SANTA CLARA PROJECT AGREEMENT

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SANTA CLARA PROJECT AGREEMENT

This Agreement is made and entered into on January 18, 2001, by and among the Bloomington Canal Company; Edward Bowler, a shareholder in the Gunlock Irrigation Company; Ivins Irrigation Company; the Lower Gunlock Reservoir Corporation; the New Santa Clara Field Canal Company; the Shivwits Band of the Paiute Indian Tribe of Utah; the Southgate Irrigation Company; the City of St. George, Utah; the St. George Clara Field Canal Company; the United States of America; the State of Utah; and the Washington County Water Conservancy District.

1.0 Recitals.

1.1 On July 21, 1980, the State of Utah, pursuant to Title 73, Chapter 4, Utah Code as amended, initiated a statutory adjudication of water rights in the Fifth Judicial District Court of the State of Utah in and for Washington County, Civil No. 800507596, which encompasses all of the rights to the use of water, both surface and underground, within the drainage area of the Virgin River and its tributaries in Utah ("Virgin River Adjudication"), including the Santa Clara Drainage ("Santa Clara System").

1.2 The United States of America was joined as a party in the Virgin River Adjudication pursuant to 43 USC § 666. On February 17, 1987, the United States filed a Statement of Water Users Claim asserting a water right based on state law and a federal reserved water rights claim for the benefit of the Shivwits Band of the Paiute Indian Tribe of Utah.

1.3 The Santa Clara System is subject to erratic flows and in most years does not supply sufficient water to satisfy all existing water rights, and the annual flow of the Santa Clara System is characterized by either low flows or extremely high flows with very few average water years.

1.4 To assist in stabilizing the water supply from the Santa Clara System, the Parties have studied the feasibility of pooling the water rights of the Parties and have determined that it is in their mutual interests to construct a pressurized pipeline from the Gunlock Reservoir to the lower Santa Clara River along with main lateral pipelines, which would result in the delivery of water as provided for herein, improve the efficiency of water delivery, conserve water, and help

alleviate current water shortages in the Santa Clara System.

1.5 The Parties intend to provide instream flow water from the Gunlock Reservoir to the lower Santa Clara River for the benefit of the Virgin Spinedace.

1.6 To remove causes of present and future controversy over the waters of the Santa Clara System without further litigation, the Parties hereto have conducted extensive negotiations regarding the settlement of the water rights claims of the Shivwits Band of the Paiute Indian Tribe of Utah and the United States of America for the benefit of the Shivwits Band of the Paiute Indian Tribe of Utah.

AGREEMENT

NOW, THEREFORE, the Parties agree as follows:

2.0 Parties.

2.1 Bloomington Canal Company ("Bloomington") is a Utah nonprofit corporation, and is a member of the Board of Trustees of Lower Gunlock.

2.2 Edward Bowler is an individual who owns shares in the Gunlock Irrigation Company.

2.3 Ivins Irrigation Company ("Ivins Irrigation") is a Utah nonprofit corporation, which currently has approximately 3% of its shares owned by WCWCD.

2.4 Lower Gunlock Reservoir Corporation ("Lower Gunlock") is a Utah nonprofit corporation, the storage rights of which are part of the Santa Clara Project Water Right pursuant to subsection 4.2, which is responsible for the operation and maintenance of Gunlock Reservoir including the Conservation Pool, and has as members of its Board of Trustees representatives appointed by Bloomington, New Santa Clara, St. George Clara, St. George, and Southgate.

2.5 New Santa Clara Field Canal Company ("New Santa Clara") is a Utah nonprofit corporation and is a member of the Board of Trustees of Lower Gunlock.

2.6 Shivwits Band of the Paiute Indian Tribe of Utah ("Shivwits Band") is one of five constituent bands of the Paiute Indian Tribe of Utah.

2.7 Southgate Irrigation Company ("Southgate") is a Utah nonprofit corporation, formerly known as the Santa Clara Seep Ditch Company, which currently has approximately 77.6% of its shares owned and controlled by St. George and is a member of the Board of Trustees of Lower Gunlock.

2.8 City of St. George ("St. George") is a Utah municipal corporation which currently owns approximately 77.6% of the shares in the Southgate, owns approximately 38% of the shares in the St. George Clara Field Canal Company, and has five (5) representatives on the Board of Trustees of Lower Gunlock.

2.9 St. George Clara Field Canal Company ("St. George Clara") is a Utah nonprofit corporation which has approximately 38% of its shares owned by the City of St. George, Utah, and approximately 3% of its shares owned by WCWCD, and is a member of the Board of Trustees of Lower Gunlock.

2.10 United States of America ("United States"), acting by and through the Secretary of the Interior.

2.11 State of Utah ("Utah), acting by and through its Department of Natural Resources.

2.12 Washington County Water Conservancy District ("WCWCD") is a Utah water conservancy district which owns approximately 3% of Ivins Irrigation and approximately 3% of St. George Clara.

3.0 Definitions.

3.1 "Average Water Year" means when the April 1 forecasted Santa Clara River stream flow for the period of April 1 through July 31, at Santa Clara River near Pine Valley U.S. Geological Survey Gage, as forecasted by the National Weather Service's Colorado River Basin Center, plus the storage in Gunlock Reservoir on April 1, meets or exceeds 12,500 acre-feet.

3.2 "Below Average Water Year" means when the April 1 forecasted Santa Clara River stream flow for the period of April 1 through July 31, at the Santa Clara River near Pine Valley U.S. Geological Survey Gage, as forecasted by the National Weather Service's Colorado River Basin Center, plus the storage in Gunlock Reservoir on April 1, is less than 12,500 acre-feet.

3.3 "Conservation Pool" means the 2,100 acre-feet of storage capacity above the Sediment Pool in Gunlock Reservoir.

3.4 "Gunlock Well Field" means that portion of the Navajo and Kayenta aquifers located adjacent to the Santa Clara River and south of Gunlock Reservoir and extending downstream to the saturated limit of the Navajo Sandstone Formation in T41S,R17W,SLB&M.

3.5 "Proposed Determination" means the Proposed Determination of Water Rights, Santa Clara River-Beaver Dam Wash Division, Book No. 1, issued by the State Engineer of Utah dated July 6, 1989, as amended.

3.6 "River Commissioner" means the Santa Clara River Water Commissioner, duly appointed by the State Engineer of Utah after consultation with the affected water users, who is charged with the responsibility of measuring, distributing and reporting the water deliveries on the Santa Clara River System, pursuant to Section 73-5-1 of the Utah Code Annotated.

3.7 "Santa Clara Project" means the pressurized pipeline from the Gunlock Reservoir across the Shivwits Indian Reservation to and including Ivins Reservoir, which will be used to deliver water to the Parties in accordance with this Agreement, and which is more fully described in **Exhibit A** attached hereto and incorporated by reference.

3.8 "Santa Clara Water Delivery Year" means the period starting on April 1 and ending on March 31 of the next calendar year.

3.9 "Sediment Pool" means the first 1,500 acre-feet of storage capacity in Gunlock Reservoir.

3.10 "Settlement Agreement" means the Shivwits Band of the Paiute Indian Tribe of Utah Water Rights Settlement Agreement executed by Bloomington, Edward Bowler, Ivins Irrigation, Lower Gunlock, New Santa Clara, the Shivwits Band, St. George, St. George Clara, Southgate, Utah, United States, and the WCWCD, and which is ratified and confirmed by Congress in legislation to settle comprehensively the water rights claims of the Shivwits Band in the Virgin River Adjudication.

3.11 "Shivwits Band Trust Fund" means the trust fund authorized by the Congress of

the United States in legislation to ratify and confirm this Agreement, to be established in the Treasury of the United States for the benefit of the Shivwits Band.

3.12 "Shivwits Santa Clara Water Right" means the water right confirmed to the Shivwits Band pursuant to this Agreement, as described more fully in Section 5.0.

3.13 "Shivwits Reservation" means the federal reservation of land in Washington County, Utah, which is held in trust by the United States for the benefit of the Shivwits Band of the Paiute Indian Tribe of Utah, as described in **Exhibit B** incorporated by reference herein, and shall include any future trust acquisitions contiguous to the Shivwits Reservation.

3.14 "Supplemental Project Water" means all groundwater rights of Ivins Irrigation, New Santa Clara, and St. George Clara, in addition to the 4 cfs to be supplied from the Gunlock Well Field.

3.15 "Virgin River Adjudication" means the statutory adjudication of water rights in the Fifth Judicial District Court of the State of Utah in and for Washington County, Civil No. 800507596.

4.0 Santa Clara Project.

4.1 Santa Clara Project. The Parties agree to the construction of the Santa Clara Project for the delivery of untreated water to the Parties and in the quantities set forth in Section 8.0 of this Agreement and to provide the release of instream flow water in the Santa Clara River downstream of Gunlock Reservoir. The Parties intend that the construction of, and the delivery of water through, the Santa Clara Project pipeline will result in a water savings and that this water savings is a part of the water the Parties agree shall be pooled in accordance with Subsection 4.2 of this Agreement and used to satisfy the water deliveries set forth in Section 8.0 of this Agreement.

4.2 Santa Clara Project Water Rights. The surface, groundwater, and storage rights of New Santa Clara, St. George Clara, Ivins Irrigation, the United States for the benefit of the Shivwits Band, St. George, and Lower Gunlock, as identified in **Exhibit C** - Tabulation of Water Rights To Be Pooled Under the Santa Clara Project Agreement, and the water conserved through

construction of the Santa Clara Project pipeline, shall be pooled and each of the Parties pooling their water rights shall receive deliveries of water in accordance with the water delivery schedule provided for in Section 8.0 herein. The water rights of the Parties identified in this subsection 4.2, and the water rights of the Shivwits Band set forth in subsection 5.1 of this Agreement, shall be the subject of Proposed Determinations, and of a judgment and decree in the Virgin River Adjudication.

4.3 The groundwater rights pooled in accordance with Subsection 4.2 of this Agreement, and the groundwater rights of St. George described in Subsection 10.2 of this Agreement, shall be considered Supplemental Project Water, and shall be used to satisfy the Santa Clara Project Water Rights as provided for in Subsection 8.5 of this Agreement.

5.0 Shivwits Santa Clara Water Right

5.1 Contingent upon satisfaction of the actions identified in Section 11.0 of this Agreement, and Section 9.0(Waivers and Release of Claims) of the Settlement Agreement, the Shivwits Band, and the United States acting on behalf of the Shivwits Band, shall be entitled in perpetuity to a total of 1,900 acre feet annually, with an 1890 priority date, from the Santa Clara System, to be provided by the Santa Clara Project in Average Water Years; provided, however, that the Shivwits Band shall have a proportionate reduction in water deliveries from the Santa Clara Project equivalent to all other Parties to this Agreement with an 1890 priority date in a Below Average Water Year, as provided in Subsection 8.4 of this Agreement. The 1,900 acre feet annually provided for herein shall include the 500.60 acre feet of water under Water Right Nos. 81-2313 and 81-2425 specified in the Proposed Determination at Pages 199-200.

5.2 The Shivwits Band may use and lease the Shivwits Santa Clara Water Right:

5.2.1 for any purpose permitted by Tribal or Federal law anywhere on the Shivwits Reservation and such use shall not be subject to State or local law, regulation or jurisdiction once the water is delivered to the Shivwits Reservation; and

5.2.2 for any beneficial use off the Shivwits Reservation in accordance with all applicable federal and State laws.

5.3 In any evaluation of a change application filed on the Shivwits Santa Clara Water Right, the State Engineer of Utah shall assume that the water is being used on the Shivwits Reservation at a 60% consumption rate.

5.4 The Shivwits Santa Clara Water Right shall not be subject to loss by abandonment, forfeiture, or non-use whether used on or off the Shivwits Reservation.

6.0 Santa Clara Project Construction.

6.1 WCWCD shall be solely responsible for the design, permitting, engineering and construction of the Santa Clara Project.

6.2 Payment of Project Costs. As of the date this Agreement was executed, the following financial contributions have been made in the form of grants to or by WCWCD to develop and construct the Santa Clara Project: (a) a grant of $750,000.00 from Utah; (b) a grant of $750,000.00 from the U.S. Fish and Wildlife Service; (c) a grant of $35,000 from the U.S. Bureau of Land Management; and (d) a grant of $750,000.00 by WCWCD. The WCWCD agrees that it shall provide the funding for the development and construction of the Santa Clara Project in excess of any funds required beyond the grant funds described in this subparagraph.

6.3 The Parties agree that based upon the contributions and grants of the federal funds described in Subsection 6.2, the Shivwits Band and the United States shall have no obligation for the construction costs necessary for the delivery of the Shivwits Santa Clara Water Right in accordance with this Agreement.

6.4 Santa Clara Project Land and Easements.

6.4.1 All Parties, with the exception of the Shivwits Band and the United States for the benefit of the Shivwits Band, whose real property will be involved in the construction, operation and maintenance of the Santa Clara Project agree to provide, without cost, all easements and rights-of-way on their respective properties necessary for the construction, operation and maintenance of the Santa Clara Project.

6.4.2 The Shivwits Band, and the United States for the benefit of the Shivwits Band, agree that they shall grant and approve the right-of-way across the Shivwits Reservation

which is necessary to construct the Santa Clara Project, in accordance with 25 U.S.C. §§ 323-328 and 25 CFR Part 169 (the "Shivwits Right-of-Way").

6.4.3 The Shivwits Right-of-Way shall be a permanent, exclusive easement for the Santa Clara Project facilities, subject to the existing highway and the Ivins Canal, and shall include a temporary construction easement.

6.4.4 Payment for the temporary construction easement shall be $4,000.00.

6.4.5 The initial payment for the Shivwits Right-of-Way shall be $1,500.00 per year for a period of 25 years. The payment shall be made on a calendar year basis. The payment for the first year of the Shivwits Right-of-Way shall be due and payable directly to the Shivwits Band within thirty days from the date WCWCD receives notice that the Secretary has approved the Shivwits Right-of-Way and shall be prorated based on the calendar year. The payment each year thereafter shall be due and payable on January 15 of each calendar year. Annual payments shall continue thereafter, in accordance with this subsection and in accordance with subsection 6.4.6.

6.4.6 There shall be new appraisals for the Shivwits Right-of-Way made at the end of each 25 year period. One appraisal shall be conducted by the Shivwits Band and one appraisal conducted by the WCWCD, or any successor operator of the Santa Clara Project. The value for each succeeding 25 year period shall be the average value and average rate of return of the two appraisals. Both appraisals must be performed by MAI licensed appraisers and use generally accepted standards for appraising rights of way and rates of return.

6.4.7 The payment for the Shivwits Right-of-Way shall be paid to the Shivwits Band by the WCWCD, or any successor operator of the Santa Clara Project, and shall be included as an operation and maintenance cost. The sole remedy for default with respect to the Shivwits Right-of-Way compensation provided for herein shall be an action for specific performance. The WCWCD, or any successor operator of the Santa Clara Project, shall be liable for any payment regardless of whether any water user is in default in its OMR&R payments.

6.4.8 The Shivwits Band, and the United States acting for the benefit of the

Shivwits Band, agree that they shall grant and approve an easement on the Shivwits Reservation for the approximately 5.3 acre portion of the Ivins Reservoir that occupies tribal land, in accordance with 25 U.S.C. §§ 323-328 and 25 CFR Part 169 and this Agreement ("Ivins Reservoir Easement").

6.4.9 The Ivins Reservoir Easement shall be a permanent, exclusive easement held in the name of WCWCD and assignable (with Bureau of Indian Affairs approval, as required by law) to any successor operator of the Santa Clara Project that is selected pursuant to Section 7.1 of this Agreement.

6.4.10 Subject to the provisions of Subsection 6.4.12(c) below, the payment for the Ivins Reservoir Easement shall be $300.00 per year and shall be paid annually at the first of the year by Ivins Irrigation to the Shivwits Band.

6.4.11 The sole remedy for default with respect to the Ivins Reservoir Easement compensation provided for herein shall be an action for specific performance. WCWCD or any successor operator of the Santa Clara Project shall be liable for the easement payment in the event Ivins Irrigation is in default on the easement payment.

6.4.12 In addition to the above annual payment, as consideration for the Ivins Reservoir Easement, all Parties, including WCWCD and Ivins Irrigation agree as follows:

(a) The Ivins Reservoir will be operated as a multi-use facility. The primary purpose will be to facilitate the Santa Clara Project as provided for in this Agreement; the secondary purpose will be recreation purposes.

(b) The Shivwits Band, Ivins Irrigation, WCWCD, and the Town of Ivins shall jointly develop an Ivins Reservoir Recreation Plan contemporaneously with the development of the Santa Clara Project OMR&R Plan which accommodates recreational use and recreational development to the maximum extent possible while first meeting the requirements of the Santa Clara Project (the "Ivins Reservoir Recreation Plan").

(c) Subject to any limits stated in the Ivins Reservoir Recreation Plan, the Shivwits Band shall have full access to Ivins Reservoir and the adjacent shoreline for recreational

purposes and the right to build structures for water-related recreational purposes on Shivwits Band land and on a three (3) acre tract of off-Reservation land located on the west half of the shoreline as shown on **Exhibit D** (the "Subject Property"). Upon request by the Shivwits Band, Ivins Irrigation and/or WCWCD or the successor operator of the Santa Clara Project (whichever entity then owns the Subject Property) shall grant and approve a permanent easement allowing the Shivwits Band to erect water-related recreational structures on the Subject Property free of charge (the "Recreational Easement"). Any recreational structure constructed by the Shivwits Band on the Recreational Easement shall comply with the Ivins Reservoir Recreation Plan and be available to the public without charge. Upon conveyance of the Recreational Easement to the Shivwits Band, the annual $300.00 payment for the Ivins Reservoir Easement shall terminate.

6.5 Construction Advisory Committee.

6.5.1 A Construction Advisory Committee ("Committee") shall be established by St. George, the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation, and shall be comprised of one representative from each of these parties. Actions of the Committee shall be decided by a majority vote.

6.5.2 The WCWCD shall inform the Committee regularly of the progress in the following Santa Clara Project activities: (a) developing the design and cost estimates; (b) financing; (c) permitting and environmental compliance; (d) the bid process; and (e) construction.

6.5.3 The Committee shall, as necessary or appropriate, provide oversight of and make recommendations about, the Santa Clara Project construction activities in order to maintain the viability of the Santa Clara Project construction and to assure consistency with the terms of this Agreement.

6.6 WCWCD shall own the Santa Clara Project for the benefit of and use by New Santa Clara, St. George Clara, the Shivwits Band, and Ivins Irrigation in accordance with the terms of this Agreement. The beneficial interest in the Santa Clara Project by New Santa Clara, St. George Clara, the Shivwits Band, and Ivins Irrigation shall be based on the proportionate share of the water right each of these four parties has in the Santa Clara Project as set forth in Subsection 8.3.

Change in ownership of the Santa Clara Project shall only be by unanimous consent of New Santa Clara, St. George Clara, the Shivwits Band, and Ivins Irrigation.

7.0 Santa Clara Project Operation, Maintenance, Repair, and Replacement.

7.1 WCWCD, or any successor operator of the Santa Clara Project, shall be responsible for the operation, maintenance, repair and/or replacement of the Santa Clara Project, pursuant to a contract to be negotiated and executed by WCWCD, St. George, the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation. The WCWCD shall remain the operator of the Santa Clara Project for a period of not less than twenty (20) years unless otherwise agreed to by the Parties identified in this subsection 7.1. Subsequent operators of the Santa Clara Project shall be selected by consensus vote of the WCWCD, St. George, the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation.

7.2 St. George Clara, New Santa Clara, Ivins Irrigation and the Shivwits Band shall each be responsible for their proportionate share of the operation, maintenance, repair and/or replacement costs of the Santa Clara Project. The proportionate share of such costs for each of these water users shall be calculated based on the percentage that each of the water user's acre foot allocation bears to the total acre foot allocation as provided in subsection 8.3. These costs shall include those incurred in connection with the Santa Clara Project facilities to and including the Ivins Reservoir facilities and the Gunlock Reservoir facilities, and shall include the annual fees assessed by the State Engineer of Utah to cover the fees associated with the administration by the River Commissioner of the Santa Clara Project Water Rights. Excluding the Gunlock Well Field, these costs shall also include the costs for the wells, pumps, and motors utilized to provide Supplemental Project Water, as further provided in Subsection 8.5. For Supplemental Project Water delivered from the Gunlock Well Field, the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation are responsible only for the power costs, including 20% surcharge, associated with water actually pumped and delivered to the Santa Clara Project facilities. Costs for system upgrades, modifications or additions required to allow the Santa Clara Project system capacity to be increased beyond that specified in the OMR&R Plan shall be borne by the

beneficiary of the upgrade and shall not be considered part of the normal operation, maintenance, repair, or replacement costs.

7.3 WCWCD shall prepare a Santa Clara Project Operation, Maintenance, Repair and Replacement Plan ("OMR&R Plan"), contemporaneously with the development of the Ivins Reservoir Recreation Plan required by Subsection 6.4.12(b), no later than 60 days after construction of the Santa Clara Project is complete and provide same to St. George, the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation for review, comment and approval, provided, however, that no Party shall unreasonably withhold approval. The OMR&R Plan shall include a provision for periodic revisions to the Plan.

7.3.1 The OMR&R Plan shall include Standard Operating Procedures that specify the criteria pursuant to which the Santa Clara Project will be operated and maintained to carry out the terms of this Agreement.

7.3.2 The OMR&R Plan shall include procedures for determining annual operation, maintenance, repair and replacement costs for all the Santa Clara Project facilities, including facilities to supply supplemental water, scheduling the delivery of water in Average and Below Average Water Years, accounting for inflows into the Gunlock Reservoir, reservoir operations and instream flow releases, dredging requirements at Gunlock Reservoir, coordinating the Santa Clara Project operations and water delivery with the River Commissioner and procedures for performing annual maintenance and repairs.

7.3.3 The OMR&R Plan shall describe the detailed process by which WCWCD, or any successor operator of the Santa Clara Project, will consult with the Parties to this Agreement concerning any aspect of implementation of and compliance with this Agreement.

7.4 St. George, the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation shall have the right to inspect the books of the Santa Clara Project.

7.5 Operation, maintenance, repair, and replacement costs begin to accrue on the date a Santa Clara Project water user is first notified by the WCWCD, or any successor operator of the Santa Clara Project, that water is available for delivery from the Santa Clara Project. Payment of

the annual OMR&R costs is a pre-requisite to receiving water in any Santa Clara Water Delivery Year. Upon payment of all delinquent OMR&R fees plus any late fee that has been assessed, a delinquent Santa Clara Project water user will again receive its water allocation, provided that delivery will not resume until the following Santa Clara Water Delivery Year if WCWCD, or any successor operator of the Santa Clara Project, determines that the delivery schedule that has already been set for that year cannot accommodate the delivery of water to the delinquent Santa Clara Project water user. WCWCD, or any successor operator of the Santa Clara Project, may take appropriate measures to recover OMR&R charges, including charging a late fee, which may include interest, for the nonpayment of OMR&R charges that are not paid by the due date, and may cease delivery of a user's water and distribute it to another user to recover delinquent OMR&R charges that continue for an extended period. The choice by a Santa Clara Project water user to forego or reduce the delivery of its Santa Clara Project Water Right for any period of time shall not affect that water user's obligation to pay its proportionate share of the operation, maintenance, repair and replacement costs.

7.6 After Congress has appropriated the One Million Dollars ($1.0 million) and deposited same in the Shivwits Band Trust Fund, as set forth in Subsection 11.5(c), the United States shall have no further obligation for OMR&R costs associated with this Agreement.

8.0 Santa Clara Project Water Delivery.

8.1 Instream Flows.

8.1.1 WCWCD, Ivins Irrigation, Lower Gunlock, New Santa Clara, the Shivwits Band, St. George, and St. George Clara by agreement do hereby make available to the Utah Division of Wildlife Resources on a perpetual basis at Gunlock Reservoir sufficient water to provide 3.0 cfs of instream flow in the Santa Clara River immediately below Gunlock Reservoir. The instream flow water shall have first priority to water deliveries from the Santa Clara Project.

8.1.2 The Utah Division of Wildlife Resources shall file for and secure the approval of the Utah State Engineer for an instream flow water right in the amount of 3.0 cfs in the Santa Clara River from Gunlock Reservoir downstream to the point of diversion for Bloomington.

8.1.3 Upon approval by the Utah State Engineer of the instream flow water right described in Subsection 8.1.2, WCWCD or any successor operator of the Santa Clara Project, shall release sufficient water from Gunlock Reservoir that when added to any spills and/or seepage flows will provide 3.0 cfs on a continual basis in the Santa Clara River immediately downstream of Gunlock Reservoir for instream flow requirements to further the conservation strategies for the benefit of the Virgin Spinedace that are set forth in the "Conservation Agreement and Strategy" which is attached as **Exhibit E** and incorporated herein by reference. WCWCD, or any successor operator of the Project, shall measure the 3.0 cfs and maintain the flow measurements as public records.

8.1.4 The Utah Division of Wildlife Resources, Lower Gunlock, and WCWCD shall enter into an agreement to amend the agreement, dated June 10, 1981, to assign 1,086 acre-feet of the Conservation Pool in Gunlock Reservoir to WCWCD. Such storage shall be used to provide water for the Santa Clara Project instream flow requirement and other Santa Clara Project purposes. The amended agreement required by this Subsection 8.1.4 is attached as **Exhibit F** and incorporated herein by reference.

8.2 Santa Clara Project Water shall be delivered to St. George Clara, New Santa Clara, Ivins Irrigation and the Shivwits Band in a Santa Clara Water Delivery Year based on the annual acre foot allocation and maximum diversion rate in cfs for each of these four Parties as specified in Subsections 8.3 and 8.4 of this Agreement. The point of delivery of the Santa Clara Project water for each of these parties shall be as specified in Subsections 8.2.1 through 8.2.4. These points of delivery may be modified by agreement of the Parties and the operator of the Santa Clara Project, and in accordance with applicable law. A temporary application submitted to the State Engineer of Utah for approval shall not require approval of any other Party to this Agreement as long as WCWCD, or any successor operator of the Project, determines that the temporary application does not adversely affect the operations of the Santa Clara Project.

8.2.1 The St. George Clara water shall be measured and delivered at the Ivins Reservoir outlet.

8.2.2 The New Santa Clara water shall be measured and delivered at the Ivins Reservoir outlet.

8.2.3 The Ivins Irrigation water shall be measured and delivered at the Santa Clara Project pipeline above Ivins Reservoir.

8.2.4 The Shivwits Band water shall be measured and delivered at the Santa Clara Project pipeline on the Shivwits Reservation.

8.3 In an Average Water Year:

8.3.1 The Santa Clara Project shall deliver to St. George Clara 3,278 acre feet annually at a diversion rate not to exceed 8.0 cfs, and to New Santa Clara 2,163 acre feet annually at a diversion rate not to exceed 5.0 cfs, measured as the water leaves Ivins Reservoir.

8.3.2 The Santa Clara Project shall deliver to the Shivwits Band 1,900 acre feet annually at a diversion rate not to exceed 4.5 cfs, measured at the outlets of the Santa Clara Project pipeline on the Shivwits Reservation.

8.3.3 The Santa Clara Project shall deliver to Ivins Irrigation 1,500 acre feet of water annually at a diversion rate not to exceed 4.0 cfs, measured at the Santa Clara Project pipeline above Ivins Reservoir.

8.4 In a Below Average Water Year:

8.4.1 The Santa Clara Project water delivery to Ivins Irrigation shall be reduced initially to 1,000 acre feet annually in order to satisfy the Santa Clara Project Water Rights of St George Clara, New Santa Clara, and the Shivwits Band.

8.4.2 If the Santa Clara Project Water Rights of St. George Clara, New Santa Clara, and the Shivwits Band are not capable of being satisfied fully after the reduction in delivery of the Ivins Irrigation water delivery provided in Subsection 8.4.1, the projected percentage of surface water allocations shall be determined for the Santa Clara Water Delivery Year. The percentage of the allocation shall be evaluated monthly and updated as necessary. St. George Clara, New Santa Clara, and the Shivwits Band each shall receive a proportionate allocation of the available Santa Clara Project water supply based on their respective acre foot allocations set forth

in Subsection 8.3, and Ivins Irrigation shall receive a proportionate allocation based on its acre foot allocation set forth in Subsection 8.4.1. Supplemental Project Water can be supplied to the Shivwits Band, New Santa Clara, St. George Clara, and Ivins Irrigation as provided in Subsection 8.5 up to the full allocation volumes identified in Subsections 8.3 and 8.4.1.

8.5 Supplemental Project Water.

8.5.1 The groundwater rights of the Parties comprising Supplemental Project Water shall be part of the Santa Clara Project Water Right supply and the Supplemental Project Water shall be utilized as needed to satisfy the water demands set forth in Subsections 8.3 and 8.4 in Below Average Water Years.

8.5.2 The decision regarding the use of the Supplemental Project Water shall be made by the WCWCD, or any successor operator of the Santa Clara Project, in conjunction with the Parties entitled to receive Santa Clara Project Water and St. George. Only those Parties which receive Supplemental Project Water shall be obligated to pay the related operation, maintenance, repair, and replacement costs in accordance with Subsection 7.2 for that Supplemental Project Water.

8.5.3 If any Santa Clara Project water user chooses not to receive its full allocation of Supplemental Project Water in any Santa Clara Water Delivery Year, any other Santa Clara Project water user may elect to take delivery of such unused Supplemental Project Water, subject to the water right limitations in subsections 8.3 and 8.4, by filing a written request in that year with WCWCD, or any successor operator of the Santa Clara Project, and paying the associated OMR&R costs. The requests will be granted pro rata among those making the requests based on the available unused Supplemental Project Water supply.

8.5.4 St. George shall be solely responsible for payment of all costs associated with drilling and equipping the wells it uses to supply Supplemental Project Water. The operation, maintenance, repair, and replacement costs for the groundwater wells developed by St. George to provide 4.0 cfs of the Supplemental Project Water supply shall be allocated between St. George and the Parties entitled to Santa Clara Project Water based on quantities of water used by these

Parties in a Below Average Water Year from the Gunlock Well Field, and shall be prorated among the Santa Clara Project water users in accordance with subsection 7.2 of this Agreement.

8.5.5 The water made available for use in the Santa Clara Project by St. George pursuant to this Agreement constitutes an exchange of water and is a compromise and settlement of water right claims of the Parties from the Santa Clara System and thus does not constitute a lease or sale of St. George's water rights, water supply or waterworks contrary to Article XI, Section 6 of the Utah Constitution.

8.6 Water User Delivery Systems. St. George Clara, New Santa Clara, Ivins Irrigation, and the Shivwits Band shall be responsible, at their sole cost and expense and without any obligation to the other Parties, for the construction, installation, operation, maintenance, repair and replacement of their respective water delivery systems from the Santa Clara Project pipelines to their respective places of use. The water delivered shall be metered from the Santa Clara Project pipelines and the meters shall constitute a Project expense.

8.7 Substitute Water. The WCWCD may provide substitute water to St. George Clara, New Santa Clara, Ivins Irrigation, and the Shivwits Band from sources other than from the Santa Clara System. The substitute water shall be of equal quantity and quality, shall not include sewer effluent water, and shall be made available at the points of delivery set forth in subsection 8.2. The substitute water will be provided in exchange for water from the Santa Clara System and the WCWCD would be entitled to utilize an amount of Santa Clara River water equal to the substitute water provided by the WCWCD for WCWCD purposes.

9.0 Santa Clara Project Deliveries for Non-Project Water Rights.

The Santa Clara Project shall be configured and used to deliver Santa Clara River water to satisfy such rights that Edward Bowler has as a shareholder in the Gunlock Irrigation Company for delivery of Santa Clara River water below Gunlock Reservoir. Edward Bowler shall not be obligated to pay any construction or operation, maintenance, repair or replacement costs for the Santa Clara Project.

10.0 Change Applications.

10.1 Pooled Water Rights. The Parties whose water rights are pooled as provided for in subsection 4.2 of this Agreement shall file change applications as required to accomplish the purposes of the Agreement. WCWCD shall assist the Parties in the preparation and filing of such change applications and pay the associated costs and filing fees.

10.2 St. George Water Right Applications. St. George shall file applications and seek approval of the State Engineer of Utah to: (a) segregate 6.0 cfs of groundwater from Water Right Number 81-1715 (A33708a); (b) allow 4.0 cfs of the 6.0 cfs of groundwater to be developed from the Gunlock Well Field and used as Supplemental Project Water in Below Average Water Years in accordance with this Agreement; and (c) allow St. George to use the 6.0 cfs of groundwater to be developed from the Gunlock Well Field for municipal purposes in Average Water Years and at least 2.0 cfs in Below Average Years. In the event that the State Engineer of Utah administers the priority of the Gunlock Well Field conjunctively with surface water in the Santa Clara System, St. George shall manage its water supplies to assure that the 4.0 cfs designated as Supplemental Project Water is made available in accordance with this Agreement.

11.0 Enforceability Date Of Agreement. This Agreement shall be effective and enforceable only after all of the following have been accomplished:

11.1 Execution of this Agreement by the Parties hereto;

11.2 Execution of the St. George Water Reuse Project Agreement by all the parties thereto;

11.3 Execution of the Settlement Agreement, and the Waivers and Release of Claims contained therein, by the parties thereto;

11.4 Ratification and confirmation of the Shivwits Water Right set forth in the Settlement Agreement in legislation duly enacted by the United States Congress;

11.5 Authorization and appropriation by the United States Congress and deposit into the Shivwits Trust Fund of: (a) fifteen million dollars ($15,000,000.00) for the Shivwits Band's share of the costs of the St. George Water Reuse Project as set forth in the St. George Water Reuse

Project Agreement; (b) five million dollars ($5,000,000.00) in consideration of the Shivwits Band's execution of a waiver and release of claims against the United States; and (c) one million dollars ($1,000,000.00) for the Shivwits Band's share of the operation, maintenance, repair and replacement costs associated with this Agreement;

11.6 Approval by the State Engineer of Utah of any and all applications necessary to effectuate the terms of this Agreement, the St. George Water Reuse Agreement, and the Settlement Agreement, from which no further appeals may be taken;

11.7 Execution by Utah Division of Wildlife Resources, WCWCD, and Lower Gunlock of the document required in subsection 8.1.4 of this Agreement;

11.8 Issuance of a judgment and decree in the Virgin River Adjudication, pursuant to Utah Rule of Civil Procedure 54(b), that is final as to all parties to the Santa Clara Division of the Virgin River Adjudication and from which no further appeals may be taken, which confirms the Utah State Engineer's Proposed Determination regarding the water rights pooled in accordance with this Agreement, the Shivwits Water Right set forth in the Settlement Agreement, and changes all "prior to 1890" water rights set forth in the 1922 adjudication entitled *St. George Santa Clara Field Co., et al. v. Newcastle Reclamation Co., et al.* to "1890" water rights; and

11.9 The Secretary of the Interior has published a notice in the Federal Register that all of the actions identified in this Section 11 have been completed.

12.0 Contingent Upon Appropriation of Funds

The expenditure or advance of any money or the performance of any obligation by the United States under this Agreement shall be contingent upon appropriation of funds therefore. No liability shall accrue to the United States or to any other Party in the event funds are not appropriated.

13.0 Counterparts.

This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Agreement.

14.0 Entire Agreement.

This Agreement supersedes any prior understanding, representation, or agreement of the Parties regarding the subject matter hereof.

15.0 Evidentiary Effect of Negotiations.

This Agreement has been arrived at in the process of good faith negotiation for the purpose of resolving legal disputes, including pending litigation, and all Parties agree that no offers and/or compromises made in the course thereof shall be construed as admissions against interest or be used in any legal proceeding other than one for approval, confirmation, interpretation, or enforcement of this Agreement.

16.0 Force Majeure.

16.1 The WCWCD, or any successor operator of the Santa Clara Project, shall exercise reasonable diligence and care to avoid interruptions of delivery of water from the Santa Clara Project, and shall not be liable for any damage or loss occasioned by any failure or interruption caused by a state of Force Majeure. For purpose of this Agreement, Force Majeure means acts of God, acts of public enemies, insurrection, riots, fires, explosions, floods, earthquakes, strikes, emergency actions the WCWCD, or any successor operator of the Santa Clara Project, may be compelled to take to prevent serious injuries or death to persons, lawful orders or acts of civil or military authority, or other causes of similar nature. The WCWCD, or any successor operator of the Santa Clara Project, shall restore its delivery of water from the Santa Clara Project as soon as is reasonably possible after such delivery is interrupted due to a state of Force Majeure.

16.2 In the event the WCWCD, or any successor operator of the Santa Clara Project, believes a state of Force Majeure exists such that the WCWCD, or any successor operator of the Santa Clara Project, cannot meet its obligation as required by this Agreement, the WCWCD, or any successor operator of the Santa Clara Project, shall provide written notification as expeditiously as possible to any affected Party, but no later than sixty (60) days after the event that resulted in a state of Force Majeure. This written notice shall describe the anticipated duration of the inability of WCWCD, or any successor operator of the Santa Clara Project, to deliver water

from the Santa Clara Project, the cause or causes of the state of Force Majeure, a description of the measure(s) to be taken by the WCWCD, or any successor operator of the Santa Clara Project, to permit it to meet its obligation under this Agreement, and an estimated timetable for implementation of these measures. The WCWCD, or any successor operator of the Santa Clara Project, shall take all reasonable measures to resume delivery of water in accordance with this Agreement after a state of Force Majeure occurs and written notification of same is provided by the WCWCD, or any successor operator of the Santa Clara Project.

17.0 Governing Law and Rights and Remedies.

17.1 This Agreement shall be construed in accordance with the applicable law of the State of Utah and applicable Federal law. Nothing contained herein waives the right of the United States or the Shivwits Band to object to the jurisdiction of the courts of the State of Utah to adjudicate any dispute arising under this Agreement, or waives the right of any Party to object to the jurisdiction of any federal court to adjudicate any dispute arising under this Agreement.

17.2 The Parties shall have all rights and remedies provided under applicable federal or state law for a breach or threatened breach of this Agreement; provided, however, that because this Agreement is intended to supply water in perpetuity to the Shivwits Band in lieu of the water rights claims filed by the United States on behalf of the Shivwits Band in the Virgin River Adjudication, termination of this Agreement for breach of this Agreement is not a permitted or authorized right or remedy under this Agreement. These rights and remedies shall not be mutually exclusive, and the exercise of one or more of these rights and remedies shall not preclude the exercise of any other rights and remedies. Each Party confirms that damages at law may be an inadequate remedy for a breach or threatened breach of any provision hereof and the respective rights and obligations of the Parties hereunder shall be enforceable by specific performance, injunction, or other equitable remedy. Nothing in this Agreement shall be construed to waive the sovereign immunity of the United States.

18.0 Modification of Agreement.

Any modification of this Agreement or additional obligation assumed by any Party in

connection with this Agreement shall be binding only if evidenced in writing and signed by each Party or an authorized representative of each Party.

19.0 Necessary Acts and Cooperation.

19.1 The Parties shall do any act or thing and execute any and all instruments required by this Agreement and which are necessary and proper to make effective the provisions of this Agreement; provided, however, that the United States shall not be required to do any act or thing that is not authorized by law and for which funds have not been appropriated by Congress; and provided, further, that Utah shall not be required to do any act or thing that is not authorized by law and for which funds have not been appropriated by the Utah legislature.

19.2 The Parties shall not protest any applications filed with the State Engineer of Utah in furtherance of or as needed to effectuate the provisions of this Agreement, the St. George Water Reuse Agreement, or the Settlement Agreement.

19.3 The Parties shall not file any objection or protest to any Proposed Determination which may be issued by the State Engineer of Utah in furtherance of or as needed to effectuate this Agreement, the St. George Water Reuse Agreement, or the Settlement Agreement; except to the extent that such Proposed Determination may be inconsistent with these agreements.

19.4 The Parties shall not file any objection or protest to the Proposed Judgment and Decree that is filed by stipulation of the Parties in the Virgin River Adjudication.

19.5 The Parties shall file in the Virgin River Adjudication those documents required to obtain a judgment and decree, pursuant to Utah Rule of Civil Procedure 54(b), that is final as to all parties to the Santa Clara Division of the Virgin River Adjudication and from which no further appeals may be taken, which confirms the Utah State Engineer's Proposed Determination regarding the water rights pooled in accordance with this Agreement, the Shivwits Water Right set forth in the Settlement Agreement, and changes all "prior to 1890" water rights set forth in the 1922 adjudication entitled *St. George Santa Clara Field Co., et al. v. Newcastle Reclamation Co., et al.* to "1890" water rights.

20.0 No Waiver.

No delay or failure by any Party to exercise any right under this Agreement, and no partial or single exercise of that right, shall constitute waiver of that or any other right, unless expressly provided herein. No waiver by a Party under this Agreement shall affect or alter the remainder of this Agreement, and each and every covenant, duty, and condition hereof shall continue in full force and effect with respect to any other then existing or subsequently occurring breach.

21.0 Notices

Any notice to be given hereunder shall have been properly given when hand delivered to the officer or manager designated hereinbelow, or when deposited in the United States mail, certified or registered, postage prepaid, addressed as follows:

Chairperson
Shivwits Band
P.O. Box 448
Santa Clara, UT 84765

Regional Director
Bureau of Indian Affairs
P.O. Box 10
Phoenix, AZ 85001

Executive Director
Utah Department of Natural Resources
P.O. Box 145610
Salt Lake City, UT 84114-5610

Bloomington Canal Company
1135 Goldenrod Circle
St. George, UT 84770

Lower Gunlock Reservoir Corporation
175 East 200 North
St. George, UT 84770

Ed Bowler
438 840 South Circle
St. George, UT 84770

St. George Clara Field Canal Company
175 East 200 North
St. George, UT 84770

City Manager
City of St. George
175 East 200 North
St. George, UT 84770

Field Agent, Southern Paiute Field Station
Bureau of Indian Affairs
P.O. Box 720
St. George, UT 84771

Washington County Water
Conservancy District
136 North 100 East
St. George, UT 84770

Southgate Irrigation Company
175 East 200 North
St. George, UT 84770

Ivins Irrigation Company
P.O. Box 380181
Ivins, UT 84738

New Santa Clara Field Canal Company
800 Old Farm Rd.
Santa Clara, UT 84765

22.0 Officials Not To Benefit

No member of or delegate to Congress or Resident Commissioner shall be admitted to any share of this Agreement or to any benefit that may arise herefrom. This restriction shall not be construed to extend to this Agreement if made with a corporation or company for its general benefit.

23.0 Persons Bound By Agreement.

23.1 This Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective employees, representatives, successors, and assigns.

23.2 In any action to enforce any term of this Agreement, no Party hereto shall raise as a defense the failure by any of its officers, directors, agents, servants, employees, successors, assigns, and contractors to take actions necessary to comply with the provisions of this Agreement. Each Party to this Agreement reserves its rights against any such person or entity whose acts cause or permit the Party to violate the terms of this Agreement. Each Party to this Agreement shall be responsible for the acts of its officers, directors, agents, servants, employees, successors, assigns, and contractors who violate, cause or permit the Party to violate the terms of this Agreement.

24.0 Signature Authority

The undersigned representative of each Party to this Agreement certifies that he or she is fully authorized to enter into the terms and conditions of this Agreement, to execute it, and to bind the Party each person represents to this Agreement.

IN WITNESS THEREOF, the Parties have executed this Agreement on the day and year first written above.

NEW SANTA CLARA FIELD CANAL COMPANY

By: _____

Its: _____

Date: 1/15/2001

ST. GEORGE CLARA FIELD CANAL COMPANY

By: _____

Its: Pres

Date: 01-15-01

IVINS IRRIGATION COMPANY

By: _____

Its: Pres

Date: 1/15/01

LOWER GUNLOCK RESERVOIR CORPORATION

By: _____

Its: Pres

Date: 01-15-01

SHIVWITS BAND OF THE PAIUTE INDIAN TRIBE OF UTAH

By: _____

Its: Band Chairman

Date: 1-15-01

Approved: _____

Chair, Paiute Indian Tribe of Utah

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT

By: _____

Its: Chair

Date: JAN. 15. 2001

CITY OF ST. GEORGE

By: David D. McArthur

Its: Mayor

Date: Jan 15, 2001

BLOOMINGTON CANAL COMPANY

By: [signature]

Its: Pres.

Date: Jan 15, 2001

SOUTHGATE IRRIGATION COMPANY

By: [signature]

Its: Pres.

Date: 15 Jan 01

ED BOWLER

By: [signature]

Its:

Date: 01/16/01

STATE OF UTAH

By: [signature]

Its: Ex Dir. Dept of Natural Resources

Date: 16 Jan 01

UNITED STATES OF AMERICA

By: [signature]

Its:

Date: 1/18/01

EXHIBIT A

[Reference: Section 3.7]

SANTA CLARA PROJECT DESCRIPTION

This project is located in southwestern Utah in Washington County. It is located in Sections 5, 8, 17, 20, 25, 26, 27, 28, and 29, T41S, R17W, SLB&M. The project will consist of a pressurized pipeline, 24 inches in diameter and approximately six miles long, used to deliver water from Gunlock Reservoir to Ivins Reservoir, with diversions to water users from the pipeline and from releases from Ivins Reservoir. The purpose of this pipeline is to use water more efficiently, and to reduce water losses from evaporation and infiltration. The conserved water will be used to provide year-long river flows below Gunlock Reservoir and to provide water to assist in settling the water rights claims of the Shivwits Band and the United States on behalf of the Shivwits Band. It is estimated that the project will conserve 13 cfs and yield 3,600 acre-feet of water per year.

The pipeline will begin at the outlet of Gunlock Reservoir and will then follow the "Gunlock Highway", being buried in either shoulder of the road and varying from one side of the road to the other depending on the location of existing utilities and other pipelines. It will be buried with at least two feet of cover. The pipeline will follow the road in a southerly direction to the Winsor Diversion (Shem Dam) located beside the Gunlock Highway on the Shivwits Indian Reservation. The dam diverts water out of the Santa Clara River into the existing Santa Clara canal.

The pipeline will then follow the existing Santa Clara canal to Ivins Reservoir. The pipeline will be laid in the existing canal, bedded in sand and covered, or laid in the road adjacent to the canal. If laid in the road, it will be in the disturbed area of the existing road, and covered with at least two feet of cover. This project will replace five Santa Clara River diversions from Gunlock Reservoir to the Town of Santa Clara. The pipeline will be equipped with fully automated recording stations to monitor water deliveries accurately to each diverting entity on a daily and cumulative yearly basis and to minimize measurement activities of the River Commissioner on the Shivwits Indian Reservation.

The water from the Santa Clara Project will be managed as provided for in the Santa Clara Project Agreement.

EXHIBIT B

[Reference: section 3.13]

MAP OF SHIVWITS INDIAN RESERVATION

Shivwits Indian Reservation
Washington County, Utah

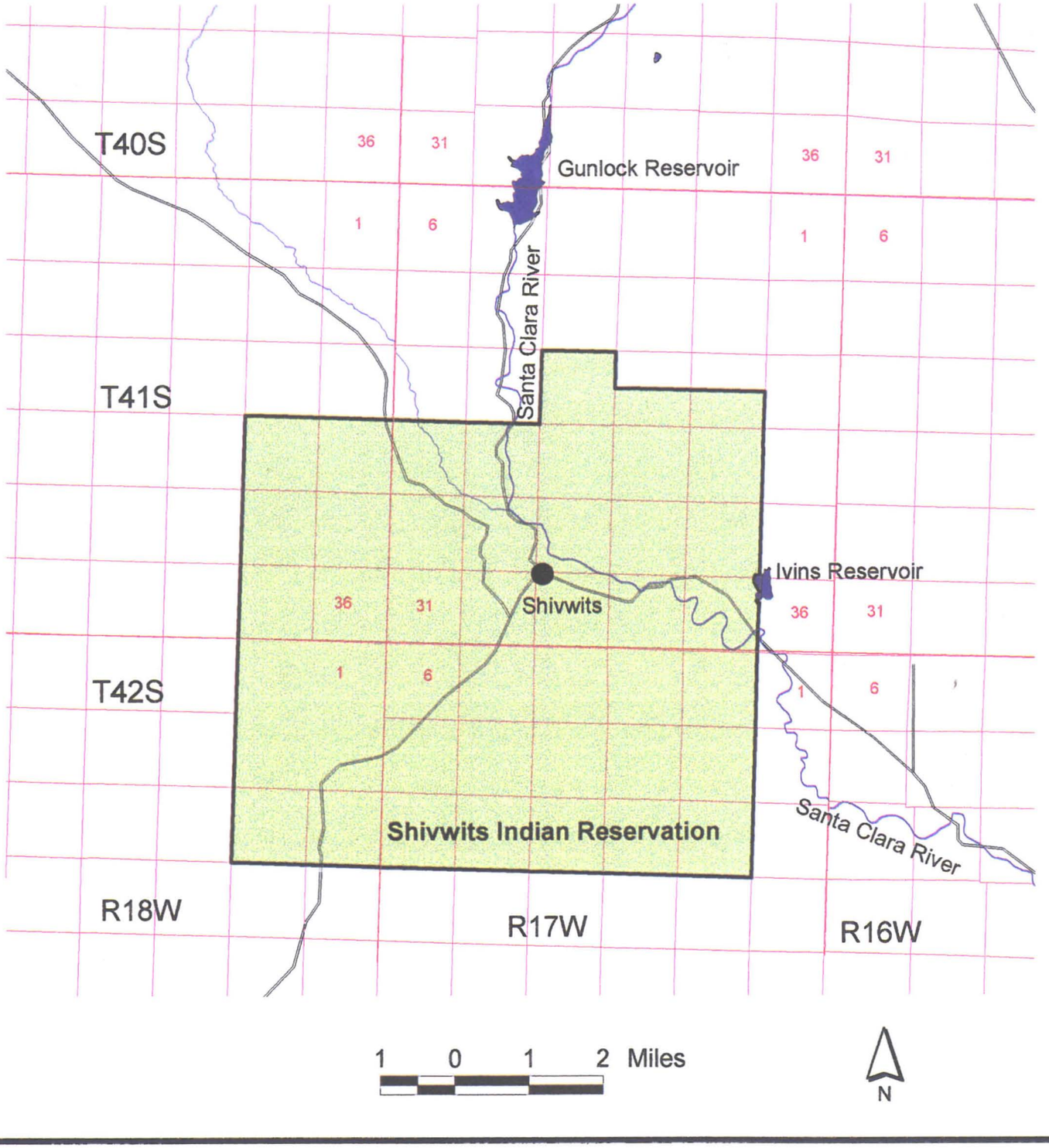


EXHIBIT C
[Reference: Section 4.2]

Tabulation of Santa Clara Project Water Rights to be Included By the State Engineer of Utah in an Amended Proposed Determination of Water Rights, Santa Clara-Beaver Dam Wash Division, Book No. 1.

Exhibit C - Tabulation of Water Rights to be Pooled Under the Santa Clara Project Agreement

WR No.	Quantity[1]	Source	Uses[2]	Location[3]	Priority	Status[4]	Remarks
Ivins Irrigation Company							
81-7	14.9	Santa Clara River	508.13 acs.	28 41S 17W	11/15/1930	Cert	Held by Utah Board of
81-77	1000 AF	Santa Clara River	I	28 41S 17W	08/21/1918	Cert	Water Resources.
81-1497	0.042	Well	4.40 acs.	36 41S 17W	11/30/1977	Cert	
81-1626	0.04	Well	4.22 acs.	36 41S 17W	11/30/1977	Cert	
81-1660	0.059	Well	6.03 acs., *S*	10 42S 16W	04/12/1965	Cert	Stockwatering 30 cattle.
81-1663	0.027	Well	2.82 acs.	36 41S 17W	11/30/1977	Cert	
81-1665	0.016	Well	1.67 acs.	36 41S 17W	11/30/1977	Cert	
81-1666	0.008	Well	0.84 acs.	36 41S 17W	11/30/1977	Cert	
81-2112	0.021	Well	2.19 acs.	36 41S 17W	11/30/1977	Cert	
81-2113	0.016	Well	1.67 acs.	36 41S 17W	11/30/1977	Cert	
Lower Gunlock Reservoir Corporation							
81-1101	14127.864 AF	Santa Clara River	I, FC	5 41S 17W	06/24/1936	Cert	Gunlock Reservoir.
81-3895	1172.135 AF	Santa Clara River	I, FC	5 41S 17W	06/24/1936	Cert	Stock owned by St. George City.
New Santa Clara Field Canal Company							
81-562	1.02	Well	I	17 42S 16W	03/29/1963	Cert	
81-793	1.0	Well	I	17 42S 16W	08/26/1934	UWC	
81-1148	8.7	Santa Clara River	360.56 acs.	5 41S 17W	1890	Dec	
St. George City							
81-	6.00	Wells	Mun, Misc	17 41S 17W	06/16/1966	App	In below avg yrs up to 4.0 cfs delivered to Project.

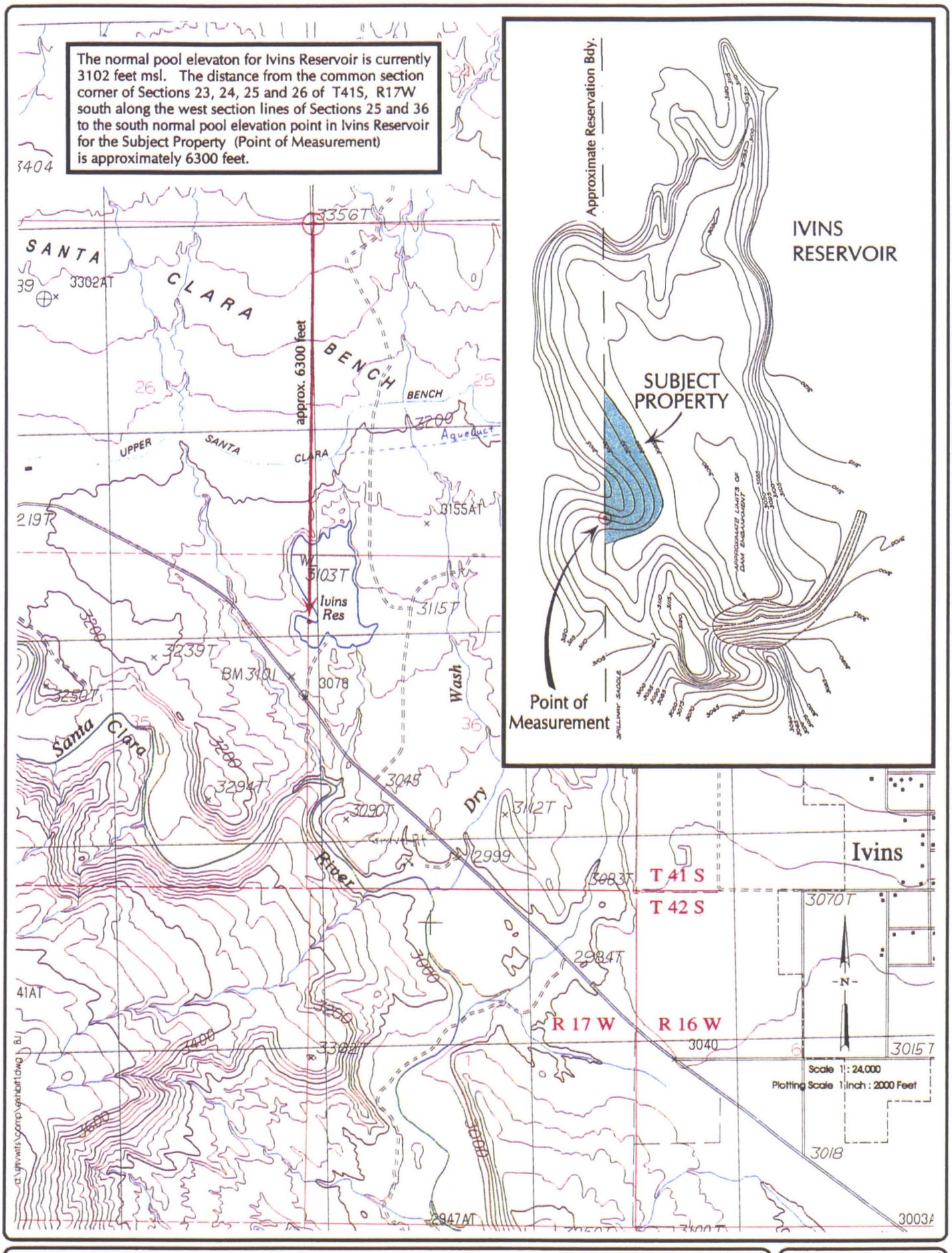
WR No.	Quantity	Source	Uses	Location	Priority	Status	Remarks
St. George Clara Field Canal Company							
81-203	0.2554	Wells	I	16 42S 16W	05/16/1946	Cert	
81-323	0.67671	Well	I	16 42S 16W	05/12/1956	Cert	
81-1149	8.5099	Santa Clara River	540.26 acs.	5 41S 17W	1890	Dec	
81-3893	0.1446	Wells	I	16 42S 16W	05/16/1946	Cert	Stock owned
81-3894	0.38329	Well	I	16 42S 16W	05/12/1956	Cert	by St. George
81-3896	4.8201	Santa Clara River	I	5 41S 17W	1890	Dec	City.
United States of America in trust for the Shivwits Band of Paiute Tribe							
81-2313	1.242	Santa Clara River	66.53 acs., *S*	28 41S 17W	1890	Dec	Stockwatering - 50 cattle.
81-2425	0.138	Santa Clara River	16.67 acs.	28 41S 17W	1890	Dec	81-2313 & 2425 are limited to an annual diversion of 500.60 AF.
	1399.40 AF	Santa Clara River	Misc	5 41S 17W	1890	Agmt	As per Santa Clara Project Agrement.

1 Units: Cubic Feet per Second, unless denoted as Acre-Feet (AF)

2 Acreage is sole supply acres. I = Irrigation, S = Stockwatering, , FC = Fish Culture, Misc = Miscellaneous, Mun = Municipal

3 Section, Township and Range. All locations in Salt Lake Base & Meridian.

4 Agmt = Agreement, App = Approved, Cert = Certificate, Dec = Decree, UWC = Underground Water Claim



"SUBJECT PROPERTY" FOR SHIVWITS BAND RECREATIONAL EASEMENT

EXHIBIT D

EXHIBIT D

[Reference: Section 6.4.12]

MAP OF IVINS RESERVOIR EASEMENT

EXHIBIT E

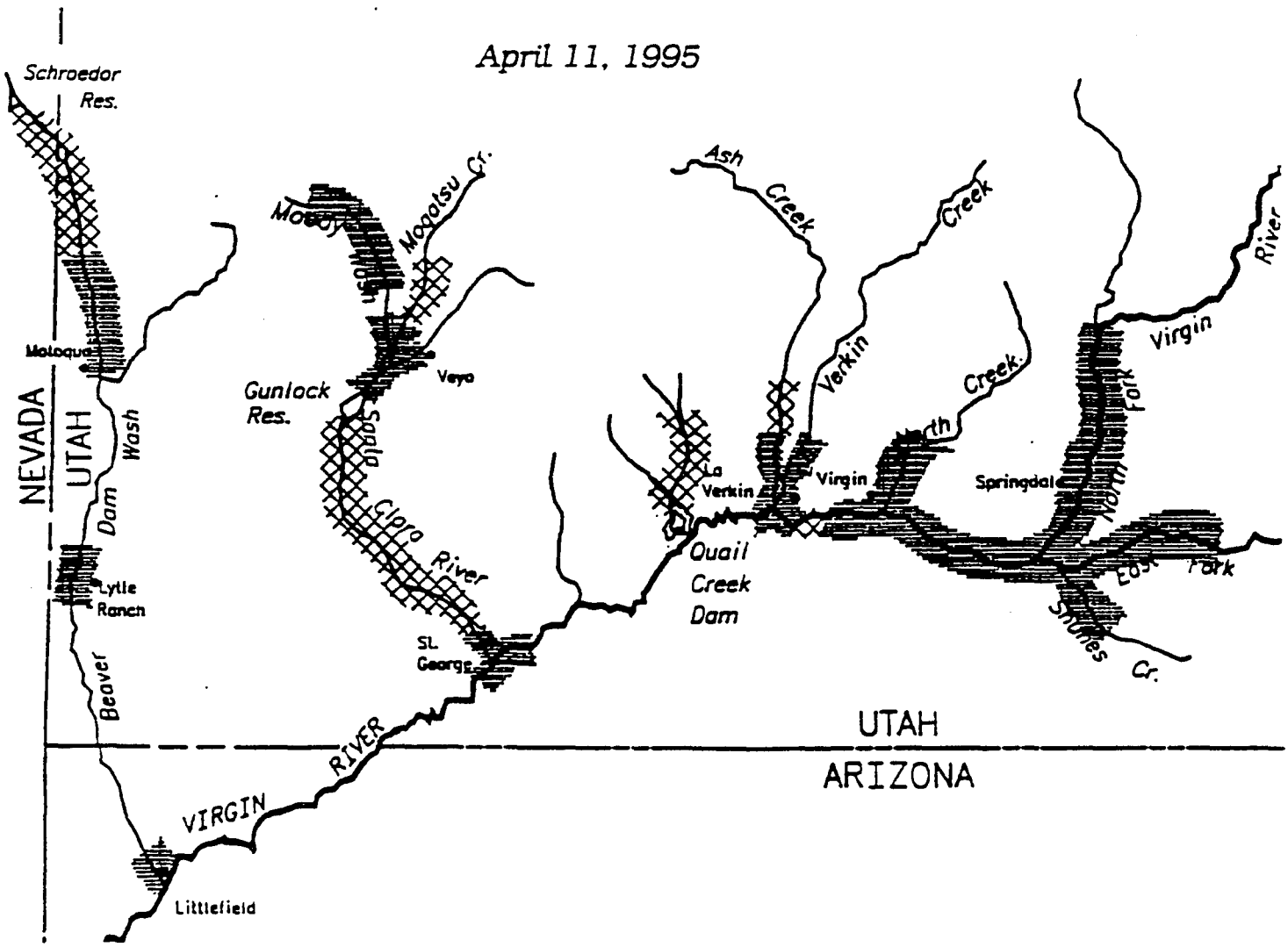
[Reference: Section 8.1.3]

CONSERVATION AGREEMENT AND STRATEGY

VIRGIN SPINEDACE

CONSERVATION AGREEMENT AND STRATEGY

April 11, 1995



VIRGIN SPINEDACE

CONSERVATION AGREEMENT AND STRATEGY

Prepared by:

Leo D. Lentsch
Native Fish and Herptile Coordinator
Utah Division of Wildlife Resources

M. Jane Perkins
Aquatic Biologist
Utah Division of Wildlife Resources

and

Henry Maddux
Biologist
United States Fish and Wildlife Service

Publication Number 95-13

Utah Department of Natural Resources
Division of Wildlife Resources
1596 West North Temple
Salt Lake City, Utah 84116

An Equal Opportunity Employer

Robert G. Valentine
Director

June 1995

ACKNOWLEDGEMENTS

We wish to thank the Virgin Spinedace Conservation Team (VSCT) and the technical advisors for their assistance in both the development of this agreement and strategy.

Virgin Spinedace Conservation Team

Leo D. Lentsch, Utah Division of Wildlife Resources
Henry Maddux, USDI Fish and Wildlife Service
Bob Douglas, USDI Bureau of Land Management, Utah
Michael Herder, USDI Bureau of Land Management, Arizona
Ralph Moore, USDI National Park Service, Zion National Park
Jon Sjoberg, Nevada Division of Wildlife
Ron Thompson, Washington County Water Conservancy District
Rob Betasso, Arizona Game and Fish Department

Technical Advisors to VSCT:

Richard A. Fridell - Utah Division of Wildlife
Dale Hepworth - Utah Division of Wildlife
M. Jane Perkins - Utah Division of Wildlife
Morgan Jensen - Washington County Water Conservancy District
Craig Addley - Utah State University
Thomas Hardy - Utah State University
Paul Marsh - Arizona State University
Wendell Minckley - Arizona State University
James Deacon - University of Nevada Las Vegas
Heidi McIntosh - Southern Utah Wilderness Alliance
Scott Groene - Southern Utah Wilderness Alliance
Pamela Hyde - American Rivers
Paul Holden - Bio/West Inc.
Richard Valdez - Bio/West Inc.
Larry Anderson - Utah Division of Water Resources
Norm Stauffer - Utah Division of Water Resources

CONSERVATION AGREEMENT
Virgin spinedace
Lepidomeda mollispinis mollispinis

This Conservation Agreement for the Virgin spinedace *Lepidomeda mollispinis mollispinis* has been developed in order to expedite conservation measures needed for the continued existence and recovery of the species. These measures will be taken in accordance with the Endangered Species Act of 1973 as amended (ESA). The agreement focuses on two objectives. The first is to reduce and eliminate significant threats. The second is to enhance and/or stabilize specific reaches of occupied and unoccupied historic habitat. These objectives will be reached through implementation of the Conservation Strategy for the species (Attachment A). Full implementation of this agreement and the associated strategy will reduce threats to the Virgin spinedace that warrant its listing as a sensitive species by State and Federal agencies, and as threatened or endangered under the ESA.

The Virgin spinedace is a small minnow endemic to the Virgin River Basin in Utah, Arizona, and Nevada. Shoreline-land ownership within the flood plains of Virgin spinedace habitat is approximately 38% federal, 3% state, 5% Paiute Tribe managed and 54% private. Past and present human activities such as water development projects, agriculture, mining, urbanization and the introduction of non-indigenous fishes have altered the Virgin River ecosystem. There has been a 37-40% reduction (approximately 84 km/52 mi) in Virgin spinedace historic range (approximately 226 km/140 mi). Current populations are fragmented, and occur almost exclusively within Utah. Due to these reductions and perceived threats to the species, the United States Fish and Wildlife Service (FWS) proposed listing the species as threatened, pursuant to the ESA, on May 18, 1994 (59 FR 25875).

I. OTHER SPECIES INVOLVED

The primary focus of this agreement is the conservation and enhancement of the Virgin spinedace and its habitat; however, other species occurring within or adjacent to Virgin spinedace habitat may also benefit. Three hundred and sixty-six species of fish, amphibians, reptiles, birds, and mammals are known to co-exist in the same or adjacent habitat of the Virgin spinedace. Eighty-one of these species are listed as sensitive in either Utah, Arizona or Nevada and/or are listed under the ESA by FWS (Appendix A in Conservation Strategy). An additional eight sensitive plant species and seven sensitive invertebrate species also co-exist in the same or adjacent habitat of the Virgin spinedace. Using an ecosystem approach, the Virgin spinedace

Conservation Agreement could reduce or possibly eliminate threats for several of these species, which could preclude their need for federal listing pursuant to the ESA.

II. INVOLVED PARTIES

Utah Department of Natural Resources
Division of Wildlife Resources
1596 West North Temple
Salt Lake City, UT 84116
(801) 538-7227

United States Department of Interior
Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225
(303) 236-7920

Bureau of Land Management
Utah State Office
324 South State Street
Salt Lake City, UT 84111
(801) 539-4072

Bureau of Land Management
Arizona State Office
3707 North 7th Street
Phoenix, AZ 85011
(602) 650-0260

National Park Service
Rocky Mountain Regional Office
P.O. Box 25287
Denver, CO 80225-0287
(303) 969-2500

Nevada Department of Conservation and Natural Resources
Division of Wildlife
1100 Valley Road
Reno, NV 89520-0022
(702) 688-1500

Washington County Water Conservancy District
136 N. 100 East, Suite 1
St. George, UT 84770
(801) 673-3617

Arizona Game and Fish Department
2221 W. Greenway Road
Phoenix, AZ 85023-4312
(602) 942-3000

Separate Memorandum(a) of Understanding and Cooperative Agreements will be developed with additional parties as necessary to ensure implementation of specific conservation measures.

III. AUTHORITY

* The signatory parties hereto enter into this Conservation Agreement and the attached Conservation Strategy under federal and state law, as applicable, including but not limited to Section 2(c)(2) of the Endangered Species Act of 1973, as amended, which states that "the policy of Congress is that Federal agencies shall cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species."

* All parties to this Agreement recognize that they each have specific statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of wildlife and the management, development and allocation of water resources. Nothing in this Agreement or the Strategy is intended to abrogate any of the parties' respective responsibilities.

* This Agreement is subject to and is intended to be consistent with all applicable Federal and State laws and interstate compacts.

IV. STATUS AND DISTRIBUTION OF THE VIRGIN SPINEDACE

In 1979 and 1989, the Virgin spinedace was identified as threatened by the American Fisheries Society, Endangered Species Committee. Criteria used for determining this status were consistent with the ESA. Their determination was based on review of original data and discussions with pertinent agencies and knowledgeable scientists. On May 18, 1994, the FWS proposed the species for listing as threatened under the ESA (59 FR 25875).

The Virgin spinedace currently occupies approximately 60-63% of historic habitat, nearly all being in Utah. Populations no longer exist in Nevada and few individuals remain in Arizona. The species occupies approximately 117 km (73 mi) of tributary streams and 25 km (16 mi) of the mainstem Virgin River. Occupied streams include three reaches of Beaver Dam Wash, two reaches of the Santa Clara River, isolated reaches in Moody Wash and Magotsu Creek, one reach of Ash Creek, two reaches of La Verkin Creek, two reaches of North Creek, the North and East Forks of the Virgin River, and Shunes Creek. Occupied habitat in the mainstem Virgin River is considered to be limited to the area above Quail Creek Diversion. Occasionally, Virgin spinedace have been collected in the Virgin River between Pah Tempe Springs and

Littlefield, Arizona. Their occurrence has generally been associated with tributary inflows. This area is not considered to be historic habitat because this reach does not have the same habitat components found in reaches supporting self-sustaining populations. A detailed description of the status and distribution for this species is presented in the Conservation Strategy.

V. PROBLEMS FACING THE SPECIES

The FWS assessed real and/or potential problems facing the species based on five criteria as required by Section 4(a)(1) of the ESA. Within each of these criteria, several factors which may have contributed to the elimination or degradation of Virgin spinedace habitat and its populations were identified (59 FR 25875 dated May 18, 1994). The threats identified and described by the FWS (59 FR 25875) do not necessarily reflect the views of all signatories to this agreement. The Conservation Strategy provides a detailed review of problems and threats to the species that signatories to this agreement will address with management actions.

VI. CONSERVATION ACTIONS TO BE IMPLEMENTED

In order to meet the objectives of this agreement, seven conservation actions will be implemented. These actions, as defined and detailed in the Strategy, include: establish existing conditions as a baseline; re-establish population maintenance flows; enhance and maintain habitat; selectively control non-indigenous fish; maintain genetic viability; monitor populations and habitat; and develop a mitigation plan and protocol for future activities. In addition, four general administrative actions, as outlined below, will be implemented: coordinate conservation activities; implement the conservation schedule; fund conservation actions; and assess conservation progress.

Coordinating Conservation Activities

* Administration of the conservation agreement will be conducted by the Virgin Spinedace Conservation Team (VSCT). The team will consist of a designated representative from each signatory to this Agreement and may include technical and legal advisors and other members as deemed necessary by the signatories.

* Since the majority of the areas of concern covered by this Agreement are located in Utah, and since the State of Utah presently has primary jurisdiction over Virgin spinedace within the State, the designated team leader will be the Utah Department of Natural Resources, Division of Wildlife Resources

representative.

* Authority of VSCT shall be limited to making recommendations for the conservation of Virgin spinedace to the Director, Utah Division of Wildlife Resources.

* The VSCT will meet annually to develop yearly conservation schedules, review the Strategy, and modify the Strategy as required.

* The VSCT will meet on a quarterly basis to report on the progress of implementing the Conservation Strategy.

* VSCT meetings will be open to the public. Minutes of the meetings will be kept and distributed to any interested party.

Implementing Conservation Schedule

* A total of 10 years is anticipated for full implementation of actions identified and specified in the Conservation Strategy. Nevertheless, the parties agree that significant actions to benefit the Virgin spinedace will be implemented within the first five (5) years. These actions will be determined by the VSCT.

* Conservation actions will be scheduled on a yearly basis. Activities that will be implemented in 1995 are listed in Table 1.

* As leader of the VSCT, the Utah Division of Wildlife Resources, Department of Natural Resources, will coordinate conservation activities and monitor conservation actions taken by participants of this Agreement to determine if all actions are being implemented and carried out in accordance with the Conservation Strategy and annual schedule.

Funding Conservation Actions

* It is anticipated that expenditures to implement this Agreement could exceed $3,000,000 (Table 2). It is projected that the actions implemented for the re-establishment of population maintenance flows to stream channels will incur the greatest expense and occur during the first three to five years of the agreement.

* Funding for the Conservation Agreement will be provided by a variety of sources. Federal, State and local sources will need to provide or secure funding for initiative procedures of the Conservation Agreement.

- Federal sources include, but will not be limited to, the FWS, BLM, Land and Water Conservation funds, and the Natural Resource Conservation Service.

- State funding sources include, but will not be limited to, direct appropriation of funds by the legislature, Community Impact Boards, Water Resources Revolving funds, State Department of Agriculture (ARD), and State Resource Management Agencies.

- Local sources of funding will be provided by the Habitat Conservation Plan, Water District, cities and towns, Washington County, and local irrigation companies.

* In-kind contributions in the form of personnel, field equipment, supplies etc., will be provided by participating agencies (Table 3). In addition, each agency will have specific task responsibilities and proposed actions/commitments related to their in-kind contributions.

* It is understood that all funding commitments made under this Agreement are subject to approval by the appropriate local, state or federal entities.

Conservation Progress Assessment

* A quarterly assessment of progress towards implementing actions identified in this agreement will be provided to the Director, Utah Division of Wildlife Resources by VSCT. This assessment will be based on updates and evaluations by VSCT members. Copies of this assessment will also be provided to the signatories of this document.

* An annual assessment of conservation accomplishments identified in Table 1 and subsequent yearly schedules will be made by VSCT. This assessment will determine the effectiveness of this agreement and whether revisions are warranted. It will be provided to the Director, Utah Division of Wildlife Resources by VSCT. Copies of this assessment will also be provided to the signatories of this document.

* If threats to the survival of the Virgin spinedace become known that are not or cannot be resolved through this or any Conservation Agreement, the Utah Division of Wildlife Resources immediately will notify all signatories.

VII. DURATION OF AGREEMENT

The initial term of this Agreement shall be 5 years. Prior to the end of each 5 year period, a thorough analysis of actions implemented for the species will be conducted by the VSCT. If all signatories agree that sufficient progress has been made towards the conservation and recovery of the Virgin spinedace this Agreement shall be extended for an additional five (5)

:rs. Any party may withdraw from this Agreement on sixty (60) /s written notice to the other parties.

:I. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

;ning of this agreement is covered under authorities outlined section III listed above. We anticipate that any survey, .lection, or research activities for implementation and .ntenance of the Conservation Agreement will not entail ;nificant Federal actions under the NEPA and will be given a :egorical exclusion designation. All other actions will be :luated prior to implementation and will comply with NEPA ;ulations.

FEDERAL AGENCY COMPLIANCE

During the performance of this agreement, the participants :ee to abide by the terms of Executive Order 11246 on non-:crimination and will not discriminate against andy person :ause of race, color, religion, sex or national origin.

No member or delegate to Congress or resident Commissioner, .1l be admitted to any share or part of this agreement, or to benefit that may arise therefrom, but this provision shall be construed to extend to this agreement if made with a :poration for this its general benefit.

X. SIGNATURES

Utah Department of Natural Resources
Utah Division of Wildlife Resources
1596 West North Temple
Salt Lake City, UT 84116

4/11/95
Ted Stewart — Date
Executive Director

USDI Fish and Wildlife Service
P.O. Box 25486
Denver, CO 80225

4/11/95
Ralph O. Morgenweck — Date
Regional Director

USDI Bureau of Land Management
324 South State Street
Salt Lake City, UT 84111

4/11/95
Mat Millenbach — Date
State Director

USDI Bureau of Land Management
3707 North 7th Street
Phoenix, AZ 85011

April 11, 1995
Lester K. Rosenkrance — Date
State Director

USDI National Park Service
(Rocky Mountain Regional Office)
P.O. Box 25287
Denver, CO 80225

4/11/95
John Cook — Date
Regional Director

Nevada Department of Conservation and Natural Resources
Division of Wildlife
1100 Valley Road
Reno, NV 89520-0022

4/14/95
William A. Molini — Date
Administrator

Washington County Water Conservancy District
136 N. 100 East Suite 1
St. George, UT 84770

4-11-95
Jack Lemmon — Date
Board Chairman

Arizona Game and Fish Department
2221 W. Greenway Road
Phoenix, AZ 85023-4312

6-16-95
Duane Shroufe — Date
Director

Table 1: Conservation Actions to be Implemented in Calendar Year 1995

Reach	Date	Lead	Action
Basin-Wide:	Immediate*	States	- Establish existing conditions as a baseline for historic habitat
	Immediate	States	- Maintain all existing population maintenance flows
	Continuing	States	- Identify methods for flow protection
	12/31	All	- Develop mitigation protocols for future activities
	Immediate	States	- Implement procedures to control the introduction of non-indigenous species
	4/30	States	- Implement sport fish stocking procedures
	4/30	States	- Implement genetic management protocols
	4/30	States	- Implement population and habitat monitoring
	12/31	All	- Identify funding mechanisms
Beaver Dam Wash:			
Below Schroeder Res.	10/31	NDOW	- Selective removal of rainbow trout
	10/31	NDOW	- Re-introduce Virgin spinedace
Santa Clara River:			
Below Veyo (Baker Dam)	Immediate	UDWR	- Cease brown trout stocking
Below Gunlock Res.	12/31	WCWCD	- Develop cooperative agreements for providing flows
	12/31	UDNR	- Identify methods for flow protection
	4/30	BLM	- Initiate recreation management
	Immediate	UDWR	- Initiate feasibility analysis for green sunfish removal
Mainstem Virgin River:			
Below Quail Creek Div.	4/30	WCWCD	- Letter of commitment to provide flows
	5/30	WCWCD	- Finalize cooperative agreements for providing flows
	6/30	WCWCD	- Develop evaluation study plan for population
	4/30	WCWCD	maintenance flows
	6/30		- Provide population maintenance flows (5 km/3 mi)
	4/30	All	- Evaluate population maintenance flows
		UDNR	- Identify methods for flow protection
Below Washington Div.	9/30	UDWR	- Initiate removal of red shiner
Below Johnson Div.	11/30	UDWR	- Initiate removal of red shiner

* Actions implemented upon signing of the Conservation Agreement

:le 2. Estimated Costs for Implementing the Virgin spinedace
:servation Agreement over 10 year period.

Conservation Agreement Actions	Estimated Costs($)
Habitat Maintenance and Enhancement:	
Determination of Flow Requirements	200,000
Establish Existing Conditions as a Baseline	30,000
Re-establishment and/or Enhancement of Flows	2,000,000
Formalize Flow Protection	200,000
Implement Habitat Improvements	100,000
Population Genetics Management:	
Develop and Implement Protocols	2,500
Non-Indigenous Fish Management:	
Implement Introduction/Stocking Procedures	2,500
Control/Eradication of Non-indigenous Fish	300,000
Population and Habitat Monitoring:	
Implement monitoring plans	300,000
Administration:	
Annual Review of Activities	100,000

Table 3: Estimated agency in-kind contributions, actions, and responsibilities for implementation of the Virgin spinedace Conservation Agreement.

Agency	Brief Description of Tasks and Responsibilities *
Utah Department of Natural Resources, Utah Division of Wildlife Resources	Serve as Virgin spinedace conservation group team leader (eg: oversee administrative responsibilities of agencies, reports, meetings etc.). Consult on water protection issues. Assist in obtaining and/or securing water rights and land within Virgin spinedace habitat. Assist in funding basin-wide enhancement projects. Plan and implement eradication/control projects of non-indigenous species within the basin (eg: red-shiners, green sunfish, brown trout and crayfish). Serve as lead agency for population and habitat enhancements, re-introductions and monitoring projects in Utah.
Nevada Department of Conservation and Natural Resources, Division of Wildlife	Serve as lead agency for funding, monitoring, Virgin spinedace re-introductions, and non-indigenous control/eradication in Upper Beaver Dam Wash. Cooperate and assist in basin-wide habitat enhancement and population monitoring projects.
Arizona Game and Fish Department	Cooperate and assist in eradication/control projects of non-indigenous species in lower basin reaches, and cooperate and assist in basin-wide habitat enhancement and population monitoring projects.
U.S. Fish and Wildlife Service	Advise and assist implementation of conservation agreement in regard to existing laws (eg: ESA, NEPA regulations etc.). Cooperate and assist in eradication/control projects of non-indigenous species, cooperate and assist in basin-wide habitat enhancement and population monitoring projects. Maintain Virgin River fishes data base. Assist in funding basin-wide enhancement projects.
National Park Service	Serve as lead agency in funding and implementation of population and habitat enhancement and monitoring projects within Zion National Park. Cooperate and assist in basin-wide habitat enhancement and population monitoring projects.
Bureau of Land Management (Utah)	Cooperate and assist in basin-wide habitat enhancement and population monitoring projects. Assist in funding basin-wide enhancement projects. Cooperate and assist in eradication/control projects of non-indigenous species, cooperate and assist in basin-wide habitat enhancement and population monitoring projects.
Bureau of Land Management (Arizona)	Serve as lead agency for planning and locating, and cooperate in securing funding for construction of, and constructing migration barriers for red-shiner eradication in Arizona reaches of Virgin River as well as cooperate and assist in eradication/control projects of other non-indigenous species. Cooperate and assist in basin-wide habitat, enhancement and monitoring projects.
Washington County Water Conservancy District	Assist and facilitate in obtaining and/or securing water rights within Virgin spinedace habitat. Assist in planning, funding, and construction of non-indigenous fish migration barriers and diversion enhancements. Cooperate and assist in monitoring of fish populations and habitat responses to management actions.

* All agencies will participate in, and provide technical and administrative assistance to the Virgin spinedace Conservation Team

ATTACHMENT A

CONSERVATION STRATEGY
Virgin spinedace
Lepidomeda mollispinis mollispinis

PURPOSE

The purpose of the present document is to describe specific procedures and strategies required for conservation of Virgin spinedace. The general conservation approach focuses on two main objectives. The first objective is to eliminate threats where possible, and reduce threats to the greatest extent possible that cannot be eliminated entirely. The second is to enhance and/or stabilize instream flows in specific reaches of occupied and unoccupied habitat. Though the primary focus of this strategy is conservation and enhancement of the Virgin spinedace, it could also reduce or eliminate threats and improve habitat for many other species, which could preclude their need for federal listing pursuant to the Endangered Species Act of 1973 as amended (ESA).

Definitions

For the purposes of the Agreement and Strategy, the following terms are defined as:

Occupied Habitat - Occupied habitat consists of stream reaches containing self-sustaining Virgin spinedace populations.

Historic Habitat - Historic habitat consists of stream reaches that have been shown, can be shown, and/or can logically be deduced as historically being occupied by Virgin spinedace. This area is approximately 226 km (141 mi). The exact extent of historic habitat is unknown. Historically, spinedace habitat probably fluctuated with changing environmental conditions.

Population Maintenance Flows - Population maintenance flows are flows of sufficient magnitude to maintain self-sustaining Virgin spinedace populations during low-flow periods. These flows are dependent on flow events of sufficient magnitude, timing, and duration to maintain channel characteristics and provide environmental cues.

Self-Sustaining Population - Self-sustaining populations are those with sufficient numbers, age class structure, and natural reproductive success to provide for their long-term survival.

Non-indigenous - An organism that is not native, or occurs naturally in a specific area or environment.

BACKGROUND

The Virgin River basin is characterized by a diverse landscape with unique communities of fauna and flora. The basin encompasses approximately 15,600 km^2 (6000 mi^2). Virgin River headwaters are in Washington and Kane County, Utah, and the stream flows in a general southwesterly direction to empty into Lake Mead on the Colorado River in Nevada. Elevations range from 3300 m (10,000 ft) above mean sea level (msl) near the headwaters to less than 700 m (2000 ft) at Littlefield, Arizona. The river varies from reaches with narrow, steep-walled canyons and steep gradients to low desertland with broad open canyons and low gradients. Mean annual precipitation ranges from about 20 cm (8 in) at low elevations to about 100 cm (40 in) at higher elevations.

Due to the diverse topography, this river and its associated riparian area and floodplain provides habitat for over 366 species of wildlife (Appendix A). Of these, 81 species have been identified as sensitive. There are six fish species indigenous to the basin: woundfin (*Plagopterus argentissimus*), Virgin River chub (*Gila seminuda*), flannelmouth sucker (*Catostomus latipinnis*), desert sucker (*Catostomus clarki*), speckled dace (*Rhinichthys osculus*), and Virgin spinedace (*Lepidomeda m. mollispinis*). Except for the speckled dace, all of these have been listed or are candidates for federal listing under the ESA.

The Virgin spinedace was recognized in 1979 as a threatened species by the scientific community. The Endangered Species Committee of the American Fisheries Society added it to their list of threatened and endangered fish after assessing criteria consistent with the ESA (Deacon et al., 1979). Their determination of the species' status was based on review of original data and discussions with pertinent agencies and knowledgeable scientists. On May 18, 1994, the United States Fish and Wildlife Service (FWS) proposed the species for listing as a threatened species pursuant to the ESA (59 FR 25875).

Systematics and Description

The Virgin spinedace, *Lepidomeda mollispinis mollispinis* is a member of an endemic tribe of western cyprinids, the Plagopterini (Miller and Hubbs, 1960). The group is comprised of three genera: *Meda, Plagopterus* and *Lepidomeda*. The first two are monotypic, represented by the spikedace (*M. fulgida*) and woundfin (*P. argentissimus*). *Lepidomeda* is a polytypic genus containing four species: the White River spinedace (*L. albivallis*), the Pahranagat spinedace (*L. altivelis*), the Little Colorado spinedace (*L. vittata*), and the Virgin spinedace (*L. mollispinis*). *L. mollispinis* is further classified into two subspecies; *L. m. pratensis* (Big Springs spinedace) and *L. m.*

mollispinis (Virgin spinedace). The Pahranagat spinedace is considered extinct (Miller and Hubbs, 1960; Valdez et al.,1991). Extant members of the tribe Plagopterini are rare. The woundfin and White River spinedace are listed as endangered (35 CFR 16047 and 50 FR 37198 respectively). The spikedace (51 FR 23781), Big Springs spinedace (50 FR 12302) and the Little Colorado River spinedace (52 FR 35040) are listed as threatened.

Spinedace get their name from the fusion of two anterior, hardened spiny rays of the dorsal fin and a similar structure located in the pelvic fin. The Virgin spinedace derives its specific name from the latin words *mollis*, meaning soft, and *spinis*, meaning spine, both referring to the soft-tipped second dorsal spine (Miller and Hubbs, 1960).

The body of the Virgin spinedace is silvery with a brassy sheen and occasionally with light sooty blotches on the dorso-lateral half. During breeding, bases of the paired fins are reddish-orange. The Virgin spinedace is characterized by a terminal mouth, rounded head and belly, and a body size typically ranging from 60 mm to 120 mm (2.4 to 4.7 in SL)(Rinne, 1971; Addley and Hardy, 1993). The species has a well-scaled body, with 77-91 scales on the lateral line and two rows of pharyngeal teeth which typically number 2, 5-4, 2 (Addley and Hardy, 1993; Sigler and Miller, 1963; Valdez et al., 1991). The dorsal fin has eight rays and the anal fin usually includes nine rays, but may vary from eight to ten rays.

Life History

The life history of the Virgin spinedace was described by Rinne (1971). Having a life-span of about three years, the fish reaches sexual maturity at about one year. Populations typically are comprised mostly of young-of-the-year (YOY) and one-year-old fish. Because of the mild climate of Virgin spinedace habitat, age determination after one year can be difficult. However, Rinne (1971) indicated that fairly accurate estimates could be made using SL: young-of-the-year <55 mm, age 1 55-76 mm, age 2 77-85 mm, age 3 >85 mm.

Although sexual dimorphism is not apparent most of the year, sexes can be distinguished during peak breeding season. Females tend to be more robust and plump, while males remain streamlined. Furthermore, the vent of the female becomes swollen and the ovipositor becomes a reddish color (Rinne, 1971). Both sexes exhibit the reddish-orange coloration at the bases of the paired fins.

Annual spawning of the Virgin spinedace has been observed from April through June at mean daily water temperatures of 13-17°C and day lengths of about 13 hrs. Rinne (1971) found that one-year-old females had the lowest mean relative fecundity averaging

459 eggs, while two and three-year-old females averaged a 42% and 34% increase in mean relative fecundity over one-year-olds, respectively. Since populations are comprised primarily of one year olds, they often comprise 90% of the spawning population (Addley and Hardy, 1993).

Virgin spinedace are typically found in clear, cool, swift streams that have interspersed pools, runs, and riffles (Deacon et al., 1979; Valdez et al., 1991). Upper thermal preferences have been reported as 23.1°C (Deacon et al, 1987). Rinne (1971) found Virgin spinedace most frequently in pools with some type of protection such as undercut banks, boulders or debris; however, variations in habitat preferences have been noted. For example, in Beaver Dam Wash, Virgin spinedace utilize narrow, shallow runs with large amounts of emergent vegetation, while in North Fork of the Virgin River, they most often occupy quiet pools (Rinne, 1971). Virgin spinedace have also been documented to prefer shear zones between high (100 cm/sec) and low (10 cm/sec) velocities containing cover (Deacon et al., 1979; Deacon et al., 1991; Hardy et al, 1989). Nursery habitat preferences, however, remain unclear.

Virgin spinedace are primarily insectivorous, feeding on a wide range of insects and occasionally plant material and organic debris (Angradi et al., 1991; Gregor and Deacon, 1988; Rinne, 1971). Virgin spinedace feed on drifting prey in midwater and at the surface. Usually they maintain equilibrium in the midwater column darting to the surface to capture prey in a manner similar to drift-feeding salmonids (Addley and Hardy, 1993; Rinne, 1971).

Historic Distribution

The historic distribution of the Virgin spinedace is not well documented. Holden (1977) speculated that historic occurrence was in most of the clearwater tributaries and several mainstem reaches of southwestern Utah, northwestern Arizona, and southeastern Nevada (Figure 1). Museum records from the University of Nevada at Las Vegas, Brigham Young University, University of Michigan Museum of Zoology, and the United States National Museum support Holden (Addley and Hardy, 1993; Cross 1975; Rinne, 1971; Valdez et al., 1991). The earliest survey records indicated this species was common in the Santa Clara River and North Fork of the Virgin River, but probably less common in the Virgin (Tanner (1932, 1936). C.L. Hubbs (unpub. data) collected Virgin spinedace near Bunkerville, Nevada, in 1938, but surveys in 1942 in the same area lacked Virgin spinedace (Cross, 1975). Furthermore, the species was absent from surveys below Littlefield, Arizona between 1942 and 1975 (Cross 1975).

PROBLEMS FACING THE SPECIES

Populations of Virgin spinedace currently exist in the mainstem Virgin River and eleven of its tributaries including East Fork Virgin River, Shunes Creek, North Fork Virgin River, North Creek, La Verkin Creek, Ash Creek, Santa Clara River, Beaver Dam Wash, Coal Pits Wash, Moody Wash and Magotsu Creek (Table 1). According to Addley and Hardy (1993), the largest populations are in the upper mainstem above Quail Creek diversion and in drainages of the Santa Clara River and Beaver Dam Wash. Small populations exist in Ash Creek, La Verkin Creek, and the lower mainstem below Pah Tempe Springs. The remaining areas contain intermediate sized populations.

The present distribution of Virgin spinedace is significantly smaller than historically, with approximately 37-40% (84 km/52 mi) now unoccupied (Table 1). In addition, 24% of currently occupied habitat has experienced some degree of adverse modification (Table 1). Dewatered streams, water depletions, introductions of non-indigenous fish, and habitat degradation through agricultural and recreational uses have been identified as the primary factors involved in the reduction of range of the species (Valdez et al., 1991; Addley and Hardy, 1993).

In 1994, the FWS described pertinent problems and threats they perceived as facing the Virgin spinedace based on criteria for federal listing as required by Section 4(a)(1) of the ESA (59 FR 25875). The threats they listed do not necessarily reflect the view of all signatories to this Agreement. The following discussion summarizes the significant threats to Virgin Spinedace that will be addressed by conservation actions identified in this Strategy.

Present or threatened destruction, modification, or curtailment of its habitat or range.

Virgin spinedace habitat modification and/or elimination has occurred primarily through human activities such as dam and diversion construction, water depletion or diversion, and agricultural practices (Table 1). Approximately 7 km (4 mi) of Virgin spinedace historical habitat has been inundated by reservoirs including Quail Creek Reservoir on Quail Creek, Gunlock on the Santa Clara River, and Schroeder Reservoir on Beaver Dam Wash (Figure 1). Approximately 60 km (37 mi) of historic habitat has been dewatered by diversions. Furthermore, diversions have depleted water in approximately 31 km (19 mi) of currently occupied habitat. Lack of stable instream flows and low water levels as a result of diversions cause changes in water temperature, affect aquatic vegetation, and alter water chemistry and dissolved oxygen levels. Dams and diversions also act as barriers to fish movement within the system and fragment Virgin

spinedace habitat and populations. In areas of extensive habitat fragmentation, migration becomes virtually non-existent.

Agricultural practices have also modified several areas of Virgin spinedace habitat through alteration of the riparian zone. Riparian alterations often cause stream bank erosion, siltation, and devegetation. A recent evaluation of the Virgin River basin riparian zone (Fridell, Hansen, Leany, and Douglas, pers. comm., 1994) indicated that some alterations from crop production are occurring along lower La Verkin Creek, lower Ash Creek, and middle Virgin River reaches. Several reaches are impacted by livestock, including the Santa Clara River below Gunlock Reservoir, lower Santa Clara River, lower North Creek, lower La Verkin Creek, lower Ash Creek, and portions of the Virgin River mainstem. The remaining riparian zones appear to be relatively intact.

Predation, Competition, and Disease

Aquatic species introduced into the Virgin River system have been identified as contributing to reductions of native fish populations (Addley and Hardy, 1993; USFWS, 1993). Several non-indigenous fish species have been identified as occupying the same habitat as Virgin spinedace (Table 2). Several of these prey on the Virgin spinedace. Other non-indigenous species (Table 2), such as crayfish (i.e., Astacidae), may be preying on larval and young-of-year life stages in lower reaches of several tributaries (Addley and Hardy, 1993). Some non-indigenous species may also affect Virgin spinedace habitat by competing for limited resources such as food and space. Disease and parasites do not appear to have had significant roles in the declining status of the Virgin spinedace; however, they may have adverse effects when coupled with other threat and stress factors (Addley and Hardy, 1993).

Other natural or manmade factors affecting the species' continued existence.

Several other natural and manmade factors play a role in the declining status of the Virgin spinedace. Natural limiting factors include drought, flood and in some instances, natural barriers and native species interactions. The extent that natural factors affect Virgin spinedace is unclear.

Pollution from return flows, municipal drains and agriculture is a potential problem for all native species within the basin. Return flows from municipal drains and agriculture can make up a significant portion of a stream's total flow. Water from these return flows can be polluted with pesticides as well as other wastes. Mining along Beaver Dam Wash may contribute to habitat degradation. Low flows, caused naturally or by diversions, increase the impacts of pollution, erosion, siltation and mineral

springs have on the chemical composition of the water.

Recreational use (e.g. off-road vehicles) has been documented (Fridell et al., pers comm.) as significantly impacting several reaches including the Santa Clara below Gunlock Reservoir, the lower Santa Clara, and the lower mainstem Virgin River.

CONSERVATION ACTIONS TO BE IMPLEMENTED

Conservation measures needed for the continued existence of Virgin spinedace focus on two objectives: 1) to eliminate significant threats or reduce those that cannot be completely eliminated to the maximum extent possible, and 2) to stabilize, restore and enhance specific reaches of occupied and unoccupied historic habitat. The goal of these measures is to expand the range so that the species occupies at least 80% (approximately 181 km/112 mi) of its historically occupied habitat. Attainment of the goal and objectives of this strategy would be achieved by implementing the following management actions: 1) establish existing conditions as a baseline 2) re-establish population maintenance flows 3) enhance and maintain habitat 4) selectively control non-indigenous fish 5) maintain genetic viability; 6) monitor populations and habitat and 7) develop a mitigation plan and protocol for future activities.

Establish Existing Conditions As A Baseline

All management actions associated with the conservation of Virgin spinedace will be evaluated as to their effectiveness. In addition, any modification to the existing conditions upon which Virgin spinedace depend, will be evaluated as to their potential effect on the species. For these purposes, the existing conditions of historic habitat are considered to be this baseline. Three primary attributes will be used to describe existing conditions: 1) basin hydrology averaged over the last 20 years, 2) water rights and depletions, and 3) Virgin spinedace populations.

Re-establish Population Maintenance Flows

Existing flow patterns provide the habitat requirements of the Virgin spinedace in approximately 159 km (99 mi) of the species historic habitat (Table 1). These conditions are described by hydrographs in terms of flow quantity, timing, duration, and frequency. In approximately 91 km (57 mi) of historic habitat, stream channels are dry or flows are significantly depleted during the late-summer and early-fall period (Table 1).

Population maintenance flows will be re-established and maintained in approximately 39 km (24 mi) of de-watered historic habitat of the Virgin spinedace in order to reduce habitat fragmentation and to restore populations. These flows will be re-established based on determining the flow requirements of the species using an empirical approach by incorporating components of the conceptual framework outlined by Hill et al. (1991). This empirical approach incorporates current data on flow patterns that are currently maintaining self-sustaining populations in reaches of the Virgin River basin. The process of re-

establishing flows adheres to the following step-wise outline: 1) Estimate population maintenance flows, 2) Provide population maintenance flows, 3) Evaluate population maintenance flows, 4) Finalize flows required, and 5) Protect flows.

Estimate Population Maintenance Flows

Population maintenance flows currently occur in approximately 15 occupied stream reaches (Table 3). These flows were estimated by comparing Virgin spinedace population numbers, stream flows, and habitat characteristics throughout the drainage for empirical relationships (Addley and Hardy, 1993; Valdez et al, 1991). A total of 10 reaches have been identified as potential sites for population maintenance flow re-establishment to reach the goal of 80% of historic habitat (Tables 3 and 4). These reaches were selected because they were identified as areas that are dewatered or experience significant depletions (Table 1). Two reaches have been designated as priority areas toward attaining the goal. The first encompasses approximately 31 km (19 mi) of the Santa Clara River between Gunlock Reservoir and the confluence with the Virgin River. The second encompasses approximately 5 km (3 mi) of the Virgin River between Quail Creek Diversion and Pah Tempe Springs. Historically, these areas supported common to abundant populations of Virgin spinedace. Additional reaches of Virgin spinedace habitat to have flows restored will include one or a combination of the other reaches listed in Tables 1 and 4.

Evaluate Population Maintenance Flows

The response of Virgin spinedace populations and habitat to population maintenance flows will be evaluated over a five year period. A detailed study plan will be developed for each stream reach. The study plan will include, but not be limited to, estimations of population abundance, recruitment, habitat utilization and availability. A progress report will be provided annually. A completion report will be provided at the end of the five year period.

Finalize Population Maintenance Flows Required

A final recommendation for re-establishing population maintenance flows in specific reaches will be developed after completion of the population maintenance flow evaluations. Information obtained from other instream flow studies will be considered in making those recommendations. In the Santa Clara River, the maximum amount of flow provided will not exceed 3 cfs at the point of release.

Protect Population Maintenance Flows

Flow protection measures will be implemented that are consistent with state laws. These measures may include: river operating

agreements, minimum instream flow rights, irrigation rights, and federal reserved water rights. Instream flows for water-related resource attributes, including native fish, are currently being discussed by the National Park Service, the State of Utah, and the Washington County Water Conservancy District. These discussions are part of ongoing negotiations to determine Federal reserved water rights for Zion National Park in the Virgin River adjudication.

Enhance and Maintain Habitat

Habitat enhancement procedures will be implemented in approximately 26 km (16 mi) of occupied habitat. Enhancement projects will focus on specific factors that contribute to Virgin spinedace habitat degradation including: agricultural activities, mining activities, recreational use of riparian zones, and activities that affect water quality (Table 4). Enhancement projects will include maintenance and construction of boundary-line fences between federal and private parcels to control unauthorized grazing and recreational (ie: ORV, hiking, etc.) use along the riparian zones, establishment of intensive grazing management programs for federal lands along streams, and development of barriers and conservation easements within the Virgin River floodplain to reduce additional agricultural, recreational, and developmental impacts. Any future projects which alter habitat will be evaluated as described in the mitigation section of this strategy.

Selectively Control Non-indigenous Fish

Non-indigenous fish populations identified in Table 2 will be evaluated in order to identify detrimental effects on Virgin spinedace populations. Management and control of non-indigenous fish will focus on implementation of stocking and introduction procedures as well as control and/or eradication of selected populations of these fish in the Virgin River basin. Specific management actions will be developed on a reach-by-reach basis to remove the threats to Virgin spinedace associated with non-indigenous species. Table 4 summarizes reaches where non-indigenous fish management actions will be implemented.

Control Fish Stocking and Introductions

The following basin-wide procedures for controlling stocking, introduction, and spread of non-indigenous aquatic species of vertebrates and invertebrates will be implemented by the appropriate agencies. These procedures have been developed using adapted versions of The American Fisheries Society procedures for nonnative fish introductions.

Stocking of Non-indigenous Species Already Occurring:

SALMONIDS:

Several species of salmonids are routinely stocked in the Virgin River Basin. Stocking of salmonids is to be restricted to areas in association with existing salmonid populations OR made in new areas only where they will not conflict with native species of special concern. Areas where salmonids are routinely stocked are presented in Table 5.

Rainbow Trout (Onchorhynchus mykiss)

New stockings are prohibited where self-sustaining populations would establish in association with native fishes of special concern or where stocking would cause conflicts with native species of special concern.

Brown Trout (Salmo trutta)
Brook Trout (Salvelinus fontinalis)
Cutthroat Trout (Onchorhynchus clarki)
Other Hybrid Trout

Stocking is prohibited in areas under 5,000 feet elevation or at higher elevations where stocking would cause conflicts with native species of special concern. The only area where maintenance stocking of brown trout occurs in the Virgin River basin is upstream from Glendale, Utah in the East Fork of the Virgin River (Table 5).

OTHER NON-INDIGENOUS SPECIES:

Channel Catfish (Ictalurus punctatus)

Stocking is prohibited except in isolated ponds and reservoirs as determined on a case by case basis.

Largemouth bass (Micropterus salmoides)
Bluegill sunfish (Lepomis macrochirus)

Stocking to be restricted to standing water impoundments, including existing mainstream reservoirs and other isolated ponds and reservoirs. Direct conflicts with native fish species of special concern will be avoided.

Introduction of a New Species:

Guidelines for introducing a new species to the drainage will follow the "Introduction of Aquatic Species, Environmental Policy Statement of the American Fisheries Society" and the "Non-indigenous Aquatic Nuisance/Prevention and Control Act of 1990".

Prohibited Species:

Non-indigenous minnows (Family: Cyprinidae), smallmouth bass (*Micropterus dolomieni*), green sunfish (*Lepomis cyanellus*), black crappie (*Pomoxis nigromaculatus*), all crayfish species (i.e., Astacidae) and all other non-indigenous aquatic species prohibited by respective state regulations or recommended for prohibition by the Colorado River Wildlife Council.

Selective Removal of Non-indigenous Fish

Eradication of detrimental non-indigenous fish will be implemented where feasible and controlled to the maximum extent possible where eradication is not possible (Table 4). Several species have already been targeted for control and/or eradication including rainbow trout in the upper reaches of Beaver Dam Wash, green sunfish from the Santa Clara River and red shiner in the mainstem Virgin River below the Washington Fields Diversion (see below for details). Engineering feasibility for fish barrier structures to control non-indigenous fish is currently being developed. Possible impacts to native species will be evaluated prior to implementation of control and eradication actions.

Upper Beaver Dam Wash:
NDOW will have lead responsibility for an interagency effort to re-introduce Virgin spinedace into historic habitat in Nevada below Schroeder Reservoir. Efforts will be focused on re-creating the historic species matrix which occurred in this reach prior to dam construction, through selective removal of rainbow trout from the reach below Schroeder Reservoir. Virgin spinedace will be obtained from other populations within the Beaver Dam Wash drainage. The anticipated date of re-introduction will be early summer 1995 following the normal peak spring runoff period for upper Beaver Dam Wash. NDOW will provide pre-project assessments, documentation and monitoring of re-introduction efforts.

Santa Clara River:
UDWR will initiate efforts to control and manage green sunfish in the Virgin River basin in ways to benefit native fishes, including Virgin spinedace. The feasibility of chemical renovation projects in the Santa Clara River drainage will be evaluated in respect to controlling or eliminating green sunfish and other exotic fishes that are determined to be a problem.

The overall project will be divided into workable segments that can be treated separately. For example, if upstream sources of green sunfish can be eliminated above Baker Reservoir then, in turn, the stream segment between Baker Reservoir and Moody Wash could be renovated to remove exotic fishes. Providing that upstream treatments are feasible, this area could also be isolated from contamination by exotic fishes from downstream sources. Other project segments could include Moody Wash downstream to Gunlock Reservoir, and from Gunlock Reservoir downstream to the confluence of the Virgin River.

Control of green sunfish in the Santa Clara River below Gunlock Reservoir might be necessary after population maintenance flows are established. In this case, chemical treatments to temporarily reduce exotic fish while Virgin spinedace are re-introduced and become established might be needed. Such work

could be conducted regardless of upstream occurrence of non-indigenous fishes.

Virgin River:
Attempts to eradicate the red shiner from the Virgin River basin, particularly from the Washington Fields diversion downstream to the Mesquite diversion, have been conducted in the past. Though these attempts were not 100% effective, they were successful at eliminating red shiners between Washington Fields and Johnson diversions. These attempts included construction of fish barriers and chemical treatments with the pesticide rotenone.

Chemical procedures to eradicate red shiners will be implemented in 1995 and followed up by subsequent treatments as needed. General chemical treatment methodology will involve 1) approximately 20 drip stations where rotenone will be introduced into the river, 2) spraying Noxfish in standing water areas along stream channels, 3) detoxifying the rotenone in the Virgin River with potassium permanganate. Temporary fish barriers will be constructed in Utah at strategic sites in 1995 to prevent upstream migration of red shiners. These barriers will also assist in dividing the chemical treatments into manageable treatment areas.

Maintain Genetic Viability

Protocols for introduction, re-introduction, and sub-basin transfer of Virgin spinedace will be established and utilized.

Population and Habitat Monitoring

Virgin spinedace population and habitat monitoring will be implemented. Information obtained from the monitoring process will be used to determine if current management actions are attaining the objectives set forth in the Conservation Agreement. In addition, a general assessment of the overall response of other species occurring in the Virgin River basin will be conducted.

Population and habitat monitoring will be implemented cooperatively by participating Virgin Spinedace Conservation Team (VSCT) personnel. VSCT responsibilities regarding monitoring actions are described in Table 3 of the accompanying Conservation Agreement. Protocols for monitoring will be similar to those established by the Virgin River Recovery Team. A general overview of the methodology is presented below.

Monitoring Plan Methodology
A minimum of 10 stations will be chosen as monitoring points throughout the basin. Once re-establishment procedures have been completed, the number of stations established may increase to include the new areas. Sampling will be conducted annually in

the fall.

Seining will consist of repeated hauls of a 4.6 meters wide x 1.8 meters deep x 3.2 mm mesh seine until depletion (the number of fish captured in a haul is 10% or less of the highest seine catch for that sample site). Samples will be taken from preferred Virgin spinedace microhabitats approximately 10 meters in length. In areas where seining is not feasible, electrofishing methods will be incorporated. These repetitive techniques will primarily provide that the population in a given habitat has been thoroughly sampled. It secondarily provides depletion information for population estimates.

All native fish will be identified to species, counted, measured, and returned to site of capture. All non-indigenous fish will be identified to species, counted, measured and returned to site of capture.

In addition to the sampling described above, Virgin spinedace population information will be obtained from data acquired in the bi-annual sampling by the Virgin River Recovery Team.

Data obtained on responses of populations and habitat to management actions from the monitoring process will be assessed and evaluated annually by the Virgin spinedace conservation team. The effectiveness of the management actions will be measured using empirical criteria to be established for this Strategy.

Develop Mitigation Plan and Protocols for Future Activities

A mitigation plan and protocols for mitigating future activities will be developed during 1995. Any new water depletion or habitat alteration of baseline conditions of historic habitat will require prior evaluation, assessment, and approval. Mitigation will be determined based on an evaluation of how baseline conditions would be altered. During 1995, methodologies for conducting this evaluation will be developed. The evaluation will incorporate procedures for determining flow requirements by integrating components of the conceptual framework outlined by Hill et al. (1991).

Descriptions of existing flow patterns will probably include details on the timing, duration, magnitude, slope, and frequency of high-flow events in selected streams along with analyses to determine an average annual hydrograph for timing and slopes of rising and falling limbs. The HEC-2 analysis (U.S. Army Corps of Engineers 1982) may be used to estimate bankfull flows. A frequency-of-occurrence curve may be required to describe the return period for peak flows. A flow duration curve may also be required to describe the flow duration associated with specific exceedence values.

DESIRED OUTCOME

Implementation of the Conservation Agreement and Strategy will initiate management actions that should provide for the continued existence and recovery of Virgin spinedace. We anticipate that the range of the species will be increased to occupy 80% of its historic habitat (Figure 2). The most significant threat to the species has been identified as dewatered-historic habitat (60 km or 37 mi). This threat will be significantly reduced by providing flows in approximately 39 km (24 mi) of stream channel. We anticipate that this single action will greatly enhance current populations of Virgin spinedace by reducing habitat and population fragmentation, enhancing stream productivity, enhancing water quality, and enhancing the riparian communities. Actions such as non-indigenous fish management and habitat improvement should provide additional benefits by removing negative fish interactions and enhancing impacted habitats.

LITERATURE CITED

Addley, R.C. and T.B. Hardy. 1993. The current distribution of spinedace in the Virgin River basin. Report to Wash. Co. Water Conserv. Dist. Logan, UT. 198 pp.

Angradi, T.R. J.S. Spaulding, and E.D. Koch. 1991. Diet and food utilization by the Virgin River spinedace, *Lepidomeda mollispinis mollispinis*, and speckled dace, *Rhinichthys osculus*, in the Beaver Dam Wash, Utah. Southwestern Naturalist 36(2):157-170.

Cross, J.N. 1975. Ecological distribution of the fishes of the Virgin River (Utah, Arizona, Nevada). M.S. Thesis, Univ. Nev. Las Vegas. 187 pp.

Deacon, J.E., G. Kobetich, J.D. Williams, and S. Contreras. 1979. Fishes of North America, endangered, threatened, or of special concern: 1979. Fisheries 4(2):29-44

Deacon, J.E., P.B. Schumann, and E.L. Stuenkel. 1987. Thermal tolerances and preferences of fishes of the Virgin River System (Utah, Arizona, Nevada). Great Basin Naturalist 47(4):538-546.

Deacon, J.E., A. Rebane, and T.B. Hardy. 1991. Final report to National Park Service: A habitat preference analysis of the Virgin spinedace in Zion National Park, Utah, Univ. of Nevada, Las Vegas, 85 pp.

Gregor, P.D. and J.E. Deacon. 1988. Food partitioning among fishes of the Virgin River. Copeia 1988(2):312-323.

Hardy, T.B., B. Bartz, and W. Carter. 1989. Population dynamics of the fishes in the Virgin River from 1984 through 1987 and impact analysis of the Quail Creek and North Creek Reservoir systems. Dept. Civil and Environmental Engineering, Utah State University, Logan. 183 pp.

Hill, M.T., W.S. Platts, and R.L. Beschta. 1991. Ecological and geomorphological concepts for instream and out-of-channel flow requirements. Rivers 2(3):198-210.

Holden, P.B. 1977. Investigation of the status and critical habitat of the Virgin River chub. PR-11-1. Bio/West, Inc. Logan, Utah. 27 pp.

Miller, R.R. and C.L. Hubbs. 1960. The spiny-rayed cyprinid fishes (Plagopterini) of the Colorado River system. Misc. Publ. Mus. Zool. Univ. Mich. 115:1-39.

Rinne, W.E. 1971. The life history of *Lepidomeda mollispinis mollispinis* (The Virgin River spinedace) a unique western cyprinid. M.S. Thesis, Univ. Nev. Las Vegas. 109 pp.

Sigler, W.F., and R.R. Miller. 1963. Fishes of Utah. Utah State Department of Fish and Game, Salt Lake City, Utah. pp. 203.

Tanner, V.M. 1932. A description of *Notolepidomyzon utahenis*, a new catostomid from Utah. Copeia 3:135-136.

Tanner, V.M. 1936. A study of the fishes of Utah. Proc. Utah Acad. Sci., Arts, Lett. 13:155-178.

United States Army Corps of Engineers. 1982. HEC-2, Water surface profiles. Computer program 723-x6-L202A. Davis, CA: Hydrologic Engineering Center.

Valdez, R.A., W.J. Masslich, R. Radant, and D. Knight. 1991. Status of the Virgin spinedace (*Lepidomeda mollispinis mollispinis*) in the Virgin River drainage, Utah. Report to Utah Div. Wildl. Res. Salt Lake City, Ut. BIO/WEST Report No. PR-197-1. pp. 43

Table 1: Estimated historic and present occupied Virgin spinedace habitat and estimated kilometers (miles) of impacted stream reaches. (modified from Addley and Hardy, 1993)

REACH	Occupied Habitat		Water Development		Other Habitat Alteration	
	Historic (km/mi)	Current (km/mi)	Area Dewatered (km/mi)	Area Depleted (km/mi)	Non-indigenous Species (km/mi)	* Habitat Degradation (km/mi)
Beaver Dam Wash						
Below Shroeder Res.	13.8(8.6)	0.0	-	-	13.8(8.6)	-
Upper BDW	13.0(8.1)	13.0(8.1)	-	-	-	-
Upper Lytle Ranch	4.0(2.5)	4.0(2.5)	-	-	-	1.0(0.6)
Lower Lytle Ranch	4.8(3.0)	4.8(3.0)	-	-	-	-
Littlefield	1.3(0.8)	1.3(0.8)	-	-	1.3(0.8)	1.3(0.8)
East Fork	6.9(4.3)	0.0	2.1(1.3)	-	2.9(1.8)	-
Santa Clara River						
Moody Wash	11.3(7.0)	11.3(7.0)	-	-	-	-
Magotsu Creek	5.0(3.1)	1.0(0.6)	4.0(2.5)	-	-	-
Below Veyo	6.0(3.7)	6.0(3.7)	-	6.0(3.7)	6.0(3.7)	-
Above Gunlock Res.	12.2(7.6)	12.2(7.6)	-	12.2(7.6)	12.2(7.6)	3.0(1.9)
Below Gunlock Res.	30.6(19.0)	0.0	30.6(19.9)	-	-	-
Lower Santa Clara	10.0(6.2)	6.3(3.9)	3.7(2.3)	6.3(3.9)	-	6.3(3.9)
Leeds Creek	6.8(4.2)	0.0	6.8(4.2)	-	-	-
Quail Creek	5.3(3.3)	0.0	-	-	-	-
Ash Creek						-
Upper	4.3(2.7)	0.0	4.3(2.7)	-	-	-
Lower	4.0(2.5)	4.0(2.5)	-	1.6(1.0)		4.0(2.5)
La Verkin						-
Upper	8.7(5.4)	8.7(5.4)	-	-	-	-
Lower	3.2(2.0)	3.2(2.0)	-	3.2(2.0)	-	3.2(2.0)
Virgin River						
Above Quail Cr Div	29.9(18.6)	25.4(15.8)	4.5(2.8)	-	-	-
North Creek						-
Upper	6.9(4.3)	6.9(4.3)	-	-	-	-
Lower	5.5(3.4)	1.6(1.0)	3.9(2.4)	1.6(1.0)	-	1.6(1.0)
North Fork Virgin	18.5(11.5)	18.5(11.5)	-	-	-	-
East Fork Virgin	14.7(9.1)	14.7(9.1)	-	-	-	-
Shunes Creek	4.5(2.8)	4.5(2.8)	-	-	-	
TOTAL	226.4(140.7)	142.6(88.6)	59.9(38.1)	30.9(19.2)	36.2(22.5)	26.4(16.4)

* Includes one or a combination of: agriculture, recreation, development, channelization, or barriers due to dams/diversions.

Table 2: Non-indigenous species which occur in the Virgin River Basin. An "x" indicates where these species occupy Virgin spinedace habitat.

Reach	RBT	BT	GSF	LMB	CCF	BG	MF	RS	GS	GC	KOI	TP	GP	BB	CF
Beaver Dam Wash															
Below Shroeder Res.	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper BDW	x	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Upper Lytle Ranch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Lower Lytle Ranch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Littlefield	-	-	x	x	-	-	x	x	-	-	-	-	-	x	-
East Fork	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Santa Clara River															
Moody Wash	-	x	x	x	-	-	-	-	-	-	-	-	-	-	x
Magotsu Creek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
Below Veyo	x	x	x	-	-	-	-	-	-	-	-	-	-	-	x
Above Gunlock Res.	-	x	x	x	-	-	-	-	-	-	-	-	-	-	x
Below Gunlock Res.	-	-	x	x	-	-	-	-	-	-	-	-	-	-	x
Lower Santa Clara	-	-	x	-	-	-	x	-	-	-	-	-	-	-	x
Leeds Creek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quail Creek	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ash Creek															
Upper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
La Verkin															
Upper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Virgin River															
Above Quail Cr Div	-	-	-	x	-	-	-	-	-	-	-	-	-	x	x
North Creek															
Upper	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lower	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x
North Fork Virgin	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-
East Fork Virgin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shunes Creek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RBT= Rainbow trout, BT=Brown trout, GSF=Green sunfish, LMB=Large mouth bass, CCF=Channel catfish, BG=Bluegill, MF=Mosquitofish, RS=Red shiner, GC=Grass carp, KOI=Koi, TP=Tilapia, GP=Guppy, BB=Black Bullhead, GS=Goldenshiner, CF=Crayfish

Table 3. Estimated existing conditions and population maintenance flows to be re-established for each of Virgin spinedace habitat (modified from Addley and Hardy, 1993)

REACH	EXISTING CONDITIONS					RE-ESTABLISHED[a]
	Low Flows (cfs)	Density (#/10m) Adult	Density (#/10m) YOY	Density (#/100m²) Adult	Density (#/100m²) YOY	Sign. Deplet.Y/N	Population Maintenance Flows (cfs)
Beaver Dam Wash							
Below Shroeder Res.	1-2	-	-	-	-	N	-
Upper BDW	1-2	4.4	3.5	16	12.6	N	-
Upper Lytle Ranch	3	10.7	123	58.9	677	N	-
Lower Lytle Ranch	0	-	-	-	-	N	-
Littlefield	4-5	-	-	-	-	N	-
East Fork	1	-	-	-	-	Y	1
Santa Clara River							
Moody Wash	1.5	27.9	119	143.1	203	N	-
Magotsu Creek	1	-	-	-	-	Y	1
Below Veyo	3-4	2.1	0.8	5.6	2.1	Y	3.5
Above Gunlock Res.	2-4	27.9	119	143.1	203	Y	3
Below Gunlock Res.	0-1	0.0	0.0	0.0	0.0	Y	3
Lower Santa Clara	1-3	0.4	1.0	2.9	6.9	Y	3
Leeds Creek	0	0.0	0.0	0.0	0.0	Y	1.5
Quail Creek	2-4					Y	1.5
Ash Creek							
Upper	0	0.0	0.0	0.0	0.0	Y	-
Lower	2-4	10.1	11.3	48.9	55.1	Y	-
La Verkin							
Upper	5-6	0.4	0.3	1.2	0.8	N	-
Lower	1	0.0	2.0	0.0	5.5	Y	-
Virgin River							
Below Quail Cr Div	0	-	-	-	-	Y	3
North Creek							
Upper	3	23.3	12.5	59.9	32.2	N	-
Lower	0	-	-	-	-	Y	2
North Fork Virgin	*b*	2.9	12.4	4.7	20.1	N	-
East Fork Virgin	*b*	7.9	7.0	10.2	9.1	N	-
Shunes Creek	1	0.2	8.5	1.0	47.8	N	-

a These flows will be measured at the point of release where dams and diversions exist

b Instream flows for water-related resource attributes are currently being discussed by the NPS, the State of Utah, and the WCWCD. These discussions are part of ongoing negotiations to determine Federal reserved water rights for Zion National Park in the Virgin River adjudication.

Table 4: Management actions to be implemented by reach and agency involvement

REACH	Flow Re-establishment	Habitat Enhancement	VS Introduction	Non-indigenous Fish Management
Beaver Dam Slope				
Below Shroeder Res.	-	*NDOW, UDWR, FWS, BLM	*NDOW, UDWR, FWS	*NDOW, USWR, FWS
Upper BDW	-	-	-	*NDOW, UDWR, FWS
Upper Lytle Ranch	-	-	-	*UDWR, FWS
Lower Lytle Ranch	-	-	-	*UDWR, FWS
Littlefield	-	*BLM, UDWR, FWS,	-	*BLM, UDWR, FWS
East Fork	*UDNR, FWS, WCWCD, BLM	*UDWR, FWS, BLM	*UDWR, FWS	*UDWR, FWS
Santa Clara River				
Moody Wash	-	-	-	*UDWR, FWS
Magotsu Creek	*UDNR, WCWCD, FWS, BLM	-	*UDWR, FWS	*UDWR, FWS
Below Veyo	*UDNR, WCWCD, FWS, BLM	-	-	*UDWR, FWS
Above Gunlock Res.	*UDNR, WCWCD, FWS, BLM	*UDWR, FWS, BLM	-	*UDWR, FWS
Below Gunlock Res.	*UDNR, WCWCD, FWS, BLM	-	*UDWR, FWS	*UDWR, FWS
Lower Santa Clara	*UDNR, WCWCD, FWS, BLM	*UDWR, FWS, BLM	-	*UDWR, FWS, BLM
Leeds Creek	*UDNR, WCWCD, FWS, BLM	-	*UDWR, FWS	*UDWR, FWS
Quail Creek	*UDNR, WCWCD, FWS, BLM	-	*UDWR, FWS	*UDWR, FWS
Ash Creek				
Upper	-	-	*UDWR, FWS	-
Lower	-	*UDWR, FWS, BLM	-	*UDWR, FWS
La Verkin				
Upper	-	-		*UDWR, FWS
Lower	-	*UDWR, FWS, BLM		*UDWR, FWS
Virgin River				
Above Quail Cr Div	*UDNR, WCWCD, FWS, BLM	-	*UDWR, FWS	*UDWR, FWS, BLM
North Creek				
Upper	-	-	-	*UDWR, FWS
Lower	*UDNR, WCWCD, FWS, BLM	*UDWR, FWS, BLM	*UDWR, FWS	*UDWR, FWS
North Fork Virgin	-	-		*UDWR, FWS
East Fork Virgin	-	-		*UDWR, FWS
Shunes Creek	-	-		-

* Represents lead agency for management action(s) to be implemented

Table 5: Routinely stocked Salmonids in the Virgin River Basin

Area/Reach	Rainbow Trout	Brown Trout	Brook Trout	Yellowstone Cutthroat Trout
Baker Reservoir	X	X[a]		
Schroeder Reservoir				
Pine Valley Reservoir	X		X	
Upper Sand Cove Reservoir	X			
Upper Santa Clara River	X			
Quail Creek Reservoir	X			
Kolob Reservoir	X		X	X
Upper East Fork Virgin River	X	X		
Navajo Lake	X		X	
Private Ponds	X		X	

a Stocking could be discontinued

FIGURE 1: Estimated historic and present distribution of the Virgin Spinedace in the Virgin River Basin (modified from Valdez et al. 1991).

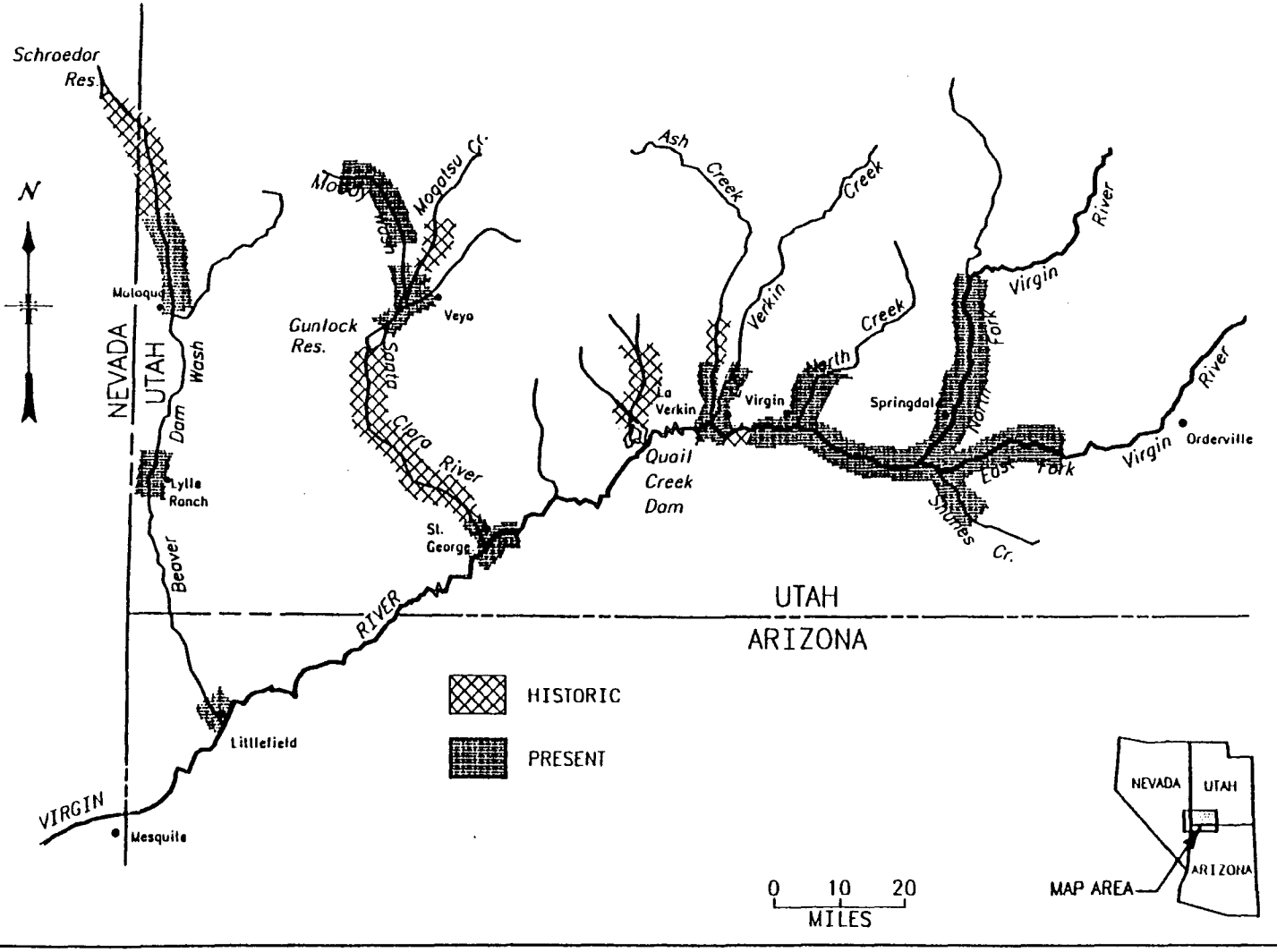
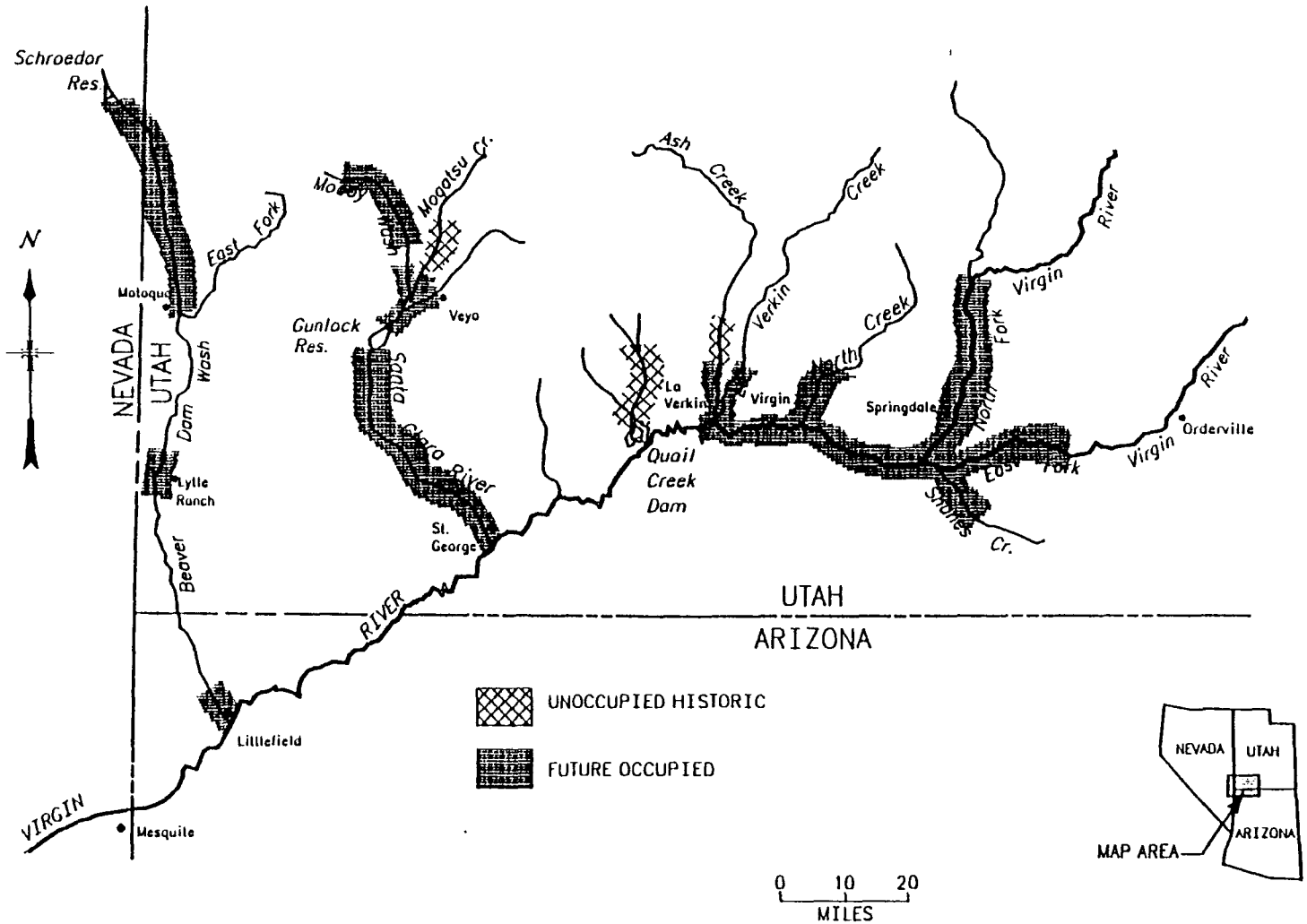


FIGURE 2: Projected Virgin Spinedace distribution in the Virgin River Basin as a result of the Conservation Agreement



APPENDIX A

Native Species of the Virgin River Basin

	Status			
	ESA	UT	NV	AZ
Plants:*				
Holmgren milkvetch (*Astragalus holmgreniorum*)	C1	S		
Beaver Dam milkvetch	C2			
Hay's sedge (Carex haysii)	C2	S		
Virgin thistle (Cirsium virginensis)	C2	S		
Zion tansy (Sphaeromeria ruthiae)				
Cliff jamesia (Jamesia americana)	C2	S		
Nevada goldenrod		S		
Virgin phacelia (Phacelia cephalotes)				
*Invertebrates:**				
Tiger beetle (Cicindela oregona)	C2	S		
Utah hydroporous diving beetle (Hygrotus utahensis)	C2			
Utah minute moss beetle (Limnebius crassalus)	C2			
Utah water scavenger beetle (Chaetarthria utahensis)	C2	S		
MacNeil sooty wing skipper (Hesperopsis gracielae)	C2	S		
Wet Wall snail (Physa zionis)	C2	S		
Desert spring snail (Pyrgulopsis deserta)	S			
Note: Only federal candidate species of plants and invertebrates are included.				
Fish:				
Virgin spinedace (Lepidomeda mollispinis)	PT	E	P	E
Woundfin (Plagopterus argentissimus)	E	E	E	E
Virgin River chub (Gila seminuda)	E	E	S	E
Flannelmouth sucker (Catostomus latipinnis)	C2	S		
Desert sucker (Catostomus clarki)	C2	S		
Speckled dace (Rhinichthys osculus)				
Amphibians:				
Tiger salamander (Ambystoma tigrinum)				
Southwestern toad (Bufo microscaphus)	C2	S		
Red-spotted toad (Bufo punctatus)				
Woodhouse's toad (Bufo woodhousei)				
Great Basin spadefoot (Scaphiopus intermontanus)				
Canyon treefrog (Hyla arenicolor)				
Pacific treefrog (Psuedacris regilla)		S		
Northern leopard frog (Rana pipiens)				C
Lowland leopard frog (Rana yavapaiensis)	C2	S		C
Relict leopard frog (Rana onca)	3A	S		
Reptiles:				
Desert tortoise (Gopherus agassizii)	T	E	T	C
Utah banded gecko (Coleonyx variegatus)		S		
Desert night lizard (Xantusia vigilis)		S		
Desert iguana (Dipsosaurus dorsalis)		S		
Western chuckwalla (Sauromalus obesus)	C2	T		
Collared lizard (Crotophytus collaris)				
Long-nosed leopard lizard (Gambelia wislizenii)				
Zebra-tailed lizard (Callisaurus draconoides)		S		
Desert spiny lizard (Sceloporus magister)				
Western fence lizard (Sceloporus occidentalis)				
Eastern fence lizard (Sceloporus undulatus)				
Sagebrush lizard (Sceloporus graciosus)				
Tree lizard (Urosaurus ornatus)				

Long-tailed brush lizard (Urosaurus graciosus)				
Side-blotched lizard (Uta stansburiana)				
Short-horned lizard (Phrynosoma douglassi)				
Desert horned lizard (Phrynosoma platyrhinos)				
Great Basin skink (Eumeces skiltonianus)				
Western whiptail (Cnemidophorus tigris)				
Plateau striped whiptail (Cnemidophorus velox)				
Banded gila monster (Heloderma suspectum)	*C2*	*E*	*S*	
Western blind snake (Leptotyphlops humilis)		*S*		
Regal ringneck snake (Diadophis punctatus)				
Western leaf-nosed snake (Phyllorhynchus decurtatus)				
Red coachwhip (Masticophis flagellum)				
Striped whipsnake (Masticophis taeniatus)				
Mojave patch-nosed snake (Salvadora hexalepsis)		*S*		
Great Basin gopher snake (Pituophis melanoleucus)				
Glossy snake (Arizona elegans)		*S*		
California kingsnake (Lampropeltis getulus)		*S*		
Utah mountain kingsnake (Lampropeltis pyromelana)		*S*		
Long-nosed snake (Rhinocheilus lecontei)				
Wandering garter snake (Thamnophis elegans)				
Ground snake (Sonora semiannulata)				
Utah black-headed snake (Tantilla utahensis)		*S*		
Night snake (Hypsiglena torquata)				
Sonoran lyre snake (Trimorphodon biscutatus)		*S*		
Great Basin rattlesnake (Crotalus viridis)				
Mojave desert sidewinder (Crotalus cerastes)		*S*		
Southwest speckled rattlesnake (Crotalus mitchellii)		*S*		
Mojave rattlesnake (Crotalus scutulatus)		*S*		
Birds:				
Common loon (Gavia immer)				
Pied-billed grebe (Podilymbus podiceps)				
Horned grebe (Podiceps auritus)				
Eared grebe (Podiceps nigricollis)				
Western grebe (Aechmophorus occidentalis)				
Clark's grebe (Aechmophorus clarkii)				*C*
American white pelican (Pelecanus erythrorhynchos)		*S*		
Double-crested cormorant (Phalacrocorax auritus)				
American bittern (Botaurus lentiginosus)				*C*
Western least bittern (Ixobrychus exilis)	*C2*	*S*		*C*
Great blue heron (Ardea herodias)				
Great egret (Casmerodius albus)				*E*
Snowy egret (Egretta thula)				*T*
Cattle egret (Bubulcus ibis)				
Green-backed heron (Butorides striatus)				
Black-crowned night-heron (Nycticorax nycticorax)				
White-faced ibis (Plegadis chihi)	*C2*			
Tundra swan (Cygnus columbianus)				
Greater white-fronted goose (Anser albifrons)				
Snow goose (Chen caerulescens)				
Canada goose (Branta canadensis)				
Wood duck (Aix sponsa)				
Green-winged teal (Anas crecca)				
Mallard (Anas platyrhynchos)				
Northern pintail (Anas acuta)				
Blue-winged teal (Anas discors)				
Cinnamon teal (Anas cyanoptera)				
Northern shoveler (Anas clypeata)				
Gadwall (Anas stepera)				
American wigeon (Anas americana)				
Canvasback (Aythya valisineria0				
Redhead (Aythya americana)				

Ring-necked duck (Aythya collaris)				
Lesser scaup (Aythya affinis)				
Common goldeneye (Bucephala clangula)				
Bufflehead (Bucephala albeola)				
Hooded merganser (Lophodytes cucullatus)				
Common merganser (Mergus merganser)				
Red-breasted merganser (Mergus serrator)				
Ruddy duck (Oxyura jamaicensis)				
Turkey vulture (Cathartes aura)				
Osprey (Pandion haliaetus)		*S*		*T*
Bald eagle (Haliaeetus leucocephalus)	*E*	*E*		*E*
Northern harrier (Circus cyaneus)				
Sharp-shinned hawk (Accipiter striatus)				
Cooper's hawk (Accipiter cooperii)				
Northern goshawk (Accipiter gentilis)	*C2*	*S*		*C*
Common black-hawk (Buteogallus anthracinus)				*C*
Swainson's hawk (Buteo swainsoni)		*S*		
Red-tailed hawk (Buteo jamaicensis)				
Ferruginous hawk (Buteo regalis)	*C2*	*T*		*T*
Rough-legged hawk (Buteo lagopus)				
Golden eagle (Aquila chrysaetos)				
American kestrel (Falco sparverius)				
Merlin (Falco columbarius)				
Peregrine falcon (Falco peregrinus)	*E*	*E*	*E*	*C*
Prairie falcon (Falco mexicanus)				
Wild turkey (Meleagris gallopava)				
Gambel's quail (Callipepla gambelii)				
Virginia rail (Rallus limicola)				
Sora (Porzana carolina)				
Commen moorhen (Gallinula chloropus)				
American coot (Fulica americana)				
Snowy plover (Charadrius alexandrinus)	*C3*	*S*		*C*
Mountain plover (Charadrius montanus)	*C2*	*S*		
Semipalmated plover (Charadrius semipalmatus)				
Killdeer (Charadrius vociferus)				
Black-necked stilt (Himantopus mexicanus)				
American avocet (Recurvirostra americana)				
Greater yellowlegs (Tringa melanoleuca)				
Lesser yellowlegs (Tringa flavipes)				
Solitary sandpiper (Tringa solitaria)				
Willet (Catoptrophorus semipalmatus)				
Spotted sandpiper (Actitus macularia)				
Whimbrel (Numenius phaeopus)				
Long-billed curlew (Numenius americanus)		*S*		
Marbled godwit (Limosa fedoa)				
Western sandpiper (Calidris mauri)				
Least sandpiper (Calidris minutilla)				
Baird's sandpiper (Calidris bairdii)				
Pectoral sandpiper (Calidris melanotos)				
Long-billed dowitcher (Limnodromus scolopaceus)				
Common snipe (Gallinago gallinago)				
Wilson's phalarope (Phalaropus tricolor)				
Red-necked phalarope (Phalaropus lobatus)				
Franklin's gull (Larus pipixcan)				
Bonaparte's gull (Larus philadelphia)				
Ring-billed gull (Larus delawarensis)				
California gull (Larus californicus)				
Herring gull (Larus argentatus)				
Caspian tern (Sterna caspia)		*S*		
Forster's tern (Sterna forsteri)				
Black tern (Chlidonias niger)	*C2*	*S*		
Band-tailed pigeon (Columba fasciata)				

White-winged dove (Zenaida asiatica)			
Mourning dove (Zenaida macroura)			
Yellow-billed cuckoo (Coccyzus americanus)		*T*	*T*
Greater roadrunner (Geococcyx californianus)			
Common barn-owl (Tyto alba)			
Flammulated owl (Otus flammeolus)			
Western screech owl (Otus kennicotti)			
Great horned owl (Bubo virginianus)			
Northern pygmy owl (Glaucidium gnoma)			
Western burrowing owl (Athene cunicularia)	*C2*	*S*	
Mexican spotted owl (Strix occidentalis)	*T*	*T*	*T*
Long-eared owl (Asio otus)			
Short-eared owl (Asio flammeus)		*S*	
Lesser nighthawk (Chordeilus acutipennis)			
Common nighthawk (Chordeilus minor)			
Common poorwill (Phalaenoptilus nuttalii)			
White-throated swift (Aeronautes saxatalis)			
Black-chinned hummingbird (Archilochus alexandri)			
Costa's hummingbird (Calypte costae)			
Broad-tailed hummingbird (Selasphorus platycercus)			
Rufous hummingbird (Selasphorus rufus)			
Belted kingfisher (Ceryle alcyon)			*C*
Lewis' woodpecker (Melanerpes lewis)		*S*	
Red-naped sapsucker (Sphyrapicus nuchalis)			
Ladder-backed woodpecker (Picoides scalaris)			
Downy woodpecker (Picoides pubescens)			
Hairy woodpecker (Picoides villosus)			
Northern flicker (Colaptes auratus)			
Olive-sided flycatcher (Contopus borealis)			
Western wood-pewee (Contopus sordidulus)			
Southwest willow flycatcher (Empidonax traillii)	*PE*	*S*	*E*
Hammond's flycatcher (Empidonax hammondii)			
Gray flycatcher (Empidonax wrightii)			
Cordillean flycatcher (Empidonax occidentalis)			
Black phoebe (Sayornis nigricans)			
Say's phoebe (Sayornis saya)			
Vermilion flycatcher (Pyrocephalus rubinus)			
Ash-throated flycatcher (Myiarchus tyrannulus)			
Cassin's kingbird (Tyrannus vociferans)			
Western kingbird (Tyrannus verticalis)			
Horned lark (Eremophila alpestris)			
Tree swallow (Tachycineta bicolor)			
Violet-green swallow (Tachycineta thalassina)			
Northern rough-winged swallow (Stelgidopteryx serripennis)			
Bank swallow (Riparia riparia)			
Cliff swallow (Hirundo pyrrhonota)			
Barn swallow (Hirundo rustica)			
Stellar's jay (Cyanocitta stelleri)			
Scrub jay (Aphelocoma coerulescens)			
Pinyon jay (Gymnorhinus cyanocephalus)			
Clark's nutcracker (Nucifraga columbiana)			
American crow (Corvus brachyrhynchos)			
Common raven (Corvus corax)			
Black-capped chickadee (Parus atricapillus)			
Mountain chickadee (Parus gambeli)			
Plain titmouse (Parus inornatus)			
Verdin (Auriparus flaviceps)			
Bushtit (Psaltriparus minimus)			
Red-breasted nuthatch (Sitta canadensis)			
White-breasted nuthatch (Sitta carolinensis)			
Pygmy nuthatch (Sitta pygmaea)			
Brown creeper (Certhia americana)			

Cactus wren (Campylorhynchus brunneicapillus)	*S*
Rock wren (Salpinctes obsoletus)	
Canyon wren (Catherpes mexicanus)	
Bewick's wren (Troglodytes bewickii)	
House wren (Troglodytes aedon)	
Winter wren (Troglodytes troglodytes)	
Marsh wren (Cistothorus palustris)	
American dipper (Cinclus mexicanus)	
Golden-crowned kinglet (Regulus satrapa)	
Ruby-crowned kinglet (Regulus calendula)	
Blue-gray knatcatcher (Polioptila caerulea)	
Western bluebird (Sialia mexicana)	*S*
Mountain bluebird (Sialia currucoides)	
Townsend's solitaire (Myadestes townsendi)	
Swainson's thrush (Catharus ustulatus)	
Hermit thrush (Catharus guttatus)	
American robin (Turdus migratorius)	
Northern mockingbird (Mimus polyglottos)	
Sage thrasher (Oreoscoptes montanus)	
Bendire's thrasher (Toxostoma bendirei)	
Crissal thrasher (Toxostoma crissale)	*S*
LeConte's thrasher (Toxostoma lecontei)	
Water pipit (Anthus spinoletta)	
Bohemian waxwing (Bombycilla garrulus)	
Cedar waxwing (Bombycilla cedrorum)	
Phainopepla (Phainopepla nitens)	
Northern shrike (Lanius excubitor)	
Loggerhead shrike (Lanius ludovicianus)	*S*
Bell's vireo (Vireo bellii)	*S*
Gray vireo (Vireo vicinior)	
Solitary vireo (Vireo solitarius)	
Warbling vireo (Vireo gilvus)	
Orange-crowned warbler (Vermivora celata)	
Nashville warbler (Vermivora ruficapilla)	
Virginia's warbler (Vermivora virginiae)	
Lucy's warbler (Vermivora luciae)	
Yellow warbler (Dendroica petechia)	
Yellow-rumped warbler (Dendroica coronata)	
Black-throated gray warbler (Dendroica nigrescens)	
Grace's warbler (Dendroica graciae)	
Nothern waterthrush (Seiurus noveboracensis)	
MacGillivray's warbler (Oporornis tolmiei)	
Common yellowthroat (Geothlypis trichas)	*S*
Wilson's warbler (Wilsonia pusilla)	
Yellow-breasted chat (Icteria virens)	
Summer tanager (Piranga rubra)	
Western tanager (Piranga ludoviciana)	
Black-headed grosbeak (Pheucticus melanocephalus)	
Blue grosbeak (Guiraca caerulea)	
Lazuli bunting (Passerina ciris)	
Green-tailed towhee (Pipilo chlorurus)	
Rufous-sided towhee (Pipilo erythrophthalmus)	
Abert's towhee (Pipilo aberti)	
American tree sparrow (Spizella arborea)	
Chipping sparrow (Spizella pallida)	
Brewer's sparrow (Spizella breweri)	
Black-chinned sparrow (Spizella atrogularis)	
Vesper sparrow (Pooecetes gramineus)	
Lark sparrow (Chondestes grammacus)	
Black-throated sparrow (Amphispiza bilineata)	
Sage sparrow (Amphispiza belli)	
Savannah sparrow (Passerculus sandwichensis)	

Song sparrow (Melospiza melodia)				
Lincoln's sparrow (Melospiza lincolnii)				
White-crowned sparrow (Zonotrichia albicollis)				
Dark-eyed junco (Junco hyemalis)				
Red-winged blackbird (Agelaius phoeniceus)				
Western meadowlark (Sturnella neglecta)				
Yellow-headed blackbird (Xanthocephalus xanthocephalus)				
Brewer's blackbird (Euphagus cyanocephalus)				
Great-tailed grackle (Quiscalus mexicanus)				
Brown-headed cowbird (Molothrus ater)				
Hooded oriole (Icterus cucullatus)				
Northern oriole (Icterus galbula)				
Scott's oriole (Icterus parisorum)				
Cassin's finch (Carpodacus cassinii)				
House finch (Carpodacus mexicanus)				
Red crossbill (Loxia curvirostra)				
Pine siskin (Carduelis pinus)				
Lesser goldfinch (Carduelis psaltria)				
American goldfinch (Carduelis tristis)				
Evening grosbeak (Coccothraustes vespertinus)				
Mammals:				
Merriam's shrew (Sorex merriami)				
Dusky shrew (Sorex monticolis)				
Northern water shrew (Sorex palustris)				*E*
Desert shrew (Notiosorex crawfordi)		*S*		
California leaf-nosed bat (Macrotus californicus)	*C2*			*C*
Little brown myotis (Myotis lucifugus)				
Yuma myotis (Myotis yumanensis)	*C2*			
Long-eared myotis (Myotis evotis)	*C2*			
Fringed myotis (Myotis thysanodes)	*C2*			
Long-legged myotis (Myotis volans)	*C2*			
California myotis (Myotis californicus)				
Western small-footed myotis (Myotis ciliolabrum)	*C2*			
Silver-haired bat (Lasionycteris noctivagans)				
Western pipistrelle (Pipistrellus hesperus)				
Big brown bat (Eptesicus fuscus)				
Western red bat (Lasiurus blossevillii)		*S*		*C*
Hoary bat (Lasiurus cinereus)				
Spotted bat (Euderma maculatum)	*C2*	*S*	*T*	*C*
Pale Townsend's big-eared bat (Plecotus townsendii)	*C2*			
Allen's big-eared bat (Idionycteris phyllotis)	*C2*			
Pallid bat (Antrozous pallidus)				
Brazilian free-tailed bat (Tadarida brasiliensis)				
Big free-tailed bat (Nyctinomops macrotis)	*C2*	*S*		
Pygmy rabbit (Brachylagus idahoensis)	*C2*	*S*		
Black-tailed jackrabbit (Lepus californicus)				
Mountain cottontail (Slyvilagus nuttalli)				
Desert cottontail (Slyvilagus audoboni)				
Least chipmunk (Tamias minimus)				
Cliff chipmunk (Tamias dorsalis)				
Yellow-bellied marmot (Marmota flaviventris)				
White-tailed antelope squirrel (Ammospermophilus luecurus)				
Rock squirrel (Spermophilus variegatus)				
Golden-mantled ground squirrel (Spermophilus lateralis)				
Red squirrel (Tamiasciurus hudsonicus)				
Virgin River pocket gopher (Thomomys bottae)		*S*		
Virgin little pocket mouse (Perognathus longimembris)				
Great Basin pocket mouse (Perognathus parvus)				
Long-tailed pocket mouse (Chaetodipus formosus)				
Desert pocket mouse (Chaetodipus penicillatus)				
Ord's kangaroo rat (Dipodomys ordii)				

Chisel-toothed kangaroo rat (Dipodomys microps)		
Merriam's kangaroo rat (Dipodomys merriami)	*C2*	*S*
Desert kangaroo rat (Dipodomys deserti)		*S*
Beaver (Castor canadensis)		
Western harvest mouse (Reithrodontomys megalotis)		
Canyon mouse (Peromyscus crinitus)		
Cactus mouse (Peromyscus eremicus)		*S*
Deer mouse (Peromyscus maniculatus)		
Brush mouse (Peromyscus boylii)		
Pinyon mouse (Peromsycus truei)		
Northern grasshopper mouse (Onychomys leucogaster)		
Southern grasshopper mouse (Onychomys torridus)		*S*
Desert woodrat (Neotoma lepida)		
Bushy-tailed woodrat (Neotoma cinerea)		
Virgin River montane vole (Microtus montanus)	*C2*	*S*
Long-tailed vole (Microtus longicaudus)		
Muskrat (Ondatra zibethicus)		
Porcupine (Erethizon dorsatum)		
Coyote (Canis latrans)		
Kit fox (Vulpes macrotis)		*S*
Gray fox (Urocyon cinereoargenteus)		
Ringtail (Bassariscus astutus)		*S*
Raccoon (Procyon lotor)		
Long-tailed weasel (Mustela frenata)		
Badger (Taxidea taxus)		
Western spotted skunk (Spilogale gracilis)		
Striped skunk (Mephitis mephitis)		
Mountain lion (Felis concolor)		
Bobcat (Lynx rufus)		
Mule deer (Odocoileus hemionus)		
Desert bighorn sheep (Ovis canadensis)		

Status
E = Endangered
T = Threatened
C1 = Candidate species (Category 1)
C2 = Candidate species (Category 2)
C3 = Candidate species (Category 3)
3A = Extinct
PE = Proposed as endangered
PT = Proposed as threatened
S = Sensitive
P = Protected
C = Candidate for state list

EXHIBIT F

[Reference: Section 8.1.4]

AGREEMENT AMONG UTAH DIVISION OF WILDLIFE RESOURCES, WCWCD, AND LOWER GUNLOCK REGARDING CONTROL OF WATER FROM THE CONSERVATION POOL IN GUNLOCK RESERVOIR

AGREEMENT

This Agreement is entered into by and between the Lower Gunlock Reservoir Corporation, a Utah non-profit mutual water company ("Corporation"), the Utah Division of Wildlife Resources ("Division"), and the Washington County Water Conservancy District ("District").

Recitals

A. The Corporation and the Division entered into a written Contract dated March 20, 1970 for the joint financial participation, construction and use of the Gunlock Reservoir located on the Santa Clara River in Washington County, Utah, providing among other things a contractual right for a sport fishery conservation pool in said Reservoir for the benefit of the Division.

B. The March 20, 1970 Contract was amended and superceded by an Amended Contract dated June 10, 1981 whereby the parties reallocated the fish conservation pool and active storage pool in Gunlock Reservoir. A copy of the 1981 Amended Contract is attached hereto as Exhibit A and incorporated by reference herein.

C. The parties wish to implement the Santa Clara Project Agreement which is intended to:

1. Conserve water and provide more dependable supplies for water users below Gunlock Reservoir;
2. Settle the water right claims of the Shivwits Band of Paiute Indians; and,
3. Provide certain instream flows in the Santa Clara River below Gunlock Reservoir for the Virgin River Spinedace.

A copy of the Santa Clara Project Agreement is attached hereto as Exhibit B and incorporated by reference herein.

D. As required by Paragraph 8.1 of the Santa Clara Project Agreement, and in order to implement that Agreement, it is necessary for the parties to reallocate a portion of the Division's fish conservation pool in Gunlock Reservoir in order to help provide instream flows for the Virgin River Spinedace below Gunlock Reservoir in the Santa Clara River.

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained herein, and for other good and valuable consideration, the parties mutually agree as follows:

1. The Division hereby relinquishes its contractual right to the first 1,086 acre-feet of water in its existing fish conservation pool in Gunlock Reservoir which was heretofore granted in Exhibit A. The Division shall retain the right to all remaining portions of the fish conservation pool and the sediment pool in Gunlock Reservoir, to be used for sport fishery purposes as provided in Exhibit A.

2. The contractual right to the use of 1,086 acre-feet of water in the fish conservation pool relinquished by the Division shall be assigned by the Corporation to the District and may be used by the District for any project purpose under the Santa Clara Project Agreement, including but not limited to providing instream flows below Gunlock Reservoir.

3. To fully compensate the Division for its relinquishment of 1,086 acre-feet from the fish conservation pool in Gunlock Reservoir, the District shall provide the Division with a perpetual sport fishery conservation pool of 1,086 acre-feet in Sand Hollow Reservoir.

4. Under no circumstances shall the release of water from Gunlock Reservoir for any Santa Clara Project uses, or otherwise, diminish the Division's remaining conservation pool rights in the Reservoir, except as may be provided in Exhibit A.

5. Any and all water released from or bypassed through Gunlock Reservoir for instream flow purposes for the Virgin River Spinedace shall be used by the Division pursuant to the Santa Clara

Agreement. The Division shall file with the Utah State Engineer an instream flow change application, pursuant to § 73-3-3, Utah Code Annotated, to preserve those flows for their intended purpose. However, the obligation to release water required for instream flows under the Santa Clara Project Agreement shall not be an obligation of the Division, but is an obligation of the Corporation and/or the operator of the Santa Clara Project, pursuant to the Santa Clara Project Agreement.

6. The parties shall cooperate in and do any act or thing and execute any and all instruments or applications required by this Agreement and which are necessary and proper to make effective the provisions of this Agreement.

7. This Agreement shall be effective and enforceable only after all of the following have been accomplished:

(a) The execution of this Agreement by the parties hereto;

(b) The approval of this Agreement has been secured in writing by the Sport Fishery Section of the United States Fish & Wildlife Service;

(c) The Santa Clara Project Agreement (Exhibit B) becomes effective and enforceable as provided for in ¶ 11.0 of the Santa Clara Project Agreement; and,

(d) The funding for the Santa Clara Project has been secured and is available to construct that Project.

8. The Amended Contract of June 10, 1981 (Exhibit A), unless inconsistent with this Agreement, shall remain in full force and effect.

DATED this 15th day of January, ~~2000.~~ 2001

LOWER GUNLOCK RESERVOIR CORPORATION

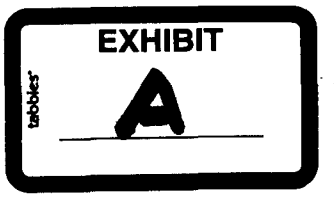
By: _____

UTAH DIVISION OF WILDLIFE RESOURCES

By: _____

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT

By: _____



AMENDED CONTRACT

THIS AGREEMENT is made and entered into this 10th day of June, 1981, by and betwen the LOWER GUNLOCK RESERVOIR CORPORATION, a Utah non-profit mutual water company, hereinafter referred to as the "Corporation", and the UTAH DIVISION OF WILDLIFE RESOURCES, a body politic of the State of Utah, hereinafter referred to as "Division".

W I T N E S S E T H:

WHEREAS, the parties entered into a written contract of March 20, 1970 for the joint financial participation, construction and use of a water storage reservoir to be located on the Santa Clara River in Washington County, State of Utah, a copy of which is attached hereto and incorporated by reference herein; and,

WHEREAS, although the agreement of March 20, 1970, has been fully executed and both parties have fully performed thereunder, there is disagreement among the parties relative to the interpretation of the certain provisions of the contract and the use of 580 acre-feet of storage capacity which was in excess of the original designed capacity of the reservoir and not addressed in the original contract, and, the allocation of sedimentation losses due to the fact that sedimentation has occurred in areas of the reservoir unanticipated by the parties; and,

WHEREAS, the parties are currently involved in litigation in the Fifth Judicial District Court in and for Washington County, Civil No. 7090, in which the parties hereto seek a declaratory judgment of the Court regarding their respective rights, duties, and obligations under the above-referenced contract, which governs the operation of the reservoir and the use and release of waters therefrom; and,

WHEREAS, the Division desires to improve the fishery within the Lower Gunlock Reservoir, which requires that the surface level of the reservoir be stabilized during the late spring and early summer of each year, which stabilization

program was not part of the original contractual agreement between the parties; and,

WHEREAS, the parties desire to fully resolve their present disputes, and to provide for an improved fishery by hereby amending the existing contract. This amended contract shall supersede the above-referenced agreement, and shall hereafter control the rights, duties, and obligations of the parties and the pending lawsuit shall be dismissed upon the grounds that the dispute therein has been hereby settled.

NOW, THEREFORE, in consideration of the mutual covenants and conditions herein contained, and the dismissal of the above pending litigation, the parties mutually agree as follows:

1. Representations of the Parties.

The parties mutually agree and acknowledge that both parties have fully complied with all of the covenants and conditions contained in the agreement of March 20, 1970, regarding the funding and construction of the reservoir; securing the required approvals of the State Engineer for the segregation and change of nature and place of use; to provide the required water for the maintenance of a 1,500 acre-foot sedimentation pool, a 2,300 acre-foot fish conservation pool, and a 7,080 acre-foot irrigation pool in accordance with the allocations set forth in this agreement, for the application for and the obtaining of Federal construction grants to assist in the financing of the construction of the Lower Gunlock Reservoir; and, that neither party is in default under any of the terms and conditions of the prior written agreement in any respect.

2. Allocation of Actual Storage Space.

The reservoir as constructed has 10,880 acre-feet of storage space before siltation, which space shall be allocated between the parties as follows:

(a) The bottom 1,500 acre-feet of storage space shall be set aside as dead storage capacity for use as a

sedimentation pool, and the water stored therein shall not be available for withdrawals by either party;

(b) The Division shall have the exclusive right to the use of the 2,300 acre-feet of storage space for the maintenance of a permanent fish conservation pool, which water has been provided for by the Corporation from its vested water rights. Additionally, the Division shall have the right to utilize all of the water stored in the reservoir specifically including the sedimentation pool as set forth in subparagraph (a) hereof for fish culture purposes, subject to the Corporation's rights to withdraw its water from the irrigation pool as set forth in subparagraph (c) hereof in accordance with the needs of its shareholders.

(c) The Corporation shall have the exclusive right to use the 7,080 acre-feet of active storage space, which shall be comprised of the 6,000 acre-foot space originally allocated to the Corporation, plus all of the additional 580 acre-feet of storage capacity created through the construction of a larger reservoir plus 500 acre-feet out of the original 2,000 acre-foot sedimentation pool which pool by agreement has been reduced to 1,500 acre-feet as set forth in subparagraph (a) hereof;

3. Allocation of Existing Sedimentation Loss.

The Lower Gunlock Reservoir has been in operation approximately eight years, and during that period of time substantial amounts of sediments have been deposited within the reservoir, reducing the actual storage capacity by approximately 500 acre-feet. The parties agree to allocate the existing sedimentation loss in proportion to their allocated storage space in the reservoir. Accordingly, the Corporation shall reduce its active storage by 300 acre-feet, which will leave 6,780 acre-feet of available storage capacity. The Division shall similarly reduce its allocated storage space by 200 acre-feet, which will leave the Division with 2,100 acre-feet of available storage capacity in its fish pool.

4. Minimum Surface Elevation.

The parties agree to the establishment of a minimum surface elevation or contour line for the purpose of defining and separating the permanent dead storage pool and the fish conservation pool from the Corporation's active irrigation storage pool. The original minimum surface elevation of 3,554 feet provided for in the original contract is hereby adjusted and established at 3,548 feet above sea level. This new minimum surface elevation represents the present allocation of storage space as set forth in paragraph 2 above, as adjusted to reflect the existing sedimentation losses as allocated in paragraph 3 above. This 3,548 foot contour line is intended to insure that there will exist below that minimum contour line 1,500 acre-feet within the sedimentation pool and 2,100 acre-feet in the fish conservation pool. The water stored in the reservoir above this minimum contour line shall represent the 6,780 acre-feet of water owned by the Corporation in accordance with allocations of paragraph 2 and 3 hereof. The water stored below the minimum contour line shall represent the 1,500 acre-feet of water held in dead storage within the sedimentation pool, and, the 2,100 acre-feet of water reserved for use by the Division in accordance with the allocations of storage space and existing sedimentation set forth in paragraphs 2 and 3 above. The minimum contour line shall be subject to periodic adjustments for siltation, as provided for in paragrph 6 hereof.

5. Maintenance of the Minimum Surface Elevation.

The Corporation agrees that it will not withdraw water from the reservoir so as to lower the surface elevation below the prevailing minimum contour line as established from time to time, except that the Corporation shall be entitled to drain the reservoir in accordance with the lawful directions of the State Engineer or the State of Utah or any other governmental entity having jurisdiction over the dam itself;

provided that any water withdrawn below the minimum surface elevation established as of the date of the withdrawal in accordance with lawful instructions from the State Engineer or other such governmental entity, shall be replaced through the storage of natural flows by the Corporation within a reasonable time and without cost to the Division.

6. Allocation of Future Sedimentation Losses.

Future sedimentation losses shall be allocated to the parties in accordance with the following formula:

(a) All sedimentation actually deposited into the sedimentation pool space shall be allocated totally (100%) to the Division.

(b) Any sedimentation actually deposited into the fish conservation pool shall be shared one-half by the Corporation and the other one-half by the Division.

(c) Actual sedimentation deposited in the irrigation storage pool shall be allocated a one-third to the Division and two-thirds to the Corporation.

The parties acknowledge that these fractional shares are not in exact proportion to their actual allocated share of the reservoir's storage capacity, but they have agreed to this fractional division for the ease of administration. The actual storage capacity of the parties shall be reduced and the contour line established by paragraph 4 hereof shall be readjusted to reflect the increased actual sedimentation losses. Should the minimum elevation require adjustment, the adjusted level shall be calculated by the engineer chosen by the parties to conduct the siltation surveys as set forth in paragraph 7 hereof, and such new minimum elevation shall be set down in writing and attached as an amendment to this agreement.

7. Measuring of Future Sedimentation Losses.

Additional sedimentation will occur within the reservoir as a natural result of the operation of the reservoir and the impoundment of waters. The parties believe it generally will be desirable to conduct a sounding study at five (5) year

intervals to determine the extent of additional sedimentation encroachment and the location of the same, and thus to determine the loss of additional storage capacity, and to allocate the additional sedimentation losses between the parties in accordance with the provisions of paragraph 6 above.

Accordingly, the parties agree that the minimum elevation line established in paragraph 4 hereof shall hold for the next five years from the date hereof. Upon conclusion of the this five year period, a sounding study will be conducted by an engineer mutually acceptable to the parties. The costs thereof shall be paid 60% by the Corporation and 40% by the Division. The minimum contour line will then be adjusted as provided for herein to meet the actual conditions as determined by the sounding study.

(a) Sounding studies will then be repeated at five year intervals at the joint and agreed proportionate expense of the parties as provided above.

(b) If the parties mutually agree that such a study is not required at the end of any given five year interval, then the study for that period of time can be mutually waived; provided however, that if either party wants to have the five year study done at that time, the study will be conducted at the joint and proportionate expense of the parties as set forth above.

(c) If either party believes that sedimentation is occurring more heavily in its allocated storage space, then the entity complaining shall be entitled to request a sedimentation study to be conducted earlier than the required five year intervals, but in that event, the study shall be conducted at the sole expense of the party requesting it. If such an earlier study is made by an engineer mutually agreeable to the parties, the contour line and space allocations will be adjusted at that time and shall remain fixed at this level for the next five years or until another study is made in accordance with the terms hereof. In no event shall

the minimum surface elevation be adjusted more often than on an annual basis.

8. Stabilization.

The Division wishes to enhance its fishery in the Lower Gunlock Reservoir. The fish eggs are generally laid near the surface of the reservoir, and have a tendency to follow the water level upwards if there is any increase in the amount of water stored in the reservoir. The eggs, however, will not follow the water downward if it recedes in the reservoir, and thus if any substantial quantity of water is withdrawn during the spawning period, the eggs are left exposed to the natural elements and may not hatch. The parties therefore acknowledge that the fish in the reservoir require a relatively stabilized condition during the spawning period, which season will fluctuate annually as a result of weather conditions and water temperatures.

The parties also acknowledge that the primary benefit of a storage water reservoir is the ability to utilize water in storage during drought conditions. The parties therefore acknowledge that it is not economically practical for the corporation to be precluded from using its stored water during drought conditions.

The parties therefore agree that the Division shall, upon reasonable notice to be given by May 1st, have the right to annually designate a three week period which must fall within the time period of May 7th through June 13th of each year, and which shall in any event end as of June 13th of each year, during which time the surface elevation of the reservoir will be maintained at a stable level, subject to the following terms and conditions:

(a) During normal or wet water years, which is defined as those years when the natural inflow to the Lower Gunlock Reservoir during the May 7th-June 13th period always equals 15 cfs or more, that the Corporation may make withdrawals from the reservoir, but the outflow from the reservoir shall not exceed the total quantity of water

flowing into the reservoir from the Santa Clara River and all other sources during the agreed three week stabilization period. In other words, the Corporation shall not make withdrawals from storage (as distinguished from use of inflow) when the inflow to the reservoir from the Santa Clara River and all other sources is 15 second-feet or more.

(b) During drought conditions, or other periods of natural or manmade shortages reasonably beyond the control of either party, defined as that period of time during the May 7th-June 13th period when the inflow to the reservoir is less than 15 second-feet, then the Corporation shall have the following rights:

(i) To withdraw an amount equal to all the natural inflow to the reservoir, and in addition, the Corporation shall have the right to make withdrawals from its water previously stored in the reservoir (but only to the extent provided for herein) in order to augment the natural inflows of the stream during the selected stabilization period.

(ii) The rate at which the corporation shall make any such withdrawal from storage shall be within the sole discretion of the Corporation; provided however, that the Corporation shall not during the designated stabilization period drawdown the surface elevation of the reservoir more than a total of one and one-half vertical feet from the elevation line existing as of the start of the designated three week stabilization period.

(iii) During periods of drought when the stream is flowing less than 15 cfs, it is acknowledged that the Corporation may obtain better irrigation efficiency by storing the inflows and then releasing the natural flows, plus some stored water, to provide a larger irrigation stream during periods of use. It is thus agreed that the Corporation may store the inflow during the stabilization period. However, if such storage builds up the elevation of the reservoir above the elevation which existed at the time

the designated stabilization period starts, the drawdown from such increased storage elevation will not be more than one and one-half vertical feet below any level reached which is above the level reached at the start of the stabilization period.

Thus, the elevation of the reservoir will be noted at the start of the designated season. If the stream drops below 15 cfs, the corporation can withdraw an amount equal to the inflow, plus stored water, so long as the combined withdrawals do not lower the reservoir elevation more than 18 inches. If the natural inflow is stored, so that the elevation goes up above the elevation at the beginning of the designated period, then the eggs will be inclined to follow the water upward, and the new elevation becomes the point from which the 18 inches must be measured.

(iv) The right to make withdrawals from storage shall continue only so long as the inflow to the reservoir is less than 15 second-feet, or until the stabilization period has terminated, which in no event shall run beyond June 13th of each year. Thus if at any time during the course of the stabilization period, the inflows should return to 15 secondfeet or more, the right to make releases from storage shall cease. If the inflow shall again drop below 15 second-feet at any time during the stabilization period, the corporation shall again have the right to make releases from storage to augment the natural inflow, provided that the surface elevation of the reservoir is not drawndown below one and one-half vertical feet below the level of the reservoir when the natural inflow to the reservoir is less than 15 second-feet.

(c) Nothing contained herein shall preclude the Corporation from storing the inflow to the reservoir in excess of 15 cfs during the stabilization period for later release, even though the storage of additional water will increase the surface elevation of the reservoir.

(d) Upon conclusion of the stabilization period the Corporation shall resume normal operation of the reservoir in accordance with the needs of its shareholders and the terms and conditions of the agreement.

9. Operation of the Reservoir.

The Corporation shall pay all expenses for operation, maintenance, repair and replacement of the dam and reservoir and all appurtenant structures and facilities. and shall hold the Division free of liability of any nature whatsoever arising out of or in connection with the maintenance, operation, repair and replacement of the dam, reservoir and appurtenant structures and facilities. The Corporation shall have the right to operate the reservoir according to the needs of its shareholders, so long as the reservoir is not lowered below the applicable minimum elevation in accordance with the terms of this agreement.

Additionally, the Corporation will maintain sufficient water in storage at all times to provide the water necessary to replace evaporation, transpiration and seepage from the reservoir. Water required to replace evaporation, transpiration and seepage losses shall be in addition to the water required to maintain the fish conservation pool, less future sedimentation losses, as required by this agreement. Any water stored and not used to replace evaporation, transpiration and seepage losses, as segregated out from Application #11929, may be used for all other authorized purposes by the Corporation in accordance with its ownership interest as reflected herein.

10. Public Access.

The Corporation shall at all times provide free public access for ingress and egress to and from the dam and reservoir, and access to the entire shoreline and surface of said reservoir for fishing, hunting, boating and all other related activities. In the event the Corporation enters into an agreement with another entity to administer the land and water areas of the reservoir, said agreement shall contain

the language to permit the aforementioned free access to the shoreline and surface areas of the reservoir. In addition, several free public parking areas shall be provided contiguous to the reservoir, and their shall be no charge for the use of minimal facilities such as garbage cans and sanitary units which may be provided in other than major developed areas.

11. Costs and Attorney's Fees.

In the event either party defaults in the performance of the covenants and conditions herein contained, the defaulting party hereby agrees to pay all costs incurred in the enforcement of this agreement, including a reasonable attorney's fee, whether such enforcement comes through litigation or otherwise.

12. Notice.

Any notice to be given hereunder shall be given to the parties at the following designated addresses:

Lower Gunlock Reservoir Corporation
c/o Rudger McArthur
St. George, Utah 84770

Division of Wildlife Resources
1596 West North Temple
Salt Lake City, Utah 84116
Attention: Don Andriano

13. Binding Effect.

The foregoing constitutes the full and complete agreement by and between the parties, and shall supersede all prior or oral or written agreements or representations of the parties, and shall specifically supersede a written agreement between these parties of March 20, 1970, and shall be binding upon the parties hereto and upon their heirs, successors, administrators and assigns.

IN WITNESS WHEREOF, the parties have hereunto set their hands the day and year first set forth above.

UTAH DIVISION OF WILDLIFE RESOURCES,

By _____

Its Director

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES,

By _____
Its Executive Director

APPROVED AS TO FORM:

ATTORNEY GENERAL, STATE OF UTAH,

By _____
Its Assistant Attorney General

LOWER GUNLOCK RESERVOIR
CORPORATION,

By _____
Its President

AGREEMENT

This Agreement is made and entered into this _____ day of January, 2001, between the Utah State Division of Wildlife Resources, hereinafter referred to as "the Division" and the Washington County Water Conservancy District, hereinafter referred to as "the District" for the establishment of a permanent fish conservation pool in the proposed Sand Hollow Reservoir in Washington County, Utah, which is to be construed, owned and managed by the District.

WHEREAS, the District is undertaking the construction of the Sand Hollow Reservoir in Washington County, Utah, for the impoundment of water from the Virgin River, and possesses sufficient water rights to impound in said reservoir; and

WHEREAS, by an agreement dated 15th January, 2001 ~~2000~~, the Division relinquished its contractual right to 1,086 acre feet of fishery conservation water in Lower Gunlock Reservoir on the Santa Clara River in Washington County, Utah, in order to facilitate the Santa Clara Project Agreement and the Shivwits Water Settlement Act enacted by Congress; and

WHEREAS, the Division and the District have heretofore agreed that the 1,086 acre feet of water relinquished by the Division in Lower Gunlock Reservoir is to be replaced by the District's granting the Division a 1,086 acre feet fish conservation pool in the Sand Hollow Reservoir for fish and wildlife related purposes;

NOW, THEREFORE, in consideration of the mutual promises of the parties, it is hereby agreed as follows:

1. The District shall construct Sand Hollow Reservoir and provide the Division with a permanent fish conservation pool in said reservoir of 1,086 acre feet. The upper elevation of the conservation pool will be calculated within a reasonable time after the reservoir is constructed.

2. The District shall be responsible for the preparation and filing of any necessary applications, permits and approvals for the Sand Hollow Project and shall prepare and process appropriate applications and instruments to obtain approval of the Utah State Engineer for the storage and maintenance, by the District, of said conservation pool, including, if necessary, an application for change in place or nature of use of said water. The Division shall cooperate in executing any appropriate instruments or applications necessary to facilitate gaining approval of the State Engineer for storage of the conservation pool.

3. The District shall retain the sole right to operate Sand Hollow Reservoir according to its needs, so long as the conservation pool capacity remains continuously available to the Division each and every year. The 1,086 acre feet of capacity for the conservation pool shall be stored within one year after final completion of reservoir construction, provided the availability of water is sufficient to accomplish such storage.

4. The Division will have exclusive use of the conservation pool in place for fish and wildlife purposes. The Division shall consult with the District regarding the species of fish that are stocked in the reservoir. The District agrees that it will not withdraw any water from the conservation pool in said reservoir to which the Division is entitled under this Agreement, and that it will continue to allocate from its water rights necessary water to offset losses to the conservation pool by seepage, transpiration or evaporation. The District will not incur liability for withdrawal of water from the conservation pool as may be required by the State Engineer for repairs to the reservoir or other purposes as may be determined by the State Engineer. To

the extent water is withdrawn from the conservation pool by order of the State Engineer, it shall be replaced within a period of one year after repairs or maintenance are completed, provided the availability of water is sufficient to accomplish the replacement.

5. Any loss of storage capacity in Sand Hollow Reservoir due to sedimentation or siltation will be prorated between the Division and the District in proportion to their respective storage capacity rights.

6. The District and the Division shall work cooperatively to provide reasonable public access to the reservoir and will specify in the Sand Hollow Reservoir Operation and Recreation Plan those areas of the reservoir and adjacent shoreline that shall be open to the public.

7. The District shall exercise reasonable diligence and care to provide the conservation pool to the Division and shall not be liable for any damage or loss occasioned by any failure or interruption caused by a state of Force Majeure. For purpose of this Agreement, Force Majeure means acts of God, acts of public enemies, insurrection, riots, fires, explosions, drought, floods, earthquakes, strikes, emergency actions the District may be compelled to take to prevent serious injuries or death to persons, lawful orders or acts of civil or military authority, or other causes of similar nature.

8. The Division assumes no liability whatsoever for the operation, maintenance or repair of Sand Hollow Reservoir, or any of its features, and the Division shall not be liable for any claim of any nature whatsoever arising from the operation or maintenance of said reservoir by the District. As governmental entities, each party

shall be responsible and liable only for their own acts, omissions and negligence, and shall hold harmless the other therefore.

9. A copy of this Agreement shall be filed with the Utah state Engineer and the Washington County Recorder and shall constitute an encumbrance of the water rights of the District for the use of the 1,086 acre feet of water for the uses specified herein.

IN WITNESS WHEREOF, the parties execute this Agreement.

UTAH DIVISION OF WILDLIFE RESOURCES

By: John Kimball

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT

By: Jack Lemmon