing. These findings include the factual determinations required by 40 CFR 230.11. There have been no modifications to the guidelines (40 CFR 230) in preparing this section 404(b)(1) evaluation.

ATTACHMENT 2

**Summary Table of Animas-La Plata Project Features,
Operation, and Scope, 1980 FES and 1992 Proposed Action**

Attachment 2

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Purpose and need	Develop water for both Indian and non-Indian irrigated agriculture and M&I use	Same, but with additional purpose to satisfy Colorado Ute Indian water rights claims
Alternatives	Without Project Development, Project at Authorization, Teft Diversion Plan, Bondad Diversion Plan	Same as 1980 FES
Location	La Plata and Montezuma Counties, CO, and San Juan County, NM	Same as 1980 FES
Project water allocation and use (acre-feet and acres)		
Average annual water supply	198,200 acre-feet (a-f)	195,400 a-f
Lands receiving project water	70,100 acres (ac)	67,460 ac
Full service irrigation:		
Indian	29,700 a-f/13,780 ac	Same as 1980 FES
Non-Indian	66,500 a-f/34,840 ac	68,700 a-f/36,030 ac
Supplemental irrigation	21,900 a-f/21,480 ac	16,900 a-f/17,650 ac
Total irrigation	118,100 a-f/70,100 ac	115,300 a-f/67,460 ac
Municipal and industrial (M&I)		
Indian	40,100 a-f	Same as 1980 FES
Non-Indian	40,000 a-f	Same as 1980 FES
Total M&I	80,100 a-f	Same as 1980 FES
Construction features and project operation		
Ridges Basin Dam:		
Location	Basin Creek, 2 miles upstream from confluence with Animas River	Same as 1980 FES, except right abutment moves upstream about 800 feet
Construction	Rolled, earth-filled structure	Same as 1980 FES
Height	313 feet	Same as 1980 FES
Crest length	1,600 feet	1,900 feet
Material excavation from borrow areas	8,600,000 cubic yards (cy)	9,900,000 cy
Outlet works capacity	2,160 ft ³ /s	2,250 ft ³ /s
Spillway	100-foot-wide emergency spillway located 1.5 miles NW of dam emptying into unnamed tributary of Animas River	The spillway has been deleted from Ridges Basin Dam

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Construction access	Upgrade existing 4WD road from CR 213 about 3.5 miles SE of dam	Portion of proposed access road between Borrow Area B and dam was constructed by DOE for UMTRA cleanup; Reclamation would construct 4,000 feet of road from CR 213 to DOE constructed road
Ridges Basin Reservoir:		
Active capacity	130,000 a-f	127,890 a-f
Inactive capacity	150,000 a-f	144,940 a-f
Dead storage	40 a-f	300 a-f
Total storage capacity	280,040 a-f	273,130 a-f
Surface area at top of active capacity	2,270 acres	2,240 acres
Durango Pumping Plant and intake structure:		
Location	About one-quarter mile downstream from Durango	Same as 1980 FES
Area occupied by plant and intake structure	26 acres	14 acres
Intake structure	Gated 300-foot-long, concrete-lined channel from Animas River; trash-rack; 870-foot-long concrete-lined settling basin; screen to keep fish out of pumping plant; 300-foot pipe to rechannel fish to river	Ungated 430-foot-long, concrete-lined channel with adjustable weir; 90-foot-long sand trap; fish screen; 300-foot-long pipe to rechannel fish to river.
No. of pumps	2 sets of 13 electrically-powered pumps	13 electrically-powered pumps
Pumping plant capacity	430 ft ³ /s	431 ft ³ /s. When the reservoir is full and the river level low, a maximum of 431 ft ³ /s can be pumped. Under the conditions when the reservoir is at its lowest point and the river level high, it is possible to pump 526 ft ³ /s.
Lift	Maximum static lift of 525 feet	Same as 1980 FES
Peak electrical requirement	25,500 kW	Same as 1980 FES
Average annual energy requirement	105,508,000 kW	Same as 1980 FES
Construction access	Construct about 1,000 feet of new gravel-surfaced road from U.S. Highway 550/160.	Construct about 2,300 feet of new, asphalt-surfaced road from CR 211

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Ridges Basin Inlet conduit:		
Location	Parallel CR 211	Up to 1/3 mile south of CR 211
Total length	About 2.1 miles	Same as 1980 FES
Construction method	1.6 miles buried concrete and steel pipe; .5 mile concrete-lined tunnel.	Same as 1980 FES.
Size	8.5-foot inside diameter	Same as 1980 FES
Construction access	CR 211	Same as 1980 FES
Durango M&I pipeline:		
Location	Locations were being studied; potential location of pipeline was shown as paralleling inlet conduit; water treatment plant to be built by others was to be near inlet to reservoir	Water delivery would be from Durango Pumping Plant to existing treatment plant; pipeline would follow existing road
Total length	About 2.3 miles	3.2 miles
Construction method	Buried pipeline	Same as 1980 FES
Size	29 ft ³ /s capacity pressure pipe	Downsized to 11 ft ³ /s
Construction access	Existing roads	Same as 1980 FES
Shenandoah pipeline:	Not included	6 ft ³ /s, 7.8-miles pipeline adjacent to existing roads
Ridges Basin Pumping Plant:		
Location	West end of Ridges Basin Reservoir	Same as 1980 FES
Area occupied by plant intake structure	2 acres	Same as 1980 FES
No. of pumps	8 electrical pumps	9 electrical pumps
Delivery capacity	700 ft ³ /s	706 ft ³ /s
Lift	264 to 330 feet	Same as 1980 FES
Peak electrical requirement	23,600 kW	Same as 1980 FES
Average annual energy requirement	50,531,000 kW	Same as 1980 FES
Access	Existing roads during construction (CR 24 from CR 141); recreation access road for O&M	Same as 1980 FES
Discharge line	2,760-foot-long buried line to the Dry Side Canal	Same as 1980 FES

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Dry Side Canal:		
Location	Ridges Basin Reservoir to western project lands	Same as 1980 FES
Length	27.5 miles	Same as 1980 FES
Capacity	700 ft ³ /s initial capacity gradually diminishing to 230 ft ³ /s	Same as 1980 FES
Construction	0.9 mile concrete-lined tunnel; 3.2 miles other inline canal structures (primarily siphons), 20.2 miles earth-lined	Same as 1980 FES
Long Hollow tunnel:		
Location	Divide that separates Animas and La Plata River drainages west of Ridges Basin Reservoir	Same as 1980 FES
Length	3.2 miles	Same as 1980 FES
Construction	Concrete-lined 10.5 feet diameter tunnel	Same as 1980 FES
Lateral pipeline systems:		
Number	Seven; four systems would be gravity-fed; three would be pressurized by pumping plants	Same as 1980 FES
Project lands served	67,460 acres	Same as 1980 FES
Length	162.1 miles of buried pressurized pipe	Same as 1980 FES
Access	Existing roads during construction; 63 miles of new gravel-surfaced roads for operation and maintenance	Same as 1980 FES
Wasteways	One 700 ft ³ /s capacity turnout to La Plata River; one 30 ft ³ /s turnout near canal terminus to deliver M&I water to Ute Mountain Ute Tribe	Same as 1980 FES
La Plata Diversion Dam:		
Location	La Plata River 1.5 miles from Breen, Colorado; used to divert riverflows to the Dry Side Canal	Same as 1980 FES
Length	50-foot-wide concrete overflow spillway flanked by two compacted earth dikes spanning the river	Same as 1980 FES
Construction	1,300 cy concrete and 11,300 cy riprap	Same as 1980 FES

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Southern Ute Diversion Dam and Inlet Canal:		
Location	La Plata River, 2.8 miles north of the Colorado-New Mexico State line; used to divert water into the Southern Ute Inlet Canal	Same as 1980 FES
Length	100-foot-wide concrete overflow spillway flanked by two compacted earth dikes spanning the river	Same as 1980 FES
Construction	2,400 cy concrete and 16,250 cy riprap and compacted embankment material	Same as 1980 FES
Southern Ute Inlet Canal:		
Location	Southern Ute Diversion Dam to Southern Ute Reservoir	Same as 1980 FES, except that a 140 ft ³ /s interim extension would be constructed in Phase I to serve La Plata, NM laterals
Length	3.3 miles	Same as 1980 FES, except that an additional 2.7-mile extension is required for Phase I-only operation (100 ft ³ /s capacity)
Construction	Concrete-lined	Same as 1980 FES
Southern Ute Pumping Plant:		
Location	Southern Ute Inlet Canal	Same as 1980 FES
Maximum pumping rate	17 ft ³ /s	Same as 1980 FES
Acres served	988	Same as 1980 FES
Lateral system	4.6 miles of buried laterals	Same as 1980 FES
Peak electrical capacity	600 kWh	Same as 1980 FES
Average annual energy requirement	1,080,000 kWh	Same as 1980 FES
Southern Ute Dam:		
Location	Dam located in New Mexico on Cinder Gulch, an intermittent tributary 2 miles east of the La Plata River	Same as 1980 FES
Construction	Rolled, earth-filled structure	Same as 1980 FES
Height	170 feet	Same as 1980 FES
Crest length	2,900 feet	Same as 1980 FES
Material volume	2,640,000 cy	Same as 1980 FES
Outlet works capacity	730 ft ³ /s	Same as 1980 FES
Spillway	None	Same as 1980 FES

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Construction access	Upgrade existing road	Same as 1980 FES
Southern Ute Reservoir:		
Active capacity	40,000 a-f	Same as 1980 FES
Inactive capacity	29,500 a-f	Same as 1980 FES
Dead storage	500 a-f	Same as 1980 FES
Total storage capacity	70,000 a-f	Same as 1980 FES
New Mexico Irrigation Canal:		
Location	Westerly direction from outlet works of Southern Ute Dam	Same as 1980 FES
Length	3.1 miles	Same as 1980 FES
Capacity	140 ft ³ /s	Same as 1980 FES
New Mexico Irrigation Canal water delivery facilities:		
Irrigation turnouts and laterals	Three; two would serve 6,370 acres through 21.6 miles of buried laterals; one would serve 1,874 acres through 9.5 miles of buried laterals	Same as 1980 FES
Interim extension—Southern Ute Inlet Canal	None	Phase I only - 2.7 miles temporary canal to serve project-irrigated lands in New Mexico
Project drainage facilities:		
Colorado:		
Buried pipe drains	45 miles	Same as 1980 FES
Shallow collector ditches and improved natural drainages	55 miles	Same as 1980 FES
Flowage easements	7 miles	Same as 1980 FES
New Mexico:		
Buried pipe drains	21 miles	Same as 1980 FES
Shallow collector ditches and improved natural drainages	7 miles	Same as 1980 FES
Flowage easements	None	Same as 1980 FES
Recreation facilities:		
Ridges Basin Reservoir:		
People at one time	1,800	3,000
Annual recreation days	290,000	331,000
Hiking trails	10 miles	Same as 1980 FES

Summary Table.—Animas-La Plata Project
Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Camping units	54	297
Picnic units	48 and 1 group area	56 and 1 group area
Boat ramp and slips	7-lane ramp and 34 slips	8-lane ramp and 39 slips
Access roads	3 miles (paved)	Same as 1980 FES (subject to relocation of CR 211)
Parking stalls	574	896
Other facilities	Entrance station, beach, fish cleaning station, administrative building	Same as 1980 FES
Southern Ute Reservoir:		
People at one time	920	Same as 1980 FES
Annual recreation days	130,000	Same as 1980 FES
Camping units	76	Same as 1980 FES
Picnic units	16 and 1 group area	Same as 1980 FES
Boat ramps and slips	4-lane ramp and 19 slips	Same as 1980 FES
Access roads	2 miles (paved); 5 miles (gravel)	Same as 1980 FES
Parking stalls	279	Same as 1980 FES
Other facilities	Entrance station, beach, fish cleaning station, administrative building	Same as 1980 FES
Electrical transmission facilities:		
Source and location	CRSP Shiprock Substation 12 miles west of Farmington, NM	Same as 1980 FES; additionally, Western is considering other alternatives.
Transmission line	Proposed 115-kV Shiprock-Durango Transmission Line (line would not be constructed if additional power is developed in the project area and buying power from an existing line would be more economical)	Western is considering other alternatives, such as wheeling over lines to Durango Pumping Plant or constructing a 14.5-miles-long 115 kV line from Hesperus substation to Durango Pumping Plant. Ridges Basin Pumping Plant would be served in a similar fashion.
Length	52 miles from substation to the Durango Pumping Plant	5.0 miles from Hesperus Substation to Ridges Basin Pumping Plant; 14.5 miles from Hesperus Substation to Durango Pumping Plant.
Service to irrigation pumping plants	23 miles of tap lines	Same as 1980 FES
Construction materials:		
Ridges Basin Dam: Impervious	2,600,000 cy	5,600,000 cy

Summary Table.—Animas-La Plata Project
 Comparison of 1980 FES proposed action with proposed action (1992)

	1980 FES	Proposed action (1992)
Pervious	4,970,000 cy	4,200,000 cy
Riprap	29,000 cy	5,000 cy
Soil cement	0	80,000 cy
Southern Ute Dam:		
Impervious	1,900,000	Same as 1980 FES
Pervious	680,000	Same as 1980 FES
Riprap	43,000	Same as 1980 FES
Material sources	Areas below the high water line of the respective reservoirs; pervious material for Ridges Basin Reservoir would come from gravel deposits along the Animas River 3.5 miles SE of the Dam; Long Hollow; or 5-6 miles west of damsite; pervious material for Southern Ute Dam would come from La Plata River deposits or nearby river terrace deposits	Same as 1980 FES, except pervious materials from Animas River gravel deposits have been removed from Ridges Basin Dam; pervious source is now borrow area B 1.5 to 2.5 miles SE of dam
Relocations:		
Structures/dwellings	One occupied farm dwelling and several farm structures	Same as 1980 FES
Utilities	4.4 miles Northwest Pipeline natural gas pipeline around south side of reservoir; 3.8 miles Greeley natural gas pipeline; 3.5 miles of Tri-State Generation and Transmission Association, Inc., 115-kV powerline; 1.5 miles US West telephone line; 2.5 miles natural gas pipeline at Southern Ute Reservoir	Same as 1980 FES, except Northwest Pipeline to be relocated either north and east of reservoir. MAPCO pipeline to be relocated adjacent to Northwest Pipeline
Roads	None	CR 211 would be relocated to the north side of Ridges Basin Reservoir

ATTACHMENT 3

ENVIRONMENTAL COMMITMENT PLAN

Environmental Commitment Plan

The Animas-La Plata Project Environmental Commitment Plan (ECP) for both Phase I and II was prepared in August 1987. The ECP briefly describes and summarizes environmental commitments for construction and operation and maintenance activities of the Project. The ECP will be updated to include the new, additional, or clarified commitments described in the Supplement to the 1980 Final Environmental Statement.

The ECP is used to prepare an Environmental Commitment Checklist (ECC) used by Reclamation to monitor compliance with environmental commitments in all construction contracts.

Animas-La Plata Project Environmental Commitment Plan

Commitment	Phase	Reference	
		Document	Page
1. A cultural resource program would be undertaken for data recovery, analysis, and publication of information on significant historic and prehistoric resources that would be unavoidably affected. ¹	I II	FES 80-18	A-5 A-29
2. Durango Pumping Plant - A screen would be placed over the inlet to keep fish from entering; fish would be rechanneled back to the river through a 300-foot-long pipe.	I	FES 80-18	A-6 A-30 C-35 D-7
3. An estimated 6,300 cubic yards of sediment would settle out annually, and removal of this deposited material would be required about once a year.	I	FES 80-18	A-6
4. Emergency spillway-Ridges Basin. Concrete sill blocks would be constructed to control erosion.	I	FES 80-18	A-8
5. The northern, western, and southwestern reservoir boundaries would have about 15 miles of fence to keep livestock from entering the reservoir area and to restrict uncontrolled access to the reservoir. ²	I	FES 80-18	A-8
6. Ridges Basin Pumping Plant - Each pump unit would be equipped with a fish screen so that fish larger than 2 inches would not be drawn into the plant.	I	FES 80-18	A-12
7. Dry Side Canal - Some of the canal's associated structures would be bridges (some for game crossings), a pipe section at a road crossing, cross-drainage culverts, siphons, and wasteway structures.	I II	FES 80-18	A-12
8. Dry Side Canal - Livestock fencing about 4 feet high would be installed on both sides of the canal.	I II	FES 80-18	A-12

¹ Ongoing—Data recovery and mitigation contract awarded for Ridges Basin Dam and Reservoir, June 8, 1992.

² Deleted—Emergency spillway is not longer to be constructed.

Animas-La Plata Project
Environmental Commitment Plan - Continued

Commitment	Phase	Reference	
		Document	Page
9. The estimated 0.9 mile of concrete-lined canal would also be fenced with 8-foot-high fence.	I	FES 80-18	A-12 A-31
10. All pumping plants would be fenced.	I II	FES 80-18	A-12
11. Pumping from the Animas River would be regulated to allow 125 ft ³ /s in the winter and 225 ft ³ /s in the summer or natural flow, whichever was less, to bypass the pumping plant.	I II	FES 80-18	A-15
12. To preserve the natural setting within the Ridges Basin Reservoir boundary as much as possible, recreation facilities would be concentrated at the northwest end, and the point of access to the recreation area would be controlled by a single entrance station.	I	FES 80-18	A-23
13. Ridges Basin - To enhance the natural lake setting, the western part of the reservoir would be restricted to nonmotorized boats.	I	FES 80-18	A-24
14. All of the transmission lines and poles would conform to acceptable standards to protect raptors.	I II	FES 80-18	A-25 C-42
15. On completion of removal activities, all of the borrow areas would be shaped to conform with the surrounding terrain, and those outside the reservoir basins would, in addition, be covered with topsoil and then seeded.	I II	FES 80-18	A-23 A-26
16. The fisheries program would consist of a stocking plan both to establish and maintain fisheries at Ridges Basin Reservoir.	I	FES 80-18	A-30
17. Fish screens would be provided at the Durango and Ridges Basin Pumping Plants to prevent fish larger than 2 inches from entering the pumps.	I	FES 80-18	A-30 D-7
18. To compensate for big-game losses at the Ridges Basin Reservoir site, a total of 3,585 acres of land of similar big-game value would be acquired.	I	FES 80-18	A-30 A-31 D-6
19. Reclamation would develop a Bald Eagle Management Plan for the reservoir.	I	FES 80-18	A-31
20. The construction of Ridges Basin Reservoir would require the relocation of a big game management area administered by the Colorado Division of Wildlife.	I	FES 80-18	A-31 A-40 C-40 C-41

**Animas-La Plata Project
Environmental Commitment Plan - Continued**

Commitment	Phase	Reference	
		Document	Page
21. In consideration of the President's July 12, 1978, directive on water policy, the water-user entities would be required, in consultation with State and local interests, to prepare a water management plan for Reclamation's approval.	I II	FES 80-18	A-35
22. Upon completion of their planning and prior to the delivery of project water, each tribe would comply with the National Environmental Policy Act of 1969 by assessing the impact of its proposed actions in an environmental statement.	I II	FES 80-18	A-35
23. Water quality programs would be established for both the construction and operation of the project.	I II	FES 80-18	A-38 D-6
24. Central to the non-point-source plant would be the establishment of erosion control measures at all construction sites on or near waterways to limit water pollution from erosion.	I II	FES 80-18	A-38
25. Sampling stations would be established and maintained upstream and downstream from each construction site on the Animas River during construction.	I	FES 80-18	A-38 D-6
26. Reclamation would establish and maintain a monitoring program on Ridges Basin to study the reservoir's developing limnology and aquatic biota.	I	FES 80-18	A-38
27. The monitoring station that would be established during construction on the Animas and La Plata Rivers upstream from the Durango Pumping Plant and Southern Ute Diversion Dam, respectively, would be maintained by Reclamation during project operation.	I	FES 80-18	A-38
28. The Durango Pumping Plant would be shut down during possible water pollution periods to prevent contaminants from being pumped into the reservoir.	I II	FES 80-18	A-38
29. Reclamation would develop and strictly follow criteria for filling the reservoirs and monitoring the safety of the dams.	I II	FES 80-18	A-39
30. A number of safety measures would be undertaken with respect to the project's canals, including safety nets and fencing at the inlets of all siphons and safety ladders spaced at intervals along the concrete-lined sections.	I II	FES 80-18	A-39
31. Fences would be constructed around the electrical switchyards, and, where appropriate, warning signs would be installed for both construction and operation.	I II	FES 80-18	A-39

Animas-La Plata Project
Environmental Commitment Plan - Continued

Commitment	Phase	Reference	
		Document	Page
32. As a requirement of the repayment contracts, the districts, under the initial guidance of Reclamation, would institute a program of irrigation scheduling on all project land, except the land north of the Dry Side Canal receiving supplemental water by exchange.	I	FES 80-18	A-41
33. Water conservation paragraphs would be included in the repayment contracts when they are negotiated.	I	FES 80-18	A-41
34. As requested by the Fish and Wildlife Service, Reclamation has agreed to review the need for additional studies of the Animas River in New Mexico to supplement existing information and attempt to verify the original assessment of the aquatic habitat. ³	I	FES 80-18	C-35
35. A comprehensive fish management plan for Ridges Basin Reservoir, including the development and implementation of a stocking schedule to include an acceptable composition of species, would be coordinated by the Fish and Wildlife Service and the Colorado Division of Wildlife.	I	FES 80-18	C-35
36. During construction, temporary disturbances to vegetation would occur, but this disturbed land would be reseeded with native vegetation.	I II	FES 80-18	C-37
37. Permanent project features would be constructed of materials and be of a color to integrate with their surroundings as much as possible.	I II	FES 80-18	C-45 C-46
38. The poles for all transmission lines would be made of wood and placed along corridors of low visibility to reduce visual impacts.	I II	FES 80-18	C-46
39. The contractor would comply with the applicable Federal and State laws, orders, and regulations concerning the control and abatement of water pollution.	I II	FES 80-18	D-1
40. The contractor must comply with all Federal regulations and take proper and efficient measures to reduce dust and exhaust pollution that might originate from construction and prevent it from becoming an annoyance to persons or causing damage to crops, cultivated fields, or dwellings.	I II	FES 80-18	D-1
41. The contractor would comply with all applicable Federal, State, and local laws, orders, and regulations concerning the prevention, control, and abatement of excessive noise.	I II	FES 80-18	D-1

³ Deleted.

Animas-La Plata Project
Environmental Commitment Plan - Continued

Commitment	Phase	Reference	
		Document	Page
42. Temporary construction areas, including camps, shops, offices, and yard areas, would be located so as to minimize the removal of trees and vegetation.	I II	FES 80-18	D-3
43. On abandonment, all materials and debris would be removed from the temporary construction sites, and those sites outside of the basins would be reshaped and revegetated.	I II	FES 80-18	D-3
44. If the use of pesticides is necessary, only those registered with the Environmental Protection Agency in compliance with the Federal Environmental Pesticide Control Act of 1972 would be used.	I II	FES 80-18	D-4
45. Because of increased truck traffic during construction, safety measures would be coordinated with appropriate State and local agencies and instituted on specific highways and county roads in the project area.	I II	FES 80-18	D-4
46. Wherever practical, roads, material source areas, and other facilities would be located so as to minimize adverse visual effects.	I II	FES 80-18	D-5
47. Where appropriate, trees damaged by construction would be replaced.	I II	FES 80-18	D-5
48. The reservoirs would be cleared and contoured to reduce the ponding of water during drawdown, and regular maintenance of the shorelines would be undertaken to eliminate mosquito habitat.	I II	FES 80-18	D-5
49. Revegetation plans would be developed cooperatively with the Colorado Division of Wildlife, and the Service, and coordination would continue during the construction phase.	I II	FES 80-18	D-7 5
50. Compliance with all applicable water and air pollution laws and regulations of U.S. and Colorado would be accomplished.	I II	FES 80-18	D-7
51. Any change in water use will require additional NEPA compliance.	I II		
52. The Southern Ute Inlet Canal would be fenced along its entire length (3.3 miles) to exclude livestock.	II	FES 80-18	A-16
53. A fence would be installed around Southern Ute Reservoir to keep livestock out.	II	FES 80-18	A-19

**Animas-La Plata Project
Environmental Commitment Plan - Continued**

Commitment	Phase	Reference	
		Document	Page
54. A total of 6.2 miles of livestock fencing would be constructed the entire length of the New Mexico Irrigation Canal.	II	FES 80-18	A-19
55. Recreation facilities would be provided at Southern Ute Reservoir.	II	FES 80-18	A-23 A-25
56. Southern Ute Diversion Dam would have fish screen placed over the inlet into Southern Ute Reservoir to limit rough fish introductions.	II	FES 80-18	C-36

ATTACHMENT 4
FINAL DRAFT PLANNING AID MEMORANDUM

United States Department of Interior
Fish and Wildlife Service



United States Department of the Interior



FISH AND WILDLIFE SERVICE FISH AND WILDLIFE ENHANCEMENT

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MEMORANDUM

SEP 15 1992

TO: Regional Director, Upper Colorado Region,
Bureau of Reclamation, Salt Lake City, Utah

FROM: Colorado State Supervisor, Fish and Wildlife Enhancement,
Golden, Colorado

SUBJECT: Planning Aid Memorandum for the Animas-La Plata Project,
Colorado and New Mexico

Attached is our Final Draft Planning Aid Memorandum (PAM) for the Animas-La Plata Project (Project), effective September 15, 1992, pursuant to the requirements of the Fish and Wildlife Coordination Act. This draft constitutes the Service's official position on fish and wildlife resource issues for the Project. Analyses and recommendations have been prepared in conjunction with the state wildlife agencies of Colorado and New Mexico. We consider this document open for public review and accordingly, request that it be attached to the Draft SEIS when it is released.

We received your memorandum of August 28, 1992, responding to our mitigation recommendations, on September 4, 1992. We believe some comments were already adequately addressed in previous iterations, or have been accommodated in this final draft. In large part, however, we have not made significant changes in our recommendations. These issues had already been discussed extensively between our two agencies and it was established that issues remained over which we disagreed. We considered your comments carefully and fully, but recognized that disagreement remained on several issues. We would like to take this opportunity to offer a few comments on some of these points.

1. Bodo Wildlife Area. While it may be a good idea for CDOW to retain residual Bodo lands, we are not certain specific recommendations to that effect in the PAM are appropriate. We did, however, adjust language eliminating any recommendation that Reclamation should acquire this land. At this time, we have decided to leave specific ownership open. We do point out that the residual lands should not be impacted as they are not included in mitigation.
2. Elk Mitigation. There still seems to be some confusion over replacement lands vs. mitigation lands. In your memorandum, regarding O&M, you state that elk habitat maintenance is and should remain CDOWs responsibility on replacement lands. We do not and never have recommended that Reclamation fund O&M on replacement lands. We do say that it is Reclamation's responsibility to fund O&M on mitigation lands. This is because mitigation value is in place only as long as the habitat enhancement is maintained. If it is initially developed, but not maintained, it will revert to its original state. Thus, your mitigation would be lost over time. We believe Reclamation has full authority to provide O&M under Section 8 of the Colorado River Project Act.

3. Raptor Nesting. We believe language in the final draft had already been adequately adjusted to accommodate the possibility that construction may not lend itself to avoidance measures. We do suggest that in this event CDOW and Service biologists evaluate the situation, recommend the best course of action, and implement it.
4. Ridges Basin Wetlands. We don't believe there are any real problems here. We continue to emphasize that we would favorably consider mitigation plans which would develop alternate wetland types of greater overall wildlife value. Certainly, agreement must be reached on these values before ratios can be adjusted downward. But, we believe this is in Reclamation's interest by providing greater flexibility in your mitigation options. In this vein, we continue to recommend shallow water wetland development at the upper end of the reservoir where it is feasible as a component of your plan. We have adjusted recommendation language to reflect your proposal to submit a preliminary plan with the SEIS, followed later by a more detailed technical plan.
5. Floodplain Wetlands and Riparian Zones. We have substantive disagreement on this issue. The Service does not contend unequivocally that significant losses on the Animas are inevitable. However, with an average 27 percent flow reduction at the diversion point, we do believe there is real potential for lowering the water table adjacent to the channel. If this is significant, the riparian corridor is likely to narrow. We believe this probability is sufficiently great that the issue should be fully addressed by Reclamation, with attention to mitigation.

In the La Plata corridor we believe significant riparian corridor losses are likely. Reclamation has made no specific mitigation commitments. We believe advance mitigation is essential to prevent the loss of wildlife resources and a valuable and declining habitat type. Measurement of actual impacts will not produce answers for 15, 20 years or more. By that time, there will have been an ongoing accumulation of losses. We do not consider this an acceptable approach to such a valuable resource.

6. Canal Irrigation Delivery System. We acknowledge that not all wetland and otherwise enhanced vegetation associated with ditch and canal seepage is especially valuable wildlife habitat. Some, however, is likely significant. We consider mitigation for losses of cottonwoods associated with this system by riparian enhancement one appropriate form of mitigation. However, Reclamation's proposal as presented is vague and noncommittal. We have no idea just what the proposal is and if there is an actual commitment. We also disagree with the assessment that vegetation within the canal prism or other enhanced vegetation is without wildlife value simply because it may be removed through operation and maintenance.
7. Reservoir Fisheries. We don't believe there are any real problems here. We don't see a need to eliminate reference to a possible hatchery facility on Indian lands since we only suggest this as a nontraditional concept which should be explored along with other more traditional options.
8. Advance Mitigation for Trout Fishery. Because some degree of negative impact is likely to result to a valuable trout fishery, we believe some measure of advance mitigation is appropriate. As presented in your memorandum, Reclamation is not providing any real commitment to that mitigation. First of all, a trial stocking program should precede, or be concurrent with, access acquisition attempts to assure that it will even work. Secondly, a firm commitment should be made towards all reasonable attempts at

acquiring adequate access along the corridor sufficient to provide meaningful public use of the resource. Lastly, Reclamation should provide a firm commitment to advance mitigation. If this mitigation effort is just not workable, then alternative options should be developed with the CDOW and the Service.

9. Native Fish - Animas River. The NMDGF does not concur with your assessment that baseline data is adequate to assess Project impacts to native fish communities. Further, there is no commitment to mitigate losses which could occur. Reclamation has stated that it is staying with the 1980 FES analysis. In that document, Reclamation estimates a 10 percent loss of the native fish community. Whatever the validity of that number, it acknowledges a Project-induced loss of a resource which includes the roundtail chub, a federal candidate and New Mexico State endangered species, and the flannelmouth sucker, also a federal candidate species. What might have been considered an acceptable resource loss in 1980, may no longer be acceptable, and now requires additional consideration.
10. Native Fish - La Plata. The roundtail chub also is present in this drainage. Furthermore, it is entirely possible this drainage provides important habitat for this species in the San Juan Basin. The substantial reduction in flows, major alteration of the hydrologic regime, and two potential impassible barriers which will result from Project action have the potential to cause serious harm to La Plata roundtail chub populations, even possibly eliminating them from the drainage. For a species already in trouble in the basin, this could result in a strong push towards federal listing. While Reclamation has agreed to conduct a one-time assessment of roundtail chub status in the drainage (which may or may not be adequate), there is no commitment to any protective or mitigative measures for this species.

Because we believe there are likely to be significant negative impacts to valuable and declining wildlife resources from Project actions, which will not be mitigated, and which will result in unnecessary resource loss, we have added an *Unmitigated Resource Losses* section to our PAM. A balanced discussion of areas of disagreement should be presented in the Draft SEIS.

Reclamation has several sources of authority and direction for providing mitigation, enhancement and wildlife conservation measures for potentially affected wildlife resources. The FWCA directs that wildlife conservation receive equal consideration with water development features. Section 8 of the Colorado River Storage Project authorizes both mitigation and enhancement measures. Reclamation instructions (Reclamation Instructions, Series 350, Part 376.6.5C-6, (d) Candidate Species) direct that for a project such as Animas-La Plata, Bureau policy is to actively coordinate with the Service to determine the status of federal candidate species; and to take reasonable measures to account for and mitigate potential impacts to species that can reasonably be expected to be listed during the course of project operation. The roundtail chub certainly falls into that category.

We offer these comments in hopes that it helps clarify our positions and may assist in resolving some of these differences. We remain open to discuss any of these issues at any time, and would welcome meaningful opportunities to achieve resolution on any and each of them. We believe resolution of these issues and a consolidated position among Reclamation, the Service, and the state wildlife agencies is in the best interests of both the wildlife resource and the Project. Resolution of the issues may not be too late, but will require dedicated effort by all.

Should you have any questions regarding the PAM or the comments offered in this memorandum, don't hesitate to contact Gary Patton or myself at the letterhead telephone number.

Attachment

Ref: PATTON: ANLAPLAT\PAM92.MES

cc: CDOW, Durango (Attn: Mike Zgainer)
CDOW, Montrose (Attn: Bob Towry)
CDOW, Denver (Attn: Gary Skiba)
NMDGF, Sante Fe (Attn: John Pittenger)
EPA, Denver (Attn: Wes Wilson)
FWE/Asst. Colorado State Supervisor, Grand Junction
FWE, New Mexico State Supervisor, Albuquerque
FWE/Field Supervisor, Salt Lake City
FWE/ARD, Region 6

File: Water Projects/Animas-La Plata/F & W Coordination Act



United States Department of the Interior



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DRAFT

MEMORANDUM

SEP 15 1992

TO: Regional Director, Upper Colorado Region,
Bureau of Reclamation, Salt Lake City, Utah

FROM: Colorado State Supervisor, Fish and Wildlife Enhancement,
Golden, Colorado

SUBJECT: Planning Aid Memorandum for the Animas-La Plata Project,
Colorado and New Mexico

This Planning Aid Memorandum (PAM) furnishes the Fish and Wildlife Service (Service) analysis of anticipated impacts to fish and wildlife resources in Colorado and New Mexico resulting from development and operation of the full Animas-La Plata Project, and our recommendations for mitigating those impacts. It supersedes previous PAMs dated August 14, 1979 (Colorado) and August 23, 1979 (New Mexico). This PAM addresses new issues, new information, and project modifications since those earlier memoranda. It has been prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and in cooperation with the Colorado Division of Wildlife (CDOW) and the New Mexico Department of Game and Fish (NMDGF).

INTRODUCTION

The Animas-La Plata Project (Project) is a multi-purpose water resources development project authorized by Congress in 1968 as part of the Colorado River Basin Act. It is situated in southwestern La Plata and southeastern Montezuma Counties in Colorado and, primarily, northcentral San Juan County, New Mexico. The Project involves four river systems within the Upper Colorado River Basin: the Animas, La Plata, Mancos, and San Juan, to which the first three are tributary. The San Juan River flows into the Colorado River at Lake Powell in Utah.

The Project will provide water for the irrigation of 67,460 ac (27,301 ha) of farmland (the majority of which is on the Southern Ute and Ute Mountain Ute Indian Reservations in Colorado) for both Indian and nonIndian water users. Municipal and industrial water will be provided to the communities of Durango, Farmington, Aztec and Bloomington; to the Southern Ute and Ute Mountain Ute Indian Reservations; and to the Navajo Nation in New Mexico. The Colorado Ute Indian Water Rights Settlement Act of 1988 incorporates water deliveries from the Project into the settlement of water rights claims by the Southern Ute and Ute Mountain Ute Indian Tribes.

In February 1992, the Sierra Club Legal Defense Fund (SCLDF), representing five plaintiffs, filed suit against Dennis Underwood and the Bureau of Reclamation (Reclamation). The suit requested a declaratory judgment that the Defendants violated the National Environmental Policy Act and Clean Water Act; and preliminary and permanent injunctions enjoining the Defendants against Project construction until an adequate Supplemental Environmental Impact Statement (SEIS) is prepared and individual Section 404 permits are obtained for all Project components. Following internal analysis of the SCLDF lawsuit, Reclamation identified four categories as deficient or in need of updating.

These four categories are:

1. 404(b)1 analysis. The original analysis did not cover all Project features.
2. Land certification. State certification that irrigation return flows will meet State water-quality standards.
3. New or updated information relevant to environmental concerns.
4. Project refinements. Changes or additions to actions identified in the 1980 FES.

Reclamation initiated "technical analyses" of these categories, establishing technical teams to evaluate each category and their components. Pursuant to the requirements of the Fish and Wildlife Coordination Act (FWCA), Reclamation requested Service participation, with a defined end-product of a new PAM, incorporating new and updated information and Project refinements.

This PAM constitutes the Service FWCA position document for the Project, supplanting our previous FWCA documents. It incorporates recommendations from previous PAMs when still valid, revises recommendations where new information or changes in philosophy or Project design dictate, or where evaluation criteria have changed or improved; and provides new recommendations for issues not previously addressed. It addresses all relevant issues of concern to the Service (exclusive of endangered species issues which have been previously addressed under the Endangered Species Act) and to the state wildlife agencies of both Colorado and New Mexico.

The analyses of Project impacts and ensuing recommendations for amelioration or mitigation of those impacts are based largely on information provided by Reclamation and the state wildlife agencies. The Service has made cursory inspections of the Ridges Basin Reservoir site, the preferred realignment alternative for the Northwest pipeline, tentative crossing alignments of the Animas River by that pipeline, and the irrigation ditch system to be abandoned with construction of the new delivery system. The Service also participated in a fish mark-recapture survey of the Animas River through the Southern Ute Indian Reservation to the state line, and in wetlands mapping in Ridges Basin.

Due to time constraints there has been limited opportunity to collect new and additional data needed for adequate analyses of impacts in support of this PAM. Our analyses have often depended on original, limited, or incomplete data, and are made based on assumptions derived from the information available to us. Exact sitings of new and relocated corridors and pipeline river crossings had not been provided to us as of the date of preparation of this PAM. The timeframe has limited coordination with involved agencies on some issues. Data and time limitations have further constrained development of appropriate mitigation measures, and mitigation agreements with Reclamation on all issues. Due to data limitations, assessment of impacts and development of appropriate mitigating measures have been deferred to the future in some cases. Mitigation agreements were reached among Reclamation, the Service, CDOW, NMDGF, and the Environmental Protection Agency (EPA) whenever possible.

Agencies participating in the evaluation and resolution of wildlife-related issues include: Reclamation, Department of the Interior; the Service, Department of the Interior; CDOW; NMDGF; and EPA.

DESCRIPTION OF THE PROJECT AREA

The Project lies at the eastern edge of the Colorado Plateau Province on the northwest rim of the San Juan Basin. All major drainages flow southward into the San Juan River, which itself flows into the Colorado River at Lake Powell in southeastern Utah. The Project area ranges from submountainous terrain at the north end near Durango, Colorado, to lower semidesert grasslands and shrublands towards the southern end in New Mexico.

The upper Project is situated in the foothills of the La Plata Mountains with elevations ranging from around 6,000 ft (1,829 m) to nearly 8,000 ft (2,439 m) in the vicinity of the Ridges Basin Reservoir site. Characteristic vegetation communities are pinyon-juniper woodland and Great Basin sagebrush. Mountain shrub communities are found at higher elevations and in cooler microclimates. Grasslands may be found in basins and valleys and on open ridges. With decreasing elevations southward (to 5,700 ft/1,738 m in New Mexico), sagebrush becomes increasingly dominant, gradually yielding to semidesert grasslands and shrub communities of greasewood, saltbushes, and rabbitbrush in the southern Project area.

Where terrain and soils are suitable, a large portion of the land area has been cultivated. Irrigation is used largely for the production of alfalfa and livestock pasture, and to a lesser degree, small grains. Pinto beans are the predominant dryland crop along with some small grains. Substantial areas of pinyon-juniper woodland have been cleared by cutting or chaining to promote grass production for livestock.

The Durango area is a substantial tourism and recreation center, and has a long history of mining activity. The San Juan Mountains offer limitless opportunities for outdoor-oriented recreation. Spectacular scenery; expansive National Forest land for hiking, camping, and fishing; nearby Mesa Verde National Park and other archaeological attractions; historic mining towns; and the Durango-Silverton Narrow Gauge Railroad combine to draw large numbers of summer vacationers to the Durango area. Large populations of elk and deer bring a heavy fall influx of hunters. The Purgatory and Telluride Ski Areas draw skiers to Durango throughout the winter.

While the Farmington economy no doubt benefits to some degree by regional recreational attractions, it is more dependent on agriculture and mineral extraction. Farmington is a traditional farming center; but in more recent years, oil and gas development along with coal mining have become increasingly important to the local economy. The San Juan Basin is the location of one of the Nation's largest gas fields.

DESCRIPTION OF THE PROJECT

The Project is designed to divert water from the Animas and La Plata Rivers for municipal and industrial (M&I), and agricultural uses in southwestern Colorado and northwestern New Mexico. A cost-sharing agreement reached among Project proponents (including the State of Colorado, Animas-La Plata Water Conservancy District, Southern Ute Indian Tribe, and Ute Mountain Ute Indian Tribe, among others) in 1986 phased the Project in two stages. Phase I includes Ridges Basin Reservoir, two pumping plants, M&I pipelines, and a network of lateral pressurized pipelines for irrigation water delivery within the La Plata drainage. All M&I and supplemental irrigation water will be provided in Phase I. Phase II will add Southern Ute Reservoir, a second water storage facility, to be located in the La Plata drainage; four pumping plants; and an expanded irrigation delivery system to include the Mancos drainage. Phase II would be financed entirely by nonfederal entities.

The Durango Pumping Plant will be built just downstream from Durango and will pump water from the Animas River through the Ridges Basin Inlet Conduit into Ridges Basin Reservoir approximately 2 mi (3.2 km) southwest of Durango. Pipelines will convey M&I water to the City of Durango and to residential developments to the west. M&I water for New Mexico users will largely be bypassed at the Durango Pumping Plant. Irrigation water will be transported by the Dry Side Canal into the La Plata River drainage, where the Red Mesa Pumping Plant will pump it into a network of lateral pipelines for delivery to individual users in Colorado and New Mexico. Water also will be diverted from the canal into the La Plata River for rediversion farther downstream by the Southern Ute Diversion Dam. This water will be conveyed by the Southern Ute Inlet, an interim Phase I only feature, to Project lands in New Mexico.

Under full development, Phase II would add the Southern Ute Reservoir as an off-stream water-storage facility in the La Plata drainage along the Colorado-New Mexico border. Three pumping plants (two in Colorado) would be added to the La Plata drainage delivery system and a fourth would move water into the Mancos River drainage. The primary expansion of irrigation would occur in the Mancos drainage and in the upper La Plata drainage with the addition of a pumping plant there.

Deliveries will total 80,100 ac-ft (64,937 dkm³) for M&I (52 percent in Colorado, 48 percent in New Mexico), and 115,300 ac-ft (93,474 dkm³) for irrigation (87 percent in Colorado, 13 percent in New Mexico). Under full development, flows will be affected in three directly-involved rivers, the Animas, the La Plata, and the Mancos; ultimately resulting in a net annual depletion of 154,800 ac-ft (125,497 dkm³) in the San Juan River.

On May 7, 1990, the Service issued a draft Biological Opinion concluding the Project would jeopardize the continued existence of the Colorado squawfish. On October 25, 1991, the Service issued a final Biological Opinion concluding jeopardy to the Colorado squawfish could be avoided with implementation of a specified Reasonable and Prudent Alternative. [A Conference Opinion was issued on October 25, 1991, for the razorback sucker; an addendum to that Opinion was issued on April 24, 1992. It became the Biological Opinion on December 16, 1991, when the razorback sucker was officially listed]. The elements of the Reasonable and Prudent Alternative are:

1. After reviewing current hydrological conditions and how Reclamation could operate the Navajo Dam to mimic the natural hydrograph, the Service determined an initial depletion of 57,100 acre-feet for the Project is not likely to jeopardize the continued existence of the Colorado squawfish, assuming the implementation of all elements of the Reasonable and Prudent Alternative. This depletion is that portion of the Project available from the construction of Ridges Basin Dam and Reservoir, the Durango Pumping Plant, and inlet pipeline, as those features are defined in the 1979 Definite Plan Report. Therefore, only those project facilities which result in a net annual depletion not to exceed 57,100 acre-feet will be constructed and operated pursuant to this Biological Opinion.
2. Reclamation agreed to fund approximately 7 years of research effort on the San Juan River and its tributaries with emphasis on observing a biological response in the endangered fish population and habitat conditions. This research will be conducted by knowledgeable endangered species and habitat experts and will allow for testing of hypotheses. The ultimate goal of this research is to characterize those factors which limit native fish populations in the San Juan River and to provide management options to conserve and restore the endangered fish community. Approval for study design shall jointly rest with the Service and Reclamation.

3. Reclamation will operate Navajo Dam under study guidelines developed under element 2 for the research period so that releases mimic a natural hydrograph. Test flows will be provided to re-create a wide range of flow conditions including high flows similar to 1987, which are hypothesized to benefit reproduction and recruitment in the endangered fish community. Release schedules will be determined by the Service and Reclamation based on research studies and with the available water supply after meeting baseline depletions. Release schedules shall meet the limitations on the outlet works facilities and safe routing of hydrological events in the Upper Colorado River Basin. Reclamation also has requested initiation of Section 7 consultation on the operation of Navajo Dam, including a commitment to operate the dam for the conservation of the endangered fish.
4. At the end of the approximately 7-year research period, the Navajo Dam would be operated to mimic a natural hydrograph for the life of the project based on the research.
5. There shall be a binding agreement(s) that the reservoir releases (for both the study period and for the life of the project) are legally protected to and through the endangered fish habitat to Lake Powell. This agreement will include a commitment for the appropriate parties to develop and implement a Recovery Implementation Program for the San Jan River within 1 year.

In particular, elements 1 and 2 are pertinent to analyses presented in this PAM. Under element 1, no Phase I features beyond Ridges Basin Reservoir, the inlet conduit, and the Durango Pumping Plant could be constructed, at a minimum, for 8 years following the initiation of the endangered fish research called for under the Reasonable and Prudent Alternative.

No alternatives to the planned project are under consideration. Likewise, no alternatives to planned facilities sitings are being considered with the exception of some corridor alignments.

Ridges Basin Reservoir will inundate approximately 2,230 ac (902 ha) of Ridges Basin, impounding 280,000 ac-ft (226,996 dkm³) of water at maximum capacity. The dam will span Basin Creek 3 mi (4.8 km) upstream from its confluence with the Animas River. It will be 313 ft (95 m) high, with a crest length of 1,600 ft (488 m), anchored on the south side of Carbon Mountain and the northeast side of Basin Mountain. Recreational development is planned at the reservoir, including boating, water skiing, fishing, swimming, camping, and picnicking. County Road 211 will be relocated to the north side of the reservoir, maintaining public access through the basin. Boat ramps, parking areas, picnic grounds, and a swimming beach will be constructed along the north shore of the reservoir. A campground will be located on the ridge just to the north. Two existing pipelines will be relocated from the basin floor, probably to the north side of the reservoir.

The Durango Pumping Plant will be sited 1/4 mi (0.4 km) south of the Durango city limits along the Animas River. It will consist of a 300-ft-long (91 m) concrete-lined intake structure, a sediment settling basin, and the pumping facility. The conduit will be buried and will largely follow the existing county road for all but the last 1/3 mi (1/2 km) of its length.

The mostly earthen Dry Side Canal will extend 27.5 mi (44 km) west into the Mancos drainage, carrying a 7.6 ft (2.3 m) water depth at capacity. It will tunnel (the Long Hollow Tunnel) 3.2 mi (5.2 km) through the divide separating the Animas and La Plata drainages. A total of 56,262 ac (22,769 ha) of Project land is to be served from the canal by means of turnouts and lateral systems consisting of 162 mi (261 km) of buried pressurized pipe. As the pipe lateral system is placed in service, existing irrigation canals and ditches will be abandoned.

Diversion of water from the Animas River into Ridges Basin Reservoir will continue throughout the year, but the largest portion of the annual depletion will occur during peak spring runoff. Diversions will bypass a minimum winter flow of 125 cfs (3.5 cms) and 225 cfs (6.4 cms) minimum summer or natural flow, whichever is less. Because of this diversion pattern, the reservoir will generally reach maximum capacity during May. Maximum drawdown, averaging 22 ft (6.7 m), will typically occur during July and August. Releases from the outlet to satisfy M&I demand in New Mexico should be infrequent since most of the annual supply simply will be bypassed at the Durango Pumping Plant.

Releases to the La Plata River from Dry Side Canal will augment the supply available to Southern Ute Reservoir and replace water diverted upstream for supplemental irrigation. Releases will occur throughout the summer, except during peak demand periods. Diversions at the La Plata Diversion Dam will be intermittent and occur only when natural flows exceed existing downstream water rights and the diversion capability to Southern Ute Reservoir, or when the reservoir is full.

In Phase II, the La Plata Diversion Dam will be constructed on the La Plata River 1.5 mi (2.4 km) below Breen to divert water into the Dry Side Canal. The dam will span the river and consist of a 50-ft-long (15.2 m) concrete overflow spillway flanked by two earthen dikes. It will impound 7.5 surface acres (3 ha) of water to a maximum depth of 8.5 ft (2.6 m).

Phase II also involves construction of the Southern Ute Reservoir system. Southern Ute Dam will be sited on Cinder Gulch in New Mexico approximately 2 mi (3.2 km) east of the La Plata River. It will be 170 ft (52 m) high, with a crest length of 2,900 ft (884 m), and have a capacity of 70,000 ac-ft (86,345 dkm³). The impoundment will extend 2.6 mi (4.2 km) up Cinder Gulch. Diversions from the La Plata River will be made at the Southern Ute Diversion Dam 2.8 mi (4.5 km) north of the state line. This structure will consist of a concrete overflow spillway 100 ft (30 m) long, flanked by two earthen dikes. The dam will impound 17 surface acres (6.9 ha) to a maximum depth of 9.5 ft (2.9 m). Water will be diverted to Southern Ute Reservoir by the Southern Ute Inlet Canal. The canal will be concrete lined for most of its 3.3-mi (5.3 km) length and will carry a maximum water depth of 4.5 ft (1.4 m). The earthen New Mexico Irrigation Canal will extend from Southern Ute Dam 3.1 mi (5.0 km) west and carry a water depth of 4 ft (1.2 m). A 31.1-mi (50 km) system of buried pressurized laterals will service 8,244 ac (3,336 ha) of New Mexico Project land.

EVALUATION METHODOLOGY

Our evaluations are largely dependent on information and data provided by Reclamation, CDOW, and NMDGF. In some cases, those data are the original data used in the 1979 PAMs and the 1980 Final Environmental Statement (FES). New data and information are used when available. The Service participated in wetland delineation at Ridges Basin, Mexican spotted owl surveys, and fishery surveys of the Animas River. The Service made field inspections of selected facilities sitings and routings. Not all facilities sitings were visited prior to preparation of this PAM.

Ridges Basin - Bodo State Wildlife Area and Elk Mitigation

Agreement was reached among the Service, CDOW, and Reclamation to utilize the HEP methodology presented in the 1979 PAM in assessing Project impacts to elk, and calculating needed mitigation (see the U. S. Fish & Wildlife Service PAM, dated August 14, 1979, for further details of the methodology). It was further agreed to recalculate mitigation needs based on new elk use-levels and patterns and revised assessments of disturbance-related impacts. These recalculations are presented in the Discussion and Mitigation section.

Mexican Spotted Owl - Ridges Basin

Surveys have been conducted in Ridges Basin over each of the past two seasons. During the summer and fall of 1991, as part of a survey effort for southwest Colorado, the CDOW surveyed Ridges Basin and Wildcat Canyon using U. S. Forest Service (USFS) Region 3 protocol (see 1991 Field Surveys by the Colorado Division of Wildlife for the Mexican Spotted Owl (*Strix occidentalis lucida*) for details of that survey). In 1992, representatives of the Service and Reclamation conducted surveys within Ridges Basin also using USFS Region 3 protocol (see Bureau of Reclamation report, Field Surveys for the Endangered Mexican Spotted Owl (*Strix occidentalis lucida*) in the Vicinity of the Proposed Animas-La Plata Project, dated 1992, for details of that survey).

Ridges Basin - Wetlands

Several factors dictated a simplified delineation of basin wetlands in 1992. First, the evaluation team wanted to identify all wetlands with wildlife value pursuant to the FWCA, not just those which would be jurisdictional under Section 404 of the Clean Water Act. Second, the discontinuance of irrigation in the basin by Reclamation resulted in a diminishment of basin wetlands, constituting a preconstruction Project impact. Third, was the severe time constraint under which the evaluation team operated. A mapping approach was used that delineated all sites with identifiable current or remnant wetland characteristics, and those whose previous locations could be reconstructed by CDOW personnel familiar with the basin and its management under the CDOW. For further details on the wetland evaluation see Animas-La Plata Special Report: Additional Wetland and Wildlife Issues, Bureau of Reclamation, June 1992. Survey team participants included the Service, EPA, CDOW, and Reclamation.

Ridges Basin - Pipeline Relocation

A representative from the Service and Reclamation each walked the proposed relocation corridor reaching independent conclusions, followed by mutual agreement on recommendations for that corridor.

Animas Fishery - Durango to New Mexico State Line

Most fishery data exist from the north Durango city limits south to an area known as the "Purple Cliffs," 3 mi (4.8 km) south of the city limits. Analyses of the Animas fishery provided by the 1980 FES were based on stream surveys conducted by the CDOW in this stretch in the mid to late 1970s. Recent (1991) mark-recapture data have been collected by the CDOW for this same reach of the Animas. A mark-recapture electrofishing survey from the Purple Cliffs through the Southern Ute Indian Reservation was conducted in early July, 1992, under direction of the CDOW (see report to the Bureau of Reclamation, by B. R. Nehring, 1992, CDOW, for details). Participants included representatives of Reclamation, the Service, and the Southern Ute Indian Tribe. Its purpose was to gather data on the extent and standing crop of the Animas River trout fishery, and on the distribution, composition, and abundance of native fish species through the Southern Ute Indian Reservation. Data were collected on species composition and age class, and were modelled to generate population and biomass estimates. Samples of both trout and native fish species were collected for trace element and petrochemical analyses. A recent (August 1992) electroshock sample was collected from the Florida River 0.5 to 1.0 mi (0.8 to 1.6 km) above the confluence with the Animas River by Reclamation personnel. This sample was an attempt to verify the presence of roundtail chubs in this tributary.

Reclamation collected and modelled Instream Flow Incremental Methodology (IFIM) data in 1981 from stations at the Purple Cliffs and at Bondad. River temperature data are currently being collected to provide updated baseline information and to predict the effects Project depletions and reservoir releases will have on downstream water temperature.

Animas Fishery - New Mexico

A number of fish surveys have been conducted on the Animas River. The earliest records are from the vicinity of Aztec in 1935, and northeast of Farmington in 1940. Several sampling efforts were made at various points on the Animas in the early 1960s and mid 1970s. More recently, are surveys conducted in 1989 and 1990. Although not comprehensive studies, these data do provide some insight into species composition, abundance and trends. During the spring of 1992, Reclamation collected sediment samples from the Animas throughout its length in New Mexico. Flow modelling, comparing project with preproject conditions, was calculated by Reclamation for the 1980 FES.

La Plata Fishery

Detailed investigations of the La Plata River have not been undertaken; however, several limited surveys of fish species composition have been made during the past 25 years. In Colorado, the CDOW collected data on fish biomass and stream invertebrate composition in the 1970s. They also conducted a point electroshock survey 1/2 mi (0.4 km) above the Long Hollow confluence in 1988. Data for New Mexico include general compositional data collected in 1966 and 1976, and some invertebrate sampling. Limited sampling by electrofishing was conducted in 1992 by Reclamation, the Service, and the NMDGF in both Colorado and New Mexico to obtain fish tissue samples for analysis of heavy metal bioaccumulation. Samples were sent to the Environmental Trace Substances Research Center at the University of Missouri for analysis. Sampling did incidentally provide some additional information on general fish composition in the La Plata River. Prior to the 1980 FES, Reclamation collected data on total dissolved solids in the La Plata and modelled stream flows to project changes resulting from Project operation.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Terrestrial Wildlife

Ridges Basin - The Bodo Wildlife Area

One of the dominant issues associated with construction of the Ridges Basin Reservoir system is the "taking" of and impacts to the CDOW-owned Bodo State Wildlife Area (BWA). This working ranch was purchased in 1974 by the CDOW as elk winter range. The BWA encompasses 7,503 ac (3,036 ha), of which 3,995 ac (1,617 ha) were condemned by Reclamation for Ridges Basin Reservoir. The reservoir will inundate 2,230 ac (902 ha), of which all but 80 ac (32 ha) are part of the BWA.

The BWA consists of a drainage basin surrounded by low mountainous terrain. The heart of the property is the basin itself and the broad ridge immediately north, extending to Highway 160. The basin floor is open, with both upland and wetland habitats. Upland habitats predominate, including grassland and shrub vegetation types. Key species include wheatgrasses, bromes, sagebrush, and greasewood. Natural wetlands form on the basin floor where a high water table results from drainage of surrounding slopes. The predominant wetland type is sedge and sedge/rush wet meadow. Others include cattail marsh, willow (along the drainage paralleling County Road 211, and along Basin Creek), and small stands of cottonwoods along Basin Creek. Several small ponds, open to emergent, are found within the basin. Irrigation enhanced wetland development and extent in the past, but was terminated by Reclamation when it acquired the property in 1988. The ridge on the north side of the basin is covered by pinyon-juniper woodland along much of its south-facing flank, while the ridge top is a more open woodland-park mixture of ponderosa pine, pinyon-juniper, Gambel's oak, mountain shrub, and grassland. The north-facing flank of Basin Mountain is predominately vegetated by a mountain shrub community type.

Following is a breakdown of vegetation communities on the Wildlife Area (area is shown as acres/hectares):

Mixed Conifer	-	293	/	119	Sagebrush	-	1797	/	727
Pinyon-Juniper	-	3078	/	1246	Grassland	-	912	/	369
Mountain Shrub	-	924	/	374	Irrigated	-	219	/	89
Wetlands	-	121	/	49					

Prior to acquisition by CDOW the basin was severely overgrazed and small patches were cultivated. An irrigation canal along the north ridge delivered water to the north and west sides of the basin, providing a crop of alfalfa and grass hay. Under CDOW management, livestock grazing within the basin was stopped, but irrigation was continued. This resulted in an enhanced wetland complex on the basin floor and, combined, yielded a substantial forage base.

At the time of the 1977 analyses, the CDOW estimated approximately 200 elk wintered on the BWA and some 50 head resided year-round, calving on the north ridge. CDOW personnel estimated this utilized roughly half the carrying capacity of the BWA. Since that time, elk use has roughly doubled.

These elk are part of the Hermosa herd, summering in the San Juan Mountains to the north and migrating to the lower elevations of the Durango area each winter. Data gathered by Burdick (1976) show a winter concentration of elk west of Durango in the Perins Peak/Twin Buttes area. Several hundred animals cross Highway 160 to winter on the Bodo property, the number varying with the severity of the winter and snow depth. During more severe winter weather, many elk may move farther south onto the Southern Ute Indian Reservation.

Continued irrigation and removal of livestock grazing increased the forage base on the BWA substantially, thereby bolstering both the carrying capacity of the area for elk and its desirability as year-round habitat. Furthermore, an overall increase in elk numbers throughout Colorado in recent years has contributed to a trend in rehabilitation of lower elevation sites year-round.

Habitat evaluations have not been conducted on the Bodo property since the late seventies analyses; however, CDOW personnel believe the potential carrying capacity of the Bodo probably has not yet been realized. Therefore, if current management practices were simply maintained, it is reasonable to expect that current elk use-levels should continue into the foreseeable future. With increased habitat management, the carrying capacity could probably be enhanced further. One unknown is the increasing development in the area and how that may affect long-term use of the site by elk. Several housing developments are proposed or are under construction to the west of Durango in the Ridges Basin vicinity. Such development may further reduce available winter range, and could ultimately sever migration corridors. Elk are placed at greater risk and are increasingly stressed as they are forced to move through zones of increasing human activity.

Mule deer also use the Bodo Wildlife Area as winter range and, to a lesser extent, year-round. In 1977, winter populations ranged from 100-250 on Bodo, and have remained relatively constant since that time.

The pine/oak habitat of the BWA supports a small population of wild turkeys. Common snipe and a few Virginia rails are attracted to basin wetlands. Dabbling duck species such as teal, mallards and gadwall use the ponds and occasionally nest in the basin. Toads, frogs, and salamanders breed in the emergent ponds, slow-moving emergent channels, and the cattail marshes. A cliff formation along the west face of Carbon Mountain has a history of raptor nesting. Peregrine falcons (a federally endangered species) reportedly nested there in 1963 and 1964. Jerry Craig, raptor specialist for the CDOW, believes that although it is not a high-quality site, peregrines may nest on this cliff in the future as the best regional sites are occupied (personal communication, April 1992). There is an occupied peregrine eyrie approximately 4 mi (6.4 km) north on Perins Peak. Golden eagles have historically and do currently nest on the cliff face. Two nests are present and are used alternately. The Mexican spotted owl (a federally proposed threatened species) is known to occur regionally. Some relatively low-quality, Mexican spotted owl habitat does exist at Ridges Basin, primarily along the steep, rocky west and south faces of Carbon Mountain and in Wildcat Canyon just north of the basin. A series of four surveys using USFS protocol were conducted in April and May of 1992 along Carbon Mountain with negative results. A CDOW crew conducted spotted owl surveys in the basin and in Wildcat Canyon during 1991, also with negative results. Great horned, flammulated, long-eared, northern saw-whet, and northern pigmy owls are other species identified in the basin during these surveys. A variety of other wildlife species have been documented within the basin by Burdick (1976) and Somers (1976).

Several wildlife species, primarily elk and deer, are hunted on the BWA. Others, including turkey, rabbits, and dove are also regularly hunted on the property. Rarely, bear and mountain lion may be taken. In the mid to late 1970s the area was providing approximately 2,000 hunter days of use, but more recently this number had swelled to around 4,000.

The Project Lands

Most Project lands in Colorado occur on the Southern Ute and Ute Mountain Ute Indian Reservations. Approximately 58,900 ac (23,837 ha) are to be irrigated in Colorado, of which 17,760 ac (7,187 ha) were irrigated to some degree in 1979. The bulk of Phase I lands are in the La Plata drainage within the Southern Ute Indian Reservation. The majority of Phase II lands are in the Mancos drainage on the Ute Mountain Ute Indian Reservation.

Approximately 13,400 ac (5,422 ha) are to receive Project irrigation water on the Ute Mountain Ute Reservation. This land was predominantly pinyon-juniper woodland, but has largely (87 percent) been chained to promote growth of grasses for livestock production. On the Southern Ute Indian Reservation, 30,300 ac (12,262 ha) will be irrigated by the Project, of which the majority are in private ownership. Of these, 16,510 ac (6,682 ha) were dry farmland, 1,100 ac (445 ha) in native range, 4,600 ac (1,862 ha) in pinyon-juniper, and 8,100 ac (3,278 ha) in mountain shrub or sagebrush as of 1979.

Mule deer range throughout the Project area. In the late 1970s a resident population of 1,000 animals was estimated, with the greatest concentration in the Mancos drainage. The area of lowest use was in the vicinity of the Southern Ute Reservoir site. A migratory herd estimated at 4,000 animals moved into the Project area from the San Juan Mountains for the winter and spring months, concentrating in the Mancos drainage.

Elk use of Project lands south of the Durango area is comparatively low. Approximately 500 animals are resident within management unit 741 (south of Highway 160, west of the Animas River, and east of the La Plata-Montezuma county line) (CDOW data, 1992). Another 500 typically migrate into the area during the winter months, but numbers vary with the severity of winter weather.

Several federally listed, proposed or candidate species may occur in the Project area. The endangered bald eagle is found throughout the area year-round and their numbers have been increasing for the past several years. All major drainages support wintering bald eagles, and several pairs are known to nest in the area (see the Service's Biological Opinion, October 1991). The federally endangered black-footed ferret could potentially occur in the Project area as well. This species is an obligate associate of prairie dogs. Gunnison's prairie dogs are scattered over the Project area, but do not seem sufficiently abundant in most Project locales within Colorado to support a ferret population. Their numbers on New Mexico Project lands are unknown. Prairie dog numbers may increase westward, probably being most abundant in the Mancos drainage. The last confirmed specimens from the Four-corners region are from the 1940s and 1950s (U. S. Fish and Wildlife Service, 1981; and updates). However, unconfirmed sightings have been received within the last few years from the Project area. Wherever prairie dogs are relatively abundant, there remains some potential for the occurrence of this very rare and very secretive species.

The Mexican spotted owl (a federally proposed threatened species) could occur on Project lands. The species is resident in nearby Mesa Verde National Park, and has been reported in several regional locations, including locations encompassed by the Project. Typical habitat for this species in this part of its range appears to be steep, rock-walled canyons with mature, multi-layered mixed-conifer or pinyon-juniper forests. The southwestern willow flycatcher (Empidonax trailii extimus) is a Federal category I candidate species with potential for occurrence in Project area riparian zones. This is a species of arid lands riparian habitats. It has been verified in western New Mexico, but not in Colorado. This may represent the northern extent of its range, or may simply be a function of a lack of survey effort in southwestern Colorado.

In general, wildlife populations over much of the Project service area are comparatively small. The largest numbers and greatest diversity remain where remnant natural communities (e.g. unchained pinyon-juniper-covered draws and ridges, and riparian corridors) remain and intersperse with agricultural land. Game species include chukar, mourning dove, cottontails, and mule deer. Hunting by nontribal members is restricted and records of harvest are not maintained. However, due to the overall relatively low quality of habitat and small huntable wildlife populations, existing hunting pressure is likely to be low.

Agriculture, development, and population expansion are the main pressures affecting area wildlife populations. The area has been experiencing steady population growth with attendant urbanized development. Landowners with large parcels succumb to economic pressures to subdivide for housing. Native rangeland is converted to cultivation, and wooded and shrub-covered land is cleared to encourage grass production for livestock grazing. The result is a continuing loss of wildlife habitat and ever increasing fragmentation of remaining habitat. Migration corridors of deer and elk are narrowed and eventually may be severed; available winter range continues to shrink. An increasing human population and its demand for irrigation and M&I water continue to dewater streams, resulting in a diminished aquatic biota and a reduction in riparian habitat.

Most New Mexico Project lands occur along the La Plata drainage from the Colorado border to about half-way to Farmington. The climate becomes more arid with a concomitant shift in vegetation types. Sagebrush and semidesert grasslands gradually replace the pinyon-juniper/sagebrush ecosystems found to the north. Saltbush and greasewood shrublands become more common.

In 1979, approximately 5,400 ac (2,185 ha) of Project lands were in seminative shrub and grass cover; only 22 ac (9 ha) in pinyon-juniper woodland. The condition of these rangelands was seriously deteriorated from overgrazing. The remaining 3,148 ac (1,274 ha) of Project land were cultivated, most receiving some degree of irrigation.

Southern Ute Reservoir Site

The proposed site for this reservoir is an arid basin between the Animas and La Plata drainages straddling the Colorado-New Mexico state line. Vegetation is sparse, dominated by sagebrush and grasses, and fringed by pinyon-juniper on surrounding knolls. Wildlife found here include mule deer, cottontails, jackrabbits, prairie dogs, Gambel's quail, horned larks, magpies, ravens, and various raptors, including golden eagles. Eagles have been observed to use the bluffs adjacent to the site. Mule deer density on the site is low, increasing on surrounding lands, particularly to the east. Approximately 150 deer hunting permits for the area west of the Animas River were sold each year to nontribal members as of 1979, with most hunting pressure occurring east of the proposed reservoir site. An insignificant number of hunter-days occur on the lands to be inundated. Nontribal small-game hunting is not permitted and tribal hunting on the site is insignificant.

Wetlands

Ridges Basin

A total of 121 ac (49 ha) of wetlands were mapped in Ridges Basin during April, 1992 (see Animas-La Plata Project Special Report: Additional Wetland and Wildlife Issues, Bureau of Reclamation, June, 1992). These are comprised of both naturally-occurring and remnant irrigation-induced wetlands. Wetland types characterized are (acres/hectares):

sedge/rush wet meadow	-	72 / 29
emergent channels	-	25 / 10
cattail marsh	-	21 / 8
ponds (emergent and open water)	-	3 / 1

Wetlands occur where drainage of surrounding slopes has created a high water table, producing an area of hydric soils on the basin floor. Other wetlands are found along natural drainage channels where intermittent flows saturate channel soils for periods sufficient to establish wetland vegetation.

Basin wetlands were enhanced by irrigation. The Bodo property has a long history of irrigation, extending back to around 1923 (Bureau of Reclamation, 1992a), and continued under CDOW management since its acquisition of the property in 1974. The regular and prolonged irrigation regime resulted in the establishment and enhancement of wetland habitat which would not have occurred under natural conditions. Reclamation terminated irrigation in 1988 when it condemned 3,995 ac (1,617 ha) of the BWA. During the three years without irrigation enhancement preceding the 1992 wetland mapping, there had been significant reversion of basin wetlands towards natural conditions.

These wetlands provide significant breeding sites to several amphibian species, including frogs, toads and tiger salamanders. Common snipe routinely utilize the wet meadows, as do a few Virginia rails. Teal, mallards and gadwall occasionally use the small ponds created in the basin. Limited nesting has occurred in the past. The cattail marshes provided nesting sites for red-winged blackbirds. The high primary productivity of the wet meadows, particularly under irrigation enhancement, provides a significant forage base for elk and deer.

Riparian Corridors

Riparian corridors contain some of the most valuable wildlife habitat in the semi-arid and arid portions of the country due to their association with water and the resultant vegetative structure. In well-developed riparian habitats, the density and diversity of plant species provide many niches to numerous terrestrial, semi-aquatic, and aquatic wildlife species. The extended linear nature of these zones promotes species dispersal on a wide scale.

Riparian and floodplain wetland habitats develop along most permanent and intermittently flowing drainages and channels. Wetlands frequently form in low-lying floodplains, detached depressions and oxbows along both perennial and intermittent channels where the flow-supported water table maintains hydric conditions for sufficient periods to support wetland vegetation. Similarly, the high water table adjacent to stream channels often supports a wooded riparian zone typically dominated by the cottonwood gallery forest. The vegetation composition of the riparian zone, the degree and nature of vegetation development, varies with the slope, soils, water table elevation, change of water table with distance from the stream channel, flooding regimes, and other factors. Dominant overstory species are cottonwood and box elder. Alder, hawthorn, chokecherry, and willows are typical understory components. Tamarisk has become a common invader in New Mexico, often forming dense stands to the exclusion of native riparian species.

The best riparian habitats are generally found along the major perennial drainages of the area, including the Animas, La Plata, and Mancos Rivers. Lesser riparian habitats develop along low flow and intermittent drainages and along irrigation and water delivery canals. The integrity and quality of riparian habitats is variable due to development along river floodplains, scouring spring flows, and overgrazing by livestock. The result is a wide range of habitat quality ranging from very good to very poor.

The riparian zone of the Animas River is similar throughout its length in Colorado and New Mexico, although there is some change in species composition. While development and grazing have impacted the Animas riparian corridor, it is relatively intact in many locations.

Irrigation dewatering creates a variable pattern of perennial and intermittent flows in the La Plata River, particularly within several miles either side of the state line. Approximately 3 mi (4.8 km) below the state line, diversions completely dewater the La Plata River for significant portions of the year. As a result, riparian vegetation has declined significantly southward to the San Juan River. Heavy cattle grazing and stream channelization have further stressed the riparian system in New Mexico, all but eliminating it in places. The only remaining relatively intact riparian habitat on the La Plata within New Mexico is found in the first 3 miles south of the Colorado border. Overgrazing has also degraded the riparian habitats of the La Plata River in Colorado; however, largely perennial flows have perpetuated the riparian corridor.

A federally listed species and one federal candidate species found regionally are closely associated with riparian zones. The endangered bald eagle is found in all major drainages during the winter and several pairs are resident year-round. The southwestern willow flycatcher (federal category I candidate) is known from northwestern New Mexico and could potentially occur in the arid lands riparian habitats of the Project area. This species is currently in review for possible proposal as a threatened species.

Irrigation Canal System

Some wetland and riverine vegetation is associated with the open ditch irrigation system currently in place. This vegetation has become established as a response to seepage from the earthen ditches and within the wetted perimeter of the ditches. In a few locations significant seepage has resulted in the development of small sedge/rush meadow or cattail wetlands in adjacent low-lying areas or natural drainages. More often, narrow corridors of willow or seepage-enhanced rabbitbrush, sagebrush, or chokecherry parallel the ditch in sporadic fashion. These sometimes dense stands may provide significant wildlife cover in areas where cover is often sparse. They may have special value as storm cover. Cottonwoods have established at various locations along the system, in places forming open galleries. Some trees have become quite large and no doubt provide significant nesting sites to raptors and cavity-dwelling birds. These may be the most valuable of the wetland/riverine habitat components associated with this system, as trees are generally lacking in this open landscape.

Aquatic Resources

The Animas River - Colorado

The Animas River is essentially free flowing, emanating from a melting, deep mountain snowpack, and bolstered by spring and summer rains. Rapidly warming spring temperatures result in heavy spring runoff. Sporadic, sometimes intense, mountain rains produce dramatically fluctuating flows. The extreme range of flows to which the river is subjected, along with both natural and human-induced pollutants, limit both the type and extent of aquatic life that can be supported (K. Lashmett, BOR, 1992, personal communication).

The headwaters of the Animas provides adequate habitat to support a limited trout fishery. Heavy siltation and heavy metals contamination from the Silverton mining district adversely affect all aquatic life for the first several miles of the upper Animas. Where the river enters Animas Canyon, about 5 mi (8 km) downstream from Silverton, Colorado, tributary streams of generally good water quality dilute heavy metal concentrations, allowing more resistant forms of aquatic life to exist. Brook trout, known to be more tolerant of heavy metal contamination, are found within the first few miles of Animas Canyon. All tributaries to the Animas River through this 20-mi (32 km) canyon, except Ten Mile Creek, support fish life. By the time the Animas reaches the Animas Valley, about 15 mi (24 km) north of Durango, heavy metals no longer appear to be a severe limiting factor to aquatic life. As the river meanders through the valley, it picks up increasing quantities of nutrients from agricultural and municipal sources. A less hostile environment and increasing nutrient enrichment combine to produce greater fish biomass and diversity. Habitat conditions begin to favor rainbow and brown trout over brook trout. Native species, including flannelmouth and bluehead suckers, and mottled sculpin, along with non-native western white suckers, fathead minnows, and common carp are frequently found.

The CDOW manages a 7-mi (11 km) stretch of the Animas River from the northern Durango city limits southward to the Southern Ute Indian Reservation as a trout fishery. Although some spawning does occur in this stretch of river, little recruitment has been observed. Probable causes for this failure are smothering of redds by heavy siltation loads carried during high runoff and non-point source organic pollution from the Durango area. Rainbow trout are particularly vulnerable to siltation, as their spawning season coincides with the heavy siltation loading of spring runoff. Barry Nehring (CDOW, 1992, personal communication) has found organic residues accumulating on brown trout eggs in the Durango area, producing anoxic conditions in the redds. The extent to which heavy metals may affect egg survival is unknown. Further, suitable spawning substrates in the Animas River appear to be limited, and may not be adequate to sustain a high quality fishery by natural reproduction in any case (Nehring, 1992, personal communication).

As a result, the trout fishery is maintained through annual stocking. Recent mark-recapture surveys by the CDOW demonstrate trout populations have reached and maintained CDOW Gold Medal Water criteria each of the past 3 years. Trout biomass was estimated at 8-12 lbs/ac (7-11 kg/ha) in the 1970s, but is currently at nearly 100 lbs/ac (92 kg/ha) within the Durango city limits, and 64 lbs/ac (59 kg/ha) downstream to the "Purple Cliffs". This improvement is attributed largely to changes in CDOW stocking strategies. These include stocking larger fish (3-5 in / 8-13 cm as opposed to 1-2 in / 3-5 cm), switching to a hardier Colorado River strain, and using drift stocking rather than stocking from fixed points. The fishery may also have benefitted from ongoing efforts to clean up heavy metal contamination and urban pollution in the river. An electrofishing survey conducted in July, 1992, (Nehring, 1992) demonstrated that a small trout population occurs southward at least to the New Mexico state line. Brown trout appeared to be most successful in the warmer waters, with lesser numbers of rainbows.

Gradual changes in the river environment southward through the Southern Ute Indian Reservation and into New Mexico slowly reduce its capacity to support trout and increasingly favor native river fishes. Near Durango, the river consists of cold water, with numerous boulders and cobble creating abundant pool and riffle habitat. Downstream, water temperatures warm seasonally, instream structure diminishes, the pools lengthen and the riffles shorten. These changes disadvantage trout, favoring native fish. Reclamation data has shown water temperatures at the state line approach the upper level of tolerance for trout, particularly rainbows.

Only five percent of all trout collected from the 23-mi (37 km) stretch from the Purple Cliffs to Bondad near the state line during a 1976 survey were collected at the Bondad station. Native fishes, primarily bluehead and flannelmouth suckers, ranged from 21 to 293 lbs/ac (19-270 kg/ha), with biomass increasing downstream to the state line. Other species included the non-native western white sucker, speckled dace, and mottled sculpin. Although not collected during this survey, the roundtail chub is another likely, but rare member of the Animas native fish community. 1992 data yielded estimates of 179-695 lbs/ac (165-641 kg/ha) for suckers, with biomass increasing markedly toward the southern end of the surveyed reach near the state line. Habitat changes are the most likely reason for this increasing biomass rather than a reduced trout population southward. It is difficult to say whether the apparent increase in 1992 biomass over 1976 figures is real or is an artifact of sampling or modelling differences. Bluehead suckers were the dominant species collected in 1992, comprising 75 percent of the biomass. Flannelmouth suckers were the next most common species at 24 percent of the biomass.

Recently, Reclamation verified the presence of the roundtail chub in the Florida River during limited electroshocking 0.5-1 mi (0.8-1.6 km) above its confluence with the Animas River. This finding substantiates earlier reports of the species in the Florida. This collection of a single specimen, along with two specimens collected earlier this year in the La Plata River, may be indicative of the importance of smaller streams in providing essential habitat for the roundtail chub in the basin. Lashmett (1992, personal communication) speculates it is these smaller streams that are producing basin roundtails, which then drift downstream into the mainstem rivers, such as the Animas and the San Juan. Roundtails have not been verified from the Animas in 17 years.

The Animas River - New Mexico

As water temperatures and siltation loads increase, and habitat structure decreases southward, the Animas River gradually transforms from a cold water trout fishery at its upper end to a system largely composed of native species towards and into New Mexico. In the 1979 PAM, the standing crop was estimated to average around 300 lbs/ac (277 kg/ha), consisting primarily of bluehead and flannelmouth suckers, both native species. In 1992, the 4-mi (6.4 km) segment immediately above the New Mexico-Colorado border had an estimated (based on mark-recapture estimates) biomass of 695 lbs/ac (641 kg/ha). Bluehead and flannelmouth suckers comprised 71 and 28 percent of the biomass respectively. Other native species present include the speckled dace, mottled sculpin, and probably, the roundtail chub (a federal category 2 candidate and New Mexico State endangered species). Introduced species include the plains killifish, mosquitofish, fathead minnow, red shiner, carp, black bullhead, and infrequent rainbow and brown trout. The aquatic macroinvertebrate community is composed of stoneflies, mayflies, chironomids, and caddisflies.

In the 1979 PAM, the principal management direction of the NMDGF was the development of a trout fishery in the Animas River. However, with the recognition that in New Mexico the Animas provides little potential as a trout fishery, and an increasing concern for declining native river fish species, the current management direction is the maintenance and recovery of native fish and their habitats.

The status of the roundtail chub in the San Juan Basin appears to be tenuous, and the species is apparently rare in the Animas River. The last documented collection of a roundtail from the Animas was by Hatch in 1975. However, specimens were collected in 1992 in the San Juan River at the mouth of the Animas and in the Florida River in Colorado approximately 0.75 mi (1.2 km) above its confluence with the Animas. This provides evidence that the species may yet occur in the Animas River. The importance of this river to the roundtail, however, is uncertain. The mottled sculpin, although not listed by either the federal government or the State of New Mexico, is of concern to the NMDGF because its only occurrence in the state is within the San Juan Basin. Its center of abundance is the Animas River. Past irregular, nonsystematic sampling of the Animas River has not adequately defined the distribution, population status, and habitat requirements of native Animas River fishes.

The La Plata River

A limited trout fishery occurs in the La Plata River, primarily upstream from Hesperus. Downstream, fish composition increasingly shifts toward native and introduced non-salmonid species. Below the Big Stick/Hay Gulch diversions, heavy seasonal dewatering is an obstacle to maintenance of a trout population. Trout do move downstream during higher flows, but are often forced upstream or into tributaries by heavy summer diversions. A few trout survive year-round in stretches maintaining perennial flow. A 1988 CDOW electroshocking survey yielded four brown trout, averaging 15 in (38 cm), 0.5 mi (0.8 km) upstream from the confluence with Long Hollow Draw. However, they represented less than 10 percent of total fish biomass, while flannelmouth suckers constituted over 90 percent. Other species present include bluehead suckers, speckled dace, and smaller numbers of fathead minnows and mottled sculpin. Sculpin are limited primarily to the upper reaches of the La Plata River. Earlier this year, electroshocking in the La Plata River by Reclamation, Service, and NMDGF biologists for purposes of obtaining tissue samples, produced two roundtail chubs toward the lower end of this stretch of river. One was collected near the confluence with Long Hollow Draw; the other just above the state line.

Below the Hay Gulch Diversion, water quality predictably deteriorates. This is a consequence of irrigation return constituting the majority of instream flow during the summer months. Turbidity, conductivity, dissolved solids, and hardness increase substantially from Hesperus to the state line. Water temperature becomes elevated in the lower stretch during the summer months.

Approximately the first 3 mi (4.8 km) of the La Plata River south of the state line maintains perennial flow in New Mexico. Below this point (specifically the Indian Ditch diversion), the stream can become completely dewatered during the irrigation season in low-water years. The native fish community in this reach is composed of bluehead and flannelmouth suckers, speckled dace, and roundtail chub. Introduced species include the red shiner, fathead minnow, and occasional rainbow and brown trout. The macroinvertebrate fauna is dominated by chironomids, midges, hemiptera and dragonflies.

The distribution, habitat requirements and status of native fish species in the La Plata River is uncertain, particularly for the roundtail chub. Presence of the roundtail chub was firmly documented in 1992 on both sides of the state line. Bureau of Reclamation and Service biologists collected one specimen near the state line and one near the confluence with Long Hollow Draw in Colorado during February. The NMDGF collected another specimen about a mile south of the state line in September. Quality chub habitat, characterized by deep pools with associated woody debris, is found to approximately 3 miles below the state line. It is uncertain where reproduction occurs and what reaches of the La Plata contain important spawning and nursery habitat. Further systematic sampling is needed to establish the status, distribution and habitat utilization of roundtail chubs and other native species within the La Plata drainage.

FISH AND WILDLIFE RESOURCES WITH THE PROJECT

Terrestrial Wildlife

Ridges Basin - Bodo Wildlife Area

In 1988 Reclamation condemned 3,995 ac (1,617 ha) of the 7,503 ac (3,036 ha) Bodo State Wildlife Area for the Ridges Basin Reservoir site. This property was purchased by the CDOW primarily to manage as elk winter habitat. The Project would result in significant reduction in elk support capacity on Bodo, both from direct habitat loss and from associated construction, operational, and recreational disturbances. Direct habitat losses will result from the inundation of 2,230 ac (902 ha), the development of 120 ac (49 ha) for recreation (including a campground, picnic grounds, parking areas, and boat ramps), and the relocation of County Road 211 around the north side of the reservoir. Habitat will be lost to the right-of-way (ROW) and, effectively, to the area between the road and the reservoir. Human disturbance is expected to cause additional habitat losses through avoidance by elk.

The CDOW estimates approximately 100 elk now reside on Bodo year-round, with some 400 overwintering on the property in an average year. This is a two-fold increase of 1979 numbers. The 1979 PAM impact assessment considered 590 ac (239 ha) of the inundation area to be unused by elk. Today all of this area is used at some time during the year. The entire inundation area is classified as winter range by the CDOW, with the majority qualifying as a winter concentration area. These are the most important portions of winter range, with animals normally two or more times densities found on surrounding winter range. Such sites are often crucial to the survival of overwintering animals.

While current recreational use of the BWA is extremely light during most of the year, Reclamation has projected up to 400,000 recreational user days at the reservoir site during project operation. Further, the relocation of County Road 211 will provide year-round access through the basin. Combined, the result will be a major increase in traffic into the basin, especially during the peak summer recreational season. A zone of avoidance by elk will develop around all roads and recreation sites, effectively eliminating those zones as elk habitat.

Location of the campground on the ridge and the routing of County Road 211 along that ridge impinge on a 2,200-ac (890 ha) calving area (CDOW mapping). The combined impacts of intense human disturbance, the loss of primary feeding grounds in the basin, and the sensitivity of calving elk to disturbance are likely to substantially reduce and possibly eliminate summer use of the Bodo property by elk. Although human use of the area will decrease significantly during winter months, it is likely to remain much higher than current levels. Nearby housing development combined with through access on County Road 211 will assure continual human presence through the winter. Loss of basin meadow and alfalfa feeding areas, as well as much open and south-facing habitat, along with campground location in some of the better basin winter habitat will combine with increased human presence to significantly reduce winter use by elk as well.

Based on studies of elk response to various forms of disturbance (e.g., Ward, 1976 and Ward et al., 1973) avoidance zones of 0.25 mi (0.4 km) for roads and 0.5 mi (0.8 km) for recreation sites will be used to calculate disturbance-related habitat losses. These are considered minimum avoidance zones based on the nature of the anticipated disturbance. Points of greatest recreational disturbance are likely to be the campground, picnic areas, parking lots, and boat ramps. Because all are within approximately 0.5 mi of each other, and all but the campground are near the edge of the reservoir, the zone of impact is calculated by assuming the developed 120 ac are all at the campground site.

Further assuming a circular configuration, a 0.5 mi diameter is calculated for this development. Adding a 0.5 mi zone of avoidance around the developed area yields a 1,130 ac (457 ha) potential zone of impact. However, because of topography and exposure, only about 620 ac (251 ha) of this zone is regularly used by elk. Approximately 4 mi (6.4 km) of road will be needed to connect remaining County Road 211 segments at the east and west ends of the reservoir. Subtracting out the 1.5 mi (2.4 km) recreation zone of impact (0.5 mi diameter development zone + 0.5 mi-wide avoidance perimeter), through which County Road 211 will pass, leaves 2.5 mi (4.0 km) of new road for which impacts still need to be calculated. Taking 2.5 miles x 0.5 mile-wide avoidance zone yields an additional zone of impact for the new road segment of 800 ac (324 ha). Summarizing the total calculated zone of impact, i.e., the minimum area presumed lost to elk is:

Inundation Area	=	2230 ac / 902 ha
Recreational Development	=	620 ac / 251 ha
CR 211 Corridor	=	800 ac / 324 ha

TOTAL	=	3650 ac / 1477 ha
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This total exceeds that calculated in 1979 (2,084 ac/1,843 ha) by 1,566 ac (634 ha). There are three reasons for this increase. First, 590 ac of the inundation area were considered unused by elk at that time. All areas of the basin floor are now regularly used. Secondly, habitat and disturbance losses will be greater than assumed in 1979 with the relocation of County Road 211. Lastly, it is believed that avoidance zones around recreational sites were underestimated in 1979 and need to be expanded to more realistic levels.

Still, we believe this impact assessment to be conservative. A variety of factors difficult to quantify are likely to increase true impacts well beyond those calculated. Recreational activities will undoubtedly extend outside the calculated impact zones. For calculations, it was assumed recreational activities would be confined to developed sites. This seems unlikely. It is logical to expect people to hike onto surrounding land, including residual CDOW property, further extending disturbance impacts. Dogs are invariably a problem at such recreation areas, often running at large, readily chasing wildlife. Impacts will be compounded by the elimination or reduction of key habitat components, diminishing habitat variety and destroying the strategic juxtaposition of important habitat elements. This will magnify the importance of total habitat loss beyond that resulting from the loss of individual habitat elements. The important meadow feeding grounds and much crucial south-facing winter habitat will be eliminated by inundation and development. Campground location is in the heart of the best winter habitat and adjacent to a calving area. County Road 211 will be routed along the north ridge, through the center of the property. Remaining habitat will be mostly wooded and a higher percentage north-facing. North-facing habitat is of little value in winter because of increased snow cover and poor thermal characteristics. Ultimately, year-round elk use may cease on the Bodo property, along with the associated loss of hunting opportunity.

Construction of project components and recreational facilities, as well as the relocation of utility corridors (necessitating a ROW through CDOW land not condemned), will cause temporary but intense disturbance throughout the basin.

CDOW's ability to manage the remaining Bodo property (3,508 ac/1,420 ha) will be seriously compromised. It is important to understand that calculated elk avoidance zones extend beyond Reclamation's "take line" into remaining CDOW property. Additional management and administrative problems are likely to result from the substantial increase in human activity within the basin. Significant unauthorized recreational use of CDOW property may occur, causing further disturbance to elk and possible property damage (e.g., fences).

Existing roads to the north rim of Smelter Mountain may experience increased use for hiking and cross country skiing, even if closed. A heightened demand for activities exceeding the capacity of current facilities and management structure, and which are beyond the intent for which the property was acquired and managed is anticipated. This may necessitate increased law enforcement presence. Corridor relocation across CDOW land not taken during condemnation will require access for construction, inspection, and maintenance, further adding to disturbance and creating additional administrative complications.

Ridges Basin - Raptor Nesting on Carbon Mountain

Eagles are sensitive to disturbance during the courting and nesting periods. Golden eagles begin courtship and nest building during the winter months, with egg laying typically occurring in March and April. Young are fledged in late June and July. Until this time, intense or frequent disturbances near the nest site carry a high potential for causing nest abandonment.

Two particularly important disturbance sources will be associated with Project construction and operation. Dam construction will create intense disturbance around the base of Carbon Mountain, just below the eagle eyrie. Construction will involve large numbers of workers, vehicles, and machinery. Traffic, noise, and dust levels will be high. Explosives presumably will be used at dam abutment sites. The most intense construction activities will occur within 0.25 mi (0.4 km) and line of sight of the nest. Without appropriate mitigating measures it is likely the nest site will be abandoned.

Ridges Basin will be developed for recreation, including boating, picnicking, water skiing, fishing, and camping. Boating, water skiing, and fishing may all occur just below the eyrie. These activities will begin in spring and build during the period when young are being raised. Traffic into the basin will be heavy throughout the nesting period. Nesting eagles may adapt to routine activities on the basin floor, but intrusive activities at the base of Carbon Mountain and onto its flanks would likely result in nest abandonment.

Inundation of meadow habitat will remove some foraging area. However, due to the extensive hunting range of eagles and the proximity of other open habitat, it is not expected to cause a significant negative impact to nesting eagles.

Ridges Basin - Corridor Realignment

The Northwest 26-in (66 cm) gas pipeline, currently routed along the basin floor, will be relocated. The 1980 FES described rerouting along the south side of the reservoir. A new preferred alignment is along the ridge top just north of the reservoir. Since the current corridor alignment is along the basin floor, any relocation will be one of the first major construction activities to occur. Consequently, wildlife use of basin habitat at that time may not have changed substantially. Impacts to wildlife will be of two types.

Habitat will be permanently altered along a 100-ft-wide (30 m) corridor. The 1980 alignment would have impacted primarily mountain shrub habitat; the new northern route will traverse pinyon-juniper woodland and ponderosa pine parkland. A corridor will be cleared of vegetation for construction, then reseeded with grasses. Although the pipeline will be buried, woody vegetation will not be permitted within the corridor to accommodate periodic inspection and maintenance. Clearing of woody vegetation is not a strictly negative impact to wildlife using the wooded habitats of the ridge. However, the continuous linear configuration of the clearance, does contribute to habitat fragmentation. Wildlife will be forced to leave cover when crossing the corridor and it does create a zone of discontinuity of woodland habitat. Summer foraging habitat for elk may be enhanced somewhat by increasing forage availability in proximity to cover, but more crucial winter browse and cover may be diminished. Edge bird and small mammal species may be benefitted.

Terrain along much of the corridor is relatively uniform, minimizing the need for substantial modification of terrain and vegetation. The corridor is anticipated to parallel an existing telephone line and access road part of the way. East of County Road 211 it will largely follow an existing transmission line until crossing the Animas River. Alignment of this crossing is not finalized, but riparian woodland could be impacted.

Construction disturbance will be intense and highly intrusive to wildlife using the ridge. Elk use the ridge year-round and the corridor will pass through an elk calving area. Construction will include line surveying, staking, vegetation clearing, building access roads, equipment and machinery laydown, trenching, pipe laying and backfilling, and finally reseeding. The intense level of disturbance and its protracted period will likely cause abandonment of the area by elk, at least during relocation activities. Periodic inspection and maintenance will increase disturbance somewhat on the ridge throughout the life of the pipeline.

While the alignment modification for the inlet conduit from that described in the 1980 FES deviates from the disturbed county road ROW onto open rangeland, little additional impact to wildlife is expected. Most of the realignment will traverse grass-covered terrain. A temporary disturbance to grassland habitat will result, but reseeding with native vegetation will largely restore the disturbed corridor.

Ridges Basin Reservoir

The inundation of Ridges Basin, creating Ridges Basin Reservoir, will also provide several positive impacts by creating habitat for aquatic, semi-aquatic and shore species, and through development of a cold water fishery. It will likely attract waterfowl, wading birds and shorebirds. Shallow areas may provide breeding opportunities for amphibians. There is some potential for attraction of bald eagles and ospreys. Overall wildlife benefits may, however, be minimized by the level of recreation activity at the reservoir unless restricted. Further, the water level will fluctuate, thus inhibiting the establishment and development of shoreline and littoral vegetation. Habitat for species requiring emergent vegetation will likely be limited to some areas at the upper end where the water table can be sustained for a period sufficient to establish sedge, rush and cattails.

Analyses by Reclamation do not project water quality problems for Ridges Basin Reservoir. While mercury has become a problem for some area reservoirs, Reclamation is using nearby Ridgeway Reservoir as a model for forecasting no mercury problems in Ridges Basin. It should be noted, however, Ridgeway is a relatively new impoundment and mercury accumulation may or may not have had time to develop. Reclamation believes the off-stream siting of Ridges Basin Reservoir will further diminish water quality problems by minimizing the mixing of bottom sediments. Additionally, efforts are ongoing to identify and clean up sources of heavy metal contamination in the Animas River, which should improve the quality of water pumped into Ridges Basin Reservoir. Fish samples have been collected from the Animas River for analysis of heavy metal bioaccumulation, but results were not available at the time of preparation of this PAM.

The Project Lands

Primary impacts on Project lands will be mostly of three types: temporary disturbance associated with construction of the pipeline delivery system, conversion of native vegetation communities to cropland with delivery of irrigation water, and loss of some wetland and riverine habitat as a result of abandonment of the existing water delivery system.

The existing system of open gravity canals and ditches will be abandoned south of the Dryside Canal and replaced with a system of buried pressurized pipe. Loss of obligate and facultative wetland and riverine vegetation associated with seepage from the open ditch system will occur with abandonment of this system. Cottonwood loss may be one of the most significant habitat impacts resulting from this action. These trees likely provide significant nesting sites in areas where trees are naturally scarce or absent. Seepage has also enhanced the growth of upland vegetation (e.g. sagebrush, rabbitbrush, chokecherry) in places. Loss of supplementing seepage water will reduce resting, hiding and storm cover where such cover may be a limiting factor.

Since the pipe system will be buried, no long-term impacts are expected. Short-term impacts will result from construction disturbance, trenching, pipelaying, access development, and equipment laydown. However, impacts are generally expected to be minor. As previously described, remaining area rangeland is often in poor condition and supports relatively low wildlife populations. Native range will be reseeded following backfill, and much of the disturbance will occur on cultivated and otherwise disturbed lands. In any case, disturbance will be of fairly short duration. Small areas will be permanently dedicated to pumping plants. Noise from these facilities will cause some localized disturbance; however, wildlife will typically habituate to low-level, regular disturbance such as this.

Isolated instances could occur with potential for greater negative impact. Pipeline crossings of drainages could irreparably damage riparian vegetation and floodplain wetlands if not carefully designed, sited, and constructed. ROWs will be cleared of vegetation during construction and maintained free of woody species. This would reduce and segment scarce and valuable riparian habitat for many wildlife species and degrade the riparian system. The Service has been given little information on planned pipeline stream crossings to evaluate specific Project impacts. Eleven crossings of the La Plata River are believed planned, but locations and designs are unknown.

Other valuable or unique habitats could be encountered on an isolated basis. An example is prairie dog towns, with some attendant potential for impacting any of several sensitive species, possibly including the black-footed ferret (a federally endangered species). The last known population of this very rare animal was in northwestern Wyoming in the 1980's. No specimens have been confirmed from the Project region since the 1950s. While the probability of Project impacts to black-footed ferrets must be considered low, due to the extremely secretive nature of the species and the difficulty of observing them, the potential for their occurrence in the Project region must still be considered wherever prairie dogs are relatively abundant.

The Dryside Canal will be an open canal for most of its length and would affect some 300 ac (121 ha) of a variety of vegetation types (1979 PAM). Because the canal is mostly earthen and will be provided with escape ramps, animal entrapment and drownings are not expected to be a problem. A portion (0.9 mi/1.4 km) of the canal will be fenced, possibly creating a partial barrier to animal movements. Some wetland vegetation may develop along the canal in response to water seepage. However, due to maintenance requirements, any associated riverine wetland habitat is unlikely to become well developed or reliable as wildlife habitat.

The 3.6-mi-long (5.8 km) Southern Ute Canal will be concrete-lined, carry a water depth of 4.5 ft (1.4 m), and have a top width of 28 ft (8.5 m). An access road will parallel the canal. The canal and access road will traverse mostly dry cropland (1979 PAM). Habitat loss will affect those species utilizing dry cropland, but should be minor. With a concrete-lined canal, the potential for animal entrapment and drowning exists; however, Reclamation is planning escape features for this canal to alleviate that potential.

Such canals also have potential for impeding or blocking animal movements. Large, wide canals, particularly when concrete-lined, are the most likely to block animal movements. Migrating large mammal populations can be seriously affected if their movement corridors are severed. Earthen canals with ramped sidewalls can be negotiated by many animals, including both deer and elk.

Overall, the most significant impacts on Project lands will be the conversion of noncropland to cropland. Some 13,000 ac (5,261 ha) will be converted on the Ute Mountain Ute Reservation. However, as previously discussed, much of that land is severely overgrazed chained pinyon-juniper and rangeland. On the Southern Ute Reservation, approximately 30,000 ac (12,141 ha) of land will be converted with irrigation delivery. Over half of that is already in dryland farming, with the remainder in native vegetation. Although there may be some shift in species composition with the conversion from dryland to irrigated farming, the net impact may be positive.

Because of generally poor habitat conditions throughout much of the Project area, the addition of irrigated cropland interspersed with remaining native vegetation communities may result in a net increase in wildlife support capacity. Species requiring native habitats such as ferruginous hawks, chukar, shortgrass rangeland birds, prairie dogs, kit fox and lizards will be negatively affected. Others, such as pheasants, Gambel's quail, swallows, robins, meadowlarks, Brewer's blackbirds, mourning doves, raccoons, skunks, cottontails, deer, red fox, and amphibians may be benefitted.

With an increase in some game species, Tribal harvest of these species may increase. However, because of Tribal restrictions on hunting by non-Indians, an overall increase in recreational opportunity should be small.

Only 8,600 ac (3,480 ha) of land in New Mexico will be converted as a result of irrigation water delivery. Roughly a third of that is already cultivated, with some irrigation. The remainder is mostly grassland and sagebrush in a severely overgrazed condition (1979 PAM). A 1979 HEP analysis showed net gains in carrying capacity for selected species. Deer winter range to the west and north of proposed irrigation lands will not be affected.

Hunting on these lands is largely restricted to deer. The 1979 PAM reported approximately 54 hunter-days occurred on the 5,400 ac (2,185 ha) of native vegetation. With conversion of that land to agriculture, there could be some reduction in deer hunting opportunities, but small game hunting opportunities may increase.

The 3-mi-long (4.8 km) New Mexico Irrigation Canal will be earthen and fenced for its entire length. Consequently, problems with animal entrapment and drowning are not anticipated. Animal movements will, however, be blocked for over 3 miles by the canal and Southern Ute Reservoir which it will adjoin. Approximately 107 ac (43 ha) of grassland and sagebrush will be lost to the canal (1979 PAM).

Southern Ute Reservoir

The reservoir will inundate 1,400 ac (567 ha) of sparse arid grassland and sagebrush habitat. Cottontails, jackrabbits, prairie dogs, Gambel's quail, horned larks, and other species using the site will be negatively affected. Hunting area for golden eagles could be reduced. A HEP analysis determined a loss of 60,794 HU (1979 PAM). The presence of a large body of water in this arid locale may provide a positive impact by attracting large numbers of waterfowl, wading birds, and shorebirds. The development of vegetation adjacent to the reservoir may increase nesting habitat for some birds and increase prey for hunting raptors. Amphibians may find breeding sites in shallow water areas.

Wetlands

Ridges Basin

In a field evaluation by Reclamation and Service biologists in 1992, 121 ac (49 ha) of wetland habitat were mapped and characterized within Ridges Basin (see *Animas-La Plata Project Special Report: Additional Wetland and Wildlife Issues*; Bureau of Reclamation, June, 1992). Mapping included all wetland habitat, whether or not it was jurisdictional. Wetland types mapped are:

sedge/rush wet meadow	-	72 ac / 29 ha
emergent channels	-	25 ac / 10 ha
cattail marsh	-	21 ac / 8 ha
ponds (emergent and open water)	-	3 ac / 1 ha

The Bodo property has a long history of irrigation, which was continued by the CDOW after its acquisition of the property in 1974. The regular and prolonged irrigation regime resulted in establishment and enhancement of wetland habitat which would not have occurred naturally. Reclamation terminated irrigation in 1988 when it condemned 3,995 acres of the Bodo State Wildlife Area, thereby negatively affecting those irrigation-supported wetlands. During the three years without irrigation preceding the 1992 wetland delineation, significant reversion of basin wetland communities towards natural conditions occurred. Because these artificially maintained and enhanced wetlands did provide some habitat to wetland-dependent species, and because Reclamation's discontinuance of irrigation constituted a preinundation Project impact to that wetland habitat, an attempt was made to include in mapping those irrigation-supported wetlands. This was done by trying to reconstruct their distribution and nature based on remnant wetland evidence and discussions with CDOW personnel familiar with the basin and its CDOW management history. All wetland habitat will be lost when the basin is flooded for Ridges Basin Reservoir.

Floodplain Wetlands and Riparian Zones

Two primary types of impacts could result to wetland and riparian habitats. First, is direct physical disturbance of these habitats, most likely by pipeline crossings of stream channels. The Service understands there will be at least 11 such pipeline crossings of the La Plata River; however, we have not been provided details of their locations or design. Consequently, specific impact analyses cannot be presented. A generic impact assessment was presented on page 22.

Of greater overall significance may be the disruption of existing hydrologic regimes by altering flow levels or the natural hydrograph. Floodplain wetlands and riparian vegetation develop in direct response to the hydrologic regime. Any change in ground water tables, extent and timing of flows, and overbank flooding will impact these communities. Western riparian systems have evolved with drastically fluctuating flows, high spring discharges, and heavy runoff siltation loads typical of many western streams. Various studies (e.g., Rood and Mahoney, 1990; Stromberg and Patten, 1990) have demonstrated the importance of high spring peak flows to cottonwood seedling establishment and periodic high flows in recharging ground water. High spring runoff flows establish a meandering of stream channels, creating point bars. The scouring effect and deposition of silt associated with peak runoff flows provide silt beds on these bars for seedling establishment. Ground water is recharged at these times. Periodic event flows through the summer may be important for groundwater recharge and the maintenance of growth. The riparian zone as a whole may be more sensitive to alterations in hydrological characteristics than are aquatic life. This, in part, is due to requirements for maintenance of adequate ground water some distance from the wetted perimeter and the need for high flows to create the meandering necessary for the creation and dispersion of seed beds. On the other hand, riparian vegetation can withstand

periods of low water and drought. Floodplain wetlands need hydric soil conditions for sufficient periods during the year to support obligate wetland vegetation. Lowering of the water table could particularly impact those wetlands removed from the stream channel.

Project diversion of water from the Animas River will reduce overall flows approximately 27 percent annually. The shape of the hydrograph will not change markedly, although the spring peak will flatten somewhat with heavier diversions during that period (fig. 1 graphically presents expected flow changes at a mid-point of the affected reach). Since flows will be diverted rather than regulated by an onstream dam, the inherent variability of natural flows will be maintained. However, overall flow reductions and flattening of the spring peak could effect water table height, channel morphology, and sediment loading and deposition patterns. The extent of these effects are difficult to predict. The water table adjacent to the stream channel may lower, resulting in a narrowed riparian corridor. A reduction in peak flows could influence channel meandering and seed bed establishment to some degree.

Flow regimes in the La Plata River will be affected differently dependent on location relative to diversion points. Between the Southern Ute and La Plata Diversion Dams in Colorado, flows may be augmented by irrigation return. These returns may protect against complete dewatering during periods of low flow and high irrigation withdrawal. A net increase in annual flow may result, possibly enhancing riparian vegetation in that stretch. Potential for water quality degradation is, however, of concern. Because summer flows in the La Plata will be heavily composed of water returning from newly irrigated lands, some likely with high levels of selenium, there is potential for at least temporary concentration of this element in floodplain wetlands. The greatest potential for settling and accumulation is in those wetlands which are recharged by periodic overbank flooding. Wetlands act as natural sinks and can concentrate toxic elements. They will, however, ultimately bind them into unavailable forms, or filter them from free water. Availability in the wetland environment does, however, provide an opportunity for accumulation in plants and, consequently, for bioaccumulation through the food chain. Pesticides are another likely contaminant from Project lands.

Below the Southern Ute Diversion Dam, flow patterns will be drastically altered (see fig. 2). Although minimum flows of 1-2 cfs (0.03-0.06 cms) will prevent complete dewatering, mean peak flows of 90-100 cfs (2.5-2.8 cms) will be reduced to 9 cfs (0.3 cms). The NMDGF identifies a high-quality riparian zone within the first 3 mi (4.8 km) of the La Plata River in New Mexico. This coincides with the only typically perennial stretch of the La Plata River in New Mexico. Clearly, the hydrologic regime will be altered dramatically. While it is impossible to quantify the magnitude of impacts with the data available to us, it is likely they will be significant. The water table will probably lower, producing a narrowed riparian corridor, and possibly resulting in reduced growth and vigor of surviving vegetation. A substantial reduction of spring peak flows will alter channel hydraulics essential for successful cottonwood regeneration and maintenance. Channel meandering essential to seed bed dispersion, and the scouring and silt deposition patterns necessary for seed bed establishment will likely be adversely affected. Modifications in flow patterns could favor establishment of non-native vegetation which can outcompete and eventually replace native riparian species.

Loss or reduction of riparian zones could negatively affect the endangered bald eagle. This species is heavily dependent on the riparian corridors for feeding and roosting. Large cottonwoods may provide valuable nesting sites. Because the southwestern willow flycatcher has not been documented on Project lands to our knowledge, no impacts to this species can be anticipated at this time. However, it has been documented in northwestern New Mexico and has the potential for occurring in the Project area. It is, as are many other species, dependent on the riparian zone.

Figure 1. Estimated pre-project and project flows in the Animas River at Cedar Hill.

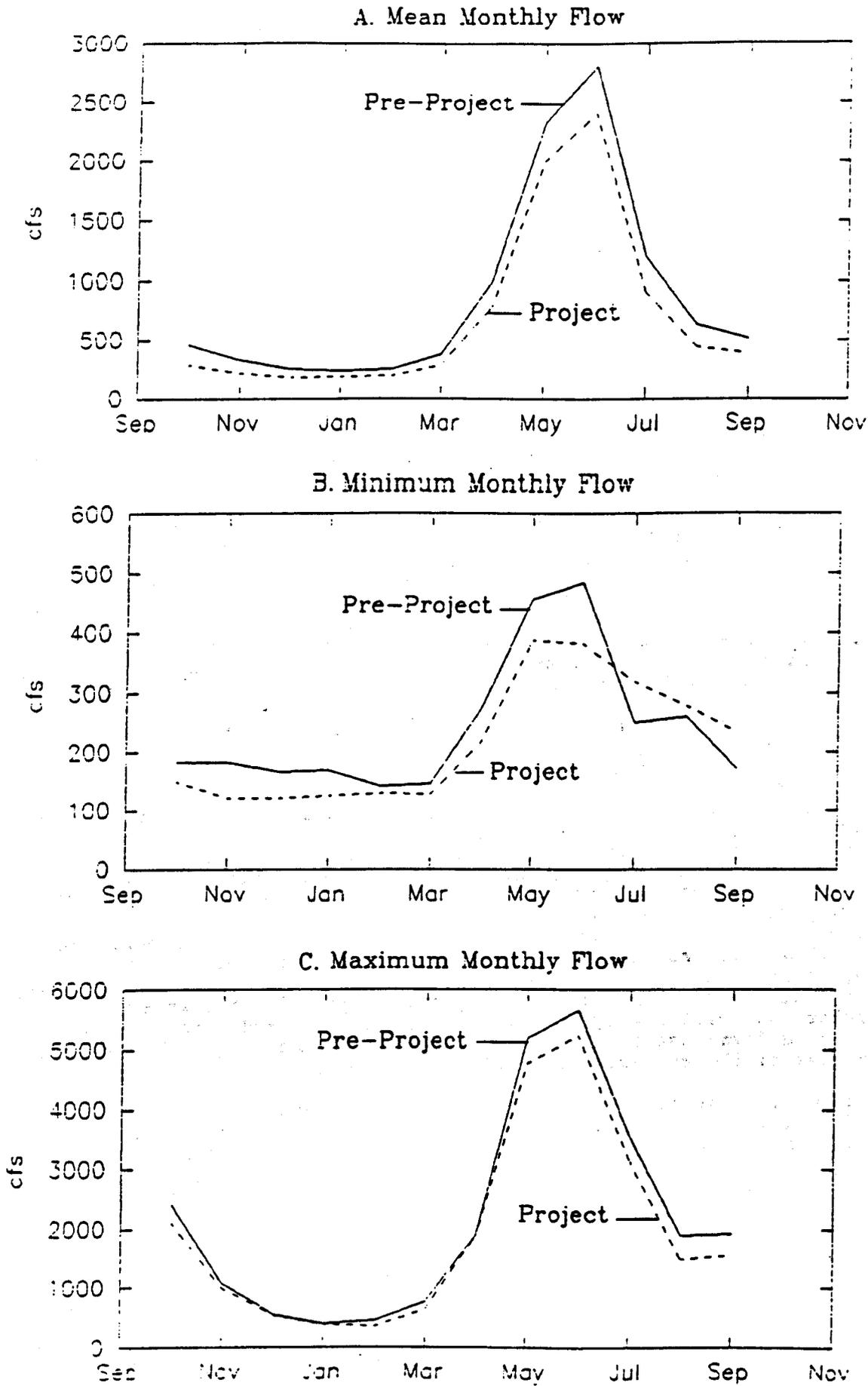
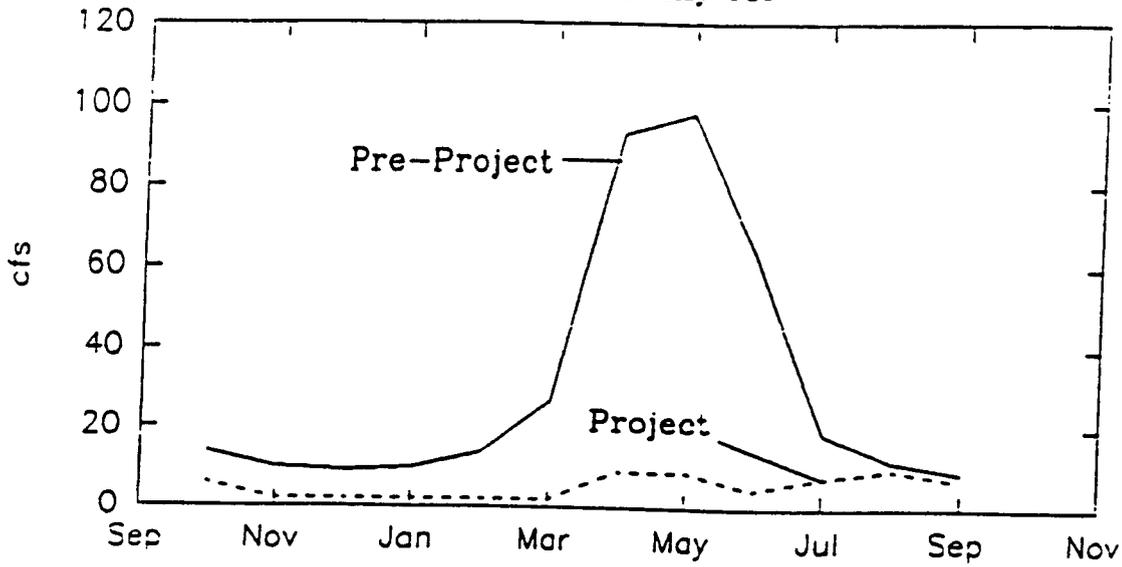
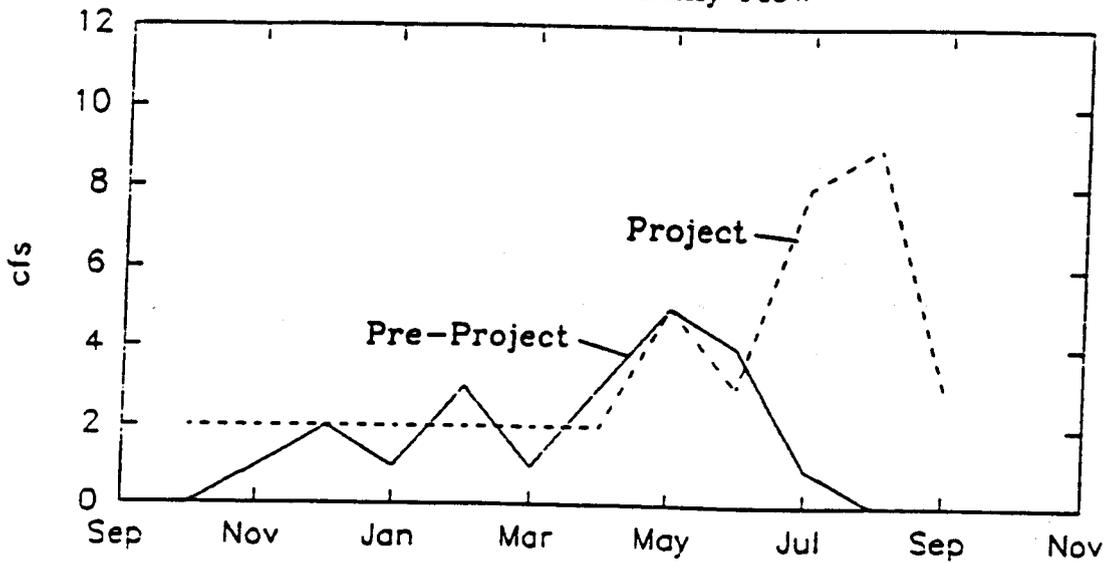


Figure 2. Estimated pre-project and project flows in the La Plata River at the Colorado-New Mexico state line.

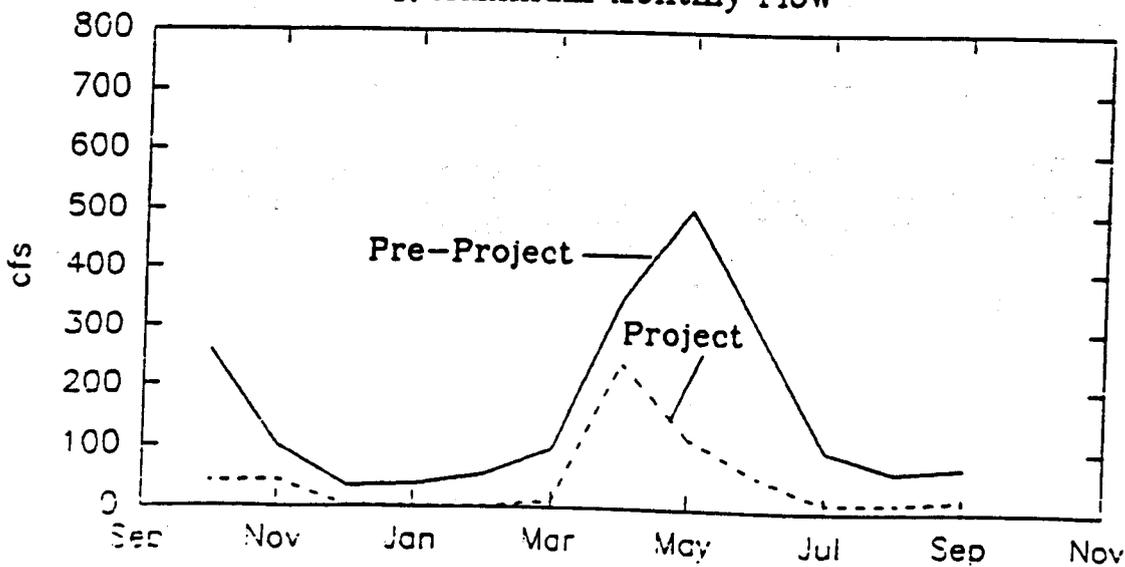
A. Mean Monthly Flow



B. Minimum Monthly Flow



C. Maximum Monthly Flow



Canal Irrigation Delivery System

With construction of the new pipeline delivery system, the existing open ditch system will be abandoned. Seepage now supporting limited wetland and riverine vegetation along many of the ditches will be eliminated. The 1980 FES calculated wetland habitat to be lost through a width times length formula: 140 mi (225 km) of canals x 32 ft (10m) of riverine wetland width. After a cursory inspection of the system this spring by Reclamation, Service, and CDOW biologists it was agreed the 32-ft width used in 1980 was an overestimate. It has since been agreed an average width of 15 ft (4.6 m) is more reasonable. Further, only those canals south of the Dryside Canal will be abandoned, reducing the affected length to 112 mi (180 km) (75 mi/121 km in Colorado and 37 mi/60 km in New Mexico). An additional 10 mi (16 km) of existing canals south of Breen is included for a total of 122 mi (196 km). This yields a new loss calculation of 222 ac (90 ha) (155 ac/63 ha in Colorado; 67 ac/27 ha in New Mexico) as opposed to the 550 ac (223 ha) previously calculated.

Aquatic Resources

Animas River - Colorado

The fully-developed Project will deplete the Animas River downstream from the Durango Pumping Plant by 154,800 ac-ft (190,946 dkm³) annually, or an average of 27 percent. Under average conditions, the largest diversions will occur during the high flow periods of spring and early summer. However, the greatest impact to flows will typically occur during the low flow conditions of late summer through the winter, and the spring peak in a low runoff year, when the greatest percentage depletions will result (see fig. 1 and table 1).

Table 1

Percent Change in Flows in the Animas River Relative to PreProject Conditions
- Below the Durango Pumping Plant -

<u>Month</u>	<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>
October	-44	-22	-17
November	-43	-20	-11
December	-34	-14	0
January	-28	+ 6	-11
February	-28	+ 3	-12
March	-36	- 7	-24
April	-27	-15	- 9
May	-15	-15	-10
June	-16	-27	- 8
July	-28	+32	-14
August	-37	+ 6	-28
September	-30	+33	-22

The 1980 FES characterized the Animas trout fishery as poor, and concluded the Project would have no negative effects on the fishery. Since that time, the trout fishery from Durango to the Purple Cliffs has improved markedly, to meet Gold Medal standards. Insufficient information exists to project impacts to either the Animas River trout or native fish populations with any degree of certainty. Flow reductions will decrease available habitat and may change its composition. Data for evaluating this change are quite limited. Reclamation collected IFIM data for selected portions of the river in 1981. However, only one station, at Purple Cliffs, was modelled to represent the primary trout fishery. Further, habitat modelling was done only for low flow conditions.

Both the data and the models used are now dated. Consequently, conclusions drawn from this data set are considered tenuous and preliminary. Nonetheless, it remains the only habitat data available at this time.

Modelling low flow conditions for brown trout at Purple Cliffs appears to reflect an essentially linear reduction in habitat availability for adult fish as flow decreases, until flows of around 250 cfs (7 cms) are reached. Further flow reduction produces increasingly large percentage reductions in remaining habitat. For instance, reducing flow from 600 cfs (17 cms) to 300 cfs (8 cms) (50 percent) models a corresponding reduction in habitat of 13 percent. Reducing flow from 200 cfs (6 cms) to 100 cfs (3 cms) (also 50 percent) produces a modelled habitat availability reduction of 22 percent. Based on this modelling, habitat availability may decline fairly rapidly as flows drop below 200-300 cfs (6-8 cms). Comparing the mean low flow without the Project just downstream of the Durango Pumping Plant (195 cfs/6cms) with the projected mean low flow with the Project (140 cfs/4 cms), a 9 percent reduction in habitat availability is estimated. Data are insufficient to extrapolate the year-round mean flow reduction to a change in habitat because high flow modelling is not available.

This same data set also indicates that ideal flows for juveniles are between 160 and 600 cfs. Below 160 cfs and above 600 cfs there appears to be a gradual falloff of available habitat. Again, because higher volume flow data are lacking, it is hard to draw conclusions. However, juvenile fish typically need habitat with lower velocity flows. There is speculation juvenile habitat may be a limiting factor in this stretch of the river and that peak runoff may be detrimental to their survival. The Project will divert more water during high flow than low flow conditions, but the percentage reduction will usually be greatest at low flow. Further, the stated Project minimum bypass will not be lower than occurs under natural conditions in dry years. Consequently, the net effect could be some improvement in juvenile fish habitat, while possibly reducing large fish habitat, particularly at lower flows.

Reclamation has projected that the minimum 125 cfs (4 cms) bypass will likely be reached during each year of operation. Therefore, it can be expected that fall and winter flows in the Animas River will, on average, be lower than now typically occur. Clearly, there will be an overall decrease in available trout habitat. The magnitude of that decrease, its significance to the various age classes, and its ultimate effect on fish populations is, however, not at all clear.

Water temperature could increase in summer due to lower flows; although a decrease is possible below the confluence with Basin Creek due to cold releases from Ridges Basin Reservoir. Temperature modelling conducted by Reclamation predicts a temperature increase of 0.5 to 1.0 °F (0.3-0.6 °C) in late summer. If still accurate, this is probably not significant to either trout or native fish populations. Reclamation is collecting new river temperature data for updated modelling. Lower winter flows could increase both surface and frazil icing, with attendant negative effects on both fish and invertebrate populations, and their habitat. Both interspecific and intraspecific age class competition may increase if habitat is reduced significantly. Channel morphology and maintenance could be altered somewhat as a result of decreased flows. Reduced spring flows could have some effect on stream meandering, bank undercutting and siltation deposition patterns. Upstream sources of siltation and metals contamination will be unaltered, but lower flows downstream from the diversion point could result in some increased deposition and accumulation of contaminants and silt with reduced spring flushing flows. Changes in each of these factors could have a negative influence on trout populations.

Animas River - New Mexico

Project effects on river flow dynamics in New Mexico will be similar to those projected upstream. The greatest flow reductions will occur May through September when pumping is at maximum; the largest percentage reductions will, however, typically occur during low flow conditions (see tables 2 and 3). Mean monthly flows during the irrigation season will decline 14 to 61 percent. The greatest impacts will occur during low flow years when mean minimum flows in June are projected to decrease by 67 percent at Farmington and 96 percent at the confluence with the San Juan River (see figs. 3 and 4). Project minimum flows at the confluence in late summer would, however, provide a minimum 4 cfs (0.1 cms) flow, where currently the Animas may be largely dewatered at this point in low flow years.

In New Mexico, the river environment transforms to a warmer, siltier system. Here concerns shift to native riverine fish. Because of dewatering and alterations of natural flow regimes throughout the West, and competition from introduced exotic fish species, many native fish species have declined precipitously in the past several decades. Two federally listed endangered fish species occur downstream in the San Juan River (the Colorado squawfish and the razorback sucker) and would be negatively affected by Project flow depletions. This has been addressed in the Biological Opinion issued by the Service in 1991. Other native fish species could also be negatively impacted. Species of particular concern in the Animas River are the roundtail chub (state-endangered and Federal category II candidate species), mottled sculpin, flannelmouth sucker (Federal category II candidate), and bluehead sucker.

The roundtail chub is of greatest concern as its status in the San Juan Basin appears tenuous. No documented collections of this species have been made in the Animas River since the mid 1970s. The presence of the species in the Animas is still likely, however, as specimens have recently been collected downstream in the San Juan River near its confluence with the Animas, and in the Florida River (Lashmett, BOR, 1992, personal communication), a tributary drainage in Colorado. Studies contracted by the NMDGF in the Gila drainage found the roundtail chub in a variety of habitats, with adults preferring deep pools with moderate current inflow and proximal overhead cover. Eggs are laid in gravel and cobble in pools and moderate-velocity runs. The degree to which the Animas River is currently dewatered has no doubt already negatively impacted this species. Further dewatering, particularly to the extent that would occur during dry years, could have negative effects on the species by reducing deep pool habitat and further degrading water quality. However, so little is known about the species within the drainage that impacts are difficult to assess. Lashmett speculates the smaller tributaries, such as the Florida may provide much of the essential breeding and rearing habitat. Numerous young suckers were found in the Florida (Lashmett, 1992, personal communication), while mostly adults were found in the mainstem Animas during electroshocking in July.

La Plata River

Project effects on flows will vary depending on location relative to diversion points. Above the La Plata Diversion Dam, net flows will be largely unchanged from preproject conditions except during peak runoff during low flow years. Consequently, little impact is foreseen in this stretch of river. Between the Southern Ute and La Plata Diversion Dams, Reclamation projects significantly enhanced flows during the irrigation season resulting from irrigation return. Currently, during dry years the river may be dewatered completely in places by late summer. Complete dewatering under Project conditions is not anticipated except in extreme conditions. Consequently, there could be a net benefit to the aquatic system. Trout may persist farther downstream and the native fish communities could benefit. Earlier this year, electroshocking by Reclamation and Service biologists verified the roundtail chub in this stretch of river.

Table 2. Percent decrease (-) or increase (+) relative to the estimated pre-project mean, minimum and maximum monthly flows in the Animas River at Cedar Hill as a result of the proposed Animas-La Plata Project. Negligible changes are denoted by NC.

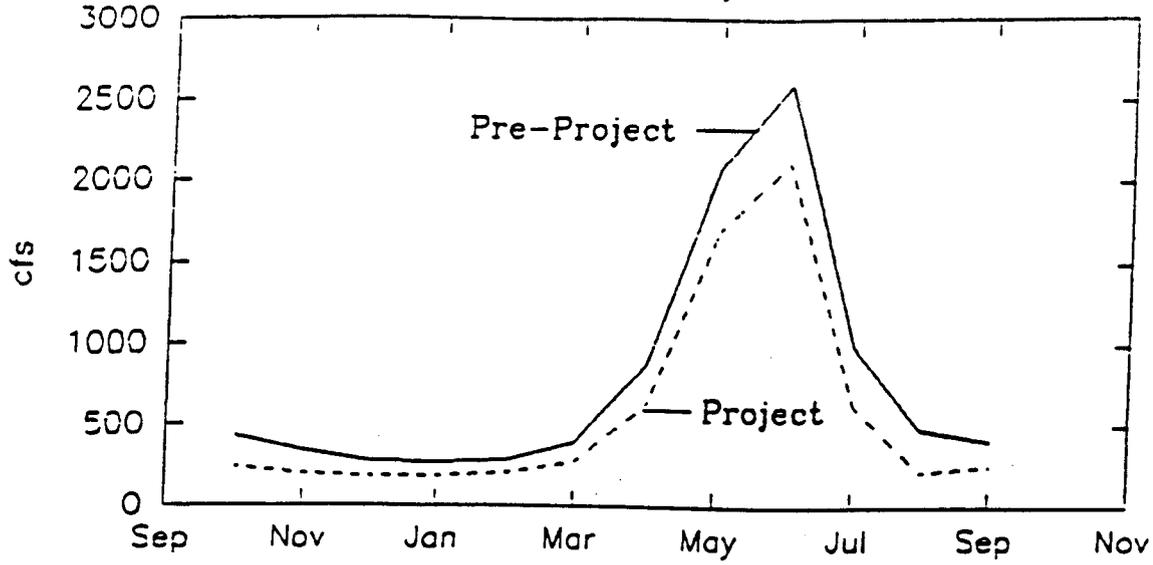
<u>Month</u>	<u>Percent change in monthly flows</u>		
	<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>
October	-37	-18	-13
November	-35	-34	- 8
December	-28	-28	NC
January	-23	-27	NC
February	-22	- 9	-24
March	-25	-13	-18
April	-22	-21	NC
May	-14	-15	- 8
June	-14	-21	- 7
July	-25	+28	-12
August	-30	+ 7	-22
September	-24	+36	-19

Table 3. Percent decrease (-) or increase (+) relative to the estimated pre-project mean, minimum and maximum monthly flows in the Animas River at Farmington as a result of the proposed Animas-La Plata Project.

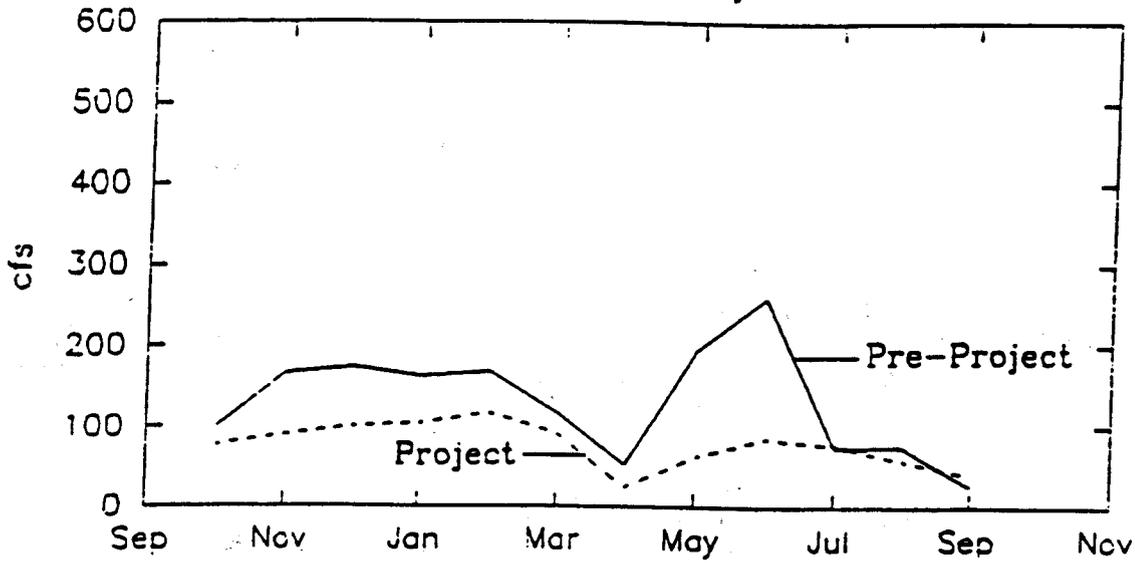
<u>Month</u>	<u>Percent change in monthly flows</u>		
	<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>
October	-44	-23	-13
November	-40	-46	- 9
December	-34	-42	- 5
January	-29	-35	- 8
February	-27	-30	-26
March	-30	-21	-25
April	-29	-52	- 3
May	-18	-67	-12
June	-18	-67	- 8
July	-37	+ 4	-14
August	-54	-21	-22
September	-37	+52	-22

Figure 3. Estimated pre-project and project flows in the Animas River at Farmington.

A. Mean Monthly Flow



B. Minimum Monthly Flow



C. Maximum Monthly Flow

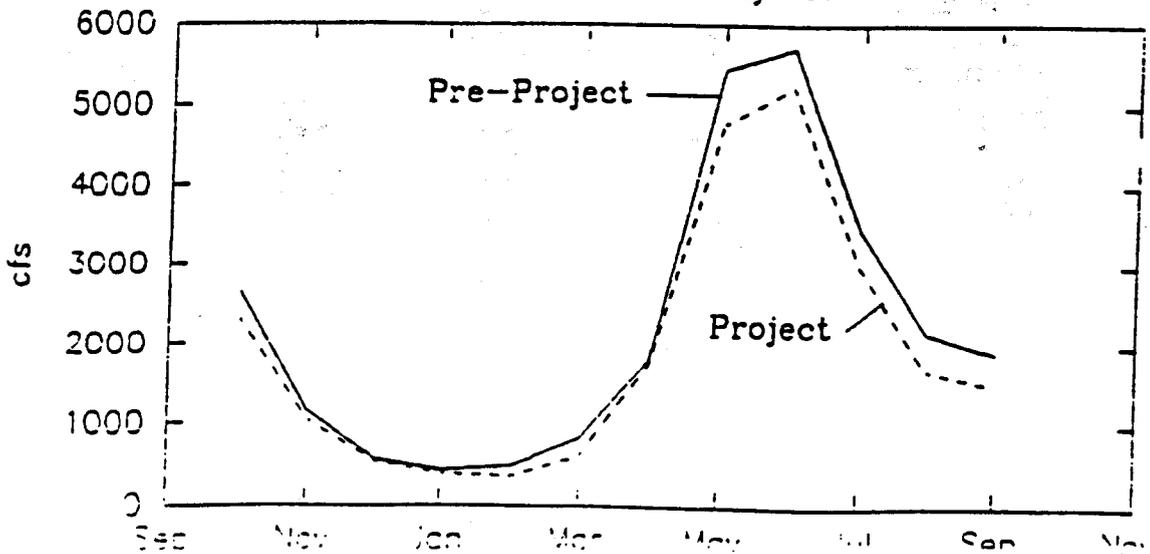
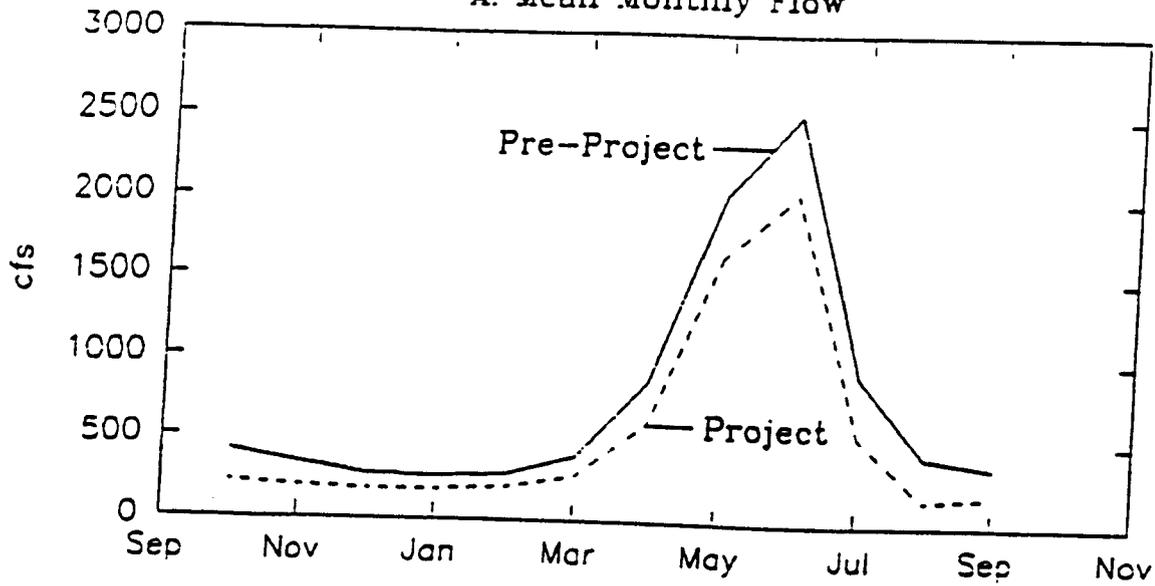
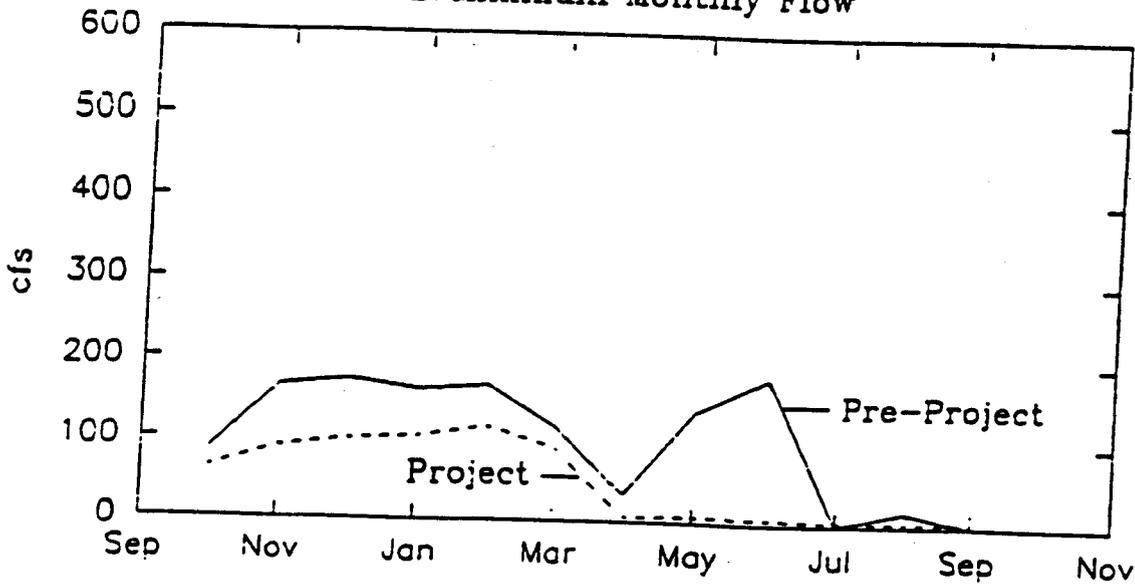


Figure 4. Estimated pre-project and project flows in the Animas River at the confluence with the San Juan River.

A. Mean Monthly Flow



B. Minimum Monthly Flow



C. Maximum Monthly Flow

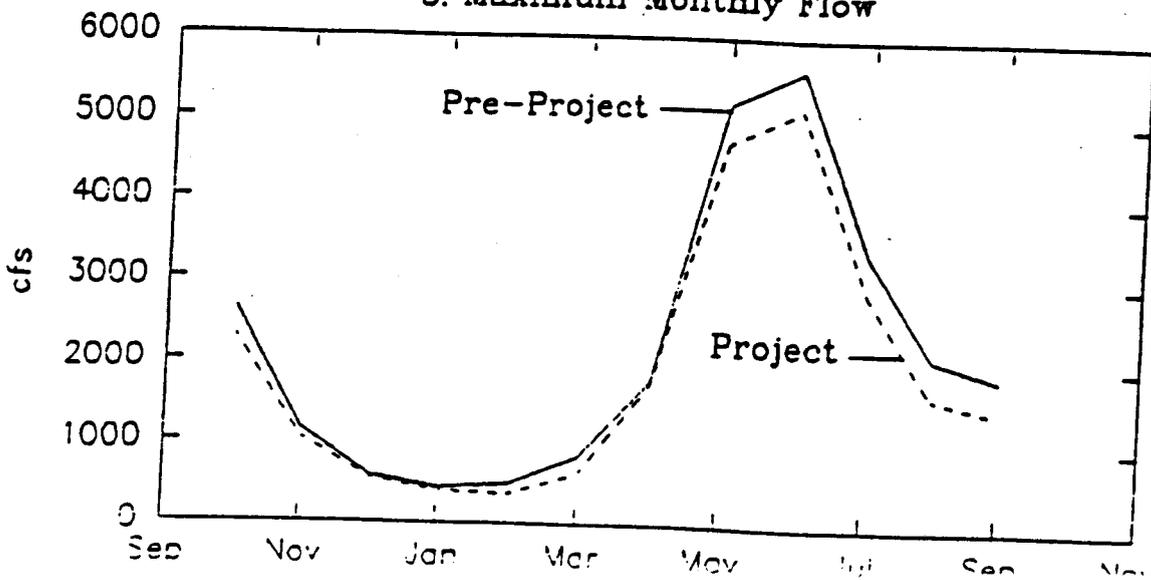


Table 4. Percent decrease (-) or increase (+) relative to the estimated pre-project mean, minimum and maximum monthly flows in the La Plata River at the Colorado-New Mexico state line as a result of the proposed Animas-La Plata Project. An increase over estimated pre-project minimum flows of 0 cfs to 1-5 cfs is denoted by ++ and an increase to 6-10 cfs is denoted by +++.

<u>Month</u>	<u>Percent change in monthly flows</u>		
	<u>Average</u>	<u>Minimum</u>	<u>Maximum</u>
October	-57	++	-84
November	-80	++	-57
December	-78	++	-94
January	-80	++	-95
February	-86	++	-96
March	-92	++	-90
April	-90	++	-31
May	-91	++	-77
June	-92	++	-81
July	-58	+++	-85
August	-17	+++	-77
September	-22	++	-73

With flow enhancement and provision of a minimum year-round flow, this species could be benefitted. It is not currently known, however, how the chub uses this stretch of the La Plata. Riparian vegetation may increase somewhat, which could enhance stream shading, woody instream structural materials, and terrestrial macroinvertebrate production along the stream.

Below the Southern Ute Diversion Dam, flows will be drastically reduced, especially during peak runoff (see fig. 1 and table 4). Mean runoff flows of 90-100 cfs (2.5-3.0 cms) (1980 FES) will fall to 9 cfs (0.3 cms) under Project conditions. It is probable native fish populations below this diversion point will be adversely impacted under Project flow regime. The hydrograph will be relatively flat in all but peak discharge periods of high flow years. Consequently, channel morphology is likely to change significantly, altering habitat structure and availability. Reduced summer flows may result in increased maximum water temperatures and diel temperature fluctuations. Flow reductions are also likely to negatively affect adjacent riparian vegetation, possibly altering patterns of stream shading and maintenance of instream woody debris, a key feature of roundtail chub habitat. A singular potential benefit may be the maintenance of minimum flows year-round in stretches where complete dewatering now occurs at times.

Also of concern is the possible effect on fish populations caused by the construction of impassible barriers on the La Plata River. The Southern Ute and La Plata diversions span the river and could segregate key habitat elements. If fish movements are blocked to or between crucial spawning, wintering, or other seasonal habitats, populations may be adversely affected. Since no information is available on habitat utilization patterns of fish populations in the La Plata River, a full assessment of likely impacts cannot be made. Of particular concern is the potential effect of the Southern Ute Diversion Dam on roundtail populations in the La Plata. Virtually nothing is known of their distribution in or use of the river, and any barriers between key habitat elements could seriously compromise their survival in the system.

In light of speculation that smaller streams may provide much essential chub habitat in the basin, the La Plata River may take on added significance for the welfare of the species in the basin. Negative impacts to La Plata River roundtail populations resulting from Project operation may have significant ramifications for the status of the roundtail chub in the San Juan Basin.

As discussed previously under "Floodplain Wetlands and Riparian Zones", the large land area to be irrigated presents serious concerns for potential water quality degradation and toxicity hazards emanating from heavily irrigation return-augmented flows. Both selenium and mercury are known regional hazards. Each can bioaccumulate, causing acute and chronic toxic effects throughout both aquatic and linked terrestrial food chains at relatively low levels. Soils testing has been conducted on Project lands by Reclamation, but results have not been made available to us.

Several fish tissue samples analyzed from the La Plata River in 1992 revealed elevated concentrations of both elements. These specimens were collected within 0.25 mi (0.4 km) of the confluence with Long Hollow Draw. Liver and kidney samples from a brown trout showed borderline high levels of selenium. Several whole body samples showed mercury levels exceeding the established predator-prey protection level of 0.1 ppm. One sample of 3 flannelmouth suckers had a mercury level of 0.105 ppm and a second 3-fish sample showed a 0.15 ppm level. A two-fish brown trout sample revealed a substantially elevated mercury level of 0.25 ppm. Further, mercury accumulating in fish tissue is typically methylmercury, a more toxic form than elemental mercury.

Although these data derive from only a few samples, and most values are not exceptionally high, they do underscore our concern for the availability and potential for bioaccumulation of these elements in the La Plata River system.

The elevated mercury levels above predator-prey protection standards found in several fish samples are of particular concern to the Service. These are baseline levels and could be exacerbated under Project conditions if either widespread or concentrated sources of this element are subject to leaching within areas to be irrigated. Higher order consumers of aquatic biota, such as the endangered bald eagle, are at risk if high levels of either element bioaccumulate in the system.

Certainly the interrupted perennial flows in this river may have contributed to accumulation of mercury at this location. However, such flow interruption will only be amplified below Southern Ute Diversion Dam during Project operation. Long Hollow Draw could also be draining a source area of this element. These data do not define a clear problem, but they do raise warning flags, and call for expanded evaluation.

In addition, is a potential for increased background levels and event slug occurrences of pesticides from Project lands contaminating the La Plata River. Pesticides can cause lethal toxic effects in aquatic biota and some can bioaccumulate, causing both lethal and sublethal toxic effects throughout the aquatic and associated terrestrial food chains. Water quality may be further degraded by leaching of salts into the aquatic system, and by increasing sedimentation. Reclamation has provided no assessment of these hazards.

Flows between the La Plata and Southern Ute Diversion Dams will be enhanced by irrigation return providing a potential net benefit to the aquatic and riparian systems. However, water quality degradation and accumulation of toxic elements are potential hazards which could not only offset potential benefits, but could result in a net degradation of the system. Further, terrestrial consumers, such as the endangered bald eagle, could be negatively impacted directly through food chain poisoning, or indirectly through a loss of food base. Below the Southern Ute Diversion Dam, the combination of substantially reduced flows and the potential for degraded water conditions portends an adverse impact to the aquatic system and to those species which are dependent on that system.

DISCUSSION AND MITIGATION

Mitigation recommendations set forth in this report have been guided by the Service's Mitigation Policy. Under the FWCA, for which these mitigation recommendations have been prepared, the federal action agency is required to give wildlife conservation measures equal consideration to features of water resources development. Consideration is to be given to all wildlife, not simply those which are legally protected under the Endangered Species Act, or those with high economic and recreational value. Further, the recommendations of the Service and the state wildlife agencies which follow are to be given full consideration by the action agency.

The time frame established for the initial "technical analyses", this PAM, and the ultimate supplementing NEPA documentation, did not permit the collection of data needed for adequate determination of probable Project-related impacts to fish and wildlife resources. As we stated at the initiation of these new Project analyses in April, 1992, this constricted time frame can still produce a satisfactory result provided that where the fact or the magnitude of impacts to wildlife resources is unclear or in dispute, that any decisions regarding mitigation err on the side of fish and wildlife resources. Where the reality or magnitude of impacts is uncertain, consistent decisions to err on the side of the project carry a high probability for net loss of wildlife resources. It is the basic philosophy of the Service that no net loss or irreplaceable losses of fish and wildlife resources should occur as a result of project development. Further, such loss would run counter to the tenants of the FWCA that provides for the conservation and enhancement of wildlife resources by federal action agencies in water development project actions.

The recommendations that follow have been developed jointly by the Service, CDOW, NMDGF, and EPA with the express intent of preventing a net loss of wildlife resources identified by these agencies as those of special concern and which are considered to be at greatest risk.

Terrestrial Wildlife

Ridges Basin - Replacement of Bodo Wildlife Area

The CDOW believes the Bodo State Wildlife Area will be so severely compromised as an elk wintering area (its primary purpose) and in administrative function that Reclamation should replace the entire area. Based on the previous analysis of Project impacts to elk use of the area and the ability of the CDOW to manage the remaining area for its intended purpose, the Service concurs. Although elk may continue to use portions of the Wildlife Area, particularly during the winter, the combined Project effects coupled with the cumulative effects of area development will render the BWA unsuitable as a managed winter range. Therefore, the Service recommends replacing the entire BWA with lands of equal monetary value.

Selection of replacement land should be prioritized according to CDOW wishes. The general priority should be to acquire replacement land: within the same management area; secondly, within the southwest region; and third, statewide. We recommend Reclamation acquire the agreed upon replacement land and transfer title to the CDOW. Property acquisition should include survey, fencing, and any other substantial costs associated with area acquisition, establishment, and enhancement.

Ridges Basin - Elk Mitigation

Replacement of the Bodo State Wildlife Area simply restores land ownership to the CDOW; it does nothing to replace lost wildlife habitat and, therefore, lost wildlife carrying capacity. Consequently, the Service recommends that Reclamation replace lost wildlife habitat value so that no net loss in area wildlife carrying capacity results from Project development.

Although a variety of wildlife habitat values will be negatively impacted by the Project, a decision was made in 1979 to mitigate based on elk habitat loss. The reasons for this decision were:

1. The difficulty of evaluating comparable habitat value for a variety of species as compared to evaluating for a single species.
2. Other species would generally be accommodated through of replacing elk habitat value.
3. The area was originally acquired expressly as elk winter range.
4. Well understood methods are available for evaluating elk habitat.
5. Proven methods are available for enhancing and improving elk habitat.

The CDOW and the Service still accept the rationale for that decision. Therefore, the Service recommends that Reclamation replace the elk habitat carrying capacity lost to Project development, assuming other wildlife habitat values will be replaced concurrently. Mitigation should replace elk habitat values lost and should occur within the winter range of the herd to which the impacted elk belong, i.e. the Hermosa herd. To most benefit this herd, priority should be given to replacing lost habitat carrying capacity on predominantly mountain shrub habitat on the north side of U. S. Highway 160; due to development, habitat to the south is no longer desirable. This may necessitate the purchase of private properties on a willing-seller basis as mitigation land. If the desired land is unavailable on a willing-seller basis, other sites will be considered by the CDOW in the range of a different herd. However, since this is the only reasonable area for mitigating winter range losses to the herd using Ridges Basin, alternative sites that would enhance habitat carrying capacity for a different elk herd will require reanalysis of mitigation acreage.

Offsetting habitat losses will require improvement of other elk habitat, as any lands acquired will have existing habitat value. The difference between current habitat value of acquired lands and the habitat value achieved through improvement efforts will constitute the mitigation for Project-related losses. In 1979, the CDOW requested mitigation land with a predominance of mountain shrub habitat north of Highway 160, estimating a 40 percent carrying capacity enhancement potential. The CDOW still accepts these precepts. Habitat improvement costs are currently estimated at \$45/ac for initial development. Costs will also be incurred for periodic management necessary to maintain habitat at this improved optimum level (the mitigation level). Failure to maintain habitat at this level will result in a transient mitigation benefit. Authority for this maintenance expenditure is provided under Section 8 of the Colorado River Storage Project (CRSP) Act of April 11, 1956.

A multi-agency team used a HEP analysis in 1979 to provide an objective means of making direct habitat value comparisons between habitats lost and those acquired for replacement and mitigation purposes. The procedure assigned relative habitat values to each principle habitat type present on the BWA. It did not attempt to determine carrying capacity, but rather, provide a system capable of comparing overall habitat value of different properties with varying habitat mixes. The elk habitat unit values (HUV) calculated for BWA habitats were:

Irrigated	=	5.7/ac (14.1/ha)
Mountain Shrub	=	5.7/ac (14.1/ha)
Grassland	=	4.1/ac (10.1/ha)
Sagebrush	=	1.5/ac (3.7/ha)
Pinyon-Juniper	=	1.4/ac (3.5/ha)

These values were then multiplied by the total acreage of the appropriate habitat type for the area being evaluated, thus providing habitat units (HU) for each habitat type. Totalling HU for all habitat types provides total HU for the evaluation area. All parties (Service, CDOW and Reclamation) have accepted the original HEP approach and agreed to recalculate mitigation requirements based on new elk use levels and patterns, and new assessments of disturbance-related impacts.

Our recalculation of Project impacts to Ridges Basin elk (presented in the previous section) yielded an additional 1,566 ac (634 ha) of impacted habitat. In determining the additional HU affected, the weighted mean HUV (2.75/ac; 6.8/ha) is used because it is unclear which part of the inundation area was considered unused by elk in 1979. Multiplying the additional calculated impacted acreage by the mean weighted HUV (1,566 x 2.75), an additional loss of 4,306 HU is calculated. Adding this figure to the original lost HU calculated in 1979, a new total loss of 10,042 HU is generated. The HEP analysis assigned a HUV of 7.0/ac (17.3/ha) for the desired mountain shrub mitigation habitat north of U. S. Highway 160. Assuming this habitat is improved through management from its current HUV of 7.0/ac to 9.8/ac (24.2 ha) (a 40 percent increase in elk carrying capacity), each acre improved replaces 2.8 lost HU. Therefore, the lost 10,042 HU can be mitigated by purchase and development of 3,586 ac (1,451 ha) (10,042 ÷ 2.8) of predominantly mountain shrub habitat north of Highway 160, within the range of the Hermosa herd.

The remaining 3,853 ac (1,402 ha) of the Bodo State Wildlife Area have not been considered negatively impacted by the Project for purposes of calculating required mitigation acreage. Any Project-related actions which would impact this area, reducing its value to elk, would necessitate further impact analysis and additional mitigation. Therefore, measures should be taken to protect this remaining area from Project-related impacts and maximize residual use by elk and deer. Efforts should be directed toward protection of the ridge between County Road 211 (as it is currently routed) and Wildcat Creek, and between the campground and Carbon Mountain.

If Reclamation acquires control of this area, the following measures are recommended to minimize further negative impact. The area should be fenced and closed to public access, at least as long as elk are present on the site. Particularly vulnerable periods are the late May to July calving period, and winter through early spring. Dogs can be a serious problem, and requirements should be in place and enforced to keep them under control. Snowmobiles should be restricted from the basin. Closing the campground and other non-essential access points along the ridge during fall and winter will help encourage continued use during that period. It would be most desirable to designate the area a wildlife reserve associated with Ridges Basin Reservoir.

Construction considerations, particularly timing, discussed under corridor relocation, are appropriate for incorporation into the planning of other basin construction activities as well.

Ridges Basin - Raptor Nesting on Carbon Mountain

Avoidance of the nesting area during sensitive periods is the most desirable course of action. During Project operation this should generally be possible. Eagles may adapt to routine activities on the basin floor, provided they are removed from the nesting area. Activities such as boating, fishing and picnicking may be compatible provided they do not occur below the nest site. It is advisable that all human activity be prohibited from Carbon Mountain. Recreational activities should be excluded from the base of Carbon Mountain and, to the extent possible, within at least 0.25 mi (400 m) of the nest site during the courting and nesting period.

Avoidance during construction will be more difficult and, in some cases, may not be possible. Because the sensitive period is extended, it is unrealistic to expect that dam and reservoir construction activities can be scheduled entirely outside this time frame. However, we recommend the most intense and intrusive construction activities be so scheduled if construction requirements can accommodate these timing constraints. In particular, activities such as blasting and other major earthmoving activities at Carbon Mountain should be scheduled for late summer if possible. In general, as the nesting season advances, the adults become increasingly bonded to the nest site. Therefore, construction scheduling should place the least intrusive activities possible early in the nesting cycle. All activities, except those necessary for construction, should be prohibited from Carbon Mountain. A minimum buffer zone of 1/4 mi should be maintained around Carbon Mountain for all but essential activities during the nesting period.

If avoidance measures are not possible, and if a site on Carbon Mountain less vulnerable to disturbance can be identified, building an alternative nest site for the eagles should be explored. As a last resort, moving a nest to a more secluded site may be possible. Some research has shown that elimination of line-of-sight to a disturbance source may lessen the sensitivity of nesting eagles to that disturbance. Therefore, it may be desirable to create a visual barrier between any existing or artificial nest sites.

Two nests currently exist on Carbon Mountain. We recommend CDOW and Service raptor specialists assess their locations relative to planned construction and operational activities, and determine whether either is likely to continue to be used under planned construction and operational scenarios. If not, they should determine the best alternative to avoid loss of this production. These specialists should then carry out any construction of alternative nest sites or moving of nests.

Avoidance measures taken for the nesting eagles would also be appropriate for the protection of nesting peregrine falcons. Although peregrines do not currently nest on Carbon Mountain, its potential as a future nest site should be considered in planning.

Ridges Basin - Corridor Relocation

We assume the pipeline and powerline relocation corridor will be along the ridge top north of the reservoir. This would provide a relatively uniform surface which should minimize the need for earthmoving and vegetation removal. In crossing the ridge top, the corridor will pass through some well-developed ponderosa pine park habitat. The alignment should be planned carefully to avoid cutting mature ponderosa pines and to minimize overall disturbance of the parkland. Construction corridor width should be minimized and equipment laydown areas located out of parkland habitat to the extent practical. An existing road and utility line on the ridge should be paralleled as much as possible to minimize new habitat disturbance. When possible, surveying and construction activities should be timed to minimize disturbance of big game using the ridge. The preferred window would be from late summer through early fall. This period would permit elk calving on the ridge to continue and would avoid impacting emigrating and overwintering big game herds. Construction and personnel activities should be confined to construction and access corridors to minimize impacts to ridge habitat and disturbance to wildlife. All access roads and corridors should be closed to public use. If not needed for corridor inspection and maintenance, they should be revegetated with native species having forage and cover value to wildlife.

Project Lands

We suggest construction of the pipeline delivery system be planned in a segmented format if possible so individual segments can be constructed independently of adjoining segments. This will permit advancing or delaying construction of individual segments to coincide with desirable construction windows around sensitive wildlife sites. An example would be a raptor nest that will be closely approached by construction activities. We suggest a biologist inspect all corridors in advance of construction to identify sensitive sites where avoidance and timing measures should be implemented. Because pipelaying should not involve protracted periods in any location, timing will often be the best way of minimizing disturbance impacts.

Native and semi-native habitats should be revegetated with appropriate native species. To minimize impacts, laydown areas and access routes should be confined in size, and located on sites already disturbed whenever possible.

Pipeline stream crossings are of concern to the Service, CDOW, and NMDGF. Concerns center on the potential for damage to riparian and floodplain habitat, impact to sensitive wildlife species, and degradation of stream channel corridors. The delivery system should be designed with an absolute minimum of stream crossings. If crossings are necessary they should be routed to avoid all developed riparian zones, particularly wooded riparian habitat and floodplain wetlands. Construction across channels should be designed to avoid damage to banks and riparian vegetation, possibly using aerial instead of buried designs. If disturbance of the channel or vegetation is necessary it should be completely restored to avoid bank destabilization. Construction near wooded riparian zones should avoid periods when bald eagles are present.

Unique and sensitive wildlife habitats should be avoided whenever possible. If prairie dog towns will be significantly affected, the Service should be consulted for a determination of need for a preconstruction black-footed ferret survey. Wherever the Project may impact potential black-footed ferret habitat, such pre-disturbance surveys will allow the assurance that this endangered species will not be affected. Additionally, the Service is in the process of identifying recovery sites for this species and the Project region has yet to be evaluated for that potential. Therefore, Project actions should not negatively impact potential black-footed ferret habitat (i.e. prairie dog towns) until the Service has the opportunity to evaluate them for their potential in the recovery process.

All concrete-lined canals should be equipped with effective escape devices to prevent animal entrapment and drownings. Earthen canals should either be adequately sloped or similarly designed with escape devices. Large canals can result in habitat fragmentation, barriers to movement, and in permanent loss of habitat. Habitat enhancement within the various canal ROW corridors may constitute suitable mitigation for habitat loss. Locations and type of plantings should be coordinated with the CDOW, NMDGF, local SCS, and adjoining landowners to assure they are appropriate and compatible with management objectives. There may be some areas where habitat enhancement and resulting concentration of wildlife would be undesirable. Larger canals should be evaluated in conjunction with the CDOW and NMDGF for their potential to constitute barriers to wildlife movement, especially to migrating deer and elk. Where such problems are identified, canal crossings should be designed and placed at frequent intervals.

Southern Ute Reservoir

The 1979 PAM presented a mitigation strategy for the 60,794 HU to be lost to inundation and development. This involved habitat development of 1,000 ac (405 ha) of land adjacent to the reservoir and managed by the Southern Ute Indian Tribe. Developing and managing wildlife habitat adjacent to the reservoir offers substantial potential for wildlife benefit. With the proximity of native range and a reservoir, habitat development and management plans can be created that will benefit a variety of rangeland, semi-aquatic and aquatic species. Wetland development is a distinct possibility. Although such a diverse habitat development plan would, in part, be out-of-kind, its potential for substantially improving the net benefit to wildlife cannot be overlooked. The Service encourages such a plan; and since habitats with significantly higher HUV ratings are possible, total mitigation acreage may be reduced. Areas developed for wildlife should be segregated from recreational sites, or benefits to wildlife may be diminished.

Estimated costs were \$21,000 for initial development and \$20,000 annually for maintenance, based on development figures for McPhee Reservoir and Perins Peak Management area. Adjusting with the Consumer Price Index, these become \$45,000 and \$37,400 respectively. However, it is uncertain just what the development considerations were in the original 1979 PAM. They may or may not be appropriate to a plan developed for Southern Ute Reservoir. Planning should be conducted with the Southern Ute Tribe and the Service.

Because the water source will be heavily constituted of irrigation return, water quality is a significant concern. A toxic buildup of selenium, mercury, pesticide byproducts, and eutrophying nitrates and phosphates are potential problems. Water quality at this impoundment requires a thorough analysis. If potential problems are identified, measures need to be in place to maintain water quality standards that will protect fish and wildlife using this reservoir. Periodic monitoring of incoming water, impounded water, and sediments should be conducted. Occasional bioassays are desirable to identify any bioaccumulation of metals and pesticide residues. Nitrates and phosphates may or may not be a problem depending on concentration levels. Eutrophying nutrients may aid the establishment of shore and littoral vegetation for wildlife benefit. Excessive nutrient-loading could lead to overdevelopment of vegetation and a degraded environment, and could even become toxic.

Wetlands

Ridges Basin

Wetland mitigation is required for any wetland losses that result under Section 404 permitting of the Clean Water Act, and by Executive Order 11990. In compliance with these requirements and within the spirit of the FWCA, the Service recommends full mitigation for all delineated wetlands at equal or greater habitat value than that lost.

Project purpose, design and nature preclude avoidance or minimization of impacts if the Project is to be built. Therefore, mitigation options fall into the categories of creation, restoration, or enhancement of existing wetlands. Restoration or enhancement of existing wetlands has the advantage of using a proven wetland hydrologic regime. However, availability, location, and types of wetland sites for mitigation are likely to be constrained. Further, in the case of enhancement, mitigation potential is limited, thus resulting in higher requested ratios. Wetland replacement offers more control over location and type to be created, but because a new hydrologic regime must be created, success is less certain.

It is desirable to locate mitigation sites as close to the original impact as possible (in-place mitigation) with the intent of replacing hydrological, wildlife and other ecological values lost. Therefore, we recommend that first priority be given to locating mitigation sites within the basin. Benefits which may be realized include the potential enhancement of wetland value resulting from their proximity to the reservoir, and significant sediment loading of the reservoir may be prevented if wetlands are located above the impoundment. Reclamation has committed to the principals of both mitigating in full for all wetland losses and to mitigating within-basin to the extent feasible. Two possible mitigation sites totalling approximately 90 ac (36 ha) have been identified within the basin proximate to the proposed inundation area. Others are being investigated by Reclamation in the headwaters of the basin and along Wildcat Creek. The Service recommends designing shallow-water wetlands at the upper end of the reservoir at every opportunity. Availability of mitigation sites may preclude full in-place mitigation. If out-of-place mitigation sites are necessary they should be selected with the input of the CDOW, Service, and EPA. The Southern Ute Reservoir site may provide some opportunities if out-of-place mitigation is necessary.

A somewhat more difficult issue is the type of wetland habitats to be created for mitigation. These decisions can be influenced by the intended purpose of the replacement wetlands and by the characteristics of the mitigation sites chosen. All wetlands have some wildlife value, but a problem arises in assigning values to wetland types as different wildlife species have different habitat needs. Therefore, the simplest strategy for mitigation is to replace with the same wetland types and functions as those lost (in-kind mitigation). The Service does not intend to place a value on one species versus another, but does recognize that habitat diversity and structural complexity often increase the diversity of wildlife species use and the capacity to support a larger wildlife biomass. Because the interest of the Service is the habitat benefit to wildlife, we would consider a Reclamation proposal that did not follow strict adherence to an in-kind strategy if a net benefit gain to wildlife could be supported to the satisfaction of the Service. Our principal concern is that there is no net loss of wildlife support capacity. If in-kind mitigation is to be undertaken, we recommend that the irrigation-supported wetland complex be used as the base model since it had a somewhat higher structural diversity than does the natural system.

This leads to a third mitigation component - quantity of mitigation land required. Two factors influencing this determination are quality of the wetland habitat created (support capacity, from a wildlife perspective), and probability for success. The EPA uses a mitigation ratio guideline based on probability for mitigation success. The lower the probability for success, the higher the ratio of mitigation wetland to wetland lost that is requested. Where mitigation involves restoration of the hydrological regime to previously existing wetlands, the ratio is 1:1; for creation of wetlands where wetland hydrology did not previously exist, the ratio is 2:1; and for enhancement of existing wetlands in a degraded condition, the ratio is 3:1. In general, the Service supports this policy. However, since the capacity of habitat to support wildlife will dictate the amount necessary for equal value replacement the Service would consider a mitigation plan that would substitute an increase in habitat support capacity for acreage. The problem to be recognized is assigning and supporting habitat values. Some means of determining relative habitat values is needed. While it would be Reclamation's responsibility to develop and support an alternative wetland mitigation plan, any adjustment of acreage requirements in lieu of providing increased HUV should be undertaken with the concurrence of the Service and EPA.

Reclamation identified 120 ac (49 ha) in potential mitigation sites in their 1992 wetland report. Assuming all is available, is usable, and will be developed in-kind, the requested ratio will be 2:1 for a creation effort. This would provide 60 ac (24 ha) of mitigation credit toward the 120 ac deficit.

Lastly is the issue of mitigation timing. As a minimum, mitigation should be concurrent with development. The Service prefers that mitigation precede all activities that will impact wetlands. If development of your mitigation sites were accomplished and success verified prior to disturbing any wetlands in the basin, the ratio could be reduced to 1:1 for full credit.

Also recommended is the use of check dams to gradually build up and restore deeply eroded channels within the basin. Over a period of years, a well designed system of check dams could result in siltation trapping, creating a shallow channel cross-section. This would likely increase linear riverine wetland habitat, resulting in replacement of some of the emergent channel wetlands lost to inundation. A second Project benefit would be substantial sediment trapping above the reservoir.

Due to the extended and phased nature of the Project, we recommend both a preliminary procedural mitigation plan and a formal accounting process be developed, and attached to the SEIS. The plan should, at a minimum, identify the overall process Reclamation will follow in accomplishing mitigation through full development (in its ultimate form), scheduling relative to project development activities, the proposed mitigation to be provided for each type of wetland impact (Ridges Basin, abandoned canal system, and riparian zones), and any mitigation implementation agreements reached between Reclamation, the Service, EPA, and CDOW. A more detailed technical plan should follow as technical studies are completed. Details to be provided may vary with the distance into the future of the proposed action, but should be as complete as possible. Accounting should maintain the status of mitigation credits and outstanding debits for the Project based on established ratios and any negotiated ratio modifications for habitat value credit, and generally provide tracking of mitigation efforts relative to the plan. Status reports should be submitted to the Service and EPA annually. Concurrence by these agencies for the plan and any future modifications should be obtained.

Floodplain Wetlands and Riparian Zones

Unlike the Ridges Basin Reservoir site, Project features are unlikely to require siting which would impact either floodplain wetlands or developed riparian habitat. Careful corridor alignment is necessary to preclude any intersection of either of these habitat types. Should Reclamation determine that a circumstance necessitates impacting either floodplain wetlands or developed riparian habitat, consultation with the Service, the EPA, and the Corps (if a jurisdictional wetland) should be undertaken regarding the necessity for impact, and appropriate mitigation strategy. The considerations for wetland mitigation provided under Ridges Basin will generally apply.

Impacts to floodplain wetlands and riparian habitat may result along the Animas and La Plata rivers as a result of flow depletions and alteration of the existing hydrograph. Below the Southern Ute Diversion Dam negative effects to the La Plata riparian corridor could be substantial. Although the degree of dewatering and hydrograph alteration are less dramatic on the Animas River, it is possible that some negative impact will occur in this riparian corridor as well. This very real potential for riparian damage is of concern to the Service, EPA and to both state wildlife agencies.

The riparian and floodplain wetland environment is declining throughout the West, yet these river corridors constitute some of the most important habitat to wildlife generally, and to the endangered bald eagle and other sensitive wildlife species in particular. Therefore, the Service recommends that Reclamation undertake an assessment of Project operations and features with the intent of identifying any and all reasonable options that will minimize flow alterations which may negatively impact these two riverine systems. Two principle options to examine for the La Plata River include resiting the diversion point downstream or bypassing a larger flow through this section of river. Options to consider for both rivers are means to bypass larger flows in alternate or every few years, especially to maximize spring scouring flows. We further recommend that Reclamation initiate a proactive program of full riparian mitigation for estimated unavoidable impacts in advance of Project construction and operation.

It is not desirable to defer mitigation until negative effects are documented. Such documentation is likely to take many years. Further, too many negative ecological ripple effects, which could be difficult to reverse, may be set in motion by riparian decline before compensating measures can be taken. As riparian and wetland habitat decline, wildlife values will be declining concurrently. Losses could be substantial before the degree of impact is fully assessed, and even greater before mitigating measures are initiated and providing benefit. Further, by assuming and mitigating all anticipated losses in advance, a greater number of options are available for maximizing resource benefits, e.g. consolidation and coordination of mitigation actions.

Therefore, the Service recommends (a) Reclamation, the Service, EPA, CDOW, and NMDGF in consultation and using their best professional judgement, make a determination of probable unavoidable losses of riparian habitat from Project operations; and (b) Reclamation mitigate the agreed losses in both river corridors jointly and in advance of Project operation by acquiring, enhancing, and providing long-term management control of other suitable riparian habitat. It is desirable mitigation acreage be combined into one or more consolidated riparian management zones for the benefit of terrestrial and aquatic biota. Mitigation plans should be developed and implemented in consultation with the above agencies. A mitigation plan and implementation agreement should be prepared and attached to the final SEIS.

In order to determine mitigation needs, the existing riparian resource needs to be quantified and characterized. To our knowledge, no such data base exists. Therefore, we recommend that Reclamation immediately map or fund mapping of the Animas and La Plata riparian corridors. The Animas corridor should be mapped from the Durango Pumping Plant to the confluence of the San Juan River. The La Plata corridor should be mapped from the Dryside Canal to at least 3 mi (4.8 km) into New Mexico, and preferably, to the San Juan River. Mapping should provide the location, extent, and habitat types along both river corridors. If adequate, recent aerial photography is available or can be generated, this would provide the quickest, simplest and least expensive mapping approach. Ground-truthing will be required as a minimum to assure accurate photo interpretation, and is desirable to provide qualitative assessments of habitat condition.

Better characterization of the riparian corridors would be achieved by collecting representative sample data on dominant species composition, cover, density, age classes of cottonwoods or other dominant indicator species, and water table height. Such data could be collected relatively inexpensively by using a carefully-selected series of sample transects to represent the various habitat types along the affected corridors, but concentrating on high quality sites. These data would provide a better analysis of the environments to be affected and would provide a baseline from which to gauge actual Project effects in the future. Although monitoring would not be required to satisfy Reclamation obligations if full advance mitigation were provided, a simple, inexpensive monitoring program to collect comparative data every few years could be very beneficial in better predicting impacts from similar actions.

Alternatively, but less desirable, Reclamation could mitigate an assumed negotiated minimum percentage loss in advance, followed by monitoring and further mitigation as needed. Long-term monitoring would be required and potentially beneficial resource options may be foreclosed. More detailed and extensive baseline data will be necessary, followed by careful monitoring using a series of permanent transects established to measure changes in the various habitat types along the length of the affected corridors. Potential changes to be monitored should include width of the riparian zone, species composition and vigor, age class structure (especially lack of reproduction) of dominant indicator species (usually cottonwood), and change in the water table height. The duration of monitoring may depend upon the results. Continued decline of the riparian zone or an erratic response attributable to the Project may necessitate continued monitoring. If the riparian zone shows no response, or a decline stabilizes after an agreed number of years, the program could be discontinued. The Service does, however, strongly advocate full advance mitigation based on a presumed loss.

Canal Irrigation Delivery System

It is neither practical nor desirable to mitigate for the loss of habitat resulting from abandonment of the open ditch system in-kind or in-place. Because the nature of this habitat is generally riverine, and because the most valuable affected habitat elements may be cottonwoods; the Service recommends that Reclamation mitigate these losses in advance of Project operation by acquiring, enhancing and providing long-term management control of riparian cottonwood gallery woodland in conjunction with mitigation provided for losses in the Animas and La Plata riparian corridors. A consolidated and coordinated mitigation package for both riparian corridors and the abandoned canal system would maximize potential benefits to regional wildlife and native vegetation resources. Mitigation plans should be developed in coordination with the Service, EPA, CDOW and NMDGF, and attached to the SEIS.

Aquatic Resources

Ridges Basin Reservoir

Reclamation committed (1980 FES) to providing a fishery in Ridges Basin Reservoir. The Service supports the development of a Ridges Basin Reservoir fishery, as long as species composition is made up of salmonids only. Because of the potential for competition with and predation on endangered and other native river fishes, no nonsalmonid, nonnative species should be introduced into Ridges Basin Reservoir.

The Service recommends Reclamation commit to providing the annual requisite salmonid fish stock for Ridges Basin Reservoir. Since the capacity to provide the needed fish stock for Ridges Basin Reservoir is not likely to exist in either the Federal or state hatchery systems, funding may necessarily include the acquisition or expansion of hatchery facilities. Sources, species, strains, and stocking rates should be developed in consultation with the CDOW and the Service. McPhee Reservoir is stocked at a rate of 100 fish per surface acre (247 per surface hectare). Earlier evaluations (1979 PAM), using a predictive model from the Service's National Reservoir Research Program estimated the reservoir could support 62 lbs of sport fish/ac (57 kg/ha).

Since the reservoir will act as a sink for any metals entering the reservoir, and because identified and potential heavy metals sources occur upstream on the Animas River, Reclamation should provide a thorough analysis for potential accumulation of heavy metals in the Ridges Basin Reservoir system. This analysis should include identification of known and probable sources, metals and concentrations which can be anticipated to enter the reservoir, and their probable fates in the water column, bottom sediments, and aquatic biota. Since it is unlikely that all questions can be satisfactorily answered in advance, and since a mercury accumulation problem has developed in other regional reservoirs, a monitoring program should be initiated at Ridges Basin. Monitoring of heavy metals in bottom sediments, the water column, and biota should be conducted regularly throughout the life of the Project to avoid problems developing unnoticed. A conceptual response plan should be developed to address foreseeable problems should they occur. The analysis, monitoring program, and conceptual response plan should be referenced in and coordinated with the Bald Eagle Management Plan to be prepared.

Animas River - Colorado

Due to a variety of factors, including limited data, a project which will divert rather than control in-stream flow, a natural system with dramatically fluctuating flows, heavy metals and non-point source organic contamination, a stocking-supported fishery, experimental management, and other factors, it is impossible to predict the magnitude or even the nature of Project-related impacts. However, since we do know that instream flows in the Animas River will be reduced by an average of 27 percent below the Durango Pumping Plant, probably resulting in an unquantified habitat loss; and because preliminary support for that conclusion is provided by 1981 Reclamation IFIM data; the Service recommends (a) Reclamation provide some mitigating measures to offset habitat loss in advance of water diversion from the Animas, and (b) collect further data to more accurately assess Project impacts on the Animas trout fishery, and (c) provide additional mitigation as necessary.

The Service recommends Reclamation undertake the following measures to offset habitat loss that may occur from reductions in flow in the Animas River due to operation of the Project.

1. Currently, a viable trout fishery exists only from the Durango area downstream to the Purple Cliffs, near the Southern Ute Indian Reservation boundary. While habitat limitations and seasonally severe conditions probably preclude a self-sustaining trout population, CDOW, Service and Reclamation biologists agree the river offers potential for establishment of a stocking-supported fishery to perhaps the Bondad area. Therefore, the Service suggests Reclamation attempt to extend the trout fishery in the Animas River from Purple Cliffs downstream to Bondad through annual stocking. Stocking methods, fish species, and strains comparable to those used currently by the CDOW upstream should be used in stocking this stretch. These would involve stocking 3-6 in (8-15 cm) brown and Colorado River strain rainbow trout throughout this reach, distributed evenly by boat. Cost is estimated at \$21,000 per year, based on stocking fish at 350/ac over 240 ac (323/ha over 97 ha) (\$0.25 per fish).
2. Because lack of access to the Animas River for the public at large due to private control would currently limit the recreational value of the newly established trout fishery, access will be necessary for the expanded fishery to benefit the public. Consequently, the Service recommends that extension of the Animas River trout fishery be coupled with provision of public access along this reach. Attempts by Reclamation to acquire access should be undertaken in coordination with the CDOW, the Southern Ute Indian Tribe (SUIT), and private landowners. Improved boat launching facilities are nonexistent, and would offer additional potential for providing public benefit. We recommend a trial stocking program be initiated to verify the viability of the concept prior to acquisition of river access.
3. Existing habitat limitations may result in a lower trout biomass yield than is found in the Durango area. Therefore, it may be desirable to assess stream habitat, attempting to identify limiting factors that could be reasonably enhanced with probability of achieving a significant gain in trout biomass or survivability.

Flow depletions resulting from Project operation will affect trout populations by reducing available habitat. Ideally, it is desirable to project habitat loss and correlate with a response in the fish population. Models exist which can relate habitat quantity and availability for a given flow regime. However, habitat changes will be difficult to model for the fluctuating, unregulated flow of the Animas River. Water quality variability (heavy metals, organics, and siltation) further complicates modelling attempts. The many variables present in the Animas River system may be impractical to account for in available models, and achieving further correlation to fish population response may be impossible. A more successful approach may be to measure actual Project effects on the trout population.

Therefore, in order to establish and quantify Project effects on the Animas River trout fishery, the Service recommends monitoring the trout fishery to measure actual Project impacts. Reclamation should provide funding to support a multi-year monitoring study of the Animas trout fishery from Durango to the Bondad area. The study should be designed to generate sufficient baseline data on the existing trout fishery and the newly created fishery within the Southern Ute Reservation to permit detection of significant changes in the fishery during Project operation. Baseline data collection should occur at least annually (perhaps biannually), using a standardized sampling program, providing 4-5 years of data prior to Project startup. Monitoring should then be conducted for a similar period following initiation river diversions. Management of the trout fishery in the monitored reach should be uniform throughout its length during the monitoring period. If there are necessary differences in management strategy along the monitored stretch, the management pattern should remain consistent and be accountable.

If Reclamation attempts to extend the Animas fishery downstream, we recommend monitoring the entire stretch of river from Durango to Bondad. This should include (as a minimum) a stretch of nonimpacted river above the Durango Pumping Plant. Although a suitable stretch may be relatively short, every attempt should be made to use this stretch as a control to compare with an impacted downstream stretch. This will require careful baseline measurements and accounting of fishery and habitat differences above and below the plant. If monitoring is to include a newly created fishery downstream, in order to allow time for stabilization of that fishery before Project monitoring begins, the Service recommends the stocking program be implemented immediately.

The Service further recommends native fish populations be included in the monitoring program. Concurrent data collection on native fishes will aid assessment of Project impacts on these fish communities as well. This is in keeping with concerns regarding native fish populations in the San Juan Basin and the endangered fish studies relative to Project operation. Results may help in determining likely effects of Project operation on native riverine species. The study should be developed and implemented cooperatively among Reclamation, the CDOW, the Service, and the SUIT.

Reclamation should commit to mitigating for any negative impacts identified by this program that are above and beyond mitigating measures provided in advance of Project operation. Reclamation should provide additional mitigating measures as needed (if any) within five years of initial operation of the Durango Pumping Plant. A mitigation implementation plan should be prepared and attached to the SEIS. If the advance mitigation option of extending the trout fishery downstream cannot be implemented, then an alternate mitigation plan should be developed jointly with the CDOW and the Service. Some other possible options for mitigation include:

1. Participation in studies to identify sources of water quality problems originating in the upper Animas River and its tributaries, and in remediation of identified contaminants sources. As heavy metals contamination in the Upper Animas is a likely major negative influence on the trout fishery above Durango, this action may have significant benefit in improving that fishery. Although the limitations of upstream contamination on the trout fishery from Durango downstream are unknown, we believe efforts to clean up Animas River water quality cannot help but benefit the aquatic ecosystem and its human users.
2. Conducting a habitat assessment within the existing managed trout fishery to determine if any limiting factors exist which could be reasonably improved; and implementing measures identified.
3. Attempting to enhance the trout fishery on the La Plata River, coupled with any necessary provision of access.

Animas River - New Mexico

Because native river fish numbers and species diversity continue to decline in the Colorado River Basin in large part due to water diversion and impoundment, and habitat segmentation effects of onstream barriers, both the Service and NMDGF are concerned about the potential for further diversions and barriers to perpetuate or accelerate this decline. The status of the roundtail chub (a federal candidate species) may now be tenuous in the San Juan Basin. Further loss of habitat or reduction of the roundtail population could lead to listing of this species in this portion of its range. Additionally, the Animas River could become important to eventual recovery native fishes in the San Juan system.

Existing data for the Animas River is limited to disparate, point-in-time samples, inadequate to assess potential impacts of the Project to native fish. Therefore, the Service recommends that Reclamation fund a joint study with the NMDGF and the Service, to determine the composition, distribution, habitats, and habitat associations of native fish in the Animas River in New Mexico, with emphasis on the roundtail chub. Data should be sufficient to permit assessment of Project effects on native fish species and detection of changes in their populations or distribution. Data needed includes distribution, abundance, reproductive status, and an assessment of existing habitat. Modelling of channel maintenance should project habitat changes resulting from Project operations. The existing data base does not permit a determination of the importance of the Animas River to the roundtail chub or the specie's status in that river. There is a need to identify those drainages and habitats which are essential to the welfare of the species in the San Juan Basin, and those which are marginally or incidentally inhabited.

Monitoring, for a period to be agreed upon, is then needed to assess changes, if any, in native fish populations and distribution under Project conditions. From initial baseline data, permanent sampling sites could be selected for monitoring after Project startup. Sampling should be systematic, using standardized protocol. Since seasonal changes in flow change habitat, a seasonal sampling strategy may be needed. We further recommend Reclamation's biota contaminants sampling program for the Animas be extended downstream to the San Juan River. A study plan should be developed cooperatively with the NMDGF and the Service, and attached to the SEIS.

Should negative impacts caused by Project operation be identified, Reclamation should develop and implement, in conjunction with the NMDGF and the Service, appropriate mitigating measures. These could include exploration of flow augmentation options for key portions of the river, and evaluation of the potential for habitat improvement.

La Plata River

Within Colorado, impacts resulting from Project operation will be variable depending on location relative to points of diversion and return of irrigation tailwater. Increased flow comprised of irrigation return could generate some enhancement of aquatic potential between the Southern Ute and La Plata Diversion Dams. Of significance is the potential for enhancement of habitat for the roundtail chub. The species was verified near the confluence with Long Hollow Draw earlier in 1992.

However, because the increased flows will emanate from irrigation return, water quality is of significant concern. Several fish samples collected from this same area earlier this year had mercury levels above predator-protection guidance levels. The Service believes it is important Reclamation conduct a thorough evaluation of the potential for accumulation of mercury and selenium in the La Plata system. We recommend an expanded program of evaluation on Project lands draining into the La Plata. Assessments are needed of the extent and location of potential contaminants sources. Further analysis is necessary to identify probable pathways for entry into the La Plata and the probable fate of these elements once introduced. It should be determined whether or not Long Hollow Draw is draining a contaminants source or whether the concentrations found there are coincidental, resulting from streamflow interruption. Additional biota sampling of the La Plata system, including tributaries, may be needed.

We also recommend thorough assessments of the potential for water quality degradation resulting from pesticide contamination, increased sedimentation, and salt leaching from Project lands, and their consequences to aquatic biota. Evaluations of probable type and extent of pesticide usage, and the potential

for movement into and concentration in the La Plata aquatic system, should be made. If analyses show potential for either lethal or sublethal toxicity to aquatic life, or for bioaccumulation in the foodchain, Reclamation should develop and implement, in coordination with the Service, CDOW, and NMDGF, measures to protect aquatic life from toxic elements. This plan should be developed and implemented prior to Project startup.

Reclamation should periodically monitor river stretches to which significant irrigation tailwater will be returned to assure water quality problems do not develop unnoticed. Monitoring should include tailwater inflow, instream water, and offstream wetlands subject to overbank flooding. Bioassays should be conducted periodically for mercury, selenium, and pesticide residues.

Below the Southern Ute diversion, flows will be substantially depleted, particularly during spring runoff. The Service, NMDGF and CDOW believe the proposed diversions and alteration of the existing hydrograph will result in significant impacts to native fish populations. Roundtail chubs were recently verified within this reach, however, lack of data preclude determination of their population status in the drainage, or assessing the importance of habitat elements or key river stretches to its survival. Because of the apparently tenuous status of the roundtail in the San Juan Basin, any loss of chub populations within individual drainages may contribute to a further decline of the species within the basin, ultimately accelerating federal listing. Therefore, no loss of roundtail populations within the La Plata or any other drainage should result from Project operation. Reclamation should commit to preventing any such loss either through avoidance or mitigating actions. Authority for these actions is found in Reclamation Instructions, Series 350, Part 376.6.5C-6, paragraph (d), Candidate Species.

Therefore, the Service recommends that Reclamation, jointly with the NMDGF, CDOW, and the Service, conduct a status assessment of native fish populations in the La Plata River, emphasizing the roundtail chub. Initial surveys should determine the distribution, relative abundance, and gross age structure of native fish populations. In addition, a broad assessment of roundtail chub habitat should be made. This assessment should determine where habitat is suitable to sustain roundtail chub populations or where seasonal habitats may be important (especially spawning or crucial survival habitat during low flows). This evaluation should be from approximately 3 miles south of the state line to a point upstream where habitat becomes unsuitable, or to a point mutually agreed upon. We recommend that Reclamation conduct a preliminary survey of the La Plata this year if at all feasible to provide preliminary data. We also recommend more detailed modelling of expected flow changes in the La Plata and the effects on channel morphology and in-stream habitat.

Results of this initial assessment should be used to further define study requirements. Additional studies may be needed to determine spatial and temporal associations of native fish populations within the La Plata drainage. Data should permit a determination of the effects of flow alterations, and the Southern Ute and La Plata Diversion Dams on native fish, especially roundtail chubs. Studies should be planned and implemented cooperatively between the above-named agencies, and an implementation agreement should be prepared and attached to the SEIS.

In order to protect native fish, and especially roundtail chub, populations in the La Plata River, Reclamation should evaluate all reasonable options for maintaining adequate instream flow, provide for free fish movements as necessary, and assess the potential for habitat enhancement between the Southern Ute and La Plata diversions.

Endangered Species

The Service recommended in the 1991 Biological Opinion that Reclamation should prepare a Bald Eagle Management Plan for the Animas-La Plata Project. Reclamation agreed with the need for this plan at the time of the Biological Opinion. The plan should address nest sites, potential nesting habitat, riparian habitat, communal roost sites, and aquatic bioaccumulation of toxic elements. Its preparation and implementation needs to be coordinated with mitigation actions taken on riparian and toxic element issues to assure that proposed actions are compatible, and to maximize benefits. Consequently, the plan should be initiated as soon as possible. Preparation should involve a cooperative effort among the Service, CDOW, NMDGF, SUIT, and Reclamation.

Additional species found in the Project area may be added or proposed for addition to the federal list of threatened and endangered species during the life of the Project. The Service will continue to coordinate with Reclamation under authority of the Endangered Species Act to identify those habitats important to the survival and recovery of federally listed or proposed species, and any potential Project-related impacts to those species and their habitats. Reclamation should promptly initiate coordination with the Service whenever such status changes occur, or in the event that any currently listed or proposed species are identified in the Project area which have not been previously addressed, as per the requirements of the Endangered Species Act. Any such future endangered species coordination will be addressed under separate memoranda.

SUMMARY OF RECOMMENDATIONS

Terrestrial Wildlife

Replacement of Bodo Wildlife Area

1. Replace the entire Bodo Wildlife Area at equal monetary value.
2. Priority of replacement sites should be as follows:
 - (a) within the same management area;
 - (b) within the region;
 - (c) statewide.
3. Reclamation should acquire the land and transfer title to the CDOW.
4. Acquisition should include survey, fencing, and other substantial costs associated with area acquisition, establishment, and enhancement.

Elk Mitigation

1. Reclamation should acquire and improve (on a willing-seller basis) sufficient acreage of predominantly mountain shrub habitat (estimated at 3,586 ac/1,451 ha) north of Highway 160 to replace the 10,042 HU (based on 1979 HEP procedures) lost.
2. To achieve mitigation of elk habitat lost due to the Project, sufficient habitat improvement necessary to generate new elk carrying capacity equal to that lost (10,042 HU) is required. An estimated mitigation acreage of 3,586 ac assumes a 40% HU improvement of mountain shrub habitat with an HUV of 7.0/ac (17.3/ha).
3. This enhanced carrying capacity will require periodic habitat maintenance to preserve the mitigation value, which should be funded by Reclamation.
4. If adequate mitigation land is unavailable in the desired area, alternate sites may be acquired within the region, subject to CDOW approval.
5. Reclamation should protect that unmitigated portion of the BWA (3,508 ac /1,420 ha) between County Road 211 and Wildcat Creek, and between the campground and Carbon Mountain from unmitigated impacts. If Reclamation acquires control of this land, the area can be protected by:
 - a. fencing the area and closing to public use, at least as long as elk are using it;
 - b. enforcing requirements that dogs be kept under control;
 - c. restricting snowmobiles from the basin;
 - d. closing the campground and other unneeded access points along the ridge during fall and winter months; and
 - e. designating it a wildlife reserve; thus permitting full control over protective measures.

Ridges Basin - Raptor Nesting on Carbon Mountain

1. All human activity should be prohibited from Carbon Mountain.
2. Recreational activities should be excluded from the base of Carbon Mountain and, to the extent possible, within a quarter mile of it.
3. Intensive and intrusive construction activities, e.g., blasting and major earth movement, should be scheduled from August to October if possible.
4. Other construction activities should be timed so that the least intrusive activities are planned for earlier in the nesting cycle.
5. A buffer zone of at least a 0.25 mi (400 m) should be maintained around Carbon Mountain during the courtship and nesting periods for all but essential construction activities.
6. If avoidance measures are not possible, and if a site on Carbon Mountain less vulnerable to disturbance can be identified, building an alternative nest site should be investigated. Moving a nest may be a last resort.
7. Provision of a visual barrier between existing or artificial alternative nest sites and disturbance sources should also be explored.
8. CDOW and Service raptor specialists should evaluate the nest sites, determine the best course of action, and implement those actions.

Ridges Basin - Corridor Relocation

1. Pipeline relocation should be routed along the ridge rather than on its flanks, minimizing the need for earthmoving and vegetation removal.
2. Alignment should be planned carefully to avoid cutting mature ponderosa pines and minimizing overall disturbance to the ponderosa parkland.
3. Construction corridor width should be minimized and equipment laydown areas located out of parkland habitat to the extent practical.
4. Existing roads and utility lines on the ridge should be used as much as possible to minimize habitat disturbance.
5. Surveying and construction should be timed to minimize disturbance of big game using the ridge whenever possible. Using a preferred window of late summer through early fall, elk calving, and emigration and overwintering by big game could be accommodated.
6. Personnel should be confined to the minimum construction and access corridors possible.
7. If unneeded for corridor inspection and maintenance, access roads should be closed and reseeded with native species having forage and cover value to wildlife following construction.

Project Lands

1. Construction of the pipeline delivery system should be planned in a segmented format to permit construction of segments independently of each other. This will permit advancing or delaying construction of segments to coincide with preferred construction windows at sensitive wildlife sites.
2. A biologist should survey planned alignments in advance of construction to identify sensitive sites where avoidance or use of construction timing windows could be implemented to avoid or minimize negative impacts.
3. Native and semi-native habitats should be revegetated with native species appropriate to the site.
4. Laydown areas and access routes should be confined in size, and located on previously disturbed sites whenever possible.
5. Stream crossings should be avoided whenever possible.
6. If necessary, crossings should be routed to avoid developed riparian vegetation, particularly cottonwood galleries, and floodplain wetlands.
7. Crossings should be designed to minimize bank and vegetation damage, possibly using aerial designs.
8. If disturbance of the channel is unavoidable, it should be completely restored to avoid bank and channel destabilization and erosion.
9. Unique and sensitive wildlife habitats should be avoided when possible.
10. Construction near wooded riparian zones should avoid periods when bald eagles are present.
11. All eagle nests should be avoided from February through July, or while eagles are occupying the site.
12. If prairie dog towns will be affected, the Service should be consulted for a determination of need for a black-footed ferret clearance survey, or for their possible value in ferret recovery efforts.
13. All concrete-lined canals should be equipped with effective escape devices to prevent animal entrapment and drownings.
14. Earthen canals should either be adequately sloped or similarly equipped with escape devices.
15. Habitat enhancement within the various canal ROWs would help mitigate habitat loss and fragmentation. Locations and types of plantings should be coordinated with the CDOW, NMDGF, SCS, and adjacent landowners to assure that they are appropriate and do not concentrate animals in undesirable locations.
16. Large canals should be evaluated, in conjunction with CDOW and NMDGF biologists, for their potential to block wildlife movements, especially the migration corridors of deer and elk. Where likely, adequate crossing structures should be designed and installed at frequent intervals.

Southern Ute Reservoir

1. Mitigate for habitat loss through development of 1000 ac (405 ha) adjacent to the reservoir for wildlife.
2. Proximity to the reservoir should be used to develop a variety of habitat types, benefitting rangeland, semi-aquatic and aquatic species.
3. The Service encourages looking for wetland development opportunities adjacent to the reservoir.
4. Habitat development should be planned so as not to conflict with or be negatively impacted by recreational development.
5. Wildlife management areas should exclude non-compatible recreation.
6. A thorough analysis of all potential contamination problems should be undertaken. Analyses should especially address excessive selenium, mercury, pesticides and eutrophying nutrients.
7. Reclamation should implement a monitoring program to identify excessive concentrations of the above potential toxicants. Monitoring should include incoming water, water column, and sediments. Bioassays should be made periodically for bioaccumulation of trace metals and pesticide residues and metabolites.
8. If potential problems are identified, either through initial analysis or monitoring, measures should be put in place to maintain water quality standards necessary to protect wildlife, and should include remediation of any contaminants problems. Plans should be developed cooperatively with the Service and SUIT.

Wetlands

Ridges Basin

1. The Service recommends full mitigation for loss of all delineated wetlands at equal or greater habitat value.
2. To the extent possible, locate mitigation sites within-basin.
3. We recommend designing shallow-water wetlands at the upper end of the reservoir at every opportunity.
4. Attempt to replace lost hydrological, wildlife and other ecological values as a minimum; exploration of alternate wetland types which would have greater overall benefit to wildlife are encouraged by the Service.
5. If out-of-place mitigation sites are necessary, alternative sites should be selected with the input of the Service, EPA, and the CDOW.
6. Consider the Southern Ute Reservoir site for out-of-place mitigation alternatives.
7. Replacement wetlands should be provided at least concurrently with wetland destruction; the Service encourages mitigation in advance of construction, in part to demonstrate success and lower ratio requirements.
8. Check dams should be employed in deeply eroded basin channels to restore a shallow profile and replace similar linear wetlands lost to inundation.
9. A preliminary procedural wetland mitigation plan should be developed and attached to the SEIS. The plan should identify the overall process Reclamation will follow in accomplishing mitigation through full development; scheduling relative to Project development; proposed mitigation to be provided for each type of wetland impact; and mitigation implementation agreements reached between Reclamation, the Service, EPA, and the CDOW. A more detailed technical plan should follow as technical studies are completed.
10. Concurrence of these agencies for this plan and any future modifications should be obtained.
11. An accounting procedure should maintain tracking of the mitigation effort relative to the plan.
12. Status reports should be submitted annually to the Service, EPA, and either of the state wildlife agencies involved in mitigation agreements.

Floodplain Wetlands and Riparian Habitat

1. Avoid stream crossings whenever possible.
2. Align corridors to avoid all developed riparian habitat and floodplain wetlands. Should Reclamation determine a circumstance necessitates impacting riparian or floodplain wetland habitat, consultation with the Service, EPA, and the Corps (if a jurisdictional wetland) should be initiated.
3. Reclamation should undertake an assessment of Project operations with intent of identifying any and all reasonable options that will minimize flow alterations which may negatively impact riparian zones.
4. Consider bypassing peak spring flushing flows every 2-4 years, and maintaining as much peak annually as possible.
5. On the La Plata River consider either moving the Southern Ute diversion as far downstream as possible, or bypassing larger flows.
6. The Service strongly advocates Reclamation initiate a proactive program of full riparian mitigation for estimated unavoidable impacts of the full project in advance of Phase I construction and operation.
7. The Service recommends Reclamation, the Service, EPA, CDOW and NMDGF in consultation and using their best professional judgement, determine probable unavoidable losses of riparian habitat due to the project.
8. The Service further recommends that Reclamation mitigate the agreed losses in both the Animas and La Plata riparian corridors jointly and in advance of Phase I operation by acquiring, enhancing, and providing long-term management control of other suitable riparian habitat.
9. We also recommend that riparian and canal mitigation acreage be combined into one or more consolidated riparian management zones for the benefit of terrestrial and aquatic biota.
10. A mitigation plan should be developed and implemented in consultation with the Service, EPA, CDOW and NMDGF.
11. The mitigation plan and implementation agreement among the above agencies should be prepared and attached to the SEIS.
12. We recommend that Reclamation immediately map the Animas and La Plata riparian corridors. The Animas should be mapped from the Durango Pumping Plant to the confluence with the San Juan River. The La Plata should be mapped at least 3 mi (4.8 km) either side of the state line; preferably from the Dryside Canal to the San Juan River.
13. Mapping should include location, extent, and habitat types along both river corridors.
14. We suggest a more thorough characterization of the riparian corridors by using a representative set of sample transects to obtain data on dominant species composition, cover, density, age classes of cottonwoods or other dominant indicator species, and water table height.
15. If Reclamation mitigates in full, in advance, monitoring is probably not essential. However, the Service recommends implementation of a simple monitoring program using a framework of the baseline transects. These could be run every few years to provide inexpensive tracking of the riparian corridors through the Project life or an agreed portion of it.
16. If Reclamation defers any mitigation to future documentation of losses (not recommended by the Service), detailed baseline data, plus extensive long-term monitoring will be required.
17. Reclamation hydrologists should also provide modelling of changes in channel morphology, maintenance, and siltation patterns resulting from flow reductions or flattening of peak discharges.
18. Reclamation should keep in mind both river corridors should be included in the Bald Eagle Management Plan and that actions taken regarding these two river corridors should be coordinated with that plan.

Canal Irrigation Delivery System

1. The Service recommends that Reclamation mitigate these losses in advance of Phase I operation by acquiring, enhancing and providing long-term management control of riparian cottonwood gallery woodland in conjunction with mitigation provided for losses in the Animas and La Plata corridors.
2. The Service recommends a consolidated and coordinated mitigation package for both riparian corridors and the abandoned canal system be developed for the maximum benefit of regional wildlife and native vegetation.
3. Mitigation plans and implementation agreements should be developed in coordination with the Service, EPA, CDOW and NMDGF, and attached to the SEIS.

Aquatic Resources

Ridges Basin Reservoir

1. Reclamation has committed to providing a cold-water fishery in Ridges Basin Reservoir. The Service supports this commitment, provided the species composition is of salmonids only.
2. Reclamation should commit to providing the annual requisite salmonid fish stock for the reservoir; this may necessitate the acquisition or expansion of hatchery facilities to meet the demand from Ridges Basin Reservoir.
3. Reclamation should explore the possibility of building or acquiring a hatchery facility on Indian lands to provide fish for Ridges Basin, the Animas River and, possibly, the La Plata River. Co-funding may be possible to expand hatchery scope beyond Animas-La Plata Project needs.
4. Sources, species, strains, and stocking rates should be developed in consultation with the CDOW.
5. Because regional reservoirs have a history of mercury and other metals accumulation problems, Reclamation should provide thorough analyses of this potential in Ridges Basin. Analyses should include identification of known and probable sources, metals and concentrations which can be anticipated to enter the system, and their probable fates in the water column, bottom sediments, and aquatic biota.
6. The Service further recommends that Reclamation establish a regular heavy metals monitoring program at the reservoir. Monitoring should include bottom sediments, water column and bioassays.
7. A conceptual response plan should be developed, and included in the SEIS and Bald Eagle Management Plan to deal with any foreseeable contaminants problems which may arise.
8. A mitigation plan should be developed and attached to the SEIS.

Animas River - Colorado

1. Since mean annual flow depletions in the Animas River will result in an unquantified habitat, and presumably, trout biomass loss, the Service recommends that Reclamation provide some form of advance mitigation.
2. The Service recommends Reclamation undertake the following measures to offset habitat loss that may occur from Project operation: (a) attempt to extend the trout fishery in the Animas River from the Purple Cliffs downstream to Bondad, through a stocking program comparable to that used by the CDOW near Durango; (b) acquire public access throughout this reach of the Animas River to increase fishing and rafting opportunities; we recommend a trial stocking program first be initiated to verify the viability of the concept; and (c) assess stream habitat, attempting to identify limiting factors that can be reasonably enhanced with probability of achieving significant gains in trout biomass or survivability.

3. If these advance mitigation measures are not viable, other suitable measures should be explored with the CDOW and the Service.
4. Because Project impacts to the trout fishery cannot be reliably projected, the Service further recommends monitoring the trout population during pre- and operational Project phases to measure actual Project impacts.
5. Reclamation should provide funding for a multi-year monitoring study of the Animas River from Durango to Bondad to measure impacts of Project operation on fish populations. Baseline monitoring should occur each year prior to Project startup (estimated 4-5 years), and continue approximately 5 years following Project startup. The study should be planned and implemented jointly by Reclamation, CDOW, the Service, and the SUIT.
6. Because the proposed monitoring program would extend to Bondad, the Service recommends that Reclamation initiate the Animas stocking program immediately so the newly established fishery has time to stabilize before implementation of operational monitoring.
7. Reclamation should provide mitigating measures for previously unmitigated losses, as determined by the monitoring study (if any).
8. In keeping with concerns for declining native fish populations and the endangered fish studies to be conducted under the Reasonable and Prudent Alternative, the Service also recommends that Reclamation gather native fish data concurrently with trout data throughout the monitoring program. Results should then be used similarly to measure actual Project effects on native fish populations.
9. Mitigation implementation plans should be developed between Reclamation, the Service, and CDOW, and attached to the SEIS.

Animas River - New Mexico

1. Reclamation should provide funding to study, in conjunction with the NMDGF and the Service, the composition, distribution, habitats, and habitat associations of native fish communities of the Animas River in New Mexico, with emphasis on the roundtail chub.
2. Reclamation should provide a baseline data collection effort adequate to permit detection of effects of the Project on key native fish (especially the roundtail chub) populations or distribution through monitoring. Data should be collected on distribution and abundance of species of concern, reproductive status, and existing habitat.
3. We further recommend that Reclamation model projected operational flow regimes to predict changes in channel morphology and maintenance patterns, permitting a better assessment of potential habitat changes.
4. The Service also recommends Reclamation's biota contaminants sampling program be extended downstream to the confluence with the San Juan River.
5. Monitoring, for a period of time to be agreed upon, should be conducted to measure changes, if any, in native fish populations and distribution under Project flow conditions.
6. Monitoring should use systematic, standardized protocol at a series of permanent sampling sites selected following collection of baseline data. It may need to be seasonal to assess temporal variation in habitat availability and use.
7. Should negative influences caused by Project operation be identified, Reclamation should seek to develop and implement, in conjunction with the NMDGF and the Service, appropriate mitigating measures. These could include exploration of flow augmentation options for key portions of the river, and evaluation of habitat enhancement potential.
8. A study plan should be developed cooperatively between Reclamation, NMDGF and the Service, and attached to the SEIS.

La Plata River

1. Since the La Plata River from 3 miles north of the state line downstream will be heavily augmented with irrigation return flow, the Service believes it is crucial Reclamation conduct a thorough evaluation of return flow water quality. Special emphasis should be placed on the potential for accumulation of mercury and selenium. An evaluation of probable pesticide use on Project lands and its implications for the La Plata system is also needed. Water quality degradation due to leaching of salts and increased sedimentation should be evaluated.
2. We recommend an expanded assessment program to thoroughly evaluate Project lands as potential sources of these contaminants, probable pathways of contaminants into the La Plata system, and probable fate of contaminants once in the system, especially their potential for bioaccumulation.
3. Reclamation should determine whether Long Hollow Draw drains a mercury source or whether elevated levels found near its confluence with the La Plata River are coincidentally concentrated there for other reasons.
4. Additional bioassays should be conducted for the La Plata drainage.
5. We further recommend that Reclamation periodically monitor irrigation return tailwater, instream water, and offstream wetlands subject to overbank flooding. Bioassays should be conducted periodically for mercury, selenium, and pesticide residues and metabolites.
6. If evaluation or monitoring show potential for the development of a toxic situation to aquatic life (lethal or sublethal), or for bioaccumulation in the foodchain, Reclamation should develop and implement, in coordination with the Service, CDOW, and NMDGF, measures to protect aquatic life from threatening toxic elements.
7. The Service recommends Reclamation, jointly with the NMDGF and the Service, determine the status of native fish populations, particularly the roundtail chub, in the La Plata River. This assessment should determine distribution, relative abundance, and age structure.
8. In addition, a broad assessment of roundtail chub habitat should be made to determine habitat suitability throughout this reach of river. Key habitat components, such as spawning habitat or crucial survival habitat during low flow, should be identified when possible.
9. The evaluation should be from approximately 3 miles below the state line, upstream through the extent of suitable roundtail chub habitat or to a point mutually agreed upon.
10. We recommend that a preliminary survey be done this year if possible to provide preliminary data to aid planning.
11. Results from the initial status assessment should be used to further define study requirements.
12. Additional, more intensive studies may be warranted to permit evaluation of the effects of flow alterations, and the Southern Ute and La Plata diversion dams on chub populations. To make this evaluation, data will be needed on spatial and temporal associations of chubs within the La Plata system.
13. Studies should be planned and implemented cooperatively with the Service, NMDGF and CDOW. An implementation agreement should be prepared and attached to the SEIS.
14. If significant populations of native fishes, especially roundtail chubs, are present in the stretch of the La Plata River below the site of the Southern Ute diversion, Reclamation, in consultation with the Service, NMDGF and CDOW, should determine ways of protecting these populations or mitigating any unavoidable losses. No unmitigated losses should occur to any fish population which may be important to the overall welfare of the species within the drainage basin. In particular, no roundtail chub populations should be lost within the La Plata drainage or any other drainage as a result of Project actions. Reclamation should commit to this principle.

15. If sustaining populations of native fishes are present above and below diversion sites, and there is potential for blocking movements of fish to important habitat elements, Reclamation should evaluate ways to permit passage of fish across the diversion structures in both directions.
16. Since there may be potential to enhance native fish habitat above the Southern Ute Diversion Dam, Reclamation may want to assess that potential.
17. Study plans and mitigation implementation agreements among the involved agencies should be prepared and attached to the SEIS.

Endangered Species

1. Reclamation should initiate preparation of a Bald Eagle Management Plan as soon as possible so that it can be coordinated with other proposed actions regarding riparian habitat and toxic elements.
2. Preparation should involve a cooperative effort among the Service, CDOW, NMDGF, SUIT, and Reclamation.
3. Additional species found in the Project area may be added or proposed for addition to the federal list of threatened and endangered species during the life of the Project. Whenever such status changes occur, Reclamation should promptly initiate coordination with Service regarding potential Project effects on these species pursuant to the requirements of the Endangered Species Act.

UNMITIGATED RESOURCE LOSSES

The Project will result in unavoidable impacts to fish and wildlife resources. However, in most cases, these losses should be mitigable. Indeed, wildlife resources which are negatively impacted should be mitigated to avoid net loss of those resources. Particular emphasis should be given to those resources identified by the Service, CDOW and NMDGF as being of special concern and which are at greatest risk. No net losses should occur to habitats with significant wildlife value. Certainly, no federal action should cause, accelerate or perpetuate the decline of a species, a population, or a valuable or unique habitat type.

Wildlife resource issues addressed in this PAM were identified by the Service and state wildlife agencies of Colorado and New Mexico as being important and of special concern. Many of the identified resources are considered by these agencies to be at specific risk to Project actions, or at risk on a larger scale and may be further negatively impacted by Project actions. Therefore, specific mitigation recommendations are presented in this document to help avoid, minimize or mitigate unavoidable impacts to these resources.

Any losses of these fish and wildlife resources resulting from Project actions, for which Reclamation does not take recommended or alternatively suitable mitigating measures, will be considered by the Service as unmitigated resource losses. In a memorandum dated August 28, 1992, the Regional Director for Reclamation responded to our recommendations for mitigation of anticipated Project impacts to area wildlife resources. In this memorandum Reclamation stated its intent not to mitigate for several resource issues for which it believes mitigation is not justified or for which they believe they are not obligated. On several other issues Reclamation's position on mitigation is noncommittal or vague. Based on this response, we conclude the following resources may suffer unmitigated losses as a result of Project actions.

1. Riparian and floodplain wetland habitats on the Animas River, and associated wildlife.
2. Riparian and floodplain wetland habitats on the La Plata River, and associated wildlife.
3. Some wetland and enhanced habitat losses associated with abandonment of the existing irrigation canal system.
4. Native fish in the Animas River.
5. Native fish in La Plata River. Particularly the declining roundtail chub (federal candidate and New Mexico State endangered species).
6. Elk mitigation without a commitment for operational and maintenance funds will be transitory, providing only temporary mitigation value.

The Service believes these losses are avoidable and should be prevented. Service Mitigation Guidelines call for no net loss of in-kind habitat for any habitat which is of high value and is scarce, or is becoming scarce. We consider each of the above wildlife habitats to be valuable and declining regionally. Therefore, the Service position is that these resources be mitigated such that no net loss of in-kind habitat results.

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