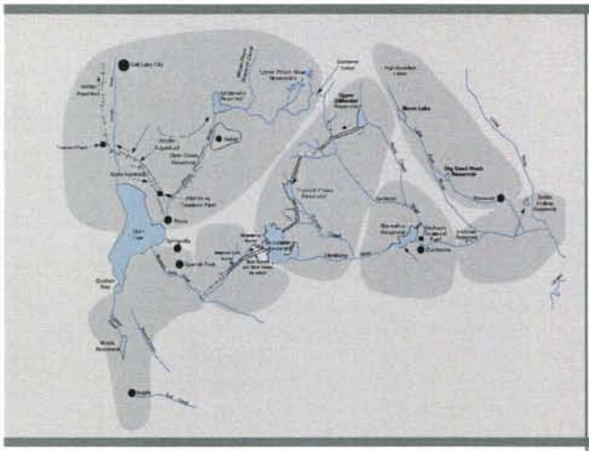
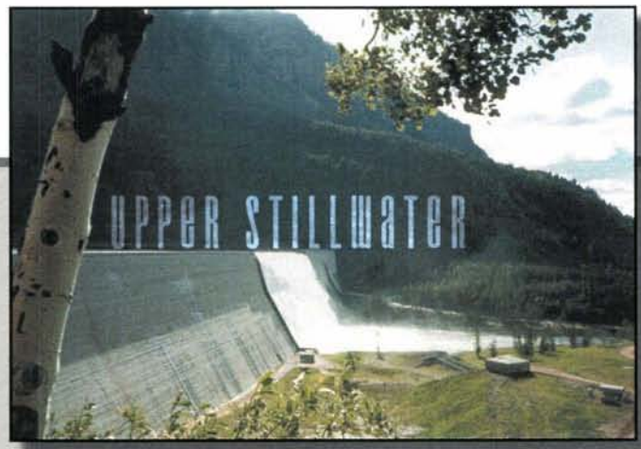
FISH AND WILDLIFE APPENDIX

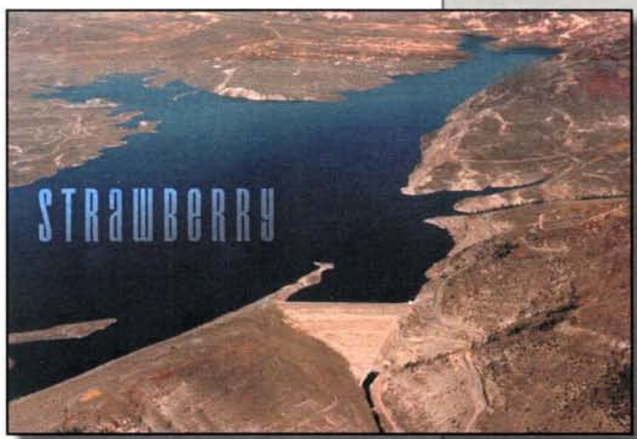
Central Utah Project Completion Program



Supplement to the 1988 Definite Plan Report for the Bonneville Unit

October 2004





UTAH RECLAMATION MITIGATION AND CONSERVATION COMMISSION

SUPPLEMENT TO THE BONNEVILLE UNIT DEFINITE PLAN REPORT

FISH AND WILDLIFE APPENDIX

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October 2004

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Central Utah Project Completion Program

Chapter 1

October 2004

UTAH RECLAMATION
MITIGATION
AND CONSERVATION
COMMISSION

INTRODUCTION

This chapter describes the following:

- Purposes of the Fish and Wildlife Appendix
- History of the Central Utah Project Completion Act (CUPCA) and the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission)
- Agencies responsible for oversight of Bonneville Unit environmental commitments, their roles and relationships
- Documents in place prior to the1988 Definite Plan Report (DPR) for the Bonneville Unit and their requirements for mitigation of environmental effects of the Bonneville Unit
- Documents enacted subsequent to the 1988 DPR and their requirements for mitigation of environmental effects of the Bonneville Unit
- Systems of the Bonneville Unit

PURPOSES OF THE FISH AND WILDLIFE APPENDIX TO THE 2004 DEFINITE PLAN REPORT (DPR)

This Fish and Wildlife Appendix has the following purposes:

- To act as a supplement to the 1988 DPR, documenting the status of Bonneville Unit environmental commitments that were not completed at the time of the 1988 DPR, and documenting any revisions to environmental commitments that have occurred since the 1988 DPR
- To document the programs of the Mitigation Commission since its creation under CUPCA
- To provide a comprehensive overview of fish, wildlife, threatened and endangered species, and recreational aspects of the Bonneville Unit since the 1988 DPR

HISTORY OF CUPCA AND THE MITIGATION COMMISSION

The passage of the CUPCA in 1992 was a historic event in the development of the Bonneville Unit. With that legislation, Congress greatly increased the project's environmental program. CUPCA established that a balance must be obtained between regional water resource development and the preservation of the fish and wildlife resources comprising the region's ecological heritage - an aspect of the public good sometimes underemphasized in the process of meeting growing water needs.

Title III of CUPCA created the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) with responsibility for coordinating, planning, and administering the Section 8 funding for Bonneville Unit development. Title II authorized $32,063,000 (1991 dollars) for completion of the mitigation commitments in the 1988 Definite Plan Report (1988 DPR) for the Bonneville Unit and Title III authorized $140,956,520 for new mitigation measures and supplemental funding for the 1988 DPR mitigation commitments.

The new CUPCA provisions were applied to expand the program of fish and wildlife provisions that had been included in the project up to 1988, but were subsequently felt by the public to fall short of the desired degree of fish and wildlife stewardship. The new CUPCA provisions, administered by the Mitigation Commission, provided remedies where financial and/or institutional obstacles impeded the realization of objectives.

BONNEVILLE UNIT MITIGATION PROGRAM OVERSIGHT

The planning and implementation of the fish, wildlife, and recreation provisions to mitigate the effects of Bonneville Unit construction and operation are shared by the Mitigation Commission, U.S. Fish and Wildlife Service (FWS), and the Central Utah Water Conservancy District (District) in cooperation with the U.S. Department of the Interior (DOI), the Utah Division of Wildlife Resources, the Ute Indian Tribe and the U.S. Forest Service (Forest Service). The FWS and Utah Division of Wildlife Resources assist in formulating the fish, wildlife and related recreation provisions of the project through the consultation provisions of CUPCA and the Fish and Wildlife Coordination Act (FWCA)(48 Statute 401 as amended; 16 U.S.C. 661 et seq.). The Mitigation Commission is involved in the formulation and implementation of various CUPCA provisions as well as associated measures previously identified by the FWS.

These agencies work together, and with other agencies, as members of project teams to carry out the requirements for evaluation and implementation of the fish, wildlife, and related recreation provisions of the Bonneville Unit. In this organizational setting, the effectiveness and adequacy of the mitigation and conservation provisions rests on an interactive effort among the key Federal and State agencies. The following sections describe the respective roles of the Mitigation Commission, FWS, District, DOI, Utah Division of Wildlife Resources and the Forest Service.

Mitigation Commission

The Mitigation Commission was created by Section 301 of CUPCA to coordinate the implementation of mitigation and conservation provisions of the Bonneville Unit among the involved Federal, Tribal, State, and local agencies. Its program includes the uncompleted fish, wildlife, and recreation provisions of the 1988 DPR and the new provisions prescribed in CUPCA. The Mitigation Commission is a Federal agency. It works within applicable environmental laws and other laws addressing fish, wildlife and recreation resources within the State of Utah.

In carrying out its program, the Mitigation Commission has been authorized to perform various actions and to administer certain appropriations for implementation of fish, wildlife and recreation provisions. These activities include the following:

- Formulating the policies and objectives for the implementation of the fish, wildlife, and recreation mitigation and conservation projects and features authorized in CUPCA

- Administering the expenditure of funds for the implementation of the fish, wildlife, and recreation mitigation and conservation projects and features authorized in CUPCA

- Preparing a plan for carrying out its duties during each succeeding five-year period, including specific objectives and measures the Mitigation Commission intends to administer

- Developing specific action plans to accomplish its purposes

- Administering the mitigation and conservation funds available under CUPCA to conserve, mitigate, and enhance fish, wildlife, and recreation resources affected by the development and operation of Federal reclamation projects in the State of Utah

- Entering into contracts, leases, grants, cooperative agreements, or other similar transactions for the implementation of the mitigation and conservation measures authorized in CUPCA, including actions necessary for compliance with the National Environmental Policy Act of 1969

In performing these functions, the Mitigation Commission has generally combined the recommendations of the FWS into a somewhat broader program with the new CUPCA provisions, and through collaboration with the FWS and the Utah Division of Wildlife Resources.

U.S. Fish and Wildlife Service

The FWS has specific responsibilities on Federal water supply projects that stem from congressional directives. Notable among these are the FWS's roles in the FWCA, Endangered Species Act (ESA) (Public Law 93-205, 1973; Public Law 96-632, 1978), evaluating environmental impacts of projects, advising implementing agencies on mitigation and conservation measures and consulting on effects of special status species. These services culminate in reports of various types, principally the following:

- The Fish and Wildlife Coordination Act Report (or Planning Aid Memorandum) on the fish and wildlife aspects of a project with conclusions on mitigation needs and recommendations on mitigation and enhancement measures

- The Biological Opinion on the potential effects of a project on a threatened or endangered species, containing findings on project impacts to species and recommendations on conservation measures to avoid such impacts

The FWS has prepared planning reports and memoranda under FWCA on fish and wildlife matters to assist in the formulation and evaluation of Bonneville Unit systems or other components. As discussed in subsequent chapters of this appendix, the FWS involvement has been a dynamic process adapting to the evolutionary planning process for facilities and operations, particularly with respect to the Bonneville Unit completion component in the Bonneville Basin.

Utah Division of Wildlife Resources

The Utah Division of Wildlife Resources is the wildlife authority for Utah, and is trustee and custodian of protected wildlife in the State of Utah. The agency is responsible to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state. The Utah Division of Wildlife Resources has a long history of involvement in planning the CUP. The Utah Division of Wildlife Resources manages several wildlife management areas in the State under management agreements for purposes of mitigating impacts from the CUP on fish and wildlife habitat. The Utah Division of Wildlife Resources shares a responsibility with the FWS under the FWCA. CUPCA states that the Mitigation Commission will cease as an entity twenty years from the end of the fiscal year during which the Secretary declares the Central Utah Project to be substantially complete. Thereafter the duties of the Mitigation Commission will be performed by the Utah Division of Wildlife Resources, which will exercise such authority in consultation with the FWS, the District, the DOI and the Forest Service.

U.S. Forest Service

The Forest Service is responsible for administering National Forest System lands. The Forest Service has served in essential roles on interagency planning teams and has been instrumental in facilitating or completing various documents. Much of the mitigation for Bonneville Unit impacts on fish, wildlife and recreation resources has occurred or will occur on National Forest System lands. The Forest Service either provides approval for the construction and operation of mitigation features on National Forest System lands or provides the those mitigation services and features under agreements with the Mitigation Commission.

Central Utah Water Conservancy District

The District has been authorized under CUPCA to complete the planning and construction of the Central Utah Project. These activities include engineering and environmental planning, preparation of designs and specifications, and construction of physical facilities remaining to be implemented as of the enactment of CUPCA. Under CUPCA, the District agrees to be considered a "Federal Agency" for purposes of compliance with all Federal fish, wildlife, recreation, and environmental laws, which extended to the use of the Federal share of funding for project planning and development. As such, the District has exercised leadership in complying with the National Environmental Policy Act (NEPA) and other environmental regulations in analyzing environmental aspects and devising measures, not only to avoid or mitigate impacts, but proactively to include provisions for endangered species restoration where opportunities occur in the scope of the project.

Under these arrangements, the District has been the Lead Agency in the preparation of numerous environmental reports required under NEPA, in cooperation with the U.S. Department of the Interior and the Mitigation Commission.

Ute Indian Tribe

The Ute Indian Tribe shares responsibilities with the Mitigation Commission and DOI for planning and implementing wetland mitigation projects to offset impacts of the Bonneville Unit water collection and delivery systems on wetlands in the Uinta Basin, and to complete commitments made in the 1965 Deferral Agreement.

U.S. Department of the Interior

The Secretary of the Interior has been designated by CUPCA to carry out the Federal responsibilities of the Bonneville Unit completion program. These responsibilities include the budgetary and financial aspects, oversight of the completion activities delegated to the District, and accomplishment of numerous other provisions of CUPCA through coordination with the District and other agencies. In summary, the DOI responsibilities include:

- Oversight of CUPCA Program accomplishment
- Participation in the NEPA compliance activities
- Review of engineering designs and construction standards
- Administration of federal funds
- Negotiations with local agencies for repayment of the federal investment
- Acquisition and administration of Federal water rights for the project
- Negotiations with local and State agencies on operating plans for water supply and environmental components of the Bonneville Unit
- Certification of completion and start of operational status of project components

SIGNIFICANT MILESTONES IN EVOLUTION OF MITIGATION PLANS

As noted earlier, the Bonneville Unit environmental program has evolved over several decades to keep pace with the planning of physical systems and operations. Program development has been accompanied by numerous documents analyzing environmental effects and defining mitigation needs. The milestone documents are listed below and described in the following sections of this chapter.

Key Environmental Documents in Place Prior to the 1988 DPR

- Fish and Wildlife Coordination Act Report of 1965 and numerous subsequent reports
- Deferral Agreement of 1965
- National Environmental Policy Act of 1969
- Bonneville Unit Programmatic Environmental Impact Statement of 1973
- Endangered Species Act of 1973
- 1980 Stream Flow Agreement

- 1987 Terrestrial Mitigation Plan
- 1988 Aquatic Mitigation Plan for the Strawberry Aqueduct and Collection System (SACS)

Fish and Wildlife Coordination Act Report of 1965. The Fish and Wildlife Coordination Act (48 Statute 401 as amended; 16 U.S.C. 661 et seq.) requires federal agencies to consult with the FWS on water resource development projects that could impact fish and wildlife resources. The FWS in conjunction with the Utah Division of Wildlife Resources (formerly known as "Utah Department of Fish and Game"), may recommend actions to mitigate, compensate or enhance wildlife resources in the State of Utah. The FWS completed the initial Coordination Act Report for the entire Bonneville Unit in 1965 and transmitted the document to Reclamation on September 9, 1965. The report had been coordinated with Ute Indian Tribe, Bureau of Indian Affairs, Utah Division of Wildlife Resources, and the Forest Service. The report formally recommended 37 mitigation measures for the Bonneville Unit. These are listed in the Fish and Wildlife Appendix to the 1988 DPR.

Deferral Agreement of 1965. On September 20, 1965, an agreement was signed by the Ute Indian Tribe, Reclamation, the Bureau of Indian Affairs, and the District that provided for deferment of certain Indian water rights so that construction could proceed on the Bonneville Unit without objection from the Ute Indian Tribe or the Bureau of Indian Affairs. Under this agreement (commonly called the "Deferral Agreement"), mitigation for losses of tribal fish, wildlife and recreational resources would be accomplished as follows:

1. Mitigation plans would be developed to offset impacts to Indian resources.

2. A minimum of 25 cfs of water would be provided in Rock Creek at the Uintah and Ouray reservation boundary (downstream of Upper Stillwater Dam).

3. Waterfowl management areas would be established along the Duchesne River.

4. The operation and maintenance of the recreation, fishery, and wildlife features of the Midview Reservoir would be transferred to the Ute Indian Tribe, and a minimum fishery pool would be maintained in the reservoir.

5. Fishing lakes aggregating approximately 800 surface acres would be constructed on Indian lands, site locations and cost estimates would be provided on the basis of further studies by the FWS, said cost not to exceed $2 million to be funded under the provisions of Section 8 of the Act of April 11, 1956 (the Colorado River Storage Project Act, or CRSPA).

National Environmental Policy Act of 1969. Congress passed the National Environmental Policy Act (NEPA) in 1969. NEPA declared a national policy to "encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality." Compliance with NEPA is

required for all federal actions that may affect the human environment. This led to a more systematic approach to analysis of environmental impacts of the Bonneville Unit and ways to mitigate impacts. The passage of NEPA had a considerable effect on extending the construction period for the Bonneville Unit. At that time, portions of the Bonneville Unit, notably the Strawberry Aqueduct and Collection System and the Starvation Collection System, were in the construction stage. The preparation of an environmental impact statement for the Bonneville Unit slowed the start of construction on features not under construction by several years while reports were being completed.

Endangered Species Act of 1973. The Endangered Species Act of 1973 (Public Law 93-205), as amended on November 10, 1978 (Public Law 96-632), requires all federal departments and agencies to seek to conserve endangered species and threatened species. The purposes of this act are to provide a means for conserving the ecosystems that support endangered and threatened species, and a program for the conservation of those species.

Bonneville Unit Programmatic Final Environmental Impact Statement of 1973. In 1970, Reclamation began preparing a programmatic environmental impact statement on the Bonneville Unit. Map 1-1 shows the location of the systems of the Bonneville Unit. Four years later, the Bonneville Unit Final Environmental Impact Statement (1973 EIS) was completed by Reclamation. The report, a benchmark environmental document, covered all six systems of the Bonneville Unit. The document utilized all available information, although much of the Bonneville Unit physical plan had not been developed in detail. The report stated that as detailed planning was completed on the remaining systems of the Bonneville Unit, an environmental impact statement would be completed for each system.

Subsequent to the 1973 EIS, Reclamation applied for a Section 404 Permit from the U.S. Army Corps of Engineers to construct Currant Creek Dam, a feature of the Strawberry Aqueduct and Collection System (SACS). The Corps of Engineers denied the permit, citing concerns that the mitigation for environmental losses was inadequate, especially with respect to minimum in-stream flows. Interagency cooperative studies were subsequently carried out to resolve the minimum in-stream flow and environmental issues. These cooperative efforts led to three of the documents previously listed:

- 1980 Streamflow Agreement
- 1987 Terrestrial Mitigation Plan
- 1988 Aquatic Mitigation Plan for SACS

1980 Stream Flow Agreement. The Stream Flow Agreement was entered into on February 27, 1980, by the United States of America, acting through the Secretary of the Interior, the State of Utah and the District. The document was prepared cooperatively by the District, the FWS, the Forest Service and Reclamation.

The essential provision of the Stream Flow Agreement was the release or bypass of water from the SACS to four of the ten streams from which water was diverted for transbasin diversion. This was part of the agreed-upon plan to maintain 50 percent of the historic trout habitat in the four major SACS streams, which required 54,900 acre-feet annually to the streams. Normal spills and

irrigation releases would provide 10,500 acre-feet of that amount in an average year. Providing the balance of 44,400 acre-feet became a goal of the cooperating agencies. The 1980 Stream Flow Agreement committed only 22,300 acre-feet of the required 44,000 acre-feet. A copy of the 1980 Stream Flow Agreement is included in this Fish and Wildlife Appendix as Attachment A.

1987 Wildlife Mitigation Plan. This plan was an agreement among Reclamation, the FWS, Utah Division of Wildlife Resources, and Forest Service. The plan addressed wildlife mitigation for the Bonneville Unit's Strawberry Aqueduct and Collection System, Municipal and Industrial System, and the Diamond Fork Power System (now the Diamond Fork System).

1988 Aquatic Mitigation Plan for SACS. In December 1988, a Final Aquatic Mitigation Plan for the SACS was prepared by the Interagency Biological Assessment Team (IBAT). The SACS Aquatic Mitigation Plan was designed to compensate for the loss of historic trout habitat not maintained by the 1980 Streamflow Agreement. Environmental commitments described in the 1988 DPR were based on a Draft Aquatic Mitigation Plan from 1984. The 1988 Plan was similar to the 1984 Plan but differed in some minor ways. The recommended mitigation measures for the SACS included four categories:

- Purchase and/or exchanges of water to provide fishery flows
- Acquisition of right-of-way for angler access
- In-stream habitat improvement measures
- Replacement of a trout egg-taking station on the Strawberry River near Strawberry Reservoir

A copy of the 1988 Aquatic Mitigation Plan for the SACS is included in this Fish and Wildlife Appendix as Attachment B.

Key Environmental Documents Completed Subsequent to the 1988 DPR

The following documents were completed after the 1988 DPR was prepared:

- 1990 Stream Flow Agreement Amendment
- 1992 Central Utah Project Completion Act (CUPCA)
- 1996 Wasatch County Water Efficiency Project and Daniel Replacement Project Final EIS
- 1997 Mitigation and Conservation Plan
- 1997 Provo River Restoration Project Final EIS
- 1999 Diamond Fork System Final Supplement to the 1990 Final EIS
- 2000 Proposed Action Modifications to the Diamond Fork System Final EA
- 2001 Uintah Basin Replacement Project Final EA
- 2002 Mitigation and Conservation Plan
- 2002 Diamond Fork System Final EA for the Proposed Action Modifications
- 2004 Utah Lake Drainage Basin Water Delivery System Final EIS

1990 Stream Flow Agreement Amendment. The Stream Flow Agreement was amended in 1990 with a commitment to provide the 44,400 acre-feet of fishery flow water from the Bonneville Unit water supply to retain the 50 percent of the historic trout habitat. Other significant elements of the 1990 Stream Flow Agreement Amendment are described in Chapter 3 under the Strawberry Aqueduct and Collection System. A copy of the 1990 Amendment to the Stream Flow Agreement is included in this Fish and Wildlife Appendix as Attachment C.

1992 Central Utah Project Completion Act (CUPCA). CUPCA was enacted as part of Public Law 102-575, signed October 30, 1992 (106 Stat. 4600). As noted earlier, CUPCA expanded the environmental program for the Bonneville Unit through the addition of various fish, wildlife, and recreation measures to the Bonneville Unit completion plan, and established the Mitigation Commission to implement them in connection with prior mitigation commitments. The range of CUPCA environmental provisions included the following items.

- Minimum flows on various streams affected by the project
- Big game winter range land acquisition
- Wetlands acquisition, rehabilitation, and enhancement around the Great Salt Lake area
- Establishment of the Utah Lake Wetlands Preserve
- Supplemental funding for stabilizing lakes in the Uinta Mountains for fish and wildlife restoration (a measure previously required by the 1988 DPR)
- Development of a plan to mitigate effects of peak flows in the Provo River
- Application of Strawberry River basin water rights to provide fishery flows in Uinta Basin to supplement flows in streams affected by the Strawberry Aqueduct and Collection System
- Provision for the use of conserved water for fish and wildlife uses
- Authorization of the Uinta Basin Replacement Project, which includes fish, wildlife, and recreation restoration

CUPCA authorized Federal funding for these and other measures, to be administered by the Mitigation Commission. As noted earlier, Title II authorized $32,063,000 for completion of the mitigation commitments in the 1988 Bonneville Unit Definite Plan Report (DPR) and Title III authorized $140,956,520 for new mitigation measures and supplemental funding for the 1988 DPR mitigation commitments. These amounts are based on 1991 price levels and are subject to escalation with the Consumer Price Index for urban consumers, published by the Department of Labor. The costs of these facilities are referred to as Section 8 costs, a designation stemming from Section 8 of the Colorado River Storage Project Act of 1956 (P.L. 48-485), which addressed costs for specific fish, wildlife, and recreation facilities. Title IV of CUPCA authorized the creation of the Utah Reclamation Mitigation and Conservation Account in the Federal treasury as another means of providing funding to the Mitigation Commission. The account is funded by yearly contributions from the Federal government, Western Area Power Administration, State of Utah, and the District for an eight-year period beginning in 1994 and ending in 2001. The annual contribution from Western Area Power Administration continues after the end of the initial eight-year period.

1996 Wasatch County Water Efficiency Project and Daniel Replacement Project Final EIS. The District, DOI and Mitigation Commission completed a final EIS on two interrelated Federal projects in Wasatch County in November 1996. The Proposed Action was the Wasatch County Water Efficiency Project with Daniel Replacement Pipeline, which replaces water historically diverted from the upper Strawberry River basin by Daniel Irrigation Company. The replacement water is supplied by water conserved from the Heber Valley CUP agricultural water supply stored in Jordanelle Reservoir by providing pressurized water that makes it possible for farmers to convert from flood irrigation to sprinklers. Conserved water from non-CUP water diversions of the Provo River and local tributaries is used to supplement in-stream flows in five Heber Valley streams to improve aquatic resources habitat and trout populations. Restored flows in six streams in the upper Strawberry River basin provide aquatic resources habitat and trout populations as a SACS mitigation requirement. Two other alternatives considered different conveyance facilities for the Daniel Irrigation Company replacement water. The Proposed Action was selected and implemented, and both projects began operating in 2002.

1997 Mitigation and Conservation Plan. The Mitigation Commission issued its Mitigation and Conservation Plan in 1997 following an in-depth assessment of Bonneville Unit mitigation and conservation needs. The planning process involved discussions with involved Federal and state agencies, and input from non-governmental organizations and private citizens through a public involvement process. The report presented a broad plan for fish, wildlife, and recreation measures, combining previously identified mitigation measures with those newly authorized under CUPCA.

1997 Provo River Restoration Project Final EIS. The Mitigation Commission and DOI completed a final EIS on the Provo River Restoration Project (PRRP) in December 1997 (Mitigation Commission 1997). The PRRP responds to the need to mitigate past CUP impacts and other federal Reclamation projects by improving fish and riparian habitats on a ten-mile reach of the Provo River in Wasatch County between Jordanelle Dam and Deer Creek Reservoir. This reach of the Provo River was channelized and diked extensively during the 1940s and 1950s. The PRRP Proposed Action consists of restoring the straightened river channel to a meandering channel emulating historic conditions, reconnecting the river to existing remnants of historic secondary channels, and constructing small side channels to re-create aquatic features. The completed project will provide a protected 800 to 2,200-foot-wide corridor along the entire reach of the restored middle Provo River for angler access and wildlife habitat. Existing levees are being set back to create a near natural flood plain and to allow the river to change course naturally. Planting and fostering streamside vegetation will help to provide the necessary environment for healthy fisheries and riparian wildlife. Side channels and ponds will improve fish habitat and create habitat for wetland-dependent wildlife. Construction of the PRRP Proposed Action began in 1999 and will be completed in 2006.

1999 Diamond Fork System Final Supplement to the Final EIS. The District, DOI and Mitigation Commission completed the Diamond Fork System Final Supplement to the Final EIS (FS-FEIS) in June 1999. The FS-FEIS covers features required to complete construction of the Diamond Fork System. The Proposed Action was formulated to complete the system and fulfill the same need, with the least long-term environmental impact, as the Recommended Plan described in the 1984 Diamond Fork Power System FEIS as modified by the 1990 Diamond

Fork System FS-FEIS and the DOI 1995 Record of Decision. The 1999 FS-FEIS considered the impacts of constructing and operating a series of tunnels and pipelines to convey water through the mountainous terrain of Diamond Fork Canyon and various Diamond Fork drainage tributary canyons in the Uinta National Forest. The following features were proposed for construction: 1) Sixth Water Connection to Tanner Ridge Tunnel, 2) Tanner Ridge Tunnel, 3) Diamond Fork Siphon, 4) Red Mountain Tunnel, 5) Red Hollow Pipeline and Connection to Diamond Fork Pipeline, 6) Diamond Fork Creek Outlet, 7) Spanish Fork River Outlet from Diamond Fork Pipeline, and 8) if necessary, modifications to Spanish Fork River diversion dams. These features would be sized to convey: 1) Strawberry Valley Project (SVP) water from Strawberry Reservoir for agricultural use in the Spanish Fork area of southern Utah County, 2) Bonneville Unit water to Utah Lake, and 3) flows to meet minimum streamflow requirements mandated by CUPCA. The Diamond Fork System removes a portion of the SVP irrigation flows that were historically conveyed down Sixth Water Creek and Diamond Fork Creek. In-stream flows mandated in CUPCA are released into Sixth Water Creek and lower Diamond Fork Creek as part of an effort to enhance fisheries in these streams.

2000 Final EA for the Diamond Fork System Proposed Action Modifications. The District, DOI and Mitigation Commission completed a Final EA for the Diamond Fork System Proposed Action Modifications in June 2000. The EA covers modifications made to the Proposed Action in Chapter 1 of the 1999 FS-FEIS. These modifications were developed as a result of the value engineering process on the Diamond Fork System Proposed Action design. The value engineering process identified that one long tunnel could replace the proposed Tanner Ridge Tunnel, Diamond Fork Siphon, Red Mountain Tunnel, and Red Hollow Pipeline and Connection to Diamond Fork Pipeline. The Proposed Action Modifications consisted of: 1)Sixth Water Connection to Upper Diamond Fork Shaft, 2) Upper Diamond Fork Shaft, 3) Upper Diamond Fork Flow Control Structure, 4) Upper Diamond Fork Tunnel, 5) Monks Hollow Overflow Structure, 6) Diamond Fork Creek Outlet, 7) Diamond Fork Pipeline Extension, 8) Connection to Diamond Fork Pipeline, 9) Access Road and Road Reconstruction, and 10) Fiber Optic Cable. The DOI and Mitigation Commission each issued a Finding of No Significant Impact on the Proposed Action Modifications.

2001 Uinta Basin Replacement Project Final EA. The District and DOI completed the Section 203(a) Uinta Basin Replacement Project Final EA in October 2001. The Section 203(a) Uinta Basin Replacement Project was authorized through the following features in Section 203(a) of CUPCA: 1) Pigeon Water Dam and Reservoir with an enclosed pipeline conveyance system; 2) McGuire Draw Dam and Reservoir; 3) Clay Basin Dam and Reservoir; and 4) Farnsworth Canal rehabilitation. Project replacement features were developed from the authorized features in the Section 203 legislation. These replacement features were included and evaluated in the alternatives formulation and development process described in the Final EA/Finding of No Significant Impact for the Section 203(a) Uinta Basin Replacement Project. Feasibility of a Section 203 project was discussed and evaluated in the Uinta Basin Replacement Project Final Feasibility Study. The Section 203(a) Uinta Basin Replacement Project provides variations of those replacement features and alternatives to meet project needs to manage the water resources within the project area to provide early- and late-season irrigation water, M&I water supplies, water conservation, and to enhance facilities for environmental purposes. Under the October 2001 plan, the Section 203(a) Uinta Basin Replacement Project includes enlargement of Big

Sand Wash Reservoir (12,000 acre-feet increased capacity), the new Big Sand Wash Feeder Diversion Structure, a new Big Sand Wash Feeder Pipeline, a new Big Sand Wash-Roosevelt Pipeline to deliver 3,000 acre-feet of M&I water to the city of Roosevelt, Utah, modification of the Moon Lake Dam outlet works to allow for winter operation to release minimum in-stream flows, mitigation of wetland impacts and stabilization of 13 high Uinta Mountain lakes.

2002 Mitigation and Conservation Plan. The Mitigation Commission issued the first five-year update of its Mitigation and Conservation Plan in 2002. This report contained an overview of the progress of fulfilling the components of the 1997 plan, adaptations and changes in the plan that occurred since 1997. Information from the 2002 plan update is included in Chapters 2 and 3.

2002 Diamond Fork System Final EA for the Proposed Action Modifications. The District, DOI and Mitigation Commission completed the Diamond Fork System Final EA for the Proposed Action Modifications in March 2002. The modifications were made to the 1) Proposed Action Modifications described in the 2000 Diamond Fork System Final EA/Finding of No Significant Impact for the Proposed Action Modifications, and 2) 1999 Diamond Fork System FS-FEIS. These modifications resulted from conditions encountered during construction of the Upper Diamond Fork Tunnel, including high inflows of groundwater with extreme concentrations of hydrogen sulfide from a partial collapse of the tunnel in a fault zone behind the tunnel-boring machine. The District and DOI concluded that further excavation of the tunnel was not feasible because of adverse geologic conditions, worker safety in a high concentration hydrogen sulfide environment, and corrosive effects of the water containing hydrogen sulfide on the tunnel lining and operation and maintenance equipment. It was decided to terminate tunnel-boring operations, seal the tunnel below the area of collapse, and complete the Diamond Fork System by implementing the modifications detailed in the 2002 Final EA. The 2002 Proposed Action Modifications consisted of the following features: 1) Sixth Water Connection to Tanner Ridge Tunnel, 2) Tanner Ridge Tunnel, 3) Upper Diamond Fork Pipeline, 4) Upper Diamond Fork Road Reconstruction, 5) Upper Diamond Fork Flow Control Structure, 6) Diamond Fork Shafts, and 7) Aeration Chamber and Connection to Upper Diamond Fork Tunnel. These features connect to the already completed Upper Diamond Fork Tunnel, Monks Hollow Overflow Structure, Diamond Fork Creek Outlet, and Diamond Fork Creek Pipeline. Diamond Fork System construction was completed in 2004 and it conveys Bonneville Unit water and SVP water to the mouth of Diamond Fork Canyon. In-stream flows specified in CUPCA are now released into Sixth Water Creek and lower Diamond Fork Creek as part of an effort to enhance fisheries in these streams. DOI has completed modifications to Strawberry Tunnel gates and Syar Tunnel gates to provide continuous release of flows to Sixth Water Creek, even when Syar Tunnel is shut down for system maintenance or repair.

2004 Utah Lake Drainage Basin Water Delivery System Final EIS. The District, DOI and Mitigation Commission completed the Utah Lake Drainage Basin Water Delivery System (ULS) Final EIS in September 2004. The ULS is the last system of the Bonneville Unit of the Central Utah Project. The Spanish Fork Canyon-Provo Reservoir Canal Alternative (Proposed Action) was formulated to deliver the remaining 15,800 acre-feet of uncommitted Bonneville Unit water and would have an average transbasin diversion of 101,900 acre-feet, which consists of a delivery of: 30,000 acre-feet of M&I water for secondary use to southern Utah County and 30,000 acre-feet of M&I water to Salt Lake County water treatment plants; 1,590 acre-feet of

M&I water already contracted to southern Utah County cities, and 40,310 acre-feet of M&I water to Utah Lake for exchange to Jordanelle Reservoir. The 30,000 acre-feet (less the water returned to DOI under the Section 207 Program) of M&I water utilized in southern Utah County would be used in the cities' secondary water systems. Under the Proposed Action, the DOI would acquire all of the District's secondary water rights in Utah Lake. These water rights would amount to 57,073 acre-feet. The acquired water rights would be used to exchange water to Jordanelle Reservoir. The Spanish Fork Canyon–Provo Reservoir Canal Alternative would include the following features: 1) Sixth Water Hydropower Plant, Substation and Transmission Facilities, 2) Upper Diamond Fork Hydropower Plant and Underground Transmission Facilities, 3) Spanish Fork Canyon Pipeline, 4) Spanish Fork–Santaquin Pipeline, 5) Santaquin–Mona Reservoir Pipeline, 6) Mapleton–Springville Lateral Pipeline, and 7) Spanish Fork–Provo Reservoir Canal Pipeline. These features would deliver ULS M&I secondary water to southern Utah County cities, deliver water to Hobble Creek to provide June sucker spawning flows, and supplemental flow during other times of the year, deliver water for supplemental flow in the lower Provo River, deliver M&I raw water to the Provo Reservoir Canal and the Jordan Aqueduct for conveyance to water treatment plants in Salt Lake County, and provide water to generate electric power at 2 hydropower plants in the Diamond Fork System, with associated transmission facilities. The Spanish Fork Canyon Pipeline, Mapleton-Springville Lateral Pipeline and Spanish Fork–Santaquin Pipeline would convey up to 10,200 acre-feet of Strawberry Valley Project (SVP) water shares contractually assigned or made available to South Utah Valley Municipal Water Association (SUVMWA) or its member cities/municipalities in southern Utah County on a space-available basis.

SYSTEMS OF THE BONNEVILLE UNIT

The systems and features of the Bonneville Unit are listed in Table 1-1 and locations of the systems are shown in Map 1-1. Systems in place at the time of the 1988 DPR are outlined in (blue) and systems completed after the 1988 DPR are outlined in (red).

Bonneville Unit systems in place and documented in the 1988 DPR included:

- Starvation Collection System
- Strawberry Aqueduct and Collection System (SACS)
- Municipal & Industrial (M&I) System
- Ute Indian Tribal Development (partially in-place; other features in planning stage)

Two systems planned to be included as original Bonneville Unit components were subsequently re-authorized by CUPCA. The Diamond Fork Power System was replaced by the Section 202 Diamond Fork System and the Irrigation & Drainage (I&D) System was replaced by the Section 202 Utah Lake Drainage Water Delivery System (ULS). New physical components authorized by CUPCA and amendments include:

- Diamond Fork System
- Utah Lake System (ULS)
- Wasatch County Water Efficiency Project and Daniel Replacement Project

- Uinta Basin Replacement Project

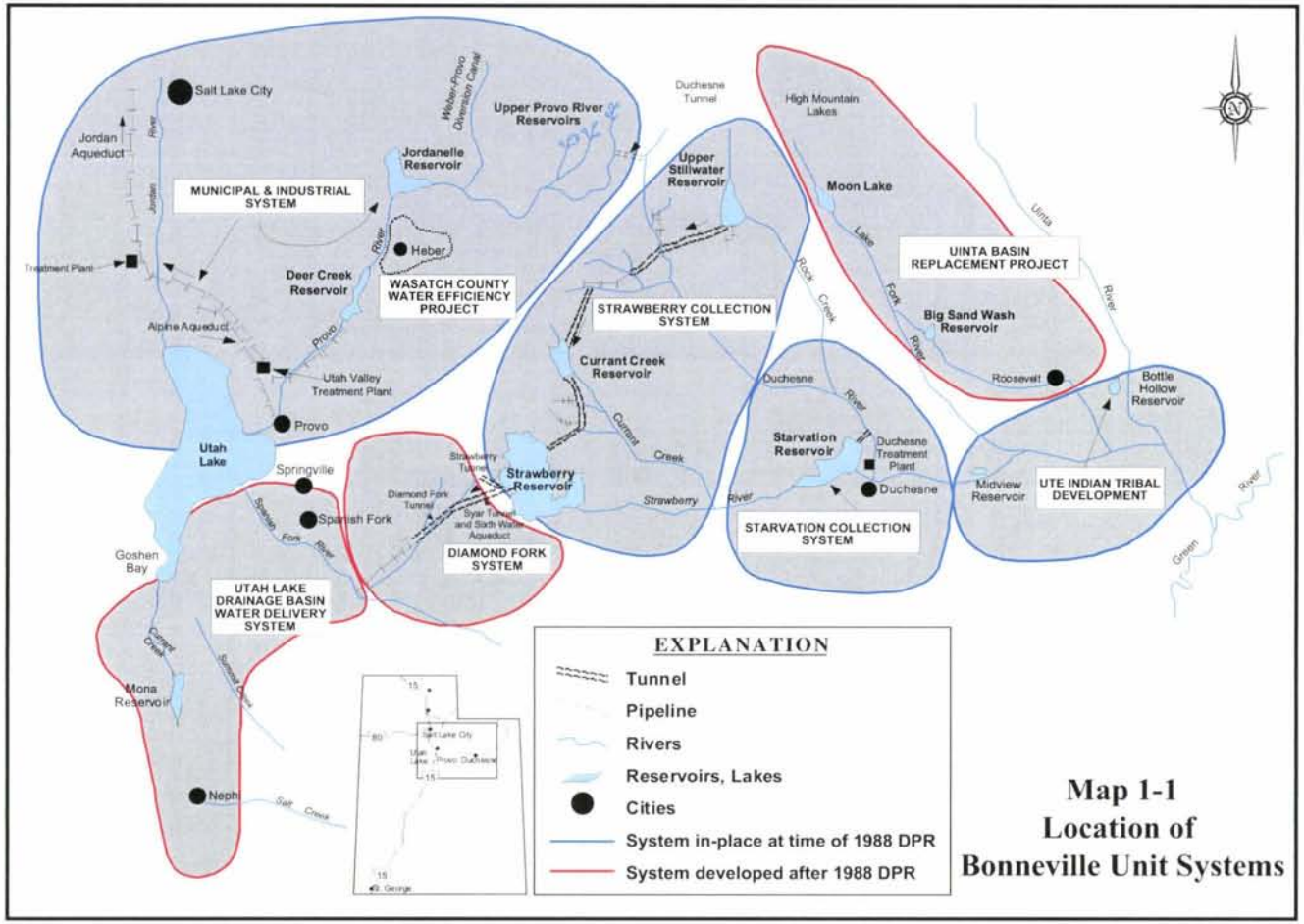
Other studies, resource development, mitigation programs, conservation programs and legal resolutions authorized by CUPCA include:

- Section 202 Conjunctive Use of Surface and Groundwater
- Section 202 Studies (Utah Lake Salinity, Provo River Studies)
- Title III Fish, Wildlife and Recreation Mitigation and Conservation
- Title IV Utah Reclamation Mitigation and Conservation Account
- Title V Ute Indian Water Rights Settlement

Table 1-1
Bonneville Unit Components

Original Systems						New Components Authorized by CUPCA & Amendments								
STARVATION COLLECTION SYSTEM	STRAWBERRY COLLECTION SYSTEM	M&I SYSTEM	UTE INDIAN TRIBAL DEVELOPMENT	DIAMOND FORK POWER SYSTEM	I&D SYSTEM	SECTION 202 DIAMOND FORK SYSTEM	SECTION 202 ULS SYSTEM[1]	SECTION 202 WASATCH COUNTY WATER EFFICIENCY PROJECT & DANIEL REPLACEMENT PROJECT	SECTION 202 CONJUNCTIVE USE OF SURFACE & GROUNDWATER	SECTION 202 ADDITIONAL STUDIES	SECTION 203 UINTA BASIN REPLACEMENT PROJECT	SECTION 207 WATER MANAGEMENT IMPROVEMENT SECTION 206 LOCAL DEVELOPMENT	TITLE III FISH, WILDLIFE, & RECREATION MITIGATION & CONSERVATION	TITLE V UTE INDIAN WATER RIGHTS
• Knight Diversion Dam • Starvation Feeder Conduit • Starvation Reservoir • Duchesne River Canals	• Soldier Creek Dam and Enlarged Strawberry Reservoir • Upper Stillwater Reservoir • Currant Creek Reservoir • Strawberry Aqueduct	• Jordanelle Reservoir • Jordan Aqueduct • Alpine Aqueduct • Stabilization of High Mountain Lakes (Trial, Lost, & Washington)	• Bottle Hollow Reservoir • Wildlife Habitat Development • Lower Stillwater • Midview Exchange	• Syar Tunnel • Sixth Water Aqueduct • Last Chance Powerplant • Monks Hollow Reservoir • Monks Hollow Powerplant • Diamond Fork Powerplant	• Wasatch Aqueduct (tunnels and pipelines) • Mona-Nephi Canal • Mona, West Mona, and Nephi Pumping Plants • Nephi-Sevier Canal • Mosida Area Canals and Pumping Plants	• Sixth Water Connection to Tanner Ridge Tunnel • Tanner Ridge Tunnel • Upper Diamond Fork Pipeline • Upper Diamond Fork Control Structure • Aeration Chamber and Connection to Upper Diamond Fork Tunnel • Upper Diamond Fork Tunnel • Monks Hollow Overflow Structure • Diamond Fork Creek Outlet • Diamond Fork Pipeline Extension • Diamond Fork Pipeline	• Sixth Water Power Generation • Upper Diamond Fork Power Generation • Spanish Fork Flow Control Structure • Spanish Fork Canyon Pipeline • Spanish Fork-Provo Reservoir Canal Pipeline • Spanish Fork-Santaquin Pipeline • Santaquin-Mona Reservoir Pipeline • Mapleton-Springville Lateral Pipeline	• Pump Stations • River Diversions • Lateral Piping • Pipeline to Daniel Irrigation Company • Wasatch Canal Rehabilitation • Timpanogos Canal Rehabilitation • Restoration of Stream Flows in Upper Strawberry River and Tributaries	• Sec. 202(a)(2)– Study and Development by Utah Division of Water Resources, in Salt Lake, Utah, Davis, Wasatch, and Weber Counties	• Sec. 202(a)(4)– Study of Utah Lake Salinity Control • Sec. 202(a)(5)– Provo River Studies (i.e. Strawberry-Provo Conveyance Study)	• Big Sand Wash Reservoir Enlargement • Big Sand Wash Diversion Dam • Big Sand Wash Feeder Pipeline • Big Sand Wash Roosevelt Pipeline • High Mountain Lakes Stabilization • Moon Lake Outlet Modification	• Sec. 207(b)– Water Management Improvement Plan • Sec. 207(b)(5)– Water Conservation Credit Program • Sec. 207(c)– Water Conservation Pricing Study • Sec. 207(d)– Study of Coordinated Operations • Sec. 207(f)– Utah Water Conservation Advisory Board • Sec. 206– Local Development in Sanpete, Garfield, and Piute Counties	• Sixth Water Creek and Diamond Fork Creek • Provo River and Utah Lake • Duchesne and Strawberry Rivers • Statewide Fish, Wildlife, and Recreation Enhancement • Fish, Wildlife, and Recreation Schedule for Completing 1988 DPR	• Ute Indian Water Rights Settlement

Note:
[1]Alternate system to the I&D System. Authorized in CUPCA, Section 202(a)(1)(B).



Map 1-1
Location of
Bonneville Unit Systems

Central Utah Project Completion Program

Chapter 2

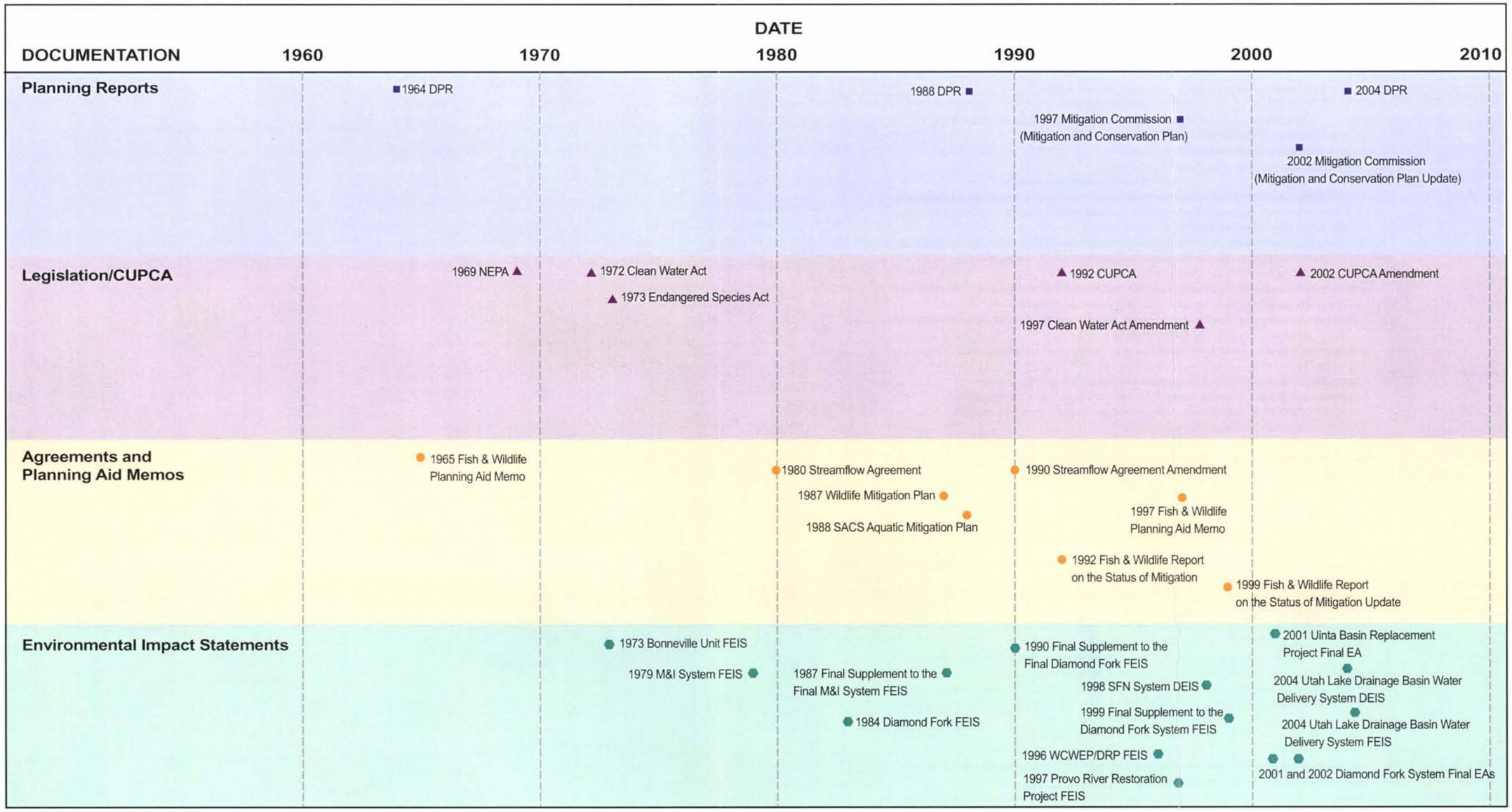
October 2004

UTAH RECLAMATION
MITIGATION
AND CONSERVATION
COMMISSION

INTRODUCTION

This chapter outlines the environmental commitments on the Bonneville Unit of the Central Utah Project (CUP) that were not completed under the 1988 Definite Plan Report (DPR), new environmental commitments or modifications to environmental commitments made since the 1988 DPR. As the Bonneville Unit of the CUP was developed and features were constructed, environmental commitments were made in National Environmental Policy Act (NEPA) compliance documents, record of decision documents and biological opinions on features of the Bonneville Unit of the CUP. A timeline for significant milestones and important reports, agreements, and legislation is shown schematically in Figure 2-1. Many of the environmental commitments made in previous Bonneville Unit documents have been fulfilled. The fulfilled environmental commitments involve stream flows for fish, land acquisition for wildlife habitat mitigation, water quality monitoring, and actions to benefit threatened and endangered species and their habitat. Some environmental commitments are no longer applicable because of changes in the Bonneville Unit of the CUP and therefore have been superseded. The Bonneville Unit environmental commitments fulfilled are incorporated into the Strawberry Aqueduct and Collection System (SACS), Municipal and Industrial (M&I) System and Diamond Fork System (DFS). Additional environmental commitments come from the reformulated Diamond Fork System and new programs authorized under the Central Utah Project Completion Act (CUPCA), including the Wasatch County Water Efficiency Project (WCWEP), Daniel Replacement Project (DRP), Provo River Restoration Project (PRRP), Uinta Basin Replacement Project (UBRP) and Utah Lake Drainage Basin Water Delivery System (ULS). The remaining environmental commitments are listed in Table 2-1 with a description of the commitment, a comment that relates the history of the commitment to other actions and documents, the public agency or agencies responsible for completion of the commitment, the current status of mitigation required by the commitment and whether the commitment was included in the 1988 DPR or a subsequent document. Table 2-1 compiles all environmental commitments for the SACS (nos. 1-12), Starvation Collection System (no. 13), M&I System (nos. 14-23), the DFS (nos. 24-46), and those associated with the Irrigation & Drainage System (nos. 47-50) now superseded. Also included are environmental commitments for the WCWCEP and DRP (nos. 51-57), PRRP (nos. 58-63), UBRP (nos. 64-74), and ULS (nos. 75-92). Source documents for the environmental commitments are listed in the references section of this appendix. Locations of wildlife mitigation lands are shown on Map 2-1.

Chapter 3 discusses Bonneville Unit environmental commitments and status in more detail under the major respective watersheds in the Bonneville Unit area. Additional fish and wildlife components authorized by the CUPCA that do not specifically address a prior DPR environmental commitment also are described in Chapter 3.



DEIS Draft Environmental Impact Statement
DPR Definite Plan Report for the Bonneville Unit
FEIS Final Environmental Impact Statement
NEPA National Environmental Policy Act

Figure 2-1
Timeline for Reports, Agreements, and Legislation

Table 2-1
Environmental Commitments on the Bonneville Unit of the Central Utah Project

No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
1	Strawberry Aqueduct and Collection System (SACS): Mitigate wildlife losses in accordance with the January 1987 "Wildlife Mitigation Plan for Strawberry Aqueduct and Collection System, Municipal and Industrial System, and Diamond Fork System, Bonneville Unit, Central Utah Project."	This comprehensive mitigation plan was developed to address impacts of three major systems of the Bonneville Unit. The plan focused on acquiring private lands, with subsequent management by public agencies for wildlife habitat values. Reformulation of the Diamond Fork System (DFS) as described in the 1990 and 1999 Final Supplements to the 1984 FEIS and 2000 Final EA for Proposed Action Modifications to the DFS resulted in a reduced mitigation need. Mitigation was met by adjusting mitigation acreage of other systems of the Bonneville Unit and by acquiring 161 additional equivalent acres of wildlife habitat. Wildlife habitats acquired adjacent to Strawberry River angler access corridor as described in the 1999 Angler Access EA achieved this commitment. The 1987 Wildlife Mitigation Plan required mitigation for 630 acres of wooded riparian vegetation impacted by the M&I System. 165 acres have been mitigated through acquisition and habitat improvements on part of the Moon properties on Currant Creek, and 237 acres have been mitigated as part of the Camelot properties on the Strawberry River. The remaining 228 acres of riparian development is being achieved by the Provo River Restoration Project (PRRP).	Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission)	Completed. In 2000, 1,760 acres were acquired along the Strawberry River for angler access, SACS aquatic mitigation and the final increment needed to complete the 1987 Wildlife Mitigation Plan terrestrial mitigation, as revised in 1997. All required lands have been acquired. Appropriate management plans (operating agreements) have been or will be implemented with Utah Division of Wildlife Resources or U.S. Forest Service (USFS). Ongoing. PRRP is approximately 75 percent complete. In addition, other acquisitions that have been made for the SACS Aquatic Mitigation Plan may provide additional riparian credits.	1988 DPR; 1997 FWS Planning Aid Letter
2	Strawberry Aqueduct and Collection System: Provisions for bypasses of sufficient water to protect 50 percent of historic trout habitat in Strawberry River, Currant Creek, Rock Creek, and West Fork Duchesne River.	The 1986 Working Agreement guaranteed 44,400 acre-feet, in addition to spills and bypasses, until 2000. The 1990 Final Supplement to the 1984 Diamond Fork FEIS also guaranteed the flow. Provisions for up to 54,900 acre-feet of water, including 10,500 acre-feet non-lapsing carry-over storage in Strawberry Reservoir, are provided by the 1990 amendment to the 1980 Streamflow Agreement. Sec. 303(a) of CUPCA commits sufficient water to maintain the minimum streamflows established pursuant to the Streamflow Agreement.	Central Utah Water Conservancy District (District) and U.S. Bureau of Reclamation (Reclamation)	Completed; ongoing.	1988 DPR
3	Strawberry Aqueduct and Collection System: Strawberry Exchange – restore natural streamflows in 16.3 miles of upper Strawberry River and 9.8 miles of Bjorkman Hollow, Hobble Creek and Willow Creek (9,225 angler days).	The Wasatch County Water Efficiency Project (WCWEP) and Daniel Replacement Project (DRP) have been constructed and start-up during June 2001 has resulted in restoring the natural streamflows in 16.3 miles of Strawberry River and 9.8 miles of Bjorkman Hollow, Hobble Creek and Willow Creek. The SACS Aquatic Mitigation Plan assigned a range between 9,225 and 10,225 angler-days credit for this measure. The Mitigation Commission and Fish and Wildlife Service (FWS) determined that 9,225 credits are applied based on Table 1 in Appendix A of the SACS Aquatic Mitigation Plan. Final disposition of the 2,900 acre-feet per year in the upper Strawberry River basin must still be decided. Section 303 (b) states that the Mitigation Commission and FWS will decide where this water will go, what its use(s) will be and how it will be released or operated.	Mitigation Commission, District, and USFS Mitigation Commission and U.S. Fish and Wildlife Service (FWS)	Completed. Irrigation diversions were terminated in 2001. District completed removal and remediation of Daniel Irrigation Company reservoirs, canals and diversion in 2002. Completed remediation of McGuire Draw and Bjorkman headcuts in 2003. Pending. For the ULS, it is assumed that 2,900 acre-feet will remain in the Uinta Basin in accordance with Section 303 of CUPCA.	CUPCA

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
4	Strawberry Aqueduct and Collection System: Acquisition of Angler Access Currant Creek upstream from U.S. Highway 40 – 9.4 miles (2,350 angler-days) Strawberry River (Camelot Resort) - 8.0 miles (2,400 angler-days) Strawberry River (Soldier Creek Dam to Camelot) - 11.2 miles (3,360 angler-days) Strawberry River (downstream from Starvation Dam) - 2.0 miles (600 angler-days) West Fork Duchesne River - 9.3 miles (2,325 angler-days) Duchesne River - 7.0 miles (1,750 angler-days) Rock Creek - 2.2 miles (550 angler-days) North Fork Duchesne River – 1.85 miles (463 angler-days)	The 1988 Aquatic Mitigation Plan for the Strawberry Aqueduct and Collection System of the Bonneville Unit of CUP identified the acquisition of approximately 51 miles of stream access on the West Fork Duchesne, Duchesne, Currant Creek and Strawberry Rivers to provide partial mitigation for lost angling opportunities. Angler access would be acquired where instream flows were being provided, and in some instances, where stream habitat improvements were made. An Environmental Assessment addressing the impacts of acquiring the remaining lands or easements and management of the angler-access corridors was released November 13, 1999. The EA revised stream segments and lengths slightly. The length of access on Currant Creek was reduced and length was added on North Fork of the Duchesne River. The Mitigation Commission entered into an agreement with the Utah Division of Wildlife Resources and Reclamation in 1996 to coordinate acquisition priorities and develop operating agreements for the acquired properties and easements.	Mitigation Commission and Reclamation	Nearly Completed. Approximately 49 miles of the required 51 miles of angler access has been acquired since the late 1980s. About 2 miles are under current negotiation.	1988 DPR; 1999 Final EA on the Angler Access Mitigation Program, SACS

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
5	Strawberry Aqueduct and Collection System: Fish habitat improvement measures Strawberry River downstream from Starvation Dam – 6.2 miles (3,124 angler-days) Currant Creek – 16.2 miles (1,368 angler-days) Rock Creek – 10 miles (914 angler-days) W. Fork Duchesne River (downstream from Vat Diversion Dam – 11.3 miles (partially completed; 75 angler-days) Strawberry River (upstream from Strawberry Reservoir) – 18.1 miles (304 angler-days for reach upstream of Daniels diversion only) Strawberry River (downstream from Soldier Creek Dam) – 6.0 miles (507 angler-days) Provo River (from Jordanelle Dam to Deer Creek Reservoir) – 9.3 miles (balance to be achieved by PRRP) Diamond Fork (Three Forks to Springville Crossing) – 6.6 miles (265 angler-days) North Fork Duchesne River – 10.0 miles (664 angler-days) West Fork Duchesne River (upstream from Vat Diversion Dam) – 10.0 miles (748 angler-days) South Fork Rock Creek – 3.0 miles (224 angler-days) Diamond Fork (upstream from Springville Crossing) – 4.0 miles (160 angler-days)	The 1988 Aquatic Mitigation Plan for the Strawberry Aqueduct and Collection System identified 14 stream segments totaling over 119 miles as potential sites for stream habitat improvement work. A limit of 9,790 angler-days mitigation credit was imposed by the FWS for fish habitat improvements as a component of the Strawberry Aqueduct and Collection System Aquatic Mitigation Plan. Ninety miles of stream habitat improvements amounting to 8,253 angler-days have been completed. An evaluation of the fish habitat improvement projects was funded by the Mitigation Commission and showed that although most projects were effective, a percentage of fish habitat structures did not function or are in need of initial repair. The FWS estimated in its January 30, 1998 Fish and Wildlife Coordination Act (FWCA) report on the PRRP that about 75 percent of the structures were performing as intended. This translates to 6,115 angler-days achieved. A balance of 3,675 angler-days is needed to complete this mitigation measure. The Mitigation Commission intends to complete the mitigation requirements for the SACS by implementing the PRRP. Strawberry Reservoir filled for the first time in 1998, fulfilling Reclamation's first-fill requirements on Soldier Creek Dam. Reservoir releases during summer, fall and winter 1998-99 resulted in unseasonally high flows in the Strawberry River below Soldier Creek Dam.	Mitigation Commission	Completed. To date, 90 miles of stream habitat improvements have been installed. A review was conducted by the Mitigation Commission in 1995, which found that most of the fish habitat structures were functioning as planned. The FWS estimated in its January 30, 1998 FWCA report on the PRRP that about 75 percent of the installed structures were performing as intended, which provided mitigation for 6,115 AD of the needed 9,790 AD. The PRRP will provide the remaining 3,675 angler days of mitigation for fish habitat improvements. Final report on Middle Strawberry River (2001) has been completed. IBAT has reviewed the impact of interim operational flows with the SACS streams and determined that no compensatory mitigation is required.	1988 DPR; 1988 Aquatic Mitigation Plan
6	Strawberry egg taking station (1,800 angler days)	Construction was completed in 1987. An electric weir was installed in 1995.	Reclamation and Mitigation Commission	Completed.	1988 DPR; 1988 Aquatic Mitigation Plan

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
7	Strawberry Aqueduct and Collection System: Duchesne River Area Canal Rehabilitation (DRACR) Program (a SACS feature): Develop 140 acres of riparian and marsh vegetation adjacent to Starvation Reservoir to replace habitat losses for the DRACR Program, a part of the Starvation Collection System.	The project plan to develop wetland mitigation areas around the shoreline of Starvation Reservoir was determined to be infeasible in 1987. Reclamation and FWS revised plans for the required mitigation. Reclamation acquired 1,087 acres of land with water rights (known as the Riverdell property) for this mitigation. Initial plans for development and management of the property by the FWS have been withdrawn. To satisfy a separate commitment under the Strawberry Aqueduct and Collection System, the Mitigation Commission, DOI and the Ute Indian Tribe are developing a plan and Draft EIS for protecting, enhancing and developing wetland areas along the Duchesne River. Some concepts being considered could combine the Riverdell property in the plan. If the Riverdell property does not become incorporated into the Lower Duchesne River Wetland Mitigation Project, the Riverdell property will be managed separately as compensation for impacts from the DRACR Program.	Mitigation Commission, Reclamation, and U.S. Department of the Interior (DOI)	Ongoing. In December 2001, DOI released a Draft EA describing the proposed action and alternatives to develop water delivery system capability for the property. Issues involving water rights and resolving an easement for the canal have been worked on since that time. This project will be implemented regardless of a decision on the Lower Duchesne River Wetland Mitigation Project, and will help satisfy DRACR mitigation objectives.	1988 DPR
8	Strawberry Aqueduct and Collection System: Six waterfowl management areas will be established along the Duchesne River to mitigate for waterfowl losses resulting from operation of the Strawberry Aqueduct and Collection System.	A 1965 FWCA report recommended the development of 6 waterfowl management areas containing 6,640 acres to mitigate for impacts of the Bonneville Unit SACS, and to provide additional wetland/wildlife-related benefits to the Ute Tribe. Plans developed by Reclamation in the 1970s were never implemented. The Mitigation Commission, DOI and Ute Indian Tribe entered into agreements beginning in 1995 for development of a conceptual plan for the protection, enhancement and restoration of wetland areas along the Duchesne River corridor. Under the agreements, the Ute Indian Tribe developed a feasibility study for a 45-mile corridor of the lower Duchesne River, from Bridgeland to Ouray, Utah. Three alternatives were identified which accomplish the specific objectives of the mitigation commitment. A Draft EIS has been prepared for this project, and was released for public review in November 2003.	Mitigation Commission, DOI, U.S. Bureau of Indian Affairs (BIA), and Ute Indian Tribe	Ongoing. This is in the Mitigation Commission Plan, continuing as part of the planning process with DOI and the Ute Indian Tribe.	1988 DPR
9	Strawberry Aqueduct and Collection System: Until it is resolved whether existing law will require that said entire 44,400 acre-feet of water remain in the Duchesne River until its confluence with the Green River, the District will re-divert above said confluence in accordance with Section 6 of the 1990 Streamflow Amendment.	The FWS is preparing a 2004 supplement to the final biological opinion for the Duchesne River Basin dated July 1998 to incorporate new information and to provide a revised reasonable and prudent alternative and a re-initiation notice. The final biological opinion on the Duchesne River System will be a factor in determining the use of the 44,400 acre-feet of the SACS in-stream flow water.	District and FWS	Pending.	1990 Streamflow Amendment
10	Strawberry Aqueduct and Collection System: A minimum of 25 cfs will be maintained in Rock Creek at the FS/Indian reservation boundary.	The 1980 Streamflow Agreement and 1990 amendment recognized the 25 cfs commitment from the September 20, 1965 Agreement. The CUP Completion Act Section 505(d) states the Secretary shall endeavor to maintain continuous flows of 29 cfs during May-October and 23 cfs during November-April at the reservation boundary. These minimum flows are met through combined releases out of Upper Stillwater Dam on Rock Creek and Docs Diversion on South Fork of Rock Creek. South Fork of Rock Creek joins the main channel of Rock Creek about 0.9 miles downstream from Upper Stillwater Dam. The two streams merge approximately 7 miles upstream of the reservation boundary.	District	With accretion flows, the 25 cfs requirement is being achieved and usually exceeded. A U.S. Geological Survey gage at the Reservation boundary is used to confirm the minimum flows are met. Monitoring of the 1980 Streamflow Agreement and 1990 Amendment is conducted by IBAT, District, Ute Indian Tribe and FWS.	1965 Deferral Agreement

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
11	Strawberry Aqueduct and Collection System: The operation and maintenance of the recreation, fishery and wildlife features of Midview Reservoir will be transferred to the Tribe, and a minimum fishery pool will be maintained in the reservoir.	This recommendation has been accomplished. The dam and related facilities and their operation and maintenance were transferred to the BIA. The Ute Indian Tribe has jurisdiction over recreational activities (including fishing and hunting) at the reservoir.	Ute Indian Tribe and BIA	Completed.	1988 DPR
12	Strawberry Aqueduct and Collection System: Fishing lakes aggregating approximately 800 surface acres will be constructed on Indian lands, site locations and cost estimates to be provided on the basis of further studies by the Service, said cost not to exceed $2 million to be funded under the provisions of Section 8 of the Act of April 11, 1956.	Bottle Hollow Reservoir (see Figure 6), with a surface area of approximately 420 acres was completed in 1970, and fulfilled part of this recommendation. The proposed Lower Stillwater Reservoir would have provided the remaining 380 acres of surface water fishing opportunity committed to the Tribe. However, the proposed Lower Stillwater Reservoir was de-authorized by Section 201 of CUPCA. Replacement features were authorized by Section 505 of CUPCA.	DOI	Bottle Hollow Reservoir is constructed. Further recreation enhancements for the Ute Indian Tribe are authorized by Section 505 of CUPCA *in lieu* of construction of Lower Stillwater Reservoir	CUPCA
13	Starvation Collection System: The acquisition and development of 1,280 acres of big game winter range.	A total of 1,661 acres of big game winter range were acquired and deeded to Utah Division of Wildlife Resources. Additional lands were acquired in lieu of development. The lands are situated within the Utah Division of Wildlife Resources Red Creek Wildlife Management Area.	Reclamation	Completed.	1988 DPR
14	Municipal and Industrial System: Transfer to Utah Division of Wildlife Resources 970 acres of Deer Creek lands. Provide funds to improve lands.	This mitigation commitment has been superseded, as a result of the 1990 reformulation of the DFS and the resulting reduced need for mitigation (see Environmental Commitment No. 1).	Mitigation Commission	Not applicable. Land has been acquired on the middle Strawberry River (see Environmental Commitment No. 1).	1988 DPR; 1997 FWS Planning Aid Letter
15	Municipal and Industrial System: Acquire 720 acres of West Hills area.	Lands have been acquired by Reclamation. The FWS recommends transfer of the lands from Reclamation to Utah Division of Wildlife Resources (see Environmental Commitment No. 1).	Mitigation Commission and Reclamation	Completed.	1988 DPR
16	Municipal and Industrial System: Manage Jordanelle Reservoir lands for wildlife within management boundary area.	Reclamation and Utah Division of Parks and Recreation developed a cooperative agreement on December 19, 1990 to manage lands within the management boundary. The agreement states that Utah Division of Parks and Recreation will implement a resource management plan developed by Reclamation.	Mitigation Commission, Reclamation, Utah Division Wildlife Resources, and Utah Division of Parks and Recreation	Pending. Mitigation Commission will address this commitment to determine its status.	1988 DPR
17	Municipal and Industrial System: Stabilization of twelve upstream reservoirs on Provo River.	A FEIS on the Upper Provo River Reservoir Stabilization Project was issued by the USFS on April 19, 1995. The Mitigation Commission entered into Interagency Agreements with the USFS and Reclamation to complete this project.	Mitigation Commission and USFS	All twelve lakes in the upper Provo River drainage were stabilized during the 1994-1999 period.	1988 DPR

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
18	Municipal and Industrial System: Construct a campground at Washington Lake and construct the Crystal Lake Trailhead.	The 1987 Final Supplement to the Final Environmental Impact Statement for the Municipal and Industrial System required the construction of Washington Lake Campground and the Crystal Lake Trailhead.	Mitigation Commission; USFS, and Reclamation	Construction began in July 1997 and was completed in 1999.	1988 DPR
19	Municipal and Industrial System: Fishery mitigation will consist of … maintenance of minimum flows of 125 cfs between Jordanelle Dam and Deer Creek Reservoir, 100 cfs between Deer Creek Dam and Olmsted Diversion, and 25 cfs during the winter from Olmsted Diversion to Utah Lake.	This commitment originated from the 1987 Final Supplement to the Final Environmental Impact Statement on the M&I System (Reclamation 1987) and compliance is also required by Sec. 303(c) of CUPCA: "The yield and operating plans for the Bonneville Unit of the Central Utah Project shall be established or adjusted to provide for the following minimum stream flows, which flows shall be provided continuously and in perpetuity from the date first feasible, as determined by the Mitigation Commission in consultation with the FWS and the Utah State Division of Wildlife Resources: In the Provo River from the base of Jordanelle Dam to Deer Creek Reservoir a minimum of one hundred and twenty-five cubic feet per second; In the Provo River from the confluence of Deer Creek and the Provo River to the Olmsted Diversion a minimum of one hundred cubic feet per second."	District and Reclamation	Completed and ongoing. Jordanelle Reservoir filled and was declared operational on July 10, 1996. Minimum stream flows have been met since that date.	1987 M&I System FS-FEIS; 1988 DPR; CUPCA
20	Municipal and Industrial System: Post-project fishery studies will be conducted below Deer Creek Dam to more precisely examine the impacts of summer habitat loss and winter habitat gain on the overall Brown trout population and assess the feasibility of improving habitat through modification of streamflow regimens.	This commitment originated from the 1987 Final Supplement to the Final Environmental Impact Statement on the M&I System (Reclamation 1987). The study is intended to address the impacts on Brown trout habitat in the Provo River downstream from Deer Creek Dam resulting from implementation and operation of the M&I System. Section 303(d) of CUPCA indicates that "The District shall, with public involvement, prepare and conduct a study and develop a plan to mitigate the effects of peak season flows in the Provo River. Such study and plan will be developed in consultation with the FWS, the Utah Division of Water Rights, the Utah Division of Wildlife Resources, affected water right holders and users, the Mitigation Commission, and the Bureau." Section 303(e) authorized the appropriation of $500,000 to conduct this study and prepare the plan.	Mitigation Commission and District	In early 2002, the Mitigation Commission, in cooperation with the District and DOI, initiated the study. At that time, it was the Joint Lead Agencies' intent that the study and plan would be completed and incorporated into the ULS draft EIS. However, that won't be possible because of the complexity of the study and statutorily required consultation process, which hasn't occurred yet. The Provo River System Stream Flow Study, as envisioned by the Mitigation Commission, will address a broader scope of study than that necessary to meet this environmental commitment. Therefore, in accordance with section 303(d) of CUPCA and this previous environmental commitment, the Joint Lead Agencies commit to complete the Provo River System Stream Flow Study and associated plan as quickly as is reasonably possible.	1987 M&I System FS-FEIS; 1988 DPR
21	Municipal and Industrial System: Angler access to 10 miles of Provo River downstream of Jordanelle Dam to Deer Creek Reservoir.	The PRRP ROD was signed by the Mitigation Commission on February 23, 1998 and by the DOI on March 20, 1998. Angler access acquisition along the middle Provo River is being integrated with the PRRP.	Mitigation Commission and Reclamation	Ongoing. This is part of the Mitigation Commission Plan. To date, the Mitigation Commission and Reclamation have purchased about 90 percent of the access needed along the river. Public access has been acquired for about 8.5 miles along the Provo River.	1988 DPR; 1998 PRRP ROD
22	Municipal and Industrial System: Replacement of Middle Provo River Diversion Dams.	The 1987 Final Supplement to the M&I System Final EIS committed to assure that instream flows released from Jordanelle Dam could be bypassed all the way to Deer Creek Reservoir. Diversion dams in this reach have been incapable of accurately measuring or delivering bypasses for instream flows. Designs to modify or replace diversion structures on the middle Provo River are incorporated into the PRRP, which is being implemented.	Mitigation Commission	Ongoing. Part of the PRRP plans.	1988 DPR; 1998 PRRP ROD

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
23	Municipal and Industrial System: Deer Mortality reduction on highways around Jordanelle Reservoir.	The Mitigation Commission continues to coordinate with Utah Division of Wildlife and FWS to determine the need and best methods for reducing deer mortality. The Mitigation Commission is no longer funding studies to evaluate the at-grade deer crossing areas as a viable mitigation measure. Utah Department of Transportation funded a study to evaluate deer exit ramps.	Mitigation Commission	Pending. The Mitigation Commission will reconvene work with FWS, Utah Division of Wildlife Resources and others; must determine next course of action.	1988 DPR; 1989 FWCA Report on M&I System; 1997 FWS Planning Aid Memo
24	Diamond Fork System: A total capacity of 510 cfs will be included in the Diamond Fork Pipeline for the purpose of removing project water, as well as existing high irrigation flows, from the lower Diamond Fork to mitigate potential project impacts and provide enhancement to the fishery resource.	A 560 cfs capacity pipeline and the Diamond Fork Tunnel have been constructed. When the DFS was completed and placed into operation, this commitment was satisfied.	District and DOI	Completed. See 1999 DFS FS-FEIS ROD, 2000 DF Final EA and FONSI, and 2002 DF Final EA and FONSI	1990 FS-FEIS Diamond Fork System
25	Diamond Fork System: A monitoring program will be established to ensure satisfactory water quality [and water temperature] in Diamond Fork below Monks Hollow Reservoir. If problems occur with low dissolved oxygen during project operation, corrective measures such as multi-level outlet on Monks Hollow Dam, aerators or destratifiers on Strawberry or Monks Hollow reservoirs, or warming ponds and aerators on Diamond Fork below Monks Hollow Reservoir will be constructed, as required, to guarantee a minimum dissolved oxygen content of 5 mg/L.	The DFS was reconfigured and Monks Hollow Reservoir is no longer part of any project plan. District has been collecting water quality and temperature data since July 1996. A cooperative agreement between the Mitigation Commission and District was signed in 1997 for collecting water quality and temperature data. The Mitigation Commission funded installation of two real-time stream gauging stations complete with Hydrolab water quality sampling units. Post project water temperature monitoring also would continue.	District and Mitigation Commission	Ongoing. The District and Mitigation Commission monitored water quality during construction. The Mitigation Commission will continue to monitor water quality during operation.	1990 FS-FEIS Diamond Fork System
26	Diamond Fork System: A monitoring program would be established to ensure satisfactory water quality in Diamond Fork. Impacts of the [ULS] on Strawberry Reservoir, Utah Lake, Utah Valley streams, and the Jordan River will be presented in the environmental statement on the ULS. The water quality monitoring program committed to in the 1990 Final Supplement (Reclamation 1990) and the DOI 1995 Diamond Fork Pipeline ROD will be continued.	Original EC from the 1990 FS-FEIS stated: "Features required exclusively for the Recommended Plan and Alternative A should not be constructed until there has been a disclosure of the total impacts they would have on fish and wildlife resources of Strawberry Reservoir, Utah Lake, and streams in Utah and Sevier valleys, and plans for mitigating losses have been agreed upon."	District	Ongoing. Water quality monitoring during Bonnville Unit operations continues. Water quality impacts of Bonneville Unit on Strawberry Reservoir, Utah Lake, Utah Valley streams, and the Jordan River are addressed in the ULS FEIS. Sevier Valley area, Millard and Sevier counties are no longer in the District.	Diamond Fork System ROD 1999

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
27	Diamond Fork System: The feasibility of incorporating plans for delivering up to 49 cfs during summer and 32 cfs during winter to Sixth Water Creek should be thoroughly explored. If not required by law, the feasibility of maintaining a minimum streamflow of 80 cfs in Diamond Fork for the protection of the stream fishery should be thoroughly explored.	Sec. 303(c)(1)(A) of CUPCA specifies that minimum stream flows in Sixth Water Creek downstream of Strawberry Tunnel shall be not less than thirty-two cfs during May through October and not less than twenty-five cfs during November through April. A stream gage was constructed in October 1998 on Sixth Water Creek immediately upstream of the Sixth Water Aqueduct Outlet to monitor minimum stream flows. The DFS construction is complete and these flows will now be provided in perpetuity. The minimum streamflows specified in CUPCA Section 303(c)(1)(B) state that subsequent to completion of Monks Hollow Dam or other structure that re-diverts water from the Diamond Fork drainage into the DFS of the Bonneville Unit, flows from the bottom of Monks Hollow Dam to the Spanish Fork River shall be not less than eighty cfs during the months of May through September and not less than sixty cfs during the months of October through April.	District operates per CUPCA Sec. 303(c)(1)(A) and CUPCA Sec. 303(c)(1)(B)	Completed; superseded by Sec. 303(c)(1)(A) of CUPCA which specified the in-stream flows and modified the commitment on Sixth Water. Modifications to Strawberry Tunnel and installation of the Syar Tunnel Guard Gate helped achieve this objective. See also Environmental Commitment No. 31. Completed; superseded by Sec. 303(c)(1)(B) of CUPCA which specified the in-stream flows and modified the commitment on Diamond Fork. See also Environmental Commitment No. 31.	1988 SACS Aquatic Mitigation Plan; 1992 FWCA Report on Diamond Fork System
28	Diamond Fork System: Stream channel rehabilitation work should be accomplished on lower Diamond Fork to ensure that appropriate benefits (attributable to the Diamond Fork Pipeline) are achieved and maintained.	The Diamond Fork stream restoration study and re-analysis of the DFS flows will result in recommendations for flows in Diamond Fork Creek to accomplish fisheries and riparian restoration and the accomplishment of project goals.	Mitigation Commission	Preliminary and conceptual restoration plans were developed in 1997. These will be reviewed and revised by the Mitigation Commission and the interagency team that will be re-convened to address this and other similar commitments. See also Environmental Commitment No. 31.	1984 FEIS on Diamond Fork Power System; 1988 DPR; 1990 FS-FEIS for Diamond Fork System
29	Diamond Fork System: Significant impacts on aquatic resources from modifications made at the Spanish Fork River diversions will be mitigated. If the diversion structures are modified, fish passage will be built into each structure.	The District commenced studies on modifications at the Spanish Fork River diversions in 2001, but did not complete the design studies. Construction of the bypass structures is only included in the ULS No Action Alternative. The ULS alternatives would not require modifications to the Spanish Fork River diversions to make deliveries to Utah Lake. The June Sucker Recovery Implementation Program has supported the recommendation that flows be provided through ULS to lower Hobble Creek to establish a second June sucker spawning run.	District	This Environmental Commitment has been superseded. The Spanish Fork River Structures project has been suspended.	Diamond Fork System ROD 1999
30	Diamond Fork System: The Diamond Fork System should be operated so that all sections of the Spanish Fork River receive the flows that are documented in the 1999 FS-FEIS that will benefit aquatic and terrestrial resources.	Under the ULS, water previously available in the Spanish Fork River will now be conveyed to Hobble Creek to benefit the endangered June sucker. See Environmental Commitment No. 84.	District	This Environmental Commitment has been superseded. The ULS EIS includes a description of how the Bonneville Unit water would be delivered to lower Hobble Creek, Provo River and Spanish Fork River.	Diamond Fork System ROD 1999
31	Diamond Fork System: An interagency team consisting of representatives from the joint-lead agencies (District, DOI, and Mitigation Commission), USFS, FWS, and Utah Division of Wildlife Resources should be organized to determine flow needs within Sixth Water and Diamond Fork creeks and the Spanish Fork River to benefit aquatic, terrestrial, and riparian resources.	See the comments in Environmental Commitments Nos. 27 and 28. The Mitigation Commission will re-convene the interagency team now that the DFS is operating and high irrigation-influenced streamflows no longer flow down Diamond Fork Creek. Monitoring will include assessment of spawning gravel conditions, and leatherside chub populations and habitat.	Mitigation Commission	Pending. The Mitigation Commission will re-convene the interagency team and will renew studying the potential for stream restoration and flow recommendations now that the DFS is operating.	Diamond Fork System ROD 1999

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32	Diamond Fork System: Water quality monitoring will continue downstream of Strawberry Tunnel, Sixth Water Aqueduct, and the Diamond Fork Tunnel Outlet to determine potential DO concentration impacts and how far downstream low DO levels are found.	The dissolved oxygen concentrations in Diamond Fork Creek and Sixth Water Creek downstream of the three outlets are being monitored now that the DFS is operating. Measures have been designed or are in place to re-aerate the water before it is discharged and low dissolved oxygen is not expected to be a problem. Monitoring of water quality, including dissolved oxygen, is ongoing in Sixth Water Creek and Diamond Fork Creek. Corrective measures will be taken as necessary to ensure the water quality standards for dissolved oxygen are met. This Environmental Commitment supercedes the dissolved oxygen portion of Environmental Commitment No. 25.	Mitigation Commission and District	Ongoing. The District and Mitigation Commission monitored water quality during construction. The Mitigation Commission is monitoring water quality during operation.	Diamond Fork System ROD 1999
33	Diamond Fork System: If low DO levels are found downstream from tunnel outlets, baffles or oxygen aerators should be installed to bring DO concentrations up to levels that are not detrimental to fish and other aquatic resources.	See the comment in Environmental Commitment No. 32.	District and Mitigation Commission	Pending. See the status in Environmental Commitment No. 32.	Diamond Fork System ROD 1999
34	Diamond Fork System: Conduct a water quality and temperature-monitoring program throughout the Diamond Fork System.	The Mitigation Commission entered into a cooperative agreement with District to implement the program in 1997 and at that time added additional water quality parameters to be monitored. This Environmental Commitment supercedes the temperature portion of Environmental Commitment No. 25.	Mitigation Commission and District	Ongoing. Monitoring continues through present. In 2001, the Mitigation Commission determined through consultation with District, FWS, DOI and Utah Division of Wildlife Resources that most metals and other parameters could be removed from the monitoring program. Now that the DFS is in operation, additional monitoring has resumed.	Diamond Fork System ROD 1999
35	Diamond Fork System: Acquire public access to the lower five miles of Diamond Fork Creek.	This requirement consisted of acquiring private lands. Partial accomplishment by USFS through land exchange; remaining lands acquired by Reclamation. The public access will provide angler access on lower Diamond Fork Creek.	Mitigation Commission	Ongoing. All properties have been acquired; but negotiations to clear minor boundary issues are still ongoing. An Interim Operating Agreement is in effect.	1988 DPR
36	Diamond Fork System: Provide Diamond Fork recreation facilities compatible with the conservation of natural resources.	The 1988 Definite Plan Report and 1990 Final Supplement to the Final Environmental Impact Statement for the DFS identified construction of recreation facilities to help meet the anticipated recreation demand associated with construction of the DFS and to help meet the needs of a growing population along the Wasatch Front. The recreation facilities identified in the documents included a campground, day-use areas, trails and angler access. The 1999 Final Supplement to the 1984 FEIS did not further revise the recreation commitments.	Mitigation Commission	Ongoing. Based on a 1998 Final Environmental Assessment (EA) and Decision Notice, the Diamond and Palmyra campgrounds were rebuilt in 2000. The rehabilitated campgrounds provide two-thirds the capacity of the original campgrounds in order to protect riparian vegetation from visitor use and to allow for stream restoration of Diamond Fork Creek. A Final EA for the group campground facility was released in November 2004. Other CUP recreation facilities planned in accordance with the Diamond Fork Area Assessment include day-use areas, trailheads and angler access points.	1988 DPR CUPCA 1998 Final EA Diamond Palmyra Campground

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
37	Diamond Fork System: The joint-lead agencies will plan for a long-term monitoring program to determine the effects on riparian vegetation including species composition, riparian corridor width, and vegetation density; spawning gravels; and leatherside chub habitat and populations from flow modifications within the impact area of influence.	The Mitigation Commission will be including long-term riparian vegetation monitoring along Diamond Fork Creek, part of which will include recording existing conditions prior to operation of the DFS. The District and DOI will work with the Mitigation Commission to prepare the monitoring program (See also Environmental Commitment No. 31).	Mitigation Commission	Ongoing. The Mitigation Commission will put together a team to collect GIS data and aerial photos of Diamond Fork Creek as part of the monitoring.	Diamond Fork System ROD 1999
38	Diamond Fork System: The joint-lead agencies will continue to coordinate with the FWS regarding results of the monitoring program and recommendations to mitigate any documented impacts.	The Mitigation Commission is monitoring Diamond Fork Creek and Sixth Water Creek now that the DFS is operating. These data will be shared with the District, DOI and FWS. Documented impacts will be mitigated (See also Environmental Commitment No. 31). Mitigation measures could include flow level adjustments and stream channel reconfiguration and maintenance of side channels (to maintain leatherside chub habitat).	Mitigation Commission	Pending. The Mitigation Commission will coordinate with the FWS.	Diamond Fork System ROD 1999
39	Diamond Fork System: The joint-lead agencies will mitigate any losses or detrimental impacts on wetland and riparian habitats that cannot be restored.	The Mitigation Commission will determine the need for mitigation of losses or detrimental impacts on wetland and riparian habitats that cannot be restored (See also Environmental Commitment No. 31).	Mitigation Commission	Pending. Now that the DFS is complete and operating, the Mitigation Commission will determine the need for mitigation.	Diamond Fork System ROD 1999
40	Diamond Fork System: The Mitigation Commission will continue to consult with the DOI, District, FWS, FS, Utah Division of Wildlife Resources, and others to plan and implement restoration of Sixth Water and Diamond Fork creeks, and to the extent possible, the Spanish Fork River.	The Mitigation Commission and the USFS entered into an Interagency Agreement in March 1995 to develop a conceptual plan for aquatic and riparian habitat restoration for Diamond Fork Creek that would emphasize natural processes and low maintenance. The planning area extends from Three Forks to the Spanish Fork River. The plan defined a reasonable range of alternative solutions for Diamond Fork Creek restoration considering the potential interactive effects of the Utah Lake Drainage Basin System, the Diamond Fork Pipeline, and management objectives for the watershed. The conceptual plan identifies factors that have created undesirable conditions and makes recommendations for management, structural, and hydrologic changes to rehabilitate the system (See also Environmental Commitment No. 31).	Mitigation Commission	Pending. Now that the DFS is complete and operating, the Mitigation Commission will consult with the agencies to plan and implement restoration actions as appropriate.	Diamond Fork System ROD 1999
41a	Diamond Fork System: Monitoring during the construction period prior to project operation will continue to establish a credible baseline for Ute ladies'-tresses.	The District has been conducting ULT studies in Diamond Fork Canyon and Spanish Fork Canyon during construction of the Diamond Fork Project. The Mitigation Commission will continue ULT monitoring for some period during operation of the DFS. The Spanish Fork Canyon colonies will be potentially affected by the ULS project; therefore, the commitments listed must be met under the ULS.	District	Ongoing. The District has been monitoring ULT and baseline data are being collected. The Mitigation Commission is responsible for data collection now that the DFS is operating as noted in Environmental Commitment 41b. The Mitigation Commission has been consulting with FWS regarding this change.	Diamond Fork System ROD 1999

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
41b	Diamond Fork System: Data collection following project implementation will include measurements of actual stream elevations relative to Ute ladies'-tresses orchid colony locations. If there are significant discrepancies, the model should be modified and a new impact assessment completed. Additionally, the joint-lead agencies should perform aerial mapping at a resolution sufficient to record stream channel geomorphology, vegetation community, and orchid colony locations in several-year intervals to help better understand changes and evaluate their significance in relation to restoration and conservation goals.	The measurements and other data will allow the FWS to verify the impact assessment model and its results. The Joint-Lead Agencies (Mitigation Commission, DOI and District) plan to continue aerial mapping in several-year intervals during operation of the DFS. The Mitigation Commission will take the lead on performing the aerial photography and mapping.	Mitigation Commission	Pending.	Diamond Fork System ROD 1999
41c	Diamond Fork System: Changes in vegetative communities in occupied or potentially suitable orchid habitat will be measured along Diamond Fork Creek and Spanish Fork Canyon.	The changes in vegetative communities may be measured using habitat associations, based on recent consultation between the Mitigation Commission and FWS.	Mitigation Commission	Pending. The Mitigation Commission will perform these studies; however, the plan for collecting these data may change based on consultation with the FWS.	Diamond Fork System ROD 1999
41d	Diamond Fork System: The natural variation in Ute ladies'-tresses orchid demography, population vigor and habitat will be characterized under baseline conditions and under actual operations.	The Mitigation Commission is responsible for monitoring Ute ladies'-tresses orchid populations under DFS operations.	Mitigation Commission	Ongoing. The Mitigation Commission is performing characterizations under DFS operations.	Diamond Fork System ROD 1999
41e	Diamond Fork System: The Three Forks colony will be monitored to better understand the process of loss of viability and eventual extirpation of colonies. Monitoring should focus on the rate of loss, identifying which parameters are best to measure to determine if loss is occurring.	The Three Forks colony of Ute ladies'-tresses orchid is the most upstream colony documented in the Diamond Fork Creek drainage. Baseline data on this colony have been collected since the SFN EIS was started and continued through completion of the 1999 Diamond Fork System FS-FEIS.	Mitigation Commission	Ongoing. The Mitigation Commission has been monitoring the Three Forks colony since DFS operations began.	Diamond Fork System ROD 1999

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
41f	Diamond Fork System: Conservation measures in addition to altering flows and rescue/transplant should be considered, such as vegetation manipulation, providing supplemental water to colonies, and mechanical reconfiguration of portions of the stream channel or floodplain surfaces, if monitoring data show streamflow hydrology is adversely affecting the Ute ladies'-tresses orchid population.		Mitigation Commission	Pending. The Mitigation Commission is determining the need for these measures now that the DFS is operating.	Diamond Fork System ROD 1999
41g	Diamond Fork System: If pollination is determined to be a limiting factor to long-term orchid viability and successful colonization of new habitats, then the joint-lead agencies will consider actions to enhance pollinator habitat or numbers as appropriate.		Mitigation Commission	Pending. The Mitigation Commission is determining the need for the actions under DFS operation.	Diamond Fork System ROD 1999
41h	Diamond Fork System: A methodology should be developed that will monitor changes in Ute ladies'-tresses orchid habitat quality, and the methodology should be used to establish habitat quality parameters of the population.	The District has been collecting data on Ute ladies'-tresses orchid that will support the development of the methodology.	Mitigation Commission	Pending. The Mitigation Commission will develop the methodology.	Diamond Fork System ROD 1999
41i	Diamond Fork System: Population viability parameters and "red-flag" conditions should be established for the habitat quality parameters.	The District has been collecting data on Ute ladies'-tresses orchid that will support establishing population viability parameters and "red-flag" conditions for the habitat quality parameters.	Mitigation Commission	Pending. The Mitigation Commission is establishing now that the DFS is operating.	Diamond Fork System ROD 1999
41j	Diamond Fork System: The accuracy of the predicted effects analysis should be measured.	This was not listed as a commitment in the DOI ROD. The District has been collecting data that will support measuring accuracy of the predicted effects analysis.	Mitigation Commission	Pending. The Mitigation Commission is planning to measure now that the DFS is operating.	Diamond Fork System ROD 1999
41k	Diamond Fork System: Timing for performing the most accurate canyon-wide Ute ladies'-tresses orchid counts should be evaluated.	The District has been collecting data that will support evaluation of timing for performing the most accurate canyon-wide counts of Ute ladies'-tresses orchid.	Mitigation Commission	Pending. The Mitigation Commission is evaluating now that the DFS is operating.	Diamond Fork System ROD 1999
41 l	Diamond Fork System: The relationship between river hydrology, depth to soil water, soil moisture, soil characteristics and Ute ladies'-tresses orchid colonies should be correlated.	The District has been collecting data that will support the correlation of these relationships.	Mitigation Commission	Pending. The Mitigation Commission is planning to correlate these relationships now that the DFS is operating.	Diamond Fork System ROD 1999

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
42	Diamond Fork System: The joint-lead agencies will identify, acquire, and permanently provide a block of water for flows in the lower Provo River through critical habitat, in perpetuity, for June sucker.	The District, DOI and Mitigation Commission have actively worked to acquire water for the June sucker and continue to pursue more water through Sections 207, 303, and other existing authorities involving water conservation conveyance efficiency, and outright purchase of water. Water saved or acquired will become project water and will be applied to meet this and other environmental commitment. Water for the endangered June sucker will be provided in accordance with the environmental commitments in the ULS Final EIS.	District and DOI	Ongoing. (See also Environmental Commitment No. 80).	Diamond Fork System ROD 1999
43	Diamond Fork System: District, in cooperation with the other Provo River water users, the FWS, and other members of the Provo River Flows Workgroup, will agree on operational scenarios that mimic dry, moderate and wet years. The District, with the support of the joint-lead agencies and Provo River water users, will apply operational scenarios to the annual Provo River operation to benefit June sucker.	District has developed operational scenarios that mimic dry, moderate and wet year hydrology and has applied them annually since 1999 to release of water in the Provo River to benefit June sucker. These operational scenarios are working well and the District has accomplished its goal of providing operations in the Provo River to benefit June sucker.	District	Completed. This commitment has been met, and the District will continue to manage and operate flows under the three scenarios.	Diamond Fork System ROD 1999
44	Diamond Fork System: The joint-lead agencies, in cooperation with the State of Utah and the FWS, will work toward establishment of a refugium in Red Butte Reservoir for June sucker.	District has been working with DOI and the Mitigation Commission, in cooperation with the State of Utah and FWS, to establish a refugium for June sucker in Red Butte Reservoir. The NEPA compliance document is being prepared and necessary modifications are being made to the reservoir control structures.	District	Ongoing. This commitment will be completed in late 2004 or 2005.	Diamond Fork System ROD 1999
45	Diamond Fork System: Any future development of the Bonneville Unit of CUP will be contingent on the Recovery Implementation Program making "sufficient progress" towards recovery of June sucker.	District, DOI and the Mitigation Commission have been active participants in the June sucker Recovery Implementation Program (JSRIP), and 29 separate activities or studies are underway or planned as part of the recovery of June sucker.	District, DOI, Mitigation Commission, and FWS	Ongoing. The RIP has been developed and 29 activities were performed in 2003. It is anticipated that in the future the FWS will make a determination of sufficient progress.	Diamond Fork System ROD 1999
46	Diamond Fork System: The ROD commits and obligates the Joint-Lead Agencies to prepare another EIS on the Bonneville Unit, Central Utah Project, associated with the Utah Lake System in compliance with Interior's FRN (FR Doc. 98-27484) dated October 14, 1998. That will not only address the impacts associated with any additional Utah Lake System facilities, but will also incorporate and address all remaining and incomplete commitments contained in the various CUP NEPA compliance documents and previous RODs.	The District, DOI and the Mitigation Commission have completed planning and the Final EIS on the Utah Lake System project.	District, DOI, and Mitigation Commission	Completed. The DOI and Mitigation Commission will issue separate RODs on the ULS Final EIS.	Diamond Fork System ROD 1999

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
47	I&D System/Utah Lake System: That a minimum pool elevation of 4,480 feet be maintained in Utah Lake, representing a maximum drawdown of about 9.3 feet below compromise level.	The Utah State Engineer's Office issued the Water Distribution Plan the Utah Lake Drainage Basin on October 22, 1992. This interim plan recommended the inactive storage level to be 8.7 feet below compromise. The FWS believes that the 1988 Definite Plan Report (DPR) commitments will be satisfied if the inactive storage level is established at 8.7 feet below compromise as per the Water Distribution Plan for Utah Lake.	NA	Completed. The State Engineer's Water Distribution Plan sets the level of Utah Lake.	NA
48	I&D System/Utah Lake System: That efforts be made to secure approximately 24,250 acre-feet of water annually for management of the Goshen Bay Wildlife Management Area.	This commitment was associated with a previous planning effort for components of the I&D System of the Bonneville Unit, which have since been discarded and/or de-authorized. Preliminary planning for the Utah Lake Wetland Preserve (ULWP) suggests that about 13,000 acre-feet of water might be needed for the ULWP under the "maximum possible wetland development" scenario if adopted for the development and management of the ULWP.	Mitigation Commission	The original quantity of water is not relevant anymore; this Environmental Commitment has been superseded by CUPCA.	NA
49	I&D System/Utah Lake System: That 14,500 acres of lands with attached water rights in the vicinity of Goshen Bay be acquired and developed for management by the Utah Division of Wildlife Resources. Management would be directed primarily towards mitigation of waterfowl and pheasant habitats.	This recommendation was associated with a previous planning effort for components of the I&D System of the Bonneville Unit, which have since been discarded and/or de-authorized. CUPCA authorized the establishment of the ULWP. CUPCA identifies about 22,000 acres to be acquired by the Mitigation Commission on the southern end of Utah Lake in the Goshen Bay and Benjamin Slough areas to establish the ULWP. The ULWP will be managed by the Utah Division of Wildlife Resources for protection of migratory birds, wildlife habitat and wetland values in accordance with CUPCA and the substantive requirements of the National Wildlife Refuge System Administration Act of 1966.	Mitigation Commission	This Environmental Commitment has been superseded by CUPCA. The Mitigation Commission in partnership with Utah Division of Wildlife Resources and Reclamation has acquired about 5,040 acres to date for the ULWP. The recommend acreage from the previous plan is no longer applicable.	NA
50	I&D System/Utah Lake System: That plans for about 6 miles of open canal sections of the Wasatch Aqueduct and 1.5 miles of the Mona-Nephi Canal be modified to permit crossing by big game animals.	The need for these actions will be evaluated in light of new plans. If no further Bonneville Unit developments are expected (i.e. no Utah Lake Drainage Basin Water Delivery System project), the need for these actions will also be evaluated and appropriate actions implemented.	NA	The SFN System considered changes to the Wasatch Aqueduct and Mona-Nephi Canal; since the SFN System was discontinued, this Environmental Commitment is no longer applicable.	NA
51	Wasatch County Water Efficiency Project and Daniel Replacement Project: While continuation of pre-project land use will not increase impacts on water quality, where it is necessary to purchase easements, and when practical and feasible, land uses will be restricted to those which will not impair water quality.	All United States fee easements have been acquired for the WCWEP project, and all uses of water are protected from uses that could impact water quality.	District	Completed.	1997 WCWEP/DRP Final EIS ROD
52	Wasatch County Water Efficiency Project and Daniel Replacement Project: The District will support studies to determine if there are significant losses of fish into any canal associated with the WCWEP & DRP and develop measures to prevent such losses as may warrant alleviation.	The District consulted with the FWS and Utah Division of Wildlife Resources during design of the WCWEP and DRP, and those agencies determined that no significant losses were occurring and that no measures to alleviate losses were warranted.	District	Completed.	1997 WCWEP/DRP Final EIS and ROD

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
53	Wasatch County Water Efficiency Project and Daniel Replacement Project: The Mitigation Commission will be signatory to the Conservation Agreements for Colorado River and Bonneville Cutthroat trout and as such will work to implement suitable mitigation for the impact on naturally re-producing cutthroat trout in upper Daniels Creek, within the Provo River drainage if possible.	The Mitigation Commission is signatory to the conservation agreements, and has participated in their activities. The Mitigation Commission has provided more than $380,000 to date for the native cutthroat trout conservation efforts as part of its contribution to the conservation teams.	Mitigation Commission	Ongoing.	1997 WCWEP/DRP Final EIS and ROD; CUPCA
54	Wasatch County Water Efficiency Project and Daniel Replacement Project: A survey will be conducted prior to construction activities to identify leatherside chub population centers and learn more about the status of the species.	The Mitigation Commission funded a survey by Utah Division of Wildlife Resources of potential leatherside chub habitats to determine the status and distribution of leatherside chub in the Heber Valley drainage area.	Mitigation Commission	Completed. See Utah Division of Wildlife Resources Publication Number 98-13: *Current Distribution and Status of Leatherside Chub (Gila copei) in the Heber Valley.*	1997 WCWEP/DRP Final EIS and ROD
55	Wasatch County Water Efficiency Project and Daniel Replacement Project: Areas outside the impact area but within Heber Valley that contain populations of leatherside chub that would benefit from habitat enhancement would be enhanced and protected in accordance with an agreement to be finalized with the FWS and Utah Division of Wildlife Resources.	The Mitigation Commission has created, restored and enhanced many miles of potentially suitable leatherside chub habitat in Heber Valley in association with the Provo River Restoration Project (PRRP). The Utah Division of Wildlife Resources and FWS have not yet formalized a Conservation Agreement for leatherside chub. Nonetheless, the Mitigation Commission has continued to develop habitats suitable for the species. In 2004, under the PRRP, Spring Creek, a tributary to Provo River that historically contained leatherside chub, will be extended in the Provo River floodplain to provide additional habitat.	Mitigation Commission	Ongoing.	1997 WCWEP/DRP Final EIS and ROD
56	Wasatch County Water Efficiency Project and Daniel Replacement Project: A [wetlands] monitoring plan will be established to evaluate the success of mitigation measures. Such mitigation measures will be modified as needed to ensure successful mitigation.	The District's wetlands mitigation for this project is to restore or enhance wetlands in the Strawberry River drainage following removal of the Daniel Irrigation Company facilities including two dams in the headwaters of a Strawberry River tributary. Monitoring includes determining the success of the wetlands restoration and re-establishment of wetland vegetation.	District and Mitigation Commission	Ongoing.	1997 WCWEP/DRP Final EIS and ROD

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
57	Wasatch County Water Efficiency Project and Daniel Replacement Project: Roads in the upper Strawberry River basin associated with the DIC diversion facilities would be closed. The roads leading to the dams and the two-wheel track roads used for canal maintenance will be ripped and revegetated. Signs reading "Closed to Motor Vehicles" will be posted in appropriate locations. The roads to the dams would be reshaped to natural slopes in certain areas to provide drainage and to discourage use by unauthorized vehicles.	The Uinta National Forest revised parts of this plan in 1998 with its Environmental Assessment on closing roads in the upper Strawberry River watershed. The road to the two Daniel Irrigation Company (DIC) dams was subsequently not closed; however, almost 3.0 miles of Forest Road 049 up the main Strawberry River drainage was closed and rehabilitated from about ¼ mile upstream of the former DIC diversion, to the headwaters. The two-track road to the diversion has been closed, ripped and revegetated. The canals and dams have been removed or re-contoured, and large headcuts caused by years of channel erosion have been rehabilitated. The District and USFS completed this work from 1999 through 2003. The USFS is responsible for monitoring the revegetation effort, and will re-seed areas if needed.	District and USFS	Completed.	1997 WCWEP/DRP Final EIS and ROD
58	Provo River Restoration Project: Develop a comprehensive monitoring and reporting program in cooperation with the U.S. Army Corps of Engineers, Utah Division of Wildlife Resources, FWS, recreation groups, and county officials to evaluate and provide information and management guidance on the following: A. Success of revegetation and erosion control measures. B. Control of noxious weeds and undesirable plants. C. Aquatic and terrestrial habitat mitigation. D. Aquatic and terrestrial species responses to the project. E. Threatened, endangered, and candidate species status and trends.	The Mitigation Commission has been monitoring and reporting on each item in cooperation with the agencies and entities listed at left. The project is meeting or exceeding its goals for revegetation, erosion control, control of noxious weeds and undesirable plants, aquatic and terrestrial habitat mitigation, and T&E species habitat. The aquatic and terrestrial species responses to the project are being monitored.	Mitigation Commission	Ongoing. Baseline data and post-project data have been collected since 1997. Annual progress meetings are held. The Mitigation Commission is monitoring each item as listed.	CUPCA 1998 ROD for PRRP
59	Provo River Restoration Project: The restoration project will be carried out in adherence to the numerous Standard Operating Procedures (SOPs) described in the FEIS and RODs.	The Mitigation Commission has adhered to all SOPs, or consulted with Utah Division of Wildlife Resources, FWS and other affected agencies and publics if any SOPs were revised.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
60	Provo River Restoration Project: A survey will be conducted prior to construction activities to identify leatherside chub population centers and learn more about the status of the species.	See comments on Environmental Commitment No. 54.	Mitigation Commission	Completed.	1998 ROD for PRRP

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
61	Provo River Restoration Project: Designs for fish passage facilities will be incorporated into plans for all diversion structures that are modified by the Project.	This commitment has become incorporated as a standard part of the PRRP objectives. The first choice under the restoration effort has been to eliminate diversions entirely, but where diversions are still needed, to modify them along with the restoration project to provide fish passage in both directions.	Mitigation Commission	Ongoing as part of PRRP.	1998 ROD for PRRP
62	Provo River Restoration Project: In order to avoid the likelihood of adverse impacts on Ute ladies'-tresses orchid, the following actions will be followed.	See comments for items in 62a through 62e below.	Mitigation Commission	Completed and Ongoing. See status for Environmental Commitment Nos. 62a through 62e.	1998 ROD for PRRP
62a	Provo River Restoration Project: A monitoring plan will be implemented for Ute ladies'-tresses orchid approved by the FWS and developed in consultation with the FWS, Mitigation Commission, and Utah Natural Heritage Program (UNHP) staff biologists. The monitoring plan will be part of an overall monitoring plan that will track the success of the project in meeting environmental goals.	The Mitigation Commission has developed and implemented monitoring plans in concert with the FWS and UNHP. Modifications to the monitoring program were recommended by the Mitigation Commission following several years of survey work, and the changes were approved.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
62b	Provo River Restoration Project: Prior to construction, the genetics of the Provo River watershed population will be characterized, particularly in relation to other Wasatch Front populations, to help determine the uniqueness of the Provo River population and to determine the biological appropriateness of using seeds or transplanted individuals from other populations to augment colonies or replace lost individuals following construction and implementation of PRRP.	The Mitigation Commission contributed funding for a study of genetics of the Provo River population. This study was under agreement with the FWS. The study concluded that based on the genetic markers evaluated, there is more genetic variation within populations than among populations, and the Provo River population was not genetically distinct from others, e.g. Diamond Fork, in the area (for further information, contact FWS).	Mitigation Commission	Completed.	1998 ROD for PRRP

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
62c	Provo River Restoration Project: Direct construction impacts will be avoided. The FWS and the Mitigation Commission will determine an appropriate buffer zone based upon final design and what is encountered during construction. This buffer zone will be surrounded with orange fencing and posted with signs stating "conservation area - do not disturb." The existence of the threatened Ute ladies'-tresses orchid will not be stated on the signs to avoid unwanted attention to the area. The FWS will be notified when fencing has been installed prior to construction and given the option of inspecting the location and adequacy. Additionally, the FWS will be notified when construction will be taking place near orchid colonies. A representative of the Mitigation Commission or the FWS will be present when construction is occurring near orchid colonies in order to ensure that unexpected impacts do not occur and to be available for consultation should changes in construction methods or location appear necessary.	The Mitigation Commission has complied with this environmental commitment. The FWS has been involved in reviewing and revising draft and final designs for the restoration work for every segment of the river, including those that contained historic colonies of ULT. Construction has occurred with consultation before, during and after the project to ensure FWS involvement and approval of the work. The Mitigation Commission has completed restoration work in the two river segments known to contain ULT.	Mitigation Commission	Completed.	1998 ROD for PRRP

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
62d	Provo River Restoration Project: Conditions necessary for continued viability of the Provo River population will be maintained, including "artificial" maintenance of habitat conditions, until such time as the FWS determines that such activities are no longer necessary or warranted. Circumstances that will permit termination of artificial habitat maintenance include documentation of successful establishment of viable colonies and expiration of existing colonies due to circumstances not related to this project. Artificial maintenance may include such actions as augmenting or modifying hydrologic conditions and vegetation management. The Proposed Action has been redesigned to maintain, to the extent possible, existing channel features and hydrology within the occupied habitat. This will help minimize the likelihood that artificial habitat maintenance will be required.	The Mitigation Commission has continued to consult with FWS throughout this project. To date, no artificial means of maintaining populations has been recommended by the FWS. The Mitigation Commission will continue to consult with FWS throughout the completion of the restoration work.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
62e	Provo River Restoration Project: Additionally, restoration of the river floodplain corridor and to the degree possible river dynamics will help create and maintain suitable habitat. The Mitigation Commission will work with the FWS to design and manage these areas and recreation access points and trails in a manner that will allow establishment and maintain viability of Ute ladies'-tresses orchid colonies.	The Mitigation Commission has complied with this environmental commitment. The FWS has been involved in reviewing and revising draft and final designs for the restoration work for every segment of the river, including those that contained historic colonies of ULT. Construction has occurred with consultation before, during and after the project to ensure FWS involvement and approval of the work. The Mitigation Commission has continued to consult with FWS throughout this project. The Mitigation Commission has developed and implemented monitoring plans in concert with the FWS and Utah Natural Heritage Program. Modifications to the monitoring program were recommended by the Mitigation Commission following several years of survey work, and the changes were approved.	Mitigation Commission	Completed.	1998 ROD for PRRP
63	Provo River Restoration Project: In order to avoid, reduce and mitigate potential impacts of the PRRP on spotted frog, the following actions would be incorporated (the implementation of measures marked with an asterisk (*) will be contingent upon receiving the necessary permits from the UDWR):	See comments for items in 63a through 63g below.	Mitigation Commission	Completed and Ongoing. See status for Environmental Commitments 63a through 63g.	1998 ROD for PRRP

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
63a	Provo River Restoration Project: During construction in Reach 9, spotted frogs will be precluded from moving into the "wire ponds" before the ponds are impacted by construction activities. In Reach 9, spotted frogs will be prevented from moving back into the "wire ponds" or entering the construction area. Exclusion will be accomplished by placing drift fences around ponds, and between the construction area and the USBR Jordanelle wetlands areas in Reach 9. Pit-fall traps would be placed along the drift fence prior to fall season and before construction begins. Trapping would be continued in the spring. The traps would be checked at regular, frequent intervals so that captured frogs could be moved to a suitable area. Such trapping and relocation will be in accordance with the protocols described above.	The Mitigation Commission has coordinated extensively with Utah Division of Wildlife Resources and other agencies throughout the PRRP regarding spotted frog mitigation and conservation measures. Protocols developed for Reach 9 have been applied in other reaches of the project that contain spotted frog. The Mitigation Commission has trained spotted frog technicians on staff and has funded Utah Division of Wildlife Resources to coordinate and participate in all spotted frog-related activities of the PRRP.	Mitigation Commission; Utah Division of Wildlife Resources	Completed.	1998 ROD for PRRP
63b	Provo River Restoration Project: During construction, a trained person shall be on-site to coordinate implementation of the Environmental Commitments, identify and resolve problems involving spotted frogs. This action will be performed by personnel trained by qualified professional herpetologists. An accurate record of all activities involving spotted frogs will be maintained in accordance with the approved protocols. As part of this protocol, the Mitigation Commission proposes to mark spotted frogs > 40 mm SVL that are moved due to construction disturbance with P.I.T. tags to evaluate their movement patterns and survival rates.	The Mitigation Commission has trained spotted frog technicians on staff and has funded private and academic experts and Utah Division of Wildlife Resources to coordinate and participate in all spotted frog-related activities of the PRRP. PIT-tagging and other studies have been carried out.	Mitigation Commission	Ongoing.	1998 ROD for PRRP

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
63c	Provo River Restoration Project: Collection and translocation of spotted frogs will be in accordance with protocols to be developed by the Mitigation Commission and other members of the Bonneville Basin Conservation and Recovery Team and its technical advisors. The protocols will also be reviewed for approval by the Utah Division of Wildlife Resources in conformance with the policies, procedures and regulations governing the "Collection, Importation, Transportation or Possession of Zoological Animals."	The Mitigation carries out all spotted frog activities either through direction of Utah Division of Wildlife Resources experts on the project and/or in compliance with the Certificate of Registration (COR) issued to the Mitigation Commission by the Utah Division of Wildlife Resources.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
63d	Provo River Restoration Project: The Mitigation Commission would document frog use of the existing ponds within the proposed construction corridor in Reach 9 during spring breeding season, summer, and during the periods of retreat into and emergence from hibernation.	Monitoring of the PRRP project area has been expanded greatly beyond the requirement of this environmental commitment, to include the entire 10-mile corridor of the PRRP. Monitoring has shown successful occupation of newly-created wetland by the spotted frog, and based on egg mass counts, since the PRRP has been implemented the Conservation Agreement goal of having at least 500 egg masses each spring in the population has now been exceeded for the past three years.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
63e	Provo River Restoration Project: Mitigation for the potential removal of two to four "oxbow" type ponds (created by river channelization) along the east side of Reach 9 will be completed. This mitigation is recommended because spotted frog monitoring indicates that these ponds are used by frogs for breeding, summer activity, and herpetologists speculate that these ponds may be hibernation sites. The Mitigation Commission will create four or more new ponds to address known habitat requirements for all spotted frog life stages. At least two of these ponds will be designed and constructed to mimic the two "oxbow" ponds previously identified as suitable for frogs in Reach 9, and at least two additional ponds will be designed and constructed to provide potential hibernation sites.	The Mitigation Commission created many more acres of wetlands, including wetlands designed specifically to provide suitable breeding and hibernating habitats, for the PRRP prior to removing any occupied habitats. In addition, final designs and construction avoided the oxbow ponds and they were not removed.	Mitigation Commission	Completed.	1998 ROD for PRRP

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
63f	Provo River Restoration Project: The Mitigation Commission will monitor the newly constructed and modified ponds for use by spotted frogs for 5 years after construction of each site. It is also recommended that wildlife agencies continue to monitor the sites after this period.	The Mitigation Commission and Utah Division of Wildlife Resources are monitoring annually.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
63g	Provo River Restoration Project: The Mitigation Commission will work cooperatively with Reclamation and other involved entities to modify water management of several existing mitigation ponds to hold water permanently and improve suitability as hibernation sites.	The Mitigation Commission has provided increased flows to several of the wetlands cells and modified others to maintain a more constant elevation during breeding season for spotted frog to reduce water level fluctuations that previously cause desiccation of egg masses. The Mitigation Commission and Reclamation are examining potential measures to increase and improve water supplies to the wetlands cells constructed by Reclamation for wetlands mitigation.	Mitigation Commission	Ongoing.	1998 ROD for PRRP
64	Uinta Basin Replacement Project: In-stream flow commitments by MLWUA, District, and DOI in the Lake Fork River between Moon Lake Reservoir and the Big Sand Wash Feeder Diversion Structure will be maintained. Providing these in-stream flows is considered project mitigation for the impacts created by the Moon Lake Project.	The in-stream flows in the Lake Fork River between Moon Lake Reservoir and the Big Sand Wash Feeder Diversion Structure would be as follows: **Month / Water Year / Number of Years / In-stream Flow (cfs)** Oct. 1 through Apr. 30 — Wet — 36 out of 100 years — 10.5 Average — 42 out of 100 years — 7.0 Dry — 22 out of 100 years — 3.5 May 1 through Jul. 31 — All years — Normal Irrigation Releases Aug. 1 through Sep. 30 — Wet — 36 out of 100 years — 11.0 Average — 42 out of 100 years — 11.0 Dry — 22 out of 100 years — 6.0 The following water year definition is based on anticipated active storage in Moon Lake Reservoir on October 1: • Wet year - more than 15,000 acre-feet • Average year - between 4,500 and 15,000 acre-feet • Dry year - less than 4,500 acre-feet	District and Mitigation Commission	Pending completion of the UBRP. There are four criteria for bypassing this additional water at the "C" Canal diversion: 1. Moon Lake Water User Association's (MLWUA) diversion of water must be in priority 2. The Secretary of the Interior determines that the bypassed flows will be advantageous for fishery benefits 3. Capacity is available to move the bypassed water through the Big Sand Wash Feeder Pipeline 4. Changing the point of diversion from the "C" Canal to the Big Sand Wash Feeder Diversion will not reduce the amount of water available to MLWUA, except to the extent of any conveyance losses between the "C" Canal and the Big Sand Wash Feeder Diversion	2001 UBRP Final EA and FONSI

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
65	Uinta Basin Replacement Project: In-stream flow commitments by MLWUA, District, and DOI in the Yellowstone River between Yellowstone Feeder Canal Diversion and the Big Sand Wash Feeder Diversion Structure will be maintained. Providing these in-stream flows is considered project mitigation for the impacts created by the Moon Lake Project.	The MLWUA agrees to reduce its diversions into the Yellowstone Feeder Canal in order to bypass 1,945 acre-feet of water annually past the Yellowstone Feeder Canal Diversion for the downstream diversion at the Big Sand Wash Feeder Diversion and storage in the enlarged Big Sand Wash Reservoir. The volume of water to be bypassed is equal to the average annual yield of the nine high mountain lakes in the Yellowstone River drainage basin that are being stabilized as part of this project. The following schedule will be followed for the bypass of water each year. • October 1 through June 30 3 cfs • July 1 through July 31 2.5 cfs • August 1 through September 30 2 cfs	District	Pending completion of the UBRP.	2001 UBRP Final EA and FONSI
66	Uinta Basin Replacement Project: Juvenile and adult fish passage facilities will be incorporated into the design of the Big Sand Wash Feeder Diversion Structure on the Lake Fork River	The Big Sand Wash Feeder Diversion Structure is a new feature constructed under the UBRP. Unrestricted passage for adult and juvenile fish is included in the design as specified under the description of the Proposed Action in the UBRP Final EA. The fish passage design involves a series of steps created by rock weirs constructed as part of the design.	District and DOI	Completed.	2001 UBRP Final EA and FONSI
67	Uinta Basin Replacement Project: DOI and the District will consult with the Utah Division of Wildlife Resources during final design to determine whether screening the inlet to Big Sand Wash Feeder Pipeline is justified.	The DOI and District consulted with the Utah Division of Wildlife Resources during final design of the Big Sand Wash Feeder Pipeline whether or not screening is justified. The Utah Division of Wildlife Resources decided that screening to prevent juvenile fish from entering the pipeline was not justified. The pipeline was screened with 2-inch openings, which will prevent larger fish from entering the pipeline.	District and DOI	Completed.	2001 UBRP Final EA and FONSI
68	Uinta Basin Replacement Project: The District and DOI will work with MLWUA to ensure that proper measures are taken to avoid release of contaminants into the environment when the power plant at Big Sand Wash Reservoir is dismantled. The site should be sampled for residual contaminants after power plant removal and after all contaminants are removed.	The Big Sand Wash Reservoir was completely de-watered during construction and dismantling of the power plant, which helped control any contaminant release from the power plant site during dismantling. Subsequent sampling was performed and no residual contaminants were detected in the sediments.	District and DOI	Completed.	2001 UBRP Final EA and FONSI

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
69	Uinta Basin Replacement Project: Four existing high mountain lakes in the upper Lake Fork River watershed and nine existing high mountain lakes in the upper Yellowstone River watershed that are located in the High Uintas Wilderness will be stabilized as a fish and wildlife/wilderness enhancement measure.	See items 69a through 69m for specific comments on the high mountain lakes stabilization in the Lake Fork and Yellowstone River watersheds under the Proposed Action-Lake Fork Section 203 Alternative Note: *The storage portion of Water Lily Lake and White Miller Lake is inactive, but the lakes would be stabilized to allow water users to terminate their special use permits with the USFS and discontinue the associated maintenance requirements.	Mitigation Commission	Pending. Stabilization is scheduled to begin in 2006, after Enlarged Big Sand Wash Reservoir is completed and is capable of storing the water rights to be transferred from the high mountain lakes to be stabilized. The USFS will develop a minimum tool evaluation guide to determine if, and under what circumstances, motorized or mechanical means of transport or onsite equipment may be necessary to accomplish the goal of stabilizing the high mountain lakes (reservoirs) to the "no hazard" level. The work, materials, and equipment needed to accomplish the stabilization would be different at each site because each reservoir is different. Stabilization of the high mountain reservoirs would be accomplished in a manner that protects the wilderness values at each site. The USFS will conduct the analysis in 2005.	2001 UBRP Final EA and FONSI
69a	Upper Lake Fork Watershed Stabilize Brown Duck Lake	Mechanized Equipment Used During Original Construction: Yes Lake Elevation (feet above MSL): 10,177 Present Active Storage at Spillway Crest (acre-feet): 301 Present Surface Area at Spillway Crest (acres): 33 Storage at Stabilized Elevation (acre-feet): 125 Surface Area At Stabilized Elevation (acres): 29 Drainage Basin Area (square miles): 4.0	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69b	Upper Lake Fork Watershed Stabilize Island Lake	Mechanized Equipment Used During Original Construction: Yes Lake Elevation (feet above MSL): 10,248 Present Active Storage at Spillway Crest (acre-feet): 655 Present Surface Area at Spillway Crest (acres): 70 Storage at Stabilized Elevation (acre-feet): 500 Surface Area At Stabilized Elevation (acres): 58 Drainage Basin Area (square miles): 3.5	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69c	Upper Lake Fork Watershed Stabilize Kidney Lake	Mechanized Equipment Used During Original Construction: Yes Lake Elevation (feet above MSL): 10,281 Present Active Storage at Spillway Crest (acre-feet): 3,.618 Present Surface Area at Spillway Crest (acres): 202 Storage at Stabilized Elevation (acre-feet): 1,800 Surface Area At Stabilized Elevation (acres): 180 Drainage Basin Area (square miles): 2.8	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69d	Upper Lake Fork Watershed Stabilize Clements Lake	Mechanized Equipment Used During Original Construction: Yes Lake Elevation (feet above MSL): 10,471 Present Active Storage at Spillway Crest (acre-feet): 601 Present Surface Area at Spillway Crest (acres): 58 Storage at Stabilized Elevation (acre-feet): 130 Surface Area At Stabilized Elevation (acres): 31 Drainage Basin Area (square miles): 1.7	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
69e	Yellowstone River Watershed Stabilize Bluebell Lake	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 10,891 Present Active Storage at Spillway Crest (acre-feet): 224 Present Surface Area at Spillway Crest (acres): 58 Storage at Stabilized Elevation (acre-feet): 145 Surface Area At Stabilized Elevation (acres): 52 Drainage Basin Area (square miles): 0.7	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69f	Yellowstone River Watershed Stabilize Drift Lake	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 11,066 Present Active Storage at Spillway Crest (acre-feet): 158 Present Surface Area at Spillway Crest (acres): 31 Storage at Stabilized Elevation (acre-feet): 41 Surface Area At Stabilized Elevation (acres): 23 Drainage Basin Area (square miles): 0.6	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69g	Yellowstone River Watershed Stabilize Five Point Lake	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 11,002 Present Active Storage at Spillway Crest (acre-feet): 574 Present Surface Area at Spillway Crest (acres): 83 Storage at Stabilized Elevation (acre-feet): 370 Surface Area At Stabilized Elevation (acres): 37 Drainage Basin Area (square miles): 2.1	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69h	Yellowstone River Watershed Stabilize Superior Lake	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 11,165 Present Active Storage at Spillway Crest (acre-feet): 295 Present Surface Area at Spillway Crest (acres): 40 Storage at Stabilized Elevation (acre-feet): 120 Surface Area At Stabilized Elevation (acres): 22 Drainage Basin Area (square miles): 2.0	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69i	Yellowstone River Watershed Stabilize Farmers Lake	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 10,983 Present Active Storage at Spillway Crest (acre-feet): 692 Present Surface Area at Spillway Crest (acres): 50 Storage at Stabilized Elevation (acre-feet): 692 Surface Area At Stabilized Elevation (acres): 50 Drainage Basin Area (square miles): 1.0	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69j	Yellowstone River Watershed Stabilize East Timothy Lake	Mechanized Equipment Used During Original Construction: Yes Lake Elevation (feet above MSL): 11,005 Present Active Storage at Spillway Crest (acre-feet): 616 Present Surface Area at Spillway Crest (acres): 43 Storage at Stabilized Elevation (acre-feet): 85 Surface Area At Stabilized Elevation (acres): 24 Drainage Basin Area (square miles): 3.5	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
69k	Yellowstone River Watershed Stabilize White Miller Lake*	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 10,680 Present Active Storage at Spillway Crest (acre-feet): 239 Present Surface Area at Spillway Crest (acres): 20 Storage at Stabilized Elevation (acre-feet): 199 Surface Area At Stabilized Elevation (acres): 18 Drainage Basin Area (square miles): 0.5	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69 l	Yellowstone River Watershed Stabilize Deer Lake	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 10,240 Present Active Storage at Spillway Crest (acre-feet): 110 Present Surface Area at Spillway Crest (acres): 11 Storage at Stabilized Elevation (acre-feet): 33 Surface Area At Stabilized Elevation (acres): 6 Drainage Basin Area (square miles):	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
69m	Yellowstone River Watershed Stabilize Water Lily Lake*	Mechanized Equipment Used During Original Construction: No Lake Elevation (feet above MSL): 9,346 Present Active Storage at Spillway Crest (acre-feet): 115 Present Surface Area at Spillway Crest (acres): 15 Storage at Stabilized Elevation (acre-feet): 82 Surface Area At Stabilized Elevation (acres): 12 Drainage Basin Area (square miles): 1.0	Mitigation Commission	Pending.	2001 UBRP Final EA and FONSI
70	Uinta Basin Replacement Project: Mitigate for impacts to wetlands associated with the UBRP Project.	Permanent wetland impacts would occur around the enlarged Big Sand Wash Reservoir. Most temporary impacts would occur along the Big Sand Wash Feeder Pipeline and the Big Sand Wash-Roosevelt Pipeline. The mitigation site approved by the U.S. Army Corps of Engineers (Corps) is located downstream of the new dam. The Mitigation Commission will be coordinating with the DOI, Utah Division of Wildlife Resources, and FWS on the wetland mitigation and whether it will be located as proposed in the Corps Section 404 Permit or at an alternative site suggested by the Mitigation Commission or one of the other entities.	Mitigation Commission	Ongoing. Temporary impacts have been mitigated through compensation to the National Fish and Wildlife Foundation for a wetland mitigation bank. Permanent impacts need to be mitigated.	2001 UBRP Final EA and FONSI
71	Uinta Basin Replacement Project: The proposed diversion structure location and final pipeline alignments will be intensively surveyed for Ute ladies'-tresses orchids in August prior to final design, and all populations will be mapped or marked. DOI, in cooperation with FWS, will develop appropriate conservation measures for unavoidable adverse impacts.	The District and DOI performed an intensive survey for Ute ladies'-tresses orchids in August 2004 prior to final design of pipeline alignments. A comprehensive map of the vegetation survey was prepared documenting the survey results. No Ute ladies'-tresses orchids were documented within the final pipeline alignments.	DOI and District	Completed.	2001 UBRP Final EA and FONSI

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No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
72	Uinta Basin Replacement Project: District commits to survey habitat for Uinta Basin hookless cactus. If the cactus is found, FWS will be consulted to avoid impacts.	The District performed a survey for Uinta Basin hookless cactus during summer 2004 and found none.	District	Completed.	2001 UBRP Final EA and FONSI
73	Uinta Basin Replacement Project: The DOI and District will participate in carrying out the reasonable and prudent alternative identified by the FWS in their 1998 Duchesne River Basin Final Biological Opinion [as amended] for the four listed Colorado River fish species.	The FWS is in the process of amending the Biological Opinion for the Duchesne River based on recent flow recommendations developed by the RIP and finalized in 2003 (Modde and Keleher 2003). It is anticipated that implementation of flow recommendations will be coordinated through the Duchesne River Working Group (DRWG) that includes representatives from the FWS, State of Utah, Department of Natural Resources (Divisions of Water Rights, Water Resources and Wildlife Resources), the District, the DOI, and the Mitigation Commission. The DRWG was informally formed in 2003 to address issues involved with implementing the flow recommendations. The DRWG is addressing many issues, including water availability, water management, and protection of in-stream flows provided for endangered fishes. It is anticipated that this working group will be formalized in the amended Biological Opinion for the Duchesne River.	DOI, District and Mitigation Commission	Ongoing.	2001 UBRP Final EA and FONSI
74	Uinta Basin Replacement Project: Roosting surveys for spotted and Townsend's big-eared bats will be conducted in suitable habitat along pipeline corridors during the first year following project authorization. Occupied roost sites at non-reservoir features will be marked to avoid impacts on the bats.	The District performed roosting surveys for spotted and Townsend's big-eared bats in suitable habitat along the pipeline corridors during summer 2004. No bats were observed or recorded along the pipeline corridors. The District roosting surveys did find raptor nesting along the Roosevelt Pipeline corridor, and the District will continue to survey and monitor for nesting raptors during construction activities. The District has informed the FWS and Utah Division of Wildlife Resources about the observed raptor nesting.	District	Completed. Raptor nesting surveys will continue throughout construction activities.	2001 UBRP Final EA and FONSI
75	Utah Lake System: Complete all mitigation commitments for fish, wildlife and related recreation associated with the ULS project or other CUP facilities.	The Utah Lake Drainage Basin Water Delivery System (Utah Lake System or ULS) Final EIS has been completed. Draft mitigation and environmental commitments are identified in the Final EIS and will be finalized in the Record of Decision documents. The Mitigation Commission will use some of the funds available for this program to implement June sucker recovery actions in accordance with the June sucker Recovery Implementation Program. Also, see Environmental Commitments 76 through 91.	Mitigation Commission	Pending.	1999 Diamond Fork System ROD
76	Utah Lake System: The District will comply with the State of Utah's water conservation goals of reducing per capita water use within the District's Bonneville Unit service area by 12.5 percent by year 2020 and by 25 percent by year 2050.	In the Diamond Fork System FS-FEIS, the Joint-Lead Agencies committed to EPA that water conservation as it relates to Bonneville Unit M&I water uses would be included and addressed in the planning effort for the ULS. Numerous activities implemented by the State of Utah, the District, and the project's major water petitioners to conserve water are substantial. These combined activities serve as partial fulfillment of the commitment to EPA. Additionally, the repayment contracts and water petitions with water districts and associations include provisions requiring water users to comply with the State of Utah's water conservation goals consisting of a 12.5 percent reduction in per capita water use by 2020 and a 25 percent reduction in per capita water use by 2050, using 2000 water use as a comparison basis.	District	Pending. Contracts have been signed between DOI and the District, and between the District and it's petitioners, for the ULS water.	2004 ULS Final EIS

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77	Utah Lake System: Beginning in 2005, the District will prepare an annual report for the Utah Division of Water Resources and DOI on the average annual per capita water use within the District's Bonneville Unit service area for each of the District's petitioners of ULS water.	See comments for Environmental Commitment No. 76. Additionally, the repayment contracts and water petitions with water districts and associations include provisions requiring the District to prepare an annual report of actual per capita water use based on average per capita water use throughout each petitioner's service area. The District's annual report will include a target line showing the required annual water conservation savings necessary to achieve the goal of 12.5 percent reduction by 2020 and 25 percent reduction by 2050, actual yearly per capita use data points, and a linear regression of those data points (actual progress line). The District will certify in its annual report the extent to which its petitioners have made progress towards achieving the required conservation goals. The annual data points for the actual progress line will begin in 2000, and the first regression line will be prepared in 2005.	District	Pending.	2004 ULS Final EIS
78	Utah Lake System: The District, working with the DOI, the District's petitioners, and owners/operators of wastewater treatment plants, shall by the year 2030 recycle 18,000 acre-feet of return flows from the Bonneville Unit project water.	The Utah State Engineer may approve 18,000 acre-feet of Bonneville Unit water delivered to Salt Lake County for recycling. Recycling of this water would help meet the M&I needs in the JVWCD service area. Recycling would involve the DOI, District, District's petitioners, and the owners of the South Valley and Central Valley wastewater treatment plants. The 18,000 acre-feet to be recycled would not be part of the ULS supply but would be included in the overall Bonneville Unit water supply.	District	Pending.	2004 ULS Final EIS
79	Utah Lake System: Commencing with water year 2016 and continuing until the water year 2033, the District shall demonstrate its annual progress towards recycling 18,000 acre-feet and shall continue to maintain recycling the 18,000 acre-feet through water year 2050.	The District will annually certify to the Secretary of the Interior that it and its Salt Lake County petitioners are making annual progress towards reaching the recycling goal of 18,000 acre-feet per year. Annual progress towards reaching the recycling goal will be demonstrated by the District meeting an established schedule. In the event the District fails to achieve annual progress, it shall assess itself a surcharge to be used by the District to help fund water recycling projects developed under Section 207 of CUPCA within its service area.	District	Pending.	2004 ULS Final EIS
80	Utah Lake System: Provide 12,165 acre-feet of water to be regulated annually from Deer Creek Reservoir to the lower Provo River for June sucker spawning and rearing flows.	The DOI and District have formulated the ULS project to provide 12,165 acre-feet of conserved water annually in the lower Provo River for June sucker spawning and rearing. This includes 2,875 acre-feet of existing contracted Bonneville Unit M&I water conserved from Section 207 projects in northern Utah County, 1,000 acre-feet of water conserved from Section 207 piping of the Upper East Union and East River Bottom canals, 290 acre-feet of water conserved from Section 207 piping of the Timpanogos Canal, and 8,000 acre-feet from enclosing the Provo Reservoir Canal or other Section 207 projects.	District and DOI	Pending.	2004 ULS Final EIS
81	Utah Lake System: The Mitigation Commission and the District will continue to acquire water shares from irrigation companies to provide flows in the lower Provo River to meet the 75 cfs target flow.	CUPCA Section 302(a) provides for the District, using funds provided by the Mitigation Commission, to acquire by purchase from willing sellers or exchange, 25,000 acre-feet of water rights in the Utah Lake drainage basin. CUPCA Section 303(c)(4) states "Upon the acquisition of the water rights in the Provo Drainage identified in section 302, in the Provo River from the Olmsted Diversion to Utah Lake, a minimum of seventy-five cubic feet per second" shall be provided continuously and in perpetuity from the date first feasible. This effort will continue, subject to availability of authorized funds. See Environmental Commitment No. 82.	Mitigation Commission and District	Ongoing.	2004 ULS Final EIS

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82	Utah Lake System: Provide 3,300 acre-feet of irrigation company shares of water to flow unregulated toward the 75 cfs target flow in the lower Provo River.	The District has acquired irrigation company water shares representing 3,300 acre-feet of water for the Mitigation Commission towards the amount necessary to meet the 75-cfs target flow in the lower Provo River. The acquired water shares are in the form of water rights and water stock, and this water is only available during the irrigation season. None of this water is storage water and it cannot be regulated by reservoir operations. Instead, the water will be allowed to flow past the diversion location associated with the original water right or share, and the water will continue to flow down to Utah Lake. A change application will be filed with the Utah State Engineer to implement this action.	Mitigation Commission, District, and DOI	Ongoing.	2004 ULS Final EIS
83	Utah Lake System: An annual average of 16,000 acre-feet of Bonneville Unit water would be delivered to the lower Provo River through the Spanish Fork-Provo Reservoir Canal Pipeline, when water is needed in Utah Lake for exchange to Jordanelle Reservoir, and when the lower Provo River is below the 75 cfs target flow.	The District has planned the Utah Lake System project to include delivering an annual average of 16,000 acre-feet of Bonneville Unit water to the lower Provo River to assist in meeting in-stream flow objectives and would be subsequently exchanged from Utah Lake to Jordanelle Reservoir. This water would be conveyed through the Spanish Fork-Provo Reservoir Canal Pipeline and discharged to the Provo River at the pipeline crossing when needed to make the Utah Lake-Jordanelle Reservoir exchange and when flows in the Provo River are less than 75 cfs. A minimum 75 cfs flow normally occurs in the river between the Olmsted and Murdock diversions during the summer months when releases are made from Deer Creek Reservoir for conveyance through the Provo Reservoir Canal.	District	Pending.	2004 ULS Final EIS
84	Utah Lake System: An annual average of 12,037 acre-feet of water, of which 4,000 acre-feet will be available annually, would be regulated out of Strawberry Reservoir through the Mapleton-Springville Lateral Pipeline to Hobble Creek to Utah Lake for June sucker spawning and rearing in Hobble Creek.	The District and DOI have planned the Utah Lake System project to include delivering an annual average of 12,037 acre-feet of project water through the Mapleton-Springville Lateral Pipeline to Hobble Creek for June sucker spawning and rearing flows (April through July) and to provide other fish and wildlife benefits throughout the year. This water would be part of 40,310 acre-feet of Utah Lake inflow from Strawberry Reservoir and would be subsequently exchanged from Utah Lake to Jordanelle Reservoir. Of the 12,037 acre-feet, 4,000 acre-feet would be provided in every year because this is the amount of water saved each year through Section 207 projects with Spanish Fork City, Mapleton City, and Springville City. An average of 8,037 acre-feet would be provided when water is being delivered from Strawberry Reservoir to Utah Lake for exchange up to Jordanelle Reservoir. Hobble Creek supplemental water would not be delivered during high runoff years when Utah Lake is above compromise level. The high runoff years correspond with years when natural runoff would be sufficient to attract June sucker spawning in lower Hobble Creek.	DOI and District	Pending.	2004 ULS Final EIS

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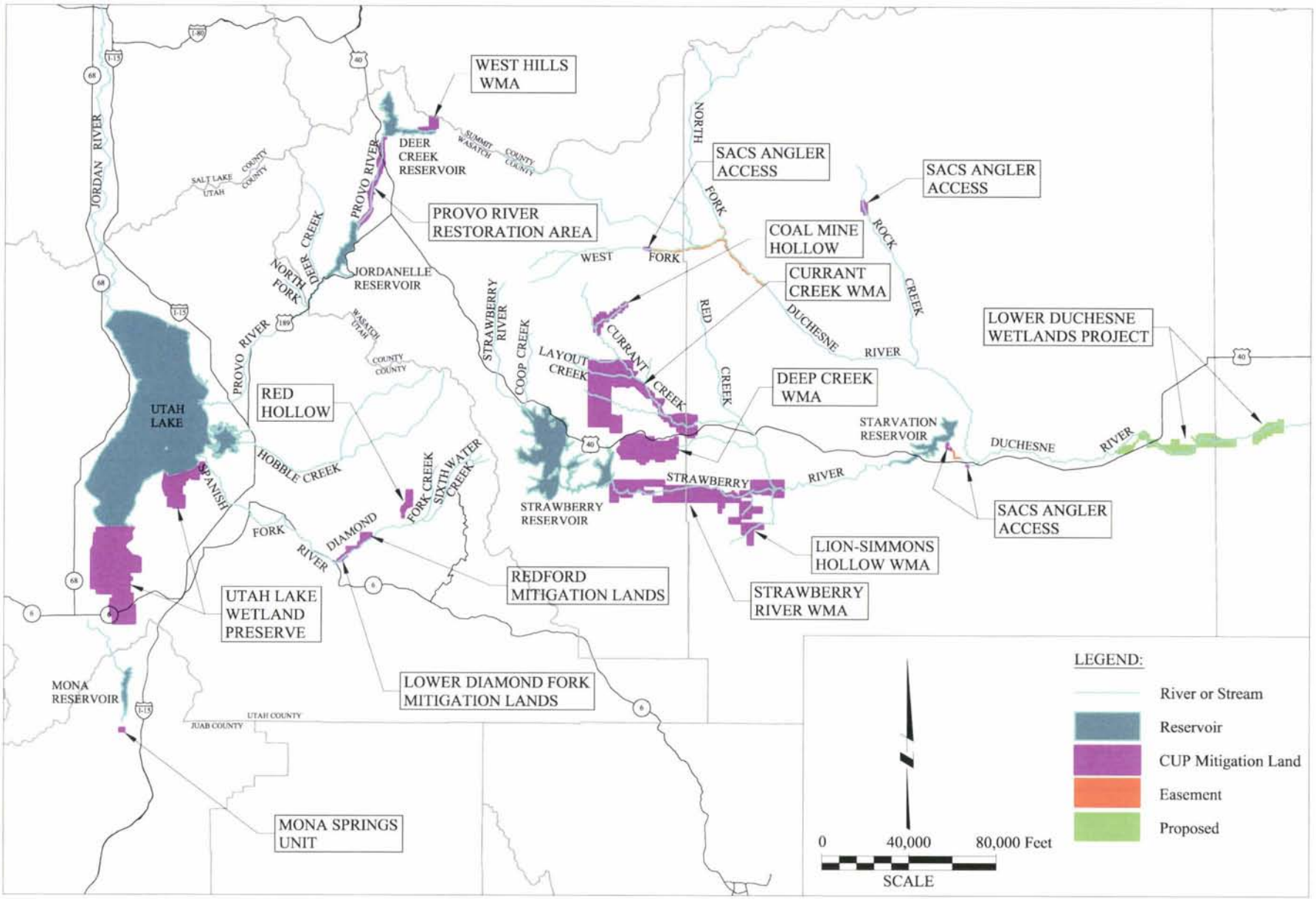
85	Utah Lake System: The Mitigation Commission will provide 10 acres of the 85 acre Mona Springs Wetland Unit which was acquired for protection of the wetlands complex for mitigation of 1.03 acres of non-jurisdictional permanent wetland loss and 0.27 acres of temporary wetland impacts.	The Mitigation Commission acquired 85.5 acres of a natural spring-fed wetland complex in Juab County south of Mona Reservoir in 1998 as mitigation for anticipated wetland and riparian impacts of the then-planned SFN System. Subsequently, planning for the SFN System was abandoned. The wetland is known as the Mona Springs Wetland Unit of the Burriston Ponds Wildlife Management Area. A portion of the Mona Springs Wetland Unit is available to mitigate for ULS impacts on riparian wetlands. The mitigation for ULS project permanent impacts on 1.03 acres of non-jurisdictional wetlands and 0.27 acre of temporary riparian wetland impacts would include 10 acres of the Mona Springs Wetland Unit, resulting in a mitigation ratio of 9.7 to 1.	Mitigation Commission	Pending. This environmental commitment will be considered completed when the ULS ROD is signed.	2004 ULS Final EIS
86	Utah Lake System: The District is fully committed to participating with the Utah Division of Water Quality in the state's Total Maximum Daily Load (TMDL) study and has joined the Stakeholders Advisory Committee established by the State to guide the TMDL study.	Utah Lake has been listed by the Utah Division of Water Quality as being impaired for total phosphorus (TP) and total dissolved solids (TDS). The Division of Water Quality has initiated a Total Maximum Daily Load (TMDL) study for Utah Lake. The Utah Lake System project would decrease TP and TDS loads in Utah Lake. The District has been an active participant in the TMDL study through the Stakeholders Advisory Committee, and will continue to participate throughout the study because of the influence of the Bonneville Unit operations on Utah Lake and its tributary streams.	District	Ongoing.	2004 ULS Final EIS
87	Utah Lake System: The Joint-Lead Agencies, in cooperation with the June Sucker Recovery Implementation Program (JSRIP) and FWS, have initiated a study to determine the feasibility of providing fish passage or removing the Fort Field Diversion Dam on the lower Provo River for June sucker spawning and rearing.	The Fort Field Diversion Dam is a low irrigation diversion structure that prevents June sucker from migrating upstream of the dam during normal and low water years. During some high runoff years, the Provo River stage at the dam is high enough to inundate the structure and is thought to allow upstream passage to adult June suckers seeking suitable spawning habitat. The study to determine the feasibility of providing fish passage at the dam or removing the dam is underway as an element of the JSRIP, and planning that could result in combining the Fort Field Diversion with another diversion or eliminating the Fort Field Diversion Dam is included in the 2004 JSRIP program. The Mitigation Commission's five-year plan includes planning and implementing diversion dam modifications on the lower Provo River.	Mitigation Commission	Ongoing.	2004 ULS Final EIS
88	Utah Lake System: A Ute ladies'-tresses orchid monitoring program should be carried forward for a number of years (to be determined jointly by the District, Mitigation Commission and FWS) similar to the pre-operation study in Diamond Fork. If the changes to the Ute ladies'-tresses orchid population in Spanish Fork Canyon exceed the variation expected from pre-operation analysis and the critical values established, management guidelines presented in the 1999 Diamond Fork Biological Opinion may be implemented to compensate for impacts.	There are seven known occurrences of the Ute ladies'-tresses orchid in Spanish Fork Canyon along the Spanish Fork River from Diamond Fork Creek to the Spanish Fork Diversion Dam. The Ute ladies'-tresses orchid is presently listed as a threatened species protected under the Endangered Species Act and its amendments. The ULS Proposed Action may result in decreased river stages, ranging from 0.1 to 0.7 feet lower than baseline conditions, because of lower stream flows from conveying the Bonneville Unit water through a new pipeline down Spanish Fork Canyon. The lower stream flows, simulated through hydraulic models of the Spanish Fork River channel, are not expected to change the hydrology around the Spanish Fork River Ute ladies'-tresses colonies because they typically grow outside the direct influence of the river flows and are supported by secondary hydrology (i.e., subsurface water, springs, seeps, or flows from off-channel ponds). The orchid monitoring program for the Spanish Fork Canyon colonies is based on the program referenced in Environmental Commitment No. 41a. The District will be responsible for orchid monitoring until the Spanish Fork Canyon Pipeline becomes operational; the Mitigation Commission will be responsible for orchid monitoring during ULS operation.	District, Mitigation Commission	Ongoing.	2004 ULS Final EIS

Table 2-1
Environmental Commitments on the Bonneville Unit of the Central Utah Project

No.	Environmental Commitment	Comments	Responsibility	Status	1988 DPR or Other Document
89	Utah Lake System: If post-operation monitoring results in measured parameters exceeding pre-set critical values for Ute ladies'-tresses orchid populations in Spanish Fork Canyon, the Diamond Fork System operation has the flexibility to supplement flows in Spanish Fork River. Other measures, such as a rescue/transplant program, could be initiated.	See the comments under Environmental Commitment No. 88 and Nos. 41f. If decreased flows in the Spanish Fork River are found to cause conditions exceeding the pre-set critical values for Ute ladies'-tresses orchid colonies and individuals in Spanish Fork Canyon, then the Joint-Lead Agencies will consult with the FWS.	Mitigation Commission, District, and DOI	Pending.	2004 ULS Final EIS
90	Utah Lake System: To offset potential impacts on leatherside chub, the Joint-Lead Agencies will support the Utah Division of Wildlife Resources in evaluating population and habitat status, or determining threats and/or identifying conservation actions that could protect and where appropriate enhance leatherside chub habitat.	Flows in the Spanish Fork River would decrease under the ULS Proposed Action from the baseline conditions that occur with the Diamond Fork System operating and delivering the full 86,100 acre-feet of Bonneville Unit water to Utah Lake for exchange to Jordanelle Reservoir. The decreased flows would reduce in-stream habitat in the Spanish Fork River during much of the year and could result in a long-term decrease in the leatherside chub population. Leatherside chub is a sensitive fish species in Utah. The Joint-Lead Agencies' support of the Utah Division of Wildlife Resources to evaluate population and habitat status, determine threats to the species, and identify conservation actions that could protect and enhance leatherside chub habitat would be focused first on the Spanish Fork River, but if necessary, on other streams of the Utah Lake drainage basin.	Mitigation Commission	Pending.	2004 ULS Final EIS
91	Utah Lake System: The District and DOI will re-consult with the Native American Tribes if there are significant changes in ULS Proposed Action facility locations.	The five Native American tribes consulted on the Utah Lake System project each indicated that the Proposed Action features and facilities would not have known impacts on resources important to them, on traditional cultural properties, or on sacred sites. Any changes in Proposed Action features or facility locations would require the District and DOI to re-consult with each tribe to determine if there would be impacts on tribal resources, traditional cultural properties, or sacred sites.	District and DOI	Pending.	2004 ULS Final EIS
92	Utah Lake System: The District will use Best Management Practices (BMPs) to minimize erosion - sediment load to adjacent waters, monitor water quality to determine effectiveness of BMPs, and comply with the conditions of the 401 Water Quality Certification issued by the Utah Division of Water Quality.	The Utah Department of Environmental Quality, Division of Water Quality issued the 401 water quality certification in a November 1, 2004 letter to the EPA. The 401 Water Quality Certification includes conditions regarding turbidity, fill materials containing organic chemicals and nutrients, and fish spawning areas. The letter provides the State of Utah opinion that water quality standards will not be violated and accompanies the 404(b)(1) analysis prepared for the ULS Final EIS.	District	Pending.	2004 401 Water Quality Certification



Map 2-1

CUP Mitigation Properties

Central Utah Project Completion Program

Chapter 3

October 2004

UTAH RECLAMATION
MITIGATION
AND CONSERVATION
COMMISSION

INTRODUCTION

This chapter presents the fish and wildlife mitigation and related recreation measures associated with systems and components of the Bonneville Unit of the Central Utah Project (CUP). Environmental commitments discussed are those unfulfilled at the time of the 1988 Definite Plan Report (DPR) and those established subsequently by the Central Utah Project Completion Act (CUPCA) or through other programs. The chapter is organized in six main parts:

Part 1: Commitments unfulfilled in the 1988 DPR

Part 2: Fish and wildlife mitigation and conservation measures established by CUPCA; amendments to prior commitments; Commitments from other environmental documents (Environmental impact statements [EISs] and Biological Opinions) subsequent to the 1988 DPR

Part 3: Overview of fish, wildlife and related recreation programs associated with the Strawberry River and Duchesne River watersheds

Part 4: Overview of fish, wildlife and related recreation programs associated with the Provo River and Utah Lake watersheds

Part 5: Overview of fish, wildlife and related recreation programs associated with the Diamond Fork and Spanish Fork watersheds and Southern Utah County

Part 6: Overview of fish, wildlife and related recreation programs associated with Colorado River Storage Project or statewide programs

Some fish and wildlife programs, such as those involving sensitive, threatened or endangered species, may occur in more than one watershed area. Therefore, in Parts 3 through 5, programs and commitments involving these species are described in greatest detail in the part where most of the activity for that/those species is occurring. Reference to activities in other watershed planning areas is mentioned.

PART 1: COMMITMENTS UNFULFILLED IN THE 1988 DPR

Table 3-1 summarizes the status in 2004 of environmental commitments unfulfilled at the time of the 1988 DPR. For more detailed information, see Table 2-1 in Chapter 2, and Parts 3, 4, and 5 of this chapter.

Table 3-1
1988 DPR Fish and Wildlife Mitigation Commitment Completion Schedule for the Bonneville Unit

Page 1 of 3

No.	Commitment	Schedule	Status	Responsible Agency
1.	Streamflow Agreement	1986	Completed; Ongoing	District
2.	Aquatic Mitigation – Daniels - Strawberry Exchange	1990 to 2003	Completed	MC District
3.	Aquatic Mitigation – Stream Habitat Improvements	1984 to 2001	Completed	MC Reclamation
4.	Aquatic Mitigation – Angler Access	1984 to 2004	Ongoing	MC Reclamation UDWR
5.	Aquatic Mitigation – Egg-taking Station	1988 to 1996	Completed	Reclamation UDWR
6.	Wildlife Mitigation – 1987 Plan	1979 to 2002	Completed	MC Reclamation UDWR USFS
7.	Wetland Mitigation - Waterfowl Development	1995 to 2002	Ongoing Draft EIS released 2003	MC DOI Ute Indian Tribe
8.	Minimum flow of 25 cfs at Indian boundary on Rock Creek	Since Project Inception	Completed, Ongoing	District
9.	Midview Reservoir – Management by and for Ute Indian Tribe fish and wildlife and recreation	1968	Completed	BIA Ute Indian Tribe
10.	Fishing lakes aggregating 800 acres for Ute Tribe [Bottle Hollow Completed; Title V of CUPCA compensates for Lower Stillwater]	1992	Completed	DOI Ute Indian Tribe
11.	Wetland/Wildlife Mitigation – Duchesne River Area Canal Rehabilitation Program	1989 to 2012	Ongoing	MC Reclamation
12.	Wildlife Mitigation – Big Game Winter Range	1987	Completed	Reclamation

Table 3-1
1988 DPR Fish and Wildlife Mitigation Commitment Completion Schedule for the Bonneville Unit

Page 2 of 3

No.	Commitment	Schedule	Status	Responsible Agency
13.	Angler Access – Provo River	1996 to 2006	Ongoing.	MC Reclamation
14.	Modify Diversion Dams – middle Provo River	1998 to 2006	Ongoing	MC
15.	Multilevel Outlet on Jordanelle Dam	1990 to 1992	Completed	District
16.	Minimum Flows – Provo River (a)below Deer Creek (b) below Jordanelle	1986 1996	Completed	District
17.	Wetland Mitigation – Jordanelle Dam and Reservoir	1987 to 2002	Completed	MC Reclamation
18.	Stabilize Upper Provo River Reservoirs	1994 to 2001	Completed	MC Reclamation
19.	Campground at Washington Lake	1997 to 1999	Completed	MC Reclamation USFS
20.	Trailhead at Crystal Lake	1997	Completed	Reclamation
21.	Post-project Fishery Studies – Provo River	2002 to 2005	Ongoing	MC District
22.	Wildlife Mitigation – Deer mortality reduction	1997 to 2006	Ongoing	MC
23.	Post-construction Fish Movement Studies – Syar Tunnel	--	Deleted	--
24.	Post-construction Water Quality Monitoring	1994 to 2010	Ongoing	District MC
25.	Fishery Enhancement – Upper Diamond Fork Pipeline	1990 to 1992	Completed	District
26.	Minimum Flows – Sixth Water	1992	Completed	District
27.	Angler Access – Diamond Fork Creek	1990	Completed	MC Reclamation
28.	Stream Habitat Improvements – Diamond Fork Creek	1994 to 1996	Completed	Reclamation; USFS
29.	Recreation Facilities (a) Diamond - Palmyra Campgrounds (b) Group Site Campground	1995 to 2001 1995 to 2006	Partially Completed	MC USFS

Table 3-1
1988 DPR Fish and Wildlife Mitigation Commitment Completion Schedule for the Bonneville Unit

Page 3 of 3

No.	Commitment	Schedule	Status	Responsible Agency
30.	Recreation Facilities – Day-use Areas	1995 to 2006	Ongoing	MC USFS
31.	Stream Habitat Improvements – Currant (Goshen) Creek	---	Deleted	--
32.	Minimum Pool Elevation in Utah Lake	1992-1993	Completed	UDWRi
33.	Wetland Mitigation – Utah Lake	---	Deleted	--
34.	Fencing and Management of Federal Lands at Utah Lake	---	Deleted	--
35.	Big Game Fencing – Mona-Nephi, Nephi-Sevier, and Elberta Canals	---	Deleted	--

*Agency abbreviations are:
Reclamation = U.S. Bureau of Reclamation
USFS = U.S. Forest Service
Ute Indian Tribe = Northern Ute Indian Tribe, Uintah & Ouray Reservation
FWS = U.S. Fish and Wildlife Service
MC = Mitigation Commission
UDWRi = Utah Division of Water Rights
District = Central Utah Water Conservancy District

PART 2: COMMITMENTS ESTABLISHED BY CUPCA AND AMENDMENTS AND FROM OTHER ENVIRONMENTAL DOCUMENTS (EIS AND BIOLOGICAL OPINIONS)

Title III of CUPCA created the Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) with responsibility for coordinating, planning and administering the Section 8 funding for Bonneville Unit development. Title II authorized $32,063,000 (1991 dollars) for completion of the mitigation commitments in the 1988 Definite Plan Report for the Bonneville Unit (1988 DPR) and through Title III authorized $140,956,520 for new mitigation and conservation measures and to provide funding for measures to complement and/or supplement 1988 DPR mitigation commitments.

The number one priority for the Mitigation Commission is to complete unfulfilled mitigation commitments of the Bonneville Unit of the CUP. Congress intended this to be a high priority as noted in Section 304 of the CUPCA. Section 304 requires the Mitigation Commission to complete outstanding mitigation commitments in accordance with the schedule identified in the Act. The Mitigation Commission carried this congressional intent forward into its Planning Rule (Section 10005.12(b)(1)) which identifies priority projects as, "[projects] that address fish, wildlife and recreation resources affected by the development of the Central Utah Project, including projects authorized in Title II, section 304 or section 315." This direction was reinforced as the Mitigation Commission established four priorities to guide the selection of proposed programs—the number one priority being to complete unfulfilled mitigation commitments of the Bonneville Unit of the CUP.

The new CUPCA provisions were applied to expand the program of fish and wildlife provisions that had been included in the Bonneville Unit up to 1988. Congress found that "Reclamation mitigation efforts during preceding decades have lagged behind project construction or have been inadequate when measured against modern environmental standards. Several projects [CUP] were designed or developed prior to passage of key environmental legislation, such as the Fish and Wildlife Coordination Act, the National Environmental Policy Act, and the Endangered Species Act and "...this title [Title III] is designed to provide for mitigation of the effect of future as well as to generally enhance the environment throughout Utah to offset past effects" (Senate Report 102-267, Reclamation Projects Authorization and Adjustment Act of 1992).

This Fish and Wildlife Appendix documents the environmental plan for fish, wildlife and recreation of the Bonneville Unit completion program. This environmental plan has evolved over several decades as water systems planning progressed to the currently proposed configuration and operational program. The environmental aspects of the various components of the Bonneville Unit are presented in the sections and attachments of this Fish and Wildlife Appendix. This chapter integrates the environmental commitments prior to CUPCA (generally speaking, those that were in existence and described in the 1988 DPR); with those environmental commitments stemming from National Environmental Policy Act (NEPA) compliance actions on projects authorized for additional water development features under CUPCA, and subsequent to the 1988 DPR; along with those projects or features authorized by Title III of CUPCA that are in

addition to the 1988 DPR. Many of the projects authorized by CUPCA have been carried out in order to supplement or complement measures included in the 1988 DPR.

Environmental Commitments Established by CUPCA

The following section summarizes the important provisions of Title III of CUPCA. This is not a complete reading of the legislation; those interested in learning more about the legislation should obtain a copy of the CUPCA legislation.

Section 301 – Utah Reclamation Mitigation and Conservation Commission. Section 301(a)(1) established the Mitigation Commission to "... coordinate the implementation of the mitigation and conservation provisions of this Act among the Federal and state fish, wildlife, and recreation agencies." The Mitigation Commission's authorities were in addition to those already established within other Federal, state or local governments. The primary duty of the Mitigation Commission is to formulate the policies and objectives for the implementation of the fish, wildlife, and recreation mitigation and conservation projects and features authorized in CUPCA, and to administer the expenditure of funds for those projects and features [Section 301(c)]. The Mitigation Commission was authorized to "... enter into and perform such contracts, leases, grants, cooperative agreements, or other similar transactions, ... with universities, non-profit organizations, and the appropriate public natural resource management agency or agencies ... for the implementation of the mitigation and conservation projects and features authorized in this Act..." [Section 301(f)(4)].

Although Section 301 of CUPCA does not in itself establish environmental commitments for the Bonneville Unit, it describes in great detail the process by which the Mitigation Commission is to develop its mitigation and conservation plans and what types of activities are appropriate. Congress directed through enactment of CUPCA that the Mitigation Commission shall develop plans for its program with public involvement [Section 301(g)(1 through 3)] and that the Mitigation Commission shall include in its plans only those measures which: "(A) restore, maintain, or enhance the biological productivity and diversity of natural ecosystems within the State and have substantial potential for providing fish, wildlife, and recreation mitigation and conservation opportunities; (B) be based on, and supported by, the best available scientific knowledge; (C) utilize, where equally effective alternative means of achieving the same sound biological or recreational objectives exist, the alternative that will provide public benefits through multiple resource uses; (D) complement the existing and future activities of the Federal and State fish, wildlife, and recreation agencies and appropriate Indian tribes; (E) utilize, when available, cooperative agreements and partnerships with private landowners and nonprofit conservation organizations; and (F) be consistent with the legal rights of appropriate Indian tribes. Enhancement measures may be included in the plans to the extent such measures are designed to achieve improved conservation or mitigation of resources" [Section 301(g)(4)].

The Mitigation Commission issued its first Mitigation and Conservation Plan in 1997 following an in-depth assessment of Bonneville Unit mitigation and conservation needs and a thorough public involvement process. The planning process involved discussions with involved Federal and state agencies, and input from non-governmental organizations and private citizens through a

public involvement process. The report presented a broad plan for fish, wildlife and recreation measures, combining previously identified mitigation measures with those newly authorized under CUPCA. The Mitigation Commission issued a five-year update of its Mitigation and Conservation Plan in 2002. This report contained an overview of the progress of meeting the components of the 1997 plan, and described changes in the plan at that time. Information from the 2002 plan and annual report is included in the sections that follow.

Section 302 – Increased Water Capability. The District is authorized to acquire by purchase or exchange 25,000 acre-feet of water rights in the Utah Lake Drainage Basin with funds provided by the Mitigation Commission. These rights are not needed for water supply purposes for water delivery contracts, but would be acquired to establish up to a 75-cfs minimum flow in Provo River. Funds are also authorized to modify or construct replacement diversions on the Provo River to accomplish the in-stream flow purposes of this section.

Section 303 - Stream Flows.

Section 303(b)(1). The District shall acquire the rights to the transbasin diversion to the Heber Valley through Daniels Creek, for use in increasing the minimum streamflows in the upper Strawberry River and other streams in the Uinta Basin.

Section 303(b)(3). The District is directed to construct a Daniels Creek water replacement pipeline from Jordanelle Reservoir to the existing Daniel Irrigation Company (DIC) water storage facility for the purpose of providing a permanent replacement of water in an amount equal to the Strawberry Basin water being supplied to the DIC by diversion from the upper Strawberry River. The replacement water must be equal in quality and quantity to the DIC water being replaced.

Section 303(c). The District is directed to provide sufficient water to sustain certain minimum stream flows in portions of Sixth Water and Diamond Fork creeks, the Provo River and the Strawberry River.

Section 303(d). In addition to the in-stream flow provisions previously described, the District is directed to prepare and conduct studies and develop a plan to mitigate the effects of peak season flows in the Provo River. Considerations include fishery and recreational use associated with peak flows, mitigation and conservation opportunities associated with habitat or streambed modification, operating agreements, streamflow agreements, conjunctive use of surface and groundwater, water right exchanges, and a potential bypass flow line from Deer Creek Reservoir to the Olmsted Diversion.

Section 303(f). CUPCA restricts the use of the Strawberry Tunnel to water delivery for minimum flow maintenance in Sixth Water Creek, except in the event that Syar Tunnel or Sixth Water Aqueduct become unusable.

Section 304 – The Definite Plan Report. The Mitigation Commission is directed to complete the fish, wildlife and recreation features of the 1988 DPR that have not yet been completed in accordance with the schedule specified in Section 315 of CUPCA.

Section 305 - Wildlife Lands and Improvements. The Mitigation Commission is authorized to acquire big game winter range lands to compensate for the impacts of federal reclamation projects in Utah. The lands to be acquired are in addition to those required to satisfy the 1988 DPR requirement for terrestrial wildlife mitigation (the 1987 Wildlife Mitigation Plan).

Section 306 - Wetlands Acquisition, Rehabilitation and Enhancement. Funds are authorized to develop projects that will preserve, rehabilitate and enhance wetlands around the Great Salt Lake and Utah Lake. The Mitigation Commission is authorized to inventory, prioritize and map the occurrences of sensitive plant and non-game wildlife species and their habitats in Utah.

Section 307 - Fisheries Acquisition, Rehabilitation and Enhancement. Funding is authorized for the acquisition, rehabilitation, and/or improvement of fisheries resources in waters and drainages affected by the Bonneville Unit of the CUP.

Section 308 - Stabilization of High Mountain Lakes in the Uinta Mountains. CUPCA authorized additional funds for stabilization of high mountain lakes in the Uinta Mountains. This project is a mitigation component of the Municipal and Industrial (M&I) System and was described in the 1988 DPR. Big Elk, Crystal, Duck, Fire, Island, Long, Wall, Marjorie, Pot, Star, Teapot, and Weir lakes in the upper Provo River drainage are to be stabilized at levels beneficial for fish habitat and recreation.

Section 309 - Stream Access and Riparian Habitat Development.

Section 309 (a)(1). CUPCA authorized funds to rehabilitate riparian habitats along Provo River between Jordanelle Dam and Deer Creek Reservoir. The additional funds authorized by CUPCA have been used to supplement the 1988 DPR mitigation requirement from the 1987 Wildlife Mitigation Plan that required mitigation for 630 acres of impacted riparian area. The Provo River Restoration Project (described later in this chapter) will achieve at least 228 acres of that amount.

Section 309(a)(2). The Mitigation Commission is authorized funds to improve riparian habitat, including rehabilitation and development of watersheds along Diamond Fork and Sixth Water creeks. The Mitigation Commission has included these improvements, together with required studies, in the Diamond Fork Creek watershed program contained in its Mitigation and Conservation Plan. These are also environmental commitments of the Diamond Fork System.

Section 309(a)(4). Authorization includes funds to acquire additional recreation and angler accesses and riparian habitats that are included in the Mitigation and Conservation Plan.

Section 309(b). CUPCA authorizes study of the impact of the Strawberry Aqueduct and Collection System on soils and riparian fish and wildlife habitat in drainages that will experience

substantially reduced flows as a result of the operation of the Strawberry Collection System. The study shall identify mitigation opportunities.

Section 311 – Jordan and Provo River Parkways Natural Areas. CUPCA authorized funds for improvements to the Provo/Jordan River parkway, including facilities in Utah, Wasatch and Salt Lake counties. Other funds are authorized for improvements to fisheries, riparian habitat, and wetlands along the Jordan River; and riparian habitat acquisition and preservation on a willing seller basis, stream habitat improvements, and recreation and angler access along the Provo River from the Murdock Diversion to Utah Lake.

Section 312 – Recreation. Utah Lake recreational improvements and recreational improvements associated with CUP features, including camping facilities, hiking trails, biking trails, and signage are authorized.

Section 313 – Fish and Wildlife Features in the Colorado River Storage Project. Section 313 authorized several features that were not intended to be limited to the Bonneville Unit area. Funds were authorized to purchase lands for watershed conservation in Albion Basin of Utah (Section 313(b)); to rehabilitate small dams on State of Utah or National Forest System lands (Section 313(b)); and to construct or rehabilitate fish hatcheries of Federal and state agencies and Indian Tribes for use within waters affected by the Colorado River Storage Project (CRSP) in Utah (Section 313(c)).

Section 314 – Concurrent Mitigation Appropriations. This section directed the Secretary of the Interior as to distribution of funds authorized under CUPCA, and authorized a program for mitigation and conservation projects outside the State of Utah.

Section 315 – Fish, Wildlife and Recreation Schedule. Section 315 established a schedule intended to guide the implementation of the fish, wildlife and recreation programs authorized by CUPCA and required by the 1988 DPR.

PART 3: OVERVIEW OF FISH, WILDLIFE AND RELATED RECREATION PROGRAMS ASSOCIATED WITH THE STRAWBERRY AND DUCHESNE RIVER WATERSHEDS

The fish and wildlife mitigation program in the Uinta Basin has a long evolutionary period as planning and implementation of Bonneville Unit components progressed from the early 1960s to present, a span of over 40 years. During that period of time understanding of fish and wildlife needs has increased, the knowledge base of resources and opportunities has expanded, and regulatory imperatives have increased. The program of mitigation and conservation measures has evolved through a continuum of planning, development and analyses until a comprehensive plan for the Bonneville Unit has been developed that incorporates significant mitigation measures for fish and wildlife. The process involved re-evaluations of some measures originally proposed and substitution of other measures where conditions or perceived needs have changed.

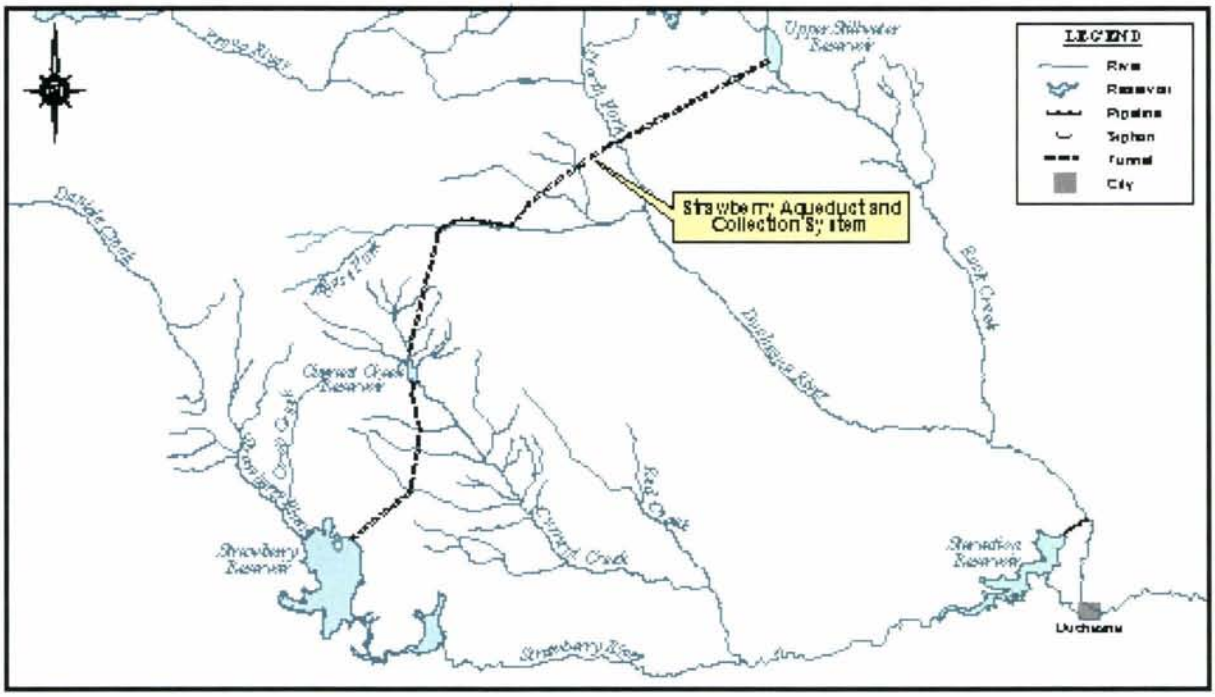
The result of the planning cited above is that a fish, wildlife, or recreation mitigation provision accompanies virtually every major Uinta Basin stream affected by the Bonneville Unit operation and every constructed facility. In combination, these provisions are designed to preserve fish and wildlife resources and their availability for fishing, hunting and other outdoor recreation.

The Bonneville Unit impacts on fish, wildlife, and recreation resources have been analyzed on a facility by facility basis. Many of the program elements described in the Strawberry/Duchesne watershed arise from mitigation needs for the SACS project. The Final Aquatic Mitigation Plan for the SACS was transmitted to Reclamation in December 1988 by the U.S. Fish and Wildlife Service (FWS). The plan included minor revisions to the 1984 Draft Aquatic Mitigation Plan for the SACS that had been presented in the 1988 Bonneville Unit DPR. The identified mitigation measures for the SACS encompassed four categories: 1) purchase and/or exchanges of water to provide in-stream flows, 2) acquisition of angler access, 3) in-stream habitat improvement measures, and 4) replacement of a trout egg-taking station on the Strawberry River near Strawberry Reservoir. Both on-site and off-site mitigation was recommended in this plan. On-site mitigation would occur on Strawberry River, Currant Creek, West Fork of the Duchesne River, North Fork of the Duchesne River, Rock Creek, and South Fork of Rock Creek. Map 3-1 shows the SACS and Map 3-2 shows the general location of these streams targeted for mitigation measures.

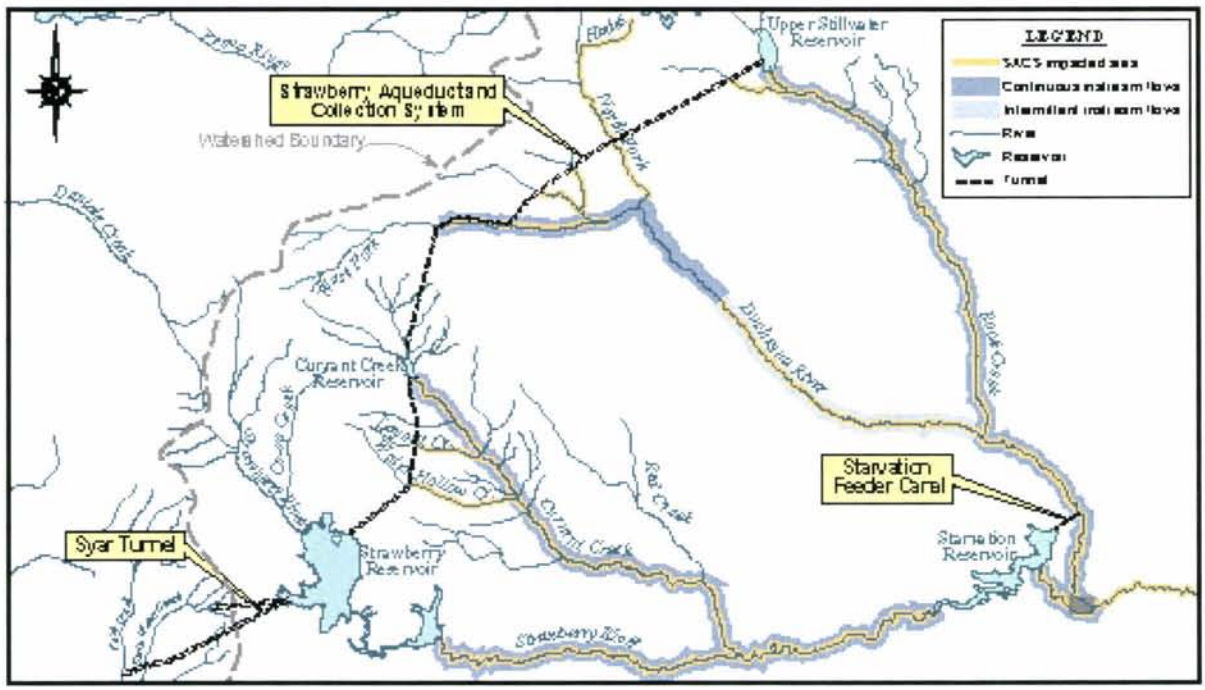
The following sections briefly describe fish, wildlife and recreation program components completed in the Strawberry and Duchesne watersheds subsequent to the 1988 DPR.

Daniels – Strawberry Exchange

The 1988 Mitigation Plan from the IBAT stated that providing streamflow water is the most important method to mitigate for aquatic impacts associated with the SACS. The Daniels-Strawberry Exchange was identified as the top priority mitigation measure. The implementation of the Daniels Replacement Project (Wasatch County Water Efficiency Project with Daniel Replacement Pipeline) has terminated the diversion of natural flows from the Strawberry River



Map 3-1
Strawberry Aqueduct and Collection System



Map 3-2
Location of Streams Affected by Strawberry Aqueduct and Collection System

drainage into the Provo River drainage. This restores natural flows in 16.3 miles of the upper Strawberry River and 9.8 miles in Bjorkman Hollow, Murdock Hollow, Point of Pines Canyon, and Willow and Hobble creeks. These streams are traditional cutthroat trout spawning habitat, and restoring flows in them provides approximately 27 percent of the required mitigation (9,225 angler-days) for the SACS (see Table 2-1, Environmental Commitment No.3).

Angler Access and Related Facilities

The purpose of this program element is to fulfill the angler-access component of the 1988 Aquatic Mitigation Plan for the SACS. The Plan identified the acquisition of approximately 51 miles of stream access in contiguous segments on the West Fork Duchesne, Duchesne, Currant Creek and Strawberry rivers to provide partial mitigation for lost angling opportunities (see Table 2-1, Environmental Commitment No. 4; Table 3-2). Angler access would be acquired where in-stream flows were being provided, and in some instances, where stream habitat improvements were made. Along with this effort, the Mitigation Commission will develop small parking areas and other facilities and, through operating agreements with Utah Division of Wildlife Resources or the Forest Service, transfer management authority to those entities. Fee title to acquired lands may be transferred to the management entity. This program includes developing maps and other useful guides to direct the public to these areas and to describe allowed activities.

An environmental assessment (EA) was released on November 13, 1999 addressing the impacts of acquiring the remaining lands or easements and management of the angler-access corridors. The EA slightly revised stream segments and lengths. The length of access on Currant Creek was reduced and length was added on the North Fork of the Duchesne River (Table 3-2).

Table 3-2
Angler Access Strawberry Aqueduct and Collection System
(Source: 1988 SACS Aquatic Mitigation Plan)

Stream	Length (miles)	Benefits (angler-days per year)
Currant Creek (upstream from Highway 40)	10.9	2,740
Strawberry River		
1. Camelot resort property	8.0	2,400
2. Soldier Creek Dam to Camelot	11.2	3,360
3. Private property downstream of Starvation Dam	2.0	600
West Fork Duchesne River	9.3	2,325
Duchesne River	7.0	1,750
Rock Creek	2.2	550
Total	**50.6**	**13,725**

Fish Habitat Improvements - 1988 SACS Aquatic Mitigation Plan

The 1988 Aquatic Mitigation Plan for the Strawberry Aqueduct and Collection System identified 14 stream segments totaling over 119 miles as potential sites for stream habitat improvement work.

Fish habitat improvements could include bank stabilization and in-stream structures on approximately 119.2 miles of streams and, if all were implemented, would mitigate 13,878 angler-days annually. However, the 1988 SACS Aquatic Mitigation Plan stated that mitigation credit from habitat improvement should not exceed 9,790 angler-days (see Table 2-1, Environmental Commitment No. 5).

About ninety miles of stream have been treated with habitat improvements amounting to 8,253 angler-days completed. Chapter 2, Table 2-1 presents the streams and stream miles considered for fish habitat improvement under the 1988 SACS Aquatic Mitigation Plan, and the amount of 'Angler-Day' credits initially achieved. An evaluation of the fish habitat improvement projects was funded by the Mitigation Commission and showed that although most projects were effective, a percentage of fish habitat structures did not function or were in need of initial repair. The FWS estimated in its January 30, 1998 Fish and Wildlife Coordination Act (FWCA) report on the Provo River Restoration Project (PRRP, see Part 4) that 75 percent of the structures were performing as intended. This translates to 6,115 angler-days achieved. A balance of 3,675 angler-days was needed to complete this mitigation measure. The Mitigation Commission completed the mitigation requirements for the SACS by implementing the PRRP, which improved fish habitat conditions on the Provo River between Jordanelle Dam and Deer Creek Reservoir.

Duchesne River Area Canal Rehabilitation Program Wetland Mitigation

This program element is intended to satisfy the 1988 DPR requirement to mitigate for losses of wetlands and wildlife habitat caused by implementing the Duchesne River Area Canal Rehabilitation Program (DRACR) (see Table 2-1, Environmental Commitment No. 7). The original mitigation plan to develop wetland mitigation areas around the shoreline of Starvation Reservoir was determined to be infeasible in 1987. Reclamation and FWS revised plans for the required mitigation. Reclamation acquired 1,087 acres of land with water rights (known as the Riverdell property) along the Duchesne River near Myton, Utah, for this mitigation. Initial plans for development and management of the property were developed by FWS and were funded by Reclamation, but the plan was subsequently withdrawn. The Mitigation Commission, DOI and the Ute Tribe developed a plan and released a Draft EIS in November, 2003 for protecting, enhancing and developing wetland areas along the Duchesne River to satisfy a separate commitment under the Strawberry Aqueduct and Collection System to mitigate for wetlands impacts. Some alternatives being considered for that project could combine the Riverdell property in the plan. If the Riverdell property does not become incorporated into the Lower Duchesne River Wetland Mitigation Project, the Riverdell property will be managed separately as compensation for impacts from the DRACR Program. In January, 2002, DOI released a Draft EA describing the proposed action and alternatives for Water System Improvements on the

Federal Riverdell Property. Issues involving consolidating the water rights and alternative water delivery systems have been addressed since that time. A final EA has not yet been issued. This project will need to be implemented in some manner regardless of whether the decision on the Lower Duchesne River Wetland Mitigation Project includes the Riverdell property, in order to satisfy DRACR mitigation objectives.

Ute Indian Tribal Development Activities and SACS Wetland Mitigation

The SACS Wetland Mitigation program is to fulfill a long-standing commitment made to the Ute Indian Tribe and to mitigate for impacts of construction and operation of the SACS on wetland resources along the lower Duchesne River corridor. The long-standing mitigation commitment to the Ute Indian Tribe is based on the 1965 FWCA Report on the Bonneville Unit by the U.S. Fish and Wildlife Service as adopted by the 1964 DPR and 1988 DPR as well as the 1965 agreement that deferred development of Indian water rights so they could instead be used for the Bonneville Unit. A portion of the agreement included mitigation for losses of fish, wildlife, and recreational values caused by the project.

There were five elements of the 1965 deferral agreement that required fish and wildlife mitigation. Four have been completed or satisfied in other ways (e.g. Title V of CUPCA). The ongoing element is the waterfowl management area and SACS wetland mitigation.

Waterfowl Management Areas and SACS Wetland Mitigation. The first element, described in the 1964 Definite Plan Report and the 1973 Bonneville Unit FES, committed to developing waterfowl areas along the Duchesne River to mitigate for waterfowl losses that were predicted with construction and operation of the SACS, which was a required element of the 1965 Deferral Agreement (see Table 2-1, Environmental Commitment No. 8). This commitment was based upon an analysis and recommendation (FWS 1965) that proposed a series of waterfowl managed areas to be developed for management by the Ute Indian Tribe as both mitigation for the SACS impacts on wetlands and to provide additional wetland/wildlife benefits.

At the time of the 1988 DPR, little progress had been made to implement this mitigation. Subsequent to the 1988 DPR, substantial progress has been made. Following passage of CUPCA in 1992, the Mitigation Commission, DOI and Ute Indian Tribe have reformulated several alternatives for completing this mitigation measure. In 1995, the Mitigation Commission provided funding to the Ute Tribe to plan the Lower Duchesne River Wetlands Mitigation Project (LDWP). The DOI, FWS, U.S. Bureau of Indian Affairs (BIA) and Reclamation assisted the Ute Indian Tribe in this planning. The goal was to develop a plan to meet SACS mitigation requirements and provide wetland-wildlife benefits to the Ute Tribe that would be acceptable to the Ute Indian Tribe and the other partners and that would satisfy the ecosystem restoration mandate of CUPCA. The project goals are to create and improve a mix of wetland and riparian habitat types to benefit a broad range of wetland-dependent wildlife, including waterfowl. The LDWP would restore, create and enhance wetland and riparian habitat along the Duchesne River to compensate for the impacts of the SACS on wetlands and associated wetland-wildlife resources. A Draft EIS was released in November 2003. The draft Proposed Action of the LDWP would create, restore and otherwise enhance riparian wetlands habitat on approximately 7,790

acres of land along the Duchesne River corridor. The project involves a variety of restoration measures including re-watering oxbows, connecting oxbows to form contiguous systems, enlarging oxbows, enhancing water quality in oxbows, filling drainage ditches to create marsh complexes, replanting riparian areas with native woody trees and shrubs, removing non-native invasive species, and changing management of areas adjacent to wetlands to benefit wildlife. The acreage is distributed among four units located in a 45-mile long corridor extending from the junction of Highways 40 and 89 near Bridgeland, Utah, to the junctions of the Duchesne and Green Rivers just north of Ouray, Utah. Two of the units are located south of the Duchesne River and have only small amounts of riparian land. The other two units are centered on the river and include meandering riparian zones along their entire lengths. The proposed wetlands units are situated such that they receive water from existing irrigation canals that skirt the units, generally through existing canal turnouts.

The land for the wetlands project is a combination of Tribal Trust lands to be placed under a conservation easement, 1,087 acres previously acquired for mitigation of wetland losses resulting from the DRACR Program, and additional lands to be acquired by the Federal government. Although the project has been planned by the Mitigation Commission, DOI and the Ute Indian Tribe, the Tribe would administer the completed project.

The following four commitments have been fulfilled.

Minimum Flow in Rock Creek. Upper Stillwater Dam and Reservoir permit the control of downstream flows in Rock Creek. The commitment to maintain a 25 cfs minimum flow at the Indian Reservation boundary (about 8 miles below the dam) is being met (see Table 2-1, Environmental Commitment No. 10). Higher minimum flows on Rock Creek may occur as a result of operation under the Streamflow Agreement.

Mitigation for Loss of 37,200 Angler-Days from Construction and Operation of SACS. Although historically not a planned part of the Ute Indian Commitments, the construction and operation of the SACS was projected to result in loss of habitats and fisheries resources of the Ute Indian Tribe that were slightly higher than occurred on non-Indian lands (37,200 angler-days compared to 34,090 angler-days). Several attempts by the FWS and Ute Indian Tribe to develop an acceptable mitigation plan were unsuccessful. Passage of CUPCA in 1992 therefore authorized numerous fish, wildlife and recreation measures in Title V as compensation to the Ute Indian Tribe for impacts of the Bonneville Unit including the SACS.

Midview Reservoir. Operation and maintenance of the recreational, fishery, and wildlife resources of Midview Reservoir were transferred to the Ute Indian Tribe in 1968 along with storage rights in the reservoir sufficient to maintain a 1,500-acre-foot minimum conservation pool for fisheries. This action fulfilled the commitment made in the Bonneville Unit Final Environmental Statement (Reclamation 1973) and was consistent with the Coordination Act Report (FWS 1965) and the 1965 Agreement (see Table 2-1, Environmental Commitment No. 11). The Ute Indian Tribe has maintained a trout and smallmouth bass fishery in the reservoir. No waterfowl hunting has been allowed, creating a needed preserve for ducks and geese in the Uinta Basin area during the hunting season.

Bottle Hollow Reservoir and Lower Stillwater Reservoir. Bottle Hollow Reservoir (near the Tribal headquarters in Fort Duchesne) was completed in 1970 by Reclamation for the Ute Indian Tribe. This 420-acre reservoir provides about 50 percent of the flat-water fishery habitat for fishery losses on Indian land as recommended in the Coordination Act Report (FWS 1965) and identified in the Deferral Agreement (Reclamation 1965; see Table 2-1, Environmental Commitment No. 12). Historically, Bottle Hollow Reservoir has been a good fishery providing rainbow, brown, cutthroat and brook trout. The reservoir water elevation remains relatively stable because it is not operated as a water supply. An additional recommended facility was the 380-acre Lower Stillwater Reservoir on Rock Creek, to be managed by and for the benefit of the Ute Indian Tribe. Subsequently, the plan to construct Lower Stillwater Reservoir was abandoned, and Section 505(f) of CUPCA provides compensation to the Ute Indian Tribe in lieu of the reservoir.

Uinta Basin Replacement Project Mitigation

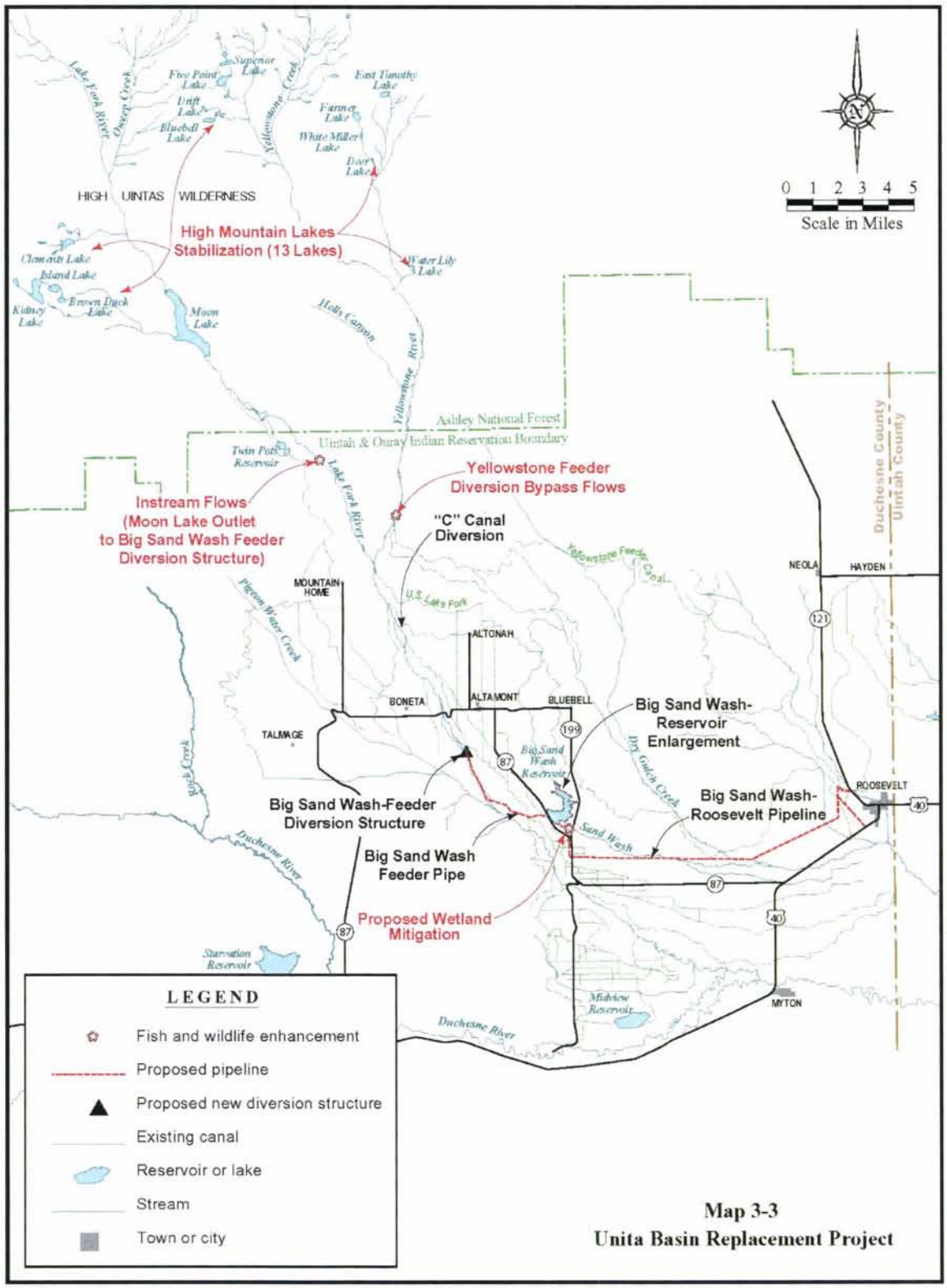
The Uinta Basin Replacement Project (UBRP) was authorized by CUPCA. The Mitigation Commission is responsible for participating with the DOI, District and other cooperating agencies in designing and implementing mitigation for the proposed project (see Table 2-1, Environmental Commitment Nos. 64 through 74).

Project-related fish and wildlife features that would be realized under the UBRP include diversion structures (fish passage), in-stream flows and stabilization of high mountain lakes (fish and wildlife/wilderness benefits). In addition, the District will provide funding to extend an existing boat ramp to the new high water line of the enlarged Big Sand Wash Reservoir for continued public access. Map 3-3 shows the features of the UBRP, with emphasis on mitigation, fish, and wildlife elements.

High Mountain Lakes Stabilization.

Description of Facilities. Four existing high mountain lakes in the upper Lake Fork River watershed and nine existing high mountain lakes in the upper Yellowstone River watershed that are located in the High Uintas Wilderness will be stabilized as a fish and wildlife/wilderness enhancement measure. The Moon Lake Water Users Association (MLWUA) operates and maintains the 13 existing high mountain lakes under permits from the Forest Service. Map 3-3 shows the locations of these lakes in the High Uintas Wilderness. Table 3-3 presents characteristics of these 13 lakes.

Lake stabilization would generally consist of removing a portion of the dam embankment to the stabilized level (breach height) and removing or plugging the outlet works. The existing spillways would be left in place or modified to be sure the stabilized elevation is maintained. The proposed stabilized level is based on the Utah Division of Water Rights Dam Safety Classification of "No Hazard". This classification means that no future operation or maintenance of the facility would be required once the stabilization construction has been completed. In addition, it means that the downstream effects of dam failure on a stabilized lake would be no more serious than the occurrence of a 100-year natural flood event for that lake's drainage basin.



Map 3-3
Unita Basin Replacement Project

An agreement "Transfer of Storage Water from Brown Duck, Island, Kidney, Clements, Bluebell, Drift, Five Point, Superior, Farmers, East Timothy, White Miller, Deer and Water Lily Lakes to Enlarged Big Sand Wash Reservoir" (High Mountain Lakes Agreement) has been signed by the District, MLWUA, Forest Service and DOI to provide for stabilizing the high mountain lakes and transfer of that storage water to the enlarged Big Sand Wash Reservoir. Stabilization will be accomplished by the DOI under a Special Use Authorization between the DOI and Forest Service pursuant to the High Mountain Lakes Agreement. Title to the 13 high mountain lakes would remain with the United States under the jurisdiction of the Forest Service. When the stabilization is complete, the Forest Service will cancel MLWUA's special use authorizations for these dams.

Table 3-3
High Mountain Lakes Stabilization in the Lake Fork and Yellowstone River Watersheds Under the Proposed Action-Lake Fork Section 203 Alternative

Lake	Mechanized Equipment Used During Original Construction	Lake Elevation (feet above MSL)	Present Active Storage at Spillway Crest (acre-feet)	Present Surface Area at Spillway Crest (acres)	Storage at Stabilized Elevation (acre-feet)	Surface Area At Stabilized Elevation (acres)	Drainage Basin Area (square miles)
Lake Fork Watershed							
Brown Duck	Yes	10,177	301	33	125	29	4.0
Island	Yes	10,248	655	70	500	58	3.5
Kidney	Yes	10,281	3,618	202	1,800	180	2.8
Clements	Yes	10,471	601	58	130	31	1.7
Yellowstone River Watershed							
Bluebell	No	10,891	224	58	145	52	0.7
Drift	No	11,066	158	31	41	23	0.6
Five Point	No	11,002	574	83	370	37	2.1
Superior	No	11,165	295	40	120	22	2.0
Farmer	No	10,983	692	50	692	50	1.0
East	Yes	11,005	616	43	85	24	3.5
White	No	10,680	239	20	199	18	0.5
Deer	No	10,24	110	11	33	6	13.0
Water Lily*	No	9,346	115	15	85	12	1.0

Note:
*The storage portion of these lakes Is Inactive, but the lakes would be stabilized to allow water users to terminate their special use permits with the Forest Service and discontinue the associated maintenance requirements.

Lake Stabilization Procedures. The Forest Service uses a minimum tool evaluation guide to determine if, and under what circumstances, motorized or mechanical means of transport or onsite equipment may be necessary to accomplish the goal of stabilizing the high mountain lakes (reservoirs) to the "no hazard" level. The work, materials, and equipment needed to accomplish the stabilization would be different at each site because each reservoir is different.

Stabilization of the high mountain reservoirs would be accomplished in a manner that protects the wilderness values at each site. The minimum tool analysis would determine if motorized or mechanical transport or equipment would be needed to accomplish the stabilization, and at the same time make sure that wilderness values are protected. It is anticipated that much of the construction work associated with stabilizing the lakes would require motorized and/or mechanical equipment, materials, and supplies that would be delivered to each of the lakes via helicopter. However, until a minimum tool analysis is completed for each lake, the type and amount of motorized/mechanical transportation and/or equipment that may be needed cannot be specifically quantified.

The fundamental process of stabilizing the 13 lakes would be the same at each site. Each lake would be drawn down in the fall prior to the summer scheduled for the stabilization work. The dam would be breached, with the embankment material being spread within the lake basin below the old high water level, but above the future high water level of the stabilized lake. Old concrete that cannot be broken up and hauled out of the area would be buried beneath the substrate below the stabilized water line. The outlet works would be removed, or if removal is infeasible, the conduit would be plugged with concrete, and the gate operating mechanism removed from the wilderness area. The breach outlets would be stabilized with some combination of impermeable membranes, filter fabric, gabions and riprap. Some work may be necessary to make sure a functioning spillway or overflow is provided at some locations.

Campsites for the stabilization work would comply with all existing standards and guidelines in the High Uintas management plan, including hill compliance with the group size limits and the number of livestock allowed at each campsite. Construction equipment and supplies would be confined to sites within the existing reservoir area.

Fish and Wildlife Mitigation and Enhancement.

Riparian Wetland Creation. The fish and wildlife feature consisting of riparian wetland creation has been developed as an integral part of the UBRP project to avoid a net loss in wetland and riparian habitat. The riparian wetland creation program that would be implemented is described in detail in the Technical Report that has been prepared as a supporting document to the UBRP Final Environmental Assessment of 2001.

Permanent impacts from project implementation would occur around the enlarged Big Sand Wash Reservoir. Most temporary impacts would occur along the Big Sand Wash Feeder Pipeline and the Big Sand Wash-Roosevelt Pipeline. The mitigation site approved by the U.S. Army Corps of Engineers (Corps) is located downstream of the new dam. The Mitigation Commission will be coordinating with the DOI, Utah Division of Wildlife Resources, and FWS in the development of the wetland mitigation whether it will be located as proposed in the Corps Section 404 Permit or at an alternative site suggested by the Mitigation Commission or one of the other entities.

It is anticipated that no water rights would need to be purchased given the nature of proposed wetland/riparian habitat development and improvement, but if necessary, they would be acquired. It is anticipated that an operating agreement would be developed to transfer the lands and facilities to a Federal or non-Federal entity that would perform the operation and maintenance activities associated with this wetland/riparian habitat feature of the project.

In-stream Flows. Fisheries would be enhanced by returning the streams above Moon Lake Reservoir to their natural flow regimes through high mountain lakes stabilization. In addition, in-stream flows for fish would be provided in the Lake Fork River between Moon Lake Reservoir and the Big Sand Wash Feeder Diversion Structure during late summer, fall, and winter through the coordinated operation of the existing Moon Lake Reservoir and the enlarged Big Sand Wash Reservoir. Water that is currently stored in the high mountain lakes would naturally flow into Moon Lake Reservoir following high mountain lakes stabilization, where it would be re-regulated for subsequent release to the Lake Fork River for in-stream flow purposes. Table 3-4 summarizes these in-stream flows.

As part of the project, minor modifications would be made to the Moon Lake Dam outlet works to facilitate release of the in-stream flows. Each year, up to 4,500 ac-ft of high mountain lake water may be released from or passed through Moon Lake Reservoir and would remain in the Lake Fork River downstream to the Big Sand Wash Feeder Diversion Structure, where it would be diverted into the Big Sand Wash Feeder Pipeline and then stored in the enlarged Big Sand Wash Reservoir. The existing "C" Canal Diversion Structure on the Lake Fork River would be operated to accommodate passage of in-stream flows downstream about 4 miles to the Big Sand Wash Feeder Diversion Structure.

In-stream flows for fish and their associated fish and wildlife benefits are considered project mitigation for the impacts created by the Moon Lake Project. In addition, and to the extent that water is available, MLWUA agrees to allow up to 70 cfs from sources other than Project water and High Mountain Lakes Replacement Storage water to bypass the "C" Canal diversion at the request of the Secretary of the Interior to enhance the stream fishery between the "C" Canal diversion and the enlarged Big Sand Wash Feeder Diversion, where it will be diverted according to priority. Table 3-5 shows in-stream flows in the Lake Fork River.

The following water year definition is based on anticipated active storage in Moon Lake Reservoir on October 1:

- Wet year - more than 15,000 ac-ft
- Average year - between 4,500 and 15,000 ac-ft

Table 3-4
In-stream Flows in the Lake Fork River Between Moon Lake Reservoir and the Big Sand Wash Feeder Diversion Structure

Month	Water Year (Number of Years)	In-stream Flow (cfs)
October 1 through April 30	Wet (36 out of 100 years)	10.5
	Average (42 out of 100 years)	7.0
	Dry (22 out of 100 years)	3.5
May 1 through July 31	All years	Normal Irrigation Releases
August 1 through September 30	Wet (36 out of 100 years)	11
	Average (42 out of 100 years)	11
	Dry (22 out of 100 years)	6

There are four criteria for bypassing this additional water at the "C" Canal diversion:

1. MLWUA's diversion of water must be in priority

2. The Secretary of the Interior determines that the bypassed flows will be advantageous for fishery benefits

3. Capacity is available to move the bypassed water through the Big Sand Wash Feeder Pipeline

4. Changing the point of diversion from the "C" Canal to the Big Sand Wash Feeder Diversion will not reduce the amount of water available to MLWUA, except to the extent of any conveyance losses between the "C" Canal and the Big Sand Wash Feeder Diversion

This bypassed water will be diverted at the Big Sand Wash Feeder Diversion under the provisions of the Warren Act, but will be exempt from a carriage charge as such water is bypassed for in-stream flow purposes. Non-project water diverted through the Big Sand Wash Feeder Diversion and Pipeline not identified by DOI for in-stream flow purposes will be subject to a carriage contract.

The Operating Agreement stipulates further conditions for in-stream flows that would benefit fish and fish habitat. The MLWUA agrees to reduce its diversions into the Yellowstone Feeder Canal in order to bypass 1,945 acre-feet of water annually past the Yellowstone Feeder Canal Diversion for the downstream diversion at the Big Sand Wash Feeder Diversion and storage in the enlarged Big Sand Wash Reservoir. The volume of water to be bypassed is equal to the average annual yield of the nine high mountain lakes in the Yellowstone River drainage basin

that are being stabilized as part of this project. The following schedule will be followed for the bypass of water each year.

- October 1 through June 30 3 cfs
- July 1 through July 31 2.5 cfs
- August 1 through September 30 2 cfs

The water may be diverted at the Yellowstone Feeder Canal Diversion and returned to the Yellowstone River at or near that diversion for measuring purposes. The in-stream flow requirements described here and in Article VI of the Operating Agreement are a project commitment that will be met by the MLWUA, the District and the DOI. The agencies would meet annually or as required to evaluate this determination, consistent with written agreements.

Strawberry Area Assessment, Watershed and Wildlife Habitat Restoration

CUPCA authorized additional funds for improvement of watershed and fishery conditions in the Strawberry Valley and Strawberry River watershed, areas highly involved with Bonneville Unit development and mitigation programs. The Mitigation Commission and Uinta National Forest together conducted an area assessment, designed to identify resources and areas in the watershed that were not currently in a properly functioning condition. The assessment has been used to guide further evaluations and projects. The Uinta National Forest recently released a draft Watershed Restoration Plan for the Strawberry Valley. The Mitigation Commission will work closely with Uinta National Forest, other Federal agencies, state agencies and local groups to identify potential projects that might qualify for funding under CUPCA guidelines. Emphasis will be placed on measures that will supplement or complement other Bonneville Unit mitigation activities in the area.

Sage Grouse Conservation and Recovery

Sage grouse population decline is a concern in the Strawberry Valley. The enlargement of Strawberry Reservoir as part of the SACS inundated four of the five known sage grouse leks in Strawberry Valley. No specific mitigation commitment was identified for this impact. The Mitigation Commission has used authorizations under Section 315 of CUPCA to participate in a sage grouse conservation effort among FWS, Utah Division of Wildlife Resources, Uinta National Forest and Brigham Young University to investigate the factors involved in decline of the population. A number of other factors beyond lek destruction are likely to be involved. The Mitigation Commission and others will support protective or restorative measures as they are identified.

Wildlife Habitat Acquisition

Section 305(a) of CUPCA directed the Mitigation Commission to acquire big game winter range lands from willing sellers to compensate for the impacts of Reclamation projects in Utah. Lands acquired for this purpose that lie within the boundaries of Federal land ownership are to be transferred to the appropriate Federal agency for management as big game winter range. Other

lands acquired under this provision of CUPCA are to be transferred to the Utah Division of Wildlife Resources for such management. Acquiring additional big game habitat in the Currant Creek, Strawberry River and/or adjacent watersheds that would be contiguous to other Bonneville Unit mitigation areas is an emphasis.

In-stream Flow Management

The major impact of the SACS has been a significant reduction of flows in several Uinta Basin streams. The Bonneville Unit FES (Reclamation 1973) called for releases of 6,500 acre-feet per year for fisheries purposes. This was to have been divided between Rock Creek (3,500 acre-feet per year) and the Strawberry River (3,000 acre-feet per year). No minimum flow requirements were established for eight other streams to be impacted. Subsequent to the 1973 FEIS, the Stream Flow Agreement of 1980 was executed which recognized that 44,400 acre-feet of fishery flow releases would be needed and a process of securing the water was initiated. At the time of the 1988 DPR, the Stream Flow Agreement of 1980 was in effect; but that agreement only guaranteed about 60 percent of the water needed to retain 50 percent of historic trout habitat in the four major streams impacted by SACS (Currant Creek, West Fork Duchesne River, Rock Creek, and Strawberry River); six other streams [South Fork Rock Creek, Hades Creek, Twin Creek, Wolf Creek, Layout Creek and Water Hollow Creek] were not protected under the Stream Flow Agreement).

Ultimately, a commitment was made in the 1990 Amendment to the Stream Flow Agreement to provide the 44,400 acre-feet per year from the SACS, in addition to 10,500 acre-feet of spills or bypasses on an average annual basis. This amount of water is to be operated within the SACS area to retain 50 percent of historic trout habitat affected by SACS. The other losses will be offset by implementing the recommendations in the 1988 Aquatic Mitigation Plan for the SACS.

This program element is intended to support the responsibility the FWS shares with Utah Division of Wildlife Resources to develop recommendations for management of the 44,400 acre-feet and other supplies available for in-stream flow purposes to meet Stream Flow Agreement objectives. The FWS and Utah Division of Wildlife Resources have additional coordination requirements with other Federal, state and local entities in this process. Under this program element, the Mitigation Commission has initiated studies and will engage in further studies to determine flow regimes necessary to sustain healthy stream fisheries and riparian communities on the streams affected by the SACS (Section 309(b) of CUPCA).

Following is a brief summary of the main provisions of the 1980 Stream Flow Agreement. A copy of the agreement is presented in Attachment A.

Streamflow Agreement of 1980. The agreement was entered into on February 27, 1980, by the United States of America, acting through the Secretary of the Interior, the State of Utah and the District. The document was prepared cooperatively by the District, FWS, Forest Service, and Reclamation.

Flow and habitat requirements of the agreement were taken from an interagency report to the Governor of Utah in 1979. Nine alternatives were presented that included both biological and economic impacts of providing additional water above that which was planned in the 1964 DPR (6,500 acre-feet). Option 7 in the report was recommended which provided 44,400 acre-feet of fishery flow releases in addition to 10,500 acre-feet of normal spills and irrigation bypasses. The water would be released in amounts and at times and locations specified to retain 50 percent of the historic trout habitat that would have been lost under the 1964 DPR Plan.

Following are major components of the 1980 Streamflow Agreement.

1. The acknowledgment that the 6,500 acre-feet committed by the April 12, 1965 resolution would remain available for fisheries.

2. The District would provide an additional 15,800 acre-feet making a guaranteed total of 22,300 acre feet.

3. The overall goal would be to acquire 44,400 acre-feet of water, which would mitigate for 50 percent of the historic trout habitat that was lost.

4. The remaining 22,100 acre-feet of water would be acquired if possible by the State and the DOI, at no expense to the District.

5. The 44,400 acre-feet would be made available as fishery flows until completion of the Bonneville Unit. Thereafter, if none of the remaining 22,100 acre-feet of water was found, only 22,300 acre-feet would be available for fishery flow releases.

6. The planned average annual transbasin diversion of 136,600 acre-feet would be maintained.

7. Parties agreed that the 404 Permit for construction of Currant Creek Dam and Reservoir would be issued.

8. All parties would cooperate in completing the Bonneville Unit of the CUP and seek to avoid delays and impediments.

1990 Amendment to Streamflow Agreement of 1980. The 1990 amendment to the Streamflow Agreement of 1980 was executed on September 13, 1990 among the United States of America, the State of Utah and the District. The amendment was concurred with by the FWS, Forest Service, Utah Department of Natural Resources, Utah Division of Water Resources, and Utah Division of Wildlife Resources.

The following summarizes the 1990 Amendment. A copy of the amendment is presented in Attachment D.

1. Article 1 stated in part "... Any additional Project water...hereafter committed by Congress to the maintenance of minimum streamflows for fish habitat protection...shall be subject to...the terms and conditions of the said Agreement of 1980, as supplemented hereby".

2. Article 2 committed the District and the United States to provide 44,400 acre-feet of water, subject to several conditions such as:

   - Only if Congress authorizes construction of the proposed Irrigation and Drainage System, as heretofore planned

   - And only if Congress authorized the federal portion of a state and federal program for... the proposed Irrigation and Drainage System, as heretofore planned

   - This Amendment will be null and void unless and until legislation is enacted to provide such authorization

   In addition, Article 2 recognized the voluntary commitment of the District up to that time (and as per the 1986 Working Agreement) to provide the 44,400 acre-feet annually until the Project was under full demand at year 2000. Article 2 addressed important aspects of the 1965 repayment contract. The passage of CUPCA in 1992 satisfied the three conditions specified above.

3. Article 3 stated that the provisions of the 1980 Streamflow Agreement which committed the parties to proceed to jointly develop or acquire additional water, beyond the 22,300 acre-feet committed, was superseded by virtue of the United States and the District agreeing to provide the full 44,400 acre-feet out of the project supply.

4. Article 4 limited the commitment of Project water as follows:

   - The 6,500 acre-feet committed by the 1988 Definite Plan Report for the Bonneville Unit.
   - The additional 15,800 acre-feet committed by the 1980 Streamflow Agreement.
   - The increase made by the 1990 Amendment of 22,100 acre-feet.

   Article 4 recognized that providing the minimum stream flows to retain 50 percent of the historic adult trout habitat would require approximately 54,900 acre-feet, and the difference (10,500 acre-feet) will be made up through irrigation by-passes and spills to the stream on an average annual basis ("base flows").

5. Article 5 included several important elements not previously included in the 1980 Streamflow Agreement:

- Established the provision for placing a portion of the annual 44,400 acre-feet allocation, if unused, into carry-over storage, on a space-available basis, for future stream flow maintenance

- Set aside 10,500 acre-feet of non-lapsing storage space in Strawberry Reservoir, which would not spill out when the reservoir fills

- Provided a one-time fill of the 10,500 acre-feet from Project water already in storage in Strawberry Reservoir

- Established that unused water that is carried over in storage will become Project water if it is computed that the reservoir would fill (excepting the 10,500 acre-feet noted above)

- Water allocated annually may be carried over on a space-available basis from the current year for one more calendar year; but any such carry-over water not used by December 31 of the second year (or when the reservoir fills) will become Project water.

6. Article 6 had the following provisions:

- All Project water may be rediverted by the District below the confluence of the Duchesne and Strawberry Rivers and up to 12,000 acre-feet per year may be stored in Starvation Reservoir, so long as flows at any point between the Knight Diversion Dam and the confluence of the Duchesne and Strawberry Rivers do not drop below 15 cfs; and flows between Starvation Dam and the confluence do not drop below 15 cfs.

- Recognized that the by-pass valve on Starvation Dam is a fixed orifice, and so flows below Starvation Dam will necessarily range between 15 and 22 cfs, depending on stage of the reservoir

- After the Section 7 consultations under the Endangered Species Act are completed, the parties will jointly explore retrofitting the outlet works using Section 8 funds to increase the capacity to by-pass said water.

- The FWS and Utah Division of Wildlife Resources will retain the option granted in the 1980 Agreement to vary the place and amount of use of stream flow water.

- Until it is resolved whether existing law will require that the entire 44,400 acre-feet remain in the Duchesne River until its confluence with the Green River, the District will not redivert above the confluence.

7. Article 7 recognized that there may be shortages, and in the event of shortages, the shortages shall be shared on a pro-rata basis between the 44,400 acre-feet allocated for stream flow maintenance and that portion of the 100,000 acre-feet initially committed for trans-mountain diversions for irrigation use. It is agreed that M&I uses (from the trans-basin diversion) shall be administered as though they had a higher priority than irrigation or streamflow. This will not apply to any water hereafter converted from irrigation to M&I uses.

8. The parties will cooperate in efforts to protect the "base flow" and the District and the United States would join in resisting any new hydropower applications that would adversely affect the intent of the parties to provide for stream flow maintenance.

9. The District will reference the 1980 Streamflow Agreement and the 1990 Amendment in all future long-term contracts to make sure that it can supply the 44,400 acre-feet for maintenance of minimum stream flows and fisheries, but will not seek to re-write existing contracts.

10. Any provision of the 1980 Streamflow Agreement that is inconsistent with the 1990 Amendment is superseded and replaced by the Amendment to Agreement. In all other respects, the 1980 Agreement will apply to the 44,400 acre-feet, rather than to the 22,300 acre-feet specified in the 1980 Agreement.

Modification of Diversion Structures, Duchesne and Strawberry Rivers

The Duchesne River and Strawberry River in Duchesne County provide both irrigation and municipal water supplies and quality sport and native non-sport fisheries. However, some diversion structures impact fish habitat or inhibit fish passage and delivery of in-stream flows as identified under the Stream Flow Agreement of 1980 and its 1990 amendment. Section 205(a)(3) of CUPCA authorized funds for rehabilitation or replacement of diversion dams on the Duchesne and Strawberry Rivers to reduce their impacts on fish and wildlife and their habitats. A total of 24 diversion dams (Table 3-6) are located in the project area and were evaluated for this project. The Mitigation Commission is working with Duchesne County Water Conservancy District (DCWCD) and other local water users, and the public natural resource agencies to modify or replace selected diversions that are causing the greatest problems for fish and wildlife resources.

The project area includes reaches along the Duchesne River, from its confluence with the North Fork and West Fork downstream to its confluence with the Strawberry River, and reaches along the Strawberry River, from its confluence with Red Creek downstream to its confluence with the Duchesne River. The diversion structures were evaluated based on their potential adverse impacts on fish and wildlife resources. The diversions to be repaired or replaced were prioritized in an order that would be the most beneficial to fish and wildlife.

The DCWCD replaced three diversions on the Duchesne River between 1999 and 2001 with funds provided by the Mitigation Commission. The Mitigation Commission and DCWCD then evaluated those projects and used the information to prepare an EA on the project to determine

how to best proceed with rehabilitating or replacing the remaining structures. The Mitigation Commission issued its Final EA and Finding of No Significant Impact in 2003, selecting the alternative that would combine diversion structures along the rivers to the extent feasible.

The Ute ladies'-tresses (*Spiranthes diluvialis*) is a threatened plant species found along the Duchesne River in portions of the Project Area (see Chapter 3, Part 5 for more detailed life history information on Ute ladies'-tresses and a summary of environmental commitments for the species in the Diamond Fork and Utah Lake watershed planning area). The Mitigation Commission and DCWCD surveyed the areas several times during the course of the project. Direct impacts to plant colonies or individuals have been avoided to the extent possible. As a conservation measure, the Mitigation Commission and DCWCD have contributed information and funding to the U.S. Fish and Wildlife Service to complete the status review of Ute ladies'-tresses.

Table 3-5
Diversion Dams Evaluated on the Duchesne and Strawberry Rivers

Duchesne River	Strawberry River
Diversion	
Rhoades Diversion	Strawberry Diversion #10
Turnbow Diversion 1	Strawberry Diversion #9 (Vanderhooft)
Turnbow Diversion 2	Strawberry Diversion #8
Leo S. Defa Diversion	Strawberry Diversion #7
Farm Creek Diversion	Strawberry Diversion #6 (JJNP)
New Tabby Diversion	Strawberry Diversion #5
Jasper Pike Diversion	Strawberry Diversion #4
Hicken Diversion	Strawberry Diversion #3 (Ivie & Peterson)
B. Peterson Diversion	Strawberry Diversion #2 (Peatross/Pender)
Wagstaff Diversion	Strawberry Diversion #1 (Peatross)
J. Peterson Diversion	
Brown Diversion	
Broadhead Diversion	
Jones Diversion	
Knight-Shanks Diversion	
Pioneer Diversion	
Rocky Point Diversion	

Recreation Improvements

The purpose of this program is top expand public recreation access, including information and facilities within the Duchesne and Strawberry River drainages. Priority is on supplementing resources and opportunities provided by other SACS mitigation measures. Funding is from Section 312(b) of CUPCA.

Watershed Stabilization, Wildlife Enhancement and Access Management

This program will utilize funding provided under CUPCA Sections 307(8) and 309(a)(3) to stabilize watersheds, improve wildlife habitat, and manage public access in the area. Priority will be on actions that complement measures on Bonneville Unit mitigation properties in the watershed, however other projects are considered.

Endangered Species

In compliance with the Endangered Species Act of 1973 and subsequent amendments, Reclamation, the Mitigation Commission, DOI and others agencies involved in implementing the CUP have consulted with the FWS regarding threatened and endangered species known or suspected to occur within the CUP project area in the watershed.

Formal Section 7 consultation began with Reclamation's submission of a Biological Assessment (BA) to the FWS on October 20, 1977. In the BA, Reclamation concluded that constructing and operating the SACS would not threaten the continued existence of any of the species then listed (bald eagle, peregrine falcon, Colorado squawfish and humpback chub).

The FWS responded with a threshold report dated January 5, 1978. This report concluded that the project would not affect the bald eagle because this species is migratory and habitat use in the project area is unpredictable with no known winter concentrations. For the peregrine falcon, the report concluded that although historic nesting sites were known, no recent activity had been observed. However, the FWS concluded that the Strawberry Aqueduct and Collection System would jeopardize the continued existence of the Colorado squawfish and humpback chub, both native Colorado River fishes. They maintained that the system would store or divert water from the Green River, reducing natural flows and thus reduce available habitat for these fishes.

Reclamation provided the FWS with additional information regarding water depletions from the Green River system and requested a Biological Opinion from them to conclude formal Section 7 consultation. In a Biological Opinion dated February 27, 1980, the FWS concurred with Reclamation that the Colorado River Storage Project system could be operated in a manner to mitigate adverse effects they had determined may occur on the native fishes from the constructing or operating the SACS.

However, the FWS recommended collection of additional information to determine how to operate Colorado River Storage Project facilities in a manner sensitive to the environmental needs of the Colorado squawfish and humpback chub. Reclamation agreed to fund the Colorado River Fisheries Project which ended in 1982 but was extended through 1985 by the Colorado River Fishery Monitoring Project. Since 1985, research efforts have continued under the supervision of the Colorado River Coordinating Studies, in cooperation and coordination with the FWS. The emphasis was on collecting and analyzing enough information to make final decisions regarding a conservation policy and Colorado River Storage Project operations to aid recovery of the native Colorado River fishes.

SACS and Endangered Colorado River Fishes. The FWS Biological Opinion for the Duchesne River Basin, Utah (FWS 1998) concluded that "historic project operations and the development and use of new project water contributes to the endangerment of listed fishes and is likely to jeopardize the continued existence of the Colorado squawfish (pikeminnow), razorback sucker, humpback chub, and bonytail and is likely to adversely modify their critical habitats in the Duchesne, Green, and Colorado Rivers." Future projects identified in the Biological Opinion included the Uintah Unit and the Upalco Unit of the UBRP.

The 1998 Biological Opinion, issued to the DOI, Mitigation Commission, Reclamation, U.S. Bureau of Indian Affairs and the District, was based on the best scientific and commercial data available at the time including: 1) the level of knowledge of the Duchesne River, 2) the status of the Colorado squawfish (pikeminnow), humpback chub, bonytail, and razorback sucker, 3) the environmental baseline for the Duchesne River basin area, 4) the cumulative effects of non-Federal projects in the Duchesne River basin, and 5) the effects of the proposed action (historic project operations and the development and use of new project water). As stated in the Biological Opinion, the FWS determined that completion and /or implementation of all elements of the reasonable and prudent alternative (RPA) would offset impacts of historic and future projects and would avoid the likelihood of jeopardy and the destruction or adverse modification of critical habitats. In addition, successful implementation of all elements of the RPA would allow the Recovery Implementation Program (RIP) for Endangered Fish Species in the Upper Colorado River Basin to serve as the RPA for Federal actions which result in depletion impacts on the Duchesne River. Further, the biological opinion states that the "Service believes that the integrated operation of new and existing facilities, constrained by annual hydrologic conditions and available water storage, can be coordinated to meet the needs of the listed fishes in most years."

RPAs identified in the Biological Opinion consisted of items from the RIP's Recovery Action Plan (RAP). The following identifies the RPAs applicable to the Bonneville Unit of the CUP and the status of action to meet the RPAs.

- Conduct Hydrology/Water Availability Study. This item has been completed. CH2M Hill (1997) conducted a study with the main purpose of determining the effect of existing projects (both existing and future operation) on Duchesne River flows and to identify possible water sources that could be used to augment river flows to meet preliminary flow recommendations that were identified in the 1998 Biological Opinion. The study pointed to several potential water sources including: Bonneville Unit Fishery Flows (Stream Flow Agreement of 1980, as amended), Daniels Creek Diversions, Land Purchase and Fallow, Conservation Projects-Delivery Systems, On-Farm Conservation Projects and Purchase of Existing Water in Storage.

- Determine Feasibility and Benefits of Coordinated Reservoir Operation. Reclamation initiated a coordinated reservoir operations study that was scheduled for completion in June 2003. This study should be brought to completion as soon as practical to provide information necessary to effectively coordinate implementation and protection of in-

stream flows. This activity would be completed under the amended Duchesne River Biological Opinion. Reclamation has initiated an Environmental Impact Statement process to address alternatives for coordinated reservoir operations.

- Develop Agreements, If Feasible, to Coordinate Reservoir Operation and Protect Flows to the Green River. Revised flow recommendations for the Duchesne River required in the RPA to the 1998 Biological Opinion were developed by the RIP and finalized in 2003 (Modde and Keleher 2003). An informal Duchesne River Working Group (DRWG) that includes representatives from the FWS, State of Utah, Department of Natural Resources (Divisions of Water Rights, Water Resources and Wildlife Resources), the District, the DOI, and the Mitigation Commission, was formed in 2003 to address issues involved with implementing the flow recommendations. The DRWG is addressing many issues, including water availability, water management, and protection of in-stream flows provided for endangered fishes. It is anticipated that this working group will be formalized in the amended Biological Opinion for the Duchesne River. The FWS is in the process of amending the Biological Opinion for the Duchesne River based on the recent flow recommendations and it is anticipated that implementation of flow recommendations will be coordinated through the DRWG. Preliminary investigations into potential water sources for meeting flow recommendations have been promising. Potential water sources are being investigated along with opportunities to modify existing diversion structures (to measure flows and allow fish passage) and develop agreements to provide legal assurances that water identified for endangered fish flows is not diverted for other purposes and can be protected under the State of Utah Water Rights Law to the confluence with the Green River.

- Conduct Follow-up Studies to Evaluate and Refine Flow Recommendations. This action has been completed. Studies to develop flow recommendations were funded through the RIP and initiated in 1997. A final report entitled *Flow Recommendations for the Duchesne River with a Synopsis of Information Regarding Endangered Fishes* (Modde and Keleher 2003) was approved by the RIP in 2003. The year-round flow recommendations were designed to provide for the physical processes needed to maintain channel complexity and substrate quality (high flow needs) and maintain adequate flows for endangered fish access and aquatic productivity needed to sustain the prey base for Colorado pikeminnow (base flow needs). Flow recommendations account for various types of hydrologic conditions by allowing for high peak flows in wet years (>4,000 cfs) while requiring no peak flows in dry years. Base flows were similarly scaled, targeting a minimum of 50 cfs in dry years and up to 115 cfs in wet years.

The FWS has prepared a draft amendment to the 1998 Biological Opinion for the Duchesne River Basin (July, 2004) in order to incorporate new information and to provide a revised RPA and a re-initiation notice. The RPA for the jeopardy finding in the 1998 Biological Opinion required follow-up studies to evaluate and refine flow recommendations for the Duchesne River. The amendment will provide supplemental information on the biology and habitat requirements of the Colorado pikeminnow, razorback sucker and the flows required to support these species in the Duchesne River. It will provide a new RPA that replaces the original RPA developed for the

1998 Biological Opinion. All other sections of the 1998 Biological Opinion would remain in effect, including the project description, estimates of depletions, status of the species, conclusions and the incidental take statement.

The RIP for endangered fish species in the Upper Colorado River Basin (FWS 2003) outlines procedures for consultation pursuant to Section 7 of the ESA on water projects in the Upper Colorado River Basin. The Section 7 Agreement (including Section 7 Consultation, Sufficient Progress and Historic Project Agreement) was developed to clarify how Section 7 consultations will be conducted on water depletion impacts related to new projects and impacts associated with historic projects in the Upper Colorado River Basin. The RIPRAP was developed in support of the Section 7 Agreement using the best, most current information available and the recovery goals for the four endangered Colorado River fish species.

The District and DOI, although not signatories, participate in the Colorado Fishes RIP. The Mitigation Commission has not funded or participated in the RIP. The Mitigation Commission is involved through the DRWG formed to investigate potential ways to meet in-stream flow targets. Reclamation continues to participate in and fund the RIP. The District provides funding and technical resources to enable success of the RIP in both recovery of the Colorado River fishes and in meeting human water needs. The District will continue to be committed to RIP efforts.

Other CUP Projects in the Watershed and Endangered Species. Other projects since the SACS also require consultation with the FWS on threatened and endangered species. After consultation with the FWS to determine species that could be affected, an Endangered Species Act Section 7 biological assessment on the Uinta Basin hookless cactus and black-footed ferret was prepared by Reclamation in 1981 for the DRACR project. The assessment concluded that neither species are known to exist within the areas that would be affected by the project; therefore, neither short-term nor long-term effects on the species or their habitat would occur. The FWS concurred with the assessment and conclusion on February 22, 1982. DOI consulted with the FWS on its proposed Water System Improvements on the Federal Riverdell Property, which was acquired to provide mitigation for DRACR wetlands impacts. The Draft EA prepared by DOI concluded that there would be "no effect" on species potentially present within the project impact area: Colorado River endangered fishes, Barnaby ridge-cress, or shrubby reed-mustard. The draft EA concluded the project "may affect, but not adversely affect" Uinta Basin hookless cactus and Ute ladies'-tresses. The U.S. Fish and Wildlife Service informally concurred with this finding.

PART 4: OVERVIEW OF FISH, WILDLIFE AND RELATED RECREATION PROGRAMS ASSOCIATED WITH THE PROVO RIVER WATERSHED AND UTAH LAKE

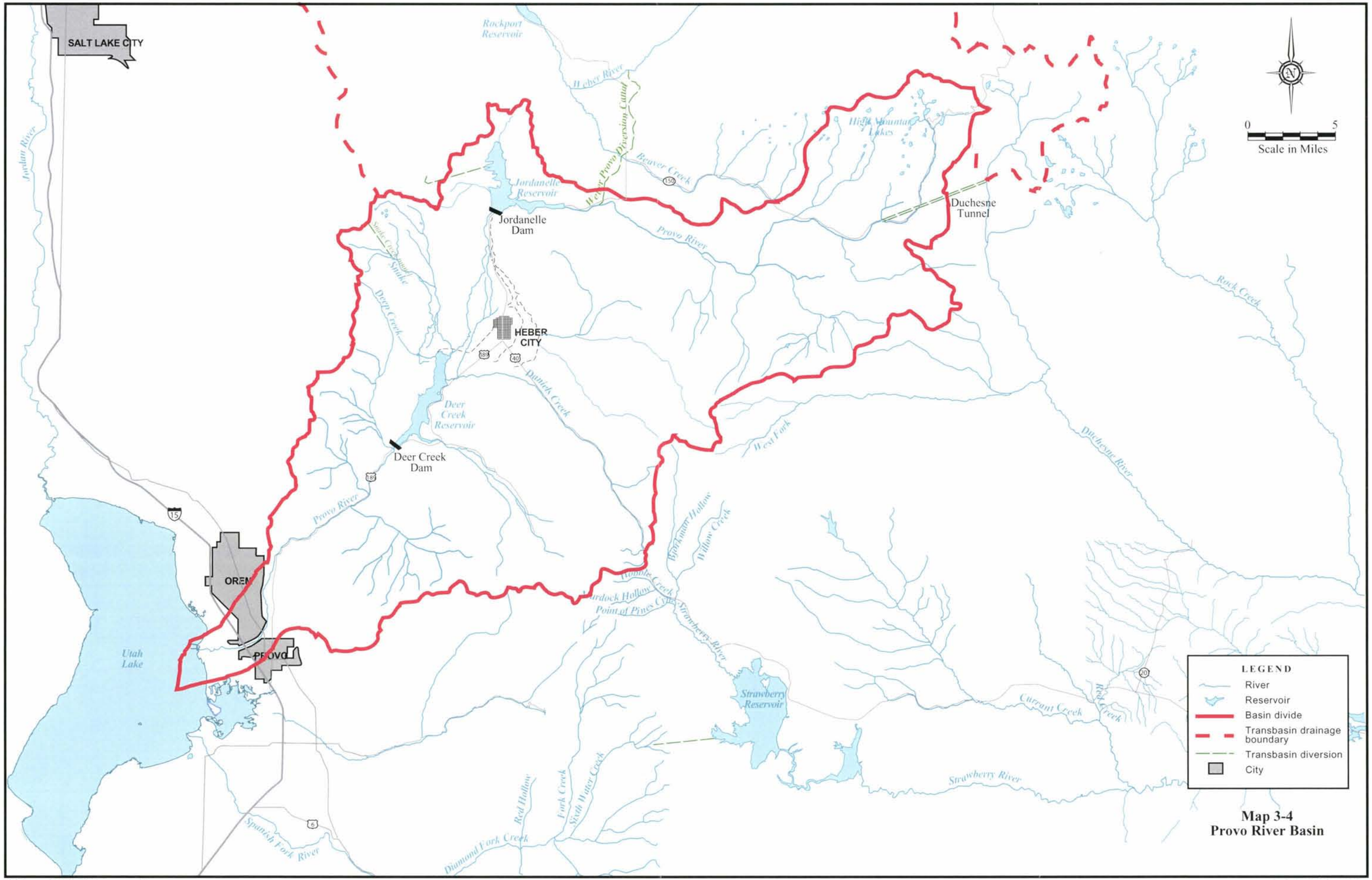
This part presents the fish and wildlife program for the Provo River watershed and Utah Lake. It includes a brief discussion on environmental commitments of the Bonneville Unit (previously described in Chapter 2) and a description of other fish and wildlife programs authorized by CUPCA in these areas. Where applicable, the relationship between a CUPCA-directed fish and wildlife feature and the previous 1988 DPR is included. Progress toward meeting these program

objectives is described. The Bonneville Unit systems that generated environmental commitments in the Provo River watershed and near Utah Lake are the SACS, M&I System, Wasatch County Water Efficiency Project and Daniel Replacement Project, Provo River Restoration Project and the Utah Lake Drainage Basin Water Delivery System (ULS) plus new programs authorized under CUPCA. See Map 3-4 for general location of the Provo River watershed and Utah Lake.

This part is divided into three main topics.

- Provo River Drainage Fish and Wildlife Program
  - Upper Provo River
  - Middle Provo River
  - Lower Provo River
- Utah Lake and Surrounding Area Fish and Wildlife Program
- Endangered Species (June Sucker)

An abbreviated discussion on the endangered June sucker is presented at the end of this part. The more detailed discussion is contained in the Biological Assessment for the ULS, included as Attachment F to this document.



Map 3-4
Provo River Basin

Provo River Watershed Fish and Wildlife Program

The Provo River watershed has been a high priority resource area for the Mitigation Commission since its first 5-year plan. Priority goals are to complete unfulfilled mitigation requirements of the Bonneville Unit and ongoing Title II projects, and to implement CUPCA's Title III program measures that are complementary and supplemental to those in Title II. An ecosystem approach is utilized to develop a comprehensive program for fish, wildlife and recreation mitigation and conservation. The basin is subdivided into three reaches to facilitate planning for this program, although these units are not in fact discrete and isolated, but are highly interrelated from management and ecosystem perspectives. The three reaches are:

- Upper Provo River (headwaters to Jordanelle Dam)
- Middle Provo River (Jordanelle Dam to Deer Creek Reservoir)
- Lower Provo River (Deer Creek Dam to Utah Lake)

The following sections contain information on progress of prior existing and new fish and wildlife program components since the 1988 DPR.

Upper Provo River - Headwaters to Jordanelle Reservoir. The Fish and Wildlife Program for the Upper Provo River reach focuses on completion of unfulfilled (as of 1988) mitigation commitments of the M&I System of the Bonneville Unit of the CUP. No new programs have been added since 1988. The following projects form the basis of the fish and wildlife program for the upper Provo River watershed.

Upper Provo River Reservoir Stabilization Project. The 1987 Final Supplement to the 1979 Final EIS for the M&I System required stabilizing 12 lakes in the upper Provo River watershed for fishery and recreation purposes as a mitigation measure (see Table 2-1, EC# 17). Fifteen lakes in the area had historically been modified in the early 1900s to increase water storage capability for downstream irrigators. Water rights from the 12 lakes have been transferred downstream to Jordanelle Reservoir or to the three lakes in the upper Provo River watershed that are still used for irrigation water storage. Reclamation is coordinating the water right transfers with the Provo Reservoir Water Users Company, the District, the Utah Division of Water Rights and others.

Each of the 12 lakes have been rehabilitated and restored for fishery and recreation purposes. In addition to stabilizing the lakes at levels beneficial to fish and recreation, the project has mitigated the impacts from heavy recreational use of the area by hardening dispersed camping areas and relocating trails away from fragile environmental resources. Stabilization of the upper Provo River reservoirs will enhance the productivity of each of these reservoirs, resulting in more and healthier fish. It is estimated that fisherman use would increase by 65,000 angler-days (from 135,000 to 200,000 angler-days per year). Although this project fulfills an environmental commitment of the M&I System, funding was accomplished through Section 308(c) of CUPCA.

Washington Lake Campground. A 40-unit campground has been constructed near Washington Lake as a Bonneville Unit recreation feature. Heavy recreational use, caused in part by the

stabilized lakes, was anticipated in the upper portion of the watershed. Funding was provided through Title II of CUPCA (see Table 2-1, Environmental Commitment No. 18).

Crystal Lake Trailhead. A trailhead consisting of a parking area, horse-loading facilities, restrooms and small picnic area has been constructed. Funding was provided through Title II of CUPCA (see Table 2-1, Environmental Commitment No. 18).

Deer Mortality Reduction. The 1987 Wildlife Mitigation Plan (see Attachment B) required installation of reflectors along the relocated portions of several highways around the new Jordanelle Reservoir (see Table 2-1, Environmental Commitment No. 23). The purpose of the reflectors was to reduce big game (especially deer) mortality from vehicle collisions, by keeping deer off highway areas. The reflectors were subsequently tested elsewhere and found to be ineffective at keeping deer and other big game animals off highways, and the plan was abandoned. A replacement study was proposed by Utah Division of Wildlife Resources and enacted to evaluate highway corridor fencing in combination with at-grade "deer crosswalks" as a potential measure to reduce big game mortality along the relocated highways. Consultation with the Utah Division of Wildlife Resources and FWS resulted in a decision to cease evaluating the at-grade "deer crosswalks" as a viable mitigation measure. The Mitigation Commission continues to work with the FWS, the Utah Division of Wildlife Resources and others to determine the best methods for reducing deer mortality. Off-site mitigation is being considered. Funding is provided through Title II of CUPCA.

Middle Provo River - Jordanelle Dam to Deer Creek Reservoir. The Mitigation Commission's program for the middle Provo River focuses on completion of unfulfilled mitigation requirements of the Bonneville Unit. Additionally, the Mitigation Commission is working cooperatively with the District, DOI and others to make sure that in-stream flows and water quality requirements of the 1987 M&I System FEIS are achieved. The goal is for the entire middle Provo River to provide continuous aquatic and riparian habitat. Minimum flows of 125 cfs between Jordanelle Dam and Deer Creek Reservoir support that goal. Releases from Jordanelle Dam are withdrawn through a selective level outlet works, which allows operators to blend water from various depths and temperature strata within Jordanelle Reservoir to provide suitable downstream water quality and a temperature range generally preferred by trout (48 to 55 ^{o}F).

Fish and Wildlife Programs of the Bonneville Unit that address needs of, or occur near, the middle Provo River include:

- Wasatch County Water Efficiency Project and Daniel Replacement Project (see Table 2-1, Environmental Commitment Nos. 3 and 51 through 57).

- Provo River Restoration Project
  - Acquisition of Angler Access (see Table 2-1, Environmental Commitment No. 21)
  - Recreation Facilities Planning and Development (see Table 2-1, Environmental Commitment No. 21)

- Fish and Riparian Habitat Restoration (see Table 2-1, Environmental Commitment Nos. 1 and 5)
- In-stream Flow Studies and Operations (see Table 2-1, Environmental Commitment Nos.19 and 20)
- Middle Provo River Diversion Dams (see Table 2-1, Environmental Commitment No. 22)
- Jordanelle Wetlands Mitigation (required under Section 404 Permit issued by U.S. Army Corps of Engineers)

Wasatch County Water Efficiency Project and Daniel Replacement Project. This project is complete and integrates a water efficiency and conservation program in the Heber Valley of Wasatch County with the Daniels/Strawberry Water Exchange component of the SACS Aquatic Mitigation Plan. Under the project, a portion of the water conserved through implementing more efficient water management (primarily irrigation improvements) in Heber Valley of Wasatch County is supplied to the Daniel Irrigation Company service area, located in the southeast corner of Heber Valley. Water previously diverted from the upper Strawberry River basin to Daniels Creek for re-diversion and use is now allowed to remain in the Strawberry River watershed, effectively restoring natural flows in 26 miles of streams in Strawberry Valley. Diversion facilities and canals in the Strawberry River watershed have been removed and/or partially reclaimed to avoid potential future impacts from eroding canals.

This mitigation measure accomplishes more than one-fourth of the required mitigation for aquatic resources impacted by the Bonneville Unit's SACS located in the Uinta Basin. This measure received 9,225 angler-days of mitigation credit because of improved fishery conditions and opportunities. The Mitigation Commission contributed almost $12 million of the cost of the project, authorized under Section 303 of CUPCA.

Provo River Restoration Project. The Provo River Restoration Project (PRRP) was developed to satisfy several major mitigation requirements of the 1988 DPR in a manner that would satisfy the ecosystem restoration mandates of CUPCA. The PRRP utilizes funding for several environmental commitments of the 1988 DPR and additional authorizations under Title III of CUPCA. The following are elements of the PRRP.

Acquisition of Angler Access. Acquisition of angler access and establishment of parking areas and restrooms along the Provo River corridor is an environmental commitment of the 1987 M&I System FEIS. To date, more than 8 miles of access have been acquired and established by the Mitigation Commission and Reclamation; the remainder (about 1.5 miles) is in progress.

Recreation Facilities Planning and Development. In addition to the angler access acquisition and related facilities requirements, Section 311 (d)(2) of CUPCA directed the Mitigation Commission to develop and implement plans for constructing recreational facilities along the middle Provo River corridor in partnership with local, state and Federal governments and public and private entities. In addition to angling, other compatible recreational uses such as hiking, wildlife viewing and environmental education will be provided. Informational signs

and educational kiosks will be installed in 2004. As proposed in 1986, the public access would have provided additional recreational benefits by providing facilities for kayaking, canoeing, and floating activities. However, the 1987 Supplement to the Bonneville Unit M&I System Final EIS modified plans to provide only angler access. Boating and personal watercraft are not allowed. About 5 miles of river land has been acquired in addition to 3 miles that were already Reclamation fee title lands.

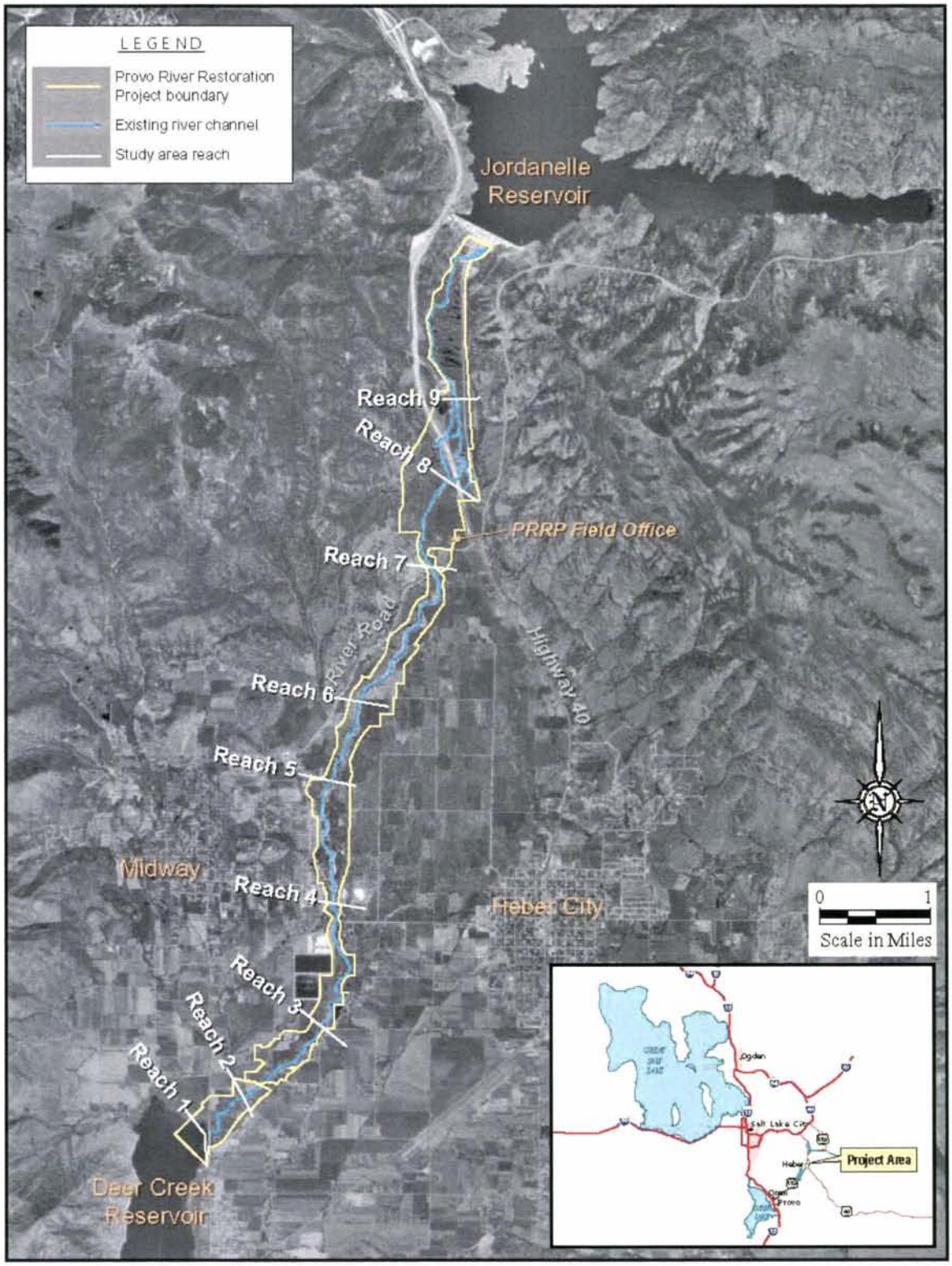
Fish and Riparian Habitat Restoration. Restoration of fish habitat (satisfies 3,675 angler-day credits under the SACS Aquatic Mitigation Plan) and replacement of riparian habitat (228 acres remained to be fulfilled under the 1987 Wildlife Mitigation Plan) is required as partial mitigation for the Bonneville Unit. Planning for this project has been underway since the late-1980s and early-1990s. A final EIS for the PRRP was issued in December 1997, which proposed acquisition of lands and waters for fish and riparian habitat restoration and angler access, modification of diversion dams to bypass in-stream flows, recreation facilities planning and development, and Jordanelle wetlands mitigation.

Project implementation began in 1999 and is anticipated to continue to 2006. The project involves removing or setting back most existing flood-control dikes, restoring meanders and re-establishing a floodplain along the middle Provo River. The middle Provo River channel will be lengthened through alignment changes, and flow velocity reduced through changes in channel geometry. Angler access will consist of a protected 800 to 2,200-foot-wide corridor along the entire middle Provo River. Reclamation is a joint-lead agency in the land and access acquisition effort. Flood easements were previously acquired by Reclamation for the Provo River Project on many of the lands that are being utilized to construct some of the project features. Funding for the project includes numerous sources from CUPCA Titles II, III and IV.

Map 3-5 shows the study area reaches included in the PRRP from Jordanelle Dam to Deer Creek Reservoir.

In-stream Flow Studies. The 1987 M&I System Final Supplement to the Final EIS prepared by Reclamation (Reclamation 1987) identified as an environmental commitment a study to examine the impacts of full operation of the M&I System, especially the anticipated loss of brown trout habitat in summer and gain of brown trout habitat in winter in the Provo River downstream of Deer Creek Dam. Section 303(d) of CUPCA authorized funds to "... conduct a study and develop a plan to mitigate the effects of peak season flows in the Provo River."

The Provo River System Stream Flow Study as developed by the Mitigation Commission in cooperation with the District, DOI, FWS, Utah Division of Wildlife Resources and others, addresses a broader scope of study than that necessary to meet the environmental commitment. The Provo River System Stream Flow Study examined the potential impacts (positive and negative) on aquatic resources of Provo River between Jordanelle Dam and



Map 3-5
Provo River Restoration Project Reaches on the Middle Provo River

Deer Creek Reservoir, and from Deer Creek Dam to Utah Lake, and will identify potential operational patterns that will help achieve ecological objectives and mitigation requirements of the PRRP. Under the Deer Creek-Jordanelle Operating Agreement, opportunities for managing flow release patterns between Jordanelle Dam and Deer Creek Reservoir are incorporated into the study. The Mitigation Commission initiated the first phase of a comprehensive study in 2002 to determine relationships among flows levels, aquatic habitat and other ecological functions on the Provo River. A final report on the first phase of the study was released in 2004 for the reach from Jordanelle Dam to Deer Creek Reservoir.

Middle Provo River Diversion Dams. The 1987 Final Supplement to the Final EIS for the M&I System committed Reclamation to make sure that in-stream flows released from Jordanelle Dam could be bypassed all the way to Deer Creek Reservoir. Some diversion dams in this reach are incapable of accurately measuring or delivering bypasses for in-stream flows. No funding, or responsible party, was identified for this item. The Mitigation Commission worked in partnership with the State of Utah, FWS, DOI and other interested parties to re-program Title II funding for this program element from funds available to implement the mitigation measures of the 1988 Definite Plan Report (see Table 2-1, Environmental Commitment No. 22). Modifications to the diversion dams are being implemented in concert with the PRRP. Several diversions will be eliminated and water provided through other means.

Jordanelle Wetlands Mitigation. The Mitigation Commission cooperated with Reclamation to complete wetland mitigation requirements for the M&I System. The Mitigation Commission and Reclamation will develop a joint management plan for the Jordanelle Wetlands Mitigation Area (JWMA) to make sure that long-term operation and maintenance of the JWMA will be consistent with PRRP objectives.

Lower Provo River - Deer Creek Dam to Utah Lake. The Mitigation Commission's program for the lower Provo River contains a number of components: 1) study of excess flows and in-stream flow needs and acquisition of water rights; 2) June sucker recovery and education (discussed later under endangered species); and 3) stream restoration and changes to diversions; public access and facilities development; and water quality improvements.[1] The Mitigation Commission is working cooperatively with the District and others to implement program components in the lower Provo River. These components are as follows.

Study of Excess Flows and In-stream Flow Studies. The 1987 M&I System Final Supplement to the Final EIS prepared by Reclamation (Reclamation 1987) identified as an environmental commitment a study to examine the impacts of full operation of the M&I System, especially the anticipated loss of brown trout habitat in summer and gain of brown trout habitat in winter in the Provo River downstream of Deer Creek Dam. Section 303(d) of CUPCA authorized funds to ". . . conduct a study and develop a plan to mitigate the effects of peak season flows in the Provo River" (see Table 2-1, Environmental Commitment No. 20). The Provo River System Stream

[1] Note that the Mitigation Commission's inclusion of recreation projects in the Mitigation Plan is limited to those that are compatible with and support conservation of biological resources and natural systems.

Flow Study as directed by the Mitigation Commission addresses a broader scope of study than that necessary to meet the environmental commitment, which the District and Mitigation Commission are responsible for completing. The Provo River System Stream Flow Study examines these impacts and potential mitigation measures through modification of stream flow regimens. The Mitigation Commission initiated the first phase of a comprehensive study in 2002 to determine relationships among high flows, aquatic habitat and other ecological functions on the Provo River System from Jordanelle Reservoir to Utah Lake. A final report on the first phase of the study was released in 2003 for the reach from Deer Creek Dam to Utah Lake.

Acquisition of Water Rights. CUPCA Section 303(c)(4) states that "Upon the acquisition of the water rights in the Provo River Drainage identified in Section 302, in the Provo River from the Olmsted Diversion to Utah Lake, a minimum of seventy-five cubic feet per second" shall be provided from the yield and operating plans for the Bonneville Unit of the CUP. The Act states the purchases would be limited to willing sellers only. Toward this goal, CUPCA has authorized funds for acquiring up to 25,000 acre-feet of water rights in the Utah Lake Drainage Basin. The District has acquired with Mitigation Commission funds irrigation company water shares representing about 3,300 acre-feet, which would allow such water to flow undiverted to Utah Lake, thereby increasing the summertime flow in the lower Provo River. The Proposed Action described in the ULS DEIS would help achieve this goal of establishing a year-round 75 cfs minimum flow in the lower Provo River by delivering some of the CUP water from Strawberry Reservoir to Utah Lake that is needed to accomplish the Jordanelle Exchange via the lower Provo River. The Mitigation Commission would contribute the remaining authorization under Section 302(a) of CUPCA plus other funds that would be appropriated to the Mitigation Commission under Section 202(c) of CUPCA for planning, constructing and operating a portion of the ULS delivery system.

Stream Restoration and Changes in Diversions. This component includes planning for and implementing actions to improve the biotic, hydraulic and geomorphic conditions of the riverine and riparian system. This could include measures to combine, relocate or redesign and reconstruct diversion dams. Some potential water conservation projects might involve combining diversions, resulting in elimination of one or more structures. Ecological studies will identify possible modifications of the river channel, in selected reaches, to provide the diversity of habitat conditions necessary to support all life stages of aquatic biota including June sucker in the lower Provo River.

The June sucker inhabits Utah Lake and the Provo River, and is known to spawn in the lower Provo River (a more detailed treatment of June sucker is included in the last section of this part). Spawning is generally restricted to the lower 3.5 miles of the Provo River, below the Fort Field diversion. The Fort Field diversion presents a migration barrier in most years. During very high flow years, June sucker adults may pass this barrier and continue 1.9 miles further upstream. At this writing, the Tanner Race diversion presents an impassable barrier to migration further upstream under all flow regimes (FWS 1999).

Map 3-6 shows the location of irrigation diversion dams on the lower Provo River. CUPCA authorized funds for the Mitigation Commission to modify diversion dams to allow fish passage and to bypass in-stream flows. In cooperation with the June Sucker Recovery Implementation Program, the Mitigation Commission proposes to investigate modification of the Fort Field diversion in 2004.

Water Quality Improvements. The Mitigation Commission is working cooperatively with Reclamation, the Provo River Water Users Association and others in pursuit of agreements and measures to achieve better water quality in this reach of the river. Reclamation and the Provo River Water Users Association began implementing measures in 2003 to introduce air into releases from Deer Creek Dam, which during some past summers have had low dissolved oxygen levels.

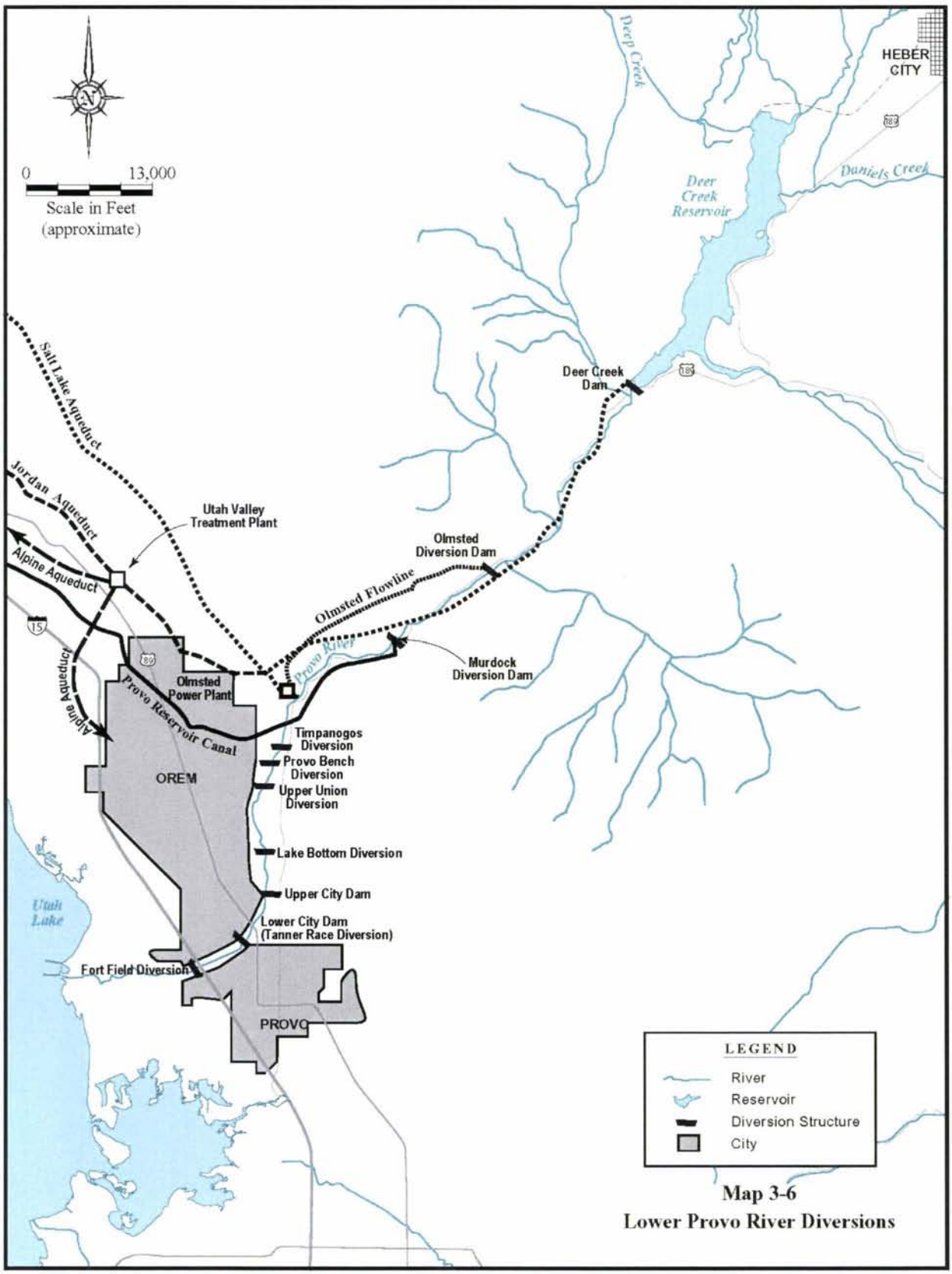
June Sucker Recovery. The Mitigation Commission, District and DOI are among the many Federal, state and local entities working cooperatively to recover the June sucker, an endangered species that occurs in Utah Lake and the lower Provo River. More discussion follows in the last section of this part.

Utah Lake and Surrounding Area Fish and Wildlife Program

Provo River Flow Augmentation.

In-stream Flow Deliveries. The Utah Lake Drainage Basin Water Delivery System (ULS) would not have any negative impacts on the Provo River System. It would contribute to aquatic mitigation efforts by delivering 16,000 acre-feet of water to the lower Provo River for in-stream flow augmentation. Lower Provo River flows from about 1.5 miles downstream of the Murdock Diversion to Interstate 15 would be 75 cfs or greater 82 percent of the months over the 50-year period 1950 through 1999, based on simulation performed for the ULS Proposed Action. Stream flows in the lower Provo River from Murdock Diversion to Interstate 15 would be lower than 75 cfs primarily during November through March in some years. The minimum monthly flows during these months over the 50-year simulation period would range from 28 to 42 cfs. Lower Provo River flows from Interstate 15 to Utah Lake would be 75 cfs or greater 67.5 percent of the months over the 50-year period 1950 through 1999, based on simulation performed for the ULS Proposed Action. Stream flows in the lower Provo River from Interstate 15 to Utah Lake would be lower than 75 cfs primarily during November through March and in August and September of some years. The minimum monthly flows during these months over the 50-year simulation period would range from 6 to 29 cfs.

Water for June Sucker Under the ULS Proposed Action. In addition to the 16,000 acre-feet that would be delivered to the lower Provo River for in-stream flow objectives established under Section 302 and Section 303(c)(4) of CUPCA, the Joint-Lead Agencies have committed that under the ULS Proposed Action, additional supplies of water would be committed for June sucker recovery purposes. The following water quantities and sources comprise the water that would be released under the ULS Proposed Action to the lower Provo River for June sucker spawning and rearing flows.



Map 3-6
Lower Provo River Diversions

- 2,875 acre-feet Northern Utah County 207 project savings
- 1,000 acre-feet Upper East Union and East River Bottom canals piping
- 290 acre-feet Timpanogos Canal piping
- 8,000 acre-feet Provo Reservoir Canal seepage loss savings or other future Section 207 water savings to be assigned to DOI

12,165 acre-feet total

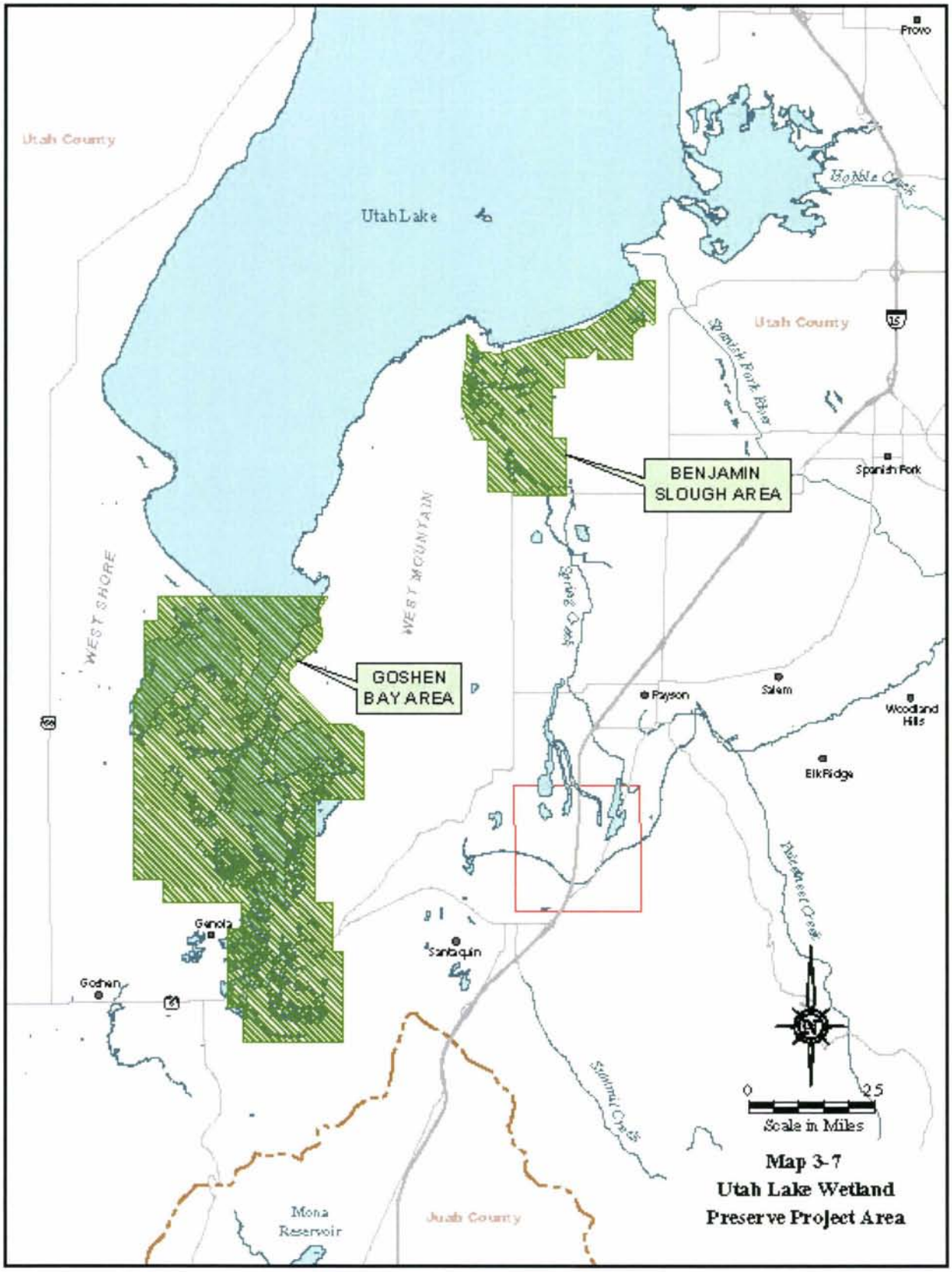
An annual volume of 12,165 acre-feet of water for June sucker will be provided each year, pursuant to existing contracts.

Utah Lake and Connected Wetland Environments. Utah Lake in central Utah is the largest naturally occurring freshwater body in the western United States. Its wetlands have long been recognized locally and nationally for their critical importance for fish and wildlife resources. The Utah Lake wetland ecosystem is nationally important as a breeding area and stopover for many migratory birds in the Pacific Flyway. Approximately 226 species of birds are known to use Utah Lake wetlands, as well as 49 mammalian species, 16 species of amphibians and reptiles and 18 species of fish. Utah Lake provides feeding areas for birds nesting around the Great Salt Lake.

Wetlands that adjoin the Utah Lake environment are, for the most part, privately owned, whereas, the bed of the lake is owned by the State of Utah. Current private ownership and management for non-wildlife purposes often conflicts with wildlife use and habitat protection goals and constrains public access and enjoyment of the area. This ownership pattern has resulted in wetland losses in the past. The remaining wetlands continue to be threatened by proposed residential developments, diking, airport expansions, new highways and recreational developments.

CUPCA authorized establishment of the Utah Lake Wetland Preserve (ULWP) to partially mitigate for past and anticipated future impacts of Bonneville Unit water development actions in the basin. The ULWP is a network of wetland and interspersed upland habitats near the southern end of Utah Lake. When established, it will provide habitat for avian, wetland and upland species in perpetuity. Map 3-7 shows the location of the ULWP planned for the Benjamin Slough area and Goshen Bay area of Utah Lake. Establishment of the ULWP is through acquisition of lands and waters from willing sellers. Funding is authorized under Section 306(c) of CUPCA. Establishment of the ULWP is coordinated by the Mitigation Commission and is managed by the Utah Division of Wildlife Resources.

Initial efforts have been on acquisition of land and water rights for the preserve. The *Final Environmental Assessment for Establishment of the Utah Lake Wetland Preserve (EA)* was published and the Decision Notice and Finding of No Significant Impact for the EA was signed May 23, 1996. This documentation provides for land acquisition in the ULWP area and limited management as identified in the EA. To date, about 5,500 acres have been acquired in the Goshen Bay and Benjamin Slough units established by CUPCA.



Map 3-7
Utah Lake Wetland
Preserve Project Area

Utah Lake Drainage Basin Water Delivery System. Various environmental commitments made for the abandoned I&D System remain in force and have been incorporated into the ULS.

Minimum Pool in Utah Lake. This commitment involves the maintenance of a minimum pool elevation of 4,480 feet in Utah Lake, representing a maximum drawdown of about 9.3 feet below compromise level. This commitment has largely been met through the Water Distribution Plan for the Utah Lake drainage basin issued by the Utah State Engineer's Office on October 22, 1992. This interim plan set the inactive storage level 8.7 feet below compromise level. The FWS stated in it's April 9, 1997 Fish and Wildlife Coordination Act Planning Aid Memorandum (Attachment E) that it believes that the 1988 DPR commitment will be satisfied by this recommended minimum operating level (see Table 2-1, Environmental Commitment No. 47) (FWS 1997b).

Completion of Mitigation Commitments for Utah Lake Drainage Basin Water Delivery System. Environmental Commitment No. 75 (see Table 2-1) provides for the completion of all mitigation commitments for fish, wildlife and related recreation associated with the proposed ULS or other CUP facilities. The formulation of the ULS includes various mitigation commitments as well as assistance to the June Sucker Recovery Implementation Program (JSRIP). The Mitigation Commission will use some of the funds available for this commitment to implement June sucker recovery actions in accordance with the JSRIP. Table 2-1 in Chapter 2 contains a comprehensive list of Bonneville Unit environmental commitments and their status, including the environmental commitments for the ULS (see Table 2-1, Environmental Commitment Nos. 76 – 92).

Utah Lake Fish Management. Section 307(5) of CUPCA authorized funds for the study and development of management plans for improving Utah Lake as a warm water fishery and addressing other important issues. The Mitigation Commission supports operational strategies in the Provo River watershed and Utah Lake that 1) promote a more stable lake elevation and natural tributary inflow[2] and 2) implement measures to aid recovery of the Utah Lake ecosystem with emphasis on high-priority components, such as the endangered June sucker. As new information becomes available about the requirements of the Utah Lake ecosystem, the Mitigation Commission incorporates recommendations into future strategies. To support information gathering, the Mitigation Commission's program has funded studies necessary to develop a comprehensive aquatic resources management plan for Utah Lake. The focus has been on measures that restore the Utah Lake ecosystem, aid recovery of the endangered June sucker, and aid sport fish management. Educating the public on the plight of the June sucker is an element in the Mitigation Commission's program. The Mitigation Commission now carries out these activities primarily through its involvement with and support of the JSRIP.

[2] In November 1992, the Utah State Engineer implemented the Utah Lake Distribution Plan, which is a system for administering the water rights and resources of the Utah Lake basin, including its imported waters. The Plan stipulates water storage conditions that must be met in Utah Lake prior to allowing storage of upstream (junior) water rights, and establishes a process for completing exchanges. This plan is currently being used to administer water rights in the Utah Lake drainage basin. It allows flexibility regarding how water sources are utilized within the system and is subject to revision and refinement as new information, based on monitoring, is developed over the next few years. Utilization of existing water rights and sources to achieve ecosystem objectives will be coordinated with involved entities and incorporated into the Mitigation Commission's Plan.

Endangered, Threatened and Conservation Species

Conservation Species.

Spotted Frog. The Columbia spotted frog (*Rana luteiventris*) occurs in the Provo River/Utah Lake watershed, particularly in areas affected by the M&I System. The overall distribution of Columbia spotted frog is continuous throughout extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta; and south through Washington (east of the Cascades), eastern Oregon, Idaho and western Nevada. Its southern extent includes disjunct populations in central and northeastern Nevada, southwestern Idaho, western and north-central Wyoming, and northern Utah. Two distinct populations of the spotted frog occur in Utah in isolated locations in the West Desert (western Utah) and the Wasatch Range (Ross et al. 1993). Spotted frogs were formerly common within these areas; however, current distribution is extremely patchy and limited. The largest remaining population along the Wasatch Front occurs in wetland areas adjacent to the Provo River in Heber Valley.

Known locations of spotted frogs within Heber Valley are concentrated in the northern portion of the Provo River corridor near Jordanelle Reservoir and in the southern part near Deer Creek Reservoir. Most of the habitats where spotted frogs have been found are characterized by ponds with a variety of emergent vegetation such as cattail, sedge, water cress and musk grass. The ponds are typically supported by springs, seeps or backwater areas of streams such as those created by beaver activity. Wet meadows, open water ponds and emergent marshes may also provide suitable habitat for spotted frogs.

Spotted frogs are typically found in cool, clear spring-fed water with organic substrate (Dumas 1966, Morris and Tanner 1969) occurring anywhere from sea level to 10,000 feet in elevation (Spahr et al. 1991). More specifically, the frogs inhabit pooled areas containing a variety of emergent, floating, and submergent vegetation (Ross et al. 1993). Spotted frogs are thought to hibernate in holes near springs or other areas where water is constantly renewed and does not freeze (Spahr et al. 1991).

Mating occurs during the day in shallow water (<15 cm deep) resulting in egg deposition on the bottom of ponds or quiescent water (Ross et al. 1994, Spahr et al. 1991). Other conditions found in deposition areas include substrates of organics, silt, and clay, water temperatures of 11 to 15 ^{o}C, and placement of egg masses within 2 meters of shoreline (Ross et al. 1994). Prey items of the spotted frog include insects and a few kinds of mollusks, crustaceans, and arachnids (Spahr et al. 1991).

The Heber Valley population was considered to be of concern prior to the PRRP because of the low population numbers which increase the risk of inbreeding, fragmented habitat which hinders dispersal of young, drying of some potential habitat in the fall and winter making conditions less suitable for frogs and varying water levels during the spring in managed wetland mitigation cells which have caused egg masses to dry up (Ross et al. 1993, Keleher 1995).

Numerous variables have been attributed to the decline in spotted frog populations including capping of springs, extraction of water for stock and mineral exploration, livestock grazing, non-native introductions (i.e., mosquitofish, *Gambusia affinis*), and herbicide applications (Ross et al. 1994). Competition from the northern leopard frog (*Rana pipiens*) and the bullfrog (*Rana catesbiana*) contribute to reductions in spotted frog populations (Spahr et al. 1991, Ross et al. 1994).

The PRRP was initially assessed as potentially having short-term adverse impacts on spotted frogs and their habitat, especially in Reaches 7, 8 and 9 of the PRRP. Impacts could include direct loss of individuals, reduced reproductive success, and disturbance of 55.2 acres of potentially occupied habitat. Adjacent habitats could be affected by the change in hydrology and temperature. It was felt that if unmitigated, the level of impacts could threaten the already questionable viability of the population of spotted frogs in Heber Valley. However, field inventories of Reclamation's Jordanelle Wetlands Mitigation Area by Utah Division of Wildlife Resources in 1995 (and annually since then) indicated that the created wetlands have been occupied by spotted frog and used as breeding sites and suspected over-wintering sites.

The PRRP was assessed to have long-term benefits on spotted frog habitat throughout the Provo River corridor because of the riparian habitat restoration and wetlands mitigation. More specifically, 90.9 acres of open water, emergent marsh and wet/moist meadow habitat would be created or enhanced throughout the river corridor. The PRRP could ultimately contribute to the conservation of the species by increasing its distribution and densities.

In order to avoid, minimize, or compensate for potential impacts of the PRRP on spotted frog, the Mitigation Commission organized an interagency/interdisciplinary group to assist them in developing recommendations to avoid, reduce and/or to mitigate adverse impacts to spotted frogs which might be caused during construction of the PRRP. This group, referred to as the Spotted Frog Advisory Team, developed a list of recommendations, all of which were adopted by the Mitigation Commission:

- Spotted frog habitat in emergent marsh, open water and wet meadow areas within the area of impact would be inventoried to more accurately identify occupied areas before construction. Surveys for egg masses would be conducted in early April during the year construction is scheduled. Results of these surveys and records of known spotted frog locations would be used to guide appropriate conservation measures. Impacts on spotted frogs could be minimized by restricting construction activities during certain periods in areas that are known to be occupied by spotted frogs. Frog activity in occupied habitats occurs from hibernation in October to transformation of most tadpoles into adult frogs. Also, barriers would be placed around the construction site to prevent spotted frogs from entering, and measures would be designed for relocating frogs that are discovered in the area during construction. Orange fencing would be installed to prevent construction equipment from unnecessarily entering occupied habitat. Occupied areas near construction zones would be posted with signs stating "Conservation Area - Do not disturb." This conservation measure would avoid disturbance of reproduction and minimize the loss of egg masses and tadpoles. In addition, it would avoid the mortality of

immobile, hibernating individuals that would not be able to escape from construction equipment.

- Direct effects on spotted frogs would be minimized by conducting rescue and relocation of adult frogs prior to starting construction and constructing a barrier or fence between the construction corridor and adjacent undisturbed habitat. Adult frogs would be collected from the immediate area and transferred to suitable adjacent habitat during the late summer and fall months. The construction area would be fenced with silt fencing high enough to prevent re-entry of frogs during construction. The silt fencing would remain in place until the habitat is restored. After construction and restoration are complete, the barrier would be removed to allow frogs to return to the site. Rescue and relocation of frogs would minimize effects on the population. Sites designated to receive relocated frogs would be selected with input from the FWS and Utah Division of Wildlife Resources. Habitat conditions of spotted frogs would be enhanced where necessary.

- The final project plan for the PRRP Proposed Action in the Final EIS was adjusted to avoid and reduce potential short-term adverse impacts to spotted frogs in the Project Area. The Proposed Action main channel alignment was altered from the Draft EIS in Reaches 7, 8 and 9, primarily to avoid impacts to spotted frog habitats and reduce the amount of wetland impacts and required mitigation. In addition, the Mitigation Commission constructed 4 ponds, about 0.1 acre in size, on federal property acquired by the Mitigation Commission in Reach 8 prior to any disturbance of occupied sites, to be suitable for overwinter survival of spotted frogs.

- The Mitigation Commission should cooperate with Reclamation, the District and others to develop a permanent water supply for a small portion of Reclamation's Jordanelle Wetlands Mitigation Area (cells N8 through N18) to provide suitable overwinter habitat for spotted frogs. Excavation of deep areas within some of the cells to replace habitats impacted by construction of the Proposed Action would be completed prior to disturbance of the occupied habitats.

- A detailed, long-term monitoring plan would be designed and implemented in accord with the Spotted Frog Conservation Agreement conditions and objectives to determine the success of habitat recovery after disturbance, re-population of the restored area and relocation efforts. If monitoring results show a need for additional measures to avoid losses of spotted frogs or their habitat, feasible actions would be immediately implemented.

The PRRP has been extremely successful with respect to conserving the spotted frog. Studies have demonstrated the rapid colonization of restored and constructed new habitats (Ammon et al. 2003) by breeding adults and metamorphosed juvenile frogs. The Utah Division of Wildlife Resources has used a population estimator (counting the number of egg masses) to determine effective population size of spotted frog for more than a decade. Number of egg masses never reached the conservation goal of 500 from 1994 through 2001. Since 2001, the PRRP population has exceeded 500 egg masses, reaching a total of 782 egg masses counted in the area in 2004

(Wilson et al. 2004 in prep.). A prime reason for the increased population size (as determined by standardized egg mass counts) is the restoration and creation of many acres of suitable spotted frog habitat by the PRRP (Wilson et al. 2004 in prep.). Based heavily on the success of the PRRP and the strength of the Heber Valley population of spotted frog, the FWS issued its determination in August 2002 that the Wasatch Front Distinct Population Segment of the spotted frog was not warranted for listing as a threatened or endangered species under ESA (50 CFR Part 17; Federal Register, August 30, 2002 (Volume 67, Number 169, Pages 55758 - 55767)).

Threatened Species.

Ute ladies'-tresses. Commitments to conserve threatened and endangered species have been expanded dramatically since the 1988 DPR (see Table 2-1, Environmental Commitment Nos. 41a through 41 l, 62, and 62a through 62e). The Ute ladies'-tresses (*Spiranthes diluvialis*), a native orchid, was found along the Provo River in Heber Valley and in Diamond Fork Canyon since it was listed as threatened under the Endangered Species Act in 1992. The plant has subsequently been observed in Spanish Fork Canyon. The background, life history, location in the effect area of influence, construction and operation effects under the Bonneville Unit of the CUP are described in the Final Biological Assessment (CUWCD 2004b), so only a brief description is given here.

Ute ladies'-tresses orchid is a perennial, terrestrial orchid with stems 20 to 50 cm (8 to 20 inches) tall, arising from tuberously thickened roots. Its narrow (1.0 cm (0.39 inches)) leaves can reach 28 cm (11 inches) long. Basal leaves are longest and become reduced in size up the stem. The flowers consist of few to many small white or ivory flowers clustered into a spike arrangement at the top of the stem. The species is characterized by whitish, stout, gaping-at-the-mouth flowers. It blooms, generally, from late July through August. It is endemic to moist soils or wet meadows near springs, lakes, or perennial streams. The orchid occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams, in apparently stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers, and in the eastern Great Basin in wetland and seepy areas near freshwater lakes or springs (FWS 1992; Jordan 1998). Jennings (1990) and Coyner (1989) observed that Ute ladies'-tresses orchids seem to require "permanent sub-irrigation", indicating a close affinity with floodplain areas where the water table is near the surface throughout the growing season and into the late summer or early autumn. This observation has been corroborated by ground water monitoring research conducted in Dinosaur National Monument (Martin and Wagner 1992), Boulder, Colorado (Naumann 1993), and Diamond Fork Canyon, Utah (Black 1998). Soils are generally silty-loam, but occurrences in peat and other highly organic substrates are known (Hreha and Wallace 1994; Jordan 1998).

The Ute ladies'-tresses orchid occurs primarily in areas where the vegetation is relatively open and not overly dense or overgrown (Coyner 1989; Jennings 1989, 1990). A few populations in eastern Utah and Colorado are found in riparian woodlands, but generally the species seems intolerant of shade, preferring open, grass, sedge, and forb-dominated sites instead. Where colonies occur in more wooded areas, plants are usually found on the edges of small openings and along trails. Plants usually occur as small scattered groups and occupy relatively small areas

within the riparian system, although quite large and dense colonies are known from the more stable historic floodplain meadow sites (Stone 1993; Jordan 1998).

The Ute ladies'-tresses orchid appears to be well adapted to areas influenced by water movement through floodplains (Naumann 1992; Reidel 1994). In riparian settings, the species is most typically found in mid-successional habitats (well established soils and vegetation) in older floodplain features (for example, oxbows and high flow channels). These sites may receive periodic inundation that helps maintain their hydrologic and vegetation characteristics. However, they are generally scoured or significantly reworked by flows that occur at a frequency greater than 10 years.

Very little is known about the life history and demography of the Ute ladies'-tresses orchid. Many orchid species remain below ground for several years in a symbiotic relationship with a mycorhizal fungus (Arditti 1992; Wells 1967, 1981). Even after they become autotrophic (produce green aboveground parts), they may not emerge aboveground every year (Magrath 1973; Wells 1981). The Ute ladies'-tresses orchid first appears aboveground as a rosette of thickened grass-like leaves that is very difficult to distinguish from other vegetation. A distinctive flower stalk appears in late summer (July through September), and location, identification, and population size estimates are typically determined then. Some individuals remain under ground or do not flower each year (Arft 1994; Riedel1993). Thus, fluctuations in numbers of observed flowering individuals do not necessarily correspond to population fluctuations or indicate habitat alterations. The life span of individuals is unknown.

Ute ladies'- tresses orchid requires pollinators for reproduction. Because of the unique anatomy of orchid flowers, only certain insects can affect pollination. Further, since the orchid only supplies nectar to pollinators (pollination is accomplished incidentally), flowers that provide pollen must be available during the orchid flowering period. Pollinators that have been identified to date that can affect pollination are bumblebees (*Bombus* spp.), and anthophorans (*Anthophora* spp.) (Sipes and Tepedino 1995a, 1995b). These insects must have suitable habitat nearby.

Population estimates are generally based upon observations of flowering individuals, although on occasion it is possible to observe and count non-flowering individuals that have produced vegetative aboveground growth (basal rosette). Information on establishment, recruitment, and longevity is lacking. Therefore, it is usually undeterminable whether a marked individual that fails to flower has died or is merely dormant. Criteria have not been established for determining mortality based on the number of seasons without appearance of aboveground parts.

Apparent population numbers, based on flowering individuals, fluctuate greatly. For example, in Diamond Fork Canyon in Utah, one colony was counted as 203 individuals in 1992 and 2,214 individuals in 1993. Another colony had 27 individuals in 1992, 615 individuals in 1993, and 91 individuals in 1994 (CUWCD 1998). Without a better understanding of life history and species response to environmental factors, it would likely require decades of monitoring at a site to determine long term population dynamics.

Populations of Ute ladies'-tresses orchids are known from three broad general areas of the interior western United States: near the base of the eastern slope of the Rocky Mountains in southeastern Wyoming and adjacent Nebraska and north-central and central Colorado; in the upper Colorado River basin, particularly in the Uinta Basin; and in the Bonneville Basin along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah, extreme eastern Nevada, and southeastern Idaho. The orchid has also been discovered in southwestern Montana and in Washington in the Okanogan area and along the Columbia River.

Although the range of the orchid is large, it typically occurs as localized clusters of colonies. Most colonies are small, with fewer than 100 individuals, and many fewer than 10. A few colonies have large numbers of individuals, in some cases between 5,000 and 10,000 individuals, however, these large colonies may be the only occurrence of the orchid in that portion of its range. In 1995, the total estimated population size was 20,500 individuals. With discoveries since 1995, population estimates have increased. As of the date of this document, the total population size of Ute ladies'-tresses orchid is estimated at approximately 60,000 individuals.

Principal threats to the orchid include:

1. Urban, residential, agricultural, or recreational development within riparian or lacustrine floodplain areas currently or potentially occupied by the orchid.

2. Incompatible agricultural or other land management practices.

3. Alterations of hydrology.

Impacts on Ute ladies'-tresses orchid may occur because of five principal causes: (1) direct mortality from construction activities and/or placement of facilities in occupied habitat; (2) alterations in hydrology supporting existing colonies and potential habitat; and (3) introduction or proliferation of aggressive exotic or native plant species into occupied or potential habitat; (4) direct mortality or habitat alteration that reduces numbers or viability of pollinators; and (5) habitat management or mitigation actions that make occupied or potential habitat less suitable for the orchid, such as shrub and tree planting.

The District, Mitigation Commission and DOI support an approach to recovery of Federally listed species by taking an ecosystem approach, i.e., to work to restore species, habitats, and processes to a naturally functioning state in which Federally listed species flourish as a self-sustaining component. Management of a system to the exclusive benefit of one species at the expense of many others is contrary to conservation biology principals. The U.S. Fish and Wildlife Service's draft recovery plan for Ute ladies'-tresses orchid, prepared in 1995, describes the preferred recovery goal as self-sustaining populations of the orchid in a watershed that is in a state of dynamic equilibrium with its physical and biological setting. The recommended recovery strategy to accomplish this includes the following steps: (1) a multi-disciplinary watershed evaluation to determine the physical and biological status and capabilities of the watershed; (2) participation by all affected interests in establishing watershed goals; and (3) development of a mechanism for affected interests to evaluate management proposals for their contribution toward

achieving established goals. It is assumed that self-sustaining orchid populations will be among identified high priority goals.

Ute ladies'-tresses occur in low numbers along portions of the middle Provo River within the PRRP. Consultation with the FWS resulted in the following conservation measures being adopted:

- Existing Ute ladies'-tresses colonies would be avoided during construction to the extent possible. Riparian woodlands and riparian scrub habitats developed in the constructed floodplain under the Proposed Action and Existing Channel Modification Alternative would fully replace potential but unoccupied habitat for Ute ladies'-tresses that would be removed during construction. If habitat needs would not be met by development of riparian woodlands, additional measures would be identified and implemented. These could include artificial maintenance of existing Ute ladies'-tresses colonies, additional surveys, and other conservation measures identified by the FWS.

- Existing colonies of Ute ladies'-tresses would be conserved by allowing water to flow continuously into the occupied side-channels from the new river location. A proposed side channel under the Proposed Action in a portion of the current Provo River channel near the known colonies would receive continuous flow from the new river channel and some overflow during flooding events. Continuous flow into this side channel would minimize the potential for loss of the colonies, and a 170-foot buffer zone around the colonies would be sufficient to avoid impacts of construction. This buffer zone would be surrounded by orange fencing and posted with signs stating "Conservation Area - Do Not Disturb." The presence of threatened Ute ladies'-tresses would not be stated on the signs to avoid unwanted attention.

- The constructed floodplain and resulting riparian woodland proposed in Reaches 7 and 8 would provide additional suitable habitat for Ute ladies'-tresses. The alignment of the Proposed Action has been modified from the Draft EIS in response to comments about potential impacts on spotted frogs and wetlands. The alignment of the Proposed Action through Reach 8 of the Final EIS would allow current channel characteristics to continue and allow additional habitats to potentially develop in the areas containing Ute ladies'-tresses colonies. Under proposed (baseline) operations of Jordanelle Reservoir, flood flows would occur over the floodplain every other year, and scouring flows would occur every 3 to 5 years, exposing gravels and depositing sediments that would provide additional Ute ladies'-tresses habitat - a combination that would improve the potential for Ute ladies'-tresses to disperse in this additional habitat. The periodic flooding would supply water to known colonies, thereby enhancing the probability for continued existence of the Ute ladies'-tresses colony. If monitoring of the Ute-ladies'-tresses colonies suggests that other flow regimes may be desirable to protect or promote establishment of colonies, the Mitigation Commission would cooperate with the FWS in requesting consideration of such requests by the District, Reclamation, and other involved entities in accordance with the Deer Creek-Jordanelle Operating Agreement (DOI 1994). Wetland enhancement at the proposed wetland mitigation sites would

improve the potential for dispersal of Ute ladies'-tresses by providing additional and more suitable habitat.

- An annual monitoring program would be designed to document site conditions, development of new habitat, and the status of the Ute ladies'-tresses colonies during the optimum blooming period, which varies year-to-year. These efforts would be coordinated with the wetland mitigation monitoring for the PRRP.

Endangered Species.

June sucker. Information on the June sucker that is presented in the following pages is excerpted from the ULS Biological Assessment included as Attachment F to this Fish and Wildlife Appendix. Status of environmental commitments and conservation measures for June sucker are described in detail in Attachment F.

Life History of the June sucker. The June sucker (*Chasmistes liorus*) is an endangered fish species endemic to Utah Lake and the lower Provo River. Once a locally abundant species, it was listed as endangered by the FWS in 1986, with 4.9 miles of the lower Provo River, from the Tanner Race diversion to Utah Lake, designated as Critical Habitat (51 FR 10857).

The number of adult June sucker remaining in Utah Lake is estimated each spring based on the number spawning in the Provo River (FWS 1995). From 1979 to 1985, the number of spawners never exceeded 500 fish, and 1985 was the last year in which aggregations of 30 to 50 June sucker spawners were observed in the Provo River. During the 1990s, collections of June sucker spawners in the Provo River have been less than 100 fish, and occasionally were less than 50 fish. Recent estimates placed the wild adult population size at approximately 300 individuals (Keleher et al 1998). Recruitment to the adult population is thought to be poor as a result of predation by white bass and other introduced predators. Aging of various groups of June sucker collected in the 1980s and 1990s found few fish less than 10 years of age, suggesting recruitment and survival of juveniles is inadequate (FWS 1999).

The Provo River, the largest tributary of Utah Lake, historically has been the major spawning tributary for June sucker, but other tributaries were likely used prior to changes that made them unavailable or unsuitable for the species. Carter (1969) notes that early explorers and indigenous Native Americans keyed fishing activities on the lower Spanish Fork River, Hobble Creek and the mouth of Peteetneet Creek. All three of these streams now have considerably reduced flows from pre-irrigation times. Radant and Sakaguchi (1980) noted adult June sucker in spawning condition near the mouth of the Spanish Fork River, but later studies failed to find either spawning suckers or suitable habitat in that stream. The Utah Division of Wildlife Resources found spawning June suckers in the lower Spanish Fork River in 2002. The lowermost irrigation diversion structure on the Spanish Fork River prevents the species from accessing potential spawning habitat (Radant and Shirley 1987). Peteetneet Creek no longer reaches Utah Lake, as it is dewatered near the High Line Canal. Flow in Hobble Creek has been significantly reduced and no longer provides suitable habitat for a large species such as the June sucker.

Various historic riverine habitat characteristics, many of which no longer exist, are presumed to be favorable to June sucker spawning success. These features include multiple, meandering channels at the inlet of tributaries to Utah Lake and riparian zones. These components are thought to create microhabitats that benefit June sucker as their ecological needs change associated with development through life history stages. Advantages of these habitats include cover from predators and slow, warm pools, which support larval growth.

Factors that have contributed to the reduction in June sucker numbers include changes that have occurred both in Utah Lake and in historical spawning tributaries. In the tributaries, these effects include water management (primarily irrigation use) that has reduced streamflows during critical spawning times, reductions in available spawning habitat caused by impassable barriers associated with irrigation diversions, introduction of exotic predators, introduction of other species (carp), loss of spawning habitat, poor water quality, reduced aquatic vegetation, and channelization or channel simplification. In Utah Lake, contributing factors include changes in chemical and physical habitat, introduction of exotic predators, and lake level management.

The life history of the June sucker involves both Utah Lake and its tributaries. One of only four "lake suckers," the mouth of the June sucker is terminal, and the lips and gill rakers of adults are adapted to feed on microscopic plankton. Adults live in Utah Lake, apparently moving about the lake considerably. Sexual maturity likely occurs at 5 to 7 years of age, but most adults are from older age classes (Scoppettone and Vinyard 1991). During June, reproductive adults move into the Provo River to spawn. During most water years, spawning is limited to the lower 3 miles because of a partial passage barrier at the Fort Field diversion. However in very high water years adults have been seen above this partial barrier using the next 1.9 miles of habitat up to the Tanner Race diversion dam. Spawning typically occurs in mid- to late June, with the eggs hatching in 1.5 to 2 weeks. Adults move back into the lake shortly after spawning. A post-spawning aggregation of adult June sucker was found in Provo Bay by Radant and Shirley (1987) and recent findings based on radio-tagged June sucker confirm this (Crowl 2003). This portion of Utah Lake has higher than normal plankton densities during this period, and the fish may be responding to this food source following relatively little feeding during their stay in the Provo River.

The early life history of the species is poorly understood. Larvae apparently drift down to the lake relatively quickly after spawning (Radant and Sakaguchi 1980; Radant and Shirley 1987; Modde and Muirhead 1990). It is thought that many of the spawning tributaries originally had deltas into the lake that would have provided young suckers with food, cover and space for growing. These habitats no longer exist. It is thought that juveniles live in or around the lake. Recent research (Crowl 1994) indicates young are very susceptible to predation by white bass, although they will seek cover if it is available. Current thinking on limiting factors for the species suggests that predation on the young, either in the dredged lower Provo River channel, or in Utah Lake, is the major factor in poor recruitment to the adult population (FWS 1995). Lack of hiding cover in the lower Provo River and in the lake may be a contributing factor to

predation. Poor water quality conditions and a large carp population appear to be factors in young sucker survival.

Area of Influence. The June sucker inhabits Utah Lake and the Provo River, and is known to spawn in the lower Provo River. Spawning is generally restricted to the lower 3.5 miles of the Provo River, below the Fort Field diversion. The Fort Field diversion presents a migration barrier in most years. During very high flow years, June sucker adults may pass this barrier and continue 1.9 miles further upstream. At this writing, the Tanner Race diversion presents an impassable barrier to migration further upstream under all flow regimes (FWS 1999).

Consultation on the June sucker. This section provides a brief history of consultation and summarizes the conclusions of previous consultation on June sucker.

Reclamation was informed by the Utah Division of Wildlife Resources in mid-February 1979 of the tentative taxonomic verification of the "June" sucker, a small population of an endemic fish unique to Utah Lake. The taxonomy of the fish was still uncertain, and unknowns relative to spawning habits and other requirements for this species precluded making conclusions concerning project impacts. The evaluation of specific project impacts on reproductive success of this species in the Provo River and development of a mitigation plan was deferred until completion of additional studies.

In 1982, the FWS published a notice in the Federal Register that it would review the status of the June sucker and requested information related to the species. Reclamation coordinated with the FWS, the Utah Division of Wildlife Resources and the District several times in 1983. As a result of this coordination, Reclamation contracted with the Utah Division of Wildlife Resources to study the in-stream flow needs of the June sucker as a basis for determining project impacts and mitigation. The study was completed in 1986 (Radant et al 1987).

Reclamation re-opened Section 7 consultation with the FWS in 1985 because of proposed modifications to the M&I System and the proposed listing of the June sucker as an endangered species. On April 30, 1986, June sucker was officially listed as endangered. The FWS informed Reclamation that it would withhold its determination on the effects of the M&I System on that species pending further analysis of data gathered by Reclamation and Utah Division of Wildlife Resources. On October 8, 1986, Reclamation submitted a supplement to the biological assessment, which again concluded no effect on the June sucker. On December 11, 1986, the FWS concurred with Reclamation, issuing its own determination of "no effect", but requesting that enhancement opportunities be considered.

Reclamation also consulted on the Diamond Fork System as plans for it were modified. From the 1990 Diamond Fork Final Supplement to the 1984 Final EIS, Reclamation concluded there would be no adverse impacts on June sucker... On January 21, 1987, the Service concurred in the "no effect" determination for the Proposed Action.

The 1994 Biological Opinion for the Provo River Project (an existing prior Reclamation project, but not a Bonneville Unit project) concluded that the Provo River Project, as operated, is likely to jeopardize the continued existence of the June sucker and is likely to destroy or adversely modify designated critical habitat. The Biological Opinion also noted that the conversion of farmlands to residential areas allows for encroachment of residential areas adjacent to critical habitat areas (thereby reducing future June sucker recovery options), and urbanization and water conversions will, therefore, increase the likelihood of jeopardy to the June sucker and adverse modification of critical habitat.

The RPA for June sucker was primarily based upon the establishment and protection of flows in the Provo River to ensure annual river flushing, support adult spawning activities, and maintain high quality egg and larval habitat conditions. The RPA called for a range of research flows and associated studies over a three year period (1995-97). At the end of the 3-year study, Reclamation was to reinitiate consultation for the Project to define the size of the permanent block of water to be acquired and delivered by Reclamation for June sucker needs.

After reviewing the 1996 Biological Assessment for the Wasatch County Water Efficiency Project and Daniels Replacement Project, and the Provo River Restoration Project, the FWS concurred with the finding of a "no effect" on June sucker.

From the 1999 Diamond Fork System Final Supplement to 1990 Final Supplement to the 1984 Final EIS for the Bonneville Unit of the CUP (CUWCD 1999a), the Biological Opinion on June sucker states that "*after reviewing the current status of June sucker, the environmental baseline for the action area, the effects of the Bonneville Unit, and the cumulative effects, it is the Service's biological opinion that the Bonneville Unit, as proposed, is not likely to jeopardize the continued existence of the June sucker, and is not likely to destroy or adversely modify designated critical habitat. The finding of "not likely to jeopardize" is based on the commitment of the joint-lead agencies to implement the conservation recommendations which have been included as part of the proposed action.*"

The following conservation actions were identified:

1. The JLA [DOI, District and Mitigation Commission], in cooperation with the FWS and the June Sucker Flows Workgroup, should model reservoir operations and Provo River flows (using new approach of operational scenarios that mimic dry, moderate and wet years) over the period of record to determine how this approach meets the needs of water users and reservoir operation as well as meet flow requirements for June sucker.

2. The JLA, in cooperation with the FWS and the June sucker Technical Workgroup, should determine the feasibility of restoring the lower Provo River to obtain past habitat characteristics and complexity. The lower Provo River historically had a complex delta system, which provided braided, slow, meandering channels. This delta system provided low velocity habitat as a refuge and rearing habitat for larval and juvenile June sucker.

Re-establishment of the delta system may provide habitat needed by larval and juvenile June sucker to obtain sized needed to reduce predation by nonnative fishes.

3. The JLA, in cooperation with the FWS and the June Sucker Technical Workgroup, should determine the feasibility of the Spanish Fork River as an additional self-sustaining June sucker spawning run in Utah Lake. The June Sucker Recovery Plan identifies the need for a second spawning run for delisting of the species. Completion of the Diamond Fork System allows the opportunity of the JLA to determine habitat needs and availability and flow requirements to establish a second river for a June sucker spawning run.

The 1999 Diamond Fork System Final Supplement to the 1990 Final Supplement to the 1984 Final EIS for the Bonneville Unit of the CUP (CUWCD 1999a) included the following environmental commitments based on the FWS *Draft* Biological Opinion:

1. The JLA will identify, acquire and permanently provide a block of water for flows in the lower Provo River through critical habitat, in perpetuity, for June sucker.

2. The District, in cooperation with the other Provo River water users, the FWS and other members of the Provo River Flows Workgroup, will agree on operational scenarios that mimic dry, moderate and wet years. The District, with the support of the JLA and Provo River water users, will apply operational scenarios to the annual Provo River operation to benefit June sucker.

3. The JLA, in cooperation with the State of Utah and the FWS, will work toward establishment of a refugium in Red Butte Reservoir for June sucker.

4. The JLA will participate in the development of a Recovery Implementation Program (RIP) for June sucker.

5. Any future development of the Bonneville Unit of CUP will be contingent on the RIP making sufficient progress towards recovery of June sucker.

In April 2002, after several years of interim activity, the June Sucker RIP (JSRIP) was formally adopted by the following partners: FWS, DOI, Reclamation, District, Mitigation Commission, Utah Department of Natural Resources, Provo River Water Users Association, Provo Reservoir Water Users Company, and Outdoor and Environmental Interests (CUWCD 2002).

The JSRIP has the following two goals:

Goal 1. To recover June sucker so that it no longer requires protections under the ESA

Goal 2. To allow continued operation of existing water facilities and future development of water resources for human use

For the purpose of the JSRIP, the recovery actions identified in the June Sucker Recovery Plan (FWS 1999) were grouped into six general categories referred to as recovery elements. Recovery elements were established to organize recovery actions by the threats they are intended to address in an effort to make sure a diversified and balanced approach to the implementation of recovery actions whereby funding and effort can be applied at the appropriate level for each recovery element. The recovery elements include: (1) Nonnative and Sportfish Management, (2) Habitat Development and Maintenance, (3) Water Management and Protection to Benefit June Sucker, (4) Genetic Integrity and Augmentation, (5) Research, Monitoring and Data Management, and (6) Information and Education.

A final environmental assessment and FONSI on the JSRIP were prepared by the FWS and issued in April 2002 (FWS 2002). The final EA analyzed the environmental consequences of federal agency participation in development and implementation of the JSRIP and determined that the recovery actions would not have a significant impact on resources of the human environment. These federal agencies include FWS, DOI, Mitigation Commission and Reclamation. The District and Utah Division of Wildlife Resources serve as cooperating agencies. Future NEPA compliance may be necessary to cover potentially significant actions that could result from implementing the JSRIP.

The District, Department and Mitigation Commission are all partners in the JSRIP. The JSRIP has been implementing many actions including those that are required as commitments for the Bonneville Unit. In cooperation with the U.S. Fish and Wildlife Service, the June Sucker/Provo River Flows Workgroup (Workgroup), and other JSRIP participants, the District, Department and Mitigation Commission have modeled reservoir operations and Provo River flows to determine how to meet the needs of water users and reservoir operation as well as meet flow requirements for June sucker. The flow approach developed by the District and partners in 1999 (see Appendix F for more detailed review) for meeting flow requirements for the lower Provo River was incorporated as part of the ULS planning effort. The analysis included water that would be supplied under the ULS and results are included in the hydrology and impact analysis documented in the EIS.

The analysis made adjustments for imported water in order to determine to historic "natural" runoff patterns at the Hailstone gauge on the Provo River. Runoff patterns (April though July) showed considerable variation from year to year for the period of record.

- Runoff volumes ranged from as low as 23,961 acre-feet in 1977 to a high of 199,345 acre-feet in 1986.
- The maximum peak magnitude, based on daily averages, ranged from 345 cfs in 1977 to 2,820 cfs in 1983.
- Minimum flows during the runoff ranged from as low as 1.4 cfs in 1990 to 219 cfs in 1986.
- The date of the runoff peak ranged from April 10 through June 15.

In spite of the variation in the natural runoff pattern, two trends were apparent: 1) the duration of the runoff was longer, and 2) the peak in the hydrograph was higher and tended to occur later in wetter years. Based on these trends, and in an attempt to mimic historic conditions, this approach was developed for providing target flows for the June sucker spawning and nursery period.

Based on the trends in the historic data and using other analyses, three hydrograph scenarios were produced using a 3-parameter Lorentzian Model (based on a 75 cfs base flow, peak date, magnitude, and runoff duration. For a dry (low flow) year, flows to the lower Provo River should peak around May 15 at 550 cfs with a runoff duration of 46 days (approximately April 23 to June 7) (see Figure 3-1). For a moderate year, flows should peak around May 26 at 750 cfs with a runoff duration of 72 days (April 21 to July 1) (see Figure 3-2). For a wet (high flow) year, flows should peak on June 7 at 1,050 cfs with runoff duration of 97 days (April 20 to July 25) (see Figure 3-3). The quantity of water required to provide the three scenarios (including a minimum 75 cfs base flow from April 1 to July 31) is 34,610 acre-feet for a dry year, 51,457 acre-feet for a moderate year, and 75,819 acre-feet for a wet year.

Implementing this approach is coordinated through the June Sucker/Provo River Flows Workgroup. Determinations of which hydrograph scenario to follow are based on available June sucker water supply, reservoir status, forecasted runoff, anticipated demands to the system and biological considerations for the given year. As weather conditions and demands to the system change, reservoir releases are adjusted to compensate for those changes.

Daily flow values in this approach represent targets for water managers. Actual flows in the lower Provo River may vary from target flows because it is difficult to maintain precise flows at such distances below control structures, and because of unforeseen changes within the system (i.e., sudden weather changes). Under this approach, beginning April 20-23 flow releases increase from base flow in the lower Provo River and reach approximately 550 cfs on May 15 (the peak date for the dry year scenario). By May 15, a decision is made based on forecast information and available reservoir space. If it appears that a dry year scenario is in store, and reservoirs can capture the remaining runoff, flows would recede in the lower Provo River targeting the return to base flow conditions around June 7. Flows would drop from the peak to base flow conditions sooner than June 7 if required to meet system demands. Base flow conditions should be such that water quality standards are maintained while not disturbing spawning areas or developing larval fish. These flows should provide researchers

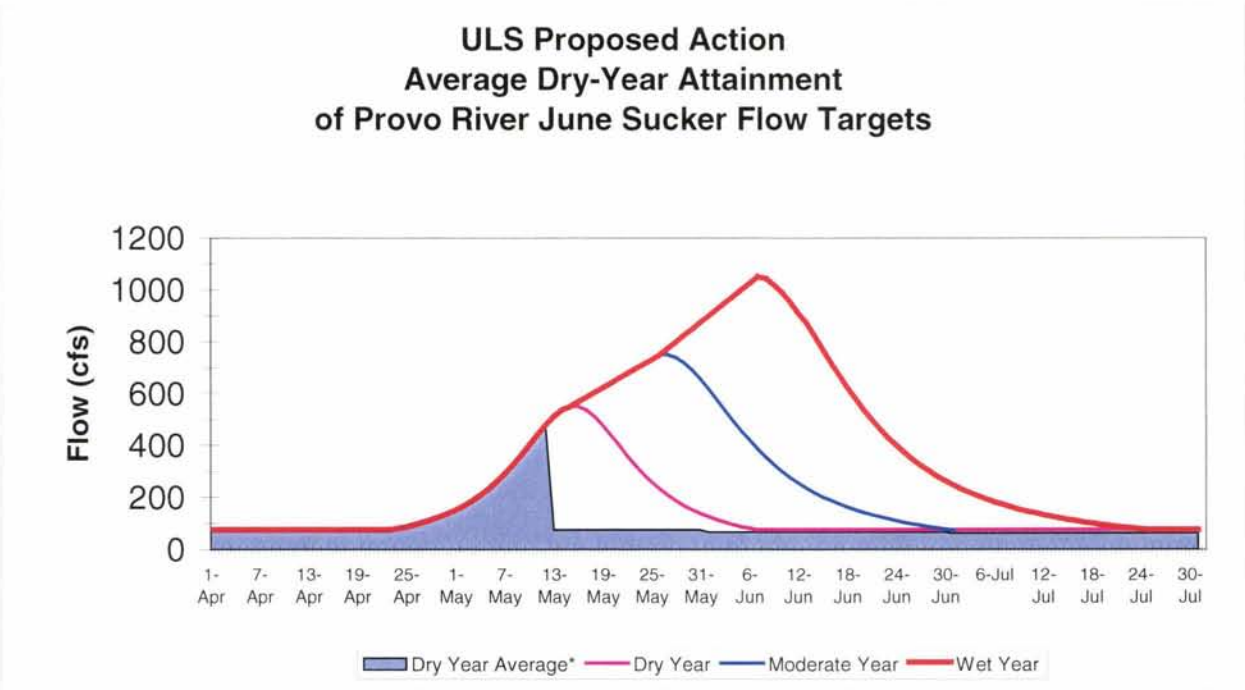


Figure 3-1
ULS Proposed Action Average Dry-Year Attainment of Provo River June Sucker Flow Targets

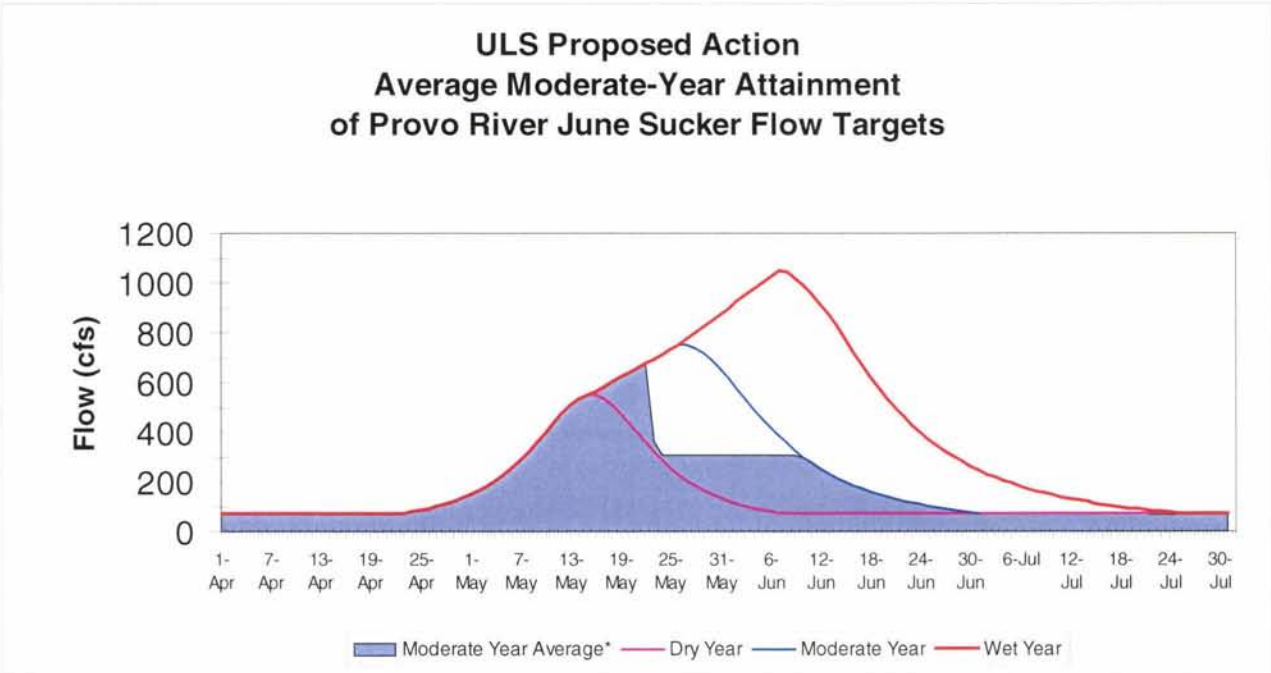


Figure 3-2
ULS Proposed Action Average Moderate-Year Attainment of Provo River June Sucker Flow Targets

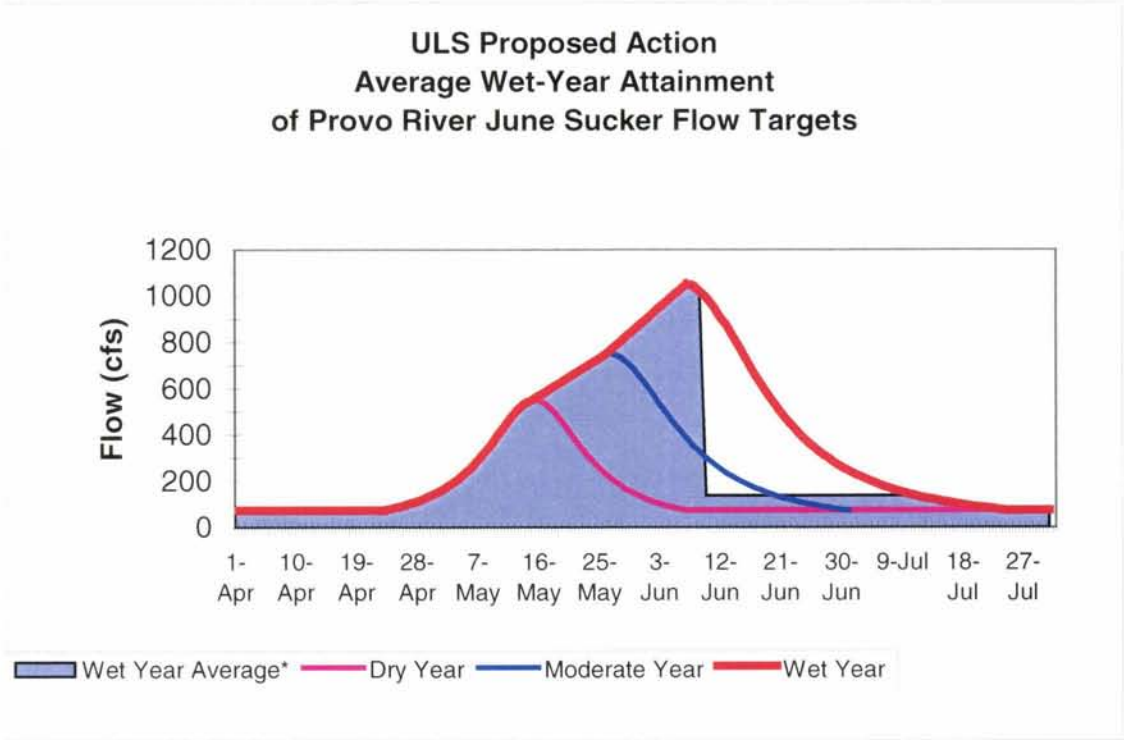


Figure 3-3
ULS Proposed Action Average Wet-Year Attainment of Provo River June Sucker Flow Targets

the opportunity to monitor the spawning population, but may need refinement depending on conditions in the river. If, on May 15, it appears that there is not sufficient space in reservoirs to capture the remaining runoff, flows would continue to increase targeting a peak of 750 cfs on May 26. Likewise, if the peak of 750 cfs is reached on May 26 and there is not sufficient space in reservoirs to capture remaining runoff, flows would continue to increase targeting 1,050 cfs on June 7. After May 15, however, decisions of whether to continue to increase flows would be made after frequent reviews of reservoir capacity, weather forecasts and system demands. Moderate and wet year scenarios provided are references for targeting flows in these types of years.

The benefits of this approach are: 1) it provides reservoir operators a target for planning and over-winter operations, and 2) it mimics the natural conditions in which June sucker evolved. For this approach to mimic natural conditions over the long-term, dry, moderate, and wet years should occur essentially in equal frequency.

The period 1950 through 1999 was used to model the impacts of ULS on achieving the flow approach identified above. In this period, 17 years were considered dry years, 17 were considered moderate and 16 were considered wet years. Modeling efforts indicate that the above flow approach could be met 10 of the 50 years under baseline conditions. Of the 10

years that the approach is met, 7 are categorized as moderate and 3 are categorized as wet. Under baseline conditions, modeling results indicate that the dry year scenario is not met. For those years when the above flow approach is not achieved under baseline conditions, modeling results indicate average deficiencies of 24,731 acre-feet in dry years, 30,681 acre-feet in moderate years, and 39,314 acre-feet in wet years.

Under the ULS Proposed Action, 12,165 acre-feet would be secured by the JLA for June sucker flows on an annual basis. Modeling efforts indicate that the flow approach could be met 17 of the 50 years under ULS operation. Of these 17 years, 2 are in the dry year category, 9 are in the moderate year category and 6 are in the wet year category. For those years when the flow approach is not achieved under ULS operation, average deficiencies would be significantly reduced from baseline conditions. The average deficiency in dry years is 12,002 acre-feet (see Figure 3-1), in moderate years is 21,244 acre-feet (see Figure 3-2) and in wet years is 32,175 acre-feet (see Figure 3-3).

Table 3-6 shows the Department of the Interior's water acquired for June sucker spawning in the Provo River from 1995 through 2004. The water volumes varied between years because some of it was acquired on a temporary basis from year to year, and some was acquired on a permanent basis. The 12,165 acre-feet secured by the JLA will provide a permanent supply of water for June sucker spawning and rearing flows.

Table 3-6
Department of the Interior Water Availability and Use for June Sucker Spawning in the Provo River 1995 to 2004
(acre-feet)

Year	New Water Available	Total Water Available (Remainder + New Water)[a]	Water Used	Remaining Water
1994	1,600	1,600	1,600	0
1995	5,000	5,000	760	4,240
1996	5,000	9,240	2,857	6,383
1997	5,000	11,383	3,208	8,175
1998	6,800	14,975	0	14,974
1999	5,000	19,975	7,001	12,974
2000	11,300	24,274	17,634	6,640
2001	9,672	16,312	8,845	7,467
2002	9,672	17,139	13,960	3,179
2003	10,672	13,851	4,660	9,191
2004	12,172	21,363	--	--

Note:
[a] Start of each new year

Bonneville Unit Water Operations. Baseline conditions in the Provo River were assumed to be full operation of the M&I System as presented in the 1979 M&I System EIS. The M&I System has been partially operating since 1996 after the Syar Tunnel in the Diamond Fork System became operational and up to 30,000 acre-feet per year of Bonneville Unit water has been allowed to flow down Sixth Water and Diamond Fork creeks into Utah Lake for exchange to Jordanelle Reservoir. When the Diamond Fork System is completed in 2004 and begins to operate in 2005, an average of 86,100 acre-feet per year of Bonneville Unit water will be delivered to Utah Lake for exchange to Jordanelle Reservoir. Therefore, when the ULS begins to operate in 2016, the M&I System will have been fully operating for approximately 10 years, which represents the baseline conditions for the ULS.

Past and ongoing human actions have had significant, detrimental effects on habitat availability, water quality and river flow timing, magnitude and duration. The combination of these non-CUP-associated activities has reduced June sucker populations to critically low levels. Several major actions have had and continue to have significant, detrimental effects on June sucker, including depletion of Provo River flows by priority water right holders, introductions of non-native sport fish into the Provo River and Utah Lake, habitat alteration, and other direct mortality. These past and ongoing actions have influenced the baseline conditions for June sucker in the Provo River.

Table 3-7 presents a summary of the June sucker collected on the Provo River during spawning runs from 1991 through 2003. During the years from 1991 to 1996, all of the spawning June sucker collected in the Provo River were wild. Starting in 1997, June sucker originating from a hatchery and released to the Provo River and Utah Lake were collected in addition to the wild fish. Starting in 2002, June sucker raised in Red Butte Reservoir and released to the Provo River and Utah Lake were collected in the Provo River during the spawning run. June sucker spawning data from 1998 through 2003 were provided by the Utah Division of Wildlife Resources (UDNR 2003b).

Table 3-7
Number of June Sucker Collected During Spawning Runs on the Provo River
Page 1 of 2

Year	Wild Fish	Hatchery Fish	Red Butte Reservoir Fish	Total Fish
1991	35	0	0	35
1992	46	0	0	46
1993	38	0	0	38
1994	67	0	0	67
1995	24	0	0	24
1996	29	0	0	29
1997	13	1	0	14

Table 3-7
Number of June Sucker Collected During Spawning Runs on the Provo River
Page 2 of 2

Year	Wild Fish	Hatchery Fish	Red Butte Reservoir Fish	Total Fish
1998	0	1	0	1
1999	0	1	0	1
2000	2	6	0	8
2001	2	4	0	6
2002	15	12	12	39
2003	34	23	59	116

Source:
UDNR 2003

Water for June Sucker Under the ULS Proposed Action. The following water quantities and sources comprise the water that would be released under the ULS Proposed Action to the lower Provo River for June sucker spawning and rearing flows:

- 2,875 acre-feet Northern Utah County 207 project savings
- 1,000 acre-feet Upper East Union and East River Bottom canals piping
- 290 acre-feet Timpanogos Canal piping
- 8,000 acre-feet Provo Reservoir Canal seepage loss savings or other future Section 207 water savings to be assigned to DOI

12,165 acre-feet total

An annual volume of 12,165 acre-feet of water for June sucker will be provided each year pursuant to existing contracts. This amount is in addition to and separate from the average of 16,000 acre-feet to be delivered to the lower Provo River through ULS facilities to help achieve the goal of establishing a year-round minimum flow of 75 cfs in the lower Provo River.

Operation Effects.

Methods of Analysis. The Instream Flow Incremental Methodology (IFIM) was used in this study to assess the effects of flow manipulation in the Provo River on fish habitat (Radant et al 1987; Olsen et al 2003). IFIM is composed of a suite of analytical procedures that describe habitat features resulting from a specific flow scenario. One of these procedures is the microhabitat model component of the IFIM known as the Physical Habitat Simulation (PHABSIM). In this study, the PHABSIM component of the IFIM was used to predict the amount of fish habitat for spawning June sucker and other fish species under a range of possible flows in the Provo River. The major premise of the PHABSIM procedure is that the suitability of a species' habitat can be described by

measuring selected physical variables in a stream. To address this assumption, extensive research was conducted for June sucker and other aquatic species in the Provo River to measure their requirements for depth, velocity and substrate (Radant et al 1987). Once these values were determined, the biological data was linked with the hydraulic properties of the river (depth and velocity at hundreds of individual points within a two-dimensional mesh developed by a detailed hydraulic model) to estimate the relationship between habitat availability and flow within study reaches.

Selected habitat parameters for the PHABSIM analysis were measured at two locations in the Provo River to evaluate June sucker habitat availability. Since June sucker only have access to habitat in the Provo River below Tanner Race Diversion for spawning, potential habitat was evaluated based on study sites taken at two locations (Site 1 and Site 2c) in the approximately 5 miles of the Provo River below the Tanner Race Diversion. The study station at Site 1 was situated downstream of the Fort Field Diversion. The study station at Site 2c was located between the Fort Field Diversion and Tanner Race Diversion.

During habitat modeling for the Provo River, fish species with similar habitat requirements were grouped together into eight distinct habitat niches (Olsen et al 2003). In this analysis, habitat requirements for the spawning life stage of June sucker was best represented by the moderate/mid-depth habitat niche, and the larval/young-of-year life stages were assigned to the backwater/edge and slow/shallow niches (Olsen et al 2003). Although fish habitat changes were predicted for many fish species in the Provo River, only habitat niche results related to the spawning, larval, and young-of-year life stages of June sucker are presented herein because of the regulatory status of this species. Predicted changes in habitat within these three habitat niches were used to indicate a potential change in June sucker spawning and/or rearing habitat in both reaches from Utah Lake to the Tanner Race Diversion.

Two modeling approaches were used during this study to estimate habitat availability for June sucker. In the first approach, a PHABSIM model was run for the spawning life stage of June sucker that included habitat suitability for depth, velocity and substrate. Assumptions of the IFIM model are habitat-based and do not consider the presence and influence of non-native fish in the habitat. In the second approach, habitat niche modeling was conducted based only on depth and velocity habitat suitability criteria (Olsen et al 2003). The habitat niche modeling approach was preferred for June sucker because this species has demonstrated plasticity in the types of spawning substrate they use for reproduction (Crowl 2003).

After the integration of biological and physical habitat components, modeling projected the amount of habitat available to June sucker in terms of Weighted Usable Area (WUA). For these purposes, WUA can be defined as the total area per unit length of river that would be expected to provide usable habitat for a selected habitat niche. Habitat was modeled as WUA (ft^2) per 1,000 linear feet of stream. In this analysis, a modeled average monthly flow generated a monthly WUA value. For a record of 50 years (1950-1999),

May, June (spawning) and July (larval/young of year) average monthly flows under a project alternative were used to predict a corresponding value of monthly WUA for each modeled habitat niche. An average WUA for each month over the period of record (1950-1999) was then calculated for alternative comparison. WUA was the measure of habitat used to assess potential impacts to June sucker under the project alternatives. Predicted habitat for June sucker at Site 2c was extrapolated to the reach of the Provo River between Tanner Race Diversion and Fort Field Diversion. Modeled habitat for June sucker at Site 1 was extrapolated for the reach of the Provo River between Fort Field Diversion and Utah Lake.

Effects. Changes in hydrology in Utah Lake under the Proposed Action would be within the current range of operations. It is therefore assumed that there would be no effects on adult June sucker individuals or populations in Utah Lake. Hydrologic changes that could affect June sucker would occur in the lower Provo River.

The average monthly flows in the Provo River downstream of the Murdock Diversion under the Proposed Action represent a projected increase compared to baseline conditions (Table 3-8 and Table 3-9). Under the Proposed Action, the reach of the Provo River between Murdock Diversion and Fort Field Diversion would receive flow increases in all months (Table 3-8). Flows in this reach were used to predict habitat availability for June sucker between Tanner Race Diversion and Fort Field Diversion. The reach of the Provo River between Fort Field Diversion and Utah Lake would receive higher flows compared to baseline conditions in all months, with the highest proportional flow increases projected to occur in August and September (Table 3-9). Increased flow during May, June (spawning) and July (larval/young-of-year/out migration) in both of these reaches was designed to benefit June sucker spawning and early life history. In-stream flows would be targeted during summer months to support incubation and facilitate out-migration of juvenile suckers to Utah Lake.

Table 3-8

Estimated Average Flow (cfs) and Percent Change in Provo River from Murdock Diversion Dam to Fort Field Diversion for the Spanish Fork Canyon-Provo Reservoir Canal Alternative Compared to Baseline Flows (average water year)

	Month											
Flow Condition	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Baseline	88	72	59	55	70	147	199	476	527	182	149	134
Proposed	129	90	77	74	86	158	251	553	563	231	196	182
% Change	47	25	31	35	23	7	26	16	7	27	32	36

Table 3-9
Estimated Average Flow (cfs) and Percent Change in Provo River from Fort Field Diversion to Utah Lake for the Spanish Fork Canyon-Provo Reservoir Canal Alternative Compared to Baseline Flows (average water year)

	Month											
Flow Condition	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Baseline	32	76	56	51	64	142	168	347	374	42	4	6
Proposed	77	94	75	69	81	153	222	445	433	110	61	62
% Change	141	24	34	35	27	8	32	28	16	162	1,425	933

In the reach of the Provo River between Tanner Race Diversion and Fort Field Diversion (Site 2c), predicted spawning habitat for June sucker during May-June would be higher under the Proposed Action. In this alternative, the moderate/mid-depth habitat niche would increase 192 percent in May and 122 percent in June compared to baseline conditions (Table 3-10). The Fort Field Diversion is a partial passage barrier during June sucker spawning. During very high water years, adults can utilize 1.9 miles of habitat up to the Tanner Race diversion dam. In summary, monthly average flows in May and June described under the Proposed Action would produce significant increases in the amount of June sucker spawning habitat in the reach of the Provo River between Tanner Race Diversion and Fort Field Diversion compared to baseline conditions. Furthermore, the total amount of available spawning habitat in the Provo River would slightly increase under the Proposed Action.

Table 3-10
PHABSIM Predictions for Moderate/Mid-depth Habitat Niche under Proposed Action Flows in the Provo River from Tanner Race Diversion to Fort Field Diversion [a,b,c]

Flow Scenario	Month	Average Monthly Flow (cfs)	Moderate/Mid-Depth Habitat Niche	
			Average WUA (ft^2)	Percent Change from Baseline
Baseline Condition	May	352	3,198	--
	June	381	3,409	--
Proposed Action	May	441	9,326	192
	June	429	7,565	122

[a] WUA results were expressed as square feet per 1,000 feet of river
[b] Results from Site 1 were extrapolated to represent habitat throughout this Provo River reach
[c] Average monthly flow and average WUA calculated over period of record (1950-1999)

Additional habitat niche modeling in the reach of the Provo River between Tanner Race Diversion and Fort Field Diversion indicated that predicted backwater/edge and

slow/shallow habitat in July would decrease under the Proposed Action compared to baseline conditions.

The 50-year average WUA values for the backwater/edge habitat niche would decrease by 61 percent under the Proposed Action compared to baseline conditions (Table 3-11). Projected habitat for the slow/shallow habitat niche would decrease by 8 percent under the Proposed Action. Although the backwater/edge habitat niche was predicted to experience a large proportional decrease in predicted habitat, the actual magnitude of the decrease was relatively small (2,007 ft^2) compared to the amount of habitat available in the slow/shallow habitat niche (14,637 ft^2).

June sucker in their early life history stages would be expected to use habitat in both slow-flow niches. The total habitat decrease in both niches was predicted to be 3,226 ft^2 under the Proposed Action, with total available habitat in both of these niches decreased by approximately 20 percent compared to baseline conditions. Predicted decreases in habitat for early life stages may be offset by gains in spawning habitat for adult June sucker, particularly since available literature indicates larval June sucker drift downstream immediately after emerging (Modde and Muirhead 1990).

Table 3-11
PHABSIM Predictions for Slow Flow Habitat Niches in July Under Proposed Action Flows in the Provo River from Tanner Race Diversion to Fort Field Diversion [a,b,c]

Flow Scenario	July Average Monthly Flow (cfs)	Backwater/Edge Habitat Niche		Slow/Shallow Habitat Niche	
		WUA (ft^2)	Percent Change from Baseline	WUA (ft^2)	Percent Change from Baseline
Baseline	57	3,311	--	15,856	--
Proposed Action	58	1,304	-61	14,637	-8

[a] WUA results were expressed as square feet per 1,000 feet of river
[b] Results from Site 1 were extrapolated to represent habitat throughout this Provo River reach
[c] Average monthly flow and average WUA calculated over period of record (1950-1999)

In the lower Provo River from Fort Field Diversion to Utah Lake (Site 1), simulated habitat during May-June (spawning niche) would be higher under the Proposed Action, with the moderate/mid-depth habitat niche increasing 96 to 181 percent compared to baseline conditions (Table 3-12). Habitat in this niche was projected to increase 181 percent in May and 96 percent in June. Under the Proposed Action, the increased flows would produce significant increases in June sucker spawning habitat in the reach of the Provo River between Fort Field Diversion and Utah Lake.

Table 3-12
PHABSIM Predictions for Moderate/Mid-depth Habitat Niche under Proposed Action Flows in the Provo River from Fort Field Diversion to Utah Lake [a,b,c]

Flow Scenario	Month	Average Monthly Flow (cfs)	Moderate/Mid-Depth Habitat Niche	
			Average WUA (ft^2)	Percent Change from Baseline
Baseline Condition	May	347	6,570	--
	June	374	7,011	--
Proposed Action	May	445	18,467	181
	June	433	13,763	96

[a] WUA results were expressed as square feet per 1,000 feet of river
[b] Results from Site 1 were extrapolated to represent habitat throughout this Provo River reach
[c] Average monthly flow and average WUA calculated over period of record (1950-1999)

In general, hydrologic changes in July under the Proposed Action would have potential positive effects on the early life history stages of June sucker. Projected flow increases during July of 68 cfs would aid the dispersal of June sucker larvae as they drift downstream to Utah Lake. Habitat modeling of the backwater/edge and slow/shallow habitat niches in July from 1950 to 1999 indicated another benefit to early life stages of June sucker. Additional flow to this reach under the Proposed Action resulted in modeled average monthly flows for July that never declined to zero. Under baseline conditions, 31 of 50 modeled July average monthly flows would be zero. Based on historical flows and habitat modeling during the month of July, a significant benefit to the early life history stages of June sucker would be achieved under the Proposed Action because water would be available in the Provo River downstream of Fort Field Diversion every year.

Habitat niche modeling over the entire period of record indicated that backwater/edge and slow/shallow habitat niches showed negligible changes in the Proposed Action compared to baseline conditions (Table 3-13). Average WUA values for these niches would change less than two percent over the entire time period. Although 50-year averages of flow and available habitat in July would experience minor changes between baseline conditions and the Proposed Action, a significant benefit to the early life history stages of June sucker would be achieved under the Proposed Action because water would be available in the Provo River downstream of Fort Field Diversion every year.

Table 3-13
PHABSIM Predictions for Slow Flow Habitat Niches in July Under Proposed Action Flows in the Provo River from Fort Field Diversion to Utah Lake [a,b,c]

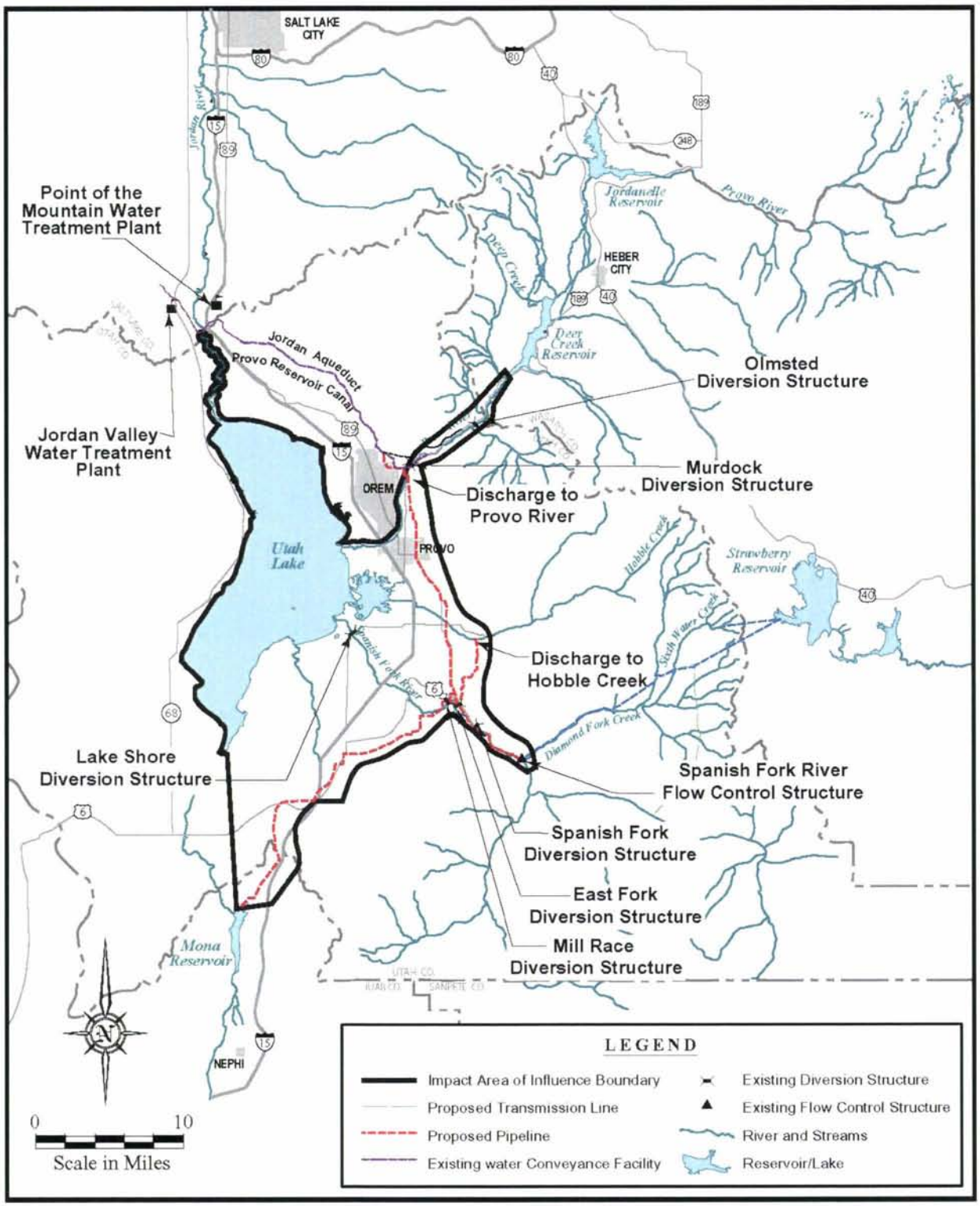
Flow Scenario	July Average Monthly Flow (cfs)	Backwater/Edge Habitat Niche		Slow/Shallow Habitat Niche	
		WUA (ft^2)	Percent Change from Baseline	WUA (ft^2)	Percent Change from Baseline
Baseline	57	9,647	--	16,885	--
Proposed Action	58	9,638	No Change	17,079	1

[a] WUA results were expressed as square feet per 1,000 feet of river
[b] Results from Site 1 were extrapolated to represent habitat throughout this Provo River reach
[c] Average monthly flow and average WUA calculated over period of record (1950-1999)

Based on modeling results for all three habitat niches used by June sucker in the Provo River, total available habitat under the Proposed Action would significantly increase compared to baseline conditions. Habitat niche modeling in both reaches of the Provo River indicated that the moderate/mid-depth habitat niche would experience significant increases under the Proposed Action, although predicted habitat increases in the moderate/mid-depth habitat niche could cause some indirect negative effects on June sucker by improving habitat suitability for predatory fish species, such as brown trout, white bass and walleye. In contrast to moderate flow habitats, slow water habitats were projected to decrease significantly under the Proposed Action in the reach between Tanner Race Diversion and Fort Field Diversion, and less significantly in the reach between Fort Field Diversion and Utah Lake compared to baseline conditions. In both reaches of the Provo River, the small magnitude of projected habitat decreases for early life stages would be offset by large predicted habitat gains for spawning June sucker. July flow increases in both reaches of the Provo River would provide a benefit to young-of-year June sucker by restoring the hydrograph to a more natural condition.

Hobble Creek June Sucker Commitment. Information on Hobble Creek was not included in the 1988 DPR because the proposed plans did not affect that resource. The ULS Proposed Action would provide supplemental in-stream flows for potential June sucker recovery actions and game fish habitat. Map 3-8 shows the location of Hobble Creek in Utah County relative to the Spanish Fork River (See Table 2-1, Environmental Commitment No. 84).

Overview of Hobble Creek. Hobble Creek originates in the canyons of the Wasatch Front in northern Utah. Hobble Creek discharges to Utah Lake near the City of Springville. As the creek descends into the City of Springville, the majority of the stream is surrounded by private land (UDNR 2003a). Irrigation diversions and dams are common in Hobble Creek below the small flood control reservoir in the mouth of Hobble Canyon (UDNR 2003a). In



Map 3-8
Location of Hobble Creek in Utah County

Hobble Creek below the reservoir, bank vegetation is very dense and grown over the stream in residential areas. As the creek flows west toward Utah Lake through Springville, Hobble Creek is confined in a rectangular channel. Downstream of Springville, the creek flows through agricultural land and industrial areas and streamside vegetation decreases. Riparian vegetation consists of cottonwood, willow, dogwood, rose, and box elder (UDNR 2003a).

The reach of Hobble Creek downstream of the Mapleton Lateral is cobble and gravel dominated, and the lower reach is sand dominated with small gravel sub-dominant. Median (D_{50}) sizes of surface substrate decreased from about 51 mm upstream, to 23 mm at a middle reach cross-section, to less than 1mm at a lower cross-section. Field geomorphology indicated that more than 90 percent of banks surveyed in upper and lower Hobble Creek are stable. In addition, sediment modeling indicates that bedload transport in Hobble Creek is initiated when flows exceeded 95 cfs.

Hobble Creek supports brown trout populations (UDNR 2003a). Bonneville cutthroat trout and rainbow trout are found in the headwater reaches of Hobble Creek (FWS 2001). Before settlement of Utah valley, Hobble Creek provided suitable spawning habitat for June sucker (FWS 1999).

Remnant populations of Bonneville cutthroat trout have been documented in the right and left forks of upper Hobble Creek. These populations are upstream of the impact area of influence and several miles above a small flood control dam in the mouth of Hobble Canyon east of Springville, Utah.

Based on Utah Division of Wildlife Resources fisheries surveys conducted in 1998 and updated Binns HQI Model II results, Hobble Creek above Kolob Park in Springville, Utah has an estimated trout standing crop of 10 pounds per acre with a total biomass of 56 pounds, and lower Hobble Creek (Kolob Park to Utah Lake) has an estimated standing crop of 15 pounds per acre and a total biomass of 132 pounds.

Spawning cutthroat trout prefer clear, cold, and shallow riffles with course gravel substrates (Sigler and Sigler 1987). These habitats were historically most prevalent upstream of the interface between the river and backwater from Utah Lake. Reconnaissance surveys of channel geomorphology indicated that gravel/cobble habitat is available upstream of lowest surveyed reach, although the quality of the spawning gravel increased in upper reaches. The prevalence of sand and silt in the lowest Hobble Creek reaches indicated sub-optimal or unsuitable spawning habitat for trout.

Supplemental In-stream Flows for Game Fish. Under baseline conditions, monthly average flows in Hobble Creek range from 1 to 109 cfs with the peak average monthly flow occurring in May (Table 3-14). Under the Proposed Action, additional water would be delivered to Hobble Creek. This additional water would be supplied to enhance potential June sucker spawning habitat in lower Hobble Creek and would result in increased flows in Hobble Creek in all months. The greatest proportional flow increases would occur from August to October with increases greater than 100 percent. During April through early June, flows would be

sustained above 85 cfs. Projected flows in May would average 145 cfs and likely would be accompanied by bedload transport.

Table 3-14
Estimated Baseline and Proposed Monthly Average Flow (cfs) in Hobble Creek Under the ULS Proposed Action

	Month											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Baseline	7	25	23	22	26	38	60	109	38	4	1	1
Proposed	20	36	33	32	35	47	100	145	65	16	13	11

Higher springtime flows would increase total available aquatic habitat and might benefit game fish in Hobble Creek. Standing crop estimates from the Binns HQI Model II indicated that game fish biomass would increase by 344 pounds per acre in upper (Mapleton-Springville Lateral Discharge to Kolob Park in Springville) Hobble Creek (Table 3-15). Total biomass was estimated to increase by 1,926 pounds in upper Hobble Creek. In the lower section (Kolob Park in Springville to Utah Lake) of Hobble Creek, standing crop estimates from the Binns Model II indicated that game fish biomass would increase by 388 pounds per acre. Total biomass was estimated to increase by 3,414 pounds in lower Hobble Creek. These increases reflect improved flow in late summer, reductions in annual stream flow variation, lower water temperatures, decreased nitrate concentrations, and improved substrate conditions. These predictions from the Binns HQI Model II suggest a significant increase in game fish numbers and/or biomass would be expected in Hobble Creek.

Supplemental In-stream Flows for June Sucker. Supplemental in-stream flows discharged into Hobble Creek provide an opportunity to establish a second spawning run of June sucker in Utah Lake. This section briefly describes the ULS commitment of providing supplemental in-stream flows for Hobble Creek as a conservation measure to aid in recovery of June sucker.

The June Sucker (*Chasmistes liorus*) Recovery Plan (FWS 1999) states as a criterion necessary for June sucker to be delisted the "establishment of an additional self-sustaining spawning run of June sucker in Utah Lake" which "will require adequate protection of in-stream flows and available habitat, as well as successful recruitment to the spawning run of June sucker naturally produced in the Lake..." In 2001, the JSRIP funded a study to examine the feasibility of establishing an additional spawning location in the Utah Lake system. All tributaries draining into Utah Lake were examined preliminarily and three tributaries, American Fork River, Hobble Creek, and Spanish Fork River were carried forward for detailed analyses (Stamp, et al 2002). Based on the results of the feasibility analysis, the JSRIP decided to pursue establishing an additional spawning run in Hobble Creek, primarily

Table 3-15
Hobble Creek Estimated Trout Standing Crop (lb/acre) and Biomass (lbs)[1]
Under the ULS Proposed Action

		Baseline Conditions		Proposed Action	
Water body	**Reach Description**	**Standing Crop (lbs/acre)**	**Biomass (lbs)**	**Standing Crop (lbs/acre)**	**Biomass (lbs)**
Hobble Creek Above Kolob Park in Springville					
Reach 1	Mapleton – Springville Lateral Discharge to Kolob Park in Springville	10	56	354	1,982
Hobble Creek Below Kolob Park in Springville					
Reach 1	Kolob Park in Springville to Utah Lake	15	132	403	3,546
Total			**188**		**5,528**

[1]Standing crop and biomass predictions rounded to nearest pound

because of the amount of suitable spawning habitat, the high quality of nursery habitat available where Hobble Creek enters Provo Bay, depths and velocities over spawning beds that are similar to those observed in the Provo River, and opportunities for securing necessary flows through the ULS project.

However, detailed PHABSIM modeling has not been performed for Hobble Creek; therefore, habitat niche analysis equivalent to the Provo River is not possible. As stated in the FEIS, Chapter 3, Section 3.9.8.2, other elements of the JSRIP (i.e., removal of beaver dams, Hobble Creek channel modifications, etc.) would need to be implemented before increased flows, per se, would affect June sucker spawning in Hobble Creek.

Figure 3-4 shows the average monthly dry-year flow in Hobble Creek under the ULS Proposed Action. About 4,000 acre-feet of water would be provided each year to Hobble Creek as a firm supply (without supplement) shown in Figure 3-4. This firm supply would be supplemented in dry years with Bonneville Unit water through the Mapleton-Springville Lateral Pipeline discharged to Hobble Creek to meet the target flows shown in Figure 3-4. The Bonneville Unit water would flow down Hobble Creek to Utah Lake for exchange to Jordanelle Reservoir.

Figure 3-5 shows the average monthly flow in Hobble Creek under the ULS Proposed Action. During an average year, the natural flow during the June sucker spawning and rearing period plus the firm supply of 4,000 acre-feet would meet the target flows for June sucker in Hobble Creek.

Figure 3-6 shows the average wet-year flow in Hobble Creek under the ULS Proposed Action. During a wet year, the natural flow and firm supply of 4,000 acre-feet would exceed the target flows for June sucker in Hobble Creek.

One shortcoming of Hobble Creek for establishing a spawning run is a disconnection between the mouth of the stream and Provo Bay that would limit access of adult June sucker and the transportation of larval June sucker to suitable rearing habitat. In 2002, the JSRIP funded a study to investigate and develop habitat enhancement concepts for lower Hobble Creek. A final report of this study's findings has been submitted to the JSRIP Technical Committee (Stamp et al 2003). Flows that would be provided through the ULS would be one necessary component toward meeting the delisting criterion referenced earlier. To fully meet this criterion, the JSRIP is pursuing habitat enhancement opportunities and developing concepts for nonnative fish control.

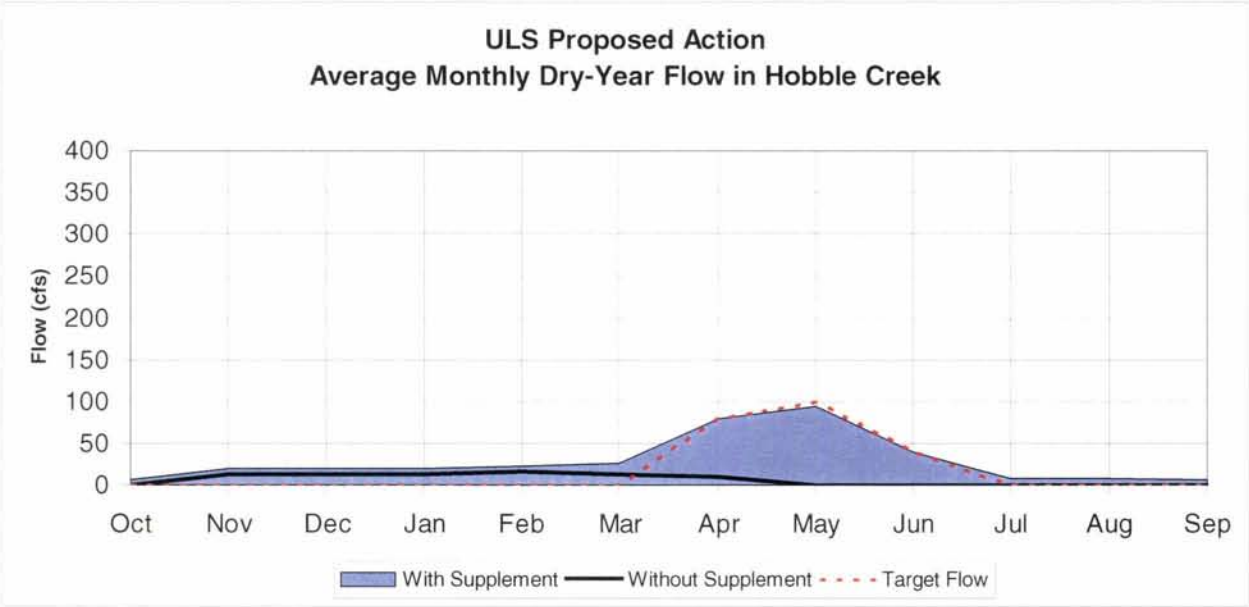


Figure 3-4
ULS Proposed Action Average Monthly Dry-Year Flow in Hobble Creek

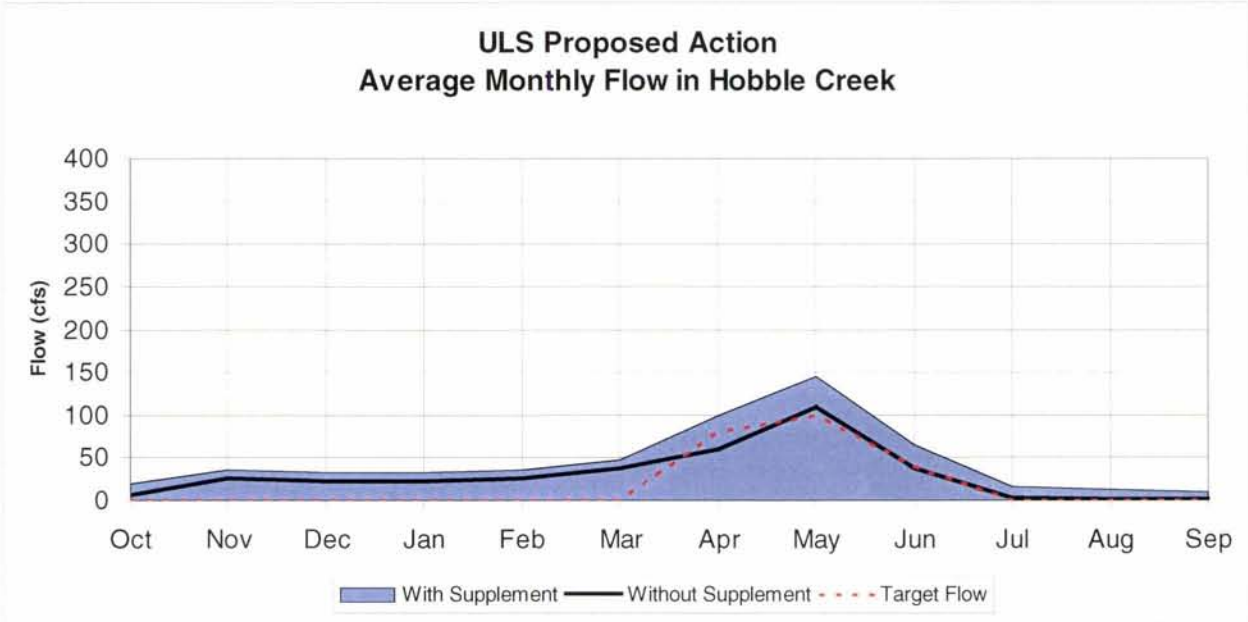


Figure 3-5
ULS Proposed Action Average Monthly Flow in Hobble Creek

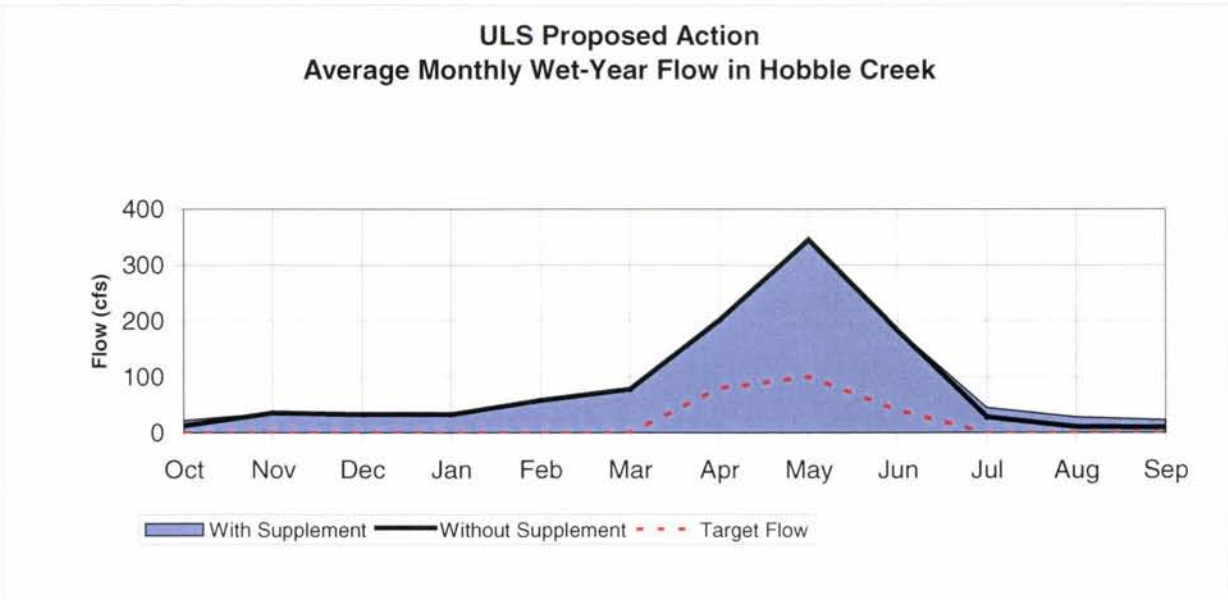


Figure 3-6
ULS Proposed Action Average Monthly Wet-Year Flow in Hobble Creek

PART 5: OVERVIEW OF FISH, WILDLIFE AND RELATED RECREATION PROGRAMS ASSOCIATED WITH THE DIAMOND FORK AND SPANISH FORK WATERSHEDS AND SOUTHERN UTAH COUNTY

This part presents the fish and wildlife mitigation and conservation measures associated with the completion of Bonneville Unit components in the Diamond Fork watershed, portions of Spanish Fork watershed, and in southern Utah County. The areas covered contain the following Bonneville Unit systems. (1) Diamond Fork System for transbasin diversion of water from Strawberry Reservoir; and (2) Utah Lake Drainage Basin Water Delivery System (ULS) for distribution of water to southern Utah County communities and to Hobble Creek for the endangered fish species, June sucker.
Part 5 is divided into three main topics.

- Overview of Diamond Fork and Spanish Fork Aquatic Resources
- Elements of Diamond Fork Creek, Spanish Fork River and Hobble Creek Fish, Wildlife and Recreation Programs
- Endangered Species and Commitments

Overview of Diamond Fork and Spanish Fork Aquatic Resources

Revisions in the Bonneville Unit Plan. Substantial revisions have been made in the Bonneville Unit plan within the Diamond Fork and Spanish Fork watersheds since the 1988 DPR. The Diamond Fork System was reformulated four times, as described in Chapter 4 of the 2004 DPR. The first reformulated version of the Diamond Fork Project was described in the Diamond Fork System 1990 Final Supplement to the Final EIS and 1990 Record of Decision (ROD), and a subsequent 1995 ROD. This plan substantially reduced the power generation of the Diamond Fork System and included the Sixth Water Aqueduct, Last Chance Powerplant, conveyance of Bonneville Unit water down Sixth Water Creek, Monks Hollow Dam, Reservoir and Powerplant, Diamond Fork Pipeline, and Diamond Fork Powerplant. The 1990 ROD approved the Recommended Plan, and the 1995 ROD approved construction of the Diamond Fork Pipeline as part of the 1990 reformulated Diamond Fork System. The Sixth Water Aqueduct and Diamond Fork Pipeline were subsequently constructed, with the remainder of the Diamond Fork System to be further reformulated. The second reformulation was covered in the 1998 Spanish Fork Canyon-Nephi Irrigation (SFN) System Draft EIS, which included completion of the Diamond Fork System by constructing the Sixth Water Siphon, Tanner Ridge Tunnel, Diamond Fork Siphon, Red Mountain Tunnel, and Red Hollow Pipeline, which would connect the existing Sixth Water Aqueduct to the existing Diamond Fork Pipeline, in addition to irrigation features that would be constructed throughout southern Utah County and eastern Juab County comprising the SFN System. The SFN Draft EIS was discontinued in June 1999 by the Joint-Lead Agencies after receiving substantial and significant review comments on the SFN portion of the Draft EIS. The Joint-Lead Agencies then prepared the Diamond Fork System 1999 Final Supplement to the Final EIS, incorporating the same features of the Diamond Fork System as had been included in the SFN Draft EIS, and the 1999 ROD was signed approving completion of the Diamond Fork System (CUWCD 1999c). The 1999 Diamond Fork System Final Supplement to the Final EIS eliminated the power plants but did not preclude future opportunities to develop hydropower at

certain facilities in the Diamond Fork System. Subsequent to completing the 1999 Final Supplement, the U.S. Congress passed a law requiring value engineering. Following value engineering on the approved 1999 Proposed Action, the Joint-Lead Agencies again reformulated the project and prepared the 2000 Final EA for the Diamond Fork System Proposed Action Modifications on recommended modifications from the value engineering review, replacing the two new siphons and tunnels with one long tunnel (Upper Diamond Fork Tunnel), Upper Diamond Fork Shaft, and connecting pipelines. The ROD was signed in June 2000 and construction commenced on the reformulated Diamond Fork System in October 2000. Initial construction of the Upper Diamond Fork Tunnel was nearly completed in October 2001 when a partial collapse occurred in a fault zone near the upper end of the tunnel. The collapsed portion of the tunnel was abandoned because of safety and operation concerns, and the Joint-Lead Agencies reformulated the remaining features of the project and prepared the Diamond Fork System 2002 Final EA for the Proposed Action Modifications. The ROD was signed on the final reformulated Diamond Fork System in April 2002. The 2002 Final EA for the Proposed Action Modifications evaluated impacts of replacing the collapsed tunnel with the Sixth Water Connection to the Tanner Ridge Tunnel, Tanner Ridge Tunnel, Upper Diamond Fork Pipeline, Upper Diamond Fork Flow Control Structure, Diamond Fork Shafts, and Aeration Chamber and Connection to Upper Diamond Fork Tunnel. Construction of the Diamond Fork System was completed in 2004.

Restoration of lower Diamond Fork and Sixth Water Creek from State Highway 6 to the Strawberry Tunnel outlet is a purpose of the Diamond Fork System of the Central Utah Project Completion Act (CUPCA) that is supported by the District, Department of the Interior and the Mitigation Commission, as well as by many other partners such as the U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), and Utah Division of Wildlife Resources (UDWR). One of the primary purposes for the Diamond Fork System is to reduce the excessive flows in Sixth Water Creek and the Diamond Fork River in order to allow for ecosystem restoration. As built and operated under CUPCA the Diamond Fork System will provide opportunities, through water management, to help achieve recovery of the Sixth Water and Diamond Fork Creeks riparian corridors. The Sixth Water/Diamond Fork ecosystem is not pristine. It has been severely impacted by the construction and operation of the Strawberry Valley Project for over 75 years. The construction of the Tanner Ridge Tunnel, Upper Diamond Fork Pipeline, Upper Diamond Fork Flow Control Structure, Diamond Fork Shafts, and Aeration Chamber and Connection to Upper Diamond Fork Pipeline, together with the other features of the Diamond Fork System, will lead to a substantial reduction of the excessive flows as the Diamond Fork System operates in the future. The extent to which ecosystem restoration can occur is in large measure dependent upon the quantities, timing and duration of flows to be released. Implementing hydrologic regimes that recover and maintain a diversity of aquatic and riparian habitats is a central tool in the restoration of riverine ecosystems.

The final system of the Bonneville Unit described in the 1988 DPR was the proposed Irrigation and Drainage (I&D) System. It was subsequently reformulated under CUPCA as the SFN System, and then abandoned after public and agency comments were received on the SFN Draft EIS. The Joint-Lead Agencies substantially reformulated the final system of the Bonneville Unit as the Utah Lake Drainage Basin Water Delivery System (ULS), which is described in Chapter 5

of the 2004 DPR. The ULS Draft EIS was issued by the Joint-Lead Agencies in March 2004. The ULS Proposed Action would have a buried pipeline in Spanish Fork Canyon along U.S. Highway 6 to convey Bonneville Unit water to the mouth of the canyon. From the mouth of Spanish Fork Canyon, one pipeline would convey water for delivery to southern Utah County cities, another would convey water for discharge to Hobble Creek, and a third would convey water through Mapleton, Springville, Provo and Orem to the enclosed Provo Reservoir Canal and the Jordan Aqueduct for delivery to water treatment plants in Salt Lake County. Two hydroelectric powerplants and a transmission line upgrade are proposed as part of the Proposed Action in the ULS Draft EIS.

These substantial revisions in the Bonneville Unit plan have led to corresponding changes in the fish, wildlife and related recreation programs for the Diamond Fork and Spanish Fork watersheds. Following is a detailed description of aquatic resources in the area affected by the reformulated systems of the Bonneville Unit.

Aquatic Resources in the Diamond Fork Watershed Under Bonneville Unit Operations. This section addresses beneficial changes in wild trout fisheries that occur under operation of the Diamond Fork System and the ULS. The information and analyses provided in this section have been summarized from the 1999 Diamond Fork System Final Supplement to the Final EIS (CUWCD 1999a) and the Supplement to the Definite Plan Report, Fish and Wildlife Resources Appendix (Reclamation 1988). The affected reaches include two in Sixth Water Creek and five in Diamond Fork Creek.

Sixth Water Creek Above Sixth Water Aqueduct. Diamond Fork System operation maintains the required minimum flows in Sixth Water and Diamond Fork creeks. Table 3-16 shows the flows predicted to occur in an average year, which were used in the Binns HQI analysis. These flows increase trout standing crop from the baseline condition of 213 pounds per acre to an estimated 356 pounds per acre (see Table 3-17). Part of this enhancement is derived from the increased proportion of streamflow from Strawberry Reservoir water, which has higher levels of nitrogen and phosphorus than local runoff waters. Results of the IFIM analyses indicate that the range of flows under the Diamond Fork System during all life cycles of brown and cutthroat trout increases habitat (UDNR 1998). Table 3-17 includes standing crop and fish biomass values from the 1988 DPR for comparison purposes and to document how the reformulation of the Bonneville Unit has affected aquatic resources.

Table 3-16
Average Monthly Flows Used in the Binns HQI Analysis for Sixth Water Creek and Diamond Fork Creek From Three Forks to Diamond Fork Creek Outlet Under the Diamond Fork System (cfs)

Stream Reach	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Sixth Water Creek (From Strawberry Tunnel to Sixth Water Aqueduct)												
Baseline (Post-1996)	6	6	6	6	6	7	14	21	11	7	6	6
Diamond Fork System	34	27	26	26	26	27	33	48	37	34	33	34
Sixth Water Creek (From Sixth Water Aqueduct to Three Forks)												
Baseline	34	10	9	8	9	11	35	121	242	288	225	122
Diamond Fork System	36	30	29	28	29	31	48	75	45	37	36	36
Diamond Fork Creek (From Three Forks to Diamond Fork Creek Outlet)												
Baseline	39	16	14	12	14	18	67	180	260	295	230	128
Diamond Fork System	42	36	33	32	34	38	80	134	64	45	42	42

Table 3-17
Estimated Wild Fish Production for Sixth Water Creek and Diamond Fork Creek Upstream From Diamond Fork Creek Outlet Under the Diamond Fork System

Stream Reach	1999 DF Average Width (ft)[a]	1988 DPR Standing Crop (lb/acre)	1999 DF Standing Crop (lb/acre)	1988 DPR Fish Biomass (lb/reach)	1999 DF Fish Biomass (lb/reach)	1999 DF Change From Baseline (lb/reach)
Sixth Water Creek (From Strawberry Tunnel to Sixth Water Aqueduct)						
Baseline	22[b]	21.6	213	478	3,333	
Diamond Fork System	25[b]	37.3	356	557	6,332	+2,999
Sixth Water Creek (From Sixth Water Aqueduct to Three Forks)						
Baseline	15[c]	20.6	72	273	471	
Diamond Fork System	16[c]	2.2	296	19	2,066	+1,595
Diamond Fork Creek Upstream of Three Forks (From Diamond Fork Creek Siphon to Three Forks)						
Baseline	13[d]	--	108	--	357	
Diamond Fork System	13[d]	--	108	--	357	0
Diamond Fork Creek Below Three Forks (From Three Forks to Diamond Fork Creek Outlet)						
Baseline	23[e]	3.6	72	28	510	
Diamond Fork System	26[e]	0	192	0	1,537	+1,027

[a]Average stream widths are estimated for brown trout production, which is favored over cutthroat trout production by the flows shown in Table 3-16, according to the results of IFIM studies prepared by Addley and Hardy (1998) and Utah Division of Wildlife Resources (UDNR 1998).
[b]Average stream width measured for IFIM study prepared by Utah Division of Wildlife Resources (UDNR 1998).
[c]Average stream width measured for sediment study prepared by U.S. Geological Survey (USGS 1991).
[d]Average stream width measured in field.

The 25 and 32 cfs minimum streamflows released from Strawberry Tunnel have lower average stream temperatures compared to baseline conditions. The average June through September temperatures range from 50°F to 55°F. These temperatures are within brown trout's optimum growth range of 46°F and 63°F (EPA 1973). Average stream temperatures in this reach do not exceed the maximum temperature standard established for a coldwater fishery in this reach.

Annual spring shutdown of all features except Syar Tunnel for inspection and maintenance has minimal impacts on aquatic resources in Sixth Water Creek above Sixth Water Aqueduct. The week-long inspection and maintenance shutdown normally occurs in April during spring runoff. Up to 35 cfs additional flow is released from Strawberry Tunnel for one week during seven dry

years over the 44-year period of hydrologic record to maintain CUPCA-mandated minimum streamflows of 60 cfs in Diamond Fork Creek below Diamond Fork Creek Outlet. This increases the Strawberry Tunnel discharge to an estimated maximum of 69 cfs in April of some years during the one-week inspection and maintenance shutdown. The estimated 69 cfs release is within the ranges of maximum winter habitat for brown and cutthroat trout (UDNR 1998).

The periodic one-day system shutdown to inspect the Syar Tunnel inlet gates during spring runoff has no effect on minimum flows in Sixth Water Creek. Minimum flows in Sixth Water Creek are met through delivery of flows through Strawberry Tunnel, using the new connection to the bypass pipe.

The annual fall inspection of Sixth Water Aqueduct every October results in minimal impacts on aquatic resources in Sixth Water Creek above Sixth Water Aqueduct. Up to 27 cfs additional flow is released from Strawberry Tunnel during the two-day shutdown to maintain minimum flows at Diamond Fork Creek Outlet. This increases the Strawberry Tunnel discharge to an estimated maximum of 61 cfs in October each year during the inspection and maintenance shutdown. The estimated 61 cfs release is within the ranges of maximum adult and juvenile habitat for brown and cutthroat trout, and within the range of maximum brown trout spawning habitat (UDNR 1998).

The periodic clamshell valve maintenance reduces minimum streamflows discharged from Strawberry Tunnel for two days following the irrigation season once every five to seven years. The flow in Sixth Water Creek above Sixth Water Aqueduct is temporarily reduced to about 6 cfs, comprised of Strawberry Tunnel seepage and natural flows. This reduction has short-term impacts on brown trout spawning and the juvenile and adult life stages of brown and cutthroat trout. The quantity of pools and remaining flows in this reach provides sufficient refuge habitat for juvenile and adult trout life stages. The two-day shutdown occurs at or near the beginning of the brown trout spawning period and could slightly delay selection of spawning sites and building of redds. The brown trout spawning period occurs in October and November, followed by up to four months of incubation.

Emergency operations involves release of up to 200 cfs to Sixth Water Creek from Strawberry Tunnel during May, which is when Bonneville Unit water is most needed to fill Utah Lake. Such emergency operations have less than a 1 percent chance of occurrence over the life of the project. The 200 cfs flow through Sixth Water Creek in May decreases cutthroat trout spawning habitat by 38 percent, decreases brown trout fry habitat by 29 percent and cutthroat juvenile habitat by 4.8 percent, and increases brown trout juvenile habitat by 25 percent (UDNR 1998). There is no change in habitat for adult cutthroat or brown trout.

Sixth Water Creek Below Sixth Water Aqueduct. The Diamond Fork System removes most irrigation flows from this reach and provides minimum flows of 32 and 25 cfs (summer/winter schedule) mandated by CUPCA (see Table 3-16, shown previously). These minimum flows reduce bank erosion and turbidity and, based on IFIM results, the new flow regime increases adult brown and cutthroat trout habitat (Addley and Hardy 1998). Beneficial levels of dissolved nutrients are provided by the hypolimnetic waters of Strawberry Reservoir. Trout standing crop

increases from 72 pounds per acre to an estimated 296 pounds (see Table 3-17, shown previously).

Water temperatures are similar to those described previously in the stretch of stream Sixth Water Creek above Sixth Water Aqueduct. Average stream temperatures in this reach do not exceed the maximum temperature standard established for a coldwater fishery in this reach.

Maintenance operations are the same as described for Sixth Water Creek above Sixth Water Aqueduct, except that the periodic clamshell valve maintenance causes no change in aquatic resources because the minimum streamflows are released from the Sixth Water Aqueduct outlet pipe during the two-day shutdown period.

Diamond Fork Creek From Three Forks to Diamond Fork Creek Outlet. This reach benefits from providing the 32 cfs and 25 cfs minimum flows exiting Sixth Water Creek (see Table 3-16). The IFIM results show that the Diamond Fork System flow regime results in a 283 percent increase in adult brown trout habitat (Addley and Hardy 1998), and 83 percent in juvenile brown trout habitat, while fry habitat declines 44 percent. The Diamond Fork System flows do not increase brown trout spawning habitat in this reach, but trout standing crop in this reach increases from the baseline estimate of 72 pounds per acre to 192 pounds under the Diamond Fork System (see Table 3-17).

Flow in Diamond Fork Creek below Three Forks under the Diamond Fork System favors brown trout production over cutthroat. Since brown trout are fall spawners, the flow during the fall is conducive to reproduction and egg maturation. Flow during the spring, when cutthroat trout spawn, does not result in the same level of predicted benefit compared to brown trout.

Strawberry Reservoir releases have average temperatures ranging from 52°F to 55°F from June through September (CUWCD1999b). These temperatures are basically the same as baseline conditions and are within optimum range for brown trout growth. Average stream temperatures in this reach do not exceed the maximum temperature standard established for a coldwater fishery in this reach.

Maintenance operations are the same as described for Sixth Water Creek above Sixth Water Aqueduct, except that the periodic clamshell valve maintenance causes no change in aquatic resources because the minimum streamflows are released from the Sixth Water Aqueduct outlet pipe during the two-day shutdown period.

Emergency operations involving release of up to 200 cfs to Sixth Water Creek from Strawberry Tunnel in May result in flows of about 300 cfs in this reach of Diamond Fork Creek, including the natural flows tributary to the reach. Such emergency operations have less than a 1 percent chance of occurrence over the life of the project. The 300 cfs flow through this reach of Diamond Fork Creek in May decreases cutthroat trout juvenile habitat by 13 percent, adult cutthroat trout habitat by 25 percent and adult brown trout habitat by 45 percent (Addley and Hardy 1998). Habitat for brown trout fry and juveniles and cutthroat spawning remains

unchanged from the Diamond Fork System under these flow conditions (Addley and Hardy 1998).

Diamond Fork Creek From Diamond Fork Creek Outlet to Spanish Fork River. The primary benefits of the Diamond Fork System in this reach are related to the following changes from the baseline conditions: 1) minimum flows of 80 cfs in summer and 60 cfs in winter; 2) lower temperatures; and 3) a change in erosion, sediment load and sedimentation due to the reduced flow regime. The effects of these changes on aquatic resources are discussed in the following paragraphs.

The Diamond Fork System flow regime restores Diamond Fork Creek flows to a more natural pattern of peak runoff in mid-May, with a subsequent gradual reduction in flows down to the summer minimum flow of 80 cfs (see Table 3-18). The IFIM study predicted that adult brown and cutthroat trout habitat from Red Hollow to the Spanish Fork River is maximized by flows in the range of 60 to 90 cfs and increases adult trout habitat by 311 percent over the baseline conditions in Segments 1 and 2 and 385 percent over baseline in Segment 3 (Addley and Hardy 1998). Spawning habitat increases 259 percent over baseline in Segments 1 and 2 and 61 percent over baseline in Segment 3. Estimated trout standing crops increases from 201 to 253 percent over baseline conditions for the three segments of this reach (see Table 3-19). Nutrient concentrations at optimal levels continue to be provided by the hypolimnetic waters of Strawberry Reservoir.

Average June through September temperatures in this reach range from 50°F to 55 °F. These temperatures are within the optimum growth range of 46°F and 63°F (EPA 1973) for brown trout. Diamond Fork System water temperatures are slightly lower than baseline conditions. Average stream temperatures in this reach do not exceed the maximum temperature standard established for a coldwater fishery in this reach.

Maintenance operations cause no changes on aquatic resources, except that minimum streamflows may not be met at Diamond Fork Creek Outlet during periodic shutdown of the Diamond Fork System when the Syar Tunnel inlet gates are closed for two days for inspection and maintenance. Streamflows at the Diamond Fork Creek Outlet are lower for two days than the CUPCA-mandated minimum flow in four years during the 44-year period of record. The periodic system shutdown (once every five to seven years) is conducted during a year when natural flows, plus the minimum streamflows from Sixth Water Creek, meet or exceed the minimum flow requirement at Diamond Fork Creek Outlet.

Emergency operations involving release of up to 200 cfs to Sixth Water Creek from Strawberry Tunnel in May result in flows of about 339 cfs in this reach of Diamond Fork Creek, including the natural flows tributary to the reach. Such emergency operations have less than a 1 percent chance of occurrence over the life of the project. The 339 cfs flow through this reach of Diamond Fork Creek in May decreases adult brown trout habitat by about 42 percent (Addley and Hardy 1998). All other life-stage habitats for brown and cutthroat trout remain unchanged from the Diamond Fork System under these flow conditions (Addley and Hardy 1998).

Table 3-18
Average Monthly Flows Used in the Binns HQI Analysis for Diamond Fork Creek From Diamond Fork Creek Outlet to Spanish Fork River (cfs) Under the Diamond Fork System

Stream Reach	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Baseline	39	16	14	12	14	18	67	180	260	295	230	128
Diamond Fork System	61	60	60	60	60	60	85	140	89	82	81	80

Table 3-19
Estimated Wild Fish Production for Diamond Fork Creek From Diamond Fork Creek Outlet to Spanish Fork River Under the Diamond Fork System

Stream Reach	1999 DF Average Width (ft)[a]	1988 DPR Standing Crop (lb/acre)	1999 DF Standing Crop (lb/acre)	1988 DPR Fish Biomass (lbs)	1999 DF Fish Biomass (lbs)	1999 DF Change From Baseline (lbs)
Diamond Fork Creek From Diamond Fork Creek Outlet to Diamond Campground						
Baseline	24	11.8	73	75[b]	276	
Diamond Fork System	29	57.2	247	311[b]	1,129	+853
Diamond Fork Creek From Diamond Campground to Brimhall Canyon						
Baseline	35	11.8	127	108[b]	1,185	
Diamond Fork System	37	57.2	382	450[b]	3,769	+2,584
Diamond Fork Creek From Brimhall Canyon to Spanish Fork River						
Baseline	32	10.1	70	371	950	
Diamond Fork System	45	56.7	247	1,742	4,715	+3,765

[a]Average stream widths are estimated for brown trout production, which is favored over cutthroat trout production by the flows shown in Table 3-18.
[b]Fish biomass value estimated from total pounds per reach from Diamond Fork Creek Outlet to Brimhall Canyon, as shown in the 1988 DPR Fish and Wildlife Appendix.

Aquatic Resources in the Spanish Fork Watershed Under Bonneville Unit Operations. This section addresses changes in wild trout fisheries that occur under Bonneville Unit operation in the Spanish Fork watershed downstream of the Diamond Fork Creek confluence. The information and analyses provided in this section have been summarized from the 2004 ULS Draft EIS (CUWCD 2004a) and the Supplement to the Definite Plan Report, Fish and Wildlife Resources Appendix (Reclamation 1988). Four reaches were analyzed for the Spanish Fork River.

Spanish Fork River From Diamond Fork Creek Confluence to Spanish Fork River Diversion. The Spanish Fork River conveys natural flows, SVP flows, and Bonneville Unit flows remaining from the minimum in-stream flows required in Sixth Water Creek and Diamond Fork Creek. The SVP water is diverted from the Spanish Fork River at the diversion dam. Table 3-20 shows the flows predicted to occur in an average year, which were used in the Binns HQI analysis. These flows increase trout standing crop from the baseline condition of 151 pounds per acre to an estimated 159 pounds per acre (Table 3-21). Fish biomass increases by an estimated 212 pounds over baseline conditions. Maintenance and emergency operations cause no measurable changes in trout standing crop or fish biomass in this reach of the Spanish Fork River.

Table 3-20
Average Monthly Flows Used in the Binns HQI Analysis for Spanish Fork River From Diamond Fork Creek Confluence to Lakeshore Diversion (cfs)

Stream Reach	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spanish Fork River (From Confluence of Diamond Fork Creek to Spanish Fork Diversion Dam)												
Baseline	158	191	201	215	248	285	425	740	645	546	457	258
ULS	134	130	124	125	138	171	296	578	452	356	305	180
Spanish Fork River (From Spanish Fork Diversion Dam to East Bench Diversion)												
Baseline	58	109	130	143	163	160	190	339	242	176	134	88
ULS	34	48	53	54	53	46	60	189	99	54	43	29
Spanish Fork River (From East Bench Diversion to Mill Race Diversion)												
Baseline	54	109	130	143	163	159	182	295	187	127	93	70
ULS	31	48	53	54	53	46	53	147	51	17	14	15
Spanish Fork River (From Mill Race Diversion to Lakeshore Diversion)												
Baseline	131	194	205	219	252	289	389	471	257	149	113	86
ULS	108	133	128	130	143	175	260	324	121	38	35	31

Table 3-21
Estimated Wild Fish Production for Spanish Fork River From Diamond Fork Creek Confluence to Lakeshore Diversion Under the Diamond Fork System

Stream Reach	2004 ULS Average Width (ft)[a]	1988 DPR Standing Crop (lb/acre)	2004 ULS Standing Crop (lb/acre)	1988 DPR Fish Biomass (lbs)	2004 ULS Fish Biomass (lbs)	2004 ULS Change From Baseline (lbs)
Spanish Fork River (From Diamond Fork Creek Confluence to Spanish Fork Diversion Dam)						
Baseline	52	0	151	0	4,002	
ULS (I&D System)	47	5.6	159	159	4,214	+212
Spanish Fork River (From Spanish Fork Diversion Dam to East Bench Diversion)						
Baseline	24	0	348	0	2,888	
ULS (I&D System)	22	1.5	365	6	3,030	+142
Spanish Fork River (From East Bench Diversion to Mill Race Diversion)						
Baseline	24	5.0	348	16	3,793	
ULS (I&D System)	22	1.6	305	13	3,325	-468
Spanish Fork River (From Mill Race Diversion to Lakeshore Diversion)						
Baseline	52	8.3	126	224	7,623	
ULS (I&D System)	50	0.5	63	20	3,812	-3,811

[a]Average stream widths are estimated from field data and HEC-RAS cross section data.

Spanish Fork River From Spanish Fork River Diversion to East Bench Diversion. The Spanish Fork River conveys natural flows and Bonneville Unit flows remaining from the minimum in-stream flows required in Sixth Water Creek and Diamond Fork Creek. Table 3-20 shows the flows predicted to occur in an average year, which were used in the Binns HQI analysis. These flows increase trout standing crop from the baseline condition of 348 pounds per acre to an estimated 365 pounds per acre (Table 3-21). Fish biomass increases by an estimated 142 pounds over baseline conditions. Maintenance and emergency operations cause no measurable changes in trout standing crop or fish biomass in this reach of the Spanish Fork River.

Spanish Fork River From East Bench Diversion to Mill Race Diversion. The Spanish Fork River conveys natural flows and Bonneville Unit flows remaining from the minimum in-stream flows required in Sixth Water Creek and Diamond Fork Creek. Table 3-20 shows the flows predicted to occur in an average year, which were used in the Binns HQI analysis. The reduced flows would decrease trout standing crop from the baseline condition of 348 pounds per acre to an estimated 305 pounds per acre (Table 3-21). Fish biomass decreases by an estimated 468 pounds from baseline conditions. Maintenance and emergency operations cause no measurable changes in trout standing crop or fish biomass in this reach of the Spanish Fork River.

Spanish Fork River From Mill Race Diversion to Lakeshore Diversion. The Spanish Fork River conveys natural flows and Bonneville Unit flows remaining from the minimum in-stream flows

required in Sixth Water Creek and Diamond Fork Creek. Table 3-20 shows the flows predicted to occur in an average year, which were used in the Binns HQI analysis. The reduced flows would decrease trout standing crop from the baseline condition of 126 pounds per acre to an estimated 63 pounds per acre (Table 3-21). Fish biomass decreases by an estimated 3,811 pounds from baseline conditions. Maintenance and emergency operations cause no measurable changes in trout standing crop or fish biomass in this reach of the Spanish Fork River.

Summary of Fishery Benefits Under Diamond Fork System and ULS Operations. Diamond Fork System operation increases trout populations in Sixth Water Creek and Diamond Fork Creek because of a more stabilized flow regime, less erosion and turbidity, and suitable water temperatures and water quality conditions. These conditions result in an estimated increase of 12,823 pounds (191 percent) in wild trout biomass in Diamond Fork Creek and Sixth Water Creek. ULS operations decrease trout populations in the Spanish Fork River because of reduced flows compared to baseline conditions. The reduced flows result in a decrease of 3,925 pounds (21 percent) in wild trout biomass in the Spanish Fork River. There is an overall net increase of 8,898 pounds (36 percent) in wild trout biomass under Diamond Fork System and ULS operations. Maintenance operations of the Diamond Fork System cause minimal decreases in trout spawning and rearing success throughout Sixth Water and Diamond Fork creeks, and there are no changes in aquatic resources in the Spanish Fork River under ULS maintenance operations. Emergency operations involving the release of 200 cfs from the Strawberry Tunnel for one month would cause short-term decreases in habitat for trout life stages in some affected reaches and short-term increases in habitat for trout life stages in other affected reaches. These short-term changes would not affect the long-term trout standing crop.

Elements of Diamond Fork Creek and Spanish Fork River Fish, Wildlife and Recreation Programs

The Mitigation Commission identified eight program elements in 1996 to encompass the environmental commitments of the 1988 DPR and subsequent plan revisions, and to incorporate the new provisions of CUPCA into a comprehensive fish, wildlife and recreation program for the watershed. The following comprise the program elements.

- Diamond Fork Area Assessment
- Acquisition of Angler Access
- Sixth Water Creek Aquatic and Riparian Restoration
- Diamond Fork Creek Aquatic and Riparian Restoration
- Water Quality and Temperature Monitoring
- Diamond Fork Campground and Recreation Facilities
- Diamond Fork System Mitigation

Diamond Fork Area Assessment. The Mitigation Commission and Uinta National Forest performed an area assessment similar to the area assessment described for the Strawberry/Duchesne program. The area assessment was performed to determine the condition of various natural resources in the area already affected by or to be affected by completion of the

Diamond Fork System and subsequent Bonneville Unit features on the Spanish Fork Ranger District of the Uinta National Forest, which comprise the majority of the land area surrounding the lands withdrawn by Reclamation and Department of the Interior for the Diamond Fork System. This assessment was completed in 2000. Resources at risk or not in a properly functioning condition were identified as well as opportunities to correct the trends of such resources. This document has continued to guide the development of other program plans in the Diamond Fork watershed.

Angler Access Acquisition. Three of the five miles committed for angler access along lower Diamond Fork Creek from the Uinta National Forest boundary to the confluence with the Spanish Fork River had been acquired as of the 1988 DPR (see Table 2-1, Environmental Commitment No. 35). Reclamation and the Forest Service entered into a management agreement for the lands in 1990 (Reclamation 1990). Following passage of CUPCA in 1992, Reclamation acquired the remaining 155 acres of land encompassing the remaining lowest two miles of Diamond Fork Creek. Several other minor acquisitions to consolidate ownership and access between the Diamond Fork Road and Diamond Fork Creek are being finalized. The Mitigation Commission, Reclamation and Forest Service entered into an interim management agreement for the property in 2000. Upon completion of initial developments and habitat improvements on the property, Reclamation will transfer administration of the lands to the Forest Service under a management agreement.

Sixth Water Creek Aquatic and Riparian Habitat Restoration. In the 1991 Fish and Wildlife Coordination Act report on the 1990 Diamond Fork System Final Supplement to the Final EIS, the FWS proposed that the feasibility of providing delivery of up to 49 cfs during the summer and 32 cfs during the winter to Sixth Water Creek be thoroughly explored to develop and implement appropriate restoration measures (see Table 2-1, Environmental Commitment No. 27). In 1992, CUPCA (Section 303(c)(1)(A)) required the project to provide minimum flows of 32 cfs during May thorough October, and 25 cfs during November through April, which have been met since 1996, thereby superseding this commitment.

Sixth Water Creek, a tributary to Diamond Fork, lies in a steep, narrow canyon that contains many active landslides. The narrow riparian zone of Sixth Water Creek consists of plant communities that are dominated by coyote willow, narrow-leafed cottonwood, river birch (*Betula occidentalis*), and Kentucky bluegrass (*Poa pratensis*) (Western Wetland Systems 1997). L. Gecy (1996) suggested that the riparian vegetation community has changed greatly in historic times due to the cumulative effects of grazing and water table decline from channel incision due to sustained high irrigation flows. The current plant community structure and diversity are below their potential and desired condition as most of the forested riparian areas lack a shrubby understory and are frequently dominated by a single species.

There was a further environmental commitment to develop and implement a stream channel rehabilitation plan and an aquatic and riparian habitat restoration and monitoring plan for Sixth Water Creek (see Table 2-1, Environmental Commitment Nos. 28, 31, 37, 38, and 40). CUPCA authorized additional funds for fish habitat improvement (Section 307(6)) and rehabilitation and development of watersheds and riparian habitat (Section 309(a)(2)) in both Sixth Water and

Diamond Fork creeks. The Mitigation Commission began this program in 1995, when it funded the Forest Service to develop a conceptual aquatic and riparian habitat restoration plan. The plan was developed with interagency input. The report documented baseline conditions, including channel pattern, geology and riparian vegetation, and completed a preliminary conceptual restoration plan (Trihey & Associates 1997a). This plan made recommendations for structural and hydraulic improvements of aquatic and riparian habitats within the Sixth Water riverine system. Implementing hydrologic regimes that recover and maintain a diversity of aquatic and riparian habitats is a central tool in the restoration of riverine ecosystems. The extent to which ecosystem restoration can occur is in large measure dependent upon the quantities, timing and duration of flows to be released. In-stream flow regimes of natural rivers are extraordinarily complex, and a thorough understanding of the Sixth Water Creek system is crucial. To evaluate flow regimes for their ability to promote suitable conditions for recovery of the ecosystem, detailed analyses of both the current and the historic physical conditions of the river are generally necessary. Because additional observations of the Sixth Water Creek ecosystem under Diamond Fork System and ULS operating conditions have not yet been obtained, such a detailed analysis was not possible for the purpose of this Definite Plan Report. The Mitigation Commission utilized the Trihey & Associates report along with information from Reclamation in-stream flow studies (unpublished file data, circa 1980), U.S. Geological Survey data, Utah Division of Wildlife Resources, Utah Division of Water Rights, the District, and conducted additional analyses to develop preliminary in-stream flow recommendations for Sixth Water Creek (Mitigation Commission 1997b) based solely on ecological considerations. The in-stream flow regimes described in Table 3-22 should be considered preliminary, and future analyses will be necessary to confirm and revise, if necessary, the findings outlined here. These rates are targets that might be met through a combination of natural flows and managed releases. These recommendations have not been analyzed with respect to whether or how often these flow regimes might be achievable under Diamond Fork System and ULS operating conditions and do not represent specific environmental commitments. The Mitigation Commission will re-convene the interagency team following completion of the Diamond Fork System in 2004, after which time high irrigation-influenced streamflows of the past will be removed from Sixth Water Creek. Monitoring will evaluate responses of stream and riparian conditions to reduced flow regimes. The preliminary flow recommendations in Table 3-22 may be subject to adjustment for the rehabilitation of aquatic and riparian habitats along the creek. It also will be necessary to coordinate closely with the District, DOI, and others to determine whether the ecosystem-based recommendations can be achieved under actual water delivery operations. Restoration planning will focus on natural responses to the extent possible, but will consider intervention with structural improvements to the stream and riparian areas if the Mitigation Commission determines they are necessary.

Table 3-22
Example of Managed Ecosystem Restoration Flow Regimes for Sixth Water Creek

Flow Regime	Peak Flow Magnitude (cfs)	Rate of change and/or comments	Frequency	Timing
Base flow (in-stream flow for fish)	32 & 25[a]	Mandated in-stream flows: CUPCA Section 303(c)(1)(A)	All years	All seasons
Peak of channel maintenance flow	50 to 80	Maximum rate of decline = 2 inches/day	2 in 3 years	Mid-May
Vegetation:				
Peak recruitment flow	80 to 150	Maximum rate of decline = 1 inch/day	1 in 3 years	Mid-May
Maintenance flow	32 & 25	32 cfs summer and 25 cfs winter	All years	All seasons
Maximum mid-summer flows	32 to 50[b]	Mid-summer maximum discharge	All years	July
Flood flows	220	220 cfs = 10-year event	1 in 10 years	Mid-May

Notes:
[a]These legislated values are much greater than natural base flows.
[b]Andrews and Nankervis (1995) suggest that in most streams, the initiation of channel bed sediment entrainment and transport occurs between 60 and 80 percent of bankfull flow. Mid-summer releases should not re-work channel bed sediments.

Diamond Fork Creek Aquatic and Riparian Habitat Restoration. In the 1990 Diamond Fork System Final Supplement to the Final EIS, the FWS proposed that the feasibility of providing and maintaining a minimum streamflow of 80 cfs in Diamond Fork Creek for the protection of the stream fishery (see Table 2-1, Environmental Commitment No. 27). In 1992, CUPCA (Section 303(c)(1)(B)) required the project to provide minimum flows of 80 cfs from May to September and 60 cfs from October to April at Monks Hollow, thereby superseding this commitment.

The Mitigation Commission committed to develop and implement a stream channel rehabilitation plan and an aquatic and riparian habitat restoration and monitoring plan for Diamond Fork Creek to measure responses to flow changes by operation of the reformulated Diamond Fork System (see Table 2-1, Environmental Commitment Nos. 28, 31, 37, 38, and 40). Implementing hydrologic regimes that recover and maintain a diversity of aquatic and riparian habitats is a central tool in the restoration of riverine ecosystems. The extent to which ecosystem restoration can occur is in large measure dependent upon the quantities, timing and duration of flows to be released. In-stream flow regimes of natural rivers are extraordinarily complex, and a

thorough understanding of the Diamond Fork Creek system is crucial. To evaluate flow regimes for their ability to promote suitable conditions for recovery of the ecosystem, detailed analyses of both the current and the historic physical conditions of the river are generally necessary.

CUPCA authorized additional funds for fish habitat improvement (Section 307(6)) and rehabilitation and development of watersheds and riparian habitat (Section 309(a)(2)) in both Sixth Water and Diamond Fork creeks. The Mitigation Commission began this program in 1995 when it funded the Forest Service to develop a conceptual aquatic and riparian habitat restoration plan. The report (Trihey & Associates 1997b) assessed baseline conditions, including channel pattern, geology and riparian vegetation, and completed a preliminary conceptual restoration plan. This plan made recommendations for structural and hydraulic improvements of aquatic and riparian habitats within the Diamond Fork riverine system. The planning area extended from Three Forks to the Spanish Fork River. The plan defined a range of alternative solutions for Diamond Fork Creek restoration considering potential interactive effects of the pending Spanish Fork Canyon-Nephi Irrigation System (now the Utah Lake Drainage Basin Water Delivery System), the Diamond Fork Pipeline, and watershed management objectives. The conceptual plan identified factors that created undesirable conditions and made recommendations for land resource management, structural, and hydrologic changes to rehabilitate the system. During the plan development phase, the Mitigation Commission worked closely with the Forest Service, consultants, and other resource agencies. The Mitigation Commission will re-organize the interagency team after the Diamond Fork System begins to operate in 2004 and the high irrigation-influenced streamflows are removed from Diamond Fork Creek. The monitoring program will evaluate responses of stream and riparian conditions to reduced flow regimes and will include assessment of spawning gravel conditions, and leatherside chub populations and habitat (see Table 2-1, Environmental Commitment Nos. 37 and 38). In 1997, the Mitigation Commission incorporated information from the Trihey report, along with information from Reclamation in-stream flow studies (unpublished file data, circa 1980), U.S. Geological Survey data, Utah Division of Wildlife Resources information, and Utah Division of Water Rights data, and conducted additional analyses to develop preliminary in-stream flow recommendations for Diamond Fork Creek (Mitigation Commission 1997b) based solely on ecological considerations. Table 3-23 shows an example of flow regimes for lower Diamond Fork Creek that might be recommended for maintenance, restoration and enhancement of aquatic and riparian habitat along lower Diamond Fork Creek. These flow rates are preliminary and may be subject to adjustment following further monitoring and study by the interagency team. The rates represent targets that might be met through a combination of natural flows and managed releases. These recommendations have not been analyzed with respect to whether or how often these flow regimes might be achievable under Diamond Fork System and ULS operating conditions. It will be necessary to coordinate closely with the District, DOI, and others to determine whether the ecosystem-based recommendations can be achieved under actual water delivery operations.

Table 3-23
Example of Managed Ecosystem Restoration Flow Regimes for Lower Diamond Fork Creek

Flow Regime	Flow Magnitude (cfs)	Comments and\or Rate of Change	Frequency	Timing
Base flow (maintenance flows)	80 and 60	80 cfs summer and 60 cfs winter	all years	all seasons
Peak of channel maintenance flow	240	Rate of flow decline = 2 inches/day, but the maximum rate of 2 inches/day should not occur on successive days.	2 in 3 years	mid May
Vegetation: (1) peak recruitment flow (2) year-round maintenance flow	240 to 500 80 and 60	Maximum rate of decline = 1 inch/day 80 cfs summer and 60 cfs winter	1 in 3 years all years	mid May all seasons
Maximum summer flows	240	instantaneous peak; managed irrigation flow	2 in 3 years	mid May
Maximum sustained flows	170	average weekly flows	Irrigation season	summer
Natural flood flows	480 and 630	e.g., 480 cfs = 10 year event; 630 = 25 year event	10- and 25-year recurrence	mid May

Water Quality and Temperature Monitoring Study. The 1984, 1990, 1999 and 2000 NEPA documents for the Diamond Fork System and the 1988 DPR recommended a water quality and water temperature monitoring program in Diamond Fork Creek (see Table 2-1, Environmental Commitment Nos. 25, 26, 32, 33, 34, and 38). Specific recommendations have changed slightly because of reformulation of the Diamond Fork System, but water temperature and low dissolved oxygen are potential concerns that are being monitored. The Mitigation Commission and the District have entered into a cooperative agreement, signed in 1997, to collect water quality and temperature data. The Mitigation Commission funded installation of two real-time stream gauging stations complete with Hydrolab water quality sampling units. The District and Mitigation Commission are monitoring water quality during construction; the Mitigation Commission will monitor following construction. In 2001, the Mitigation Commission determined through consultation with District, FWS, DOI and Utah Division of Wildlife Resources that most metals and other parameters could be removed from the monitoring program. As the Diamond Fork System begins to operate, additional monitoring will resume. Dissolved oxygen concentrations in Diamond Fork Creek and Sixth Water Creek downstream of the three outlets will not be known until the Diamond Fork System begins to operate. However, measures have been designed or are in place to re-aerate the water before it is discharged and low dissolved oxygen is not expected to be a problem. If problems with low dissolved oxygen,

temperature or other parameters are identified, corrective measures will be identified and implemented. Water quality and temperature monitoring continues at present.

Diamond Fork Campground and Recreation Facilities. The 1988 Definite Plan Report and 1990 Diamond Fork System Final Supplement to the Final EIS identified construction of recreation facilities to help meet the anticipated recreation demand associated with construction of the Diamond Fork System and to help meet the needs of a growing population along the Wasatch Front (see Table 2-1, Environmental Commitment No. 36). The recreation facilities identified in the documents for the Diamond Fork System included the following features:

- Monks Hollow Recreation Area - 96 camping units; one day use area including 40 parking spaces, 20 picnic tables, two group shelters, angler access point with six parking spaces and a restroom

- Palmyra and Diamond Campground - 10 camping units to be added for lost units at Three Forks and Hawthorn Campgrounds

- Monks Hollow Day Use Area - 20 parking spaces, a restroom, signs; used for hand launching of non-motorized boats

- Trails - Lower Diamond Fork Trailhead two miles below the proposed Monks Hollow dam to serve existing trails, 20 parking spaces allowing for trailer use, a restroom, horse loading ramp, hitching rack

As the Diamond Fork System was reformulated, changes in the recreation components of the project were not updated and were not formerly addressed until the September 1998 Final EA and FONSI for the Diamond Fork Campground. It was determined that the Palmyra and Diamond Campgrounds would be reconstructed and combined into a single campground in lieu of constructing the 96-unit Red Ledges facility described in the 1984 EIS. In addition, the group-site facilities in the Diamond Campground would be removed and relocated to a more appropriate location. The decision to reconstruct the Diamond Campground in lieu of constructing the 96-unit Red Ledges facility resulted in fewer available campsites but achieved the following objectives:

- Reclaimed approximately 2.6 acres of riparian vegetation by removing facilities from the active floodplain

- Eliminated the footprint and the associated impacts associated with the construction of a 96-unit campground at Red Ledges

- Provided all new facilities at the Diamond Campground and the group-site campground to replace the old facilities at Palmyra and Diamond Campgrounds that were in poor repair and not in compliance with the Americans with Disabilities Act (ADA)

A draft EA for the relocated group-site campground was issued in May 2003 and a final EA is anticipated for release in November 2004.

In accordance with the Diamond Fork Area Assessment, the Forest Service and Mitigation Commission jointly prepared a draft Conceptual Recreation Plan for the Diamond Fork Drainage in December 2000. The purpose of the plan was to update the recreation feature components of the Diamond Fork System and to identify other recreation features the Forest Service planned to implement in the Diamond Fork drainage independent of the Diamond Fork System. The recreation facilities commitments for the Diamond Fork System under the 2004 Bonneville Unit DPR include the following components that are summarized and compared with the 1988 Bonneville Unit DPR recreation facilities commitments in Table 3-24.

Table 3-24
Comparison of Original Recreation Facility Commitment with Present Planning Direction
Page 1 of 2

1984 and 1990 Diamond Fork System Final EIS and 1988 Bonneville Unit DPR Recreation Commitments	**2000 Conceptual Recreation Master Plan[1] and 2004 Bonneville Unit DPR Recreation Commitments**
Monks Hollow Recreation Area • Ninety-six Unit Campground • One day use area including: (40 parking spaces, 20 picnic tables, two group shelters, angler access point with six parking spaces and a restroom)	**Diamond Fork Campground Reconstructed** • Campground capacity reduced by 33% (constructed) • Group-sites to be relocated. (NEPA decision document planned winter 2005)
Palmyra and Diamond Campground • Ten camping units to be added for lost units at Three Forks and Hawthorn Campgrounds	
Monks Hollow Day Use Area • 20 parking spaces, a restroom, signs; used for hand launching of non-motorized boats	**Red Ledges Day Use Area** • 20-25 car parking area • restroom • ten picnic tables, fencing, signing and a trail system

Table 3-24
Comparison of Original Recreation Facility Commitment with Present Planning Direction
Page 2 of 2

1984 and 1990 Diamond Fork System Final EIS and 1988 Bonneville Unit DPR Recreation Commitments	2000 Conceptual Recreation Master Plan[1] and 2004 Bonneville Unit DPR Recreation Commitments
Trails Lower Diamond Fork Trailhead two miles below the proposed Monks Hollow dam to serve existing trails, 20 parking spaces allowing for trailer use, a restroom, horse loading ramp, hitching rack.	**Sawmill Hollow trail** • Construct a graveled parking area, one-unit vault restroom, information board, trail signing and some fencing. **Fifth Water trail** • Relocate portions of this trail to address resource concerns.
	Angler Access • Approximately ten sites (most sites have been constructed in conjunction with Diamond Fork Pipeline construction) • Vault toilets, signing
	Education and Interpretation • Provide I&E roadside opportunities along the new road in the lower portion of the canyon • Interpretative trails • Education areas (like the wetlands) and links with the Youth Forest

[1]This table lists only those features that are components of Diamond Fork System recreation commitments. Other features identified by the 2000 Conceptual Recreation Plan that the Forest Service plans to implement independent of CUP are not shown in this table.

Diamond Fork System Mitigation. The Mitigation Commission program for the Diamond Fork System places priority on completing unfulfilled mitigation responsibilities, identified in the 1988 DPR and subsequent NEPA documents. Most of the environmental commitments have already been discussed as part of the previously listed programs. Other remaining commitments are described in this section (see Table 2-1, Environmental Commitment Nos. 24 through 46).

The Mitigation Commission will plan for a long-term riparian vegetation monitoring program in concert with the monitoring programs described above for Sixth Water and Diamond Fork creeks to determine the effects on species composition, riparian corridor width, and vegetation density from flow modifications within the impact area of influence. Monitoring program activities will include recording existing conditions from aerial photos of Diamond Fork Creek. The Mitigation

Commission will continue to coordinate with the FWS, Forest Service, Utah Division of Wildlife Resources and others regarding results of the monitoring program. The joint-lead agencies will mitigate any losses or detrimental impacts on wetland and riparian habitats that cannot be restored.

As previously noted, Reclamation, the Utah Division of Wildlife Resources, FWS, and Forest Service signed the January 1987 agreement, titled "Wildlife Mitigation Plan for Strawberry Collection System, Municipal and Industrial System, and Diamond Fork Power System, Bonneville Unit, Central Utah Project" (see Table 2-1, Environmental Commitment No. 1). The signatory agencies agreed on full and adequate compensation for wildlife impacts on the M&I System, along with the Strawberry Aqueduct and Collection System, and the Diamond Fork Power System. A copy of the agreement is Attachment B to this Fish and Wildlife Appendix. The components and acreage amounts in the 1987 Plan were revised in 1997 through a FWCA Planning Aid Memorandum because of the reformulation of the Diamond Fork System in 1990. Reformulation of the Diamond Fork System as described in the 1990 and 1999 Final Supplements, 2000 Final EA for the Proposed Action Modifications, and 2002 Final EA for the Proposed Action Modifications resulted in a reduced mitigation need. Mitigation was met by adjusting mitigation acreage of other systems of the Bonneville Unit and by acquiring 161 additional equivalent acres (483 acres) of wildlife habitat. Wildlife habitats acquired adjacent to Strawberry River angler access corridor as described in the 1999 Angler Access EA achieved this commitment (Mitigation Commission 1999).

The 1987 Wildlife Mitigation Plan required mitigation for 630 acres of wooded riparian vegetation impacted by the M&I System. One-hundred sixty-five acres have been mitigated through acquisition and habitat improvements on part of the Moon properties on Currant Creek, and 237 acres have been mitigated through purchase of the former Camelot properties on the middle Strawberry River. The remaining 228 acres of riparian development is being achieved by the Provo River Restoration Project (PRRP).

Table 3-25 shows how all the lands proposed in the 1987 Plan were to be used to satisfy the remaining mitigation needs for the three Bonneville Unit systems. The acreages from the listed properties that would satisfy the wildlife mitigation as revised in 1997 are presented in Table 3-26, and in the FWCA Planning Aid Memorandum included as Attachment E.

Table 3-25
1987 Terrestrial Wildlife Mitigation Plan
Based on the Utilization of Optional Land Purchases
(acres)

Page 1 of 2

Mitigation Lands	SACS	M&I System	Diamond Fork System	Totals
Emory Smith	13,490	9,461	Not applicable	22,951

Table 3-25
1987 Terrestrial Wildlife Mitigation Plan
Based on the Utilization of Optional Land Purchases
(acres)

Page 2 of 2

Mitigation Lands	SACS	M&I System	Diamond Fork System	Totals
Coal Mine Hollow	640	Not applicable	572	1,212
Moon	185	165	595	945
Camelot	Not applicable	237	2,595	2,832
Deer Creek	Not applicable	970	1,030	2,000
Jordanelle	Not applicable	720	Not applicable	720
Riparian Development	Not applicable	228	Not applicable	228
Diamond Property	Not applicable	Not applicable	591	591
Redford Property	Not applicable	Not applicable	617	617
Total	**14,315**	**11,781**	**6,000**	**32,096**

Data Source: 1987 Wildlife Mitigation Plan (Attachment B)

Table 3-26
Revised 1987 Terrestrial Wildlife Mitigation Plan
(Revised in 1997 Because of Reformulation of the Diamond Fork System)
(acres)

Page 1 of 2

Mitigation Lands	SACS	M&I System	Diamond Fork System	Totals
Emory Smith	13,490	9,461	Not applicable	22,951
Coal Mine Hollow	640	N/a	572	1,212
Moon	185	165	595	945
Camelot	Not applicable	237	2,595	2,832

Table 3-26
Revised 1987 Terrestrial Wildlife Mitigation Plan
(Revised in 1997 Because of Reformulation of the Diamond Fork System)
(acres)

Page 2 of 2

Mitigation Lands	SACS	M&I System	Diamond Fork System	Totals
Deep Creek	Not applicable	Not applicable	Not applicable	0
Jordanelle	Not applicable	720	Not applicable	720
Riparian Development	Not applicable	228	Not applicable	228
Diamond Property	Not applicable	Not applicable	591	591
Redford Property	Not applicable	Not applicable	617	617
Other	Not applicable	483	Not applicable	483
Total	**14,315**	**12,226**	**4,038**	**30,579**

Data Source: April 9, 1997 FWCA Planning Aid Memorandum (Attachment E)

Threatened and Endangered Species Environmental Commitments

The District, Mitigation Commission and DOI support an approach to recovery of Federally listed species by taking an ecosystem approach, i.e., to work to restore species, habitats, and processes to a naturally functioning state in which Federally listed species flourish as a self-sustaining component. Management of a system to the exclusive benefit of one species at the expense of many others is contrary to conservation biology principles.

Ute ladies'-tresses. The U.S. Fish and Wildlife Service's draft recovery plan for Ute ladies'-tresses orchid, prepared in 1995, describes the preferred recovery goal as self-sustaining populations of the orchid in a watershed that is in a state of dynamic equilibrium with its physical and biological setting. The recommended recovery strategy to accomplish this includes the following steps: (1) a multi-disciplinary watershed evaluation to determine the physical and biological status and capabilities of the watershed; (2) participation by all affected interests in establishing watershed goals; and (3) development of a mechanism for affected interests to evaluate management proposals for their contribution toward achieving established goals. It is assumed that self-sustaining orchid populations will be among identified high priority goals.

The formation of the interagency/interdisciplinary team mentioned previously for planning the monitoring and restoration on Sixth Water and Diamond Fork creeks and the Spanish Fork River would help assure this approach is taken.

The current conditions in Diamond Fork Canyon have provided ample suitable habitat for Ute ladies'-tresses orchid which sustains a substantial population. However, the current conditions represent a degraded, unstable riparian and aquatic environment that is detrimental to many ecosystem components. A watershed approach to restoration that includes water management to more nearly mimic the natural hydrograph and hydrology will result in improvement of aquatic and riparian habitats for many species. It is possible and perhaps likely that accomplishment of restoration goals will be accompanied by a concomitant decrease in suitable Ute ladies'-tresses orchid habitat and population size. However, the DOI, District, FWS and Mitigation Commission expect that if healthy, dynamic, sustainable stream and riparian environments are achieved, the orchid will remain as an integral, if not dominant, component.

The Diamond Fork drainage is an important recovery unit for Ute ladies'-tresses orchid because it contains the largest Wasatch Front population, the habitat is under Federal jurisdiction for management thereby reducing threats of incompatible development and providing opportunities for flexible and compatible management, and long-term management goals are for a sustainable, naturally functioning watershed capable of providing outdoor, wildlife-based recreation.

As the Diamond Fork System is constructed and operated and restoration is implemented, there is an opportunity to learn about the orchid and its habitat. Improvement in our knowledge of the species and its habitat will make an important conservation contribution toward recovery that will help compensate for temporary or long term detrimental impacts to the orchid as a result of operation of the Diamond Fork System. The numerous environmental commitments of the Diamond Fork System and the ULS recognize and address the importance of monitoring and studying the species as recovery measures. Careful and continual evaluation of the most appropriate and useful monitoring measurements will be necessary to accomplish monitoring goals with the minimum expenditure of human and fiscal resources.

Ute ladies'-tresses orchids also occurs in limited numbers along portions of the middle Provo River within the Provo River Restoration Project. Individuals from two colonies have been observed and monitored since 1992.

June sucker. The June sucker is known to occur naturally only in Utah Lake and that population currently is known to spawn only in Provo River. Numerous conservation measures have been adopted since the 1988 DPR regarding the June sucker. Previous sections on the Provo River/Utah Lake watershed discussed most of the measures being taken under Bonneville Unit for the June sucker.

PART 6: OVERVIEW OF FISH, WILDLIFE AND RELATED RECREATION PROGRAM ASSOCIATED WITH THE COLORADO RIVER STORAGE PROEJCT OR STATEWIDE PROGRAMS

This part presents an overview of fish, wildlife and recreation programs authorized by CUPCA that occur or can be implemented in other areas of the State not discussed in previous sections. Some of the programs are authorized in the areas affected by the Colorado River Storage Project in Utah, or on a regional or Statewide basis. This part also covers the recreational benefits of the Bonneville Unit, and the fish and wildlife benefits of the Mitigation Commission's program in addition to the Bonneville Unit components already discussed. The recreational benefits and fish and wildlife benefits and the status of their accomplishment are described in the following main sections.

- Fish and Wildlife Benefits
- Recreational Developments and Benefits of Bonneville Unit Systems
- Great Salt Lake Wetlands Improvement
- Jordan River Watershed Improvement
- Statewide Fish and Wildlife Program

Fish and Wildlife Benefits

Fish and wildlife benefits are based on visits to Bonneville Unit features for fishing, measured in angler-days that represent a one-day visit by one person. The angler-days for fishing at Bonneville Unit facilities were developed for the 1988 Supplement to the DPR through consultation with the U.S. Fish and Wildlife Service and other professionals in the field. Table 3-27 shows the number of angler-days for each reservoir or stream in the project, and the associated annual benefit value.

Benefit values for fish and wildlife visitations were computed from the 2001 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for Utah (March 2003) prepared by the Fish and Wildlife Service, U.S. Department of the Interior and the U.S. Department of Commerce. This publication reported an average trip expenditure of $33.00 per angler-day spent fishing in Utah. A 2004 angler-day value of $35.35 was computed by indexing from the $33.00 angler-day value using the average 2001 Consumer Price Index (CPI) to the June 2004 CPI.

The number of angler-days for each Bonneville Unit facility is consistent with the 1988 Supplement to the DPR. However, the angler-days in Diamond Fork for the stream that will not be inundated by the abandoned Monks Hollow Reservoir plan have been added to Table 3-27. Angler-day estimates also have been added for the UBRP project as shown in Table 3-27. Additional angler-days would be realized on the lower Provo River through water conveyed through facilities of the ULS project. Angler-days are included for publicly accessible reaches of the Spanish Fork River that benefit from increased flows under the Bonneville Unit.

Table 3-27
Annual Fishing Benefits

Feature	Number of Angler-Days			Value Per Day	Total Annual Benefit ($)
	Without Project	With Project	Project Increase		
Bonneville Unit					
Upper Stillwater Reservoir	-	14,200	14,200	$35.35[a]	501,970
Midview Reservoir	3,000	21,000	18,000	$35.35	636,300
Starvation Reservoir	-	26,500	26,500	$35.35	936,775
Currant Creek (above reservoir)	500	2,500	2,000	$35.35	70,700
Currant Creek Reservoir	-	47,500	47,500	$35.35	1,679,125
Strawberry Reservoir	207,600	300,000	92,400	$35.35	3,266,340
Upper Provo Reservoirs	135,000	200,000	65,000	$35.35	2,297,750
Jordanelle Reservoir	-	90,700	90,700	$35.35	3,206,245
Sixth Water Creek	906	12,111	11,205	$35.35	396,097
Diamond Fork Creek	1,402	20,703	19,301	$35.35	682,290
Spanish Fork River (below confluence with Diamond Fork)	4	7,088	7,084	$35.35	250,419
Lower Provo River	127,958	164,300	36,342	$35.35	1,284,690
Total Annual Fishing Benefits Bonneville Unit			**430,232**	**$35.35**	**$15,208,701**
Uinta Basin Replacement Project[b]					
Stabilization of High Mountain Lakes					403,700[c]
In-stream Flows					
Moon Lake Reservoir to Big Sand Wash Feeder Diversion			7,300	$35.35	258,055
Yellowstone River to the Confluence of the Lake Fork River			6,000	$35.35	212,100
Big Sand Wash Reservoir Enlargement			5,000	$35.35	176,750
Total Fishing Benefits UBRP			**18,300**		**$1,050,605**
Project Total					**$16,259,306**
Rounded					**$16,300,000**

[a] The $35.35 was computed from the 2001 National Survey of Fishing, Hunting, and Wildlife Associated Recreation for Utah, March 2003, published by U.S. Department of the Interior and U.S. Department of Commerce. The $35.35 was computed by indexing from $33.00 using the average 2001 Consumer Price Index (CPI) to the June 2004 CPI.

[b] The Uinta Basin Replacement Project (UBRP) angler-day values were taken from the Final Feasibility Study for UBRP, October 2001.

[c] Indexed to June 2004 from year 2000 value using the CPI. The year 2000 value shown in the UBRP report is $367,000.

Recreational Developments and Benefits of Bonneville Unit Systems

Recreational Developments. Recreational developments are considered in terms of 1) building recreational use into project facilities, and 2) providing compensation for the reduction in pre-existing recreational opportunity resulting from constructing and operating water supply facilities.

One of the purposes of the Bonneville Unit is to provide water-based recreational opportunities. Recreational provisions are defined as those that provide non-fishermen and non-hunters with opportunities for boating, water skiing, hiking, horseback riding, nature study, and other activities. Fishing and hunting opportunities are classified as "fish and wildlife benefits" and are included with aquatic and terrestrial resources described earlier in Chapter 3 of this Fish and Wildlife Appendix. Most of the recreation provisions are available for public use. Table 3-28 summarizes the recreation opportunities provided by Bonneville Unit reservoirs.

Table 3-28
Recreational Facilities at Bonneville Unit Reservoirs

Reservoir	Fishing	Boat Ramps	Boat Slips	Dry Docks	Camping	Picnic Area	Food Service
Starvation Reservoir	■	■	■		■	■	
Currant Creek Reservoir	■	■			■	■	
Strawberry Reservoir	■	■	■		■	■	■
Jordanelle Reservoir	■	■	■	■	■	■	■

The costs of including public recreation opportunity in Bonneville Unit systems and the benefits they provide are included in the economic analysis of the Bonneville Unit. The analysis shows that the recreation benefits amount to approximately 10 percent of the total Bonneville Unit benefits.

Recreation Benefits. Recreation benefits measure the value to non-fisherman and non-hunters of using project facilities for vacations, boating, water skiing, hiking, horse-back riding, and other outdoor activities. The demand for this type of activity is increasing rapidly, and available facilities are becoming scarce. Benefits for these activities were indexed to a current price level from values shown in the 1988 DPR using the consumer price index. Table 3-29 shows the location, number of recreation days, and the value of recreation benefits at each Bonneville Unit facility that provides new recreation opportunities. The total annual recreation benefit is $12,060,000 as shown in Table 3-29.

Table 3-29
Annual Recreation Benefits

Feature	Recreation Day Value				Total Annual Benefit
	Recreation Days	1988 DPR	Index Factor (a)	2004	
Bonneville Unit					
Upper Stillwater Reservoir	40,200	$4.95	1.67	$8.27	$332,454
Current Creek Reservoir	41,500	$4.95	1.67	$8.27	$343,205
Strawberry Reservoir	694,000	$4.85	1.71	$8.27	$5,739,380
Starvation Reservoir	56,000	$4.85	1.71	$8.27	$463,120
Jordanelle Reservoir	475,000	$4.85	1.71	$8.27	$3,928,250
Diamond Fork System	60,400	$4.85	1.71	$8.27	$499,508
High Mountain Lakes					
New	16,500	$4.95	1.67	$8.27	$136,455
Enhanced	45,700	$0.75	1.67	$1.25	$57,125
				Subtotal	$11,499,497
UBRP (Uinta Basin)					
High Mountain Lakes					$565,000
Total (rounded)					$12,060,000

The CUPCA authorized additional recreation facilities in addition to the recreation facilities in the 1988 DPR. The additional recreation facilities are provided to mitigate for project-caused reductions in pre-existing recreation use of the outdoors, and measures to simply "fill in the gaps" among the water-based recreational opportunities previously included in the Bonneville Unit. Included are interpretive facilities, public access to streams in addition to fishing access, and enhancements of public touring and recreational aspects of projects planned by State and local agencies. These provisions have been included in the Mitigation Commission's program and funding for their implementation has been authorized by CUPCA. These programs are discussed in the section associated with each watershed.

Great Salt Lake Wetlands Improvement

Ecological Setting. The Great Salt Lake (GSL) is a saline water body in the Bonneville Basin adjacent to the populous area along the Wasatch Front that includes Salt Lake City, Ogden, and other urban centers. Major tributaries include the Bear River on the north, the Weber and Ogden rivers on the east and the Jordan River on the south. Each of these rivers has large tributary areas. The Jordan River connects Utah Lake, a freshwater lake on the south, with the GSL. Some inflow to the lake occurs from springs.

The waters converging on the Great Salt Lake have created extensive wetlands areas adjacent to its eastern and southern shorelines. The 400,000 acres of marsh along the shore of the lake

represent almost 75 percent of all the wetlands in Utah. Within the lake itself, more than 1,500 square miles of water environments are available. Wildlife associated with the GSL and its periphery is abundant and diverse, including shore and wading birds, marsh-oriented songbirds, and millions of migratory waterfowl that use the GSL as a staging area in their annual migration. The interface of salt water, mudflats, and the fresh water from tributaries and springs create a haven for insect production, an important food base for migrating and resident birds.

In addition to birds, the GSL ecosystem hosts 23 species or subspecies of fish, 8 species of amphibians and 64 species or subspecies of mammals. One endangered, one threatened and ten sensitive species occur on the GSL. The variety of plants and invertebrates, especially brine flies and brine shrimp, occurring in and around the lake provide a food source for these other species.

The Great Salt Lake wetland ecosystem is recognized internationally for its importance as a vital link in the migration corridor for water birds. The GSL was designated as 1 of 11 Hemispheric Reserves and 4 International Reserves that make up the Western Hemisphere Shorebird Reserve Network.

Needs and Objectives. The Great Salt Lake (GSL) wetland ecosystem has been significantly impacted by human development. With over 60 percent of Utah's 2.2 million people living within 20 miles of GSL's wetlands, human impacts on the resource are substantial and habitat encroachment is obvious. Less obvious are impacts such as altered or contaminated aquifers, degraded quality of inflows, solid waste deposits, invasive exotic species, and effects of air pollution.

The GSL ecosystem is affected by natural processes. During the wet years of the 1980s the lake's water level rose to a record high elevation. The high water rendered over 300,000 of the 400,000 acres of wetlands at the GSL essentially useless temporarily because of inundation and saltwater intrusion. Production of ducks dropped 70 percent, goose production decreased 60 percent, and fall swan use dropped more than 90 percent. Total migratory bird use decreased 88 percent from 100 million to 12 million annually.

Additional difficulties are created by the lack of coordinated management. Ownership and administration along the GSL is complex, encompassing the Utah Division of Wildlife Resources, Utah Division of Forestry, Fire and State Lands, FWS, Bureau of Land Management, county and municipal governments, The Nature Conservancy and other private interests. The coordination of public wetlands is a challenge and there has been no mechanism to coordinate private wetlands management with public wetlands administration. The State of Utah completed a plan for the Great Salt Lake; however, it did not include a detailed plan for coordinated management that extended beyond State jurisdiction. This diffuse management condition needs to be overcome to foster a common vision for the future of GSL wetlands.

The Mitigation Commission envisions a wetland and upland corridor along the shoreline of the Great Salt Lake that will provide avian species with a dedicated supply of resting, feeding, and nesting habitat. Achievement of this would be based on the following elements:

- A wetland and upland corridor bordering the GSL, that contains a sufficient buffer to function when the lake level rises as it did in the 1980s
- Dedicated resting, feeding and nesting habitat for resident wildlife, migratory shorebirds, and waterfowl in the Pacific Flyway
- Perpetual maintenance of wetlands hydrology
- A commitment to preserve the ecological functions and values of the GSL and associated wetlands among state and local governments and private industry
- Harmonious management of wetlands owned by federal, state, and local governments and non-governmental organizations
- Public and political support for maintenance of the lake and wetlands ecological systems as the foundation of agency oversight and administration
- Educational programs that promote understanding of the complexity and value of the lake and wetlands ecological systems
- Access for compatible recreation

Mitigation Commission Program. Section 306(a) of CUPCA authorized $14 million for the Mitigation Commission's use in planning and implementing projects to preserve, rehabilitate and enhance wetland areas around the Great Salt Lake. The Mitigation Commission has formulated a program to help consolidate public/private partnerships for ownership and management of selected wetland areas contiguous with the lake, mitigate earlier impacts, address future impacts, create public awareness and support, and improve the coordination of management by involved agencies, organizations, and private landowners.

Generally, about 70 percent of the Mitigation Commission's funding has been used to provide for the perpetual conservation of wetland areas through acquisition or easements for land and water rights. The remaining 30 percent of the funding has been used for restoration of State- and Federally-managed wetland areas along the shore of the Great Salt Lake, enhancement of existing wetlands, and public education. Some of the restoration and enhancement funds are used for protection and management of Mitigation Commission-acquired properties.

Acquisition along the eastern and southern shores of the Great Salt Lake is the Mitigation Commission's highest priority as human growth and other development pressures threaten to encroach on the wetlands and/or affect their hydrologic functions. Steady progress in creating a wetland and upland wildlife corridor through direct acquisitions, restoration and planning is occurring. The Mitigation Commission has acquired several thousand acres, along with water rights, that add key pieces to the larger holdings of The Nature Conservancy on the east shore,

and of the National Audubon Society on the south shore. The Mitigation Commission has supported restoration of State and Federally managed wildlife areas adjacent to the GSL.

To begin to address the identification and conservation of high priority wetlands outside of reserved lands that could be included in the Great Salt Lake wetland and upland corridor, the Mitigation Commission co-funded wetland conservation plans in Davis, Box Elder, Tooele and Salt Lake counties. Each plan identifies critical wetlands for conservation, and high value wetlands suitable for development that have the potential for creating land set-aside arrangements that are beneficial for wetland protection and for the private property owners.

Although the Mitigation Commission has scoped its efforts to concentrate on areas adjacent to the lake, the quantity and quality of water from tributary streams are critical to the hydrologic functioning of GSL wetlands. Thus, the cooperation of local governments, industry, and landowners in protecting the waters of the tributary streams is critical to the vitality of the wetlands and lake ecosystem. The Jordan River, a 45-mile waterway through urban areas, is of particular concern.

The Mitigation Commission has essentially completed its role in restoring agency management areas. The Mitigation Commission is continuing with the acquisition of high value GSL wetlands and development of wetlands protection plans. The following are the remaining active program elements.

- Great Salt Lake Wetlands Acquisition. Continue support for acquisition of properties managed complementary to Mitigation Commission goals and objectives. These properties may include lands adjacent to Federal and State management areas, local government holdings, or private conservation group holdings that will be managed for wetland functions and wildlife values. About $3.7 million remains available for this program as of 2004. These funds are expected to be expended by the end of 2005.

- South Shore Ecological Preserve. Continue support of the efforts of National Audubon Society on the South Shore Ecological Preserve.

- Nature Conservancy. Continue support of the efforts of The Nature Conservancy in habitat acquisitions in the Layton-Kaysville area for the Great Salt Lake Shorelands Reserve.

- Davis County Wetland Conservation Plan. Support Davis County in implementation of their Wetland Conservation Plan.

- Restoration and Management of Mitigation Commission-Acquired Properties. Continue agreements with appropriate entities to address immediate and long-term management needs of Mitigation Commission properties to protect and enhance values.

- Wetland Preservation Strategies. Develop and implement strategies that will contribute to the perpetual conservation of wetland functions and values through planning,

management agreements and strategic partnerships. Plans have been developed in four of the five counties adjacent to the Great Salt Lake.

Jordan River Watershed Improvement Program

Ecological Setting. The Jordan River is 44 miles long (not including meanders) and flows north from the outlet of Utah Lake to the Great Salt Lake. As the Jordan River flows to the Great Salt Lake, it is fed by tributary streams. Seven major streams (Little Cottonwood Creek, Big Cottonwood Creek, Mill Creek, Parley's Creek, Emigration Creek, Red Butte Creek, and City Creek) and 13 smaller streams originate in the Wasatch Range east of the river. Six originate in the Oquirrh Mountains on the west side of the river.

Before settlement of the Salt Lake Valley, the Jordan River meandered from its entry into Salt Lake Valley at the Jordan Narrows across a broad floodplain to the Great Salt Lake (UDNR 1997). A forest of cottonwood trees traced its path along the valley floor. Numerous oxbows, marsh areas, and riparian zones provided home to a diverse community of wildlife. The Jordan River is reported to have been an excellent fishery in the early years following the first settlement of the valley. Now the Jordan River corridor contains a mix of developed recreation areas, such as parks, golf courses, and sports parks; residential and commercial development; a trail system; river restoration areas; and natural areas for wildlife values. These developments are largely a consequence of population growth.

The history of water development and use in the Jordan River Basin covers a period of over 150 years. Water was diverted from tributary streams as farming communities developed along the Wasatch Front. Water was diverted from the river to irrigate cropland. Now, at intervals along its length, flows from the Jordan River are diverted, then replenished from seepage, wastewater discharge, and irrigation return flow. The largest diversions occur at the Jordan Narrows, located about 10 miles north of Utah Lake near the Utah-Salt Lake county line. The upper 10-mile section of the Jordan River is wide, slow and meandering. The channel has been dredged there to increase the rate of release from Utah Lake during wet years. The river carries a high silt, total dissolved solids and nutrient load.

Needs and Objectives. Since settlement of the Salt Lake Valley, the forests have been cut, the river has been channelized, the river water quality has been degraded, oxbows and wetlands filled, and much of the wildlife displaced. The river has suffered from industrial and municipal waste discharges; encroachment of industrial, commercial, and residential activities on its flood plain; dredging and channelization; extensive water diversions and manipulations; and polluted runoff from streets and fields. Mining operations in both the Wasatch Front canyons and the Oquirrh Mountains have contributed a considerable amount of pollution. These mining activities have affected Jordan River water quality since before the turn of the century but were at a peak from the early to middle part of the 20th century. The Jordan River was channelized to increase the discharge from Utah Lake as noted earlier and for other purposes.

Society's ideas of acceptable uses of the Jordan River corridor are changing. The Mitigation Commission's program for the Jordan River focuses on the river's natural values. Visitors will

enjoy a visually pleasing landscape at several natural areas along the Jordan River corridor with urban sights and sounds moderated by a stable and healthy riparian and wetland system. These systems will provide fish and wildlife habitat, ecological food chain support, recreation opportunities, flood and pollution control, and river stability. The integrity of both the function and value of these systems will be protected.

Mitigation Commission Program. The Mitigation Commission program for the Jordan River has focused on acquiring and restoring critical wetlands that can serve as mitigation for impacts on wetland riverine systems caused by the CUP or other Federal Reclamation programs. The Mitigation Commission's initial priority was land acquisition in three key areas, and in subsequent years, restoring fish and riparian habitat on acquired lands will occur to a limited degree. To encourage cooperative management of the corridor, the Mitigation Commission supported development of a planning effort to identify long-term protective measures for management of the natural areas along the corridor.

In order to achieve the desired future condition, the Mitigation Commission has pursued projects with three communities on the Jordan River, with the aim of fostering continuity in the management of several natural areas for fish and wildlife. The Mitigation Commission's planning process identified several projects in South Jordan, Draper/Riverton, and West Jordan that stood out as having potential to provide significant benefits for riverine habitat along the Jordan River with the communities' planning efforts and ability to partner with the Mitigation Commission and others. The programs will continue in the future but will not be expanded through Mitigation Commission participation.

The Mitigation Commission worked with willing sellers to acquire properties along the Jordan River. Agreements with Reclamation and non-profit groups were used to complete acquisitions under Section 311(c) of CUPCA. Section 311(a) and 311(b) authorized funds for Jordan River fish habitat and riparian habitat rehabilitation. The Mitigation Commission will terminate its land acquisition program along the Jordan River in 2005.

Ongoing Complementary Programs. The Environmental Protection Agency and the Army Corps of Engineers are working with Salt Lake County, West Jordan City, the Mitigation Commission and other parties to restore the bed, banks and floodplain of the Jordan River through a reach located in West Jordan City. The Mitigation Commission has committed its acquired lands in the project area to the effort.

In the area of South Jordan City, the FWS has formulated a plan to restore natural resources damaged as a result of hazardous materials released for the Sharon Steel and Midvale Slag Superfund sites on or adjacent to the Jordan River (*Sharon Steel Damage Settlement: A Conceptual Restoration Plan,* FWS). The FWS will be funding restoration activities that meet their criteria and complement Mitigation Commission goals. The Mitigation Commission acquired many of the parcels needed for this project, with South Jordan City contributing the rest. These efforts have been magnified with private partners taking a lead role in accomplishing wetland and wildlife habitat restoration on the project.

Statewide Fish and Wildlife Program

Program Overview. The Mitigation Commission is authorized under CUPCA to plan and implement fish and wildlife mitigation and conservation activities that lie outside of the administrative and/or geographic boundaries of the Bonneville Unit completion program. These activities stem from specific or programmatic authorizations in CUPCA. The following components are included in this program.

Fish Hatchery Restoration and Construction. The CUP and other reclamation projects have created many reservoirs in Utah. These flatwater areas provide for a variety of water-related recreation opportunities including fishing. Most reservoir fisheries are heavily used and are not able to sustain themselves, and consequently have management programs that depend on stocking fish reared in hatcheries. Hatchery production demands in Utah for Reclamation projects have been met in the past through both State and Federal hatcheries. The CUPCA identifies funding for planning and implementing improvements to existing hatcheries and/or the development of new fish hatcheries to increase production of warm-water and cold-water fishes for areas affected by the Colorado River Storage Project in Utah.

The Mitigation Commission's statewide program contains an element for funding hatchery improvements and construction to help meet these demands. The funding authorization in CUPCA for fish hatchery improvements and development is not intended to replace natural production nor should it be viewed as an alternative to the Mitigation Commission's other programs which emphasize habitat restoration objectives. Support for this program does not diminish the Mitigation Commission's commitment to implement measures that achieve ecosystem restoration and biological diversity.

The planning process included steps to determine the need for hatchery improvements, types of fish to be raised, effects on native species from stocking fish and scheduling of implementation. Through the planning process, the need for development of facilities for producing sensitive species, such as native cutthroat trout and threatened or endangered species, has been addressed. A plan was developed in 1995 and revised in 1998 that describes Mitigation Commission-funded actions over the next ten years for hatchery improvements in Utah. The Fish Hatchery Production Plan was mandated by CUPCA (Section 313(c)) to identify long-term needs and management objectives for hatchery production in the CRSP-affected area. The Plan has been updated by the Hatchery Workgroup, incorporating Mitigation and Conservation Plan priorities, feasibility report information, stocking assessment report results and the Utah Division of Wildlife Resources stocking policy. An EA and Finding of No Significant Impact were released in April of 1998 on implementing the Plan (FWS and Mitigation Commission 1998).

Site-specific NEPA analysis is completed for the Kamas, Fountain Green, and Whiterocks State Fish Hatcheries. Reconstruction of the Kamas Hatchery began in September 1998 and is complete. The hatchery was dedicated in July 2001. Over 1.3 million rainbow, cutthroat and brook trout and grayling, weighing 131,335 pounds were stocked from the new Kamas State Fish Hatchery in 2002, its first full year of operation. Construction of the new Fountain Green Hatchery began in 2001 and was completed in May, 2002. Over 700,000 Bonneville cutthroat

trout (Bear Lake strain) eggs were moved to the new station at that time. The majority of these will be stocked in Strawberry Reservoir, a Bonneville Unit facility. Dedication of the hatchery occurred in Spring 2003. Contracts for the design and construction of the Interim June Sucker Hatchery, to be located at Utah Division of Wildlife Resource's Fisheries Experiment Station in Logan, Utah and the Whiterocks State Fish Hatchery, were awarded in 2004. Construction will be completed in 2005.

Work to complete the NEPA analyses for the Big Springs Tribal Fish Hatchery and the Warm-water Sport Fish and Native Aquatic Species Hatchery are underway. The Draft EA was released in 2003 for the Big Springs Hatchery. An EIS is anticipated in 2004 for the Warm-water Sport fish and Native Aquatic Species Hatchery project. Additionally, the Mitigation Commission funded modifications to a water supply system for the Jones Hole National Fish Hatchery. Planning to determine additional measures at the Jones Hole National Fish Hatchery is ongoing.

Sensitive Species Inventory and Database. The Mitigation Commission is participating in an integrated fish and wildlife inventory that will improve wildlife (including fish and invertebrate) and plant species databases. Priority is given to species occurring in the area impacted by CUP activities. Through inventory and mapping occurrences of sensitive non-game animals and plant species in Utah, with an emphasis on wetland ecosystems, this database will aid land and resource managers in decision-making. As the species inventory and database elements of the project progress, the Mitigation Commission supports advancing toward community surveys to improve decision-making abilities.

Mitigation Commission funds authorized under Section 306(b) of CUPCA have been used to help develop Utah Division of Wildlife Resources' biodiversity information database. Sensitive vertebrate, invertebrate and plant species information now exists in a central database that is continually updated and widely available over the internet.

For 164 sensitive vertebrate species and 80 sensitive invertebrate species, database information includes: taxonomic comments, subspecies discussions, status as identified by several agencies, Natural Heritage ranking (global and state ranks), abundance notes, range in Utah, habitat requirements in Utah, trends, threats, special considerations, inventory needs, and county of occurrence maps. In addition, the central database contains 2,146 detailed sensitive vertebrate species occurrence records and 456 detailed sensitive invertebrate species occurrence records.

For 751 sensitive plant species, database information includes: taxonomic comments, status as identified by several agencies, Natural Heritage ranking (global and state ranks), and county of occurrence maps. In addition, the central database contains 3,646 detailed sensitive plant species occurrence records.

Reports published under the project include:

- *Inventory of Sensitive Vertebrate and Invertebrate Species: A Progress Report*
- *Endemic and Rare Plants of Utah: An Overview of Their Distribution and Status*

- *Rare, Imperiled, and Recently Extinct or Extirpated Mollusks of Utah: A Literature Review*
- *The Bats of Utah: A Literature Review*

Inventory work for both plant and animal sensitive species is ongoing. The initial vertebrate sensitive species inventory was completed during 2002. It will continue to be updated and refined. Initial plant and invertebrate work will be completed in the future.

Stream and Riparian Restoration Enhancement. Many of the Mitigation Commission stream and riparian restoration projects are in specific watersheds; however, some will be conducted on a statewide basis in accordance with Section 309(a)(4) of CUPCA. The Mitigation Commission program will support projects designed to restore health and function to riparian areas and public access to enjoy recreational opportunities. Projects that will be funded under this element include recreational access, stream restoration, riparian restoration, and enhancement for fish and wildlife. Activities under this program only have occurred within the Bonneville Unit area through 2004.

Small Dam Improvements. Numerous small reservoirs exist in the State of Utah. Most were initially built more than 50 years ago for irrigation water storage high in the headwaters of river systems. In later years, the water storage rights on many of these reservoirs have been transferred to larger, newer reservoirs downstream. In those cases, either the Utah Division of Wildlife Resources or the Forest Service has often assumed ownership and/or management responsibility for the dam and reservoir, and continues to perpetuate the public recreational uses those reservoirs provide. In other cases, small high-elevation reservoirs continue to be used by irrigation companies as water storage facilities. Many have developed into productive fisheries, particularly where conservation pools have been included or acquired to retain a portion of the water supply in the reservoir year round to support fish populations.

Many of the small impoundments do not meet current dam safety standards and are in need of repair. Some that previously supported productive fisheries have been breached because they did not meet safety requirements or because the irrigation supply is no longer needed. Section 313(b) of CUP CA authorizes funds for restoration- and conservation-related improvements to small dams and watersheds on State of Utah and National Forest System lands within the CUP and Colorado River Storage Project (CRSP) areas in Utah. Numerous opportunities exist for funding the repair of small dams and for the acquisition of water rights to establish conservation pools or stabilized lakes.

Funding for small dam improvements was provided in 1994 and 1995. The following small dams were either completely rebuilt or partially rehabilitated 1994 through 1996. Forest Service projects include: on the Fishlake National Forest: Abes, Twin Ponds and Farnsworth Reservoirs; on the Manti-LaSal National Forest: Boulger and Benches Reservoirs; on the Dixie National Forest: Beaver Dam Reservoir, in cooperation with Reclamation; on the Ashley National Forest: a reservoir basin was dredged to restore capacity and improve fisheries at Moon Lake Electric Association's Yellowstone Hydroelectric Reservoir (MLEA), this was a partnership with MLEA

paying half the cost; on the Uinta National Forest: Silver and Pittsburgh Lakes (this was an investigation only; no actual work was performed.)

The Utah Division of Wildlife Resources accomplished the following projects: on the Manti-LaSal National Forest: Ferron Reservoir was rebuilt; on the Dixie National Forest: Long Willow Bottom and Round Willow Bottom Reservoirs were rebuilt, reservoirs and fishway for fish passage provided; on the Fishlake National Forest: Joe Lay, Lower Barker and Barker Reservoirs were rebuilt; at Chriss Lake and Burraston Ponds the Division of Wildlife Resources conducted limited investigations and engineering.

Funding for improvements on small dams, other than the improvements in the 1988 DPR, is currently a low priority in the Mitigation Commission's Mitigation Plan. No new work has been initiated since 1996 following adoption of the first Mitigation Plan, which removed this element as a priority. In order for projects to increase their priority in subsequent Plan revisions, the Mitigation Commission recommends that proponents develop proposals with one or more of the following objectives: restores native cutthroat trout habitat or aids in recovery of native cutthroat trout subspecies; restores habitat for, or recovers populations of, other aquatic or amphibious species impacted by development of Bonneville Unit features; contributes to the restoration of a natural ecosystem or to the preservation of biodiversity of native species; provides backcountry angling opportunities similar to those lost through development of roads, accesses and developments for the Bonneville Unit; and provides outstanding recreational, aesthetic or educational opportunity.

Native Cutthroat Trout Restoration. There is strong public support for restoration of native cutthroat trout populations and habitats. The Mitigation Commission has incorporated an element into the Mitigation Plan for native cutthroat trout restoration. Both the Colorado River and Bonneville cutthroat trout are native to areas affected by the Bonneville Unit. Interstate and Intrastate Conservation Agreements have been signed for both subspecies by State of Utah and surrounding states, in accordance with the Endangered Species Act, to determine strategies for conserving native cutthroat trout populations in Utah. The Mitigation Commission has used funding authorized under Section 307(4) of CUPCA to support conservation measures, specifically projects for identifying suspected remnant populations of native cutthroat trout, using a combination of geographic, meristics and DNA analyses. Procedure manuals and databases have been developed and are continually updated. Genetic and physical or meristic analysis is continuing on sampled cutthroat populations to determine the amount of introgression with rainbow trout and non-native Yellowstone cutthroat trout.

Wetlands Ecosystem Education Plan. The Mitigation Commission was involved in the development of a plan to educate the general public as to the natural attractions of the Greater Great Salt Lake Wetland Ecosystem (GGSLWE), and that will identify opportunities for delivery of educational messages for the area. For the purpose of the Wetlands Ecosystem Education Plan, the GGSLWE includes the area from Cache Valley, Bear River, Great Salt Lake, Jordan River, Utah Lake, and Provo River to the Jordanelle Reservoir. The area is known internationally for its contribution and importance to migrating shorebirds and waterfowl. It is vital for aquatic and terrestrial wildlife and other avian species moving from

north to south or from lower to higher elevations and vice versa during seasonal migrations. This ecosystem includes freshwater wetlands, salt water wetlands, open water, mudflats and everything in between which supports an incredible diversity of flora and fauna. The project has subsequently been taken over by Utah State University, and is now called the Utah Wetlands Information Network (UWIN).