WCN-EA-97-3

Grand Valley Water Management

DRAFT ENVIRONMENTAL ASSESSMENT

Efficiency Improvements to the Government Highline Canal

and

Agreement to Deliver Surplus Water from Green Mountain Reservoir to the Grand Valley Power Plant

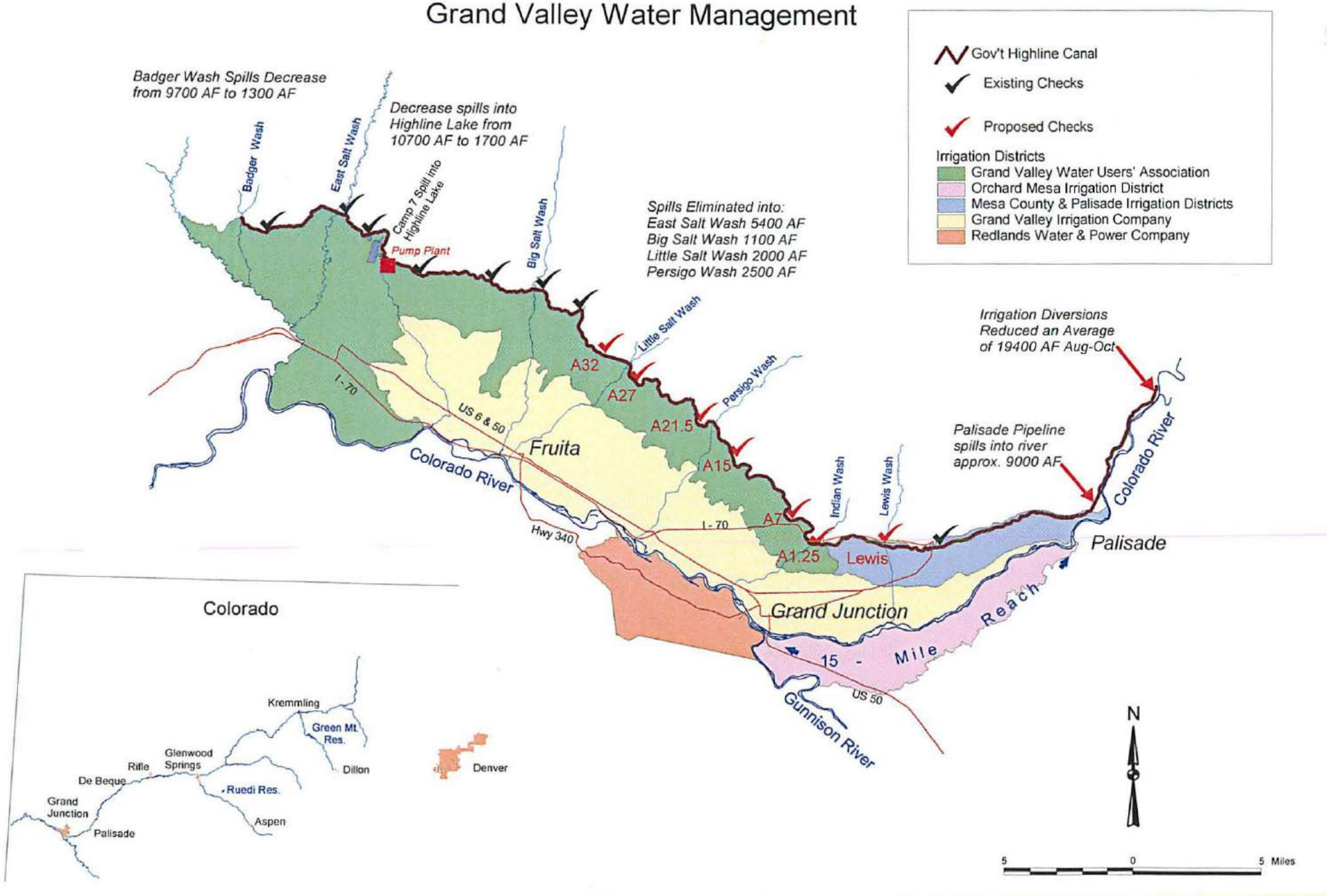
United States Department of the Interior
Bureau of Reclamation

Upper Colorado Region
Western Colorado Area Office
Grand Junction, Colorado

Great Plains Region
Eastern Colorado Area Office
Loveland, Colorado

December 1997

Project Map
Grand Valley Water Management



GRAND VALLEY WATER MANAGEMENT
DRAFT ENVIRONMENTAL ASSESSMENT

TABLE OF CONTENTS

BACKGROUND INFORMATION

FIGURES

TABLES

ATTACHMENTS

CHAPTER 1 - INTRODUCTION

This Draft Environmental Assessment (**EA**) has been prepared by the Bureau of Reclamation (**Reclamation**) to comply with the National Environmental Policy Act of 1969, as amended, the Endangered Species Act of 1973, as amended and other applicable environmental laws, regulations and Department of the Interior policies. It discusses the Grand Valley Water Management (**GVWM**[1]) proposal to:

- make efficiency improvements to the Government Highline Canal of Reclamation's *GRAND VALLEY PROJECT*,[2] located in Mesa County, Colorado, and

- enter into an agreement for delivery of *SURPLUS* water from *GREEN MOUNTAIN RESERVOIR*, in Summit County, Colorado, to the *GRAND VALLEY POWER PLANT* near Palisade, Colorado.

The GVWM Project Map (frontispiece) shows the location of Green Mountain Reservoir and the Grand Valley Project area in western Colorado, and the sites for proposed canal system improvements within the Grand Valley. These improvements include: adding seven new check structures (adjustable dams) in the Government Highline Canal to control water surface elevation, adding a pump station at Highline Lake, installing a spillway pipeline near Palisade, and installing devices on existing check structures to automate monitoring and operation of the canal system. These improvements are expected to conserve a significant amount of Grand Valley Project water.

Development of the surplus Green Mountain Reservoir agreement and delivery of water to the Grand Valley Power Plant would be completed as specified in the settlement for the *ORCHARD MESA CHECK CASE* (**Settlement**). The Settlement requires delivery of surplus water under this agreement, even if the canal improvements are not made. Analyses in this EA predict how impacts associated with the surplus water delivery agreement change if water is conserved by the canal improvements.

Actions proposed by GVWM are expected to enhance flows in the *15-MILE REACH* of the Colorado River to benefit recovery of endangered fish species. High capture rates for two endangered species, the Colorado squawfish and razorback sucker, make this reach very important to establishing self-sustaining populations of these species. The 15-Mile Reach extends from the privately-owned diversion dam of the Grand Valley Irrigation Company (**GVIC**), near the Grand Valley Power Plant, to the confluence of the Gunnison River in Grand Junction.

---

[1] When abbreviations or acronyms are first used in this EA, they appear in **bold** text.

[2] Terms or concepts for which background or explanatory information is later provided within this EA appear in *UPPER CASE* text.

Reclamation is planning and would implement GVWM in cooperation with the Grand Valley Water Users' Association (**Association**) and the Upper Colorado River Basin Recovery Implementation Program for Endangered Fish (***Recovery Program***). The Association operates and maintains irrigation features of the Grand Valley Project, GARFIELD GRAVITY DIVISION. The goal of the Recovery Program is to establish self-sustaining populations of endangered fish while also allowing for continued development and use of water throughout the upper Colorado River basin. GVWM is scheduled for completion under the Recovery Program. The Program would fund the canal improvements with a goal of using conserved water supplies to increase flows in the 15-Mile Reach.

Following consideration of public comments on this Draft EA, and based on information in the Final EA, Reclamation will decide whether or not a detailed Environmental Impact Statement is needed to implement measures described by the Proposed Action.

1 - RECOVERY PROGRAM FOR ENDANGERED COLORADO RIVER FISHES

A number of factors, ranging from habitat reduction or alteration to introduction of non-native species, account for the declining numbers of four endangered fish species. Timely action is needed to reverse the decline of these fish populations. In response, the Recovery Program for Endangered Fish Species in the Upper Colorado River Basin was organized. It is a joint effort of Federal agencies (Fish and Wildlife Service, Reclamation, Western Area Power Administration), States (Colorado, Utah, Wyoming), water users, environmental organizations, and the Colorado River Energy Distributors Association. The program is designed to recover the fish while proceeding with development of the upper basin States' Colorado River Compact allocations. So long as progress is being made under the Recovery Program, it serves as the best method of avoiding a confrontation between resource protection and water development.

Vic cuts water quality?

Need for and Purpose of Action

Action is needed to meet Federal responsibilities for managing Reclamation project water and protecting endangered fish species. Purposes considered in proposing actions were:

✦ Conserve Grand Valley Project water, by improving efficiency of Government Highline Canal operations without interfering with delivery of irrigation water.

✯ Protect endangered fish, by supplying conserved water to the 15-Mile Reach consistent with State water law.

✚ Help recover endangered fish, by delivering surplus water in Green Mountain Reservoir to the Grand Valley Power Plant, consistent with the Orchard Mesa Check settlement.

The degree to which project goals are met would be measured by the amount of Grand Valley Project water that is conserved and supplied to the 15-Mile Reach.

✦ **Improving Efficiency of Canal Operations.** During each irrigation season, demands for water from the Government Highline Canal change daily based on crop needs, irrigators' schedules and the weather. The Association diverts enough water from the river to keep the canal level high enough to meet delivery demands along the entire 55 miles of the canal.

Water in the canal that is not delivered to customers is 'administratively spilled' into Highline Lake and natural washes in the valley (see Project Map). These washes return the water to the Colorado River.

A study of canal operations in 1992, 1993 and 1994 showed the amount of water spilled in August, September and October, when demands for irrigation water decrease, averaged 31,400 acre-feet. For comparison purposes, this is close to the amount of water that is stored in Vega Reservoir near Collbran, Colorado, and is enough water to cover the entire service area of the Grand Valley Project with a foot of water. *GVWM is designed to conserve water by significantly reducing late summer canal spills*, while still maintaining the Association's ability to deliver a reliable supply of irrigation water to their customers.

2 - *THE GRAND VALLEY PROJECT*

The Project, authorized in 1912, furnishes irrigation water to more than half of the 70,000 acres of irrigated land in the Grand Valley. Water is diverted from the Colorado River into the Government Highline Canal at the Grand Valley Diversion Dam, about 8 miles upstream from the 15-Mile Reach. The initial reach of the Government Highline Canal has a capacity of 1,675 cfs. It carries water for the Garfield Gravity and Orchard Mesa Divisions, the non-federal Palisade and Mesa County Irrigation Districts, and the Grand Valley Power Plant. About 5 miles below the Grand Valley Diversion Dam, the canal splits; about half of the water crosses under the river into the 800 cfs Orchard Mesa Power Canal to supply Orchard Mesa Irrigation District and the Grand Valley Power Plant. The remainder stays in the canal for delivery to lands of Palisade and Mesa County Irrigation Districts and the Garfield Gravity Division.

Since 1949, the Grand Valley Water Users' Association has operated and maintained all project facilities except those of the Orchard Mesa Division and the Grand Valley Power Plant. This includes delivering irrigation water to about 23,000 acres of project land.

☆ **Supplying Conserved Water to the 15-Mile Reach.** Under the Endangered Species Act, all Federal agencies are responsible for ensuring their actions do not endanger species listed under the Act, and for taking measures within their authority to conserve sensitive species.

Four fish species, found only in the Colorado River Basin, are listed as endangered under the Act. On the mainstem of the Colorado River, designated critical habitat for two of the species, the Colorado squawfish and razorback sucker, extends from Rifle, Colorado to Lake Powell in Utah. A factor that has contributed to the decline of fish populations is the depletion of stream flows. The Colorado River, as it flows through the Grand Valley, provides habitat essential to successful reproduction of these species. Development of water, including Grand Valley irrigation diversions above the 15-Mile Reach, has significantly changed flow regimes. The U.S. Fish and Wildlife Service (**FWS**) has studied flow to habitat relationships within the 15-Mile Reach, and recommended flows to recover the fish (FWS, 1995). *GVWM aims to supply as much conserved water as possible to the 15-Mile Reach to help meet the FWS flow recommendations.*

Water is diverted into the Government Highline Canal above the 15-Mile Reach. Some of the diversions are used to generate power at the Grand Valley Power Plant or to pump irrigation water to the Orchard Mesa Irrigation District (**OMID**) lands on a bluff south of the Colorado River. Water used by the Grand Valley Power Plant and Orchard Mesa Pumping Plant returns to the river at the upstream end of the 15-Mile Reach. The canal also carries water for delivery to the Association's service area (the Garfield Gravity Division of the Grand Valley Project). Most canal spills return to the Colorado River, but they do so below the 15-Mile Reach.

Reducing the amount of water spilled, redirecting spills to return to the river above the 15-Mile Reach, reducing the amount of water diverted into the canal, and/or increasing the amount of water supplied to the Grand Valley Power Plant are all measures considered by GVWM. The measures are designed to augment flows in the 15-Mile Reach, and thus help to offset the depletive effects of historic project operation on endangered fish habitat and assist in efforts to establish self-sustaining populations of the Colorado squawfish and razorback sucker.

✚ **Delivering Surplus Water**. Reclamation's Colorado-Big Thompson (**CBT**) Project also influences Colorado River flows in the critical habitat of the endangered fish. *SENATE DOCUMENT 80* describes the CBT Project as initially proposed, and includes direction for operation of the many features of the CBT, including Green Mountain Reservoir (Reclamation, 1937). In 1984, Reclamation further defined use of the 100,000 acre-foot pool of water set aside for power production and use in western Colorado (Reclamation, 1988). The resulting 1984 Operating Policy states that up to 66,000 acre-feet can be used to assure diversions with water rights perfected prior to October 16, 1977, are not curtailed due to insufficient flows in the Colorado River. This number was determined by the amount of water released from Green Mountain during the 1977 drought. As such, it was believed adequate to protect water users from shortages. This 66,000 acre-foot supply of water is known as the *HISTORIC USERS POOL* (**HUP**); recipients of releases are 'HUP beneficiaries.'

The 1984 Operating Policy also provides that water surplus to the needs of the historic beneficiaries may be disposed of on a short-term basis.

3 - *COLORADO-BIG THOMPSON PROJECT*

Reclamation's Colorado-Big Thompson Project was authorized for construction on the basis of a report prepared by Reclamation on its plan of development and cost estimates. A synopsis of this report was submitted to Congress in June 1937, and is referred to as *Senate Document 80*. It states that primary purposes of the CBT Project are to "...conserve and make use of these waters for irrigation, power, industrial development, and other purposes, as to create the greatest benefits." The CBT diverts water from the headwaters of the Colorado River in an extensive delivery system for use in the South Platte basin, in northeastern Colorado.

Green Mountain Dam and Power Plant was the first component of the CBT Project to be completed. It is on the Blue River, a headwater tributary of the Colorado River that is upstream of the Shoshone Power Plant above Glenwood Springs, and about 170 river miles above the Grand Valley. Green Mountain Reservoir can store over 152,000 acre-feet of water, of which 52,000 acre-feet was to be used to replace 'out-of-priority' diversion of water to the eastern slope by the CBT Project. The remaining 100,000 acre-feet was to be used primarily for power purposes, and "water released from the power pool was to be made available, without charge, to supply existing irrigation and domestic appropriations of water, including the Grand Valley reclamation project... and for future use for domestic purposes and in the irrigation of lands thereafter...in western Colorado."

Recent settlement of the Orchard Mesa Check Case included additional criteria for operation of Green Mountain Reservoir. It allows for delivery of surplus water to non-consumptive uses (such as generating power) that would also benefit recovery of the fish. It also specifies surplus water will be delivered to the Grand Valley Power Plant before additional deliveries are made under other surplus water agreements. In 1997, Recovery Program participants revised their action plan to include the delivery of surplus water to the Grand Valley Power Plant.

The proposed agreement to deliver water to the Grand Valley Power Plant represents an important first step towards supplying surplus HUP water from Green Mountain Reservoir indirectly to the 15-Mile Reach to help recover the fish. One effect of reducing canal spills would be to decrease water that needs to be diverted into the Government Highline Canal in the late summer months to maintain deliveries of irrigation water in the Association's service area. When Colorado River flows are too low to meet diversion requirements, Grand Valley irrigators call for supplemental releases from Green Mountain Reservoir. Reducing the Association's demand for irrigation diversions would decrease the amount of water released from the HUP of Green Mountain Reservoir. This would, in turn, increase the amount of surplus HUP water. The challenge then becomes legally supplying surplus water to uses that, indirectly, augment 15-Mile Reach flows to benefit the fish, consistent with requirements of the Settlement.

Related Activities

Interactions of Grand Valley Irrigation Entities. In addition to supplying water to the Garfield Gravity and Orchard Mesa Divisions of the Grand Valley Project, the Government Highline Canal carries water to the Palisade and Mesa County Irrigation Districts. The Garfield Gravity Division's service area is north of the Colorado River and west of Indian Wash. The Orchard Mesa Division serves lands south of the river. The areas served by the Palisade and Mesa County Irrigation Districts are north of the river and east of Indian Wash (see Project Map). Figure 1 shows the location of the Grand Valley Power Plant and irrigation features of the OMID near Palisade, in relation to the privately-owned GVIC Diversion Dam. The GVIC service area is also north of the Colorado River, below lands irrigated by the Palisade and Mesa County Irrigation Districts and the Association.

About half the water initially diverted into the Government Highline Canal is diverted to the Orchard Mesa Power Canal for delivery to the OMID Pumping Plant and the Grand Valley Power Plant. The OMID Pumping Plant uses some of the water to lift their irrigation water to two canals for delivery to their lands on the mesa south of the river. The rest of the water goes through the Grand Valley Power Plant, which is operated year-round by the Public Service Company of Colorado. Revenue from power sales is shared by the Association, OMID, and Public Service. Water used for pumping and generating power returns to the common afterbay of the pumping and power plants, and then naturally flows into the Colorado River just below the GVIC Diversion Dam. The GVIC Diversion Dam is the upstream boundary of the 15-Mile Reach.

In many years, there is not enough flow in the river to satisfy the combined water rights of all entities in the Grand Valley. Since about 1926, OMID and the Association have 'borrowed' water destined for diversion under senior irrigation rights of GVIC to meet their pumping and/or power generation needs. This water then returns to the river above the GVIC Diversion Dam via

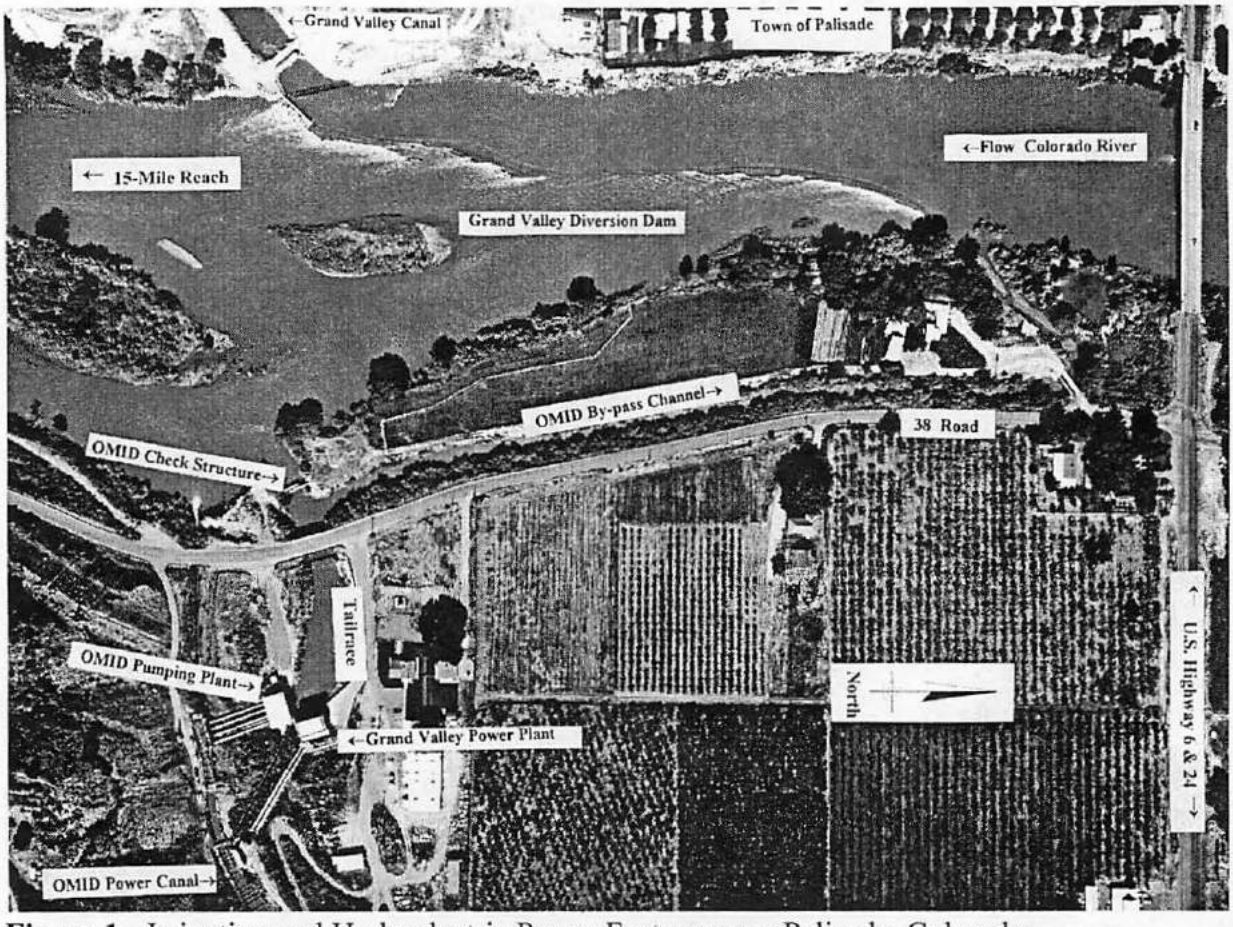


Figure 1 - Irrigation and Hydroelectric Power Features near Palisade, Colorado

the Orchard Mesa Check facilities. The check structure consists of three radial gates. Lowering the gates raises the water level in the common afterbay of the Grand Valley Power Plant and Orchard Mesa Pumping Plant. This causes the borrowed water to flow through the by-pass channel and return to the river--upstream of the GVIC Diversion Dam (see Figure 1).

The Orchard Mesa Check Case and Green Mountain Reservoir Operation. Prior to 1983, when flows were too low to meet diversion needs of western Colorado water users, the State would sometimes require operation of the Check before honoring a call by water users in the Grand Valley area. Although this river administration practice was not agreeable to everyone, it resulted in an increased water supply during dry years for users with rights junior to those of the Grand Valley irrigators. In other years, it resulted in additional water in Green Mountain Reservoir at the end of the irrigation season that may have been released for power generation in the winter.

While this operation may have benefitted junior water users, it also had the negative impact of increasing OMID's operational costs. It decreased their ability to hydraulically pump irrigation water, required them to use supplemental electrical pumps, and decreased generating efficiency at the Grand Valley Power Plant. Following establishment of the 1984 Operating Policy, the Division Engineer agreed to require Green Mountain releases for HUP beneficiaries without

requiring the check to be in operation. The Check would still have to be operated to meet the demand of the Grand Valley Power Plant when there was insufficient water under the Power Plant water rights. This river administration change brought about concerns that, without historic operation of the Check, the 66,000 acre-foot HUP might not be adequate to protect western Colorado water users from shortages.

In the late 1980's, Reclamation, the Association and OMID filed an application in State water court to obtain approval for the exchange of water that was informally occurring. Many water users who had benefitted from historic operation of the Check filed statements of opposition to the Orchard Mesa Check application. These entities did not oppose the exchange application, but rather sought to impose terms and conditions for operation of the Check that would benefit junior water rights. After 5 years of analyses and negotiations with many objectors, a settlement was reached in October 1996.

The settlement included additional criteria for operation of the 66,000 acre-foot HUP of Green Mountain Reservoir. Water that is not needed to satisfy irrigation or municipal water rights of HUP beneficiaries may be declared 'surplus' and made available for delivery to beneficial uses in Western Colorado, and indirectly to the 15-Mile Reach to augment flows for the recovery of endangered Colorado River fishes. Also, the U.S. agreed to not exercise their 400 cubic feet per second (cfs) power right against upstream junior rights. Instead, only natural stream flows and surplus HUP water would be used to generate power at the Grand Valley Power Plant. If no surplus water is available, the Check would be operated to borrow water destined for GVIC.

4 - *Green Mountain Reservoir HUP Operating Criteria*

Paragraph 5a of the 1997 Stipulation and Agreement for the Orchard Mesa Check Settlement (Case No. 91WCW247, Water Division 5) provides direction relating to the delivery of HUP surplus water to benefit endangered fish:

"HUP surplus water shall be available for delivery to beneficial uses in Western Colorado...Any HUP surplus water contract...for delivery of water upstream of the 15-Mile Reach shall be for non-consumptive use only. HUP surplus water contracts shall provide that...return flows...shall flow through the 15-Mile Reach...thereby augmenting flows for the recovery of endangered Colorado River fish species."

Green Mountain Reservoir HUP Operating Criteria is Exhibit D to the Stipulation and Agreement.

Other Recovery Program Activities. The 'Recovery Implementation Program Recovery Action Plan' (**RIPRAP**) lists all the flow and non-flow activities believed necessary to recover the fish. This annually revised document, currently 33 pages long, is organized by sub-basins within the upper Colorado River drainage (FWS, 1997). GVWM, including making the proposed canal improvements and executing the surplus water agreement, is one of many approaches identified in the Colorado River Mainstem sub-basin specifically designed to supply water to the 15-Mile Reach. Other flow-related activities in the RIPRAP for the 15-Mile Reach include:

- ➤ Acquire and protect instream flows under Colorado State water law;
- ➤ Complete/implement recommendations for a Coordinated Reservoir Operations study;
- ➤ Enter into water delivery contracts for Ruedi and Wolford Mountain Reservoirs;
- ➤ Explore options for delivery of additional surplus water from Green Mountain Reservoir, pursuant to the Orchard Mesa Check Case Settlement.

'Additional' surplus water of the last item refers to water not delivered to the Grand Valley Power Plant. It recognizes that capacity constraints in the Government Highline Canal limit the amount of surplus HUP water that would be delivered to the Grand Valley Power Plant under the proposed agreement. The RIPRAP schedules options to be identified by September, 1998.

Participants in the Recovery Program also recognize that a plan is needed to further define basin-wide options with respect to all water supply and management activities. Efforts begun in 1997, that are not reflected in the RIPRAP, include the formation of a '15-Mile Reach Strategy Group' and work on an 'Intra-Service consultation' for the 15-Mile Reach. A Biological Opinion will conclude this consultation, and a draft opinion is due from the FWS in 1998.

Scoping and Issues

Significant issues of potentially affected interests identified during scoping include:

✦ ***Canal Efficiency Improvements***

- Reduce canal spills while protecting Grand Valley water users
- Protect unique geographical features
- Obtain temporary construction easements; minimize disturbances to residents
- Discuss selenium contamination concerns for fish and wildlife
- Comply with the Clean Water Act
- Avoid adverse impacts to historic characteristics of the canal system
- Minimize impacts at Highline Lake State Park
- Discuss costs and funding

☆ ***Supplying Conserved Water to the 15-Mile Reach***

- Help meet FWS flow recommendations for the 15-Mile Reach
- Protect other water rights
- Protect delivery of conserved water to the 15-Mile Reach
- Comply with the Endangered Species Act
- Ensure cooperation by Grand Valley irrigation entities will provide relief from regulation under the Endangered Species Act
- Contribute to progress of the Recovery Program

✚ ***Delivering Surplus Green Mountain Reservoir Water***

- Execute proposed agreement consistent with State and Federal water rights and authorization and terms of the Orchard Mesa Check Case settlement
- Coordinate with other, related, Recovery Program activities

These issues are evaluated in Chapter 3.

CHAPTER 2 - ALTERNATIVES

Alternatives evaluated by this EA are limited to No Action and the Proposed Action alternatives. The No Action alternative assumes operation of the Government Highline Canal and Grand Valley Power Plant would continue as they are now. This includes using HUP water released from Green Mountain Reservoir when river flows do not meet irrigation diversion needs, and using surplus HUP water when river flows are too low to meet diversion needs at the Grand Valley Power Plant. Under the Proposed Action, canal efficiency improvements would be made. The availability of resulting conserved water supplies would cause changes in use of HUP water, including surplus water, to meet irrigation and power diversion demands during the irrigation season.

No Action

Canal Operation. If No Action is taken, the Association would continue to operate the canal system to ensure that irrigation water deliveries are made to their customers. Current operation results in substantial spills of carriage water in August through October. In addition to losing the opportunity for reducing the spills, no conserved water would be available to benefit recovery of endangered fish.

Since 1992, Reclamation has worked closely with the Association to characterize daily operation of the Government Highline Canal system. In 1992, 1993 and 1994, data was collected daily for water orders and the volume and time of canal spills. Analyses from the Government Highline Canal Modernization Study (ITRC, 1997) showed a minimum flow of 400 cfs needs to be in the canal as it enters the Association's service area at Indian Wash. This flow is necessary, even when delivery orders are low, to keep canal water surface elevations at a level required for delivering water to all headgates along its 55-mile length. Water not delivered to laterals is spilled. For the 3 years studied, an average of 31,400 acre-feet was spilled during August through October. Flows in the 15-Mile Reach are depleted by the spills as they return to the Colorado River below it.

Green Mountain Reservoir and Grand Valley Power Plant Operations. Water is released from the 66,000 acre-foot HUP in Green Mountain Reservoir to meet the direct delivery and replacement needs of the HUP beneficiaries, which include the Grand Valley irrigation entities. When river flows fall below the amount of water required by the Grand Valley irrigators, HUP water is released. Recent settlement of the Orchard Mesa Check Case has made it possible to determine and release surplus HUP water to the Grand Valley Power Plant.

Analyses for the Orchard Mesa Check Settlement showed there have been many years when substantial amounts of HUP water were not needed during the irrigation season, and would be available for delivery under surplus water agreements. The long-term average for the November 1 reservoir content shows about 28,000 acre-feet of water remained in the HUP. Reclamation has released this water during the winter months to generate power at Green Mountain Dam and make room for spring runoff.

The Settlement developed a process and criteria for determining if a surplus storage condition exists in Green Mountain Reservoir. Reclamation is required to develop an Annual HUP Operating Plan (**Operating Plan**) in collaboration with other 'Managing Entities.' Managing Entities include representatives of the Association, OMID, GVIC, the Colorado Water Conservation Board (**CWCB**), Colorado State Engineer, FWS and Reclamation. The Operating Plan covers water operations for the July through October irrigation season and provides a mechanism to integrate the operations of the Green Mountain Reservoir and Grand Valley area irrigation systems. Managing Entities are to meet as necessary to review Operating Plan elements including Green Mountain Reservoir storage conditions, projected irrigation demands, and 15-Mile Reach flow conditions. If actual Green Mountain Reservoir HUP storage volumes are in excess of HUP beneficiaries needs, as determined by criteria developed as part of the Settlement, then a surplus storage condition can be declared.

Future if No Action is Taken. Not making the proposed canal efficiency improvements would result in failure to meet a Recovery Program objective for supplying water to the 15-Mile Reach. In their review of progress, the FWS might find the Recovery Program is not serving to offset depletion impacts of water use and future water development on endangered fish. Past consultations for Federal actions under the Endangered Species Act that relied on the Recovery Program as the 'reasonable and prudent alternative' to jeopardy might be re-opened. For these and future consultations, the FWS might curtail continued use and development of projects that deplete Colorado River stream flows. This may lead to denials for Federal permits or to imposition of more stringent requirements on existing and/or future water uses.

Other water users believe Grand Valley irrigation practices are wasteful and they have threatened to take legal action to curtail continued diversion of irrigation water. Not taking action reinforces this perception and increases the probability of future legal actions. An outside entity who might benefit from an increase in Colorado River flows that would result from improving efficiency of Government Highline Canal operations could pursue funding and completion of the proposed canal improvements.

The Orchard Mesa Check Case Settlement specifies that surplus water in Green Mountain Reservoir will be delivered to and through the Government Highline Canal, Orchard Mesa Power Canal and Grand Valley Power Plant, to the extent there is capacity; and that surplus HUP water will first be delivered to the Grand Valley Power Plant before additional deliveries are made under other, separate, surplus water agreements. Therefore, the proposed agreement for the delivery of surplus water to the Grand Valley Power Plant would probably occur, with or without completion of the proposed canal improvements. Options for protecting delivery of additional surplus water in Green Mountain Reservoir to the 15-Mile Reach would also continue to be explored under the Recovery Program.

Canal Improvements. With assistance of consultants, a computer model was developed to test modifications that could be made to help match the amount of water diverted into the canal to irrigation demands and reduce spills. The results: add seven checks, modify eight existing checks, add a pump station at Highline Lake, add a new spill location at the beginning of the canal (the Palisade Pipeline), and install devices to automate monitoring and operation of the improved canal system (see Project Map). Agreements among appropriate parties would be needed to fund, construct and operate and maintain these canal improvements. The operation strategy for the improved canal system would still be to meet demands. However, diversions into the canal could slowly be reduced beginning in August as demand decreases.

Table 1 - Average Volume of Canal Spills (August-October; 1992-1994)

Spill Location	Spills *without* GVWM (AF)	Spills *with* GVWM (AF)
Persigo Wash	2,500	0
Little Salt Wash	2,000	0
Big Salt Wash	1,100	0
Camp 7	10,700	1,700
East Salt Wash	5,400	0
Badger Wash	9,700	1,300
Total Spills below 15-Mile Reach	31,400	3,000
Total Spills above 15-Mile Reach (Palisade Pipeline)	N/A	9,000
Grand Total	**31,400**	**12,000**

Checks: The seven new checks, together with modifications to existing checks, would let the Association reduce deliveries of water to project lands to more closely follow demands. The improvements would allow the delivery of water to all headgates along the canal at flows as low as 150 cfs at Indian Wash.

The seven proposed new checks and their locations are:

- ✔ Lewis - just upstream of the existing wash/siphon;
- ✔ A1.25 - between where the canal crosses Indian Wash and 28 Road;
- ✔ A7 - just south of H Road;
- ✔ A15 - about where 25 Road crosses the canal;
- ✔ A21.5 - close to where L Road would intersect the canal;
- ✔ A27 - about where 22 Road would intersect the canal;
- ✔ A32 - just east of where 20 Road would intersect the canal.

The new checks would be within the existing canal right-of-way. However, their construction would require use of a slightly larger area that would extend about 150 feet on each side of the centerline of the canal, for a length of about 300 feet. Temporary easements would need to be obtained from underlying landowners as necessary for construction. Concerns would be identified during negotiations with landowners. *Temporary easements would avoid existing improvements, disturbed areas would be restored after construction is completed, and landowners would be compensated for any damages.*

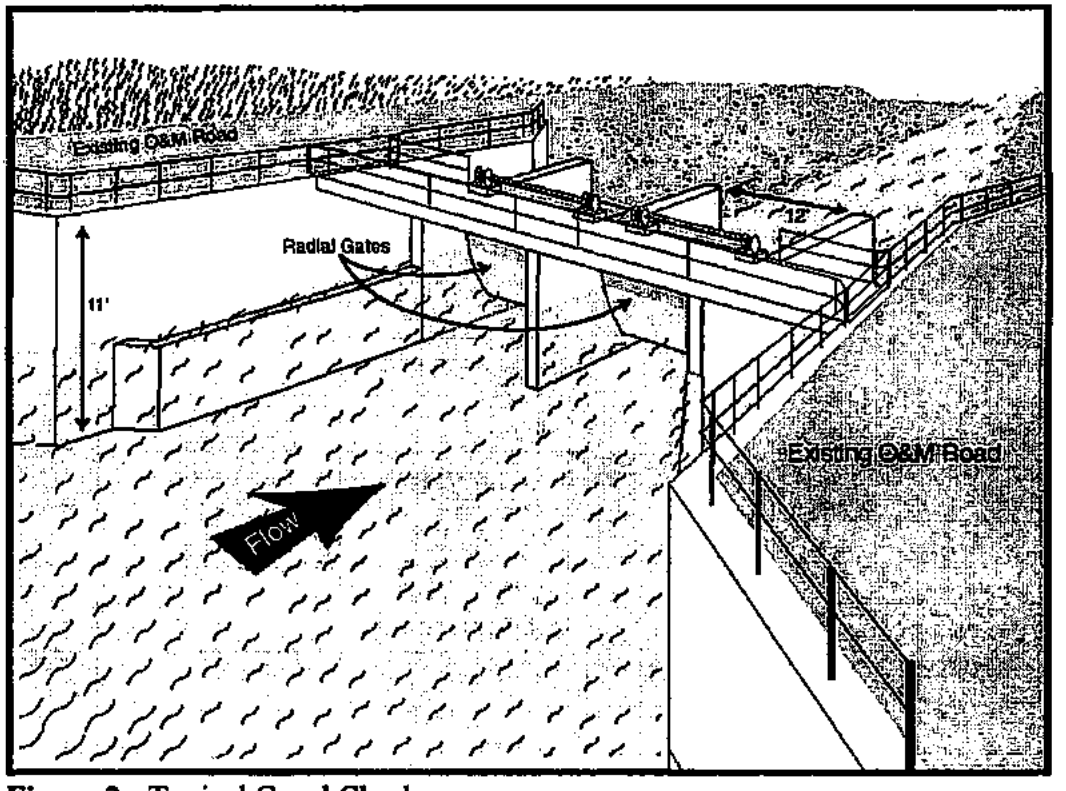


Figure 2 - Typical Canal Check

Palisade Pipeline: The location of this new spillway would allow the Association to 'fine-tune' the canal flow rate before it enters their service area based on projected demand, and shorten the lag time involved in matching canal flow with changes in demand. Another advantage is that it would return spills to the Colorado River upstream of the 15-Mile Reach. The design diameter of the pipeline (36 inches) would allow up to 120 cfs of spills to be discharged back to the river. *Spills would be measured, with amounts annually reported.*

Highline Lake Pump Station: The pump station would let the Association use Highline Lake as a buffer reservoir to ensure sufficient water is available for deliveries to customers in the west end of the valley. The Association could spill water into the lake from the Camp 7 spillway and/or pump it back into the canal based on changes in daily delivery orders. *Camp 7 and Badger Wash spills would be measured, pump use tracked, and net spill volume (acre-feet spilled minus acre-feet pumped) would be reported annually.*

Automation System: Automation devices include equipment that would systematically monitor and control the canal water surface elevation at each of the seven new checks and at the eight existing checks. Existing checks in the east end of the canal are the Price-Stubb and Clifton Checks. Existing checks in the west end are: 16 Road, 13 Road, Camp 7 (above Highline Lake), A49 (above East Salt Creek Wash), 8 Road, and Badger Wash. Sensors would transmit information to the Association's office, including water surface elevation upstream of each check structure and the canal flow rate at critical points along the canal. Equipment at the Highline Lake Pump Station would provide performance and warning information to the control center.

Funding, Construction and Operation and Maintenance Agreements: Reclamation estimates about $8.4 million would be required to plan, design and construct the canal improvements and cover project-caused increases in operation and maintenance costs over the next 50 years. *Construction funds would be appropriated under the Recovery Program, with the intent of supplying conserved water to the 15-Mile Reach. The State of Colorado has committed funds to pay for the increase in long-term operation and maintenance costs due to the improvements.*

Several construction and operation and maintenance agreements would be necessary. If the Association chooses to construct the improvements, funds would most likely be made available to them in the form of a Federal grant or cooperative agreement. The agreement would outline procedures for financial accounting, design, construction, construction management and expected results.

The State's appropriation to cover increased operation and maintenance costs is about 15 percent of the total GVWM cost. It would count toward Colorado's share of costs for the Recovery Program. The appropriation includes funds to cover power costs for operation of the Highline Lake Pump Station and replacement costs for the pump station, automation hardware and software, and communication equipment. Once the State has transferred the funds to a managing entity, it is then proposed to establish a 'trust' fund. One possible managing entity is the National Fish and Wildlife Foundation (**Foundation**). The Foundation was established by Congress "to encourage, accept, and administer private gifts of property for the benefit of, or in connection with, the activities and services of the United States Fish and Wildlife Service." (U.S.C. Title 16 Chapter 57 Section 3701 (b)(1)).

Another agreement would involve the managing entity setting up a trust account from which the Association would be paid for actual expenses. Reclamation and the Association would develop a letter of agreement to meet separate accounting needs for the increased costs of operating and maintaining the improved canal system.

Green Mountain Reservoir/Grand Valley Power Plant Agreement. As specified in the Orchard Mesa Check Case Settlement, this agreement would furnish surplus water from the HUP of Green Mountain Reservoir to the Grand Valley Power Plant. Reclamation would hold formal negotiation session(s) with the parties to the Agreement that would be open to public observation. The parties include the Association, OMID and Public Service Company of Colorado. The proposed agreement has a renewable 5-year term.

The HUP surplus water to be provided under this agreement would be made available on an 'if and when' basis, based on the Managing Entities determination of surplus water availability. As for the No Action alternative, an Annual Operating Plan would identify water operations for July through October. The Managing Entities would meet as needed to re-examine and adjust the operating plan and releases as the irrigation season progresses. Amounts of surplus water delivered under the agreement would be limited to available capacity of the Government Highline Canal, the Orchard Mesa Power Canal, or the Grand Valley Power Plant, whichever is less.

Future if Proposed Action Taken. The canal checks, Highline Pump Station, and automation system are expected to reduce the volume of water now spilled into Highline Lake and washes from 31,400 acre-feet to 3,000 acre-feet during August, September and October. The improvements would reduce the amount of late irrigation season return flows that annually return to the Colorado River, downstream of the 15-Mile Reach, by an average volume of 28,400 acre-feet.

The checks would eliminate use of the washes as spillways in the middle reach of the canal. The Palisade Pipeline would be a new spillway located near the beginning of the irrigation service area. It would return spills to the Colorado River above the 15-Mile Reach. The spills would occur as a result of the Association 'fine-tuning' the canal flow rate to match demands for irrigation water in their service area. Although the Palisade Pipeline would be designed to carry as much as 120 cfs of spill water, Reclamation estimates that during August-October, a daily average of 50 cfs would be spilled. This means about 9,000 acre-feet of the 28,400 acre-feet of conserved spill water would return to the river via the Palisade Pipeline. Because administration of water rights in most years should ensure that sufficient water is already in the river to meet senior diversion rights of the GVIC, it is expected that spills discharged to the river through the Palisade Pipeline would flow through the 15-Mile Reach to benefit the fish.

Total estimated costs of $8.4 million for planning, installing, and operating and maintaining the improvements equates to a capital cost of $300 per acre-foot of conserved water. Based upon a 50-year project life and using Reclamation's planning interest rate of 7.375 percent yields an annualized cost of about $22.50/acre-foot/year.

The Association's reduced late season diversion demand decreases HUP water deliveries from Green Mountain Reservoir by about 19,400 acre-feet in some years. Actual amounts of the reduction will change according to annual water supply conditions and the many factors which affect demand for irrigation water. Even more variable would be the amount, if any, of HUP water declared surplus. Surplus water delivered to the Grand Valley Power Plant through the initial reach of the Government Highline Canal and the Orchard Mesa Power Canal would be limited by the capacity of the canals. Thus, the amount of surplus water supplied to the 15-Mile Reach via the Power Plant tailrace would also be limited.

Alternatives Eliminated from Consideration

Previous studies that led to formulation of the Proposed Action considered alternatives that were eliminated from detailed consideration. The Government Highline Canal Modernization Study, was completed with the assistance of the Irrigation Training and Research Center (ITRC) at California Polytechnic State University. In this study, options not considered feasible included those that would diminish the ability of the Association to deliver irrigation water to their customers or increase costs to the Association and/or their customers. Cost effectiveness and consistency with Colorado State water law were major factors in eliminating alternatives for supplying water to the 15-Mile Reach.

Adding checks to the Government Highline Canal was first proposed and evaluated when Reclamation made salinity control improvements under the Colorado River Water Quality Improvement Program (Reclamation, 1986). Eight canal checks were added as portions of the

canal were lined. Lining prevented seepage that added salts to the river. However, lining the middle reach was deferred, because it would not be cost-effective compared to other salinity control measures proposed in the Colorado River basin. GVWM proposes to add checks in the unlined portions, and operation of the improved system incorporates use of the eight checks in the lined reaches.

In 1992, a Recovery Program study of alternative water supplies for the 15-Mile Reach was completed under the Recovery Program (Reclamation, 1992). One of the alternatives suggested by this study included "*Improve irrigation efficiency in the Grand Valley so that river diversions could be reduced, thereby leaving more water in the 15-Mile Reach than there is now.*" Options eliminated from further consideration included reducing irrigated acreage, decreasing irrigation system evaporation, decreasing irrigation system seepage, and decreasing phreatophyte evapotranspiration losses by controlling vegetative growth along the water ways. This screening effort led to the initiation of the Canal Modernization Study.

5 - HOW SALINITY CONTROL IMPROVEMENTS INCREASED CANAL SPILLS

Since 1979, Reclamation and the Association have placed about 120 miles of the smaller irrigation ditches (laterals) of the Garfield Gravity Division water delivery system into pressurized pipe. With open laterals, water not applied to the irrigator's fields would continue flowing in ditches for downstream use. Unused water would spill into drains at the end of the ditch until the Association adjusted the flow rate at the canal headgate. These adjustments were made twice a day. Placing the laterals in pipe allowed water users to shut-off their individual deliveries. The flow rate into/within a pipeline adjusts automatically, and the extra water stays in the canal. While this makes the previously spilled water available to other users, it also causes the canal to spill more. Small spills previously occurred at 75 points on the laterals; larger spills now occur at 8 locations along the canal.

The Canal Modernization Study (ITRC, 1997) monitored canal operations in 1992-1994 to define the location and magnitude of administrative spills from the canal. This, in turn, set the stage for modeling options for placing checks to reduce the spills while maintaining the Association's ability to deliver water. Many iterations of the model were eliminated and/or fine-tuned before the canal improvements described by the Proposed Action were recommended.

The 15-Mile Reach water supply study (Reclamation, 1992) found some alternatives to be infeasible. Other alternatives considered feasible are being, or have been, pursued separately under the Recovery Program:

(1) Release stored water from existing reservoirs.

Releases are currently being pursued through the Coordinated Reservoir Operations Study and contracts for water from Ruedi, Wolford Mountain and Green Mountain Reservoirs.

(2) Release stored water from new reservoirs.

Release of stored water from new reservoirs was found to be too costly to pursue.

(3) Purchase existing agricultural water rights from willing sellers. Once purchased, the Colorado Water Conservation Board would apply for the necessary water right changes. These changes would result in instream flow rights;

The purchase of existing agricultural water rights would reduce use of the State's Colorado River Compact allocation rather than develop it. This alternative was eliminated because one of the basic principles of the Recovery Program is to recover the fish while the upper basin states continue to develop their Compact allocations.

(4) Relocate some Grand Valley irrigation diversions to points downstream from the 15-Mile Reach so that more water would remain in the Reach.

This alternative was found to be too costly.

(5) Miscellaneous alternatives, such as pump ground water to provide supplemental flows and import water to the Colorado River mainstem.

These alternatives were found to be too costly.

Summary Comparison of Alternatives		
FACTOR	**NO ACTION**	**PROPOSED ACTION**
Reduce canal spills	Spills from Government Highline Canal (GHC) average 28,400 acre-feet (AF) in Aug-Oct	GHC spills reduced to about 12,000 AF
Supply conserved water to 15-Mile Reach (15MR)	Grand Valley (GV) Power Plant tailrace flows run into 15MR (unless diverted by GVIC due to use of the Orchard Mesa Check). Other GHC diversions decrease 15MR flows, with canal spills returning below 15MR.	Estimated 9,000 AF (50cfs/day) of canal spills return to river above 15MR via Palisade Pipeline. Increase in supply from GV Power Plant tailrace. In many years, overall increase of 10-11 percent estimated, but volume varies. Increase in natural flows accounts for variable amount of increase and results from reduced irrigation diversion demand of the Association.
Deliver HUP surplus water in Green Mountain Reservoir (GMR) to GV Power Plant.	Surplus water agreement made possible, and required by, OM Check Case settlement. Deliveries limited by GHC, OM Power Canal, or GV Power Plant capacities.	When available, amount of surplus water delivered decreases if canal improvements are also made, due to increased availability of natural river flows. Amount of HUP surplus water potentially available for release to 15MR increases.
Protect interests of Grand Valley water users	Perception of wasteful irrigation practices continues	Irrigation delivery system and operations modernized and more efficient.
	Shortages rare in Aug-Oct.	Magnitude and/or duration of already rare shortages decreases.
	Water rates re-evaluated as necessary to cover indexed, pre-salinity control costs for operation and maintenance (O&M) of the canal system.	Increased costs to O&M GVWM improved system covered by Recovery Program; no change in water rates due to GVWM.
	Depletion impacts to endangered fish of GHC diversions cause regulatory uncertainty to Grand Valley water users.	No change, rely on favorable biological opinion from Intra-Service consultation for regulatory relief.
	Depend on releases from HUP of GMR when flows at Cameo gage do not meet GHC irrigation diversion needs.	Association's reduced demand in Aug-Oct decreases HUP releases, providing other Colorado River water users with more reliable supply.
Help meet FWS flow recommendations for the 15MR	15MR flows often below FWS flow recommendations in Aug-Oct. Meeting flows in Apr-Jul addressed by other Recovery Program actions.	Aug-Oct 15MR flows increase 10-11 percent in most years to help meet (and sometimes exceed) FWS recommendations.
Impacts to other water rights	Water rights upstream of the Grand Valley benefit from GMR/HUP operation according to criteria of the OM settlement.	Magnitude and/or frequency of the Cameo call for water rights administration reduced to increase benefits to upstream water rights.
Legal protection of conserved water to/through the 15-Mile Reach	River diversions and canal spills continue below 15MR. CWCB's in-stream flow right(s) help protect 15MR flows contributed via GV Power Plant tailrace. Surplus water delivered from GMR to GV Power Plant protected by proposed agreement.	Depending upon hydrologic conditions, less surplus water delivered to GV Power Plant, but more water contributed/protected from tailrace.
Compliance with the Clean Water Act	No need to obtain 404 (dredge and fill) permits or water quality certification.	Appropriate agencies contacted to obtain necessary permits or water quality certification due to construction of Highline Lake Pump Station and Palisade Pipeline.

Summary Comparison of Alternatives		
FACTOR	**NO ACTION**	**PROPOSED ACTION**
Selenium contamination concerns for fish and wildlife	Selenium standards for fish and wildlife often exceeded in affected washes. Marginal levels found in river environment at times.	Selenium concentrations in affected washes increase as canal spills reduced or eliminated. No significant harm to fish and wildlife expected. No measurable change in selenium concentrations expected in the river environment.
Compliance with Endangered Species Act	Recovery Program serves as reasonable and prudent alternative to historic depletions of existing water projects. No change in the status of endangered fish populations or their habitat.	River flows enhanced in the 15MR. Net contribution to recovery of endangered fish species.
Unique geographical features	Project operations support wetlands, riparian areas, prime/unique farmlands.	No significant impacts as a result of the Proposed Action.
Construction easements and disturbances to residents	No easements needed, no construction disturbance to adjacent landowners.	Impacts to permanent landowner improvements avoided as condition of temporary easements. Disturbed areas outside canal ROW to be restored. Dust/noise/traffic would occur during construction.
Historic character of the Government Highline Canal	Government Highline Canal and Orchard Mesa Power Canal have been determined eligible for National Register of Historic Properties. Determination recognized these properties require continuous modification and repair to ensure they serve irrigation needs.	Records for affected structures are being reviewed and updated to assess potential for impacts to historic nature of the properties. Mitigation measures needed to avoid potential adverse effects will be determined in consultation with the Colorado State Historic Preservation Officer.
Indian Trust Assets	No impact	No impact
Environmental Justice	No impact	No impact
Impacts to Highline Lake State Park	No change in recreational use	Reduced canal spills into Highline Lake and operation of the pump station will cause lake level fluctuations (less than 1 foot daily) and reduced fresh water dilution of bacterial loading. Water quality is monitored, and problems are not expected. If problems occur, local, State, and Federal agencies will review operational practices to determine if modifications are necessary.
Cost and Funding	No impact to local water users.	No impact to local water users. Total estimated cost of $8.4 million for planning, construction, and long-term operation and maintenance funded by State and Federal sources.

CHAPTER 3 - AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

Indicators have been established for each *issue* to focus analyses. On the basis of the existing conditions relating to each issue/indicator, the impacts of the No Action and Proposed Action alternatives are comparatively discussed. Mitigation measures are also indicated, if appropriate.

General

The Grand Valley Project was developed to support settlement of the Grand Valley in the early 1900's. Where agriculture once dominated the economy of the sparsely populated valley, more than 100,000 residents are now sustained by a diversifying economy where agriculture plays a lesser role. There is a stark contrast between the open desert lands above the canal and the irrigated croplands and residential areas below the canal. In a semi-arid climate that receives an average of 8" of rainfall per year, irrigation projects make it possible for about 70,000 acres of valley land to receive almost 4 feet of irrigation water/acre. The Association's service area (the Garfield Gravity Division) covers about 1/3 of this acreage, and is north and/or west of the service areas of the other irrigation water providers of the valley. Within the Garfield Gravity Division, the Government Highline Canal delivers water to 75 headgates serving about 150 miles of laterals.

Water Resources

Reduce Canal Spills while Protecting Grand Valley Water Users. *Water users want assurance that the Association's cooperation and operation of an improved canal system that conserves water will not reduce their ability to deliver water, nor cause their water rates to increase.*

Indicator: Changes in: canal spills, water shortages, and water rates.

Existing Conditions: For the 3 years of the Canal Modernization Study, an average of 31,400 acre-feet was annually spilled into the washes and Highline Lake during August, September and October (See Table 1). The Association currently has a reliable water supply and, except under rare circumstances, delivers water to their customers to meet daily orders. Shortages are rare and are more likely to occur during full irrigation diversions not affected by GVWM, when delivery demands exceed supply. However, a flow of at least 400 cfs is needed as the canal enters the Association's service area at Indian Wash to maintain the water surface elevation necessary to deliver water to all headgates -- even when demands decrease in the late summer. This causes the undelivered water to be spilled into the six natural washes between Indian Wash and Badger Wash, at the end of the canal.

Meters were installed on the lateral headgates when open ditches were placed in pipe under the salinity control program. Customers pay a flat rate per acre of irrigated land for the first 4 feet

of water, and are charged extra for amounts in excess of 4 feet/acre. Water rates are periodically re-evaluated to ensure they cover operation and maintenance costs. By contract, Reclamation reimburses the Association for operation and maintenance costs that are above the indexed, pre-salinity control costs.

Impacts: If No Action is taken, the Association's ability to match river diversions with delivery demands would not improve. About 31,400 acre-feet would continue to spill into Highline Lake and the washes in August through October. Shortages would continue to be rare.

The Association was involved in the Canal Modernization Study to ensure their operational needs would be understood and their system reliability would be maintained or enhanced. Diversions into and deliveries from the canal would gradually decrease in the late summer as demands for water decrease. Spills into the four washes of the middle reach (Persigo, Little Salt, Big Salt, and East Salt) would be eliminated. Reduced spills would occur at Highline Lake (Camp 7) and at the end of the canal (Badger Wash). New spills would occur into the Palisade Pipeline as the canal enters the east end of the Grand Valley.

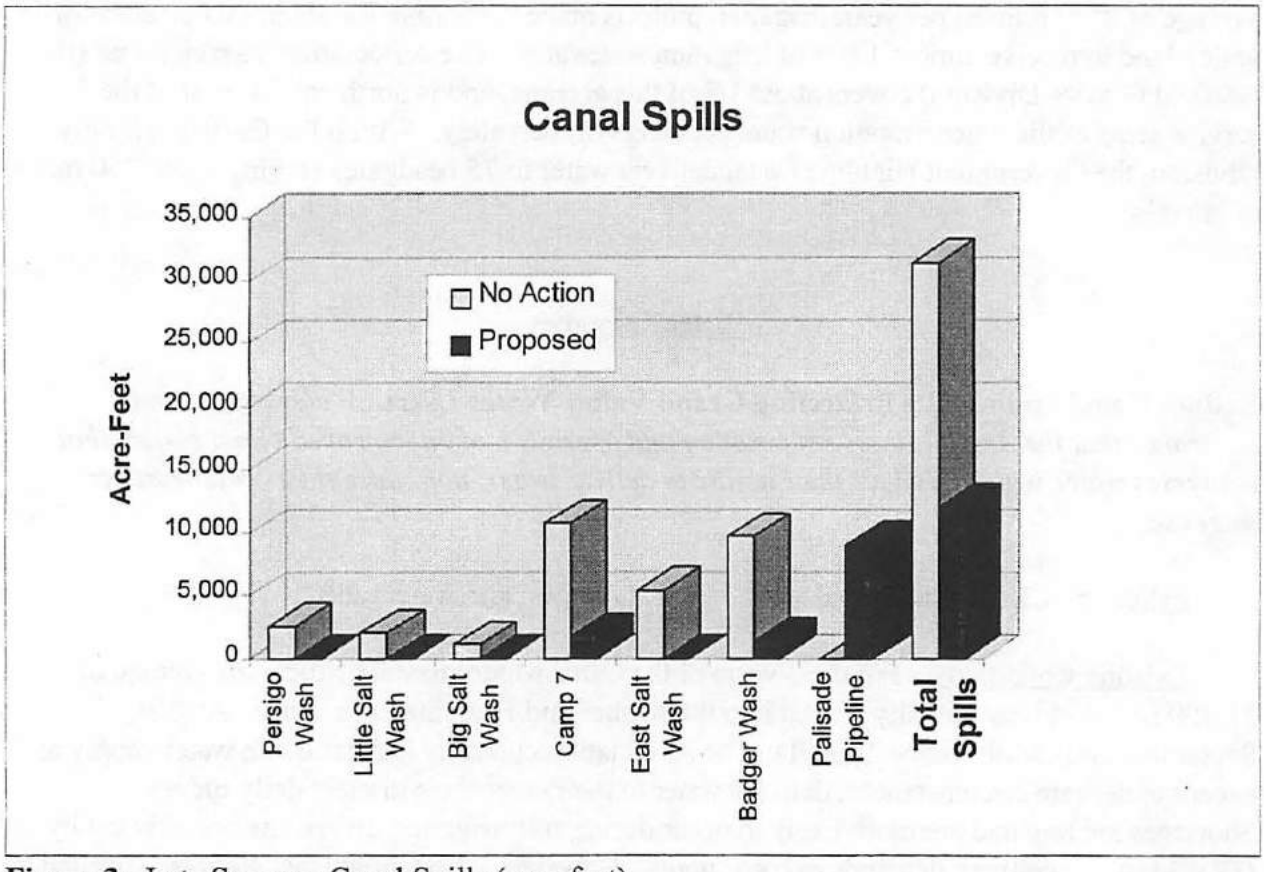


Figure 3 - Late Summer Canal Spills (acre-feet)

The canal model predicted a decrease in late summer spill volume, from 31,400 to 12,000 acre-feet (see Table 1). This represents a 38 percent increase in efficiency. This analysis assumed an average of 50 cfs would return to the river, above the 15-Mile Reach, via the new Palisade Pipeline, which accounts for 75 percent of the reduced spills. The addition of the Palisade

Pipeline and the Highline Lake Pump Station along with conserving water would increase operational flexibility and help ensure late summer shortages don't occur.

Unsuccessful negotiation/delays of the proposed funding, construction and/or operation and maintenance agreement(s) for GVWM canal improvements would result in No Action being taken or GVWM being delayed. An increase in operation and maintenance costs for the improved system would result from providing electricity at the Highline Pump Station and to maintain and replace the new checks and automation system components. However, all costs would be covered under the Recovery Program to prevent any increase in water user rates.

Mitigation Measures: Recovery Program participants would cover all costs of implementing GVWM, including establishing a trust fund agreement to pay increased operation, maintenance and replacement costs of the improved canal system.

Help Meet FWS Flow Recommendations for the 15-Mile Reach. *Diversions to irrigate lands in the Grand Valley have significantly altered flows in critical habitat where the Colorado squawfish and razorback sucker once thrived. The FWS has recommended 15-Mile Reach flows they believe are necessary to recover the fish.*

Indicator: Change in 15-Mile Reach flows.

Existing Conditions: The 1995 FWS flow recommendations for the 15-Mile Reach serve as a target for Recovery Program activities aimed at improving flows in this reach (see Table 2). GVWM would be funded by the Recovery Program to help meet these flow recommendations. Since existing diversions do not directly affect flows outside the irrigation season, only the flow recommendations for the irrigation season are shown. Average flows exceed the recommended flows for the non-irrigation season months.

Table 2 - 15-Mile Reach Monthly Flow Recommendations

Mean Monthly Flow	Apr	May	Jun	Jul	Aug	Sep	Oct
Recommended (cfs)	2,463	8,790	12,253	4,349	1,349	1,349	1,349
Recent Avg (cfs)	2,142	7,452	10,404	4,197	1,279	775	932
Shortfall (cfs)	321	1,338	1,849	152	70	574	417
Shortfall (AF/mo)	**19,101**	**82,270**	**110,023**	**9,346**	**4,304**	**34,155**	**25,640**

(FWS, 1995)

The study period for the recent average was 1954-1993. The FWS considered desired frequencies of varying flows in recommending the long-term mean monthly flows. Limitations and risk in using the monthly data, along with its conversion to a monthly volume (in acre-feet) are related to the fact that averages cannot reflect the variations in flows needed to mimic the natural flow conditions under which native fish evolved and may need for recovery. Therefore, FWS also presented monthly flow recommendations for different types of water supply years. Recommended August, September and October flows for a dry year like 1992 are 810 cfs; for a wet year like 1993 are 1,630 cfs; and for another drier than average year like 1994 are 1,240 cfs.

One generality that may be inferred is that the endangered fish are thought to need much higher flows during the runoff months (May and June), and during the onset and last half of the irrigation season (April, July - October). In the late summer months, when flows are needed to help recover the fish, substantial spills occur from the Government Highline Canal in August, September and October that return to the river -- below the 15-Mile Reach. Lower flows in the winter months would help mimic natural conditions reflected by the year-round flow recommendations.

Impacts: If No Action is taken, no conserved water would be available to help meet the flow recommendations in August-October. Whether or not the Proposed Action is taken, flow-related RIPRAP actions to provide a protected supply of water to the 15-Mile Reach to meet the recommended flows during the irrigation season would continue. The canal system improvements are not designed to help meet the recommended flows during the run-off months, nor cause any changes to winter (non-irrigation season) flows. However, potential delivery of additional surplus HUP water during the summer months would reduce amounts available for release in the winter (see Cumulative Impacts section).

One effect of the proposed canal improvements would be to decrease the amount of stream flow the Association needs to divert to meet demands for irrigation water as they decrease in the late summer months. Reducing irrigation diversions would make capacity available in the initial reach of the canal for delivery of water to the Grand Valley Power Plant.

Any water that runs through the power plant, and is not diverted by GVIC due to operation of the Orchard Mesa Check, would increase flows in the 15-Mile Reach. In addition, any spills that return to the river via the Palisade Pipeline, and are not diverted by GVIC, would also increase flows in the reach.

Table 3 - Increase in Water Supply to the 15-Mile Reach

Year	*without* Canal Impr.	*with* Canal Impr.	Volume Increase	Percent Increase	Aug. Increase	Sep. Increase	Oct. Increase
	(acre-feet)				(cfs)		
1992	148,410	163,401	14,991	10%	106	72	68
1993	278,943	309,033	30,090	11%	158	124	210
1994	141,980	155,849	13,860	10%	68	65	94

Table 3 shows modeled predictions for the effect of the canal improvements on 15-Mile Reach water supplies for the 3 years of the Canal Modernization Study (see Attachment A). Both scenarios (*without* and *with Canal Improvements*) use up to 20,000 acre-feet of water available for release from Ruedi Reservoir under an existing agreement. Both scenarios also limit delivery of water to the Grand Valley Power Plant by the capacity of the Government Highline Canal or Orchard Mesa Power Canal, and allow delivery of surplus HUP water to the Grand Valley Power Plant. In the years studied, it was not necessary to operate the Orchard Mesa Check. Thus, water supplied to the 15-Mile Reach includes all water from the afterbay of the Grand Valley Power Plant and Orchard Mesa Pumping Plant. The *'with Canal Improvements'* scenario includes

contributions from the Palisade Pipeline spills. The analysis assumed spills that return to the river via the Palisade Pipeline would contribute an average daily flow of about 50 cfs, or 9,000 AF over the 3-month period. Actual flows would be highly variable, ranging between 0 and 120 cfs (the design capacity of the pipeline), and probably decrease in future years, as the Association learns to operate the modernized system to match supplies with demand.

The '*with Canal Improvements*' scenario increased 15-Mile Reach flows by 10-11 percent in all 3 years, but the volume of the increase varied. The factors which account for the variations are related to water supply and use conditions of each year. The greatest increase occurred in 1993, the wettest year. In 1993, under both scenarios, flows in the river were adequate to deliver a full supply to the irrigators and the Grand Valley Power Plant, so no HUP surplus water was released. In the drier years, the flow increase of the *'with Canal Improvements'* scenario used about half the water conserved by the canal improvements. The rest of the conserved water is stored as HUP surplus in Green Mountain Reservoir (see Cumulative Impacts).

Impacts to Other Water Rights. *Upstream HUP beneficiaries rely on storage in Green Mountain Reservoir to lessen impacts of the Grand Valley water rights placing the 'Cameo call.' Water users who are not HUP beneficiaries want assurance that delivery of water conserved by GVWM does not affect their water rights.*

Indicator: Change in frequency or magnitude of the *'Cameo call.'*

Existing Conditions: The combined water rights of all Grand Valley irrigators comprise a group of absolute rights with varying diversion amounts and priority dates between 1882 and 1918. Collectively, these rights have served as a control on subsequent water development throughout the basin. Placement of what is known as the 'Cameo call' by this group of rights must be examined in any assessment of water availability upstream. Its name originated because the call is administered according to flows recorded at the U.S. Geological Survey stream gage on the Colorado River near Cameo, above where the tributary flows of Plateau Creek join the Colorado River. This gage is a short distance above the Grand Valley Project Diversion Dam.

6 - *PRIORITY OF CAMEO RIGHTS*
(Irrigation Season)

Year	Agency	Amount (cfs)
1882	GVIC	520.81
1889	PID	80.00
1898	OMID	10.20
1903	MCID	40.00
1907	OMID	450.00
1908	GVWUA	730.00
1908	U.S. *	400.00
1914	GVIC	119.47
1918	PID	23.50

* U.S. water rights are for use at the Grand Valley Power Plant.

When Colorado River flows at the Cameo gage fall below 2,260 cfs during the irrigation season, the Cameo call may be placed. As part of the Orchard Mesa Check Settlement, the U.S. agreed to not exercise their 400 cfs power right to require upstream junior rights to release water from replacement sources or curtail diversions of those junior rights. Instead, only natural flows or HUP water surplus to the needs of the HUP beneficiaries would be used to generate power at the Grand Valley Power Plant. If natural flows are low and no surplus water is available, the Check could be operated to borrow water destined for the GVIC.

Impacts: If the surplus water agreement is completed, power production would only use natural flows or surplus HUP water. If available, use of surplus water would be limited by the capacity in the initial reach of the Government Highline Canal and/or Orchard Mesa Power Canal. Thus, HUP beneficiaries and junior upstream water users would *not* be affected by use of conserved water to generate power. In addition, the reduced diversion demand of the Association's irrigation rights would result in a decrease in frequency and/or magnitude of the Cameo call. Therefore, upstream water rights of entities that are not HUP beneficiaries would *benefit* by the proposed canal improvements and surplus water agreement.

Protect Delivery of Conserved Water to the 15-Mile Reach. *To realize the full benefit of funding GVWM, Recovery Program participants need to protect delivery of conserved water supplies to the 15-Mile Reach under Colorado water law.*

Indicator: Amount of increased 15-Mile Reach flows, including HUP surplus water, that is protected from diversion.

Existing Conditions: The Federal agencies participating in the Recovery Program have agreed to comply with the provisions of State water law, and rely on each of the upper basin states to legally protect water supplied to the fish. Under Colorado water law, only the CWCB may obtain a water right for instream flow purposes. In addition, the State can protect delivery of the water released from a reservoir from diversion by upstream users. However, the Division Engineer can only protect delivery of stored water to a use that is compatible with the beneficial uses identified in the water right for the storage reservoir.

Generating hydropower at the Grand Valley Power Plant is a use of surplus water that is specifically called for by the Settlement. It is compatible with the Federal authorization and State water right decrees for Green Mountain Reservoir. Therefore, the State Engineer can protect delivery of surplus water to the Power Plant (and thus indirectly to the 15-Mile Reach) from diversion by intervening appropriators.

Hydrologic studies for the Orchard Mesa Check Case show water held in Green Mountain Reservoir is often 'surplus' to the needs of its historic beneficiaries, which includes Grand Valley irrigation entities, with the HUP content averaging about 28,000 AF at the end of the irrigation season.

In 1992 and 1994, the CWCB filed for instream flow rights for the 15-Mile Reach as part of the Recovery Program that were recently decreed (see Table 4). Water in the 15-Mile Reach would be protected from diversion by the CWCB's instream flow right. Table 4 summarizes filings of the CWCB during the irrigation season months.

Table 4 - CWCB's 1992 and 1994 Instream Flow Filings for the 15-Mile Reach (cfs)

	Apr	May	Jun	Jul	Aug	Sep	Oct
1992-Summer Flow				581	581	581	
1994-Return Flow	300	300	300	300	300	300	300

well prepare information on difficult
Alternatives - retire monetary topic
why do this - reference doc performance
Very Good job explaining complicated system
Settlement compared. Bad Coach

Use of indicators good - some quantified

CWCB's 581 cfs instream flow right in July-September is equivalent to the sum of water discharged from the Orchard Mesa Pumping Plant and Grand Valley Power Plant. In August and September, this right would protect tailrace flows from the power plant that flow into the 15-Mile Reach. The 300 cfs year-round return flow right represents the largest gain measured within the 15-Mile Reach that is attributable to return flows. In October, protection of 15-Mile Reach flows from diversion would be limited to 300 cfs.

Impacts: Previous sections identified an average of about 28,400 acre-feet of water expected to be conserved by the proposed canal efficiency improvements, and that some of the conserved water would be stored in the HUP of Green Mountain Reservoir. Table 5 shows how use of HUP water, including surplus water, changes if the canal improvements are made. In a wet year, such as 1993, no HUP surplus water was released. In the drier years, about half the water conserved by the canal improvements was used to increase 15-Mile Reach flows. The amount of water supplied to the 15-Mile Reach would vary, and a portion of the increased flow would be from surplus HUP water delivered to the Grand Valley Power Plant.

Table 5 - Estimated Use of HUP Water in Green Mountain Reservoir (acre-feet)

	1992		1993		1994	
	without **Canal Improve-ments**	***with*** **Canal Improve-ments**	***without*** **Canal Improve-ments**	***with*** **Canal Improve-ments**	***without*** **Canal Improve-ments**	***with*** **Canal Improve-ments**
Natural Flow Shortage Releases	20,520	20,464	0	0	10,413	8,601
Surplus Deliverable to GV Power Plant	27,764	16,257	0	0	28,958	19,551
Surplus in excess of canal capacity	17,216	28,779	65,500	65,500	26,129	37,348
Winter Reserve	500	500	500	500	500	500
Total	66,000	66,000	66,000	66,000	66,000	66,000

The amount of surplus water delivered under the proposed surplus water agreement in the drier than average years decreases *with* the canal improvements. At the same time, delivery of natural flows increases with the canal improvements, resulting in the overall 10-11 percent increase in 15-Mile Reach flows discussed in previous sections.

Increased 15-Mile Reach flows that come from the tailrace of the Grand Valley Power Plant, no matter if they originated from the diversion of natural flows or surplus HUP releases, would be protected from diversion because: 1) GVIC's diversion rights have been satisfied by natural flows or the release of HUP water and 2) no other intervening rights have been decreed. In August and September, CWCB's recently decreed instream flow right for 581 cfs would protect flows in the reach from diversion by future appropriators. In October, only 300 cfs would be protected by CWCB's return flow right.

This analysis also shows that conserving water by making the canal improvements greatly increases the amount of HUP surplus water that could be managed to augment flows in the 15-Mile Reach. It also shows that additional instream flows may be needed to protect increased 15-Mile Reach flows from diversion by future appropriators. (See Cumulative Impacts section.)

Compliance with the Clean Water Act. *Construction of the Palisade Pipeline and Highline Lake Pump Station will involve discharge of water to the Colorado River and Highline Lake, respectively, and may involve placement of fill in the waters of the United States.*

Indicators: Need to obtain permits or certification to comply with the Clean Water Act.

Existing Conditions: Under existing project operations, water carried in the canal is spilled into natural drainages (see Table 1) when no longer needed to maintain the required water surface elevation to service the lateral headgates. Water spilled from Camp 7 is stored in Highline Lake. Water spilled into the washes combines with return flows of irrigation water and returns to the Colorado River. Due to chemicals, salts, selenium, and sediment in irrigation return flows, the quality of canal spill water is better than the quality of the return flows. Canal spills dilute concentrations of pollutants to the river from the washes.

Impacts: Compared to No Action, the elimination or reduction of spills in the late summer months would increase concentrations of total dissolved solids (salts), selenium, and sediment in the return flows of the washes. This is because the dilution effect of the 'cleaner' spill water is removed. As the lower flows return to and mix with increased flows in the river, no detectable change in dissolved solids concentrations are expected in the river environment.

Under the No Action alternative, no discharge of sediment or placement of fill material would occur in the river or at Highline Lake due to construction activities. During installation of the proposed Palisade Pipeline, a minor amount of fill and materials to stabilize the bank may need to be placed where the Palisade Pipeline would discharge into the Colorado River. The proposed Highline Lake Pump Station intake structure would be built against a steep bank along the Camp 7 arm of the lake. Its construction would occur in the winter, and may require placement of a coffer dam. The pump station foundation would cover about 500 square feet. About 75 cubic yards of material would be excavated.

Mitigation Measures. If required following consultation with appropriate agencies, Reclamation would obtain Section 402 water quality certification, a 404 Permit for the dredging or fill placement during construction, and/or a discharge permit under the Clean Water Act prior to constructing and/or operating the Palisade Pipeline and/or Highline Lake Pump Station.

Fish and Wildlife

Over the last year, Reclamation staff has had numerous meetings and discussions with FWS staff while planning GVWM. As a result, no general fish and wildlife issues were determined to merit preparation of a planning aid memorandum under the Fish and Wildlife Coordination Act. Preparation of a final report has been requested (See Attachment B).

Selenium Contamination. *What effect will reducing spills into the washes, thus increasing selenium concentrations, have on fish and wildlife using habitat of the washes?*

Indicator: Change in selenium concentrations with respect to threshold levels.

Existing Conditions: A variety of birds, small mammals, and amphibians use riparian habitat lands along the river and washes throughout the Grand Valley. The river has relatively high levels of salinity and selenium which are two major water quality factors affecting fish and wildlife resources. Selenium, a trace element that occurs naturally in some of the soils in western Colorado, is toxic in small concentrations to fish and wildlife. Water standards recently adopted by the EPA and the State of Colorado to protect fish and wildlife in general is 5 micrograms per liter (μg/l), which is equivalent to 5 parts per billion (**ppb**). Lower waterborne concentrations of 2 ppb or less have been demonstrated to be hazardous to the health and long-term survival of fish and wildlife populations as selenium levels in fish and wildlife accumulates through the food-chain, causing harmful dietary toxicity and reproductive effects (Lemly, 1993).

Levels of selenium found in wetland and riparian habitat of the Grand Valley are known to harm birds and fish in other places. As part of the west-wide National Irrigation Water Quality Program (**NIWQP**), an interagency team based in Grand Junction is studying selenium contamination related to irrigation drainage for the Grand and Uncompahgre Valleys, and will be recommending measures that need to be taken to remediate problems they find. The NIWQP has published 1991-92 results of trace element analyses collected from water, sediment and fish and wildlife samples at many tributary washes that receive irrigation drainage water in the Grand Valley as well as in the Colorado River (Butler et. al, 1994). Since 1993, the study has focused on selenium as the primary trace element of concern. NIWQP sampling sites include locations along each of the washes affected by GVWM -- Persigo, Little Salt, Big Salt, East Salt and Badger. Water chemistry data includes at least one winter-time (February) sample for each wash, and show very high selenium levels (21-74 ppb) at very low, winter flows. Data for the irrigation season months show selenium concentrations range from 6 to 10 ppb, which still exceeds the 5 ppb standard. However, collection and analysis of fish and birds for selenium has not found evidence of deformities or reproductive harm occurring to any fish and wildlife using habitat of the washes.

Impacts: Persigo Wash, the most upstream wash (see Project Map), is located just below a floodplain restoration site under study at the Walter Walker State Wildlife Area. Comparison of flow levels measured on the sampling dates with spill data from the Canal Modernization Study shows that spills contributed 20-45 percent of the total flow. Salt Creek is the most downstream tributary that would experience changed hydrologic conditions. Two of its tributaries would be affected. All spills into East Salt Creek would be eliminated. Deliveries of irrigation water to the west end of the valley basically end at Badger Wash, and spills into it are proposed to be greatly reduced. Comparing flows measured at the mouth with those spilled into both East Salt Creek and Badger Wash shows that the canal spills account for 26-38 percent of its flows.

GVWM would not cause any change in the winter conditions; they are believed to be dependent on contributions from irrigation drainage return flows that would not change as a result of GVWM. Reducing the dilution effects of spills in the washes during late summer and fall would

increase selenium concentrations in the washes. For four of the affected washes (Persigo, Little Salt, Big Salt, and East Salt), the dilution effect of all spills would be eliminated, and in Badger Wash, the dilution effect would be substantially reduced. The already high levels of selenium concentrations that fish and wildlife are exposed to in these washes would increase proportionate to decrease in flows of the affected washes. Because these changes would occur in the late summer months, and no evidence exists of harm to fish and birds found in the washes at current levels, increasing selenium concentrations as a result of the canal improvements are not expected to impact fish and wildlife. As agricultural land-use is converted to rural and suburban uses, it is unknown if changes to water use and irrigation drainage practices will help or worsen potential problems. Continued monitoring and future funding of NIWQP remediation proposals should help.

Increasing flows in the 15-Mile Reach during the late summer months may slightly improve habitat conditions for fish and wildlife. As the increased flows move downstream and combine with decreased flows from the tributary washes, water quality conditions may improve in a larger area at the mouths of the washes. However, the magnitude of change is not expected to cause any measurable change in selenium contamination levels found in floodplain habitat.

Endangered Species

Compliance with the Endangered Species Act. *To comply with consultation requirements of Section 7 of the ESA, Reclamation is responsible for submitting a biological assessment to the Fish and Wildlife Service and requesting their concurrence in resulting conclusions prior to taking action related to the Proposed Action.*

Indicator: Initiation/conclusion of consultation under Section 7 of the ESA.

Existing Conditions: In a March 11, 1997 memorandum, the FWS identified nine species that are listed under the ESA as threatened or endangered and may occur in the Grand Valley. The black-footed ferret has not been observed in the Grand Valley, and depends on habitat that would not be affected by GVWM. Riparian habitat conditions of the listed fish and bird species that may be affected by the water conservation measures of GVWM have been altered by many factors; water quality has changed from historic conditions, flow regimes have changed, channelization has occurred, and non-native species are present. For the endangered fish, the effects of depletions to the Colorado River above the Gunnison River confluence by all water projects, including diversions into the Government Highline Canal, are simultaneously being addressed by an on-going Intra-Service Consultation.

Impacts: If No Action is taken, and except for progress made by related actions of the Recovery Program for the endangered fish, no change in the status of any of the listed species would be expected. Reclamation completed a Biological Assessment for these species, and has submitted it to the FWS (see Attachment B). This assessment concluded the Proposed Action would not affect the black-footed ferret nor four listed birds species: bald eagle, peregrine falcon, whooping crane, and southwestern willow fly catcher. It also concluded the Proposed Action would not affect two of the four listed fish species: the bonytail and humpback chub. Beneficial

impacts to the Colorado squawfish and razorback sucker resulting from improved habitat conditions (increased flows) in the 15-Mile Reach are also discussed in the assessment.

Conservation Measures: Due to the beneficial effects of GVWM, Reclamation believes that GVWM should be considered as a conservation measure, in and of itself, to offset jeopardizing effects of historic Grand Valley Project operations. An additional conservation measure would be for Reclamation to stop work in the event that any construction activities are thought to be affecting any of the listed species, and consult with the FWS to determine measures needed to protect the affected species.

Endangered Species Act Regulatory Relief for Grand Valley Irrigators. *Irrigation districts that divert water into the Government Highline Canal (the Association and Mesa County, Palisade, and Orchard Mesa Irrigation Districts) want assurance their cooperation and/or participation in implementing the GVWM proposal will result in regulatory relief under the ESA by the FWS. A pre-requisite of the Association's and OMID's cooperation in implementing the Proposed Action is completion of ESA consultation activities, with a Biological Opinion that addresses all the effects of their historic projects on the endangered fish and provides certainty as to when/if consultation would be re-opened.*

Indicator: Execution of agreements related to implementation of the canal improvements and execution of the surplus water agreement for the Grand Valley Power Plant.

Existing Conditions: Options for the scope of consultation were discussed with the FWS and the districts. The irrigation districts' concerns would best be met by formal consultation on the jeopardizing effect of historic as well as proposed operation/actions related to the irrigation projects, as compared to the option of informally consulting on the 'non-jeopardizing' effects of the GVWM proposal. At the same time options were being discussed, the FWS was initiating work on the Intra-Service Consultation on the jeopardizing effects of stream flow depletions of all historic water projects in the basin above the 15-Mile Reach. The Biological Opinion that would conclude this consultation would verify and/or identify additional actions that would need to be included in the Recovery Program for it to offset the jeopardizing effects of the historic projects.

Impacts: Based on the GVWM Biological Assessment (Attachment B), and consistent with regulations in 50 CFR 402.13, Reclamation expects that formal consultation under the ESA will not be not necessary to implement GVWM. Therefore, resolution of the water users' concerns is instead dependent on the Intra-Service Consultation and concluding Biological Opinion. However, the Draft Biological Opinion will not be completed until sometime in 1998. Reclamation has suggested that, in this future Opinion, the FWS should consider GVWM as a conservation measure, in and of itself, to offset jeopardizing effects of depletions to the 15-Mile Reach by historic (pre-GVWM) Grand Valley Project operations. Resolution of this issue may delay execution of the necessary agreements, and thus implementation of this Recovery Program action.

Unique Geographical Features. *Would the proposed action affect unique geographical features such as: wetlands, wild or scenic rivers, refuges, flood plains, rivers placed on the nationwide river inventory, or prime and unique farmlands?*

Indicators: Loss of wetland or riparian values, loss of prime or unique farmland.

Existing Conditions: Wetlands supported by canal seepage and riparian communities associated with waterways in the Grand Valley are described in the Environmental Impact Statement for the Grand Valley salinity control improvements (Reclamation, 1986). Inner canal banks are typically dominated by cattails or other grass-like vegetation. In some places below the canal, patches of wetlands may be supported by seepage from the unlined canal. These communities are characterized by willows, non-native tamarisk or Russian olive trees, and/or grass-like vegetation. Isolated cottonwood trees along the canal are rare and valued for wildlife habitat and aesthetics. Riparian communities along the Colorado River include forested wetlands dominated by cottonwood trees, shrub-scrub communities dominated by willows or tamarisk, and backwater marshes. The riparian corridor provides highly valued habitat and floodplain functions. Prime farmland occurs throughout the valley, and is being lost to residential uses as growth occurs.

Impacts: Canal bank vegetation would be removed during construction of the new check sites; this occurs anyway during normal operation and maintenance activities. Loss of seepage water along the new checks would be minor, and should not cause any loss of wetland habitat values. Losses of prime and/or unique farmlands from development in the valley will continue to be dependent on local land-use regulation, whether or not the proposed action is taken.

Construction Easements and Disturbances. *Construction and operation and maintenance of the canal improvements and Palisade Pipeline may affect landowners/residents.*

Indicators: Progress in obtaining easements from landowners and response to complaints.

Existing Conditions: The Association was formed as a non-profit corporation in 1905 as part of the Reclamation Grand Valley Project. Grand Valley landowners subscribed for shares of capital stock in the Grand Valley Water Users' Association via a Subscription for Stock. Article XV, Section 2 of the Articles of Incorporation included in this Subscription for Stock grants to the United States a right-of-way over lands of stockholders in the Grand Valley Water Users' Association for water development and related purposes. Reclamation used these rights in constructing works of the Grand Valley Project, including the Government Highline Canal, wherever they crossed lands in the Association's service area. Rights-of-way needed in areas not covered by the stock subscriptions would be acquired following negotiations with landowners.

Impacts: The proposed new checks and automation devices would be within the existing canal corridor. However, the area needed to construct the new checks would be about 300 square feet, and extend beyond the existing right-of-way. Reclamation would exercise rights granted by the Subscription for Stock to obtain temporary use of areas needed to construct the new checks.

Lands needed for the Palisade Pipeline are not covered by stock subscriptions. Therefore, temporary construction and permanent easements would be acquired based on negotiations with landowners.

Affected landowners for the proposed check locations and the Palisade Pipeline have been informed of the proposal. Discussion and resolution of their concerns are underway. Disturbed areas outside the canal corridor would be restored after construction is complete.

During construction, an increase in noise and traffic would occur. Reclamation has not been advised of any concerns for disturbances during construction.

Mitigation Measures: Measures would be taken on a case-by-case basis to minimize disturbances to landowners during construction.

Cultural Resources

Modernizing the Historic Canal. *The Government Highline Canal and Orchard Mesa Power Canal are considered eligible to the National Register of Historic Properties. It is not known if cultural resources exist in the areas of the proposed Palisade Pipeline and Highline Lake Pump Station. Reclamation needs to avoid adverse effects to historic properties.*

Indicator: Potential for adverse effects to eligible features.

Existing Conditions: In consultation with the State Historic Preservation Officer (**SHPO**), the Government Highline Canal and Orchard Mesa Power Canal were included in a group of six properties related to the Grand Valley Project, considered to be eligible for inclusion in the Register (Colorado Historical Society, 1985). Their eligibility was based on their importance in development of western Colorado and their significance in representing early Federal water projects. The eligibility determination recognizes these properties require continuous modification and repair to ensure they function as a vital part of the agricultural economy which they serve.

The Government Highline Canal was constructed from 1912 to 1917 by Reclamation (then the U.S. Reclamation Service), and the course of the canal has not been significantly altered since its construction. Reclamation has conducted surveys of the canal corridor and areas to be impacted by various rehabilitation and betterment programs, the Colorado River Basin Salinity Control Program, and routine operation and maintenance activities.

The Orchard Mesa Power Canal was constructed between 1922-24, shortly after the Orchard Mesa Division became part of Reclamation's Grand Valley Project. After water in the Government Highline Canal is diverted through the Colorado River (Orchard Mesa) siphon, it is carried about 3 miles in a unique bench flume/aqueduct to the common forebay of the Orchard Mesa Pumping Plant and Grand Valley Power Plant. Periodic and routine maintenance activities and various rehabilitation and betterment programs have been carried out on the entire Orchard Mesa Division of the Grand Valley Project. Parts of the Orchard Mesa Power Canal

bench flume/aqueduct and the siphon were rebuilt in 1962, and other portions were reconstructed in the 1980's.

Impacts: It is unlikely cultural resources will be found in the highly disturbed areas of the Highline Lake Pump Station. However, surface surveys of the areas to be disturbed will be conducted. Reclamation would consult with the SHPO to ensure any findings are protected.

Past consultation with the SHPO for Grand Valley salinity control improvements included addition of canal checks, of which eight were installed. This consultation concluded with a determination that the changes would not adversely affect historic qualities of the Government Highline Canal.

Proposed modifications and/or automation of original water control structures along the canals may affect their historic nature. Reclamation is reviewing and updating records for affected canal system structures, and will consult with the SHPO to determine if mitigation measures are necessary to ensure effects are not adverse.

Mitigation Measures: Prior to constructing the Palisade Pipeline and Highline Lake Pump Station, Reclamation will conduct a surface (Class 3) cultural resource survey over areas to be disturbed. During construction, Reclamation will stop work in the event evidence of a subsurface cultural resource is found, and consult with the SHPO to determine if protection measures are needed. For the eligible properties, mitigation measures considered necessary to avoid adverse effects will be specifically documented in consultation with the SHPO. Measures related to maintenance of the historical record for the canal properties may include a review and update and/or completion of site forms for affected canal structures, including recording of structures that serve as a good example of irrigation practices at the time they were installed.

Indian Trust Assets

Indian Trust Assets (**ITAs**) are legal interests in property held in trust by the United States for the benefit of Indian tribes or individuals. Lands, minerals, and water rights are examples of trust assets. The United States, with the Secretary of the Interior as trustee, is responsible for protecting and maintaining rights reserved by, or granted to Indian tribes or individuals by treaties, statutes and executive orders. Reclamation policy, established as directed by Secretarial Order 3175 and the Commissioner's memorandum of November 1993, is to protect American Indian Trust Assets from adverse impacts resulting from its programs and activities when possible.

Various bands of Ute Indians traditionally occupied lands in western Colorado, Utah, and New Mexico. Tribal reservations now include the Southern Ute and Ute Mountain Ute Reservations in southwestern Colorado, and the Uinta and Ouray Reservations in northern Utah. The northern Colorado bands, the Paianuc (Grand River) and Yamparika (White River), appear to have been

more closely associated with areas affected by GVWM than the southern Colorado bands. Historical events resulted in the northern bands removal from Colorado to the Uintah Reservation in Utah in 1880. Since 1947, the Utes have won settlement claims for lands and resources in Colorado and Utah. However, Reclamation is not aware of any trust assets being located in the Grand Valley or of any claims to assets associated with the Grand Valley Project or Green Mountain Reservoir of the CBT Project. Reclamation, therefore, believes GVWM would not affect ITAs.

7 - *SOME IMPORTANT DATES IN UTE HISTORY*

1864 - In Utah, the Uintah Valley Reservation set aside by Act of Congress of May 5, 1864, as proposed by President Lincoln in 1861.
1868 - The Great Ute Treaty left Colorado Utes with a reservation covering about a quarter of the ColoradoTerritory, stretching from west of Gunnison, Colorado to the Utah line, and south of the White River drainage to New Mexico. The northern agency established by this treaty was at White River.
1873 - In Colorado, treaty settles Southern Ute bands on reservation in southwestern Colorado.
1879 - Indians clash with Agent Nathan Meeker and federal troops at the White River Agency.
1880 - Colorado Utes forced to sign agreement removing the White River agency bands to the Uintah Reservation in Utah.
1886 - Uintah and Ouray agencies consolidate.
1888 - Act provides for survey and allotments on the Uintah Reservation.
1896 - Colorado's Southern Utes and Utah's Northern Utes organize the Confederated Bands of Ute Indians obtain compensation for lands taken from them.
1898 to1905 -Uintah and White River Utes sell land to Uncompahgre Utes. Despite Ute objections, officials complete allotments and open Uintah Reservation to settlers.

Environmental Justice

Executive Order 12898 established environmental justice as a Federal agency priority to ensure that minority and low-income groups are not disproportionately affected by Federal actions.

No areas in the Grand Valley are dominated by minority or low-income groups. No comments were received from any minority or low-income groups following publication of local newspaper articles about the GVWM proposal. Additional opportunities to comment will occur following release of the Draft EA. The Proposed Action does not involve any population relocation, health hazards, hazardous waste, property condemnation, or substantial economic impacts. Therefore, no low-income or minority communities are expected to be affected in any disproportionate way as a result of the Proposed Action.

Recreation Resources

Impacts at Highline Lake State Park. *The proposed pump station will be constructed in an arm of the lake used by park visitors. Changes in spill patterns in August-October, use of the pump station, and using Highline Lake as a buffer reservoir may cause water quality changes at Highline Lake Reservoir that affect its use for water-based recreation.*

Indicator: Impacts to park visitors; closure of park due to excessive bacterial counts.

Existing Conditions: Highline State Park is the largest water-based park in the valley. The surface area of Highline Lake, when full, is 140 acres. Water from the Camp 7 spillway constitutes essentially all its water supply. No public safety problems have been reported for the spillway. A bridge for a new trail around the lake was recently constructed about 200 feet below the Camp 7 spill. As the canal fills in April, spills typically fill the lake before public use during the recreational season. Water quality samples are taken weekly at the lake, and currently show no problems with meeting public health/water quality standards for bacterial counts.

Impacts: The Highline Lake Pump Station would be in an enclosed, secured building that would be tucked into the bank at the head of the Camp 7 spillway arm. Noise from the pumps would be muffled by the building, but probably could be heard outside it. The station and (raptor-proof) above-ground power lines would be slightly visible to trail users.

The net reduction of Camp 7 canal spills into the lake would occur in August through October. Decreases in August would be of most concern, since this is at the end of the recreation season. In September, the spills would steadily decrease. By October, as delivery demands go below 100 cfs, spills would increase. Pump station operation studies showed pumping would cause daily water levels to fluctuate less than 1 foot. Reclamation does not believe this amount of fluctuation will cause any measurable increase in shoreline erosion. It is not known if the decrease in dilution effects from the spills would cause bacterial counts to exceed public health standards, resulting in park closures. Future monitoring would indicate if the lake has water quality problems that present a public health problem. If so, staff from the State Park would work with the Association, Colorado Water Conservation Board, Colorado State Engineers Office and Fish and Wildlife Service to determine if operational changes related to pumping and/or spill patterns into the lake are appropriate. The Association will manage the canal system in a manner that is consistent with water rights for the Grand Valley Project and that will not interfere with the Association's ability to meet demands for irrigation water.

Socio-Economic Factors

Construction of the canal improvements is a relatively small project that may create jobs for 4 to 10 workers, primarily during the next two winters. This should introduce a small amount of money into the local economy, and is not expected to place a strain on public services such as schools or transportation.

Funding: *Local water users feel they should not be asked to pay for fixing endangered fish problems caused by historic uses of Colorado River water. Many residents feel water projects to benefit endangered fish are a waste of taxpayers' money.*

Indicator: Dollar cost to water users. Cost effectiveness ($/AF of conserved water).

Existing Conditions: Local water users are not being asked to pay for the project. Initial costs of the Canal Modernization Study and Reclamation's costs associated with the Orchard Mesa Check Case Settlement were funded through Federal appropriations. Costs of planning GVWM (canal model runs, drafting agreements, hydrologic analyses, scoping, and preparation of this EA) have, to date, been covered under Federal appropriations by Reclamation as part of the

Recovery Program. For the State's share in the Recovery Program, the CWCB has appropriated funds to cover increased operation and maintenance costs over a 50-year period. Recovery Program participants are also seeking long-term funding legislation that would involve cost sharing between Federal and State sources. Program participants are available, upon request, to discuss the importance of recovering the fish and complying with the Endangered Species Act.

Impacts: If No Action is taken, the Recovery Program would continue to seek long-term funding legislation and annual appropriations from Federal and State lawmakers for flow and non-flow activities, including looking for water to maintain habitat from other sources. Total estimated costs of $8.4 million for planning, installing, operating and maintaining the improvements equates to a capital cost of $300 per acre-foot of conserved water. Based upon a 50-year project life and using Reclamation's planning interest rate of 7.375 percent yields an annualized cost of about $22.50/acre-foot/year. For comparison purposes, costs of developing new water supplies, for any purpose, typically range from $2,000 to $5,000 per acre-foot.

Cumulative Impacts

Delivering surplus Green Mountain Reservoir water to the 15-Mile Reach. *Some Federal and State officials have concerns regarding the Federal authorization for the CBT Project and/or State water right decrees for Green Mountain Reservoir as they relate to delivery of surplus water to uses that indirectly benefit endangered fish.*

Indicator: Release/protection of surplus HUP water to meet 15-Mile Reach flow recommendations.

Existing Conditions. Analyses for the Orchard Mesa Check Settlement Case showed there have been many years when surplus water in Green Mountain Reservoir could have been made available for release to benefit the fish. The long-term average for the content of the reservoir shows about 28,000 acre-feet of water remained in the HUP on November 1. Reclamation has released this water during the winter months to generate power and make room for spring runoff. The Orchard Mesa Check Case settlement, including operation criteria for the HUP, was agreed to by many State officials and representatives of the Managing Entities

Impacts. Whether or not the canal improvements are made, generating hydropower at the Grand Valley Power Plant is a use of surplus water that is compatible with the Federal authorization and State water right decrees for Green Mountain Reservoir. It is also consistent with operating policy for Green Mountain Reservoir and required by the Orchard Mesa Check Case settlement.

In most years, the reduced diversion demand resulting from the canal improvements would increase the amount of natural flows, and decrease the amount of surplus water that would be delivered to the Grand Valley Power Plant under the proposed agreement. This, in turn, would increase the amount of HUP water in Green Mountain Reservoir that could be declared surplus and be delivered to other uses that also benefit the fish (see Table 3). Legal issues should be addressed along with other issues as they relate to options for release of additional surplus HUP water to benefit the Colorado River endangered fishes. Resulting recommendations, due in

September 1998, would cover surplus water supplies that may, or may not, be a result of conserving water by the canal improvements.

Sufficient Progress of the Recovery Program. *The FWS annually reviews accomplishments of the Recovery Program to determine if the Program is making sufficient progress to continue to serve as the reasonable and prudent alternative to avoid jeopardy. GVWM actions have been cited as actions that must be completed to show progress. It is important to historic and future water users that completion dates for GVWM activities are met.*

Existing Conditions: Since the Program was established in 1987, the FWS has completed over 400 Biological Opinions to conclude consultations required by the ESA on depletive water projects. These favorable opinions cite the Recovery Program as the 'reasonable and prudent alternative' to avoiding jeopardy and adverse modification of critical habitat caused by depletive effects of water projects on the endangered fishes. An example of how the Recovery Program functions to provide ESA regulatory relief to water users is provided by a consultation now underway for a local domestic water project. Ute Water Conservancy District provides domestic water supplies to residents throughout the Grand Valley who are not served by municipal water providers such as the City of Grand Junction, Town of Palisade, or Clifton Water District. A main pipeline, which runs along Plateau Creek and crosses a mixture of private and public lands as well as the state highway right-of-way, carries high quality water from the Grand Mesa to a treatment plant near Palisade. After 30 years of operation, the pipeline needs to be replaced. In addition, it needs to be enlarged to meet future requirements of Ute's customers as the Grand Valley's population increases. The August 1997 draft Biological Opinion for this Plateau Creek Pipeline Replacement Project reads:

> "The Service has determined that the Recovery Program can serve as the reasonable and prudent alternative to avoid jeopardy to the endangered fish and destruction or adverse modification of critical habitat caused by the Project's historic depletions *provided that the Grand Valley Water Management Project, Plan item 1.A.3.c.(3)(f), is completed on schedule. ...Construction and implementation ... is scheduled for September 1997 through April 1999.*" (emphasis added)

Thus, biological opinions rely on the Recovery Program to function as the reasonable and prudent alternative for depletive effects of water projects. Annual reviews of the program's progress also verify the degree to which the program can serve this function for a specified level of new and future depletions. In their June 1996 review, the FWS raised the level of new depletions from 1,500 AF to 3,000 AF, but in doing so they also identified concerns about "progress to formalize agreements to protect ... Green Mountain Reservoir surplus water." This is the proposed agreement to deliver surplus water to the Grand Valley Power Plant.

Impacts: Implementation of GVWM, along with other flow and non-flow Recovery Program actions, is planned to establish self-sustaining populations of the endangered fish to allow for future de-listing of the species under the ESA.

If No Action is taken, or if construction of the improvements and/or execution of the surplus water agreement as scheduled by the RIPRAP is delayed, the FWS may determine the Recovery

Program is not making sufficient progress to recover the listed Colorado River fish species. This would mean the Recovery Program may not continue to serve as the reasonable and prudent alternative to historic and/or new depletions of water projects. Federal approvals of water use and development projects may instead require individual water project proponents and existing water project operators to mitigate for their own water depletions. This may trigger a regulatory confrontation between resource protection and development that would benefit neither the native or endangered fish nor water use and development. Timely completion of all measures proposed by GVWM would help ensure sufficient progress is made so the Recovery Program continues to benefit many projects throughout the basin, now and in the future.

Coordination with Other Recovery Program Activities. *GVWM is one of many actions to be coordinated with other Recovery Program activities to help recover the fish and allow for water development and use to proceed in a manner compatible with applicable State and Federal laws.*

Indicator: Progress in providing a protected supply of water to the 15-Mile Reach.

Existing Conditions: Flow-related Recovery Program activities are discussed under the Related Projects section of Chapter 1. Since 1988, 10- to 20-thousand acre-feet have been delivered to the 15-Mile Reach from Ruedi Reservoir under an annual agreement. Work is ongoing toward coordinating reservoir operations, and developing water delivery agreements from Wolford Mountain and Ruedi Reservoirs.

The State water court recently awarded decrees for the CWCB's 1992 and 1994 instream flow filings for the 15-Mile Reach. In 1995, the CWCB filed an application for an additional instream flow water right that considered water availability and the FWS flow recommendations. Many issues are under discussion with opposers to the filing.

Completion of the Recovery Program study to identify options for delivery of additional surplus water from Green Mountain Reservoir should help supply additional water that is conserved by the canal improvements to the 15-Mile Reach.

8 - CWCB'S 1995 INSTREAM FLOW FILING

The Colorado Water Conservation Board's 1995 instream flow filing is described by different components:

Base Flow Water Right - would limit future impacts to the endangered fish and their habitat during low flow conditions. For the 15-Mile Reach, the right varies from a low of 680 cfs in September to a high of 2,000 cfs in May and June.

Carve Out - seeks to protect up to 100,000 AF of water for future development of new consumptive uses. It needs to be distributed on a monthly or seasonal basis to assure its utility;

Recovery Flow Water Right - which consists of all remaining flows in excess of the Carve Out, as a first step in a long-term effort to mimic the natural hydrograph; and

Modifiable Portion of the Recovery Flow Right - includes an additional 300,000 AF, which may be added to the Carve Out for future development, even if other Recovery Program Participants withhold their consent. It has been identified to assure that the people of Colorado will not be deprived of the beneficial use of waters available by interstate compacts.

Source: Instream Flow Water Rights for Endangered Fishes in Colorado. Colorado Water Conservation Board, Department of Water Resources. January, 1996.

Impacts: Efforts to complete related Recovery Program studies and actions to provide a protected supply of water to the 15-Mile Reach will continue, whether or not GVWM is implemented. Table 3 in the Water Resource Section showed that making the canal improvements in conjunction with executing the proposed surplus water agreement would increase flows in the 15-Mile Reach by 10-11 percent in the late summer irrigation months. GVWM would not help meet flow recommendations during spring runoff that other Recovery Program actions are designed to address. The increase includes consideration of 20,000 acre-feet of Ruedi Reservoir releases. It does not include amounts of conserved water that could not physically be delivered from Green Mountain Reservoir to the Grand Valley Power Plant under the proposed surplus water agreement.

Options for delivering additional surplus HUP water from Green Mountain Reservoir, the Coordinated Reservoir Operations and 15-Mile Reach Strategy Groups of the Recovery Program are all challenged with identifying feasible measures to meet 15-Mile Reach flow recommendations, considering current and future outlook from all sources, especially during the runoff months. If the canal improvements are made, protecting deliveries of additional supplies of conserved water would be considered in conjunction with upstream supplies and demands.

It is not known how or if GVWM contributions can be measured in terms of showing population response(s) of the listed fish species. The Biological Opinion that would conclude the Intra-Service Consultation on the depletive effects of all water projects above the 15-Mile Reach should confirm and/or direct future actions planned under the Recovery Program aimed at offsetting depletions and other factors that will help to show measurable progress in recovering the endangered fish.

CHAPTER 4 - CONSULTATION AND COORDINATION

Scoping for Draft Environmental Assessment

The Association was involved in the Canal Modernization Study to ensure their needs would be understood, system reliability would be maintained, and their water rights would be protected.

A technical committee of water experts from throughout the State also reviewed results of the Canal Modernization Study, and have provided input in the course of discussing issues as the EA was being prepared. This committee includes representatives of the affected Grand Valley irrigation entities and objectors to the Orchard Mesa Check Case, and Managing Entities for Green Mountain Reservoir.

The issues listed in Chapter 1 were identified during informal scoping with potentially affected interests to guide preparation of this EA.

A News Release was published in local newspapers as preparation of this EA was begun. A scoping paper was prepared and distributed upon request. Responses were recorded and incorporated into analyses for the EA.

Consultation with other Agencies

Informal coordination and consultation with the Fish and Wildlife Service is underway to comply with the Fish and Wildlife Coordination Act and Endangered Species Act (see Attachment B).

When available, Reclamation will submit preliminary designs for the Palisade Pipeline and Highline Lake Pump Station to the Army Corps of Engineers and Colorado Water Quality Control Division to comply with requirements of the Clean Water Act.

Various divisions of the Colorado Department of Natural Resources have been and will be involved in formulation of the proposed action and review of this EA, both as participants in the Recovery Program and as advisors and reviewers.

To comply with the National Historic Preservation Act, consultation with the State Historic Preservation Officer will include submission of results of the re-evaluation of eligible properties for the National Register of Historic Places in light of proposed changes.

Information on the Proposed Action and this EA is being sent to tribal governments and the Bureau of Indian Affairs for their consideration.

REFERENCES CITED

Bureau of Reclamation. 1937. Synopsis of Report on Colorado-Big Thompson Project, Plan of Development and Cost Estimate. Senate Document 80, 75th Congress 1st Session, June 15, 1937. US Government Printing Office, Washington D.C.

_____. 1986. Final Environmental Impact Statement, Grand Valley Unit, Stage Two, Colorado River Basin Salinity Control Project. INT FES 86-10 files May 23, 1986. Salt Lake City, Utah.

_____. 1988. Green Mountain Reservoir, Colorado Water Marketing Program, Final Supplement to the Final Environmental Statement, Colorado Big-Thompson, Windy Gap Projects, Colorado. EIS 88-10 filed March 21, 1988. Denver, Colorado.

_____. 1992. Study of alternative water supplies for endangered fishes in the '15-Mile Reach" of the Colorado River. Bureau of Reclamation, Grand Junction, Colorado. 78pp.

Butler, D.L., W.G. Wright, D.A. Hahn, R.P. Krueger and B. Campbell-Osmundson. 1994. Physical, chemical, and biological data for detailed study of irrigation drainage in the Uncompahgre Project area and in the Grand Valley, West-Central Colorado, 1991-92. U.S. Geological Survey Open File Report 94-110. 146pp.

Colorado River Water Conservation District. 1988. Draft Report - Proposed Solution to the Orchard Mesa Check Problem dated September 22, 1988. Glenwood Springs, Colorado.

Colorado Historical Society. 1985. Letter dated December 20, 1985 to Regional Director, Bureau of Reclamation, Salt Lake City, Utah, from the Colorado State Historic Preservation Officer, Denver, Colorado.

Fish and Wildlife Service. 1987a. Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. Denver, Colorado.

_____. 1987b. Final Environmental Assessment-Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. Denver, Colorado.

_____. 1997a. Section 7 Consultation, Sufficient Progress, and Historic Projects Agreement and Recovery Action Plan (RIPRAP). Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. Denver, Colorado.

_____. 1997b. Section 7 Consultation for the Plateau Creek Pipeline Replacement Project. Memorandum from Field Supervisor, Ecolological Services, Fish and Wildlife Service, Grand Junction, Colorado to Area Manager, Bureau of Land Management, Grand Junction, Colorado dated August 7, 1997.

Irrigation Training and Research Center. 1997. Government Highline Canal Modernization Study, Preliminary Draft submitted to the Bureau of Reclamation, February 1997, Cooperative Agreement 5-FC-40-17650. California Polytechnic State University, San Luis Obispo, California.

Lemly, Dennis. 1993. Guidelines for Evaluating Selenium Data from Aquatic Monitoring and Assessment Studies. U.S. Forest Service Cold Water Fisheries Research Unit, Virginia Tech University, Virginia.

Osmundson, D.B. and L.R. Kaeding. 1989. Studies of Colorado Squawfish and Razorback Sucker Use of the "15-Mile Reach" of the Upper Colorado River as Part of Conservation Measures for the Green Mountain and Ruedi Reservoir Water Sales. Final Report. Colorado River Fishery Project, U.S. Fish and Wildlife Service, Grand Junction, Colorado.

ATTACHMENT A
Hydrology Analysis for the
Grand Valley Water Management
Draft Environmental Assessment

The Grand Valley Water Management proposal (GVWM) would allow water conservation through reduced diversions at the Grand Valley Diversion Dam in August, September, and October. Diversion reductions could affect surplus storage in Green Mountain Reservoir, delivery of surplus water to the Grand Valley Power Plant, and flows in the 15-Mile Reach of the Colorado River.

Background

During the irrigation season, demands for water change daily based on variations in crops and the weather. The Grand Valley Water Users Association (GVWUA) must keep 55 miles of canal full enough to meet demands along its entire length at any time. This isn't a problem during the peak irrigation season, since the amount diverted is about the same as the demand. When demand drops off in August through October, the amount diverted often exceeds demand. In October, irrigation demand can drop to about 150 cfs. However, it is not possible to reduce the canal flow to 150 cfs because about 400 cfs is required to keep the water level high enough to reach all headgates.

Water diverted that exceeds demands is 'administratively spilled.' An average of 31,400 acre-feet is currently spilled during August through October each year. Under present conditions, the water is spilled into several washes and into Highline Lake. The spilled water returns to the Colorado River downstream from the 15-Mile Reach.

Table 1. Estimated average volume of administrative spills
August through October

Spill Location	**Average Spill Volume *without* GVWM (AF)**	**Average Spill Volume *with* GVWM (AF)**	**decrease with GVWM**
Persigo Wash	2,500	0	100%
Little Salt Wash	2,000	0	100%
Big Salt Wash	1,100	0	100%
Highline Lake	10,700	1,700	84%
East Salt Wash	5,400	0	100%
Badger Wash	9,700	1,300	87%
Palisade Pipeline	0	9,000	N/A
Total Spill	**31,400**	**12,000**	**19,400**

GVWM canal improvements would help match the amount of water diverted into the canal to irrigation demands. A series of water surface elevation control structures (checks) and a pumping plant near Highline Lake would allow the GVWUA to reduce the amount of water diverted and still keep the water level high enough to make deliveries to the headgates. The Government Highline Canal Modernization Study (canal modernization study) estimates that spills into the washes and Highline Lake would be reduced to about 3,000 acre-feet.

A proposed pipeline near Palisade would accommodate fluctuations in irrigation demand, allow fine tuning of canal flow rate, and shorten the lag time for changes in flow rate. The 120 cfs pipeline would discharge any excess canal water into the Colorado River upstream from the Grand Valley Irrigation Company (GVIC) diversion dam. An estimated daily average of 50 cfs during August through October, or about 9,000 acre-feet each year, would be diverted and returned to the river through the pipeline.

Water discharged from the Palisade pipeline would be considered an operational or administrative spill, and therefore would be available for diversion (e.g., by GVIC). Any flows not diverted by GVIC would enhance flows in the 15-Mile Reach to benefit the endangered fish.

Hydrology Analyses

The canal modernization study analyzed the potential of GVWM to reduce administrative spills and meet irrigation demands with reduced diversions. Daily diversion, spill, and irrigation water order data were collected during the 1992, 1993, and 1994 irrigation seasons.

The 1996 Orchard Mesa Check Case water rights settlement (Check Settlement) also affects the analysis of GVWM. The Check Settlement provides for declaring surplus storage conditions in the 66,000 acre-foot Green Mountain Reservoir Historic User's Pool (HUP). Surplus water can then be delivered under contracts to industrial, non-consumptive uses. Part of the GVWM proposal is to contract for surplus water for delivery to the Grand Valley Power Plant. Contract deliveries could be administratively protected by the State Engineer's Office to ensure that water is not diverted before reaching the Power Plant.

A daily time-step hydrology model originally developed for the Check Settlement was adapted to use data from the canal modernization study. Model runs were made using daily data for 1992, 1993, and 1994 (the years analyzed in the canal modernization study). Two different data sets were used for each year: 1) historic diversion records (without GVWM), and 2) reduced diversions (with GVWM). The reduced diversion data set includes 50 cfs for the Palisade pipeline. Results from the model runs were used to analyze the potential effects of GVWM on:

- surplus storage volume in the HUP
- capacity of canal systems to deliver surplus HUP water to the Grand Valley Power Plant
- flows in the 15-Mile Reach of the Colorado River

Reduced Diversions

The volume of irrigation water deliveries to the headgates would not change with GVWM. Reducing the volume of administrative spills, however, would allow a corresponding decrease in GVWUA's diversions at the Grand Valley Diversion Dam. Table 2 compares the historic diversion to the reduced diversion with GVWM. The diversion volumes shown are for GVWUA irrigation supplies only (flows at Indian Wash)[3]. The decrease of 19,483 acre-feet closely corresponds to the spill reduction from Table 1 (19,400 acre-feet).

Table 2. GVWUA Irrigation Diversions
August through October (acre-feet)

Year	Diversion *without* GVWM	Diversion *with* GVWM	Decreased diversions *with* GVWM	Percentage decrease with GVWM
1992	90,250	70,352	19,898	22%
1993	84,547	61,977	22,570	27%
1994	83,365	67,384	15,981	19%
AVERAGE			**19,483**	

Effects of Reduced Diversions

In drier than average years (such as 1992 and 1994), modeling indicates that the reduced GVWUA irrigation demand results in decreased natural flow shortage releases from the HUP. This increases the volume of surplus water stored in the Green Mountain Reservoir HUP.

In wetter than average years (such as 1993), there is typically no shortage of water. Little if any water is needed from the HUP to augment stream flows for the HUP beneficiaries, and the entire HUP may be surplus.

Table 3 quantifies the effect of GVWM on utilization of the Green Mountain Reservoir HUP. "Without GVWM" shows the estimated HUP volumes given historic diversions and hydrologic conditions, and operating under the terms of the 1996 Check Settlement. "With GVWM" also assumes Check Settlement operations with historic hydrologic conditions, but applies the reduced diversion data set from the canal modernization study.

[3] Flow data for Indian Wash obtained from the canal modernization study.

- **Natural Flow Shortage Releases**: this is the HUP volume released to satisfy the water rights of the HUP beneficiaries when stream flow is insufficient to meet their demands.

- **Surplus Deliverable to GV Power Plant**: this is the volume of surplus (not needed by HUP beneficiaries) that could be delivered under contract to the Grand Valley Power Plant. This volume is limited by the carrying capacities of the Government Highline and Orchard Mesa Power Canals.

- **Surplus in Excess of Canal Capacity**: this is the remaining surplus that could not be delivered to the Power Plant.

- **Winter Reserve**: As agreed in the Check Settlement, the end-of-season (November 1) HUP volume must be at least 500 acre-feet to satisfy the winter needs of HUP beneficiaries.

Table 3. Green Mountain Reservoir
Estimated Usage of HUP (acre-feet)

	1992		1993		1994	
	without GVWM	*with* GVWM	*without* GVWM	*with* GVWM	*without* GVWM	*with* GVWM
Natural Flow Shortage Releases	20,520	20,464	0	0	10,413	8,601
Surplus Deliverable to GV Power Plant	27,764	16,257	0	0	28,958	19,551
Surplus in excess of canal capacity	17,216	28,779	65,500	65,500	26,129	37,348
Winter Reserve	500	500	500	500	500	500
Total	66,000	66,000	66,000	66,000	66,000	66,000

In the 1993 model runs, no HUP releases were needed to augment stream flow shortages, resulting in the entire pool being surplus. Also in 1993, all available canal capacity was used to deliver irrigation water and provide a full supply to the Power Plant, leaving no capacity to deliver surplus HUP water to the Power Plant.

In the drier years, modeling indicates that the reduced diversions would result in decreases in HUP natural flow shortage releases and HUP surplus deliveries to the GV Power Plant. This is because stream flows that would have been diverted without GVWM become available for use in the Power Plant.

Historically, all surplus HUP supplies have been stored until the end of the irrigation season (November 1), and then released during the winter months for hydropower generation at Green Mountain. The 1996 Check Settlement allows delivery of surplus supplies to non-consumptive beneficial uses such as the Grand Valley Power Plant.

GV Power Plant Return Flows

Table 4 shows that GVWM could result in a small increase to the volume of water that flows to the Power Plant and returns to the river from the tailrace. Tailrace flows return to the upper end of the 15-Mile Reach unless the Orchard Mesa Check is being operated to supply flows to GVIC. In all three years modeled, GVIC received their full supply without operating the Orchard Mesa Check; therefore, all tailrace flows were returned to the 15-Mile Reach.

Table 4. GV Power & Pumping Plant Return Flows
August through October (acre-feet)

Year	*without* GVWM	*with* GVWM	increased flow with GVWM	Percentage increase
1992	123,207	127,524	4,317	3.5%
1993	127,941	129,635	1,694	1.3%
1994	127,428	128,207	779	0.6%

Effect of GVWM on Flow in the 15-Mile Reach

Table 5 shows the estimated change in the volume of water reaching the 15-Mile Reach during August through October. Both the *with* and *without GVWM* scenarios include HUP surplus releases that would be deliverable to the GV Power Plant, return flows from the Power Plant, and fish releases from Ruedi Reservoir (limited to 20,000 acre-feet per year). The *with GVWM* scenario includes return flows from the Palisade pipeline (no pipeline flows were diverted by GVIC in the years modeled).

Table 5. Volume reaching the 15-Mile Reach
August - October (acre-feet)

Year	*without* GVWM	*with* GVWM	increase with GVWM	Percentage increase
1992	148,410	163,401	14,991	10%
1993	278,943	309,033	30,090	11%
1994	141,980	155,849	13,869	10%

The 1993 flow increase is nearly equal to the sum of the reduced diversion from Table 2 and the spills from the Palisade pipeline (22,570 + 9,000 = 31,570) . This indicates that most of the water conserved through GVWM could benefit the endangered fish in wetter years like 1993.

The 1992 and 1994 flow increases are less than the reduced diversion from Table 2. The difference is held as surplus storage in the HUP.

Table 6 shows the estimated average monthly flow in the 15-Mile Reach. Both *with* and *without GVWM* flows include HUP surpluses that would be deliverable to the Power Plant, return flows from the Power Plant, and fish releases from Ruedi Reservoir (limited to 20,000 acre-feet per year). *With GVWM* also includes all return flows from the Palisade pipeline (no pipeline flows were diverted by GVIC in the years modeled).

The largest increase in flows is seen in the wettest year (1993). HUP surplus releases and canal capacity to deliver the surplus were the same (zero) for both the *with* and *without* GVWM scenarios in 1993. As a result, the conserved water flowed directly to the 15-Mile Reach. In 1992 and 1994, much of the conserved water was stored as surplus in the HUP, and could not be delivered to the Power Plant (and indirectly to the 15-Mile Reach).

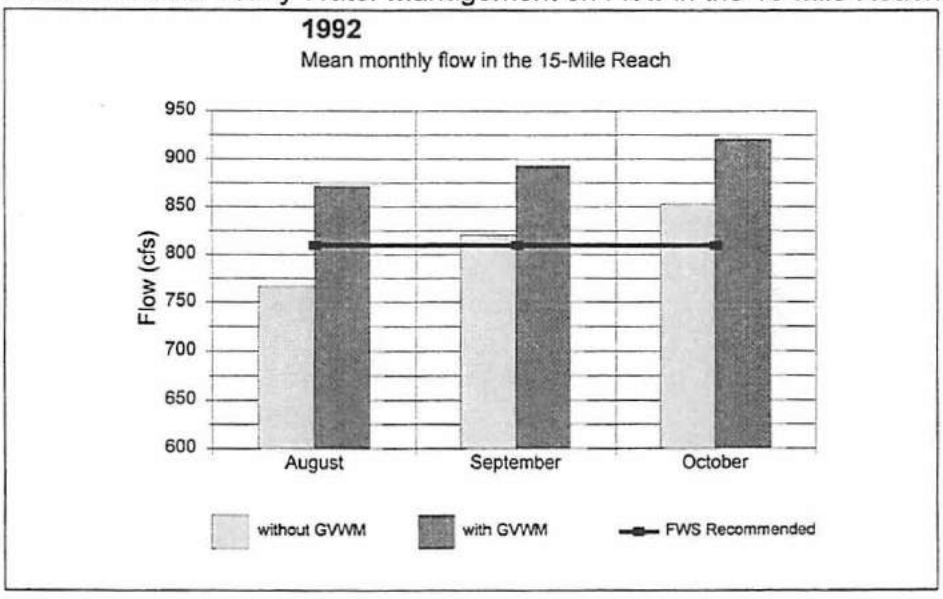
Table 6. Mean monthly late-season flow in the 15-Mile Reach (cfs)

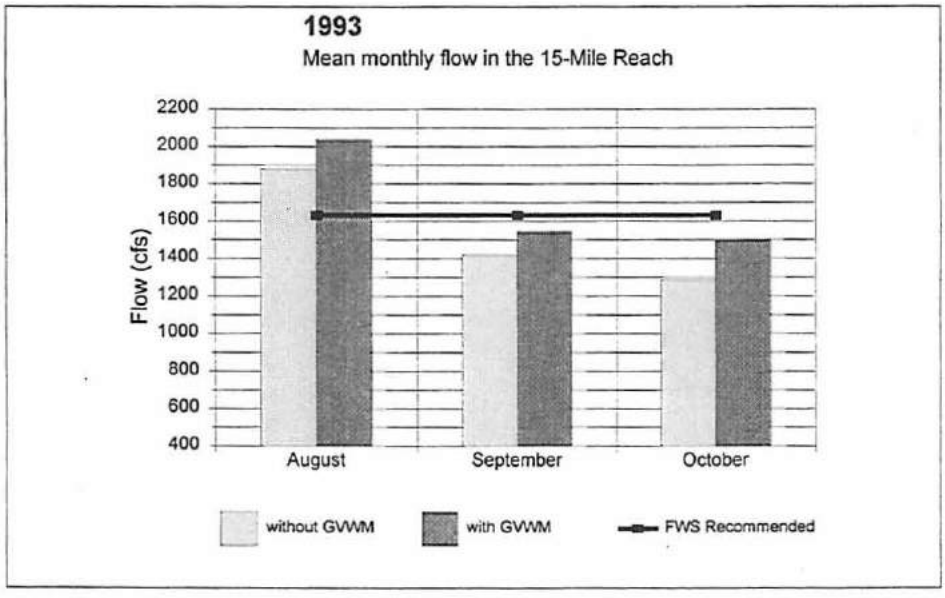
Year	Month	*without* GVWM	*with* GVWM	Increased flow with GVWM	Percentage increase
1992	August	766	872	106	14%
	September	821	893	72	5%
	October	853	921	68	8%
1993	August	1,879	2,037	158	8%
	September	1,418	1,542	124	9%
	October	1,286	1,496	210	16%
1994	August	793	861	68	9%
	September	792	857	65	8%
	October	750	844	94	13%

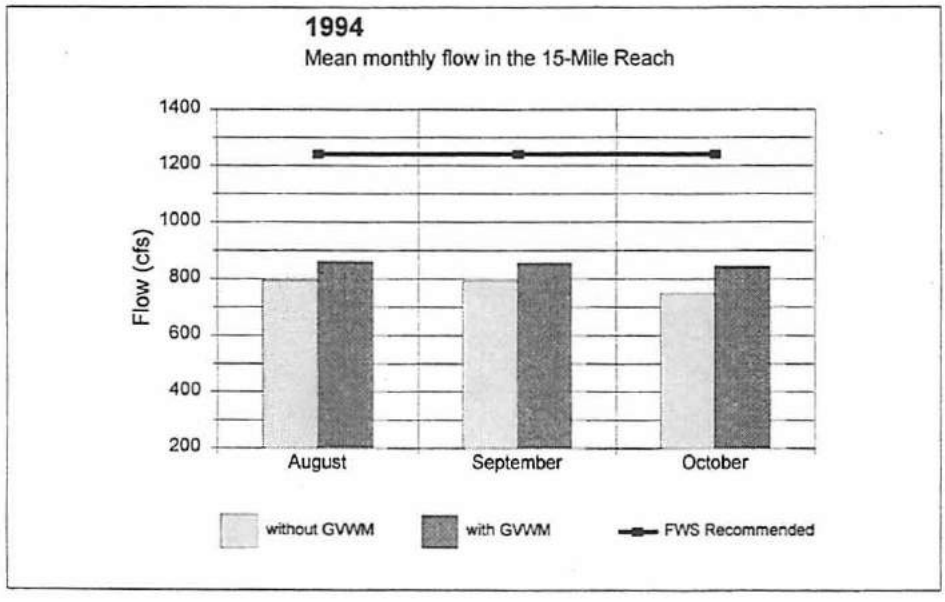
Figure 1 shows the information from Table 6 in bar chart format. The U.S. Fish and Wildlife Service's flow recommendations for each year are also shown. The chart shows that GVWM would help meet or exceed the flow recommendations in 1992. In years like 1993 and 1994, additional supplies would be needed to meet the Service's recommended flows.

Figure 1

Effect of Grand Valley Water Management on Flow in the 15-Mile Reach







ATTACHMENT B

December 12, 1997

WCN-LWest
ENV-7.00

MEMORANDUM

To: Rick Kreuger, Assistant Field Supervisor, Fish and Wildlife Service, 764 Horizon Drive, South Annex A, Grand Junction CO 81506-3946

From: Carol DeAngelis, Area Manager, Bureau of Reclamation

Subject: Compliance with Section 7 of the Endangered Species Act (ESA) and the Fish and Wildlife Coordination Act (FWCA) for the Grand Valley Water Management (GVWM) Project, Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program), Colorado

As you are aware, the Bureau of Reclamation, in cooperation with other participants of the Recovery Program and the Grand Valley Water Users' Association, is completing planning activities towards implementation of the GVWM proposal. GVWM proposes to 1) make efficiency improvements to the Government Highline Canal of the Bureau of Reclamation's Grand Valley Project, and 2) enter into a contract for the delivery of surplus water from Green Mountain Reservoir, a feature of Reclamation's Big-Thompson Project, to the Grand Valley Power Plant. The GVWM is designed to conserve and supply water to the 15-Mile Reach of the Colorado River above its confluence with the Gunnison River in Grand Junction, Colorado. Enhancing flows in this reach is considered important to the recovery efforts for the endangered Colorado squawfish and razorback sucker.

Over the last year, Reclamation and Fish and Wildlife staff have had numerous discussions while planning GVWM. As a result of a meeting held on September 10, 1996, no general fish and wildlife issues were identified that would merit preparation of a planning aid memorandum under the FWCA. Discussions of preliminary analyses relating to selenium contamination from irrigation return flows resulted in the conclusion that GVWM would not cause significant harm to fish and wildlife. Based on further discussions regarding the scope of Section 7 consultation needed to implement GVWM, Reclamation is submitting the enclosed GVWM Biological Assessment for your consideration.

The Biological Assessment discusses potential effects of implementing the Proposed Action on the nine species identified in your March 11, 1997, species list. For purposes of meeting Section 7 consultation convention, Reclamation has concluded the Proposed Action may affect, but is not likely to adversely affect the Colorado squawfish or razorback sucker, and would not result in adverse modification to their critical habitat. GVWM is not likely to affect the humpback chub, bonytail, black-footed ferret, bald eagle, peregrine

falcon, or willow flycatcher. It is unlikely GVWM would cause any measurable change to potential habitat of these species. No 'taking' of any listed species is expected.

Overall, a beneficial effect on the Colorado squawfish and razorback sucker is expected due to increased flows in the 15-Mile Reach. Historic and future depletions to Colorado River flows above the Gunnison River confluence, including depletions from Government Highline Canal diversions, are the subject of an ongoing Intra-Service consultation. As a Recovery Program action, Reclamation believes that GVWM should be considered a conservation measure, in and of itself, to offset jeopardizing effects of historic and post-GVWM depletions from canal diversions within this Intra-Service consultation.

Reclamation would invoke a 'stop work' provision during construction of any of the canal improvements if activities are thought to be affecting any of the listed species, and Reclamation would consult with the Service concerning measures needed to protect the affected species.

Based on the above conclusions from the enclosed assessment, and consistent with regulations in 50 CFR 402.13, Reclamation expects that formal consultation under the ESA will not be necessary to implement GVWM.

A Draft Environmental Assessment (EA) for GVWM summarizing impacts to fish and wildlife will be sent to you for review under separate cover in December. Your comments on the Draft EA, along with a concluding FWCA report and response to the enclosed biological assessment and conclusions, is requested by the close of the 30-day comment period for the Draft EA. This would allow Reclamation to document compliance with the ESA and FWCA within the Final EA for GVWM.

If you have questions, please call Lorrie West at (970) 248-0635.

/s/ Brent Uilenberg (for Carol DeAngelis)

Enclosure

cc: LeRoy W. Carlson, State Supervisor
U.S. Fish & Wildlife Service
730 Simm Street, Room 292
Golden CO 80401

Jack Garner, Area Manager
Eastern Colorado Area Office
11056 West County Road 18E
Loveland CO 80537-9711 (ea w/encl)

bc: Regional Director, Salt Lake City UT
Attention: Tony Morton (UC-333), Christine Karas (UC-320) (ea w/encl)

WBR:LWest:rb:12/3/97:kruger3.lw

Grand Valley Water Management - Biological Assessment

The Bureau of Reclamation, in cooperation with other participants of the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River (Recovery Program) and the Grand Valley Water Users' Association (Association) is proposing to implement the Grand Valley Water Management (GVWM) project. By memorandum to the Bureau of Reclamation (Reclamation) dated March 11, 1997, the Fish and Wildlife Service (FWS) identified nine threatened or endangered species that may occur in the affected area of the proposed Grand Valley Water Management (GVWM) project. The area that would be affected by the Proposed Action is primarily in the Grand Valley of Mesa County, Colorado. The species list includes the black-footed ferret, four bird and four fish species. GVWM is one of many actions scheduled for completion under the Recovery Program. Reclamation has prepared this biological assessment to meet consultation requirements under Section 7 of the Endangered Species Act.

Proposed Action and Expected Results

GVWM is designed to conserve water and supply it to enhance stream flows and/or restore habitat of two of the endangered fish species, the Colorado squawfish and razorback sucker. The Proposed Action represents a combination of activities that, if implemented together, would result in supplying a protected supply of conserved water to a reach of critical habitat considered important to the recovery of these species, the 15-Mile Reach of the Colorado River above the Gunnison River confluence in Grand Junction, Colorado. The Proposed Action is to:

✦ Add seven new check structures (adjustable dams) in the Government Highline Canal and a pump station at Highline Lake. Modernize the system with modifications to eight existing checks and addition of devices to monitor canal water levels and automate operation of control structures. Results of the Government Highline Canal Modernization Study (Irrigation Training and Research Center, 1997) predict these improvements would reduce the volume of water now spilled into the washes and Highline Lake in August, September and October from 31,400 to 3,000 acre-feet (AF). This significant savings of 28,400 AF would reduce flows in washes that return to the Colorado River, downstream of the 15-Mile Reach.

✦ Add a new canal spillway (the Palisade Pipeline) near Palisade. This location would allow the Association to 'fine-tune' the canal flow rate to match demands for water as the canal enters their service area and return unneeded diversions to the Colorado River, above the 15-Mile Reach. Reclamation estimate that in August-October, a daily average of 50 cfs of water, or about 9,000 acre-feet of the above-mentioned administrative spills, would be returned to the river via this pipeline. This amount may decrease as the Association gains experience in operating the improved system. Because administration of water rights should ensure sufficient water is already in the river to meet senior diversion rights of the Grand Valley Irrigation Company

(GVIC), spills discharged to the river through the pipeline would flow through the 15-Mile Reach.

✦ In accordance with the October 1996 Orchard Mesa Check Case Settlement (Settlement), develop an agreement for delivery of an initial block of surplus water from Reclamation's upstream Green Mountain Reservoir to the Grand Valley Power Plant, near Palisade. Green Mountain Reservoir was constructed as part of Reclamation's Colorado-Big Thompson (CBT) Project. It includes a 66,000 acre-foot pool of water that is managed to benefit western slope users of Colorado River water and is commonly referred to as the Historic Users Pool (HUP). When natural flows are too low to meet diversion requirements of Grand Valley rights, including senior diversion rights of the GVIC, HUP releases are made. As part of the Settlement, Reclamation agreed to not curtail diversions of upstream, junior water rights to generate hydropower at the Grand Valley Power Plant. Water from the Grand Valley Power Plant tailrace naturally returns to the Colorado River at the top of the 15-Mile Reach, just below the GVIC Diversion Dam. Thus any water delivered to the Power Plant that is not used by GVIC, whether it is natural flow or surplus HUP water, indirectly augments 15-Mile Reach flows to benefit recovery of the endangered fish.

General Effects of the Proposed Action.

Anticipated results of the Proposed Action would affect hydrologic conditions of the Colorado River and tributary washes in the Grand Valley in August through October. As such, GVWM would influence two factors believed to have contributed to the decline of the endangered Colorado River fish species: alteration of flows and water quality. Historic operation of the two Reclamation water projects involved in GVWM--the Grand Valley Project and Colorado-Big Thompson Project--deplete Colorado River streamflows, but the effects of these projects are not evaluated as part of this assessment. An ongoing Intra-Service Consultation is evaluating the depletion effects in the Colorado River above the Gunnison River confluence of all water projects on the endangered fish species. As part of that analysis, the Service will determine the environmental baseline and actions needed under the Recovery Program to offset depletive effects of historic and future new water projects on the fish.

Reclamation has used '15-Mile Reach flow recommendations' established by the Service (Osmundson, et al, 1995) as targets to measure the degree to which GVWM assists in recovery efforts for the Colorado squawfish and razorback sucker.

Reduce spills/tributary wash flows below the 15-Mile Reach. In August through October, proposed canal improvements are expected to eliminate 28,400 AF of administrative spills of canal water into Persigo, Big Salt, Little Salt and East Salt Wash, and reduce spills into Badger Wash and Highline Lake (ITRC, 1997). Of the 28,400 AF of reduced canal spills, about 9,000 AF in spills would return to the Colorado River above the 15-Mile Reach via the Palisade Pipeline. The net change in administrative spills below the 15-Mile Reach of 19,400 AF, would

be conserved in the form of a reduced irrigation diversion demand into the Government Highline Canal.

Increase 15-Mile Reach Flows. Hydrologic analyses for three years (one wet, two dry) studied predict GVWM would provide a 10-11 percent increase in 15-Mile Reach flows in August through October (Reclamation, 1997).

Increase Grand Valley Power Plant tailrace contributions. Some of the above-mentioned increase in 15-Mile Reach flows would be contributed from the tailrace of the Grand Valley Power Plant. If canal improvement are made, the Grand Valley Water Users' Association reduced demand for irrigation diversions makes room in the Government Highline Canal for deliveries to the Power Plant. A combination of natural river flow diversions and deliveries of water from Green Mountain Reservoir under the proposed surplus water agreement accounts for the increased tailrace contributions to 15-Mile Reach.

Increase availability of surplus HUP water. Analyses for the Orchard Mesa Check Settlement showed that an average of 28,000 AF of water remained in the HUP of Green Mountain Reservoir on November 1. Historically, Reclamation has released this surplus water to generate power throughout the winter months. Conserving water supplies resulting from the canal improvements would reduce amounts of HUP released to meet the Association's irrigation diversion demand, thus increasing the November 1 HUP content. In some years, this could include all of the Association's reduced diversion demand (i.e. up to 19,400 AF).

For the dry years analyzed (1992 and 1994), the amount of HUP water increased by more than 11,000 AF, even after surplus water was delivered to the Grand Valley Power Plant. Less surplus water was released to the Grand Valley Power Plant with the canal improvements than if they had not been made. In the wet year (1993) model runs, river flows were sufficient to meet the Association's irrigation and Grand Valley Power Plant diversion needs without releasing any HUP water. The entire pool (66,000 AF) was surplus, whether or not the canal improvements were made.

Alternatives and recommendations for release of additional 'surplus' water supplies to benefit recovery of the fish are expected in September, 1998.

Flows below the 15-Mile Reach. For the two dry years of the hydrologic analysis, the expected increase in 15-Mile Reach flows would also result in a slight increase in flows below the 15-Mile Reach. A much greater increase would occur in the wet year studied.

Selenium Contamination. While not initially suspected as a major factor, elevated levels of selenium contributed to Grand Valley waterways by irrigation drainage water is now under study as a possible contributing factor and/or a possible deterrent to successful recovery of the Colorado squawfish and razorback sucker. The water standards recently adopted by EPA and Colorado to protect fish and wildlife is 5 micrograms per liter (μg/l), which is equivalent to 5

parts per billion (**ppb**). Lower waterborne concentrations of 2 ppb or less have been demonstrated to be hazardous to fish and wildlife populations as selenium levels accumulates through the food-chain, causing harmful dietary toxicity and reproductive effects (Lemly, 1993). Levels of selenium found in water, sediment, food organisms, and fish and birds samples of Grand Valley drainages (Butler, et. al., 1994) often exceed the standards and guidelines. Comparisons of daily spill data from the canal against coincidental flow data collected during sampling of the drainages show that spills accounted for 20-40 percent of late summer flow in the affected washes. As spills are eliminated, selenium concentrations wash flows would increase. At the same time, increasing 15-Mile Reach flows would dilute concentrations in the river environment. However, no measurable reduction in selenium concentrations in the river environment is expected.

Aquatic Species

Occurrence and Life Requisites

The **humpback chub** (*Gila cypha*) is endemic to the Colorado River Basin and is part of a native fish fauna that has been traced to the Miocene epoch in the fossil records (Minckley et al., 1986). Documented distribution of the humpback chub includes portions of the mainstem Colorado River and four of its tributaries: the Green, Yampa, White and Little Colorado Rivers. However, its original distribution is not known with certainty due to its relatively recent discovery in remote Canyon locations (Miller, 1946). The largest populations of the species occur in the Little Colorado and Colorado Rivers in the Grand Canyon and in the Black Rocks area of the Colorado River below the Grand Valley. Other Colorado River populations have been reported in DeBeque Canyon (above the Grand Valley) and Westwater Canyon, downstream in Utah (FWS, 1993). A reach of designated critical habitat on the Colorado mainstem begins at the Black Rocks area in Colorado, and extends downstream into Utah.

The historic range of the **bonytail** (*Gila elegans*) encompassed much of the Colorado River Basin (FWS, 1993). However, the bonytail is now extremely rare. A few adult fish have been taken from Lake Havasu and Lake Mohave in the lower basin, but no successful reproduction has been documented there. In the upper basin, few wild fish have been found in the last decade. A single bonytail was collected from Black Rocks on the Colorado River in 1984 (Kaeding, et al., 1986) and several suspected bonytail have been collected in the Colorado River within Cataract Canyon (Valdez, 1988). The State of Utah and the Recovery Program initiated a trial stocking of bonytail in the Colorado River near Moab in 1996. Success of that stocking is now being evaluated.

Historically, the **Colorado squawfish** (*Ptychocheilus lucius*) ranged from Green River, Wyoming to the Gulf of California, but the species is now confined to the upper basin mainstem rivers and larger tributaries (FWS, 1987). For the mainstem of the Colorado River, critical habitat has been designated within the 100-year floodplain from the Colorado River Bridge at exit 90 of Interstate 70 in Garfield County, Colorado to Lake Powell in Utah. Because of high

capture rates and year-round presence of adult squawfish, the Colorado River floodplain through the Grand Valley provides important habitat (Osmundson and Kaeding, 1989). Biologists have captured twice as many Colorado squawfish in the 15-Mile Reach as anywhere else in the mainstem river.

Adult Colorado squawfish inhabit eddies, pools, and other areas adjacent to the main current flow, and move into the main channel to feed (Haynes and Muth, 1982; as cited by Woodling, 1985). The main food of Colorado squawfish one year old and younger is invertebrates. Colorado squawfish gradually become piscivorous (eat other fish) as they mature (Woodling, 1985). Maximum weights can exceed 80 pounds, but in recent times, specimens weighing more that 15 pounds are rare (FWS, 1987a). The life phases of squawfish that appear to most critical include spawning, egg fertilization and development of larvae through the first year (FWS, 1997). Adult squawfish have been known to migrate 100 miles or more to reach suitable spawning habitat (Tyus and McAda, 1984). Spawning generally occurs in July and August, as water temperatures warm. Although the location of spawning areas in the Colorado River is not well defined, the presence of larvae below the 15-Mile Reach indicates it does occur (FWS, 1997). Young Colorado squawfish use shallow, quiet backwaters, adjacent to faster currents of big rivers. The 10 river miles below the 15-Mile Reach has been classified by the Basin Biology Committee as a 'young-of-the-year nursery area.' Overwintering adult squawfish in the Green River used specific reaches (Valdez and Masslich, 1989), using micro-habitat of low velocity to rest in midchannel slow runs and slack waters and feed in eddies and backwaters.

The **razorback sucker** (*Xyrauchen texanus)* was common in the upper Colorado River system until the 1950's. Designated critical habitat of the mainstem Colorado River extends from Rifle in Colorado to Westwater Canyon in Utah. Razorback sucker feed on small invertebrates and organic debris from the river bottom. Adults are associated with areas of both strong currents and slow backwaters. During spring spawning, they have been found over both sand bars and gravel/cobble bars. Prior to a rapid decline in captures in the Grand Valley in the 1980s, razorback suckers had been found in spawning condition in the 15-Mile Reach (FWS, 1993). From 1979 to 1985, Osmundson and Kaeding (1989) found that 76 percent (53 out of 70 individuals) of the razorbacks captured were found in the Grand Valley. From 1986 to 1988 only 3 fish were captured. In 1992, the Colorado Division of Wildlife located adult razorbacks stranded in small private ponds adjacent to the Colorado River between Rifle and DeBeque. In 1993, young razorbacks (less than 10 years old) were also located in these ponds; prior to this no evidence of recruitment of young razorbacks to small adult populations had been found (Osmundson and Kaeding, 1989).

Osmundson and Kaeding (1989) believe the 15-Mile Reach may be a concentration point for the razorback sucker to spawn during spring runoff, but they spend the remainder of the year in the downstream 18 river miles. Virtual absence of recruitment suggests a combination of biological, physical and/or chemical factors may be affecting survival of early life stages (FWS, 1997).

Preliminary results of Recovery Program studies indicate reproductive success and larval survival of razorback suckers is hampered by elevated concentrations of selenium Ongoing studies of razorback suckers being hatched and raised, using water and food from Grand Valley sites, indicate accumulation of selenium through food organisms seems to be the most important factor affecting hatch rates and survival of larval fish (personal communication with K. Holley, 1997).

Impacts on Aquatic Species

The predicted 10-11 percent increase in 15-Mile Reach flows in August through October represents an improvement to critical habitat intended to benefit the Colorado squawfish and razorback sucker. Effects of increased flows below the 15-Mile Reach would be diminished due to the contribution of Gunnison River and irrigation return flows. Increasing amounts of HUP surplus water resulting from the canal improvements increases potential for options under the Recovery Program study for release of additional surplus water supplies to uses that, indirectly, augment flows, in accordance with the Orchard Mesa Check Case settlement.

Presently, there is no definitive answer regarding the impacts of existing or post-GVWM selenium levels on the endangered fish species. Increases in flows should reduce concerns for selenium contamination in spawning or nursery habitat of the Colorado River of the Colorado squawfish and/or razorback sucker, since more water would dilute concentrations in the river. However, reduced concentrations would be very small and limited to the late summer months.

No data exists about endangered fish, of any age class, using habitat in the mixing zone where the affected washes join the mainstem river. Therefore, it is not known if reducing flows from the tributary washes would cause changes, such as increasing selenium levels in food organisms, that would harm the endangered fish.

No 'taking' of any of the endangered Colorado River fish species is expected as a result of the Proposed Action.

Terrestrial species

Occurrence and Life Requisites

No sightings of the **black-footed ferret** (*Mustela nigripes)* have occurred in the Grand Valley. Ferrets are associated with prairie-dog colonies, in upland habitat not be affected by GVWM.

Whooping cranes (*Grus americana)* roost in marshes, ponds and sloughs over 1 foot deep, loaf in wet meadows, and feed in grain fields morning and evenings. In the Grand Valley, a few whooping cranes experimentally introduced to a flock of sandhill cranes at Grays Lake in Idaho are seen as the flock migrates from its wintering grounds at Bosque Del Apache in New Mexico. This experiment ended unsuccessfully, without whooping cranes reproduction.

The **bald eagle** (*Haliaeetus leucocephalus)* is a fairly common winter resident. They historically nested in area river bottoms, but there are no known nesting pairs in the Grand Valley. Eagles were observed in May-June of 1995 and 1996 at areas along the Colorado River (White and Broderick, 1997). White (1996) also observed eagles at Highline Lake during April-July 1996 surveys. In the winter, bald eagles are occasionally seen at Highline Lake as it is usually ice-free, supports wintering waterfowl and fish, and receives minor recreational use.

Peregrine falcon (*Falco peregrinus*) numbers are increasing. They usually inhabit open country, preferably where rocky cliffs with ledges overlook rivers or other water that support high concentrations of birds--their principal prey (FWS, 1991). About 10 nesting pairs currently exist in or near the Grand Valley, of which more than half are along the Colorado River downstream from the Gunnison River confluence. A peregrine falcon was detected at Horsethief Canyon State Wildlife Area during the June 1995 survey (White and Broderick, 1997).

The endangered **southwestern willow flycatcher** (*Empidomax traillii extimus*) may also use riparian habitat along the Colorado River in the Grand Valley. One of many neo-tropical migrant bird species of current special concern, the flycatcher typically nests in dense, even-aged, multi-layered riparian communities (FWS, 1993). In Mesa County, four individuals were detected in a June 1997 survey using the upper end of Vega Reservoir (Arbeiter, 1997). The habitat, at elevation 7,960 feet, was dominated by native willow. Suitable breeding habitat may exist along the flooded riparian habitat of the Colorado River in the Grand Valley, at the lower elevations of 4,250-4,500 feet. White and Broderick (1997) reported observing individuals during 1995-96 breeding bird surveys of Reclamation's Colorado River Wildlife Area along the 15-Mile Reach.

Habitat used by the willow flycatcher is typically comprised of a dense willow mid-layer and cottonwood overstory. Some adaptation to the use of non-native tamarisk and Russian olive thickets, such as occurs in the altered riparian communities of the Grand Valley, has been noted. The flycatcher is less likely to forage in the narrow riparian communities of the affected washes. Along the canal, relatively little woody riparian vegetation is found; it is kept at a minimum by maintenance activities such as periodic herbicidal treatments and burning.

Impacts on Terrestrial Species

Hydrologic changes resulting from GVWM would have no effect on the black-footed ferret or whooping cranes. The amount of increased late summer flows in the Colorado River is not expected to have a measurable effect on riparian communities or wetlands in the river corridor, and would therefore have no effect on the peregrine falcon, bald eagle or willow fly-catcher. Decreased flows in the washes in August-October should not cause any decline in the riparian vegetation. Discussions with biologists suggest reduced flows may even improve conditions for communities in the washes as contributions from unnaturally high late summer canal spills are eliminated. GVWM is not expected to cause any measurable change in habitat along the canal.

Construction of the Highline Lake Pump Station and the seven canal checks is not expected to impact bald eagles, although winter construction at Highline Lake may temporarily disturb use by eagles and waterfowl. No impacts from delivery of additional water supplies to the Grand Valley Power Plant are expected.

No 'taking' of any of the terrestrial species is expected as a result of the Proposed Action.

Conclusions and Conservation Measures

The Proposed Action may affect, but not adversely affect, the Colorado squawfish and/or razorback sucker, and would not result in adverse modification to their critical habitat. GVWM would not affect the humpback chub, bonytail, black-footed ferret, whooping crane, bald eagle or peregrine falcon. It is unlikely the Proposed Action would cause any measurable change in potential habitat of these species. No 'taking' of any of the listed species is expected as a result of the Proposed Action.

Supplying conserved water supplies to the 15-Mile Reach would improve flow and habitat conditions in this important reach of occupied critical habitat for the Colorado squawfish and razorback sucker. It is a Recovery Program action. The scope of this assessment has not included consideration of effects associated with historic depletions from Government Highline Canal diversions and/or Green Mountain Reservoir operations. Reclamation expects the ongoing Intra-Service Consultation and resulting Biological Opinion to suggest Recovery Program measures needed to offset impacts associated with (post-GVWM) operation of these projects. Reclamation believes that GVWM should be considered a conservation measure, in and of itself, to offset depletive effects of diversions into the Government Highline Canal.

For construction of the Highline Lake Pump Station, construction boundaries would be established to reduce disturbance to bald eagles. Reclamation would 'stop work' if construction activities are thought to be affecting any of the listed species. Reclamation would then consult with the Service concerning measures needed to protect the affected species.

REFERENCES

Arbeiter, P. 1997. Southwest willow flycatcher survey, Vega Reservoir, Colorado. Bureau of Reclamation Memorandum, from Environmental Resources Group Chief, Grand Junction, Colorado to Regional Director, Salt Lake City, Utah dated November 17, 1997.

Bureau of Reclamation. 1997. Hydrology Analysis for the Grand Valley Water Management Draft Environmental Assessment. Bureau of Reclamation, Grand Junction, Colorado. 7pp.

Burt, C., S. Styles and M. Lehmkuhl. 1996. Government Highline Canal site description and general operations plan. Draft Memorandum to Bob Norman and Ram Dhan Khalsa, Bureau of Reclamation, Grand Junction, Colorado, dated August 26, 1996. ITRC- San Luis Obispo, California. 16pp.

Butler, D.L., W.G. Wright, D.A. Hahn, R.P. Krueger and B. Campbell-Osmundson. 1994. Physical, chemical, and biological data for detailed study of irrigation drainage in the Uncompahgre Project area and in the Grand Valley, West-Central Colorado, 1991-92. U.S. Geological Survey Open File Report 94-110. 146pp.

Fish and Wildlife Service. 1987a. Recovery implementation program for endangered fish species in the upper Colorado river basin. FWS Region 6, Denver, Colorado.

_____. 1990a. Bonytail chub recovery plan. FWS, Denver, Colorado. 35pp.

_____. 1990b. Humpback chub recovery plan. FWS, Denver, Colorado. 43pp.

_____. 1993. Section 7 Consultation, Sufficient Progress, and Historic Projects Agreement and Recovery Action Plan, Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. FWS, Denver, Colorado. 50pp.

_____. 1997. Biological Opinion for fish passage at the Grand Valley Irrigation Company Diversion Dam on the Colorado River. Memorandum from Assistant Regional Director, Denver, Colorado to Area Manager, Bureau of Reclamation, Grand Junction, Colorado dated August 19, 1997.

Haynes, C.M., and R. T. Muth. 1982. Identification of habitat requirements and limiting factors for Colorado squawfish and humpback chubs. Endangered Wildlife Investigations. Project SE-3-4. Work Plan 1. Job 1. Colorado Division of Wildlife. 43 pp.

Kaeding, L.R., B.D. Burdick, P.A. Schrader, and W.R. Noonan. 1986. Recent capture of a bonytail chub (Gila elegans) and observations on this nearly extinct cyprinid from the Colorado River. Copeia 1986(4):1021-1023.

Lemly, Dennis. 1993. Guidelines for Evaluating Selenium Data from Aquatic Monitoring and Assessment Studies. U.S. Forest Service Cold Water Fisheries Research Unit, Virginia Tech University, Virginia.

Miller, R.R. 1946. Gila cypha, a remarkable new species of cyprinid fish from the Colorado River in Grand Canyon, Arizona. Journal of the Washington Academy of Science 36:409-415

Osmundson, D.B. and L.R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the 15-mile reach of the upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final report to the U.S. Fish and Wildlife Service and U.S. Bureau of Reclamation, Agreement No. 7-AA-60-00410. U.S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, Colorado. 85pp.

Osmundson, D.B., Nelson, P., Fenton, K., and Ryden, D.W. 1995. Relationships Between Flow and Rare Fish Habitat in the '15-Mile Reach' of the Upper Colorado River." Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

Tyus, H. M., and C. W. McAda. 1984. Migration, movements, and habitat preference of Colorado squawfish Ptychocheilus lucius, in the Green White and Yampa rivers, Colorado and Utah. Southwestern Naturalist 29:289-299.

Valdez, R.A. 1988. The endangered fish of Cataract Canyon. Final Report prepared for the United States Department of Interior, Bureau of Reclamation, Salt Lake City, Utah. Contract No. 6-CS-40-03980. BIO/WEST Report No. 134-3. 94pp + appendices

Valdez, R.A., P.G. and W. Masslich. 1989. Winter habitat study of endangered fish - Green River. Wintertime movement and habitat of adult Colorado squawfish and razorback suckers. Report no. 136.2. BIO/WEST, Inc., Logan, Utah. 178pp.

Woodling, J. 1985. Colorado's little fish. Colorado Division of Wildlife. Denver, Colorado.

ATTACHMENT C
Environmental Commitments
Grand Valley Water Management

1. Temporary construction easements for canal improvements will avoid existing landowner improvements. Disturbed areas will be restored after construction is completed, and landowners will be compensated for damages. Measures will be taken on a case-by-case basis to minimize disturbances due to construction activities to residents.

2. Camp 7 spills and pump use at Highline Lake will be tracked. Spills at the Palisade Pipeline and Badger Wash will be measured. Net spill volumes will be annually reported.

3. Funds to construct the canal improvements will be appropriated under the Recovery Program, with the intent of supplying conserved water supplies to the 15-Mile Reach. The State of Colorado will commit funds to pay for increased annual operation and maintenance costs resulting from efficiency improvements to the Government Highline Canal system.

4. If determined necessary following consultation with appropriate agencies, Reclamation will obtain any necessary permits and/or approvals required by the Clean Water Act prior to constructing and/or operating the Palisade Pipeline and Highline Lake Pump Station.

5. Reclamation will stop construction if activities are thought to be affecting any species listed under the Endangered Species Act and consult with the Fish and Wildlife Service to determine measures needed to protect the affected species.

6. Reclamation will consult with the State Historic Preservation Officer to identify any measures needed to avoid adverse impacts to the historic character of canal system properties that are eligible for listing on the National Register. Prior to construction of the Palisade Pipeline and Highline Lake Pump Station, Reclamation will conduct a surface (Class 3) cultural resources survey over areas to be disturbed.

7. If future monitoring of bacterial levels at Highline Lake State Park show counts are exceeding public health standards, representatives from the Grand Valley Water Users' Association, Colorado Division of Parks, Colorado Division of Water Resources, Colorado Water Conservation Board and Fish and Wildlife Service will determine if operational changes relating to pumping and/or canal spill patterns are appropriate. The Association may only take measures that are consistent with water rights for the Grand Valley Project and that would not interfere with their ability to meet their customer's demands for irrigation water.

ATTACHMENT D
Distribution List

Grand Valley Water Management
Draft Environmental Assessment

INDIVIDUALS (Including landowners)
Thomas J. & Susan K. Bosko, Palisade, CO
Albertson Cattle Company, Fruita, CO
Sheryl Baughman, Grand Junction, CO
Charles Burt, San Luis Obispo, CA
City and County Airport, Grand Junction, CO
Ralph Clark, III, Gunnison, CO
Caryn Crague, Grand Junction, CO
T.F. Currier & Estate, et. al., Collbran, CO
Steven & Cynthia Garner, Fruita, CO
Grand Junction Public Finance Corporation, Grand Junction, CO
Grand Mesa Eggs, Inc., Grand Junction, CO
Bruce & Shirlon Griffith, Grand Junction, CO
Chester & Shirley Howard, Grand Junction, CO
Thomas & Miriam Karsten, Grand Junction, CO
Donald Kooker, Jr., Grand Junction, CO
Erasmo & Sandra Muniz, Grand Junction, CO
James O'Neal, Grand Junction, CO
John Parrish, Iowa City, IA
Don Pettygrove, Grand Junction, CO
Michael & Renee Phillips, Grand Junction, CO
Bruce Smith, Grand Junction, CO
Robert Sutherland, Grand Junction, CO
Ilda Young, Palisade, CO

ORGANIZATIONS
Audubon Society of Western Colorado, Grand Junction, CO
Club 20 , Grand Junction, CO
Colorado Environmental Coalition, Grand Junction, CO
Colorado River Boat Association, Grand Junction, CO
CREDA, Salt Lake City, UT
Mesa County Water Association, Grand Junction, CO
Public Service Company of Colorado, Water Resource Department, Denver, CO
Sierra Club, Palisade, CO
Trout Unlimited, Grand Valley Anglers, Grand Junction, CO
Upper Colorado River Commission, Salt Lake City, UT
Western Colorado Congress, Concerned Citizens Alliance, Grand Junction, CO

WATER DISTRICTS
Collbran Conservancy District, Collbran, CO
Colorado River Water Conservation District
    Eric Kuhn, Glenwood Springs, CO
    Mike Gross, Glenwood Springs, CO
Denver Water Board
    Hamlet J. 'Chips' Barry, Denver, CO
    Dave Little
Grand Valley Irrigation Company, Grand Junction, CO
Grand Valley Water Users Association
    Dick Proctor (Manager), Grand Junction, CO
    Board of Directors (10)
Mesa County Irrigation District, Palisade, CO
Northern Colorado Water Conservancy District, Loveland, CO (15)
Orchard Mesa Irrigation District
    Jim Rooks, Palisade, CO
    Board of Directors (5)
Palisade Irrigation District, Clifton, CO
Silt Water Conservancy District, Silt, CO
Ute Water Conservancy District, Grand Junction, CO

LOCAL GOVERNMENT
City of Grand Junction, Grand Junction, CO
Mesa County Planning Director, Grand Junction, CO
Mesa County Commissioners, Grand Junction, CO (3)
Mayor, Town of Kremmling, CO
Town Manager, Palisade, CO

RECOVERY PROGRAM
Henry Maddux, Director, Denver, CO
Ralph Morganweck, Implementation Committee, Denver, CO (8)
John Shields, Management Committee, Cheyenne, WY (6)
George Smith, Water Acquistion Committee, Denver, CO (5)
Larry Crist, Biology Committee, Salt Lake City, UT (8)
Connie Young, Information & Education Committee, Denver, CO (5)

SOVEREIGN INDIAN TRIBES
(contacts to be determined)

STATE GOVERNMENT
Colorado Department of Agriculture, Lakewood, CO
Colorado Department of Health, Denver, CO
Colorado Department of Natural Resources, Denver, CO
Colorado Department of Transportation, Grand Junction, CO
Colorado Division of Parks and Outdoor Recreation, Clifton, CO

Colorado Division of Water Resources, Denver, CO
Colorado Division of Water Resources, Glenwood Springs, CO
Colorado Division of Water Resources, Breckenridge, CO
Colorado Division of Wildlife, Grand Junction, CO
Colorado State Historic Preservation Officer, Denver, CO
Colorado Water Conservation Board, Denver, CO
Highline State Park, Loma, CO
Upper Colorado River Commission, Salt Lake City, UT

STATE LEGISLATORS
Gayle Berry, Grand Junction, CO
Tilman Bishop, Grand Junction, CO
Russel George, Rifle, CO
Sally Hopper, Denver, CO
Matt Smith, Grand Junction, CO
Bryan Sullivant, Denver, CO
Jack Taylor, Steamboat Springs, CO
Dave Wattenberg, Walden, CO

FEDERAL AGENCIES
U.S. Department of Agriculture
    Natural Resources Conservation Service, Grand Junction, CO
U.S. Department of the Army
    Corps of Engineers, Grand Junction, CO
U.S. Department of Energy
    Western Area Power Administration, Golden, CO
    " " " " Salt Lake City, UT
U.S. Department of the Interior
    Bureau of Indian Affairs
    Bureau of Land Management, Grand Junction, CO
    Fish and Wildlife Service, Denver, CO
    " " " " Grand Junction, CO (3)
    Geological Survey, Grand Junction, CO
U.S. Environmental Protection Agency, Denver, CO

CONGRESSIONAL DELEGATION
Senator Wayne Allard, Grand Junction, CO
Senator Ben Nighthorse Campbell, Denver, CO and Grand Junction, CO
Congressman Scott McInnis, Glenwood Springs, CO and Grand Junction, CO

June Mesa County Water Association Dec. 1956

OUTLINE OF CHECK CASE SETTLEMENT

Flint B. Ogle
Dufford, Waldeck, Milburn & Krohn, LLP

Point 1: Co-applicants (Orchard Mesa Irrigation District, Grand Valley Water Users Association and the United States) obtain a Final Decree for right to operate Check to "borrow" up to 640 c.f.s. from river and return it to the river above GVIC's headgate. This right of exchange was decreed with a 1926 priority date. This underlying decree will not be subject to future change or challenge, and is not subject to the retained jurisdiction provision mentioned in Point 6 below.

Effect: Allows Co-Applicants and USA to operate their systems as they have historically, borrowing water from the river to generate power or operate hydraulic pumps when they would otherwise be out of priority, and returning it to the river upstream of GVIC diversion. To the extent Check is operated to supply water to GVIC's 120 c.f.s. junior right during the period of time after GVIC calls for Green Mountain water when the water is delivered, benefits GVIC. Also benefits upstream Objectors, in that Check operation can reduce amount of water released from Green Mountain Reservoir Historic User Pool ("HUP") (thereby preserving the Green Mountain Contract Pool) and giving upstream juniors protection from downstream call which would occur if Green Mountain was exhausted.

Point 2: The United States agrees not to exercise its 400 c.f.s. power right (system constraint limits to 310 c.f.s. in practice) against any upstream junior water right, except when the Check is inoperable or when the Cameo rights or GVIC rights are diverting less than their full amount.

Effect: Lowers the level of Cameo call (total of rights diverting at Cameo) by 310 c.f.s. (from 2,260 c.f.s. to 1,950 c.f.s.). Requires Checking to generate power during period when USA power right would have historically been calling and in priority, rather than only when USA power rights falls out of priority. Benefits upstream Objectors by lowering total call from Cameo. To the extent less water is coming down, may result in slight diminution in water quality at Cameo in early season. Intent is that this is a trade off for better water quality later in the season (see Point 5 below).

Point 3: Co-applicants and GVIC agree not to call out upstream HUP beneficiaries, provided certain conditions are met.

Effect: Benefits upstream Objectors by insulating them from Cameo call. Harms Co-applicants and GVIC *if* the 66,000 HUP is exhausted before the end of the irrigating season. Forces OMID to operate the Check enough to stretch the 66,000 HUP through the irrigating season. Trade-off is that Bureau of Reclamation will attempt to release the entire 66,000 acre-feet HUP in all years (In average years in the past, as much as 30,000 acre-feet were left in Green Mountain). These increased releases will be used to generate power, and then released to the 15 Mile Reach, benefitting the endangered fish and improving water quality at Cameo in most years. See Point 5 below.

Point 4: While the settlement is operative, upstream Objectors agree not to pursue:

(a) issues regarding alleged waste and inefficiency of the Co-applicants' and GVIC's irrigation systems and practices;

(b) issues regarding the historical operation of the Check (i.e. trying to force constant operation of the Check for the benefit of upstream junior rights);

(c) attempting to limit the amount Orchard Mesa Irrigation District can deliver for irrigation to 125 c.f.s. (current delivery is in the 178 c.f.s. range);

Effect: Some believe the Objectors intended to pursue waste claims against Grand Valley irrigation entities, particularly GVIC. The settlement gives GVIC and others some security that those claims will not be raised while the settlement is in effect. The other issues listed were raised in the Check case. The settlement saved the Co-applicants the expense of fighting those issues at this time and protects them from a possible unfavorable outcome.

Point 5: Settlement implements the "Green Mountain Reservoir HUP Operating Criteria." Under the Operating Criteria, a "managing group" made up of the Bureau of Reclamation, Grand Valley irrigation entities, and others, will attempt to release all of the 66,000 acre-foot HUP every year. In very dry years (e.g., 1977), all 66,000 acre-feet may have been released anyway. However, in average and wet years, the entire 66,000 acre-feet would not have been released (e.g., in some years, 30,000 acre-feet may remain in Green Mountain Reservoir). The excess amount (over that which would be released just to meet HUP beneficiary demands) will be released as "HUP Surplus." The HUP Surplus water will be delivered under a no-cost contract to the Grand Valley Power Plant (or other non-consumptive locations), and return flows will be released to the 15 Mile Reach.

Effect: This was the primary benefit of the bargain to the Grand Valley entities. Having the entire 66,000 acre-foot HUP released every year is predicted to improve overall water quality at Cameo. In addition, the increase of flows to the 15 Mile Reach should take some of the pressure of providing water to the endangered fish off of the Grand Valley entities.

Point 6: The settlement gives the Water Court perpetual retained jurisdiction over the issue of whether the operation of the settlement is causing injury (including injury to water quality). If any party thinks operation of the Operating Criteria is causing injury (water quantity, water quality, or expansion of draw on HUP), that party may raise an objection. The parties will attempt to resolve the objection through discussion and, if necessary, arbitration. If that is not satisfactory, the aggrieved party may request redress from the Water Court. If the objecting party is successful at any of these stages, the Operating Criteria will be amended, if possible. If necessary, the Operating Criteria and other provisions of the settlement may be suspended, in which the case the Objectors would be free to raise the claims discussed in Point 4 above.

Effect: This is intended to be a safety valve for the Grand Valley. If the settlement is causing injury, and the injured party can establish that injury, the Operating Criteria and other parts of the settlement may be amended or suspended. If the settlement is suspended, the Grand Valley entities would likely return to today's method of operation.

Miscellaneous:

a. If a person or entity which is not a party to the settlement asserts a waste claim against GVIC, GVIC may elect not to be governed by the "no call" provision described in Point 3 above. If GVIC opts out, any party to the settlement may join in the waste action against GVIC.

b. A separate paragraph of the settlement agreement specifically states that no party to the settlement waives any right to challenge the validity or enforceability of the 1983 Green Mountain Operating Policy. This is intended to preserve the right to assert that the 1983 Operating Policy (which allots 66,000 acre-feet from Green Mountain for release to West Slope beneficiaries) violates the terms of Senate Document 80 (which authorized construction of Green Mountain and allotted 100,000 acre-feet for West Slope use).

Engineer to meet area water users, discuss new plan

Heather McGregor 7/19/96
Daily Sentinel

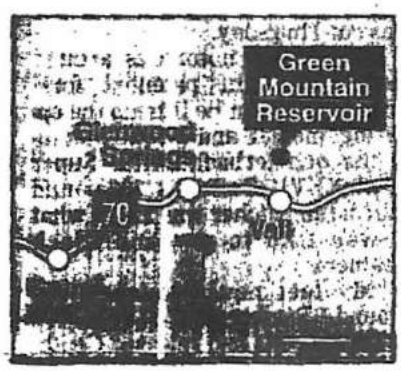
State Engineer Hal Simpson will be in Grand Junction on Monday afternoon to meet with water users and discuss his new policy, which appears to limit the rights of Grand Valley water users to water from Green Mountain Reservoir.

The meeting, sponsored by the Mesa County Water Association, is set for 5 to 6:30 p.m. at the Grand Junction City Auditorium, 520 Rood Ave. Simpson will meet earlier in the day with attorneys for the Grand Valley Water Users Association, Grand Valley Irrigation Co., the Orchard Mesa Irrigation District and the Clifton Water District.

Simpson's visit was prompted by a June 3 letter he wrote to Jack Garner, who manages Green Mountain Reservoir for the U.S. Bureau of Reclamation.

At issue is a pool of 65,000 acre-feet of water the bureau has determined to be adequate to meet the needs of Western Slope water users in the driest of years.

In the letter, Simpson states that senior water rights, particularly those held by Grand Valley irrigators, will not be able to [redacted] ior water rights once [redacted] acre-feet is drained [redacted]



reservoir.

Under Colorado water law, older senior water rights can call for water from younger junior rights when the river runs low. "First in time, first in right" defines the prior appropriation doctrine.

The rub is that Green Mountain was originally set up with a 100,000 acre-foot pool for Western Slope users. But in 1983, the bureau determined that since just 66,000 acre-feet were used in the record drought year of 1977, that's all that would be saved.

"All Hal is supposed to do is be the state's water cop. But he is adopting a federal regulation to [redacted] aid Flint [redacted] chard Me-

call and | control his actions," said Flint
junior ... once the | Ogle, attorney for the Orchard
66,000 acre-... | Mesa and Clifton water districts
from the

STATE OF COLORADO

OFFICE OF THE STATE ENGINEER
Division of Water Resources
Department of Natural Resources
1313 Sherman Street, Room 818
Denver, Colorado 80203
Phone (303) 866-3581
FAX (303) 866-3589

June 3, 1996

A. Jack Garner, Area Manager
United States Department of the Interior
Bureau of Reclamation
Eastern Colorado Projects Office
11056 West County RD 18E
Loveland, CO 80537-9711

RE: Green Mountain Reservoir Operating Policy

Dear Jack,

I am writing to you concerning the January 23, 1984 Operating Policy for Green Mountain Reservoir; Colorado-Big Thompson Project, Colorado. I believe there has been some uncertainty about the interpretation of paragraph 2 of that policy, as it relates to water rights entitled to releases without charge from the 100,000 acre-foot compensatory pool. Since, under paragraph 7, the Division Engineer for Water Division 5 is responsible for requesting the Bureau to release water from the 100,000 acre-foot pool, it is important that the State Engineer and the Bureau share a common understanding of the meaning of paragraph 2 and how I will exercise my administrative authority in connection therewith.

First, there has been some question about the meaning of the term "perfected by use." I interpret that term to mean that the water must actually have been placed to beneficial use on or before October 15, 1977. Therefore, water rights and conditional water rights made absolute by actual beneficial use by that date, whether decreed or undecreed, will be considered "perfected by use." The date of decree for a water right or decree making a conditional water right absolute is not relevant to whether actual use occurred on or before October 15, 1977. I consider a water court decree stating that a specific amount of water was put to use on or before October 15, 1977 to be conclusive proof of such use.

Second, the Operating Policy states that 66,000 acre-feet of water from the 100,000 acre-foot pool shall be "deemed adequate" to satisfy water rights perfected by use on or before October 15, 1977. That number is based on the amount of water recorded to have been released from storage to supplement natural flow shortage in western Colorado in 1977. In order to implement the Operating Policy, which was developed by a broad range of interests, including beneficiaries of Senate Document 80, it will be the policy of this office that after 66,000 acre-feet have been released from Green Mountain Reservoir in any water year for the benefit of "perfected uses," the use of water for West Slope domestic or irrigation purposes under any water right which is a beneficiary of Senate

Document 80 as implemented by the Operating Policy and which was perfected by use on or before October 15, 1977 will not be curtailed for the benefit of any valid senior call.

I understand that for a limited time the Bureau gave water users who had perfected their irrigation or domestic water rights between October 15, 1977 and December 22, 1983 an opportunity to enter into no-cost contracts for Green Mountain water; however, October 15, 1977 remains the date by which irrigation and domestic water rights not having a contract had to be "perfected by use" to be entitled to releases from the 66,000 acre-foot pool.

I have discussed the protection of irrigation and domestic water rights perfected by use between 1977 and 1984 with the Colorado River Water Conservation District. The District may be interested in entering into a no-cost contract with the Bureau for enough water to cover those rights. I would support such a contract as a way to enable those water users to share in the benefits of the 100,000 acre-foot pool.

As water users and environmental considerations place greater demands on Green Mountain Reservoir, I hope that this letter will avoid future misunderstandings about administration. I look forward to working closely with you to make optimum use of Green Mountain Reservoir for the benefit of the West Slope. Please feel free to call me at any time if you have questions or wish to discuss these matters further.

Sincerely,

Hal D. Simpson
State Engineer

HDP/db

cc: Jim Lochhead, Executive Director
Orlyn Bell, Division Engineer
Eric Kuhn, Colorado River Water Conservation District
Eric Wilkinson, Northern Colorado Water Conservancy District

STATE OF COLORADO

Colorado Water Conservation Board
Department of Natural Resources

721 State Centennial Building
1313 Sherman Street
Denver, Colorado 80203
Phone (303) 866-3441
FAX (303) 866-4474

MEMORANDUM

TO: Members, CWCB

FROM: Gene Jencsok
Randy Seaholm

DATE: July 8, 1994

SUBJECT: Agenda Item 17, July 19-20, 1994, Board Meeting--Endangered Species Recovery Program Activities: Grand Valley Water Management Study and "Saved\Salvaged" Water Issues

---

Introduction and Purpose

The Colorado River Endangered Fish Recovery Implementation Program Recovery Action Plan (RIPRAP) calls for an investigation of water conservation opportunities on the U.S. Bureau of Reclamation's Grand Valley Project near Grand Junction, Colorado. At its January, 1994 meeting, the Board approved an MOU between Reclamation, the State, Colorado River Water Conservation District, Grand Valley Water Users Association, Denver Water, and the Northern Colorado Water Conservancy District to conduct this $325,000 investigation. The purposes of the investigation are to:

1) identify possible modifications to the canal system and the manner in which it is operated that would conserve water without adversely impacting authorized water deliveries;
2) quantify the amount of water structural and operational modifications to the project could conserve;
3) identify uses of conserved water; and
4) identify the legal and institutional issues that need to be resolved to permit and protect the use of conserved water to enhance flows for endangered fish in the 15-mile reach.

The investigation has three phases. Phase I will analyze the canal system and provide recommendations for modifying the canal and operations, modification costs, and estimates of conserved water. Phase II will analyze the legal and institutional issues associated with using the

conserved water to enhance endangered fish flows in the 15-Mile reach. If a viable plan can be identified Phase III will consist of a feasibility study and NEPA compliance for implementing identified water conservation measures.

Progress to Date

Reclamation and the Grand Valley Water Users have provided **preliminary estimates** of how the Project water is used on both an annual and monthly basis. During the 1989-93 time period the annual values were as follows:

Grand Valley Project Net Supply	230,770 AF
Est. Main Canal Spill	51,476 AF
Est. Main Canal Losses	21,666 AF
Delivered to Laterals	157,628 AF
Est. Lateral Spill	16,554 AF
Est. Lateral Losses	19,764 AF
Est. Deliveries to Farms	107,878 AF
Est. Deliveries Yards & Livestock	13,432 AF
Total of all Spills and losses (51,476 + 21,666 + 16,554 + 19,764)	109,460 AF

It was noted that further lining of Grand Valley Project canals and laterals will help reduce the losses but not eliminate them as there will still be evaporation losses and some leakage. Installing canal check structures and improving operations will help reduce spills, but again some spill is inevitable. The group is still working on determining how much of the estimated 109,460 AF of spills and losses can be saved under various alternatives. But, it will not be possible to conserve all spills and losses.

With respect to the legal and institutional issues, the group has identified the following major issue areas:

I. Protection of the Grand Valley Water Users Association
II. Responsibility for Conservation Measure Construction and O&M Costs
III. Amount and Allocation of Native Flows Conserved
IV. Amount and Allocation of Green Mountain Storage Conserved
V. Coordinated Operation of Colorado River System Reservoirs
VI. Administrative Procedures & Costs
VII. Coordination with other Environmental Needs

Also, the group has identified several possible methods of making conserved water available to the 15-mile reach at this time.

A. Allow river administration to maintain current river call at Cameo leaving any excess flow to the 15-mile reach.

B. Share conserved water, delivering some to the 15-mile reach and leaving some available to basin water users.

C. Implement conservation measures and only call for actual needs at Cameo, any excess river flows arriving at Cameo automatically go to the 15-mile reach.

D. Establish a Conservation Pool in Green Mountain Reservoir, or other reservoir, into which conserved water can be stored and subsequently released as required to benefit the 15-mile reach.

E. Mutual Agreement among water users permitting delivery of conserved water to the 15-mile reach.

F. Provide storage for objecting water users in exchange for allowing conserved water to go the 15-mile reach.

G. Water Court action (summary judgement form) that would confirm that conserved water could be used in the 15-mile reach without changing the decrees.

I. Water Court action that would change decreed uses and allow water previously spilled or lost to be used in the 15-mile reach.

J. State Legislation that would allow conserved water to be used in the 15-mile reach.

K. Investigate the administrative possibility of allowing conserved water to be diverted but then spilled back to the 15-mile reach at some point after diversion.

While all concepts for protecting conserved water are under investigation at this time the group is strongly leaning toward some type of legislative approach at this point simply because it is perceived as a better way to solve this problem in the long run.

Staff will continue to participate in this investigation and keep the Board informed on the progress of the investigation. Staff would appreciate any guidance or comments the Board has on progress or alternatives under consideration at this point.

EIJ/DRS/lm 17.Jul

University of Colorado at Boulder

School of Law
Natural Resources Law Center

Room 160, Fleming Law
Campus Box 401
Boulder, Colorado 80309-0401
(303) 492-1286
Fax: (303) 492-1297

December 21, 1994

Ruth Hutchins
1574 L Road
Fruita, CO 81521

Dear Ruth:

Enclosed, at last, is a copy of the paper on the Grand Valley. It is one of six such papers we are doing on different areas of the West in association with fifteen case studies of specific Bureau of Reclamation projects around the West. The objective is to look at ways in which Bureau of Reclamation projects can be changed in their manner of operation to provide enhanced environmental benefits.

This is a lengthy draft. I hope you can find the time to take a look at it and give me back some comments. I am particularly struck by the fact that your system, the Grand Valley Irrigation Company, is not participating in the various processes underway at present that could have quite significant implications for you and the other users.

By the way, parts of this paper will be used in the chapter we are doing on the Grand Valley in our book on Water and Communities. A major addition would be to bring in the people living in the Valley, such as you.

My best wishes for the Holidays.

Sincerely,

Larry

Larry MacDonnell
Director

LJM/ad

Enclosure: The Grand Valley of Colorado (draft copy 12/20/94 - not for attribution)

The Grand Valley of Colorado

Larry MacDonnell[1]

final in Restoring the West's Waters: Opportunities for the Bureau of Reclamation Natural Resources Law Center (1996) Boulder Colorado, vol. 2

I.

As the Colorado River works its way west out of the Rocky Mountains in western Colorado, it cuts through a large, open expanse about 30 miles long and 12 miles wide known as the Grand Valley. Since the 1880s, water has been diverted from the river to irrigate farmlands in this valley. Construction of the Grand Valley Project by the Reclamation Service in the early 1900s greatly expanded irrigation activity in the valley, and a flourishing, largely agriculturally-based economy developed.

Today the Grand Valley is urbanizing. The city of Grand Junction, built at the confluence of the Colorado (originally the "Grand") River and the Gunnison River has a population of nearly 30,000, and subdivisions are filling in fields that once grew crops. Agriculture, virtually all of it irrigated, continues to be an important part of the economy of the valley, particularly the orchard lands in the higher, eastern end of the valley and the croplands in the more rural, western part of the valley. In total, there are about 70,000 acres of irrigated lands in the valley and, from a vantage point up on the high, red-colored sandstone ridge that is the Colorado National Monument, irrigated fields still dominate the landscape. To the north, beyond the irrigated areas, sage-covered desert lands that once covered the valley are still readily visible.

Water from the Colorado River created this mountain valley oasis. Getting the water from the river to the lands was no easy matter, however. As the Colorado leaves the confines of DeBeque Canyon and enters into the Grand Valley, its channel cuts down through the alluvial layers forming the adjoining lands. Not until the river is well into the valley does it

---

[1] Conrad Lattes, University of Colorado School of Law, Class of 1994, prepared an extensive paper on the Grand Valley Project as part of an internship under the supervision of Robert Wigington of The Nature Conservancy and in support of this project. The contributions of Robert Wigington to this chapter are gratefully acknowledged as is the extensive assistance provided by Robert Norman of the Bureau of Reclamation. Peter Johnson, Class of 1996, assisted with the footnotes.

make an arcing turn to the south, causing it to run almost even with its banks to the west and making it possible to divert water directly into a man-made channel for use on lands paralleling the river to the north. Not surprisingly, the oldest major ditch in the valley — owned by the Grand Valley Irrigation Company — has its headgates at this point. As the river turns once again to the west, it immediately moves back into a deeply cut channel, through which it continues to its junction with the Gunnison River and beyond.

Efforts were made to use water wheels and hydraulic pumps to lift water up to the bench lands, but the real opportunity, local developers believed, was in diverting water from the river upstream, in DeBeque Canyon, and building a canal that would bring the water to the considerable land areas not irrigable from the Grand Valley Irrigation Company Canal. This was an undertaking that exceeded the financial means of valley interests but was exactly the sort of effort that the Reclamation Service had been created to provide. The feasibility of the project was studied in 1908, and the President approved the project in 1911.

The significant, early commitment of the water of the upper Colorado River to irrigation in the Grand Valley remains the primary factor determining management of the river during the irrigation season. Irrigation diversions from the Colorado River for use in the Grand Valley average about 630,000 acre-feet annually.[2] While the drainage area of the Colorado River above the Grand Valley yields an average of more than 3 million acre-feet per year, diversion demands for irrigation in the late summer often equal or exceed flows in the river. [*get data] Known as the "Cameo Call" because of its location below the Cameo measuring gauge in DeBeque Canyon, divertible senior irrigation and power water rights for the Grand Valley collectively require the availability of 2,260 cubic feet per second of water to be in the river during the irrigation season. This "call" (the demand by downstream "seniors" for their full entitlement of water that requires upstream "juniors" to reduce or cease their diversions) typically begins in ___ and can stay in effect through ___.

Water development for irrigation in the Grand Valley has had a number of unintended consequences, including increased salinity, impacts on endangered species, and limitation of

---

[2] Bishop-Brogden Associates, Inc., An Analysis of Potential Irrigation Water Savings in the Grand Valley of Colorado, February 1994 at 3 (hereafter "Bishop-Brogden"). An additional 250,000 acre-feet of water is diverted during the irrigation season (April to October) for power purposes.

upstream water development. Subsurface soils in the Grand Valley once were part of the bed of a substantial inland sea. Irrigation return flows percolating through these so-called Mancos shales draw out the considerable salts that are residues of this sea. The loading of salts to the Colorado River from sources in the Grand Valley (not all caused by irrigation activity) is estimated to be 580,000 tons per year, about seven percent of the annual average salt load measured at Imperial Dam near the border with Mexico.[3]

Construction of the Grand Valley Diversion Dam for the federal Grand Valley Project totally blocked fish passage at this point of the Colorado River. Irrigation diversions in the summer months caused drastic reductions in streamflows of the Colorado River, particularly in the section below the headgate of the Grand Valley Irrigation Company to the confluence with the Gunnison River known as the "15-Mile Reach." These consequences of irrigation development in the Grand Valley contributed to the dramatic decline during this century of two species of fish native to this part of the river — the Colorado squawfish and the razorback sucker. In 1967, the Fish and Wildlife Service listed the Colorado squawfish as an endangered species[4] and, in 1987, the Upper Colorado River Endangered Fish Species Recovery Program was initiated.[5] The need for increased flows through the 15-Mile Reach has been identified as an objective of the recovery program.[6]

Upstream demands on the Colorado River have increased markedly during this century. Perhaps most dramatic have been the transmountain diversions taking water out of the Colorado River Basin on the west side of the Continental Divide for use in the Front Range of Colorado. Private irrigation interests constructed small structures moving water across the mountains beginning in the late 1800s, and large scale diversions began with construction of the Moffat Tunnel by the City of Denver during the 1920s and with the

---

[3] Dept. of Interior, Bureau of Reclamation, Grand Valley Unit Final Environmental Impact Statement at S-1 (1986)(hereafter Grand Valley FEIS).

[4] 32 Fed. Register 40001 (March 11, 1967).

[5] U.S. Department of the Interior, Fish and Wildlife Service, Recovery Implementation program for Endangered Species in the Upper Colorado River Basin, September 1987 (hereafter "Recovery Implementation Program").

[6] U.S. Bureau of Reclamation, Study of Alternative Water Supplies for Endangered Fishes in the 15-Mile Reach of the Colorado River (Jan. 1992) at 2 (hereafter "Alternative Water Supplies").

construction of the Colorado-Big Thompson Project by the Bureau of Reclamation in the 1940s.[7] Beginning in the 1950s, recreational development in the headwaters of the Colorado River mushroomed; world class ski areas and resorts support a strong and growing economy. Water is in demand for snowmaking in the wintertime and to meet the needs of the permanent and visiting population.

In short, the circumstances that so clearly favored the dedication of much of the water of the Colorado River in Colorado to agriculture in the Grand Valley have changed. Other interests have emerged and are expressing a desire for modifications in water uses that will allow these interests to enjoy more of the benefits of the river. This chapter explores the commitment of water to the Grand Valley and considers opportunities for broadening the beneficiaries of this water.

II.

By treaty ratified by the U.S. Senate in 1863, the Ute Indians in Colorado ceded claims to lands east of the Continental Divide, but were given dominant rights in the western part of the territory. A subsequent treaty in 1868 established a reservation for the Utes in western Colorado that was to be their exclusive territory. In 1879,?* disgruntled Utes in northern Colorado killed Nathaniel Meeker, at that time Indian agent on the reservation and formerly founder of the Union Colony at Greeley, Colorado. In response, the U.S. decided in 1880 to remove the Utes from all of western Colorado except for two small reservations in the southwest corner of the state. In August 1881, Utes residing in the Grand Valley were forced to move to the Uintah Reservation in Utah. Settlers immediately came into the valley and laid out claims to land.[8] According to one account:

---

[7] Daniel Tyler, The Last Water Hole in the West (University Press of Colorado, 1992).

[8] The Grand Valley was considered as a site for a reservation but, according to one source, was viewed as more valuable for settlement by the U.S.: "Mr. Mears [one of the U.S. commissioners sent to survey the valley as a possible reservation location] at once saw that, for the benefit of Colorado, it would be better to keep the Indians out of the state, as the land in the Uncompahgre and at Grand Junction would become very valuable, if settled by whites." Jerome G. Smiley,ed., vol. 2 Semi-Centennial History of The State of Colorado (Chicago: The Lewis Publishing Company, 1913) at 441.

> In the early days of September 1881, a bugler for the U.S. Army issued a series of shrill blasts signalling that the land that had once belonged to the Ute Indians was now open for settlement by the whites. The bugle had barely silenced when the stampede began: a flood of settlers entered the Grand Valley. This multitude soon demanded a supply of water to transform the barren land into towns, farms, ranches, and orchards.[9]

Work began on the Grand Valley Ditch later that same year, and on the Pioneer Ditch and the Pacific Slope Ditch in 1882.

The story of irrigation development in the Grand Valley is reminiscent of irrigation development in many other parts of the West. Small ditches serving the most accessible low-lying lands were built first, using largely local labor and capital. The far more ambitious Grand Valley Ditch went through a series of stages before and after reaching completion in 1884: work was begun in 1881 using local capital and labor; the project then was taken over in January 1883 and enlarged in scope by an ambitious promoter from the Gunnison area, Matt Arch; later that year, outside financial interests took over (first T.C. Henry and the Colorado and Trust in August 1883 and then the Travelers Insurance Company of Hartford, Connecticut in 1885); finally, in 1897, the private project turned into a water user-owned ditch company, the Grand Valley Irrigation Company (GVIC).[10] Today, GVIC provides water to about 38,000 acres of land and 3,000 users within its service area.

In the Grand Valley, as in most other places in the West, private efforts to get water to the higher elevation lands failed. Orchard Mesa is a good case in point.[11] Orchard Mesa is an elevated area of land about __ miles long and __ miles wide, sitting about ___ feet above the south side of the Colorado River in the east end of the Grand Valley. Fruit trees grow well on much of this land, and there had been at least five private efforts to pump water from the river up onto the benchlands that all ended in failure because the diversion facilities

---

[9] Don Davidson, "The Grand River Ditch," 1 J. of the Western Slope 1 (Winter 1986).

[10] Mary Rait, "Development of Grand Junction and the Colorado River Valley to Palisades from 1881 to 1938 - Part 1," 3 J. of the Western Slope (No. 3) 7, 16 (Summer 1988) (hereafter "Rait, Part 1").

[11] This discussion is drawn primarily from Mary Rait, Development of Grand Junction and the Colorado River Valley to Palisade from 1881 to 1931--Part 2, 3 J. of the Western Slope (No. 4) 4, 38-41 (Autumn 1988) (hereafter "Rait, Part 2").

washed out in high spring flows. Between 1909 and 1910, the Orchard Mesa Construction Company built a water diversion and delivery system taking water out of the river up in DeBeque Canyon, running the water through flumes and a canal along the south side of the river to a point where it was then pumped onto the mesa. The expense of constructing and operating the system made the cost of the water to the irrigators more than they could afford to pay. Faced with bankruptcy, the company transformed itself into the Orchard Mesa Irrigation District (OMID), a public entity formed under state law and authorized to assess a tax on all lands served with water within the boundaries of the district. In 1922, the Reclamation Service entered into a contract with OMID under which the U.S. would divert additional water at its diversion dam for the Grand Valley Project, split it off from its main canal and move it under the Colorado River in a reinforced concrete siphon to the 3.5 mile concrete-lined Orchard Mesa Power Canal. The Orchard Mesa Pumping Plant then would lift the water as much as 130 feet to the two canals on the mesa. About 8,600 acres of land are irrigated within the OMID.

The federally constructed Grand Valley Project itself grew out of a desire to be able to irrigate lands in the Grand Valley lying above and north of the lands irrigated out of the GVIC Canal. The Grand Valley Water Users Association formed in 1905 to promote this reclamation project, and signed a contract with the U.S. in 1913 agreeing to pay the costs of constructing the system. Much of the land to be served with water from the Government Highline Canal was still in public ownership.

The Reclamation Service constructed a 14-foot high, 546-foot-wide dam (Roller Dam) across the Colorado River, with six "roller" gates to control flows — the first dam of this type ever to be constructed in the United States. Water is diverted out of the west and north side of the river into a canal with a capacity of 1,675 cubic feet per second. The canal moves through three tunnels (with a portion of the flow siphoned off to the Orchard Mesa system under the river between the second and third tunnels). At the Price-Stubb Pumping Plant, water is made available to the Palisade Irrigation District (6,000 irrigable acres) and the Mesa County Irrigation District (2,000 irrigable acres). The Highline Canal, completed in 1917, extends 55 miles and carries water to about 23,300 acres of land within the Grand Valley Water Users Association. Despite assurances by valley interests in 1907 that the cost of the

system would be paid to the U.S. within three years after completion, irrigators within the Water Users Association did not begin payments until the contract had been renegotiated in 1928 to extend the payment period to 40 years, to deduct $812,000 from the original repayment cost, and to establish a reduced annual charge for the first five years.

III.

No orchards now grow in the vicinity of the town of Fruita, located toward the west end of the Grand Valley, but when William E. Pabor, another alumnus of the Union Colony, founded the Fruita Town and Land Company in 1883, he planted apples, pears, peaches, cherries, plums, and grapes with such success that by 1886 a five-acre plot was selling for $500.[12] Pabor, an avid promoter of agriculture in Colorado, was moved to write:

> Fair Fruita in the sunshine lies,
> The fairest village 'neath the skies;
> Broad sweep of fertile land around,
> Where prosperous farmer homes abound;
> Home of the almond, apple, peach,
> And vines, whose purple clusters teach
> That bounteous Nature offers here
> A generous summer with each year.[13]

Despite Pabor's optimism, there is something incongruous about growing peaches in Colorado. And yet they do grow — in most years, very well. They grow best in the eastern part of the valley, the area around the town of Palisade, on the higher lands that enjoy the benefits of the fact that warm air rises. The growing season on these higher areas averages 187 days a year, compared to the 140 day growing season in the lower part of the valley west

---

[12] Steven F. Mehls, The Valley of Opportunity: A History of West-Central Colorado (Bureau of Land Management, 1988) at 145.

[13] William E. Pabor, Wedding Bells: A Colorado Idyl 118 (1900).

of Grand Junction.[14] The early promise of a valley filled with orchards has yielded to the realities of growing fruit in a mountain valley with elevations between 4,000 and 6,000 feet, but fruit remains an important part of the agricultural economy in parts of the Grand Valley today.

Beyond problems with climate, fruit production in the Grand Valley suffered from salinity in the soils and from pests and disease. Salinity long has plagued irrigated agriculture. To a considerable degree this is a problem that can be managed through good drainage practices, but in the Grand Valley (and in most irrigated areas of the West) drainage simply was not considered until problems appeared. In retrospect, it is not surprising that lands accustomed to receiving perhaps eight inches of moisture per year would not necessarily adapt well to receiving four or five feet of additional water as a consequence of irrigation. In the Grand Valley, as mentioned above, the particular problem was the Mancos shales. The soils of the valley are primarily alluvial in origin and are underlain by the shales. With the addition of large amounts of water to the lands beginning in the 1880s, groundwater levels started to rise. A study by the Department of Agriculture in 1916 emphasized the increasingly saline character of the groundwater and concluded that successful crop production in the area would require keeping the water table far enough below the root zone to avoid salinity damage:

> In many instances the existence of a problem in the Grand Valley was first realized when some of the older apple orchards began to fail. Almost invariably the older trees in any particular orchard died first. Frequently the land upon which apples trees 15 to 25 years old had died and had been removed would be reset to apples and the younger trees appear to thrive for a period, sometimes for several years. These younger trees would then die and finally the owner would remove the orchard and plant the tract to alfalfa or small grain. It was not unusual for either of these crops to do well at first and sometimes for several years, although almost invariably the end has been the

[14] Nolan J. Doesken et al., "A Climatological Assessment of the utility of Wind Machines for Freeze Protection in Mountain Valleys," 28 J. Appied Meteorology 194, 195-96 (March 1989).

> same, i.e., the land finally became unproductive. In some cases the trouble has so far developed as to cause the land to be entirely abandoned.[15]

Between 1917 and 1921, the Reclamation Service constructed drainage ditches for the Grand Valley Project that also benefitted lands within the Grand Valley Irrigation Company.[16] In 1923 irrigators in the valley voted to levy an assessment on their lands to pay for the installation of additional drainage ditches. The work was essentially completed in 1930.

Particularly devastating to the apple orchards in the valley early in the century was the coddling moth. Eggs laid by the moth turned into worms which then infested the apples. Despite spraying lead arsenate on trees as many as 10 to 12 times a year in the mid-1920s, worm damage continued.[17] A federal requirement established at that time under the 1906 Pure Food and Drug Act required removal of lead from all agricultural products before shipping, a process that itself damaged the fruit and added considerable expense until automated means were devised.[18] In 1927 one state official estimated that the orchard areas in the valley had decreased by 40 percent since 1915, while the cost of spraying had increased by 365 percent.[19]

Peach orchards in the 1930s and 1940s were devastated by the budmite-transmitted Peach Mosaic Virus. The only effective means of control is to remove and burn infected trees. Between 1935 and 1949 over 125,000 peach trees were removed from orchard lands in the Grand Valley.[20] Nevertheless the Grand Valley remains an important producer of peaches, with most of that production centered in the Palisade area.

---

[15] Dalton G. Miller, The Seepage and Alkali Problem in the Grand Valley, Colorado, U.S. Department of Agriculture, March 1916 at 15.

[16] Rait, part 2 at 44-45.

[17] Merton N. Bergner, The Development of Fruita and the Lower Valley of the Colorado River from 1884 to 1937 (1937) (unpublished MS thesis, University of Colorado, Boulder) at 33.

[18] Rait, part 1 at 45.

[19] Id. at 46.

[20] Joyce Sexton, History of the Fruit Industry in Mesa County, Western Colorado Horticultural Society Proceedings (1987) at 96.

DDT and other high potency pesticides brought the codling moth and other pests under control. Today, spring frosts are the primary factor limiting fruit production in the Grand Valley. Record cold temperatures in the winter of 1962-63 killed more than 100,000 peach trees, and in the spring of 1989 a severe frost caused the most complete bud kill in the valley's history. Wind machines that mix in warmer air from higher elevations now are common in the peach orchards, replacing smudge pots used in the past.

IV.

Imagine an inland sea covering at times much of the continental land mass of what is now western Colorado, a sea coming in from the north and, at one period, extending all the way to what is now the Gulf of Mexico. Such was the state of the Earth during a period geologists call the Cretaceous, approximately ___ million years ago. The Mancos shale that is the product of this period underlies the entire Grand Valley, outcropping in the Book Cliffs that form a distinctive northeast boundary for the valley. The sandy shores of this sea are now the Dakota Sandstone formation, and the Mancos shales are remnants of "the shells and skeletons of innumerable marine animals: coiled ammonites, giant oysters, clams, and swimming reptiles."[21] This area is the easternmost extension of the Colorado Plateau, with its uplifted sedimentary layers still remarkably horizontal though deeply carved by water. Somehow this plateau escaped the mountain building processes that occurred in the Rockies to the east and the Sierra Nevadas on the west.

As already discussed, the salinity of these shales created problems with growing crops in parts of the Grand Valley around the turn of the century, problems that were largely addressed by the construction of a substantial drainage system. In effect, however, the problem was just transferred downstream. There are many sources of salinity feeding into the Colorado River: nearly half of the salts found in the river at Hoover Dam are thought to come

[21] Halka Chronic, Roadside Geology of Colorado (Missoula: Mountain Press Publishing Co. 1980) at 256.

from natural sources while 37 percent result from irrigation.[22] Salinity affects the quality of the drinking water that comes from the Colorado River in the Lower Basin and also makes the water less desirable for other domestic, municipal, and industrial uses. It can limit the types of crops that can be grown as well as the yield of those crops. In 1961, when highly saline drainage water from the Wellton-Mohawk Division of the Gila Project in Arizona pushed salinity levels in the Colorado River at the Mexican border to more than 2,000 parts per million of total dissolved solids, damage to crops in the Mexicali Valley caused an international incident.[23]

One response to this incident was the passage of the Colorado River Basin Salinity Control Act in 1974.[24] This law provided federal funding to construct projects in the basin that would reduce salt loading to the Colorado River. One of these projects became the Grand Valley Salinity Control Unit. The original plan called for actions that were expected to reduce salt loading to the river by as much as 410,000 tons annually.

Stage I of the Grand Valley Salinity Control Unit was essentially completed in 1983. The effort focused on a 6.7 mile section of the Government Highline Canal in the western part of the Grand Valley. The canal was lined, and diversion structures for laterals were rebuilt. In addition, 34 miles of open dirt laterals were transformed into about 30 miles of plastic pipe. In Stage II, 38 miles of the canal in the eastern part of the valley are being lined with polyvinyl chloride; 144 miles of open ditch laterals are to be replaced by pipes.

The salinity control project brought permanent change to irrigated agriculture in the Grand Valley. Because that change is still underway, it is difficult to assess its full implications. One immediate effect was that irrigation activities in the valley, practices that had been in existence with virtually no change for 50 to 70 years or more came under intense scrutiny. A system, or more accurately a collection of systems, that had met their clear objective when they were designed and constructed of providing a reliable and low cost

---

[22] Taylor O. Miller, Gary D. Weatherford, John E. Thorson, The Salty Colorado (The Conservation Foundation 1986) at 5.

[23] Id. at 24.

[24] Publ L. No. 93-320, 43 U.S.C.§ 1571.

supply of water for irrigation were found to be antiquated and even harmful. The good news, however, was that federal assistance was available to fix the problem — the irrigators themselves would not be responsible for making changes. In fact, the even better news was that the "improvements" that would be made to their water delivery systems would actually make things better for the irrigators themselves since the water would be better "managed": leaky portions of the main canals would be lined; check structures (gates regulating the depth and flow of water in a section of the canal) would be built; new diversions structures for laterals would be constructed and the old dirt laterals would be replaced with piping; trash cleaners would be installed to keep the water free from branches, leaves, and other debris; water delivered through the pipes would be under pressure, allowing irrigators to install more modern irrigation equipment such as surge systems or sprinklers that could take advantage of this pressure. Moreover, funds would be available through the Department of Agriculture to cost-share on-farm improvements that would reduce drainage.

But things are rarely what they seem. The original plans for reducing the loadings of salts from the Grand Valley were considerably scaled back. [*describe]

The need for agreement among the irrigators within each of the systems that would be altered under the salinity control program revealed some of the deep splits that existed between water users on the same laterals, between some of the water users and management of their water supply organizations, between different organizations, and, of course, between the local community and the federal government. The Bureau of Reclamation, the federal agent for carrying out much of the salinity control program, wanted a single written agreement with each of the organizations within which improvements were to be made. Such agreement proved impossible to achieve within the Grand Valley Irrigation Company and was not easily obtained from the three entities receiving water from the Government Highline Canal: the Grand Valley Water Users Association, the Palisade Irrigation District, and the Mesa County Irrigation District.

While the main canals are owned and managed by the water supply organizations in the Grand Valley, the laterals generally are owned by the water users. Once water is delivered to the diversion structure for the lateral, management of that water is left up to the users. In most cases, users on a lateral are not well organized. Only in the Grand Valley

Water Users Association system are deliveries of water to laterals based on orders or requests; in other systems, water is simply turned into laterals on the basis of the direct flow rights held by the users (e.g. if the sum total of the flow rights held by users on a lateral is x cubic feet per second, then a constant flow of x second feet is maintained in the lateral so long as sufficient water is available to do so).

For the most part, irrigators in the Grand Valley Water Users Association who are on laterals now supplied from the improved canal and pipeline system seem happy with the changes. One unexpected effect is the flip-flopping of advantages and disadvantages of location on the lateral. In the old earthen ditch system, irrigators at the head of the system enjoyed first crack at the water and could be sure to get their water if any flowed into the ditch, while those at the end of the ditch might sometimes find themselves with little or no supply. With water in pipes, irrigators at the end of the lateral find that they have the best pressure and a full supply while those at the top of the system do not have much pressure to take advantage of. The cleaner water makes use of siphon tubes and surge systems easier since there are fewer obstructions to be cleared. The improved on-field irrigation systems tend to be much less labor intensive than the traditional methods used in the area.

Through Fiscal Year 1993, federal investment in salinity control in the Grand Valley totaled over $123 million.[25] As a result, annual salinity additions from the Grand Valley are estimated to have been reduced by 85,766 tons.[26] Is this a good investment? Unsurprisingly, opinions vary considerably. Though estimates of actual damages from salinity vary widely, some believe that more has been spent in the Grand Valley on salinity control

---

[25] Personal communication from David Trueman, Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah, Oct. 28, 1994.

[26] Id. The on-farm efforts supported through the Soil Conservation Service are estimated to have produced salinity reduction of 61,500 tons per year. Salinity Update, March 1994, at 15.

than can be justified.[27] Indeed, it is hard to justify much of the now more than $___ that has been spent on salinity control in the Colorado River on a strictly economic basis.[28]

Nevertheless, the salinity control program has permanently changed irrigated agriculture in the Grand Valley. The opportunities to modify long-standing practices in a manner that reduces the need for the historical level of diversions are now well understood. Improvements made to date prove that lands in the Grand Valley can be irrigated with less overall demand on the Colorado River. Not surprisingly, in an era of growing demands for water, those who would like to enjoy the benefits of this Colorado River water are lining up. First in line after the irrigators themselves are upstream junior water rights and those wanting more water in the 15-Mile Reach for endangered fish.

V.

The west slope of the Rocky Mountains in Colorado is one of the great "water holes" of the West.[29] Moist air coming from the west struggles to hurdle the vertical barrier of these mountains, leaving behind large amounts of precipitation in the process. Particularly the wintertime snowfalls provide the source for much of the spring and summer surface flows in the many river and streams that are part of the Colorado River Basin. Many interests compete to claim these valuable flows of water, both within Colorado and in other, downstream states.

Except for irrigation in the Grand Valley, economic water uses within Colorado's West Slope were slow to develop. An early major claim that is still of great importance today is

---

[27] Richard L. Gardner and Robert A. Young, "An Economic Evaluation of the Colorado River Basin Salinity Control Program," 10 Western J. of Agricultural Economics 1 (1985); Richard L. Gardner and Robert A. Young, "Assessing Strategies for Control of Irrigation-Induced Salinity in the Upper Colorado River Basin," 70 American J. of Agricultural Economics 37 (1988).

In March 1994, the Bureau of Reclamation requested comments from the public about the salinity control program. Most of these comments were supportive of continuing the program, but several raised questions about a number of aspects of the program, including the Grand Valley Unit. See, e.g. Letter to Mr. Charles A. Calhoun from Glen A Miller, April 22, 1994; Letter to Charles A. Calhoun from Ruth P. Hutchins, April 27, 1994.

[28] Memorandum from Robert A. Young to Salinity Control Program Review, April 21, 1994.

[29] See Dan Tyler, The Last Water Hole in the West (1992) (hereafter "Tyler").

the diversion of up to 1,250 cfs of water from the Colorado River in the vicinity of Glenwood Springs to generate hydroelectric power at the Shoshone Power Plant. Originally known as the Glenwood Power Canal and Pipeline, this plant holds a 1905 priority water right for year-round operation. The size, seniority, and year-round nature of this water right cause it to dominate management of water in the Upper Colorado River.

Transmountain diversions, moving water out of the Colorado River Basin to the Front Range of Colorado, are the other major factor dominating use of Colorado River water in Colorado. Early transmountain diversions were relatively small in size and served to bolster water supplies for irrigation users.[30] The City of Denver through its Denver Water Board constructed the first large-scale transmountain diversion project taking water out of the Colorado River Basin.[31] Piggybacking on the construction of the Moffat Tunnel under the Continental Divide to provide direct rail service west from Denver through the mountains, the Denver Water Board brought water from the Fraser River, a tributary of the Colorado, through the "pioneer" bore for the Moffat Tunnel beginning in 1936. In the 1930s, Denver began construction of the Williams Fork system by which water from this drainage was brought to the Front Range.

Beginning in 1938, the Bureau of Reclamation began construction of the Colorado-Big Thompson Project.[32] The water supply for this major federal project was to be the Colorado River Basin, while the water use would occur on already irrigated lands in the northern portion of the Front Range. Completed in the late 1950s, as much as 310,000 acre-feet of water per year can be diverted from the collection system on the West Slope through the Alva B. Adams Tunnel for use on the Front Range.

Then, in the 1950s, Denver began construction of what is now its major source of water supply from the West Slope — Dillon Reservoir. With a storage capacity of about 250,000 acre-feet, the reservoir impounds the Blue River at the town of Dillon. Up to ___

---

[30] Robert Follansbee, Upper Colorado River and Its Utilization, Water Supply Paper 617, United States Geological Survey (1929) at 49.

[31] James L. Cox, Metropolitan Water Supply: The Denver Experience (1967) (hereafter "Cox").

[32] Tyler at .

acre-feet per year of water is moved through the Harold D. Roberts Tunnel to the Front Range.

In the 1960s, the Bureau of Reclamation constructed the Fryingpan-Arkansas Project.[33] This project was expected to bring about 72,200 acre-feet of water per year from the Fryingpan River on the West Slope to the Arkansas Basin.[34] Between 1982 and 1992 actual annual diversions averaged 53,500 acre-feet.[35]

The City of Colorado Springs has built two significant transmountain diversion projects moving water out of the Colorado River Basin to the Front Range. The first was on the Blue River. In 1993 the yield of this system was 11,658 acre-feet.[36] The Homestake Project which collects West Slope water out of the Eagle River drainage provided 25,900 acre-feet to the Colorado Springs water supply in 1993.[37]

Only in about the last 25 years have consumptive water uses on the West Slope of Colorado begun to increase significantly. In the late 1970s, the long-anticipated development of the oil shale industry at last appeared ready to become a reality. Companies engaged in this development aggressively pursued rights to the substantial quantities of water expected to be needed in support of this apparently massive industry.[38] These interests now are concerned with protecting the potential value of these rights, pending their future use — either in oil shale or, more likely, for other purposes.

Almost unnoticed in the boom (and bust) of oil shale development was the more gradual but significant growth occurring in many parts of the West Slope related to its scenic and quality-of-life attractions as well as its expanding recreational economy. The town of Aspen led the way, followed by Vail, Steamboat, Telluride, and a collection of areas in

---

[33] Frank Milenski, In Quest of Water (1993).

[34] Bureau of Reclamation, Water Management of the Arkansas River, Preliminary Draft, 10/5/93 at 2.

[35] Id.

[36] Personal communication from Philip C. Saletta, Supervising Resource Engineer, Colorado Springs Utilities, November 2, 1994.

[37] Id.

[38] Colorado Energy Research Institute, Water and Energy in Colorado's Future (Westview Press 1981).

Summit County. The brand new town of Battlement Mesa, constructed to house employees of the oil shale industry, transitioned remarkably easily to a retirement community. Growing needs for water in support of the expanding urban and recreational areas of the West Slope as well as for significant new uses such as snowmaking in the wintertime are making West Slope interests major players (in addition to those in the Grand Valley and those making transmountain diversions) in decisions respecting uses of Colorado River Basin water.

Demands for water in the Grand Valley have an important influence on water uses in the Upper Colorado River Basin. Efforts by the Orchard Mesa Irrigation District (OMID) to obtain a water court decree for operation of what is called "the check" illustrate well the nature of this influence. Water for lands within OMID is diverted at the Roller Dam, siphoned under the river, and moved through the power canal to the pumping plant where it is lifted up onto the mesa. The four hydraulically-driven pumps use about 272 cfs of water to pump 171 cfs of water used for irrigation.[39] The 272 cfs normally returns directly to the Colorado River through the plant tailrace. In addition, Public Service Company of Colorado constructed a hydroelectric generating facility at this location in 1933. Capacity constraints in the Grand Valley Project diversion system limit the operation of the power plant during the peak irrigation season to a maximum of 310 cfs.[40]

In 1926, the Grand Valley Project installed a radial gate "check" at the point where the tailrace enters the river and built a bypass channel allowing water to enter the Colorado River at a point about 100 yards further upstream. Motivation to build and operate this system came from the need to meet the senior priority of the GVIC system whose headgate is immediately above the point where the pumping plant tailrace joins the Colorado River. Thus, without the check in operation, return flows from the tailrace are not available to GVIC. During the late part of the irrigation season when natural flows of the river are low, the senior call of GVIC could reduce diversions at the Roller Dam. [insert figure showing the check about here]

---

[39] Robert E. Norman, Grand Valley Water Management Study: A Carrot or a Hammer? 1993.

[40] Id. at ___.

The ability to operate the check allowed the Grand Valley water users to work collectively to insure the availability of up to 2,260 cfs during the irrigation season at the Cameo Gauge (the "Cameo Call") even though the nine separate water rights have priorities ranging from 1882 to 1918. In the debate surrounding construction of the Colorado-Big Thompson Project, West Slope interests demanded "compensatory storage" to protect existing and future consumptive water uses in their area.[41] Green Mountain Reservoir, constructed on the Blue River near Kremmling, was added to the project to meet this demand. Senate Document 80, prepared in 1937 to accompany legislation authorizing the Colorado-Big Thompson Project, called for Green Mountain Reservoir to have a capacity of 152,000 acre-feet, with 52,000 acre-feet dedicated to "replacement" of water diverted out of the basin and 100,000 acre-feet for "power purposes" (to operate a hydroelectric power plant at the dam with the revenues going to help pay the cost of the project). Senate Document 80 specifically directed use of the 52,000 acre-feet as necessary to meet the 1,250 cfs diversion right of the Shoshone Power Plant; the 100,000 acre-foot pool also was to be available for meeting "existing irrigation and domestic appropriations of water, including the Grand Valley Reclamation project..." as well as future domestic and irrigation uses in western Colorado.[42]

Releases of Green Mountain water provide a critical part of the late season irrigation supply in the Grand Valley. Operation of the check reduces the amount of water that must be released from Green Mountain by enabling GVIC to meet its full demands (including its more junior 120 cfs right) with power return flows from Orchard Mesa. Even so, in the drought year of 1977, 66,000 acre-feet of water was released from Green Mountain to meet existing West Slope uses.

For many years, the Denver Water Board contested operation of Green Mountain Reservoir because it was perceived to threaten the yield from Dillon Reservoir.[43] As the consequence of a long series of court cases and negotiations, Green Mountain is recognized to hold a 1935 priority to store 160,000 acre-feet while Dillon Reservoir and the Roberts Tunnel

---

[41] Tyler at 51.

[42] Senate Document 80 at 3.

[43] This story is related in considerable detail in Tyler.

hold a 1946 priority (a storage right of 252,678 acre-feet and a direct flow right of 788 cfs). Thus Green Mountain has a better legal right to Blue River water than Dillon. The parties also agreed, however, that Denver could use its storage on Williams Fork to release water to the Colorado River in exchange for Blue River water it could store in Dillon. More recently, Denver helped finance construction of the Colorado River Water Conservation District's Wolford Mountain Reservoir on Muddy Creek, north of Kremmling. Denver will use its share of the yield of Wolford Mountain as releases to substitute for Green Mountain water it stores in Dillon Reservoir and transports to the Front Range.

In the efforts to settle the Orchard Mesa Check case, three interests have emerged as those potentially most affected: the so-called "preferred beneficiaries" of Green Mountain water, the Green Mountain contract water users, and the oil shale interests.[44] Preferred beneficiaries are those West Slope users with water rights that were diverting water by 1977 — considered to total 66,000 acre-feet of water. Contract users are those holding contract rights for delivery of water out of Green Mountain. About 10,000 acre-feet of water has been committed to date out of a designated pool of 20,000 acre-feet in Green Mountain. Oil shale interests generally hold junior conditional water rights with an appropriation date of 1955 or later.

Orchard Mesa is seeking approval to operate the check only as necessary to meet the senior GVIC right of 520 cfs, not the "enlargement" of about 120 cfs with a priority date junior to that of Orchard Mesa. In the 1980s, Orchard Mesa determined that the added expenses of operating the check only made sense when it was legally required to do so, and the Colorado State Engineer agreed that OMID was not obligated to operate the check in other circumstances. Studies indicate, however, that operation of the check reduces the need for releases from Green Mountain Reservoir by as much as 30,000 acre-feet in a dry year.[45]

Water uses in the Grand Valley affect upstream uses in the Colorado River Basin. Compensatory storage facilities for two Bureau of Reclamation projects, Green Mountain

---

[44] Personal communication from Glenn Porzak, Attorney, Holme Roberts & Owen, December 19, 1994.

[45] Colorado River Water Conservation District, Proposed Solution to the Orchard Mesa "Check" Problem, Draft, 9/22/88.

Reservoir and Ruedi Reservoir, help offset the depletive effects of the transmountain diversions out of the Colorado River Basin by these projects. The depletive effects of Denver's large-scale transmountain diversions are offset somewhat by releases from the Williams Fork and, now, the Wolford Mountain systems. Nevertheless, in a river with a native yield that substantially exceeds existing consumptive uses, there are many holding water rights who believe they would benefit from a reduced call from the Grand Valley. These interests certainly would favor reduced diversions in the Grand Valley, but they would prefer that the reduced diversions simply return to the river and become available to help supply the rights of junior appropriators.

VI.

Once, not so long ago, there lived a minnow in the Colorado River that grew up to six feet long and weighed as much as 80 to 100 pounds. That minnow, the Colorado squawfish, still inhabits the basin. But now it is an endangered species, occupying about 25 percent of its original habitat in the Colorado River and its tributaries. The largest of these fish today reach no more than half their original size. The squawfish and three other species native to the Colorado — the humpback chub, the bonytail chub, and the razorback sucker, thrived in a habitat that has been called by Philip Fradkin "A River No More".[46] In its "untamed" form as experienced by Major John Wesley Powell and his crew in their remarkable journeys down the Colorado in the 1870s, flows in the Colorado River peaked with the spring runoff — often flooding over its banks and scouring out its channel — and then declined slowly during the summer months. Sediment loads from the many tributaries feeding the river made the water turbid and brown-colored, particularly as the snowmelt dissipated. As the currents slowed and the air temperatures heated up in the river canyons, the water warmed.

Fradkin called the Colorado "A River No More" because of the dramatic changes wrought by the construction of ten major dams within the basin during the past 80 years by the Bureau of Reclamation. These dams capture and store the peak spring flows. Flooding in

[46] Philip Fradkin, A River No More: The Colorado River and the West (Knopf 1981).

the Colorado River basin now is an infrequent, though occasionally still spectacular, event. The dams transform the river, in many segments, into a series of lakes. As the sediment-loaded water backs up behind a dam, the sediments tend to drop out. While the surface area of the reservoir is exposed to the sun, the underlying waters are not. Thus water released from the reservoirs, drawn from this lower level, tends to be considerably clearer and colder than native river flows. Moreover, dams create insurmountable barriers to migration, effectively segmenting the river and potentially closing off access to spawning and rearing areas. Colorado River dams have created highly desirable trout habitat, and large numbers of introduced species of trout and other fish now reside in the river. Good habitat for trout, however, is not good habitat for fishes native to the river such as the Colorado squawfish — a fact underlined by the precipitous decline of these species since water development began during this century.

The Colorado squawfish was listed as an endangered species in 1967. Despite more than 25 years of study since that time, the biological requirements for recovery of the squawfish still are not fully understood. What is known is that the squawfish has entirely disappeared from the lower Colorado River basin, occurring now only upstream of Glen Canyon Dam.[47] Spawning occurs between July and September and appears to be closely linked to water temperature (which must reach or exceed 20 degrees C.). Eggs are deposited in coarse cobble beds that must be relatively free of sediments. Hatching and survival of the larvae are most successful under conditions where the water temperatures are even warmer. Upon hatching, the larvae apparently drift downstream, seeking backwater areas out of the river's current. In the fall and winter, the squawfish search out pools and other deepwater areas. Colorado Squawfish can migrate considerable distances — in one case, a documented distance of nearly 200 river miles between April and September.

In 1973, Congress passed the Endangered Species Act which, among other things, directed the Secretary of the Interior to develop and implement "recovery" plans for listed

[47] This discussion is taken largely from the Biological Opinion for the Muddy Creek Reservoir Project, Grand County, Colorado, Feb. 7, 1990, U.S. Fish and Wildlife Service.

threatened and endangered species.[48] The U.S. Fish and Wildlife Service formed the Colorado Squawfish Recovery Team in 1975 and expanded the scope of the effort to include all endangered fishes in the upper basin in 1976.[49] The energy boom in the late 1970s prompted a flurry of proposed water development projects in the upper basin, requiring the Fish and Wildlife Service to consider the effects of this water development on recovery of the listed fishes. According to Wydoski and Hamill, "[b]y 1984 the USFWS had issued nearly a hundred biological opinions, concluding that the site-specific cumulative effect of water developments and depletions was likely to jeopardize the continued existence of endangered Colorado River fishes."[50] The opinions, however, also proposed "reasonable and prudent alternatives" which, if implemented, would allow water development to go forward. In general, the "alternatives" included support for the activities of the recovery program and a suggestion that, so long as recovery was proceeding, so too could water development. In 1987, this approach was formalized in the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin."

As revised in 1993, the program contains seven elements, estimated to require funding of as much as $134 million between 1994 and 2004.[51] First, the instream flow needs of the fishes are to be identified and protected. Second, important habitat areas are to be restored and managed. Third, the adverse effects of nonnative fishes are to be reduced. Fourth, the genetic resources of the species are to be protected and managed. Fifth, monitoring and research are to be conducted as necessary to support recovery efforts. Sixth, education of the public is to be pursued through an active program of information dissemination. And seventh, overall planning and coordination of recovery program activities are to be pursued, as is obtaining adequate funding support. Participation in the Recovery Implementation Program

---

[48] 16 U.S. C. § 1533 (f).

[49] Richard S. Wydoski and John Hamill, Evolution of a Cooperative Recovery Program for Endangered Fishes in the Upper Colorado River Basin, ch. 8 in [] at 132.

[50] Id. at 133.

[51] U.S. Fish and Wildlife Service, Section 7 Consultation, Sufficient Progress, and Historic Projects Agreement and Recovery Action Plan--Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, Oct. 15, 1993.

includes, in addition to the Fish and Wildlife Service, representatives from the Bureau of Reclamation, from the states of Colorado, Utah, and Wyoming, from the water user community, and from the environmental community.

The Upper Colorado River is important habitat for the Colorado squawfish. At present, the upper limit of the habitat is the Grand Valley — apparently because of obstructions in passage presented by the diversion dam for the Grand Valley Irrigation Company canal, an old diversion dam for the Price-Stubb Ditch, and the Roller Dam for the Grand Valley Project. Relatively large numbers of squawfish have been found in the 15-Mile Reach, and the area has been identified as a "suspected Colorado squawfish spawning area." Consequently, the 15-Mile Reach has been a "focal point" of recovery efforts.[52]

For reasons that are not entirely understood, successful spawning by the Colorado squawfish is closely correlated with significant spring runoff periods. Possible explanations include the flooding of adjacent areas into which the squawfish move for feeding and warming prior to spawning, and the cleansing of gravel substrates utilized for egg incubation. Irrigation diversions for the Grand Valley markedly reduce flows in the 15-Mile Reach, potentially limiting access to adjacent backwater areas and limiting the flushing effect of the remaining flows. These effects are most pronounced during the months of July to September when diversions are the highest (and as flows naturally decline).

Efforts are being made to improve streamflows through the 15-Mile Reach. The Fish and Wildlife Service recommends flows in this stretch of between 700 and 1,200 cubic feet per second (cfs) during July, August, and September, with a 600-cfs floor in especially dry years. An analysis of historical flows in the reach suggests that an additional 47,000 acre-feet of water is needed to support this minimum flow objective.[53] The first increment of water to meet this need came from Ruedi Reservoir, a feature of the Fryingpan-Arkansas Project constructed by the Bureau of Reclamation on the Fryingpan River. This reservoir provides "compensatory storage" to offset the depletive effects of water removed the West Slope of

---

[52] Id. at 17.

[53] U.S. Bureau of Reclamation, Study of Alternative Water Supplies for Endangered Fishes in the "15-Mile Reach" of the Colorado River, January 1992 at 4.

Colorado for use in the Arkansas Valley on the Front Range. Water stored in Ruedi is not yet fully contracted to users on the West Slope, and the Bureau of Reclamation agreed in 1990 to release 5,000 acre-feet per year to enhance flows in the 15-Mile Reach, and committed an additional 5,000 acre-feet in four years out of five based on changes made in the operation of the reservoir. In 1991, the Bureau committed an additional 10,000 acre-feet from Ruedi.

A 1992 study by the Bureau of Reclamation examined additional sources of water potentially available for enhancement of flows in the 15-Mile Reach.[54] These sources included unallocated storage in Green Mountain Reservoir and Ruedi Reservoir, purchase and transfer of agricultural water rights, and improving the efficiency of water use within the Grand Valley. The least-cost alternatives identified in the study involved changes in the Grand Valley.

VII.

There is nothing particularly mysterious about how to reduce diversions of water for irrigation in the Grand Valley without necessarily reducing the amount of land growing irrigated crops. The GVIC Canal and the Government Highline Canal both are gravity systems, designed to run a bank-full quantity of water essentially throughout the irrigation season. At the headgates of the diversion from the Colorado River, the canal's full capacity of water is diverted. The physical capacity of the canal gradually diminishes throughout its length, roughly in proportion to the amount of water taken out through the various laterals along the way. If all goes according to plan, there is just enough water left in the canal at the last lateral to meet the needs of the irrigators. Operation is based on a continuous flow of water in the main canal and the laterals from which irrigators can draw at will, up to a maximum rate of diversion. It is a simple and relatively inexpensive system, suitable for areas with senior water rights and good water supplies.

---

[54] Id.

In such a system, a large amount of diverted water returns to the river never having been applied directly to irrigation use. It returns directly, through drainage ditches constructed specifically to allow spills of water from the canal, as necessary to regulate supply and demand in the system. It also returns as outflows from laterals from which not all water is diverted at farm headgates. This is the so-called "carriage water," water in the system necessary to ensure that the legally entitled maximum diversion rate of water is available at all laterals and headgates throughout the system. Operation of the system depends on this water; by design, large quantities of diverted water inevitably return to the river.

From an irrigation perspective, continuous-flow gravity systems make good sense. They are relatively cheap to build and operate, and they serve the needs of the irrigator by making available a full supply of water for irrigation on demand. Water that returns to the river then is available for diversion and use by other irrigators downstream.

In the case of the Grand Valley, however, it so happens that the diversions come out of the Colorado River above the 15-Mile Reach; most of the return flows do not reappear in the river until below this critical stretch. The Fish and Wildlife Service believes real benefits would accrue to the fish if diversions could be reduced and streamflows through the reach increased.

In water-short irrigation systems it is common for the water supply to be more actively managed. Actual demand for water is likely to be closely monitored. Irrigators may have to "order" water in advance of use, and use is limited to the time and amount ordered. Deliveries might be carefully measured, and the cost of water tied directly to the quantity used (perhaps using "tiered" pricing by which the unit rate increases as total usage exceeds specified quantities.) Water use may have to be "rotated" so that it is only available to laterals on different parts of the canal system at periodic, scheduled intervals. "Check" structures (gates installed in the canal to regulate the flow of water may be used to hold water in sections of the canal so that there is enough "head" of water in the canal (the water elevation in the canal) to enable diversions into laterals and headgates. There may be "reregulating" ponds or reservoirs located at points along the canal so that unneeded water can be stored and returned to the canal rather than permanently "spilled" out of the canal through drainage ditches or laterals. The canal itself can be lined with some kind of nonporous

material to prevent seepage of water. The laterals can be lined, or even converted into pipes, to enable more efficient delivery of water. And these improvements are all in addition to, and separate from, changes that can be made in the on-farm delivery and water application systems.

In fact, as described above, some of these changes already have been made in the Government Highline Canal and to laterals within the Grand Valley Water Users Association system under the salinity control program. Much more, however, could be done to this system to make it possible to reduce diversions at the Roller Dam. And the GVIC system operates little changed from the manner in which it was designed and built more than 100 years ago.

The issue is incentives. Who will pay to make the structural and management changes that would make it possible to reduce diversions of water from the Colorado River? Federal tax dollars and federal hydroelectric power revenues are paying the costs of making improvements in the Grand Valley Project to reduce salinity loadings to the river. As it happens, many of the changes made to the Government Highline Canal and laterals within the GVWUA are the same or similar to changes that would be made to reduce the amount of water diverted. The objective is to reduce salt-laden return flows, however, not to reduce total diversions from the Colorado River.

Why should the water users in the GVIC or the GVWUA be interested in reducing diversions of water that they have historically depended on to supply their needs? Why should they be interested in changing their traditional irrigation practices, in paying higher operating and maintenance costs for a more costly system, in perhaps having to pay for the water itself?

One answer might be that they may be legally required to do so. For example, upstream water users who are junior in priority might seek a judicial or administrative order compelling the reduction of diversions on grounds that the systems are "wasteful" as a matter of Colorado law. [The legal basis for this argument will be explored in Section VIII. below.] Or an action might be brought under the Endangered Species Act on the basis that these

diversions are "taking" endangered fishes by severely degrading critical habitat through irrigation diversions during low flow months.[55]

Alternatively, water users in the Grand Valley might be interested in reducing diversions if the costs of making the changes necessary to reduce the need for the historical amount of water were paid by those who would benefit from the reduced diversions. Thus, upstream juniors might be interested in helping to pay the cost of the changes if the benefits of a reduced Cameo "call," discussed above, exceeded the costs. Those desiring additional upstream water development might be willing to provide financial assistance if, either directly or indirectly, the reduced diversions would help to make possible more development. For example, increased flows in the 15-Mile Reach that would help to assure recovery of the endangered fishes presumably would make additional upstream water use possible. The State of Colorado might want to invest state funds in a program that would upgrade irrigated agriculture in the Grand Valley while helping to address the needs of endangered fishes. Finally, the U.S. Congress might be interested in investing federal funds to help remedy the adverse environmental effects of a federal reclamation program by improving valuable habitat for endangered fishes, and the U.S. Fish and Wildlife Service might wish to invest funds from the Upper Colorado River Recovery Program to increase flows through the 15-Mile Reach.

In short, there are many reasons to better manage water in the Grand Valley, and many interests with reason to invest in that objective. The opportunities to make structural and management changes that could reduce the need for the historical levels of water diversions are considerable, opportunities in addition to those possible through retirement of irrigated land and direct transfer of the water. It even seems possible that the money needed to make the changes would be available. The major limitation standing in the way of pursuing these opportunities is legal uncertainty concerning the status of the water that would be "saved" from diversion by making the changes. We turn next to this central issue.

VIII.

[55] Federico Cheever, "An Introduction to the Prohibition Against Takings in Section 9 of the Endangered Species Act of 1973: Learning to Live with a Powerful Species Protection Law," 62 U. Colo. L. Rev. 109 (1991).

An appropriative water right gives the holder a legal sanction to divert a maximum flow of water at a particular point of diversion for a described use at a specified location. Water rights are established under state law, and their use is governed by state law as well. The date when a water right is established — the priority date — is sometimes described as the most essential element of the right because it determines who gets to take water from a source when there is not enough to satisfy all valid appropriations.[56] The most senior users get to divert up their maximum rate of entitlement as long as the flow in the stream is sufficient. Junior users may not take any water if to do so would deprive a senior user of any part of its diversion right. Water rights must be used for beneficial purposes and in amounts reasonably necessary to achieve those beneficial purposes. A water right is a property right and may be sold or otherwise transferred to another holder. Its use may changed in purpose or place or point of diversion, so long as there is no injury to other water rights.

The water rights from the Colorado River for uses in the Grand Valley are listed and described in Table 1. The most senior of these rights is that held by the Grand Valley Irrigation Company. Collectively, these rights are sufficiently senior on the Colorado River that they can demand the availability of up to 2,374 cfs of water at the Cameo gauge in BeDeque Canyon during the irrigation season.[57] [How often do they place a call on the river?*] In [*many][*some] years this flow would not be available in the Colorado River at Cameo in the summer irrigation months if it weren't for the senior status of the Grand Valley water rights. Upstream water users with rights junior to the Grand Valley rights would be prevented from diverting any time the flows at Cameo go below the amount demanded under the call if water were not released from Green Mountain Reservoir.

Assuming changes were made that reduced the need for the historical levels of diversions into the Grand Valley from the Colorado River, the question is what would be the legal status of the "saved" water. Does its use remain under the control of the original diverter, or does the water simply return to be stream to be allocated by the priority system to

---

[56] Navajo Development Co. v. Sanderson, 655 P.2d 1374 (Colo. 1982).

[57] Steve Miller, Irrigation Water Salvage Issues in the Grand Valley of Colorado, Colorado Dep't of Natural Resources, Water Conservation Board, January 9, 1992 (Final draft) at 6.

junior appropriators? Does it make any difference whether the water right is held by the United States for a federal reclamation project? If, at least initially, the saved water is regarded as still legally available to the original appropriator, are there limitations on what the appropriator may do with this water? These questions are considered next.

A.

Analysis of a legal problem often involves the dissection of the subject matter into a number of pieces. Here, for example, to determine who has legal control over any saved water it is useful to consider first what the legal right to divert water entails and to further identify the legal status of the diverted water as it moves through the delivery system, is applied to direct use, and returns to a place where it is available to be taken and used by others. As already stated, an appropriative water right gives legal sanction to divert or withdraw, up to a maximum rate, that quantity of water necessary to accomplish the beneficial use for which the appropriation is made. The seniority of that right within a particular source of supply (e.g. the Colorado River in Colorado) determines the ability of the right to take from the river the full amount of water necessary to accomplish the beneficial purpose.

Direct flow water rights for irrigation (rights supplied directly out of the river rather than stored in a reservoir) are not described in terms of a volume or total quantity of water but in terms of a maximum rate of diversion. Typically, that maximum rate of diversion is the diversion capacity of the canal or ditch carrying water to the field, and the ditch is sized according to calculations about the number of acres of land to be irrigated and the expected "duty" of water: "that measure of water, which, by careful management and use, without wastage, is reasonably required to be applied to any given tract of land for such period of time as may be adequate to produce therefrom a maximum amount of such crops as ordinarily are grown thereon."[58] Since soil conditions vary from location to location (some types tending to hold water longer while others drain rapidly), the evapotranspiration needs of plants vary from crop to crop (alfalfa requires more water than beans), weather conditions change from year to year (some years it rains during the irrigation season while, in other years, it is

[58] Farmers Highline Canal and Reservoir Co. v. City of Golden, 272 P.2d 629, ___(1954).

hot and dry), the duty of water is "not a hard and fast unit of measurement, but is variable according to conditions."[59]

Use of water under a water right must be beneficial. Colorado law defines beneficial use as "the use of the amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made."[60] A court decree fixes the priority of the right and establishes the maximum rate of diversion, but beneficial use represents the ultimate "measure" of the right. Again, beneficial use is not a precisely measured quantity but is a reasonable amount of water under the specific circumstances of use. Just as the duty of water varies from crop to crop, soil type to soil type, weather condition to weather condition, so too does beneficial use.

Beneficial use is reasonable use "without waste." Numerous Colorado cases make this point.[61] Thus in 1908, the Colorado Supreme Court stated:

> The law contemplates an economical use of water. It will not countenance the diversion of a volume from a stream which, by reason of loss resulting from the appliances used to convey it, is many times that which is actually consumed at the point where it is utilized. Water is too valuable to be wasted, either through an extravagant application for the purpose appropriated or by waste resulting from the means employed to carry it to the place of use.[62]

And, in 1981, the Court stated that "[a]n implied limitation is read into every decree adjudicating a water right that diversions are limited to an amount sufficient for the purpose for which the appropriation was made, even though such limitation may be less than the decreed rate of diversion."[63] Moreover, a Colorado statute explicitly directs the division

---

[59] Id.

[60] Colo. Rev. Stat. §37-92-103(4) (1990).

[61] See Steven J. Shupe, "Wasted Water: The Problems and promise of Improving Efficiency Under Colorado Water Law, " in Tradition, Innovation and Conflict: Perspectives on Colorado Water Law (L. MacDonnell, ed. 1986) at 91-98.

[62] Town of Sterling v. Pawnee Ditch Extension Co., 94 P. 339, 341 (Colo. 1908).

[63] Rominicki v. McIntyre Livestock Corp., 633 P.2d 1064, 1067 (Colo. 1981).

engineer to "order the total or partial discontinuance of any diversion in his division to the extent that the water being diverted is not necessary for application to a beneficial use."[64]

In 1968, the Colorado Supreme Court first articulated the "maximum utilization" doctrine in a case involving attempted regulation of groundwater use.[65] The Court suggested that traditional notions of "vested rights" might have to give way to meet the larger need for full utilization of the state's limited water resources.[66] In particular, the Court noted that "the right to water does not give the right to waste it."[67]

As discussed, it is physically possible to irrigate the same acreage in the Grand Valley while diverting less water. Does this mean that the existing irrigation systems in the valley are wasting water? First, it would be necessary to determine that historical water use practices utilized in the Grand Valley are not reasonable. There is little guidance under Colorado law for evaluating reasonably efficient irrigation practices. Indeed there are no reported cases in which a court has been asked to examine a decreed water right and to evaluate its diversion right because of alleged inefficient irrigation practices.

There are Colorado cases, however, in which the historical means of diversion utilized by a water user have been challenged by a subsequent appropriator as unreasonable. For example, in City of Colorado Springs v. Bender,[68] a would-be groundwater developer challenged the right of a senior groundwater user in the same aquifer to continued use of his shallow well. The Colorado Supreme Court recognized the value of allowing more complete utilization of the groundwater but limited the duty of the senior appropriator to "whether he has created a means of diversion ... which is reasonably adequate for the use to which he has historically put the water of his appropriation."[69] If so, then actions by the junior that would

---

[64] Colo. Rev. Stat. §37-92-502(2)(a)(1990).

[65] Fellhauer v. People, 447 P.2d 986 (Colo. 1968).

[66] Id. at 994.

[67] Id.

[68] 366 P.2d 552 (Colo. 1961).

[69] Id. at 556.

require improvements to be made so that the senior can continue to receive his appropriation "should be decreed at the expense of the junior appropriator, it being unreasonable to require the senior to supply such means out of his own financial resources."[70] Any legal obligation to make improvements to one's "reasonably adequate" means of diversion must be evaluated in relation to the "reasonable economic reach" of the diverter.

In a world of increasingly competitive demands for limited water supplies, there is good reason to expect all water users to make only as much use of the water resource as is necessary for the purpose of use. An important policy question concerns the means by which this objective is to be achieved. Should water users be expected to change and improve water use practices as the technology and management skills to do so become known and available? Is this limited by some economic means test or by a cost/benefit evaluation? Or are practices to be evaluated in relation to when they were installed and to what is customary among other comparable water users?

Aside from the broad proscription against waste, Colorado law simply does not help to answer these questions. The beneficial use requirement by itself seems too general to have meaning except in the most egregious cases of waste, and the dearth of cases applying this standard to evaluating water use practices supports this view. Moreover, beneficial use under existing water rights must be determined on a case-by-case basis. Even assuming that irrigation practices under one set of facts are found to be unreasonable, what does this mean for other, somewhat different irrigation practices?

Nevertheless, there is value in the beneficial use requirement. Particularly if applied so as to require a contemporaneous standard, it puts water rights holders on notice that their rights to water remain subject to a continuing obligation to use only so much water as is necessary so that others may enjoy its benefits. As water, in many settings, becomes in higher and higher demand and therefore more valuable, there may come a time when a broad-based administrative program for requiring certain minimum standards for existing water uses will make sense. For new uses, that time is already here.

---

[70] Id.

Unfortunately there is absolutely no incentive under existing law for appropriators to invest in improvements that would reduce the amount of water that they presently divert and use. Indeed, if anything, the incentives are quite the reverse: to divert as much water as the water right allows because of the infamous "use-it-or-lose-it" requirement of prior appropriation law.[71] Under current Colorado law, an appropriator can benefit from changing his historical manner of operations only (1) by foregoing some or all of his previous use in order to transfer that use; (2) by "salvaging" water that had been diverted but lost to use; and (3) by more completely utilizing diverted water in a manner contemplated under the original appropriation. We discuss these options next.

B.

Irrigation water is diverted into a canal or ditch for the purpose of providing the moisture needed to grow field crops. In the process, some of the water evaporates; some is lost to seepage into the ground; some is lost to the transpiration needs of non-crop vegetation; some is needed just to carry the water to the crops. Measured on the basis of the amount of water actually consumed by crops compared to the amount of water diverted, irrigation efficiency of surface diversion systems in the West is probably less than 50 percent.[72] That is, less than half of the water diverted from streams in the West for irrigation is actually directly used by the crops themselves.

One way to increase the efficiency of use is to change the water use to a higher value one. The use of an appropriative water right can be changed, while maintaining the same priority, so long as other water rights are not harmed.[73] In general, the existing use must cease for the new one to be allowed. To assure the absence of injury, it is customary to limit the new use to the requirement that it not result in a net increase in depletion of water to the

---

[71] George W. Pring and Karen A. Tomb, "License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West," 25 Rocky Mt. Min. L. Inst. 25-1 (1979).

[72] Interagency Task Force, U.S. Dep't of the Interior, U.S. Dep't of Agriculture, and U.S. Environmental Protection Agency, "Irrigation Water Use and Management" (1979).

[73] Lawrence J. MacDonnell, "Changing Uses of Water in Colorado: Law and Policy," 31 Ariz. L. Rev. 783 (1989).

stream from that experienced under the original use. Protection of the stream flow conditions relied on by other appropriators also requires consideration of the timing of flows. Thus, traditional return flow patterns relied on by other irrigators may have to be maintained. As a shorthand, it is customary to think of a water transfer as involving that portion of the water historically diverted that was physically consumed (historical consumptive use) and therefore never available to downstream appropriators.

Water transfers are a valuable means by which some portion of existing water uses can be changed to meet new demands. Uses that can afford to go through the expensive procedures required to make a change of water right will necessarily be ones that value water, in an economic sense, higher than those presently using the water. Since water transfers are effectively limited to the historical consumptive use, however, they do not provide an incentive to improve water use efficiency by reducing the amount of diverted water needed to provide the original consumptive use.

A second option potentially available to an appropriator is to "salvage" water that has been diverted but subsequently lost to beneficial use. For example, phreatophytes such as willows or cottonwood trees may have grown up along irrigation ditches, along the margins of fields, or along the drainage ditches carrying water back to a stream. These phreatophytes consume water in their transpiration process, just as crops in the fields do. Removal of phreatophytes would eliminate this consumptive use of water, making it available for use by others.

Discussion of salvaged water in Colorado has been confused by failure to distinguish between salvage of water already diverted from the stream versus salvage of water outside the appropriation system. In the 1970s and 1980s, there were a series of schemes in Colorado attempting to claim a right to water based on reducing or eliminating consumptive uses of water occurring naturally in the hydrologic cycle. The first involved a plan to cut down cottonwood trees and other phreatophytes growing along the Arkansas River in order to claim a water right for the consumptive use that was eliminated.[74] Since this water was not available to other appropriators, it was argued that the water right should have a priority date,

[74] Southeastern Colorado Water Conservancy District v. Shelton Farms, Inc., 528 P.2d 1321 (1978).

in effect, senior to other water rights, rather than one based on the time salvage occurs. A second scheme involved elimination of certain ancient peat moss marshes to claim a water right to the quantity of water consumed.[75] A third approach proposed cutting down evergreen trees to gain a water right to the quantity of water that had evaporated from the snowfall that accumulated on the tree branches.[76]

The Colorado Supreme Court struck down all three of these schemes. Ultimately, the Court noted, these proposals "add nothing new; what was there was merely released and put to different use. ... To grant appellees an unconditional water right therefor would be a windfall which cannot be allowed."[77] The fundamental problem with this kind of water salvage is that it seeks to claim a water right where there had never been a water right before, a right that would, in effect, be more senior than all other existing water rights.

Another specific problem with such schemes, though one not recognized under Colorado law, is that this kind of salvage program would potentially have devastating effects on the natural environment. In the words of the Colorado Supreme Court, "unrestrained self-help to a previously untapped water supply would result in a barren wasteland."[78] Perhaps the Court was implicitly acknowledging in these cases that much of the water proposed to be "salvaged" was in fact serving a valuable use and, that granting a super priority right to water gained by their elimination, would create a perverse incentive for environmental damage.

There should be no legal reason why, under Colorado law, an appropriator cannot take actions within his irrigation system that would eliminate any undesired consumptive use of water and then apply that salvaged water to intended uses within the system. Following the Shelton Farms case involving cottonwood elimination along the Arkansas River, the Colorado General Assembly amended its definition of plan for augmentation to preclude the "salvage of tributary waters by the eradication of phreatophytes" and "the use of tributary water collected

---

[75] R.J.A., Inc. v. Water Users Ass'n of Dist. No. 6, 690 P.2d 823 (Colo. 1984).

[76] Giffin v. State, 690 P.2d 1244 (Colo. 1984).

[77] Shelton Farms at 1325.

[78] Id.

from land surfaces which have been made impermeable, thereby increasing the runoff but not adding to the existing supply of tributary water."[79] Under Colorado law, a plan for augmentation is a "detailed program to increase the supply of water available for beneficial use...."[80] Thus, a water right for unappropriated water may not be claimed under a plan for augmentation by eradicating phreatophytes or by paving land.

While not as clearly drafted as it could be, in light of the facts in the Shelton Farms case, the statutory limitation on plans for augmentation simply restricts salvage schemes seeking to appropriate tributary waters, not those seeking to make more complete use of water already appropriated. In fact, however, major surface irrigation systems in Colorado and elsewhere in the West already keep the growth of phreatophytes along their ditches under control. Cottonwood trees may be permitted to grow for aesthetic reasons, but willows and brush typically are burned off every spring as part of the general maintenance of the ditch system. In general, there is probably not a significant amount of water that can salvaged from water already appropriated.

A third option by which an appropriator may seek to make more efficient use of appropriated water under Colorado law is by more fully utilizing water under his dominion and control in accordance with his original appropriative intent. To illustrate, suppose an appropriator forms an intent to irrigate 640 acres of land and builds a ditch sufficient in capacity to provide water for this purpose. Initially, she only irrigates 320 acres. Eventually she irrigates the full 640 acres, thereby fully utilizing the diverted water. She will be regarded as having a right to the full extent of her original entitlement even as against other water users who initiated their appropriations subsequent to her and prior to her making full use of her appropriation. Her senior status depends on her original intent to appropriate — the existence of a "fixed purpose" to irrigate the full 640 acres.[81] It may also depend on the diligence with which she pursues the accomplishment of the purpose.

---

[79] Colo. Rev. Stat. §37-92-103(9)(1990).

[80] Id.

[81] Water Supply and Storage Co. v. Curtis, 733 P.2d 680 (1987).

There is some suggestion in Colorado cases that an appropriator has the legal right, and perhaps even the duty, to more fully utilize "waste water", water returning to the stream on the surface following diversion and use.[82] Certainly the decisions are clear that another user cannot acquire a water right based directly on the continuation of a flow of waste water from another use.[83] There are few situations, however, in a heavily appropriated state like Colorado that so-called waste water could be captured and reused by an appropriator in a manner that increases her consumption of water without depriving another downstream appropriator of legally protected streamflows.

None of these approaches effectively gets at the question of how best to give an appropriator the incentive to make more efficient use of water that has been historically diverted and used. A fourth option, admittedly untested at this point, would be for an appropriator to file a plan for augmentation based on a legal theory that would allow the use of "saved" water — water historically diverted and used but no longer needed to accomplish the purposes of the original appropriation — to be changed to another use. Such an application would be limited by the requirement that it not cause injury to other water rights and, of course, that it only be based on rights to water historically diverted and used.

The applicability of the plan for augmentation provision is suggested by Cache La Poudre Water Users Association v. Glacier View Meadows,[84] a case holding that water is available for appropriation under a plan for augmentation so long as other water rights are not injured. It was the potential breadth of this holding that instigated the Shelton Farms case and from which both the Colorado Supreme Court and the Colorado General Assembly retreated. Nevertheless it is a decision firmly premised on the recognition that Colorado must search creatively for ways to make the fullest possible use of its limited water resources. It is a decision that follows logically from the clarion call of the Fellhauer decision in 1968 for

---

[82] Tongue Creek v. Orchard City, 280 P.2d 426 (Colo. 1955). City of Boulder v. Boulder and Left hand Ditch Co., 557 P.2d 1182 (Colo. 1976). See also Michael Browning and Steve Bushong, "Ditch Lining: The Water Right Issue," The Colorado Lawyer, June 1992, pp. 1155-58.

[83] Metro Denver Sewage v. Farmers Reservoir, 499 P.2d 1190 (Colo. 1972).

[84] 550 P.2d 288 (1976).

"maximum utilization" of Colorado's water resources,[85] broadened by the Alamosa-LaJara decision in 1983 to the principle of "optimum use" — use that takes account of "all significant factors, including economic and environmental concerns."[86]

A plan for augmentation is a program for increasing the supply of water available for beneficial use by means that do not injure other water rights. Conceptually, anything an appropriator could do that would increase beneficial use of water already diverted and used without injury to other water rights should be permissible under a plan for augmentation. Thus, if an appropriator is able to make changes in his irrigation water delivery system to increase the usable supply of water without injury to other water rights, a plan for augmentation should be obtainable that would provide a decreed right to this changed use.

Applied in the Grand Valley setting, this would mean that Grand Valley Irrigation Company, or the United States together with the Grand Valley Water Users Association, should be able to bring to the Colorado water court a detailed program by which either or both would incorporate changes in their water delivery systems, the amount of water that would be saved by this program, the proposed new use(s) of the water, and evidence demonstrating the absence of any resultant injury to other water rights, and obtain from the court a decree recognizing the new uses with the same priority date as the original right.

The reason such a decree would be so valuable in the case of the Grand Valley is that a substantial amount of water potentially is available for a valuable use that would not cause injury to other water rights. As explained, it is physically possible to reduce diversions into the two Grand Valley canals and, by making both structural and management changes, essentially irrigate the same number of acres of land. Keeping these "saved" diversions in the Colorado River would improve flows in the 15-Mile Reach to the benefit of endangered fishes that inhabit this area.

There should be no adverse effects on downstream appropriators (as it happens, there are very few downstream appropriators on the Colorado River within Colorado anyway). There is some question, however, about whether upstream junior appropriators might be

---

[85] Fellhauer v. People, 447 P.2d 986 (Colo. 1968).

[86] Alamosa-LaJara Water Users Protection Association v. Gould, 674 P.2d 910, 935 (Colo. 1983).

injured by what can seen as a change of use of a water right that is not limited to just the consumptive use portion of the right. The no injury analysis focuses on keeping all existing appropriators whole as against changes that would benefit only the one making the change. Without question, if the changed use altered stream conditions relied on by the upstream appropriators in making their appropriation, such a use would cause injury to these appropriators. In this case, upstream junior appropriators established their rights subject to the preexisting rights of the Grand Valley irrigators. The "Cameo Call" rights historically have required flows of up to 2,260 cfs during the irrigation season at the Cameo gauge, and subsequently established upstream rights must have been based on the understanding of the senior nature of this call. A continuation of this downstream demand, even if for somewhat different purposes than originally established, cannot be regarded as injury to upstream users.

A desire for clarity concerning this understanding prompted the introduction of legislation in the Colorado General Assembly in 1992 and 1993. Sponsored primarily by Representative Tim Foster of Grand Junction, the bills introduced the idea of a "plan for conservation" by which water saved from historical diversions because of improvements could be changed to a new use, so long as no water rights are injured.[87] The primary objection to the bills was a concern that the conservation incentive would encourage changes in water use that would affect return flows relied on by downstream appropriators, and that water users would be forced to defend their rights against plans that would inadequately protect them. The fact that such evaluations are made routinely in change of water right cases, and even the addition of a provision that would have required the state engineer to screen conservation plans to insure that they contained adequate information upon which to evaluate questions of injury, failed to satisfy these concerns.

It is well understood that return flows relied on by downstream appropriators cannot be altered to the injury of those appropriators, either in quantity or in timing. An augmentation plan that would result in such changes would not be permitted under existing law. The Grand Valley situation is somewhat unique in that there are essentially no

[87] House Bill 93-1158 is reproduced in Appendix A of "Agricultural to Urban Water Transfers in Colorado: An Assessment of the Issues and Options".

downstream appropriators (in Colorado). There may be other situations, however, where the benefit to be gained from the augmentation plan would be simply to increase flows in the stream between the point of diversion and the place of return flows by reducing diversions. Even assuming there were downstream appropriators in Colorado, it would still be valuable to increase flows in the 15-Mile Reach.

As a matter of law, it is clear that a senior appropriator not unreasonably using water has the right to call to his point of diversion up to the full amount of his decreed rate of diversion, so long as sufficient water is available in the stream to do so. Incentives are needed to encourage the appropriator to consider whether he can meet his needs with less water. The clearest such incentive would be for the appropriator to be able to decide the use of any water historically diverted and used but that can be saved, so long as the savings can be obtained without injury to other water rights. The plan for augmentation provision in Colorado water law appears to offer the legal framework within which an appropriator might be able to save water and make it available for a new use.

C.

The ability to save water in the federal Grand Valley Project and apply it to another use may exist on a different legal basis. The Grand Valley Project was built under the Reclamation Act of 1902. The United States holds a decreed water right with a 1908 priority date to divert 730 cfs from the Colorado River at the Roller Dam to be used on lands within what is known as the Garfield Division, and a right to divert 400 cfs during the irrigation season and 800 cfs during the nonirrigation season for hydroelectric power generation. The Grand Valley Water Users Association, organized under Colorado law to act as the contracting entity with the Bureau of Reclamation on behalf of the irrigators in the Garfield Division, consists of about 1,300 shareholding users holding 75,000 shares of stock and irrigating approximately 23,341 acres.

The relationship between the U.S. and water users within a federal reclamation project exists at several different levels. In many, though not all, reclamation projects the U.S. is the legal owner of the state-established water right for the project. The U.S. generally is not itself the user of the water right. The U.S. Supreme Court has analogized the position of the

U.S. to that of a carrier ditch company — a private organization that builds and operates a water supply system and provides water to users.[88] While the U.S. holds legal title to the appropriation, water users hold beneficial title based on their application of water to use. Users, therefore, hold a permanent legal right to use the amount of water they have put to historical beneficial use.

The U.S. and water users in a federal reclamation project also have a contractual relationship. The primary purpose of the contract is to set out the obligation of the water user organization, on behalf of its water users, to pay to the U.S. a specific amount of money over a fixed period of time in payment for the cost of some part of the facilities constructed to provide the water supply. It is common practice in the contract for the U.S. to specifically retain rights to "waste, seepage, and return flow" of water used within the project. Thus, in the contract between the U.S. and the Grand Valley Water Users Association, there is a provision stating: "It is agreed and understood that the United States does not abandon or relinquish any of the waste or seepage water, or return flow coming from lands of the project irrigated through works constructed by the United States, but that the same is reserved and intended to be retained and used for the benefits of the project."[89]

The United States Supreme Court, in a 1924 decision, considered the legal status of drainage water returning to the stream following diversion and use within a federal reclamation project.[90] The court rejected arguments that such water could only be used once, saying: "According to the record it [the appropriation] is intended to cover, and does cover, the reclamation and cultivation of all the lands within the project. A second use in

---

[88] Ickes v. Fox, 300 U.S. 82 (1937). For a more complete discussion of the law see MacDonnell, Driver, & Wahl, Facilitating Voluntary Transfers of Bureau of Reclamation-Supplied Water, Natural Resources Law Center Research Report, December 1991, pp. 11-15.

[89] Article 43, Amendatory Contract Between the United States and the Grand Valley Water Users' Association, January 27, 1945.

[90] Ide et al. v. United States, 236 U.S. 497 (1924). See also, United States v. Tilley, 124 F.2d 850 (8th Cir. 1941); Nebraska v. Wyoming, 325 U.S. 589 (1945); Hudspeth County Conservation & Reclamation Dist. No. 1 et al. v. Robbins, 213 F.2d 425 (5th Cir. 1954); Department of Ecology v. Bureau of Reclamation, 827 P.2d 275 (Wash. 1992).

accomplishing that object is as much within the scope of the appropriation as a first use is."[91] The Court characterized the arrangement between the U.S. and the irrigator as one in which the U.S. provides a water supply sufficient for the irrigator's use but then retains "all [other] rights incident to the appropriation...."[92] In support of its conclusion, the Court quotes at length from a federal district court decision that emphasizes the need to provide the fullest possible incentive for water development: "One who by the expenditure of money and labor diverts appropriable water from a stream, and thus makes it available for fruitful purposes, is entitled to its exclusive control so long as he is able and willing to apply it to beneficial uses, and such right extends to what is commonly known as wastage from surface run-off and deep percolation, necessarily incident to practical irrigation. Considerations of both public policy and natural justice strongly support such a rule."[93] Having invested in the construction of typically very substantial and costly facilities to develop a water supply, the U.S. should have the ability to manage water not needed by existing project beneficiaries in a manner that increases project benefits.

Applying these legal principles in the context of the Grand Valley Project, it seems clear that shareholders of the Grand Valley Water Users' Association have a legally protected right to the continued delivery of the amount of water historically beneficially used. The U.S. can take no action in its capacity as owner of the Grand Valley Project facilities that would reduce deliveries to the headgates of all shareholders of that amount of water. As the owner of project facilities, however, the U.S. does have an interest in considering whether to make additional investments that would further increase the benefits of the project water without diminishing benefits already enjoyed by existing users. As a federal district court noted in relation to the Newlands Project in Nevada, an irrigation district (and thus its users) has no right to the continued operation of the project in any specific manner.[94]

---

[91] Id. at 505.

[92] Id. at 506.

[93] Id., quoting from United States v. Haga, 276 Fed. 41, 43.

[94] Truckee-Carson Irr. Dist. v. Secretary of Interior, Civil R-74-34 BR (U.S.D.C. Nev. 1983).

The contract between the U.S. and the GVWUA defines the project water supply as "water heretofore appropriated by the United States for the benefit of the project, and which at any given time is available under such appropriations."[95] The contract goes on to say: "Out of this supply, there shall be made available to the Association for the irrigation of productive lands in the project, ..., such water as is lawfully available and reasonably required therefor **as determined by the Secretary.**"[96] By practice, the "base allotment" of water provided to irrigators under the project is four acre-feet per acre.[97] In a 1986 contract between the U.S. and the GVWUA regarding construction of phase 2 of the salinity control unit, GVWUA agreed to charge assessments for delivery of "excess water," defined as "any water delivered to any water user in excess of the base allotment of 4 acre-feet per irrigable acre per water right agreement."[98] Thus it seems clear that shareholders have a legal right to receive four acre-feet of water at their headgate for every acre of land classified as productive and still in irrigation.

There are 23,341 acres of classified lands that hold water rights within GVWUA. There are over 1,300 user accounts, more than half of whom are urban or suburban users — not farmers. Assuming full diversion of the 730 cfs diversion entitlement throughout the irrigation season, more than 300,000 acre-feet of water would be taken from the Colorado River. Based on an analysis of the 1989-1993 period, the Bureau of Reclamation and the GVWUA estimated that actual total annual water diversions were 230,770 acre-feet.[99] Of

---

[95] 1945 Contract, §27 at p. 34.

[96] Id. (emphasis added).

[97] Interview with Bill Klapwyck, Manager, Grand Valley Water Users Association, August 25, 1991. The GVWUA Articles of Incorporation state that the amount of water to be delivered to each stockholder is "that proportionate part to all the water available for distribution by the Association during any irrigation season, as the number of shares owned by jim shall bear to the whole number of valid and subsisting shares then outstanding, ..." Article IV. §7. There are 75,000 shares of GVWUA stock outstanding.

[98] Contract Between the United States of America and The Grand Valley Water Users Association Providing for Rehabilitation, Operation, and Maintenance of Distribution Facilities to Reduce Salinity Inflow to the Colorado River, April 10, 1986, Article 5b at p. 12.

[99] Memorandum from Gene Jencsok and Randy Seaholm to Members, Colorado Water Conservation Board, July 8, 1994 at 2.

this amount, about 121,000 acre-feet were delivered to users. The remainder was lost to spills (51,476 acre-feet in the main canal and 19,764 acre-feet in laterals) and losses to seepage and evaporation (21,666 acre-feet in the main canal and 19,764 acre-feet in the laterals). Thus it is estimated that 109,460 acre-feet of water diverted from the Colorado River each year, on average, does not reach a GVWUA end user.

By explicitly reserving its claim to all seepage waters created by project diversions in its contract with GVWUA, the U.S. may have evidenced its intention to put this water to beneficial use. At least with respect to federal reclamation projects, courts have supported the ability of the U.S. to further develop and use waters which it has initially appropriated and developed for project use. Considerable drainage and seepage water diverted from the Colorado River for use within the GVWUA now returns unused to the river. It would seem that the U.S. has a strong legal claim to this water that could be asserted to produce additional project benefits.

There are at least two potential limitations on this claim, however. One is a matter of Colorado water law, and the other is a matter of federal law.

Because of the heavily appropriated nature of Colorado rivers and streams, its courts have been protective of the dependence of downstream appropriators on return flows from upstream water use. Particularly in rivers like the South Platte and the Arkansas, the total quantity of water diversions substantially exceeds the actual flows of the rivers because return flows from upstream diversions provide water to downstream appropriators. Under Colorado case law, once diverted water leaves the possession and control of the original appropriator and begins its return to the river, that appropriator has no further rights to use the water.[100] Moreover, the Colorado Supreme Court has created a distinction between waste water and return flows. Waste water is water returning to the stream on the surface, while return flows are waters that have percolated into the ground after being applied to irrigate crops.[101] At the same time appropriators are entitled to fully utilize their intended appropriation in a beneficial manner. Changes that reduce the amount of waste water resulting from that use are

---

[100] Comstock v. Ramsay, 133 Pac. 1107 (Colo.1913); Durkee Ditch Co. v. Means, 164 Pac. 503 (Colo.).

[101] City of Boulder v. Boulder and Left Hand Ditch Co., 557 P.2d 1182 (1977).

encouraged and may even be required.[102] Changes in the appropriator's point of diversion or place of use cannot be made, however, if they would injure other appropriators.[103]

Applying these principles to the setting of the Grand Valley, the U.S. may be able to assert that its initial appropriation of water included its intention to more fully utilize seepage and waste water. Thus, actions it might take that reduce such water may not be prevented by claims to this water asserted either by water users within the project or by users who have taken this water on its way back to the stream. GVWUA users are probably constrained by the terms of their contract arrangement with the U.S., and by case law supporting the ability of the U.S. to further utilize developed project water supplies. Users in the GVIC system who may have benefitted from the availability of waste water from the GVWUA system probably are precluded from asserting a permanent claim to this water as a matter of Colorado water law. The legal status of water that has percolated into the subsurface of GVWUA users and subsequently was used by irrigators in the GVIC system is less certain, but it seems unlikely that there is a significant amount of water that falls into this category.

The other potential limitation concerns the ability of the U.S. to assert a claim to project waste water for purposes other than those authorized as part of the Grand Valley Project. Presently, the Grand Valley Project is authorized only for irrigation and power uses. Fish benefits are not a specifically identified project purpose. It is arguable that the duty of the Secretary of the Interior under the Endangered Species Act to use his full authority to recover protected species would provide a legal basis by which the U.S. could make project changes that would protect existing beneficiaries while also providing benefits to the endangered Colorado River fishes by increasing flows through the 15-Mile Reach.[104]

Alternatively, the U.S. could shift saved water to the Orchard Mesa Power Plant and seek to maximize the capacity in the system to generate hydroelectric power during the

---

[102] Burkart v. Meiberg, 86 Pac. 98 (1906); Tongue Creek Orchard Co. v. Town of Orchard City, 280 P.2d 426 (1955).

[103] City of Boulder v. Boulder and Left Hand Ditch Co., 557 P.2d 1182 (1977).

[104] Pyramid Lake Paiute Tribe of Indians v. Hodel, 882 F.2d 364 (9th Cir. 1989); see also U.S. Department of the Interior, Regional Solicitor, Rocky Mountain Region, Memorandum: Section 7 Consultations/Recovery Implementation Program, May 12, 1989.

summer irrigation season. There is some unutilized capacity during this period that could be tapped if water historically taken down the Highline Canal could instead be shifted over to the Power Canal. Since there is no change in the point of diversion involved, and since the place of use is still within the Grand Valley Project, it is possible that this shift of water would not need to go through the Colorado change-of-water-right process.

D.

It seems ironic that a water law structure intended to help people utilize the limited water resources of the West to meet their needs now itself stands as a potential barrier to this purpose. The benefits of irrigating lands in the Grand Valley motivated some remarkable efforts to develop the needed water supply. Now other needs are pressing their claim to this water supply. From an engineering perspective, it appears that there are means by which water historically diverted from the Colorado River for irrigation use in the Grand Valley can be reduced without necessarily eliminating existing irrigation activities. As it happens, the increased flows through the 15-Mile Reach that would result from reducing diversions at the Roller Dam and at the GVIC diversion dam during the summer months are thought to have important benefits for at least two species of endangered fish that utilize this area. It appears that there are several possible legal bases by which flows through this reach could be improved. None, however, are free from potential legal challenge.

Several things could happen that would facilitate better use of the water of the Colorado River in Colorado. Perhaps the most modest and incremental action would be for the State of Colorado and the U.S. to set in motion a process by which these issues can be carefully examined, so that all interested parties could have the information needed to decide what changes in present water use practices they could support and what role they would be willing to play in bringing about those changes. In fact, something like this is already underway. In January 1994, the State of Colorado through its Colorado Water Conservation Board approved a Memorandum of Understanding involving the Bureau of Reclamation, the Colorado River Water Conservation District, the Grand Valley Water Users Association, the Denver Water Board, and the Northern Colorado Water Conservancy District, launching a

three-phase Grand Valley Water Management Study.[105] Phase I focuses on the technical aspects of saving water in the GVWUA system. Phase II will address the legal issues associated with using saved water in the 15-Mile Reach. Phase III will then involve a feasibility study and NEPA compliance for implementing conservation measures. Proceedings in the Orchard Mesa "check" case, described in Part V above, have superseded this process and forced it into a slower track.

The Grand Valley provides a powerful illustration of one of the perverse consequences of prior appropriation law of rewarding appropriators for diverting their maximum entitlement but failing to give them any incentive to make their existing use more efficient. Some western states such as Oregon, California, Montana, and Washington have changed their laws to help avoid this undesirable situation.[106] Generally, the approaches are designed to reward, rather than penalize, an appropriator for reducing water use. Saved water can be transferred to a new use, either by the appropriator herself or by a state agency. Perhaps it is now time for Colorado to provide a means to accomplish this end.

In recent years, Congress has begun a process of revisiting individual Bureau of Reclamation projects and, among other things, expanding the purposes of these projects to include fish and wildlife.[107] Perhaps it is time for Congress to enact broader enabling legislation under which projects either would automatically be regarded as including environmental uses as one of the project purposes, or would become designated for such purposes through some kind of administrative process. It makes little sense for Congress to engage in project-by-project evaluation of all Bureau of Reclamation facilities unless major changes are called for, particularly those requiring additional federal funds. Simply allowing

---

[105] Memorandum from Gene Jencsok and Randy Seaholm to Members, Colorado Water Conservation Board, July 8, 1994.

[106] Lawrence J. MacDonnell and Teresa A. Rice, "Moving Agricultural Water to the Cities: The Search for Smarter Approaches," 2 West-Northwest (1994--in press).

[107] See, e.g., Truckee-Carson - Pyramid Lake Water Rights Settlement Act of 1990, Pub. L. 101-618, 104 Stat. 3294, Title II, §§ 202 (b), 209 (a); Central Valley Improvement Act of 1992, Pub. L. 102-575, 106 Stat. 964, Title XXXIV, § 3406; Yakima Basin Enhancement Act of 1994, Pub. L. 103-434, 108 Stat. 4526, Title XII, § 1201.

projects to be operated in a manner that could encompass environmental benefits seems relatively uncontroversial and potentially quite helpful.

IX.

The Grand Valley presents a major opportunity for improving utilization of the water resources of the Upper Colorado River in Colorado. As demonstrated by the various activities under the Colorado River Salinity Program, the irrigation systems and on-farm water management practices in the Grand Valley can be improved in a number of ways that reduce the need to divert the quantities of water historically removed from the Colorado River while still irrigating essentially the same amount of land. The fundamental issues concern who should control the use of the water that is no longer required for diversion, and the uses to which the water would be put.

There are plausible legal arguments by which the historical appropriator would be regarded as able to determine the use of at least some of this water, particularly if the appropriator is the federal government on behalf of a reclamation project. There are competing legal theories under which the water would simply return to the river and be allocated according to the priority system. Short of full-scale, protracted litigation, there is no way to be sure of which legal theory might prevail in the case of the Grand Valley.

Alternatively, it seems that there might be a negotiated option available — one that recognizes the legitimate interests and concerns of the many parties affected by changing the manner of water use in the Grand Valley. First there are the water users in the Grand Valley. For ease of discussion, these users might be divided into two groups: those wanting to continue their water use and those interested in either temporarily or permanently foregoing their use. Any agreement would need to assure those wanting to continue to use Colorado River water that they would be able to do so, and would probably need to make explicit the amount of water that would be available and the terms of that availability. Moreover, it would need to provide these individuals with a clear sense of the effects of changing the existing water use system, including any increases in costs they would be expected to bear.

Existing users wishing to consider options to that use should be given choices that might include the ability to transfer to other users a quantity of water ranging in amount from their headgate delivery allocation to their consumptive use entitlement. Transfers might be either temporary or permanent and might be limited to users within their system, to instream flow uses, or to any other use.[108]

Those holding junior upstream water rights express a legitimate concern that the senior, substantial downstream demand of the Grand Valley users has imposed significant expense on their water development to assure the protection of what is regarded as inefficient water use practices. These interests oppose allowing Grand Valley users to benefit financially by now selling rights to what is considered to have been wastefully used water.

At stake are the endangered fishes that inhabit this part of the Colorado River and that are believed to need greater flows of water in certain critical areas such as the 15-Mile Reach for their continued survival. The present standoff between those defending the status quo and those who favor change only if it directly benefits them leaves the fish at risk. Ultimately, such gridlock benefits no one.

In fact, the potential water savings in the Grand Valley appear substantial enough that it seems a negotiated agreement might find ways to at least partially satisfy all the interests — Grand Valley irrigators, upstream juniors, and the fish. It may be possible to negotiate an approach to allocating water savings that provides some of the benefits of savings to upstream juniors and some to the fish. Certainly it will be necessary to discuss how the funding needed to make improvements in the Grand Valley would be forthcoming — how much the U.S. might be willing to provide, how much the state would make available, how much upstream juniors might contribute, how much could be generated through market-based transactions. It might be necessary for the Fish and Wildlife Service to make a determination of the hydrograph it believes is necessary to protect and recover the protected species and to agree that, so long as sufficient water is available in the stream to produce this hydrograph under

---

[108] For a discussion of the kinds of options available, see Teresa A. Rice and Lawrence J. MacDonnell, Agricultural to Urban Water Transfers in Colorado: An Assessment of the issues and Options, Natural Resources Law Center Research Report RR 11, 1994; see also, MacDonnell et al, Water Banks in the West, Natural Resources Law Center Research Report RR 12, 1994.

specified conditions, water users will not be subject to future reductions of their existing water yields.

Is such a negotiated approach possible? The efforts of the Upper Colorado River Recovery Program have brought together water interests in Colorado in a long-term program to seek recovery of the endangered fishes. This process provides an essential basis for the kinds of discussions proposed here. Moreover, the Orchard Mesa check case inadvertently has forced many of the interests concerned with use of the Colorado River in the Grand Valley to carefully examine the water rights structure in the river implicated by the check operation, an examination that forces consideration of many of the questions addressed in this paper.

To this point, the options considered in the two processes (the recovery program and the check litigation) are relatively narrow. In fact, the range of options is extensive. What is needed is the development of a more comprehensive process, perhaps one jointly coordinated by the State of Colorado and the Department of the Interior, including the active participation of water users in the basin along with environmental and other interests. Recent efforts in the Bay-Delta of California and the Truckee-Carson of Nevada may suggest possible approaches.

Uses of the limited water resources of the western states need to keep pace with the growing demands that are being placed on them. Water use in the Upper Colorado River Basin of Colorado, particularly that in the Grand Valley, provides unique and important opportunities to change in a manner that helps to meet these expanding demands while not diminishing the service that water provides to existing users.

LJM#12:grand.lm2

United States Department of the Interior

BUREAU OF RECLAMATION
Upper Colorado Region
Grand Junction Projects Office
P.O. Box 60340
2764 Compass Drive
Grand Junction, Colorado 81506-8758

GJ-700
ENV-1.10

DEC 23 1994

Ms. Ruth Hutchins
1574 L Road
Grand Junction CO 81521

Subject: Grand Valley Water Management Flow Protection Plan

Dear Ms. Hutchins:

Enclosed is the first draft of the Grand Valley Water Management Flow Protection Plan. If you have any comments or questions please call either Bob Norman at (303) 248-0634, or Brent Uilenberg at (303) 248-0641.

Sincerely,

Michael L Ralston

FOR Brent R. Uilenberg
Planning Coordinator

Enclosure

Purpose

The purpose of the study is to quantify water that could be salvaged from operational spills that are currently diverted by the Grand Valley Project and returned to the Colorado River through project wasteways. Under current operation approximately 59,000 acre-feet are annually diverted from the Colorado River and returned as operational spills. With current levels of technology, it is estimated that a portion of these spills could be eliminated. The purpose this water serves is to maintain an adequate canal water surface elevation to provide water deliveries to the adjacent high lands. The study concept includes analysis of the structural changes necessary to permit the reduction of operational spills occurring in the Grand Valley Project by maintaining the water surface elevation with structural modifications rather than operational spills. By reducing the volume of operational spills through the use of check structures, automated control systems, and in-system storage less water is required to be diverted from the Colorado River.

By reducing the diversion requirement several river administration opportunities are made available to address the following problems:

1) The Colorado River below the Grand Valley Project (GVP) diversion dam is habitat to four endangered fish species; the Colorado squawfish, humpback chub, razorback sucker, and bonytail chub. The reach of Colorado River from the Grand Valley Irrigation Company (GVIC) diversion dam to the confluence of the Colorado and Gunnison Rivers is called the 15-Mile Reach (Reach). The Recovery Implementation Program (Recovery Program) for Endangered Fish Species in the Upper Colorado River Basin has identified this reach of the river as critical habitat and recommended 700 - 1,200[1] cubic feet per second (cfs) as a minimum flow regime for the recovery of the four endangered fish species. Flows in this reach of the river frequently fall below 700 cfs in the mid- to late- summer period. By reducing the diversion requirement, more water could be maintained in the Reach for the benefit of the endangered fish species.

2) A portion of the Grand Valley Project diversions are supported by direct flows and storage releases from Green Mountain Reservoir (GMR). By reducing the diversion requirement, more water could be retained in GMR.

Terminology of Significance

Conserved water - A great deal of aggravation, consternation and grey hair has occurred regarding the "proper" terminology applied to the water which could be made available as a result of this study and improvement efforts. The terms "saved", "conserved", and "salvaged"

[1] Flow recommendations are under revision. The 700 - 1,200 cfs flow recommendation has been accepted by the State of Colorado and will be used in this report.

have legal and political connotations which make them non-desirable to use. The unmanageable name for this water is, "those waters which are made available for use through canal system improvement and altered operation." At the risk of creating a legal precedence, for no more than convenience, the water made available due to the canal improvements and associated water management changes will be referred to as "conserved" water in this report.

Placing a call; calling the river - a situation in which a senior water right is receiving insufficient flow in a river; that senior water right makes a request to the Division Engineer to stop diversions by all upstream junior water rights which may be diminishing supply.

Natural Flow - This term seems to have more than one meaning. For the purpose of this report it will mean the portion of flow at the Cameo gage with river administration that would be there without releases from GMR and /or contract releases such a releases from Ruedi Reservoir. Without GMR upstream junior water users would be curtailed. Consequently, the GMR replacement releases for those upstream junior diverters are really part of what would have been natural flow. Upstream replacement releases and may or may not considered part of natural flow.

Direct releases - A portion of flow at the Cameo gage that is not part of natural flow are the direct releases. For example, if, after all of the upstream juniors water rights junior to the GVIC 120 cfs right have been called out and replacement releases are being made for those junior rights, and the Cameo gage flows are still not sufficient, then direct releases are made from GMR to the 120 cfs right. All of the irrigation water rights diverted in the Grand Valley are GMR Historic Users Pool (HUP) beneficiaries and are entitled to direct releases when required.

Consumptive Use of Water - Water which is permanently removed from the river basin by evaporation, plant transpiration, or out-of-basin diversion. An in-basin irrigation water right owner may divert 40 cfs but only a portion of that amount is permanently removed. In contrast, an out-of-basin diversion is 100 percent consumptive to the basin of origin.

Background

The Government Highline canal system is part of the Grand Valley Project (GVP). The other main portion of the project is the Orchard Mesa irrigation system. The Government Highline canal system, which includes the GVP diversion dam, is operated and maintained by the Grand Valley Water Users Association (GVWUA). The study area will be limited to the Government Highline canal system. Automation could also help with water management in other canal systems in the Grand Valley, however, since a major portion of the GVWUA canal system has

been improved through the salinity control program, the majority of the capital improvements necessary to implement this practice are in place. The GVWUA system includes approximately 25,000 acres of the 70,000 acres of irrigated land in the Grand Valley. This land is served by about 50 miles of canals and 160 miles of secondary laterals. after the completion of the Salinity Control Program 30 of the 50 miles of canal will be lined and nearly all of the laterals will be placed in pipe to reduce seepage. In comparison, one of the other major systems in the valley, the Grand Valley Irrigation Company system includes about 200 miles of canals and 210 miles of laterals serving roughly the same acreage.

Recent improvements to major portions of the Grand Valley Project canal system through the Colorado River Salinity Control Program have successfully decreased the amount of seepage from the system. However, the improvements have not addressed canal system operation or water management. Modernization of facility operation was not included in the Salinity Control Program since these facilities do not provide a salinity control benefit. Consequently, the GVWUA is forced to continue historic operation patterns since salinity improvements have only replaced historic canal control facilities.

History

The most senior water rights serving the Grand Valley (both sides of the Colorado River from just above Palisade to near the Utah border) have appropriations dating from the 1880's. Private citizens, mutual ditch companies, and irrigation districts constructed a network of diversions, canals, and laterals to serve the area before the United States Reclamation Service built the Grand Valley Project (see Features Map). These early water rights, together with rights held by the United States for the Project, make up what is known as the "Cameo Call" on the Colorado River.

Semantics - There really never is a "Cameo Call" but rather one of the water rights in the Cameo group will place a call on the river. However, when speaking of the Cameo group it has become customary to refer to the group as the Cameo Call. This report will generally refer to the collection of water rights serving the Grand Valley group. River call discussions will usually be associated with an individual right.

Grand Valley Diversions and the "Cameo Call"

This accumulation (group) of water rights just below the USGS gaging station on the Colorado River near Cameo serves as a control on future water development upstream throughout the

basin. The "Cameo call" must be examined in any assessment of water availability upstream, and is of primary concern when determining amounts of stored water required for replacement for transmountain diversions or in-basin developments. The Cameo group of absolute rights has a variety of priority dates and diversion amounts, reflecting a long history of project consolidation.

There are three major organizations supplying irrigation water from the Colorado River in the Grand Valley area:

1) GRAND VALLEY IRRIGATION COMPANY (GVIC)
   - Private irrigation company serving approximately 40,000 acres north of the Colorado River.
   - Gravity system, no storage.
   - Holds the most senior right in the Cameo group (520 cfs).
   - Holds the most junior right in the Cameo group (120 cfs).
   - Relies heavily on Green Mountain Reservoir (GMR) storage to supply water to its junior 120-cfs right.

The GVIC junior right (120 cfs) is senior to several major projects, most of which have replacement storage available.

2) ORCHARD MESA IRRIGATION DISTRICT (OMID) AND THE ORCHARD MESA PORTION OF THE GVP
   - Private irrigation district serving approximately 9,000 acres south of the Colorado River.
   - Primarily a pumped system, no storage.
   - Uses hydraulic turbine pumps to lift irrigation water to service area.
   - Shares powerplant revenues with Grand Valley Water Users' Association and the United States.
   - Operates "check" and bypass channel to replace out of priority diversions at the Grand Valley Project Diversion Dam to maximize power generation.
   - At maximum irrigation-season diversion and usage levels, OMID can demand up to 460[2] cfs for irrigation/pumping and 310[3] cfs for hydroelectric power.

---

[2] This includes approximately 10 cfs for the Vinelands area which is the land served by the Orchard Mesa Power Canal.

[3] The United States owns the 400 cfs power water right. During peak irrigation demand, canal system capacity limits this right to 310 cfs. This right can divert 800 cfs during the non-irrigation season.

- At less than full irrigation demand, up to 400 cfs can be used to generate hydroelectric power.
- In the winter, and when irrigation demand by others diminishes, OMID can increase its hydroelectric power demand until the power canal reaches capacity of about 860 cfs.
- Relies on GMR storage for irrigation water when natural supplies are insufficient.

3) GRAND VALLEY WATER USERS' ASSOCIATION
- Serves approximately 32,000 acres including two small irrigation districts north of the Colorado River, above the GVIC service area.
- Gravity system, no storage.
- Created to operate the U.S. Reclamation Service's Grand Valley Project.
- Shares power revenues with OMID.
- Has diversions protected by OMID operating "check."
- Has capacity to demand 850 cfs for irrigation, including service to two small irrigation districts with senior rights totaling 120 cfs.[4]
- Relies on GMR storage for irrigation when natural supplies are insufficient.

The Grand Valley Water Users' Association, the Orchard Mesa Irrigation District, the Palisade Irrigation District and the Mesa County Irrigation District all divert from the Colorado River at the GVP diversion dam. This dam in known locally as the Roller Dam, the Cameo Dam, the Cameo Diversion, or the Grand Valley Project Diversion Dam.

Cameo Demand

A summation of the water rights above totals 2,350 cfs. However, due to capacity constraints on the portion of the Grand Valley Project canal from the diversion dam to the inlet of tunnel number 3, it is not possible to divert the full 400 cfs power plant water right when there is also a full irrigation demand. The capacity of this portion of the canal is 2,260 cfs. Consequently, when fully supplying the GVWUA and OMID irrigation needs it is necessary to decrease the flow in the power plant to 310 cfs. During periods of less than full irrigation demand, more water may be directed through the power plant.

[4] One of the irrigation districts has a junior water right of 23.5 cfs which is not only subject to river administration but is also subject to the capacity of the Grand Valley Project Diversion dam and canal system. Consequently, this right has little bearing on river administration since there is usually no canal system capacity during periods of peak irrigation demand.

DRAFT

The Orchard Mesa Check

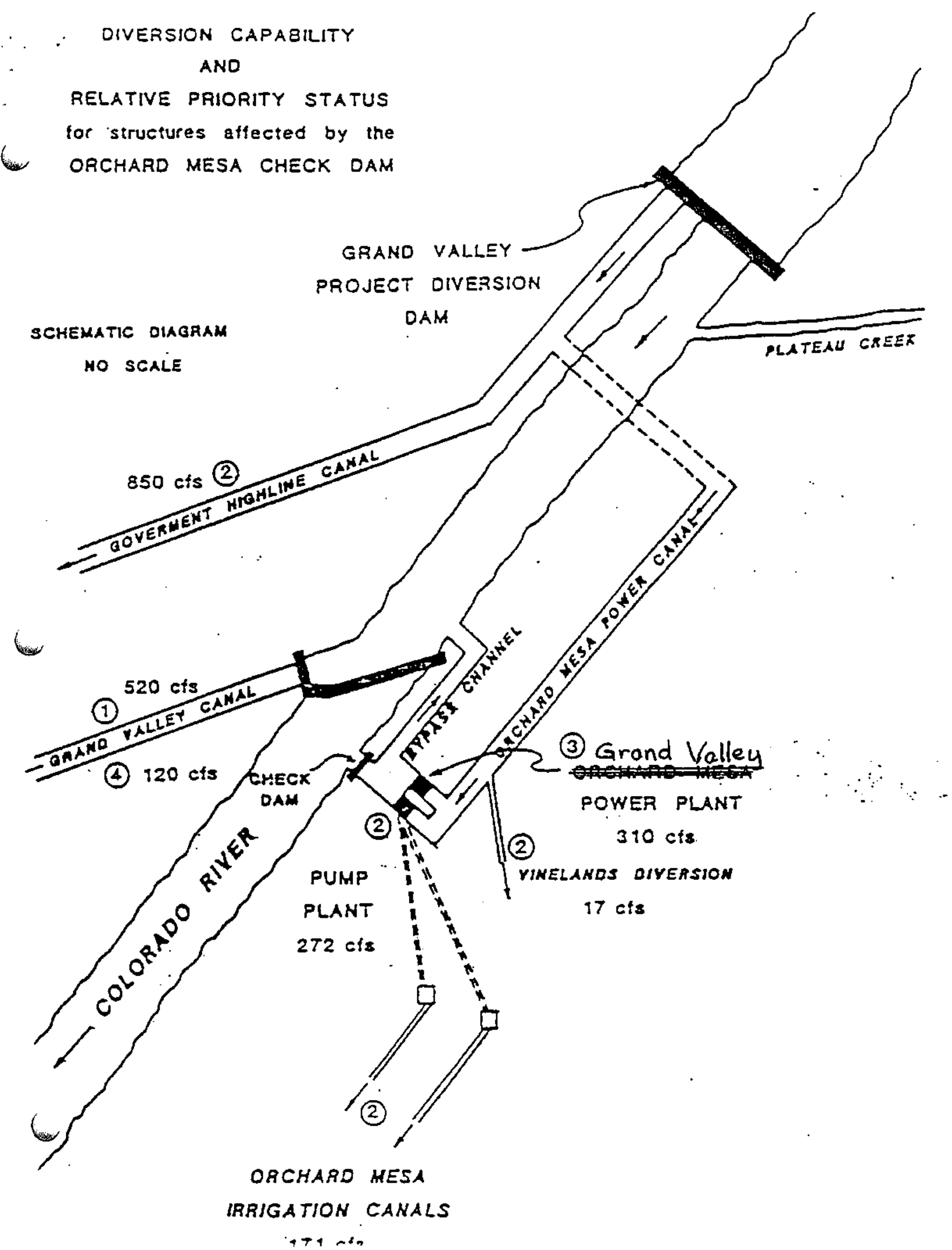
Historic Need for the "Check"

In 1907-08, the OMID began supplying irrigation water to its service area on the bluffs south of the Colorado River near Palisade, but needed a right-of-way from the United States to complete the project. At the same time, the Reclamation Service was planning a major irrigation project north of the river that would be seriously affected by OMID's senior irrigation rights. As a condition for granting the right-of-way across Federal land, the OMID agreed to share water supply shortages. Because there was no stored water to augment late-season flows at Cameo before Green Mountain Reservoir was built in 1943, operators of the Grand Valley Project needed to protect themselves against calls by the senior GVIC right of 520 cfs or risk water shortages in most years. Consequently, the bypass channel (Orchard Mesa Check) was constructed and placed in service in 1926. The bypass channel provides a means of returning the pumping plant tailrace water to the Colorado River above the senior GVIC diversion. Before the Grand Valley Project was completed, the OMID system had been absorbed and was functioning as part of the larger project.

When the natural flow of water in the Colorado River was insufficient to satisfy the water rights of the Cameo Call, an out of priority diversion was made in which some or all of the GVIC senior water right was diverted at the Grand Valley Project diversion dam. The portion of the GVIC senior right which was diverted was used for pumping purposes of the Orchard Mesa Pumping Plant and, after 1933, to generate electricity in the Grand Valley Power Plant. After the portion of GVIC senior right was used for power generation and pumping purposes, it was checked in the Orchard Mesa bypass channel to a point upstream of the GVIC diversion dam and then returned to the Colorado River for use by GVIC. This operation allowed continued service to the Highline Canal and Orchard Mesa Canals until river flows were insufficient to satisfy all the irrigation demands. The OMID powerplant and pumping plant could continue to operate under shortage conditions by out of priority diversions of up to the full GVIC senior water right at the Grand Valley Project Dam and returning it to the river just upstream from the GVIC demand point. The United States, GVWUA, and OMID agreed to this method of operating for their mutual benefit, but did not address any need to use the "check" for other purposes.

After construction of GMR additional water was available for irrigation use on the West Slope. Water from GMR was released whenever natural West Slope water supplies were insufficient to cover the major demands at Dotsero and Cameo. Transmountain diversions were forced to use replacement sources if they continued to divert, and the Division Engineer would require that the "check" was installed before releasing water from Green Mountain Reservoir. This

DIVERSION CAPABILITY
AND
RELATIVE PRIORITY STATUS
for structures affected by the
ORCHARD MESA CHECK DAM



administrative policy required a check operation which provided water to the junior GVIC right. By using the "check" to take care of a shortage to the 120-cfs junior right of GVIC (the most junior part of the Cameo group), less water was needed from Green Mountain, and more extensive administration of the river could be avoided. This river administration policy continued despite the objections of the GVWUA and OMID, who maintained that their agreement for operating the "check" was private and carried no responsibility to serve junior rights.

Impacts to Orchard Mesa Irrigation District due to "Check" Operations

Lowering the radial gates on the "check" structure causes the water level in the power/pumping plant tailrace to rise, which decreases the efficiency of the hydraulic pumps and the powerplant. As the radial gates are lowered, the flow in the bypass channel increases, the water surface elevation in the tailrace gradually increases which gradually decreases both pumping capacity and electrical power generation. At the maximum flow in the bypass channel, the ability to pump irrigation water and generate power has been estimated to decrease by 12 percent. Consequently, OMID uses the check and bypass channel only if they have made an out of priority diversion at the Grand Valley Project diversion dam and need to return the water to the river to satisfy GVIC's demands.

OMID also has been paying all operation and maintenance costs for the "check" and bypass channel since they were constructed. By operating the "check" to benefit junior rights, OMID has provided a service to water users throughout the Colorado River basin, while experiencing water shortages and increased operating costs. Annual power revenues paid to OMID and GVWUA have averaged over $200,000 per year for the last five years. In addition, the Public Service Company of Colorado derives revenue from operating the plant.

The OMID would not be willing to operate the check for the benefit of junior water rights without compensation for lost power revenues and some means to supplement pumping capacity. The frequency at which this situation would occur would have to be evaluated to determine if the costs are justified. The cost of the power lost could be significant, as the total power generation averages about $17,000/month. However, with check operation, some power would be generated. The supplemental pumping capability which would be necessary to replace the 12 percent loss of pumping capacity, would result in an annual cost of about $100,000 for a 22 cfs pumping plant operating for 60 days/year. A more detailed analysis of the impacts of check operation on power generation and pumping capacity based on historic data is currently being conducted as part of the on going Orchard Mesa Check Exchange application settlement discussions.

Changes In River Administration

In the early 1980's, OMID hired its own management and legal advisors, and separated from the GVWUA. Through a series of letters and meetings, OMID announced that it no longer intended to operate the "check" outside the original intent of the agreement with the United States and GVWUA[5]. The State Engineer and Division Engineer have since agreed with this approach saying that the "check" would not be required unless OMID began generating power or pumping with water which was diverted out of priority at the Grand Valley Project diversion dam.

Under the current strict river administration, the GVIC junior right for 120 cfs will call for water from Green Mountain Reservoir while the OMID tailrace is allowed to drain freely into the Colorado River below the GVIC diversion. This change in administration has had an impact on Green Mountain Reservoir and the protection it can provide to West Slope water users. Based upon the historically "required" "check" operations, about 66,000 acre-feet were released from Green Mountain Reservoir for West Slope uses in the 1977 drought year. This figure is often quoted as the maximum water supply protection needed by West Slope users from GMR. However, 66,000 acre-feet may not be adequate today without a guarantee that the "check" will be operated in the historic rather than current pattern. Even with operation of the check 66,000 af may not be adequate due to several changes in river administration, river accounting, and water rights perfected between 1977 and 1984.

Impacts on the 15-Mile Reach of the New Operation

The relatively large and senior irrigation and power diversions in the Grand Valley help bring water to the Reach as well as take water from the Reach. These senior rights are capable of prohibiting upstream junior appropriators from diverting water and are also capable of requesting releases from GMR. The significance of GMR to the Grand Valley water supply should not be understated. Without these releases, upstream water supply to junior appropriators would be restricted and OMID would more frequently be required to implement the check in order to generate power. For example, in the first 18 days of September 1991, GMR released over

[5] The operation of the check constitutes an exchange, where water is taken out of priority at the GVP Diversion Dam and then returned or replaced by the operation of the "check." An application was made (91CW247) to Confirm and Approve Appropriative Rights of Exchange and has generated opposition. As of December 7, 1994, settlement discussions are proceeding.

25,000 acre-feet (af) of water at an average flow rate of over 700 cfs or about 1,400 af per day.

The Colorado River Water Conservation District (CRWCD) developed a computer spreadsheet that assessed the impact of the current check operation on upstream stored water (most notably Green Mountain Reservoir). Current estimates of the impact depend on the flow capacity of the bypass channel, but range from about 20,000 to 30,000 af. Consequently, a total of 86,000 to 96,000 af of releases from GMR would have been required in 1977 if the check had been operated then as it currently. The Reach benefits from the new operation of the check because Grand Valley irrigators will place more demand on upstream storage to meet diversion requirements while the tailrace of the Orchard Mesa Pumping and the Grand Valley Power Plants return pumping and power generation flows to the Reach.

The aggregate of the Grand Valley irrigation and power diversions can place a demand of about 2,260 cfs on the Colorado River during the irrigation season. When the river is at 2,260 cfs, theoretically 582 cfs will be released through the Orchard Mesa Power and Grand Valley Pumping Plant to the Reach. Under current operations of the Orchard Mesa Irrigation District check, this flow is maintained until the natural flow in the river falls below 2,140 cfs. For every 1 cfs decrease below 2,140 cfs at the Cameo gage, the flow in the Reach decreases by 1 cfs. The Reach can be essentially dry immediately downstream of GVIC's diversion dam when the natural flow at Cameo falls below 1,560 cfs. However, the possibility of the flows in the river decreasing to these levels is remote as long as releases are available from GMR.

Based upon the CRWCD spreadsheet model, the current operation of the check could deplete or nearly deplete all Western Slope storage in GMR in dryer years. If this happens, both water users and fish habitat would suffer. Consequently, in a very low water year, it may actually be beneficial from a water supply standpoint to use the check to supply some of GVIC's junior 120 cfs water right. This operation would save water in GMR for release later in the year. If the check is used for GVIC's junior water right, the flow in the beginning of the Reach would fall below 582 cfs. Even though this flow rate is below the desired minimum, the saved water could prevent near zero flows in the Reach later in the irrigation season.

Green Mountain Reservoir - was constructed as compensatory storage facility for the diversion of water to the eastern slope of Colorado through the Colorado-Big Thompson Project. The 152,000 af reservoir has two main storage pools, a 52,000 af replacement pool to replace out-of-priority diversion by the Colorado Big Thompson Project and a 100,000 af power pool which was also available for west slope irrigation and domestic purposes. Upstream junior diverters can be grouped into two main categories, beneficiaries and non-beneficiaries of Green Mountain Reservoir. In practice this means that those junior diverters who are not beneficiaries of GMR

and are called out by a senior water right cannot request releases from GMR Historic Users Pool (HUP) and are forced to cease diverting unless they have some other source of replacement water. The State Engineers Office considers all water rights with irrigation and domestic uses that were perfected before January 1984 to be GMR beneficiaries. In 1977 (historically a very dry water year) these beneficiaries requested approximately 66,000 af of releases from the 100,000 GMR power pool. This event was instrumental in defining and quantifying the 66,000 af Historic Users Pool (HUP). The HUP is a portion of the 100,000 af power pool, not in addition to the pool. The HUP is accounted for as a separate reservoir. Therefore, on paper, when the pool is empty, the reservoir is dry.

River Administration

Before discussing a protection plan for conserved water from the Grand Valley Project it is necessary to have an understanding of Colorado River administration as applies to the Cameo Call. The number of variations of what can happen in any one water year are seemingly unlimited. The following discussion will attempt to step through what may be called a "normal" water year if one really exists. The following discussion may imply that the Cameo demand stays at 2,260 throughout the irrigation season where in actuality there is variation. For this discussion the Cameo demand will be 2,260 unless a different value is beneficial for demonstration purposes.

Prior to the beginning of runoff and the irrigation season there is usually enough water at the Cameo gage to supply the Grand Valley Power Plant. During this period the controlling water right on the river is quite commonly the Shoshone Power Plant. As the river flows begin to increase at Cameo, the Shoshone call usually stays on, and the Cameo rights will not need to place a pre-peak call. By about April 1 Cameo irrigation diversions begin. If there is not enough snowpack in the lower portions of the basin, it is possible, but infrequent, for one of the Cameo water rights to place a pre-runoff call.

Upstream juniors - During periods of peak demand the Cameo water rights are satisfied as long as the Cameo gage is above 2,260 cfs. Runoff usually stays above this amount through May and June and commonly well into July. But as flows decrease at Cameo, the effect of the Cameo group begins to reach upstream. With the Cameo demand at 2,260 cfs, the Cameo group can place a call on the river as soon as the natural flow at the Cameo gage falls below 2,260 cfs. In this case the most junior right in the group is the GVIC 120 cfs right, so GVIC will place the call. Starting from the most junior water right, more and more upstream junior diverters will then be directed to cease diversions until the flow at Cameo returns to 2,260 cfs. If those upstream water rights are GMR HUP beneficiaries, then instead of ceasing diversions, the Division Engineer will direct releases from GMR HUP to replace the consumptive use portion

of those junior diversions. The only real difference between releasing additional water for the 120 cfs right and making replacement releases is how the water is accounted for. The net effect on GMR reservoir is the same; i.e. whether you release water directly to the 120 cfs right or replace out of priority consumptive use. Theoretically, by replacing the consumptive use portion, downstream users would not be able to detect upstream junior depletions.

Technically speaking, if such a junior GMR HUP beneficiary was in Rifle, Colorado and was called out by the GVIC 120 cfs right the junior right would be required to cease irrigation until replacement releases traveled to their point of diversion (approximately 1 1/2 days travel time). In practice however, the OMID has agreed to supply the shortage to the 120 cfs by operating the check and using some of OMID's tailrace water to temporarily supply the shortage to the 120 cfs right until the GMR releases reach GVIC (estimated to be about 3 days). No statute requires this service by OMID but OMID performs this service in a cooperative spirit to facilitate river administration. Check operation does cause OMID and GVWUA loss in power revenues and decreases the ability to pump water at the pumping plant when the check is used.

It is important to point out that when the Division 5 Engineer makes releases to GMR HUP beneficiaries, those releases are for the consumptive use portion of the right only. Historically, the Division 5 Engineer has estimated irrigation diversions to be 50 percent consumptive. So for a 40 cfs irrigation diversion, the Division Engineer would release 20 cfs plus conveyance losses from GMR HUP. The Division Engineer has estimated that calling out all non-GMR HUP beneficiary upstream rights junior to the GVIC 120 cfs water right can supplement the flow at the Cameo gage by about 200 cfs.

Direct releases to the GVIC 120 cfs right - If all of the non-GMR HUP beneficiary water rights junior to GVIC's 120 cfs right have been called out and the natural flow of the river continues to fall below 2,260 cfs then direct releases are made from GMR HUP to the 120 cfs right. Up to 120 cfs of direct releases can be made to the 120 cfs right. So until the natural flow at Cameo falls to 2,140 cfs (2,260 - 120) the GVIC 120 cfs right is the calling or controlling water right.

Administration of the 400 cfs power right - If the flow at the Cameo gage continues to fall and there is a direct release of 120 cfs to the 120 cfs GVIC junior water right, then the next right that goes into priority in the Cameo group is the 400 cfs power right. There are a few water rights in the water right tabulation between the priority of the GVIC 120 right and the priority of the 400 cfs power right that can be called by the power right. In practice, the junior rights which produce wet water at Cameo are called out by the GVIC 120 cfs right. The 400 cfs power right is not a beneficiary of GMR since it is neither an irrigation nor a domestic use. Consequently, when the natural flow of the river continues to fall, this right receives a decreased

amount of water. Up until this point the flow at Cameo has been maintained at about 2,260 cfs by either calling out upstream juniors or releases from Green Mountain Reservoir. But as the natural flow continues to fall at the Cameo gage the 400 cfs power right receives less water and the flow at Cameo is not augmented by additional GMR releases.

Through operation of the check and the associated exchange, power can be produced even with this decreased supply. Instead of decreasing the amount of water diverted at the Grand Valley Project diversion dam, an out of priority diversion for the 400 cfs right can be made, the water is then run through the power plant, the radial gates in the tailrace channel are lowered, the water in the tailrace will then run back upriver through the check channel, and then return to the river upstream of the GVIC diversion dam. This process is known as checking and is also called operating the Orchard Mesa check.

The summation of water rights of the Cameo group is 2,350 cfs (the 2,260 we've been working with is to the physical capacity of the Government Highline Canal.) Therefore, while the power right is the controlling water right the river is allowed to fall to 1,950 cfs at Cameo (2,260 - 310) before any additional releases are made from GMR to the Cameo group. The quantity of flow in the "check" exchange is directly related to the river supply at the Cameo gage. As the natural flow decreases from 2,260 to 1,950 cfs the exchange is operated from 0 to 310 cfs. From a natural flow at the Cameo gage of 2,140 (2,260 - 120 releases for the junior GVIC water right) to 1,830 cfs (2,140 - 310 power right) the calling or controlling water right is the 400 cfs power right.

While the river is in this flow range, as the flow at the Cameo gage decreases, the flow in the 15-Mile Reach decreases. At the beginning of this natural flow range the flow in the Reach is about 581 cfs and at the end of the range, it has fallen to 271 cfs. Whether or not OMID operates the exchange makes no difference in 15-Mile Reach flows because if the out of priority diversion was not made at the Grand Valley Project diversion dam it would only stay in the river until it was diverted at the GVIC diversion dam.

Administration and the GVWUA/USA 730 cfs water right - The next right to come into priority in the Cameo group is the 730 cfs irrigation right. Since it is and irrigation use, it is a GMR HUP beneficiary. But before any additional releases are made for the Cameo demand, any water rights junior to the 730 cfs right and senior to the power right are called out. Since only the irrigation and domestic water rights between the 400 cfs power right and the 730 cfs irrigation right are GMR beneficiaries, any water rights not in either of these categories are required to stop diverting. The irrigation and domestic rights are technically called out but simultaneously replacement releases are made from GMR.

The 730 cfs irrigation right is the calling right from a natural flow at the Cameo gage of 1,830 to 1,100 cfs (1,830 - 730). Releases are increased from the GMR HUP to keep the gaged flow at Cameo at 1,950 cfs. It is very rare (___ times in the last ___ years) that the natural flow at the Cameo gage has fallen below 1,100 cfs during the irrigation season. River administration is somewhat simplified while the flow at the Cameo gage is in this flow range since the calling right and the priority of the call remains the same.

During this natural flow range the Orchard Mesa Irrigation District is theoretically running all 310 cfs of power water through the check and the only water in the 15-Mile reach is the approximately 272 cfs used for pumping irrigation water to the Orchard Mesa.

Administration of the OMID 460[6] cfs irrigation rights - The next right in priority in the Cameo group is the 460 cfs right. In recent history, the natural flow has not fallen low enough to cause the 460 cfs rights to call the river. Since it is irrigation use, it is a beneficiary of GMR. But before any additional releases are made for the Cameo demand, any water rights junior to the 460 cfs right and senior to the power right are called out. Non-GMR HUP beneficiaries would be required to stop diversions while replacement releases would be made for GMR beneficiaries.

The 460 cfs irrigation right is the calling right from a natural flow at the Cameo gage of 1,100 to 640 cfs (1,100 - 460). Releases are increased from the GMR HUP to keep the gaged Cameo flow at 1,950 cfs. During this natural flow range the Orchard Mesa Irrigation District is theoretically running all 310 cfs of power water through the check and the only water in the 15-Mile reach is the approximately 272 cfs used for pumping irrigation water up to the Orchard Mesa.

After the OMID 460 cfs water right - A similar process would be followed for natural flows below 640 cfs at Cameo. The calling rights would be those of Palisade Irrigation District and Mesa County Irrigation District totalling about 120 cfs. Green Mountain Reservoir would be used to supplement flows. These rights would be the calling rights until the natural flow fell to 520. The final right in the Cameo group is the senior GVIC 520 cfs right.

Timing of water conservation opportunities

[6] As previously mentioned, the 460 cfs right is a combination of the OMID's 450 cfs irrigation right and a senior 10 cfs right for the Vinelands area. Combination has been made for ease and simplification of the explanation and does not change the results.

In order to determine the opportunity to conserve water two factors should be analyzed. First, is there need for the conserved water? An indication of need may be whether the Cameo Call (explained on page 4) is curtailing any upstream diversions. Another indication of need may be the flow level in the 15-Mile Reach. If the flow in the Reach is below Fish and Wildlife Service flow recommendations then there is a need. Call this the "need" factor. The second factor is whether GVWUA is diverting excess water relative to their on-farm demand. Call this the "availability" factor. If GVWUA's on-farm demand is greater than supply then there is no excess or opportunity to conserve. There needs to be a match for both conditions to warrant changing canal operations.

Spring - In the spring, before significant runoff begins, the Cameo Call has occasionally required some upstream junior diverters to cease river diversions. This is a relatively rare situation happening ___ times in the last ___ years. (See if I can get this info from Orlyn) If the river flows are low, it is possible for flows in the 15-Mile Reach to fall below the recommended 700 cfs minimum, but generally, this minimum is maintained. Since there is a remote possibility of having a need to conserve water to supplement flows in the Reach, this is somewhat of a match for the need factor. The unexpected nature of spring runoff and flows in the Grand Valley and the operational requirement to charge the canal system makes the question of whether excess water is being diverted rather difficult. Charging the canal involves wetting and sealing the earthen canal and flushing out debris that has collected in the canal during the winter. On-farm operations may require bringing the soil moisture up to the proper levels before planting and irrigating crops. A rather large amount of water is required to accomplish these early on-farm and off-farm irrigation needs. Unfortunately, when river flows are low in the early spring, dry conditions are often experienced in the Grand Valley. There may be some flexibility to reduce diversions in this period but it is difficult to predict or quantify. This may be a match for the availability factor under certain circumstances.

Summer - The benefit of a reduction in the Cameo Call during the summer is demonstrated in nearly every water year that has below average runoff. During below average runoff years a call by the Cameo group is common. This is a good match for the need factor. Analyzing spill data along the Government Highline Canal during the summer period provides an indication of whether water may be available. During the peak of the irrigation season (about 1 June through early- to mid-September) monitoring of water patterns over the last 2 irrigation seasons (1992 and 1993) has shown that GVWUA frequently can and does deliver and use all of the water available to their irrigation water right. This does not happen everyday throughout the summer season but does demonstrate use of their full irrigation water right. The timing and duration of these peak uses is not predictable. Therefore, it is not feasible to make adjustments of diversion amounts to reflect a temporary reduction of demand with the existing canal system. The possibility of saving water during this period is remote and if at all possible would require

significantly more sophisticated system improvements, automation, and operation than are currently planned in this study. Due to the concept of customary and reasonable irrigation practices, this is considered a mis-match for the availability factor. At some date in the future, when customary and reasonable practices include irrigation systems improved to the levels anticipated in this study, it may be reasonable to analyze further advances in canal automation within the Grand Valley Project.

Late summer and early fall - after the peak irrigation season, the supply in the river is low and there is the greatest possibility to conserve water. This is the period of diminished river supply when the potential for the Cameo Call to curtail upstream junior diverters is most likely. A good match for the need factor. Demand within the irrigation system begins to fall and by early to mid-September and may be in the 200 to 250 cfs range. To maintain the water surface elevation to the level necessary to deliver water to some of the high lands adjacent to the canal a minimum diversion of about 400 to 450 cfs is required. Therefore, through the installation of canal water surface control devices (check structures) and the associated automation, there is the potential to reduce diversions up to 150 to 200 cfs to more closely follow demand. The most probable solution involves installation of five to six automated check structures to reduce peak river diversions. These improvements may be associated with the development of small volumes (300-600 acre-feet) of in-system storage that could be drawn from to meet peak demands and maintain a lower river diversion. Various configurations and combinations of these structural and non-structural components will be analyzed and screened.

Need for Flow Protection

There appears to be a "catch 22" whenever efforts are made to conserve, save or salvage water. If a diverter is following "reasonable and customary" practices within their irrigation system, it is difficult to declare that they are being wasteful. However, if they want to modernize their system beyond those standards, they are technically not entitled to the conserved water unless it can be demonstrated that water can be conserved and put to existing or new uses without injury to other water users. Normally, when water is conserved, downstream water users benefit. So if water is conserved, the downstream users could claim injury if the conserved water was applied to an expanded or new consumptive use. However, in the case of the Cameo group, there are no downstream users that experience a supply shortage. This conflict does not help motivate diverters to modernize in light of the usually significant cost of doing so and the legal costs associated with proving no injury.

But what happens if another person or organization is willing to pay for modernization? The law doesn't change, so how can conserved water be protected and used? As part of the Grand

DRAFT

Valley Water Management Study a group was formed to explore the technical, legal and policy issues associated with conserved water which may be made available through a modified canal system and different operation. This group represents municipal, industrial and irrigation water users on both the east and west slopes as well as Federal and state agencies. This group identified the legal and institutional issues that need to be resolved to protect the water made for flow enhancement in the 15-Mile Reach if all or a portion of the conserved water is used for this purpose. During a brainstorming session the group identified several different options to protect the flows. In the spirit of brainstorming there were no "bad ideas." However, some people may consider some of these options to be "bad ideas."

1. Prepare State legislation which would modify existing statutes to permit the use of water conserved through structural improvements and the corresponding management possibilities for instream flow enhancement while maintaining the original appropriation date of the underlying decree.

2. Maintain historic diversion patterns and change the point of some of the administrative spills to the inlet of tunnel number 3. (Tunnel number 3 is located several miles downstream from the GVP Diversion Dam and an administrative spill at this point would return the water to the river between the GVWUA Diversion Dam and the beginning of the 15-Mile Reach.) During periods of high irrigation demand it is anticipated that little or no water would be available at tunnel number 3. This alternative may not require a change in the 730 cfs irrigation water right of the USA/GVWUA.

3. The following alternatives require a change of use in the 730 cfs existing irrigation water right. This would require filing an application for a change of use and a water court action. These alternatives vary in the manner you would reach negotiated settlement with the objectors:
   a. Work out a mechanism to share the conserved water with other users and deliver a portion to the river.
   b. Get as many of the "major" water users to agree to protection of conserved water for flow enhancement in the 15-Mile Reach. The selling point would be the credit for significant progress toward recovery of the endangered fish in the Colorado River. This contribution would relieve some of the pressure on water development. A change in use would be necessary to the 730 cfs right and would maintain the existing priority date.
   c. Acquire enough storage within the basin to satisfy those who might object to using the conserved water for flow enhancement. This storage would replace the amount of water to nullify any percieved injury.
   d. Apply for a change in use for the 730 cfs right to include piscatorial uses. The

group was not aware of a ruling indicating that you cannot redirect water conserved through management to another beneficial use. However, the applicant would bear the burden of proving non-injury to other water users. It may be possible to ask for a decision by summary judgement although this appears to be unlikely.

4. Create a conservation pool in Green Mountain Reservoir. Whenever the Cameo Call can be reduced as a result of water conservation within the GVWUA system, the volume of conserved water would be stored and accounted for in Green Mountain and released later. This concept has several sub-alternatives.
   a. The release from the conservation pool could be delivered to the Grand Valley Power Plant. This would also require a change in the documents controlling the use of Green Mountain Reservoir (Senate Document 80 and the Operating Policy.)
   b. There are many possible alternatives for how a conserved volume could be divided up among other water users.

5. There is the possibility that releases could be made to an industrial use if the amount of water in Green Mountain is determined to be in excess of what Green Mountain beneficiaries need in any given year. This might be accomplished by establishing storage targets on Green Mountain Reservoir. If the volume in storage in the HUP is above the targets, then it may be possible to declare a surplus storage condition which would permit an industrial release to the Grand Valley Power Plant and into the 15-Mile Reach. If the Grand Valley Project can reduce the demand on Green Mountain Reservoir in the late irrigation season then there would be a surplus storage condition in GMR on a more frequently and there would be more surplus, on a volume basis. Consequently, more water would be available for an industrial release to the Orchard Mesa Power Plant and indirectly to the Reach.

The group evaluated the above options and determined that option number 5 was preferred. One of the primary criteria used in this detemination was the desire to avoid the cast of a water court proceeding and the vulnerability of exposing water rights to challanges. This option avoids any kind of water court proceedings involving the existing water rights. This was preferred due to the volatile nature of those proceedings and all of the unknowns that may surface. It was felt that legislation may be a viable option but the long reaching implications of this approach may require several efforts with the Colorado legislature to get the legislation passed. Option number 5 may only require changing administrative policies relating to operation of Green Mountain Reservoir.

Preferred Protection Alternative

The reallocation of GMR storage and release to the Grand Valley Power Plant is the preferred alternative. Under this proposed administrative method, any water determined to be in excess of HUP beneficiaries need could be delivered to the GV Power Plant and indirectly yo the 14-Mile Reach. Conservation within the GVP would create a surplus storage condition on a more frequent basis and in a greater volume than has historically occurred. To a limited extent it would also provide the ability to time releases of storage when it would be most beneficial to fish habitat rather than only providing water at times when it can be conserved in the GVWUA system. This conservation would be the result of canal modifications and modified operational strategies which would permit the canal to operate at lower flow rate while permitting full supply to water users. (See page 22 for previous discussion on potential conservation timing and quantification.) This is contingent on the ability to declare a surplus and to deliver the surplus GMR HUP water to the Grand Valley Power Plant. The following conditions must be met before the method could be implemented:

1. GMR storage must have been declared surplus under Paragraph 8 of the GMR Operating Policy, and releases of such surplus must be deliverable to the Grand Valley Power Plant.

2. The first 90 cfs of conservation can be accommodated by increasing the flow to the GV Power Plant from 310 cfs to 400 cfs. For conservation above 90 cfs, it would be possible to reduce the amount "checked" by the amount of conservation greater than 90 cfs. For example: If 150 cfs is conserved then the amount checked can be reduced by 60 cfs (150-90).

3. Canal improvements have been constructed in the Government Highline Canal system which would allow continued use of the system at lower diversion rates.

4. There is a seasonal reduction in water demand in the GVWUA system.

Declaration of GMR surplus appears to be possible with the implementation of targets on the storage volume in GMR. The target could be associated with the entire reservoir, the 100,000 af power pool or the 66,000 af HUP. Since the specifis purpose of the HUP is for west slope irrigation and domestic purposes, the preferred pool under consideration is the 66,000 af HUP. The target could be one target at the end of the irrigation season, monthly targets throughout the irrigation season or some other variation. Again, current proposals are for a November 1 target and having enough water in the HUP to meet winter water deliveries. The ability to set targets, declare excess, and then make industrial releases has not been tested. Litigation could delay the implementation of this concept. However, the success of the Recovery Program to provide the reasonable to prudent alternative for future Endangered Species Act section 7 consultations, is crucial to all Colorado River water users.

Administrative Method

Under the proposed administrative method, when a GMR HUP surplus has been identified GMR releases are not reduced to correspond to the reduction in GVWUA demand, but an amount equal to the demand reduction (conservation) is reallocated for delivery to the Grand Valley Power Plant. This increment of GMR water conserved is diverted at the Grand Valley Project diversion dam, carried through the Orchard Mesa Power Canal, run through the Grand Valley Power Plant, and allowed to return to the Colorado River without being checked back. An amount of "natural" flow equal to the reallocation is allowed to bypass the Grand Valley Project diversion dam and flow down the river channel to be diverted by the Grand Valley Irrigation Company. The Grand Valley Power Plant simply reduces the amount of water checked and increases the flow to the Colorado River via the tailrace by an amount equal to the bypass at the Grand Valley Project diversion dam and the reallocation releases.

The result of this method is that the Grand Valley Power Plant does not have to check as much, fish are able to use the GMR surplus downstream from the Grand Valley Project diversion dam (which could also be used for a fish passage structure at the Grand Valley Project diversion dam and the Price/Stubb diversion dam), and more water enters the 15-Mile Reach through the Grand Valley Power Plant tailrace. Since there could be an additional 90 cfs available to the Grand valley Power Plant, it would be possible to deliver up to 672 cfs (300 cfs which is the existing power plant flows + 272 cfs from the Orchard Mesa Pumping Plant + 90 cfs available due to conservation which would be available).

Sample Reallocation Scenario

Water distribution patterns before reallocation - In this example reallocation all of the water running through the power plant is being checked. This also means that there are 120 cfs of GMR direct releases for GVIC being made. Figure 1 is a schematic of the Cameo group diversion system with the reallocation scenario numbers indicated. The non-inclosed numbers are the pre-reallocation numbers where the circled numbers are the reallocated flows.

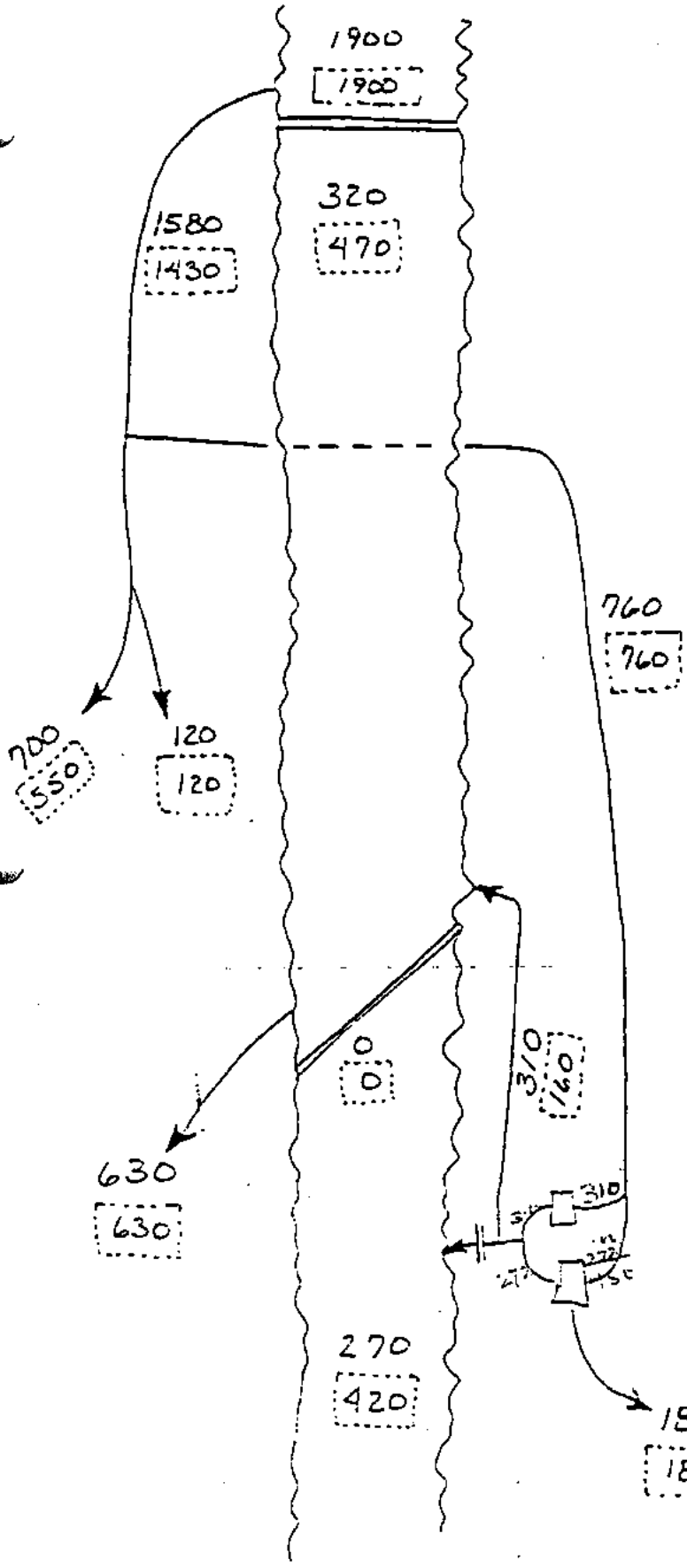
Pre-reallocation assumptions:

1. Cameo gage is at 1,900 cfs gage flow which includes 400 cfs of direct GMR releases. This means that about 280 cfs of direct releases are being made to the 730 cfs right and 120 cfs of direct releases to the GVIC's junior water right.
2. 1,580 cfs is being diverted at the Grand Valley Project diversion dam
   a. 700 cfs for the 730 cfs right
   b. 120 cfs for the irrigation districts

SHEET____ OF____

DATE _____

BY_____



START CONDITIONS:

① 1900 cfs @ CAMEO includes 400 cfs from Green Mtn.

② PLATEAU CR assumed = 0

③ CHECKING FULL POWER RIGHT @ 310

④ DIVERTING 1580 @ Roller Dam

RE-ALLOCATION PROPOSAL

① GVWUA DEMAND IS REDUCED BY 150 cfs

② GREEN MTN RELEASES ARE ASSUMED TO BE SURPLUS, AND 150 cfs IS RE-ALLOCATED TO BE DELIVERED TO POWER PLANT.

③ ROLLER DAM BYPASSES 150 cfs FROM GREEN MTN.

④ "CHECK" FLOW IS REDUCED BY 150 cfs.

FIGURE 1

COLORADO RIVER WATER CONSERVATION DISTRICT

GLENWOOD SPRINGS, COLORADO

c. 760 cfs through the orchard Mesa power canal
   i. 310 cfs for the power plant
   ii. 450 cfs for the OMID irrigation right
      (1) 180 pumped onto the Orchard Mesa
      (2) 270 cfs used for pumping

3. 630 cfs to the Grand Valley Irrigation Company through their 120 cfs and 540 cfs rights.
4. Assume Plateau Creek flows are zero.

Implications of the pre-reallocation assumptions - In order for the above conditions to exist several flows are implied. They are:

1. The flow over the Grand Valley project diversion dam must be 320 cfs (1,900 - 1,580 cfs).
2. Flow in the pumping plant and power plant tailrace is 580 cfs (310 (power) + 270 (pumping))
3. If there is only 320 cfs in the river below the Grand Valley Project diversion dam and GVIC is taking 630 cfs then there must be 310 cfs (630 - 320) flowing in the check channel.
4. Flow over the GVIC diversion dam is zero.
5. Flow at the beginning of the 15-Mile Reach is 270 cfs.

Reallocation assumptions:

6. Flow at the Cameo gage does not change
7. GVWUA is able to reduce their demand by 150 cfs from 700 cfs to 550 cfs through canal improvements and the associated operational changes. Therefore, total diversion requirements at the Grand Valley Project diversion dam are 1,430 cfs (1,580 - 150)
8. GVIC stays at 630 cfs
9. OMID irrigation and pumping stay at 180 cfs and 270 cfs respectively
10. The irrigation districts (MCID and PID) stay at 120 cfs

Results of reallocation:

1. Amount of flow going over the Grand Valley Project diversion dam is 470 cfs.
2. The required amount of checking is 160 cfs (GVIC's 630 cfs - 470 cfs river flows)
3. Flow over the GVIC diversion dam is zero
4. Flow at the beginning of the 15-Mile Reach equals 420 cfs.

Potential for Reallocation

The potential quantity that could be reallocated is controlled by two factors. The first is how much water could be conserved through the canal improvements. The second is what type of water year is experienced. If it isn't possible to stay above the GMR targets, it will not be possible to reallocate GMR storage.

Computation of Conserved Water - The difficulty in computing the volume of conserved water is figuring out what number you subtract from to compute the volume of conserved water? For example, assume that the canal improvements have been completed and GVWUA is able to reduce diversion requirements during the late irrigation season. It is not difficult to figure out how much is diverted in any one year, but how would you figure out whether that volume represented any conservation. The question is, "What would they have diverted had they not had the improvements?" Would the baseline condition be the average annual diversions within the project? Variables such as cropping patterns, rain and wind have a large effect on annual diversion requirements. Would it be the diversion based upon a dry, average, and above average water years?

The pipe laterals which have been installed as part of the salinity control program have increased the flexibility for on-farm water management. This additional flexibility is usually beneficial to salinity control because it allows water users to apply water at higher flow rates and with more control over the timing of application. Historically, GVWUA needed to know how much water farmers wanted so that a lateral headgate could be adjusted to the lateral demand. But the canal headgates for the pipelines are now left in the full open position throughout the irrigation season. Flow adjustment along a pipe lateral is therefore adjusted by individual field turnouts. Flow control has moved from lateral headgate to field delivery.

As on-farm flexibility increases, off-farm flexibility decreases. The flow in the canal needs to be able to meet anticipated demands, but since the demands can change quickly and without notice, the only option is to keep the supply in the canal above anticipated demand and administratively spill the water at canal spillways if the demand falls. Demand is hard to anticipate because of the variables. It may be possible to project some of the variables, such as cropping pattern and the amount of crop water requirements, but others such, as rainstorms, wind and heat are not. These variables can change canal demand by up to 100 to 150 cfs over the period of a day. With the pipelines, if the on-farm demand exceeds the canal's capacity, all users are asked to decrease their field turnouts by an equal percentage. With all of the unpredictable variables, it is doubtful that it will be possible to compute the quantity of conserved water. It does appear to be both possible and reasonable to estimate this quantity based upon experience.

DRAFT

The Manager Emeritus of the Grand Valley Water User's Association, Mr. Bill Klapwyk, has had roughly 40 years experience with the Grand Valley Project system. Through this experience Mr. Klapwyk has found that after the irrigation demand begins to subside, it usually takes about 400 to 450 cfs in the canal system to be able to meet all of the delivery elevations along the canal. The timing of this decreased demand varies from about the first of September up to the third week in September. Again, based upon experience, late season demand usually falls to around 200 to 250 cfs, but can fall to as low as 150 cfs. So theoretically it may be possible to conserve up to 300 cfs (450-150). (It may not be possible to maintain the desired water surface elevation at a flow of 150 cfs, or it may prove too costly to do so. In addition, it is not generally advisable to decrease canal diversions to exactly meet demand because of the uncertainties in weather and demand.)

For the purpose of estimating the possible amount of conserved water, use 100 cfs reduction in diversion requirements starting September 1 and then increase the amount conserved to 200 cfs on September 15 and carry this amount through November 1. The resulting quantity of water conserved is approximately 33,000 af.

The effect of Colorado River runoff volume on Green Mountain Reservoir storage targets - From the period 1965 to 1990 there was an average of approximately 48,000 af in the HUP on November 1. In 1989 the HUP was depleted which correlates well with the large direct releases to the 730 cfs right. If water conservation measures could have been implemented in that year it would have been possible to keep above the HUP targets and enhance flows in the 15-Mile Reach. In 1990 the November 1 HUP storage volume was about 4,000 af and releases to the 730 cfs right were 14,985 af (using the old method of computing consumptive use). A more complete analysis of November 1 storage volumes and direct release computations will be necessary, but if 1990 is an indication, if the actual releases to the 730 cfs right are closer to the estimated 26,665 af, and if a November 1 target of about 4,000 af is reasonable, then it appears that GMR HUP targets may restrict the reallocation to about 26,665 af on a firm yield basis.

Summary

The two factors which control the ability to reallocate GMR HUP and ultimately increase flows in the 15-Mile Reach; 1) the ability to conserve, and, 2) the ability to keep GMR HUP above targets. These factors appear to have a good fit for most years. In dry years, such as a 1977 water year, water conservation may only be used to keep the GMR HUP at storage target levels. But even in relatively dry years such as 1989, conservation and reallocation would benefit both GMR HUP and 15-Mile Reach flows. Of course, all of this is contingent on the ability to establish targets on the GMR HUP, to declare excess, and then make industrial releases to the Grand Valley Power Plant.

Identical Letter List:

Mr. Gene Jencsok and Mr. Randy Seaholm
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver CO 80203

Mr. Eric Kuhn and Mr. Mike Gross
Colorado River Water Conservation District
PO Box 1120
Glenwood Springs CO 81602

Mr. Hal Simpson
Colorado Division of Water Resources
1313 Sherman Street, Room 818
Denver CO 80203

Mr. Greg Trainor
City of Grand Junction
250 North 5th Street
Grand Junction CO 81501

Mr. Jay Britton and Mr. Dave Little
Denver Water
1600 West 12th Avenue
Denver CO 80254

Mr. Robert Wigington
The Nature Conservancy
2060 Broadway, Suite 230
Boulder CO 80302

Mr. Dick Proctor and Mr. G.W. Klapwyk
Grand Valley Water Users Association
500 South 10th
Grand Junction CO 81501

Mr. George Smith
U. S. Fish and Wildlife Service
Fish and Wildlife Enhancement
PO Box 25486 - DFC
Denver CO 80203

Mr. Peter Evans
Colorado Water Conservation Board
1313 sherman Street, Room 721
Denver CO 80203

Ms. Ruth Hutchins
1574 L Road
Fruita CO 81521

Ms. Lynn A. Johnson, Esq.
U.S. Department of Justice
Environmental & Natural Resources Division
999 18th Street, Suite 945
Denver CO 80202

Mr. Eric Wilkinson and Jon Altenhofen
Northern Colorado Water Conservancy District
PO Box 679
Loveland CO 80537-0679

Mr. Tom Pitts
Hall, Pitts and Associates
535 North Garfield Avenue
Loveland CO 80537-5548

See J. Aragon decision on Green Mtn att. to Gun Co. Brief Union Park

END OF EMPIRE

The Colorado River Water Conservation District and Its Role In Dismantling The Historic Purposes of Green Mountain Reservoir

by Greg Trainor
City of Grand Junction 1993

December 10, 1993

END OF EMPIRE

The Colorado River Water Conservation District and Its Role In Dismantling The Historic Purposes of Green Mountain Reservoir.

Themes

Created in 1937, the Colorado River Water Conservation District inherited the vision created by the Western Slope Protective Association. In the mid 1930s it was the Protective Association which negotiated with the Northern Colorado Water Conservancy District to compensate western slope water users for Northern's out-of-basin, out-of-priority Colorado River diversions to a thirsty, water-short agricultural northern Colorado. Colorado-Big Thompson diversions would be compensated by the construction of the western slope Green Mountain Reservoir. It is ironic that this reservoir, almost sixty years later, is the vehicle by which the Colorado River Water Conservation District has financially bound itself to Denver. The result is that Denver will divert Green Mountain water to the eastern slope and own the water in Wolford Mountain Reservoir meant to be compensation to the western slope for Denver's Green Mountain takings.

The Colorado River Water Conservation District includes all or part of fifteen western slope counties drained by the Colorado River and its tributaries within Colorado. The Colorado River Water Conservation District levies property taxes on over four billion dollars of assessed property value within Western Colorado. During the "Two Forks decade" of the 1980's, the River District turned from an organization commissioned by its enabling statute to serving

> "...the entire district and ... the welfare of all its inhabitants...and to perform acts and things necessary or advisable to secure and insure an adequate supply of water, present and future, for irrigation, mining, manufacturing, and domestic purposes within said district..."

to one serving the purposes of the City and County of Denver on the Colorado mainstem in Colorado.

The River District must be given credit for its work within other drainage basins in Colorado. The Upper Gunnison and the White River drainages are good examples. However, on the Colorado mainstem, the River District's performance of acts has led it on a path of conflict and compromise which will irreparably harm beneficiaries of Green Mountain Reservoir.

Green Mountain Reservoir-that great compensatory insurance policy for western slope water users-is the opportunity by which Denver, working through the River District as its surrogate, will, one, lay claim to additional, uncompensated western slope water and, two, substitute in its place water of lesser quality.

Development of the Themes

The germ of several ideas was established in the Two Forks permit process to realize the goal of an assured water supply for the Denver metropolitan area. Initiated and supported by the environmental community and by interests in the Vail Valley, "non-structural means" was a way to achieve a water supply without the construction of reservoirs in the canyons and high mountain valleys of Colorado. Substitutions, exchanges, trades, and use of existing water storage facilities were the preferred alternatives of the Colorado's environmental coalitions to the construction of the massive Two Forks facility on the South Platte River, Denver's preferred alternative.

Green Mountain Reservoir, as envisioned by the environmental community, would be the vehicle upon which the eastern slope-dominated Environmental Coalition would insure that its victory over Two Forks was sealed. Green Mountain was a large, already constructed facility, setting high in the Colorado River basin. Green Mountain's water decrees are senior to Denver's decrees and, thus, limit Denver's diversions to the eastern slope in dry years. If small, west slope substitution reservoirs could be built below Green Mountain Reservoir, substitutions could be made to satisfy users of Green Mountain water in dry years, allowing Denver to continue to divert in dry years. This solution was structural in nature resulting in the western slope being sacrificed to insure that the South Platte was not flooded by Two Forks.

Denver was setting the stage to implement these solutions to its water problem long before the demise of Two Forks. As late as December 15, 1986 Denver had recruited the foremost, long-standing representative of western slope water interests to assist it in its efforts to move the last amounts of old stored western slope water to the eastern slope.

The center piece of Denver's substitution strategy was Green Mountain Reservoir.

Strategically located on the lower Blue River in Summit County, Colorado, Green Mountain Reservoir is above the major senior downstream water rights that control the administration of the entire Colorado River system above Grand Junction, Colorado. The reservoir was put into operation in 1943 concurrently with Nothern Colorado's Colorado-Big Thompson project (C-BT). Fifty-two thousand acre feet of water was allocated for C-BT's out-of-priority diversions. An additional 100,000 acre feet was allocated for release to other present and future beneficial consumptive uses in Western Colorado. Total storage of Green Mountain is 153,639 acre feet.

Senate Document 80 contained the guiding principles for the construction of the Colorado-Big Thompson project and todays operation of Green Mountain reservoir. Drafted by the Bureau of Reclamation as a feasibility report on the costs and configuration of the C-BT and Green Mountain Reservoir construction, Senate Document 80 also contained the results of the negotiations among east and west slope interests on the operation of Green Mountain as a compensatory storage vessel for Northern's out-of-basin diversions. Senate Document 80 assigned operating authority of Green Mountain to the Bureau of Reclamation and appointed the Secretary of Interior as the trustee of Green Mountain. Senate Document 80 was adopted by Congress as Public Law 249 and signed by the President in August of 1937.

In 1963 another eastern slope diverter, Denver, completed construction of its flagship Dillon Reservoir on the upper Blue River in Summit County. This facility captures and diverts Blue River water to the Denver metropolitan area through the Roberts Tunnel. It can only do so, however, after the downstream Green Mountain Reservoir is filled or assured to be filled. This insures that western slope water users will have water available to them in Green Mountain Reservoir before Denver diverts its junior, Dillon water to the eastern slope. The "1955 Blue River Decree" outlined these rights and obligations after clarification was sought by the United States and others as to the Department of Interior's obligations outlined in Senate Document 80. The Blue River Decree also confirmed that modifications of Green Mountain operations were subject to the approval of the Secretary of Interior. The Blue River Decree was also approved by Congress in 1956 as part of the Colorado River Storage Act.

This requirement for Denver to fill Green Mountain for downstream users before it takes water to the metropolitan area is a significant irritation to the Denver Board of Water Commissioners. Long time observers in the east-west water wars indicate that Denver has been worn raw by this aggravation and that its biggest objective is to remove the Green Mountain filling requirement from its docket of responsibility. This policy has been evident in numerous legal attempts by Denver to remove this requirement.

In the drought of 1963 Denver unilaterally closed the gates on its Dillon Reservoir preventing water from entering Green Mountain Reservoir. This resulted in the "64 Stipulation" and the "1964 Decree". Again in 1977 Denver's actions moved from the courts to ditch bank when Denver tested the resolve of the Secretary of the Interior by refusing the Secretary's request to release water to Green Mountain from Dillon Reservoir. In 1979 the 10th Circuit Court held that the Federal government's right and obligation, under Senate Document 80, to fill Green Mountain was superior to Denver's right to fill Dillon Reservoir. In late summer of 1977, water was released to Green Mountain with the legal battles continuing until the 1979 ruling.

Subsequent to Denver's activity on the upper Blue River, events were occurring on the Colorado River just above the confluence of the Blue River and the Colorado River. In 1967 six northern Colorado cities filed on water rights on the Colorado River above its confluence with the Blue River. The project was named "Windy Gap" and was to be a planned source of water for Boulder, Estes Park, Fort Collins, Greeley, Longmont and Loveland. Water would be diverted from the Colorado River to northeast Colorado via a diversion dam and a pumping plant through facilities owned by the Northern Colorado Water Conservancy District. The six cities eventually petitioned to become a subdistrict of the Northern Colorado Water Conservancy District, which became known as the "municipal subdistrict".

In 1974, a suit was filed against the municipal subdistrict and Northern by the Colorado River Water Conservation District, the western slope water policy organization, to insure protection of western slope water users from the impacts of this further diversion of western slope water to the eastern slope. Under the Water Conservancy District Act, the Northern District and the municipal subdistrict must demonstrate that present and future uses of water in the Colorado River basin will not be harmed by further diversion of water to the eastern slope. In an August, 1985 address to the Colorado Water Workshop, River District staff Rolly Fischer reiterated the policy, again, that:

> "...present and future Western Colorado water users would be protected from the injuries of transmountain water diversions".

Not only was compensatory storage an issue but water quality in the form of salinity was raised as a "grave issue" by then River District director Robert Delaney.

In 1980, after years of court activity, a settlement agreement was reached among the parties that committed the municipal subdistrict to construction of Azure Reservoir as compensatory storage. However, issues of power generation, financial feasibility, and capacity resulted in continued, prolonged argument between the River District and the municipal subdistrict.

Finally in 1985 the municipal subdistrict agreed to pay a lump sum of $10.2 million dollars to the Colorado River Water Conservation District. The settlement would allow the River District to construct a compensatory storage facility of its own at either Rock Creek or Wolford Mountain on Muddy Creek. Windy Gap water rights were subordinated to either of the two River District projects and 3,000 acre feet of water was guaranteed to the Middle Park Water Conservancy District from Lake Granby.

After more than four decades of filing for and completing diligence on dozens of western slope water rights, the Colorado River Water Conservation District had yet to build a single project in the Colorado main-stem drainage for the benefit of western slope water users. The 1985 lump sum settlement would provide money for such a project and the hopes of the River District were that a project would be built. The biggest problem, however, was that the River District vastly underestimated the cost of such a facility.

Of the two proposed locations, Rock Creek or Muddy Creek, yield, environmental impact and political considerations eventually directed that the River District project be built at Wolford Mountain on Muddy creek. It would cost more than Rock Creek. Knowing of the relative higher cost of Wolford Mountain, former River District board member from Rio Blanco County, Kenneth O. Kenney, observed that the District still had no where near enough money to complete a storage project. Mr. Kenney was the President of Water Users Association Number 1 which built the Taylor Draw Storage Project on the White River near Rangely Colorado in 1982. He observed:

> "I could tell from the cost that we incurred at Taylor Draw that the River District staff had not estimated near enough money for their project-for either studies, utility relocations, environmental impacts, and mitigation. The cost would continue to go up."

Estimated costs did escalate on the Muddy Creek project-so much so that the Colorado River Water Conservation District had to find a money spigot in order to finance the project. The original $10.2 million plus accrued interest from the municipal subdistrict was not enough to finance the now $49 million dollar project.

Enter now the Denver Water Board with its huge financial resources and its troubled applications for the construction of Two Forks Reservoir. If it could remove its 1955 decreed filling requirement for Green Mountain Reservoir and take that water to the eastern slope, Denver would increase its flow of water regardless of the outcome of Two Forks. What Denver needed was a replacement reservoir for the Green Mountain water it would like to remove to the Eastern Slope.

On December 15, 1986 the Colorado River Water Conservation District signed an agreement with the City of Denver and the Northern Colorado Water Conservancy District. Expressing it as an "historic" agreement, the board and staff of the Colorado River Water Conservation District put the finishing touches on a pact that would finance their Muddy Creek project with Denver money. The agreement and future events would forever change the complexion of the River District and the notion of whom it represented on the Colorado mainstem.

The River District's objective for Muddy Creek, as articulated to its western slope constituents, was the storage of western slope water on the Western Slope for use by the Western Slope. If the lease with Denver could be limited for a 25 year period and if, at the end of the lease, the reservoir accrued to the western slope, the River District could sustain its rationale that the Western Slope would be getting a project built with Denver money. A masterful strategy, no doubt, but one that would unravel as future hands were played by a Denver organization intent on acquiring the use of Green Mountain water forever.

With the lease of western slope water from Muddy Creek, Denver exercised some mastery of its own and eliminated the only tax supported, broadly- based western slope organization that could unify western slope interests and raise the necessary issues to Two Forks and Denver's plans for the elimination of Green Mountain Reservoir as a source of water for western slope water users.

Upon the completion of the financial agreement with the River District in 1987, Denver acquired a replacement reservoir for Green Mountain that it did not have to permit. It also obtained a surrogate through the River District for a number of activities it would have to undertake in order to acquire Green Mountain water.

One objective of the agreement was to reach a settlement in Denver's long-standing efforts to effect its ability to acquire "rights of exchange" in a host of reservoir sites on the Western Slope of Colorado and to acquire an "interest" in Green Mountain Reservoir by finding other combinations of reservoirs to "replace the functions of Green Mountain Reservoir".

The 1986 Agreement speaks for itself in this regard.

Section IV, paragraph b of the 1986 Agreement, states that

> "The River District...will work with Denver to find a suitable reservoir or combination of reservoirs to replace the functions of Green Mountain Reservoir as set forth in Senate Document 80".

Section IV, paragraph f, indicates that

> "once replacement reservoirs have been identified, the River District, Northern, the Subdistrict and Denver will work together to deliver water stored in Green Mountain Reservoir to the Metropolitan Denver area. At that time Denver will limit the use of water rights decreed to the Eagle-Colorado Project for the operation of a replacement reservoir only".

(Denver had, by this time, acquired land for the Eagle-Colorado Project near Wolcott.)

Section V, paragraph a, indicates that

> "Denver, the River District, Northern and the Sub-district will cooperate to accomplish modifications of the decrees entered in cases 2782, 5016, and 5017 and obtain the approval of the United States Congress... to make use of the waters of Green Mountain Reservoir."

The River District contemplated the approval of Congress for its modification of Green Mountain as had been done with Senate Document 80 and the Blue River Decree.

Finally Section V, paragraph f, of the 1986 Agreement states that

> "the River District...agrees not to oppose or impede in any manner the federal, state, and local permitting necessary for the construction of Two Forks Reservoir, Straight Creek and the Williams Fork Extension..."

If the Two Forks permit failed in its original objective, it did focus the debate of water use in Colorado. The eastern slope interests were represented in the public debate. Section V of the 1986 Agreement saw the River District dumbed into public silence.

Ironically, River District staff Rolly Fischer argued in 1985 that "thresholds" were being met as a result of transmountain diversions and that

> "...the removal of major quantities of the basin's purest water from its headwaters brings about a wide range of impacts in the basin, including but not limited to: decreased crop production, diminished fisheries, increased water treatment costs, a poorer range of recreational experiences, increased capital costs for water and sewer plants, and more."

Secretary Fischer went on to say that

> "...history is replete with the empty promises made to western Colorado for mitigation... promises for such consideration have been made by state officials, by representatives of Denver and quickly forgotten. History is replete with examples of the destruction, chaos, and greater burden caused by the lack of such consideration. One such example, the raping and pillaging of Owens Valley by the City of Los Angeles, not only offers a lesson, but frightening parallels to the Denver/West Slope tradition."

It is important to repeat the articulated public policy of the River District prior to its "historic" settlement with Denver. It is important to illustrate the significance of the compromises outlined in the 1986 Agreement.

The 1986 Agreement, long before the demise of Two Forks, brought the curtain up on a new stage whose backdrop was the Federal District Court.

Denver's unswerving pursuit to consolidate and insure its water supplies created a complex and Byzantine venue upon which the most complicated Colorado water law cases are being argued.

In 1987 the City and County of Denver filed a change application in the District Court requesting the right to replace Green Mountain Reservoir's storage with a number of existing and to-be-constructed reservoirs. Denver also filed an exchange application. The Federal District Court dismissed the cases indicating that Denver failed to obtain the permission of Congress, that Denver had no standing because Denver did not own water rights in Green Mountain Reservoir, and that Denver failed to obtain the required approval of the Secretary of the Interior prior to filing its application.

The filing by Denver in 1987, before the decisions on Two Forks, indicate Denver's willingness to advance several fronts at the same time.

The City of Grand Junction, the Orchard Mesa Irrigation District, the Palisade Irrigation District, the Clifton Water District and numerous other water interests filed statements of opposition in the 1987 Denver cases, principally because it was not possible to determine whether the unbuilt reservoirs, proposed to replace Green Mountain reservoir, would function the same as Green Mountain Reservoir in terms of quantity of water available, priority date, and water quality-all very important issues to western slope water users.

The need for western slope water users to determine whether replacement reservoirs would function the same as Green Mountain relates to the issue and principle of compensatory storage, an objective nominally held by the River District. However, Denver's lease agreement with the Colorado River Water Conservation District for 30,000 acre feet of additional transmountain diversions took an authorized compensatory storage reservoir (Muddy Creek as comp storage for Windy Gap) and used it to replace an existing Congressionally-authorized compensatory storage reservoir (Green Mountain as comp storage for the Colorado-Big Thompson Project).
In the words of veteran Colorado water attorney, Kenneth Balcomb:

> "The (River District) Board should be made aware of the incongruity of spending money paid to it in trust (via the Windy Gap Settlement) as mitigation for one transmountain diversion on yet another transmountain diversion."

How much water is available in Muddy Creek for purposes of the Green Mountain substitution, beneficial uses downstream and for Windy Gap compensatory storage is still in question. In a letter response to the above issue dated April 13, 1993, Eric Kuhn of the River District indicated that

> "...there will be water available from Wolford Mountain Reservoir to future West Slope users, but exactly how much, when and at what costs are yet to be determined."

The availability of Muddy Creek water over the long-term has also been brought into question. A query was made by Glenwood Springs water attorney Scott Balcomb in a March 31, 1992 letter to River District board member Greg Hoskin. Scott asked:

> " How likely do you actually feel that Denver will relinquish the water supply upon which it has come to rely at the termination of the lease? This question is especially important because the Western Slope will not be able to evolve an economy dependent upon the water as it is committed to Denver at least for the term of the lease. The situation then becomes obvious: the River District could continue to lease to Denver or forgo the lease (and the revenue) to make water available at some future date to users in western Colorado."

Dependency upon the Denver cash flow over an extended period would likely insure that the River District provide Denver a secure, de facto permanent water supply. True to Scott Balcomb's prophetic question, on July 22, 1992 it was announced that the River District and Denver did, indeed, conclude an amended agreement that resulted in Denver owning 40% of the capacity of Muddy Creek Reservoir after the initial 25 year term of the lease expires.

Quoting from the July 1992 agreement:

> "The River District and Denver have agreed to modify the lease agreement to provide a permanent source of water for Denver subsequent to the end of the term of the Lease Agreement and Denver has agreed to change its amount and method of payment in consideration therefore, thereby making the issuance of bonds by the River District unnecessary."

Parenthetically, it is the last phrase of the above paragraph that is significant for the following discussion. Making the issuance of bonds unnecessary by the River District removed a significant impediment to the construction of the Muddy Creek project as the reality of the unsettled transfer cases could have prevented the issuance of bonds. The transfer cases are a significant reportable issue important to any bondholder because without the settlement of the transfer cases the use by Denver of this water is not possible and the lease/purchase payments evaporate.

The staff of the River District indicated that now the construction of Muddy Creek could begin and the transfer cases can be settled at leisure. However the transfer cases can not ignore the $49 million dollars of public money being spent on the project.

The long-term joint-ownership of Muddy Creek by Denver and the River District raises additional critical questions still unanswered. Kenneth Balcomb's correspondence raised it first.

Muddy Creek was meant as a compensatory storage project for Windy Gap. Muddy Creek will have an estimated firm annual yield of 23,000 acre feet. The Windy Gap Settlement, as originally contemplated, was to provide to the River District between 28,000 and 30,000 acre feet of water it could sell. Of the 23,000 acre feet of yield in Muddy Creek, there are 19,000 acre feet of uses allocated for upper western slope uses, recreation, and environmental mitigation. Fifteen thousand acre feet of the yield is committed to Denver. This results in a commitment of 34,000 acre feet but with a yield estimate of only 23,000 acre feet. No water is available for downstream users

Additional confusing calculations follow. The 1986 lease agreement provided Denver with the 25-year right to take 30,000 acre feet of Green Mountain Reservoir water in any one year and substitute it with 30,000 acre feet of water from Muddy creek. This would appear to equal out the volumes and keep the compensatory storage ideal in place. However, the 1986 Lease Agreement was amended in July, 1992 providing Denver with <u>ownership</u> of 24,000 acre feet of water in Muddy Creek. Is the 24,000 acre feet of water now owned by Denver part of the 30,000 acre feet required as substitution water for Denver's Green Mountain diversions? If so, the 1992 amendment selling 24,000 acre feet of the substitution water to Denver in addition to the

30,000 they will be taking from Green Mountain results in Denver acquiring an interest in Green Mountain ownership and in only 6,000 acre feet of compensatory substitution water in Muddy Creek for Denver's Green Mountain diversions.

There is now in place, as a result of the July 1992 lease amendment, a permanent source of water in Wolford Mountain owned by Denver. Denver now owns 40% of a storage reservoir meant as compensatory storage for Windy Gap. This allows Denver, in years beyond the first 25 year "lease", to permanently substitute for Green Mountain water which is the west slope compensatory replacement for the Colorado- Big Thompson Project. This permanent "interest" in Green Mountain has long been denied Denver by the Courts. This interest, however, can only be confirmed by the Court and is central to the Grand Valley's objections to the Wolford Mountain substitutions.

In order to accomplish this confirmation of an interest and use it to replace Green Mountain water by substitution, Denver had to apply for right of exchange. We have already learned that the 1987 application was dismissed by the District Court because the Secretary of the Interior had not approved the idea as required in the 1955 Blue River Decree.

At the time of Denver's application, the United States, as trustee for Green Mountain Reservoir, filed its own exchange application attempting to get the Federal Court to confirm the right to use Green Mountain water by exchange for existing and future beneficiaries on the Western Slope. Green Mountain water can be diverted by the beneficiaries, once it is released from the reservoir, directly from the Blue River below Green Mountain or directly from the Colorado River upstream of the Colorado-Utah state line. An "exchange" allows water from Green Mountain to be placed in the Colorado River in exchange for other water being diverted on tributaries to the Colorado River.

What is the difference between these two filings? Denver's 1987 application was an attempt to get permission to find an existing or a future reservoir that could be traded or exchanged for Green Mountain Reservoir. If this could be accomplished, then Denver would not have to wait to fill Green Mountain from its Dillon Reservoir but rather could immediately transfer that water to the eastern slope.

The United States' application was an attempt to clarify ways that Green Mountain water could be used by its authorized western slope beneficiaries for exchange purposes. One of the benefits of this clarification would be the allowance for water to be stored or diverted on tributaries other than the Colorado River mainstem and water then released out of Green Mountain to replace that water diverted to keep downstream users from being short.

Again, opposition to the United States filing was intense. Every water user in the Colorado River basin in Colorado followed the case to insure protection of its interests. Denver opposed the United States application taking the position that rights of exchange did not apply to the 100,000 acre foot pool which was reserved by Congress for future western slope water users. It was this 100,000 acre feet for which Denver hoped to find a substitute. Denver is not a beneficiary of Green Mountain Reservoir as authorized by Congress in Senate Document 80 either by direct use of Green Mountain or by exchange. This point can not be emphasized enough. Denver has no right to Green Mountain water. This fact was confirmed by Judge Arraj, almost 25 years earlier, in a 1964 consent decree. Denver must release its water to Green Mountain in the Spring before it can divert water to the eastern slope. The 1964 consent decree also confirmed that Denver's right to divert water is subject to the approval of the Secretary of the Interior. Denver did obtain a major victory in that the Williams Fork system was allowed to be used as a substitution so that Denver could store Blue River water in Dillon. This would be the first authorized substitution.

Western slope interests finally agreed in early 1992 to sign off on the USA exchange cases preserving, however, the right to argue on future specific applications designating certain reservoirs as "reservoirs of substitution". As soon as the Denver exchange case was settled, Denver and the Colorado River Water Conservation District immediately filed an application for its Wolford Mountain Reservoir as a "reservoir of substitution". Though nominally a River District project, it would be Denver's second substitution for Green Mountain Reservoir. Williams Fork was the first. This would also fulfill the River District's promises to Denver made in the 1986 Agreement "to find a suitable reservoir... to replace the functions of Green Mountain Reservoir as set forth in Senate Document 80".

Water users in the Grand Valley downstream, all beneficiaries of Green Mountain Reservoir, objected to the Denver/River District application. Nothing had changed since the Blue River Decree and the 1964 Decree. Denver and the River District had not obtained the approval of Congress. Denver and the River District were not beneficiaries of Green Mountain, did not have an "interest" in Green Mountain, and did not have a right to substitute Muddy Creek water for water in which they have no right. Denver and the River District had not obtained the permission of the Secretary of the Interior, as trustee for Green Mountain Reservoir. The previous point is a legal issue arguable in the court. Finally, during years in which substitutions would take place, releases from Muddy Creek would result in significant increases in salinity in the Grand Valley downstream.

These objections are the subject of continuing litigation in the current substitution case. Settlement has been reached with some of the Grand Valley users over the issue of salinity. Denver proposed, and some users accepted, the use of William Fork water to reduce the salinity impact. The City of Grand Junction and the Clifton Water District continue to object on the legal issues, recognizing that the salinity issue for this project and proposed future projects will have a lasting cumulative impact in the Grand Valley.

Why, however, would some Grand Valley interests agree to a substitution after objecting for so long to the entire concept of Denver and the River District jointly sponsoring projects that affect the traditional and trust operation of Green Mountain Reservoir? Paul Calder, late of the Orchard Mesa Irrigation District, indicated that the users could kill the Muddy Creek project on an entire host of arguments, but that the reality of the Grand Valley opposition is economic. How long can the Grand Valley users afford to fight or argue to protect its interests? It is unfortunate that the River District, as the successor of the original Western Slope Protective Association, has put its water users and its Counties in a position of economic disadvantage by forcing them to expend their own financial resources while the River District uses ad valorem taxes from these same Counties to advance its own agenda. The reality of this conflict of interest will eventually undo the River District as an organization using western slope revenues to oppose its own constituent interests.

Why would some western slope headwater Counties resolve their objections to the Muddy Creek substitutions? Grand County, as a beneficiary of the Windy Gap Settlement, receives 3,000 acre feet of water from the Muddy Creek project. The Fraser River basin receives 1,000 acre feet of water from the project. Grand County and the community of Kremmling receive the economic value of the project construction as well as the long-term benefits of flat water recreation. Finally, in the summer of 1992, Denver provided $3,860,000 to facilitate the purchase of Clinton Reservoir. Denver also subordinated certain of its water rights to firm up the yield of Clinton Reservoir for the benefit of Summit and Grand Counties, the towns of Dillon, Silverthorn, Breckenridge, Fraser, Granby, and numerous Summit and Grand County ski areas.

In conclusion, the most telling circumstance of the current conflict is the strategic failure of the Colorado River Water Conservation District to take a fundamental step and identify who are its affected interests and who it represents. The failure of the River District to represent major, mainstem Colorado River water interests while at the same time involved in a fiduciary relationship with Denver has created conflict of interest that will see the end of empire that was once the western slope River District.

The single focus of the River District to construct "its own project", and to fulfill decades of promise for a western slope reservoir that it could own and operate, blinded the River District to the long-term impact of its actions. Without adequate consultation with its constituents as to the cost and alternative sources of financing, the River District put itself directly in the position of losing ownership of its project. It also put itself in the camp of east slope interests hoping to dismantle the historic purposes of Green Mountain Reservoir and to end the great promise of compensatory storage developed over the past 60 years.

END

APPENDIX

The water users in the Grand Valley objected, in part, to substitutions because releases from Wolford Mountain would result in significant increases in salinity at the Grand Valley.

Studies by the River District (Merritt, 1992) indicated that, during years of substitution,, water released from Wolford Mountain would come to the Grand Valley during a 30 day period in late summer. Thirty milligrams per liter of total dissolved solids would be the resultant increase in salinity during the peak of the agricultural season.

It might be important to review for the reader that a " year of substitution" is any year when there is not enough water in the mountains between Dillion Reservoir and Green Mountain Reservoir to fill Green Mountain Reservoir. Normally there is enough water to fill Green Mountain. But in some years, like 1977 or 1981, there is not enough. It is during these years that Denver has to release water from its Dillon Reservoir to insure that Green Mountain is filled. By using Wolford as a substitute reservoir, Denver does not have to release water from Dillon but, rather, can have water released from Wolford to make up any shortage created by drought.

Grand Valley interests have argued, among the other issues, that quality of water from Wolford Mountain is not the same as water from Green Mountain.

Negotiations between Denver, the River District and water users in the Grand Valley have attempted to addressed this concern. Rather than substitute water from Wolford being delivered to the Grand Valley in August, suggestions were made by Grand Valley users that substitute water be delivered at times other than during the peak of the agricultural irrigation season. Denver engineers responded that their system did have flexibility to pattern substitution releases so that Wolford releases would be minimized during the irrigation season. By dedicating a part of its Williams Fork Reservoir as a " reservoir of substitution", by delivering some substitute water after the irrigation season (November 1), and by mixing Wolford Mountain water with Williams Fork water during portions of the irrigation season Denver engineers have fashioned a proposal that would reduce the salinity impact. These substitution patterns, however, are based on the usage of water from "reservoirs of substitution"-Williams Forks and Wolford-preserving for Denver its prime objective of Green Mountain.

8/22/98

SUPREME COURT, STATE OF COLORADO

No. 97SA93

June 15, 1998

THE CITY OF GRAND JUNCTION,

Objector-Appellant,

v.

THE CITY AND COUNTY OF DENVER, acting by and through its board of water commissioners,

Applicant-Appellee.

and

ORLYN G. BELL, Division Engineer, Water Division 5,

Appellee pursuant to C.A.R. 1(e).

Appeal from the District Court, Water Division No. 5

Honorable Thomas W. Ossola, Water Judge

EN BANC JUDGMENT AFFIRMED

Grimshaw & Harring, P.C.

Wayne B. Schroeder

Jody Harper Alderman

Denver, Colorado

Daniel E. Wilson, City Attorney, City of Grand Junction

Grand Junction, Colorado

Attorneys for Objector-Appellant.

Patricia L. Wells

Michael L. Walker

Casey S. Funk

Amy M. Cavanaugh

Denver, Colorado

Attorneys for Applicant-Appellee.

Gale A. Norton, Attorney General

Martha Phillips Allbright, Chief Deputy Attorney General

Richard A. Westfall, Deputy Attorney General

Joseph C. Smith, Jr., Deputy Attorney General

Wendy C. Weiss, First Assistant Attorney General

Natural Resources Section

Denver, Colorado

Attorneys for State and Division Engineers.

JUSTICE MARTINEZ delivered the Opinion of the Court.

JUSTICE HOBBS does not participate.

The City of Grand Junction appeals a judgment and decree of the District Court, Water Division 5 (the "Water Court"), granting the City and County of Denver's application for refill rights with respect to Dillon Reservoir. Grand Junction contends that the Water Court lacked subject matter jurisdiction to adjudicate Denver's application because the application concerns matters over which the United States District Court for the District of Colorado (the "Federal Court") retains exclusive jurisdiction. We hold that the Water Court possessed at least concurrent jurisdiction over the subject matter of Denver's application. Accordingly, we affirm the Water Court's judgment and decree.

I.

This controversy centers around water rights to the Blue River, a tributary of the Colorado River, located on the western slope of the Continental Divide. In 1963, Denver began storing water in Dillon Reservoir as part of the Blue River Diversion Project. This project is a water storage and diversion project at the confluence of the Blue, Ten Mile and Snake Rivers in Summit County. Water diverted at Dillon Reservoir

is transported eastward under the Continental Divide through the Roberts Tunnel. Denver stores water at Dillon Reservoir under a June 24, 1946 priority for municipal use in the Denver metropolitan area. Denver's storage right was adjudicated in 1955 as part of the Blue River Decree. As will be discussed more thoroughly in Part III of this opinion,[1] the Federal Court issued the Blue River Decree to resolve a complex water dispute involving substantial litigation and multiple parties and claims.

Dillon Reservoir achieved its first fill in 1965. From that point until 1985, Denver was allowed to maintain the reservoir at a specified "gauge height," or constant elevation, without regard to losses from evaporation or seepage. For practical purposes, this amounted to a refill of the reservoir. Denver exercised this refill whenever reservoir capacity and water supply were available. Between 1985 and 1987, the Division Engineer determined that accounting should be done for evaporation losses. He also determined that Denver should be charged against its first fill, under the 1946 priority, for water passing through the reservoir but not held. Pursuant to its historic use of Dillon Reservoir for flood control, Denver bypasses through the reservoir a certain amount of water that is capable of being stored under the reservoir's 1946 priority. Under the Division Engineer's determination, this bypassed water would count against the 1946 priority. Thus, Dillon Reservoir could achieve a "paper fill" without being physically full.

In order to protect its historic use of the reservoir, Denver filed an application in the Water Court in 1987 to confirm a priority to refill Dillon Reservoir after the reservoir's first fill and if space is available in the reservoir.[2] Denver's claim includes the right to deplete streamflows by storage of water in order to replenish evaporation and seepage losses. Although Denver initially claimed a 1965 appropriation date for this refill right, Denver ultimately stipulated to an appropriation date of January 1, 1985.

Denver's application claims a maximum of 175,000 acre feet ("A.F.") in any single administrative year, including 13,524 A.F. absolute and 161,476 A.F. conditional. The application prompted numerous statements of opposition. Several objectors ultimately withdrew their statements and stipulated to the entry of a decree with conditions. Grand Junction, which has rights to Blue River water under a 1947 priority, was the only objector that participated actively at trial.

At trial, Grand Junction asserted, inter alia, that Denver's application concerned matters which were the subject of the Blue River Decree. In the Blue River Decree, the Federal Court retained "continuing jurisdiction for the purpose of effectuating the objectives" of the decree. Grand Junction contended that, pursuant to this decree, the Federal Court retains exclusive jurisdiction over Denver's application for a refill right, and therefore, the Water Court should not have adjudicated Denver's claim. Grand Junction also maintained that Denver's claimed refill right conflicts with the terms of the Blue River Decree itself because the Blue River Decree restricts Dillon Reservoir to only one fill each year.

The Water Court rejected all of Grand Junction's arguments. The court held that the Blue River Decree "did not enjoin Denver from seeking a new appropriation under a different priority date at some later date. It resolved the water claims before it at the time." Further, the Water Court found that the Blue River Decree did not limit Dillon Reservoir to one fill per year. Thus, the Water Court concluded that it had "at least concurrent jurisdiction with the Federal District Court over the subject-matter of this action." The Water Court subsequently granted Denver's application for a refill right with a 1987 priority date in the amount discussed above.

Pursuant to section 13-4-102(1)(d), 5 C.R.S. (1997), and C.A.R. 1, Grand Junction appeals the Water Court's judgment.[3] Once again, Grand Junction asserts that the Water Court lacked subject matter

jurisdiction over Denver's claim. We affirm the judgment of the Water Court.

II.

We first address Grand Junction's assertion that we lack appellate jurisdiction over this matter because the Water Court did not issue a final judgment. Grand Junction's claim stems from the fact that the Water Court, in addition to finding that Denver's refill right did not conflict with the provisions of the Blue River Decree, supplied a signature line at the end of its decree for the Federal Court. The Federal Court's signature would reflect its agreement that the Water Court's decree does not adversely affect the objectives of the Blue River Decree.

The Water Court supplied this signature line as a result of a stipulated agreement among Denver and the objectors (save Grand Junction) which required the Water Court's decree to be submitted to the Federal Court for this verification. Grand Junction contends that the provision of this signature line renders the Water Court's decree merely interlocutory because "it leaves something further to be done before the rights of the parties are determined." Thus, Grand Junction maintains that, pursuant to C.A.R. 1, we lack appellate jurisdiction.

As a general matter, an appeal may be taken only from a final judgment of a district, probate or juvenile court. *See* C.A.R. 1(a)(1). An appellate court does not review interlocutory orders absent specific authorization by statute or rule. *See Mission Viejo Co. v. Willows Water Dist.*, 818 P.2d 254, 258 (Colo. 1991). The final judgment requirement is reflected in C.A.R. 1(a)(1) and applies generally, "save in the exceptional circumstances mentioned in (a)(2), (3), and (4)." *Vandy's, Inc. v. Nelson*, 130 Colo. 51, 53, 273 P.2d 633, 634 (1954); *see also Mission Viejo*, 818 P.2d at 258; *Colorado Anti-Discrimination Comm'n v. Continental Air Lines, Inc.*, 143 Colo. 590, 593, 355 P.2d 83, 85 (1960).

C.A.R. 1(a)(2) provides that an appeal to an appellate court may be taken from, inter alia, "[a] judgment or decree, or any portion thereof, in a proceeding concerning water rights." The appeal from the Water Court in this case, therefore, qualifies under C.A.R. 1(a)(2) as an "exceptional circumstance" to which the requirements of C.A.R. 1(a)(1) do not apply. Hence, our jurisdiction over this case does not depend upon whether the Water Court's judgment constitutes a "final judgment" within the meaning of C.A.R. 1(a)(1).

With regard to water matters, we have declined to exercise appellate jurisdiction where a water court's decree did not determine all claims presented. *See Mission Viejo*, 818 P.2d at 258; *Northern Colo. Irrigation Co. v. City & County of Denver*, 86 Colo. 54, 57-58, 278 P. 592, 593 (1929). Thus, "when a case involves multiple claims for relief or multiple parties, a judgment resolving fewer than all the claims or the rights of fewer than all the parties" cannot be the subject of appellate review absent special certification by the trial court. *Mission Viejo*, 818 P.2d at 258 (requiring certification of trial court's order pursuant to C.R.C.P. 54(b)).

Accordingly, we lack appellate jurisdiction over this matter if the Water Court's judgment failed to resolve all the claims before it. Grand Junction, however, does not assert that the Water Court's judgment leaves any claims unresolved, nor does the record support such an assertion. The only claim at issue in the proceeding below was Denver's application for the Dillon Reservoir refill right, and the only objector in the proceeding was Grand Junction. The Water Court granted Denver's claim after rejecting Grand Junction's objections.

We also reject Grand Junction's contention that the Water Court's provision of a signature line for the

Federal Court, per the parties' stipulation, had an effect upon the validity of the Water Court's decree. The mere presence of this signature line did not transfer ultimate authority over this water matter to the Federal Court. The parties' stipulation to obtain supplemental approval of Denver's application from the Federal Court could not, and did not, affect the Water Court's authority to enter a decree in this case. Accordingly, the Water Court's decree constitutes a "full, final, and complete determination of all claims presented." *Northern Colo. Irrigation Co.*, 86 Colo. at 58, 278 P. at 593. Therefore, appellate review by this court is proper.

III.

Grand Junction contends that Denver's claim for a refill right is not only within the subject matter of the Blue River Decree, but also conflicts with the terms of that decree. In order to address these contentions, we must first discuss the history and relevant provisions of the Blue River Decree.

The Blue River Decree is the result of a dispute dating to 1937. In that year, Congress authorized a reclamation project known as the Colorado-Big Thompson Project ("CBT"). *See City & County of Denver v. United States*, 935 F.2d 1143, 1146 (10th Cir. 1991). The CBT provided for the construction of the Green Mountain Reservoir and Power Plant on the Blue River. One of the purposes of the CBT, as set forth in Senate Document No. 80, 75th Cong., 1st Sess. (1937), was to store replacement water at Green Mountain Reservoir for use by western slope interests to compensate for other Colorado River water diverted to the eastern slope as part of the CBT. Green Mountain Reservoir was completed in 1942.

After completion of the reservoir, several appropriators of Blue River water, including Denver, commenced adjudication proceedings in the District Court of Summit County. These proceedings were designed to determine relative priorities for purposes of irrigation (State Action No. 1805) and for purposes other than irrigation (State Action No. 1806). The United States joined those proceedings by filing "Statements of Claim" to Blue River water at Green Mountain Reservoir. However, the United States later withdrew from the proceedings, and in 1949 instituted a parallel adjudication in the Federal Court (Federal Action No. 2782) to quiet title to water rights in the Blue River against Denver and others. Denver and the other parties maintained claims to divert Blue River water upstream from Green Mountain Reservoir in order to augment municipal water supplies.

In 1954, the state adjudication reached this court in *City & County of Denver v. Northern Colorado Water Conservancy District*, 130 Colo. 375, 276 P.2d 992 (1954). We affirmed the water decrees insofar as they determined the relative rights of Denver and the other parties to Blue River water. However, because the proceeding had not adjudicated the United States' storage and direct flow water rights with respect to Green Mountain Reservoir, we remanded the case with instructions to adjudicate these rights. *See id.* at 422, 276 P.2d at 1015. By this time, Congress had enacted the McCarran Amendment, Pub. L. No. 82-495, § 208(a)-(c), 66 Stat. 549, 560 (1952), codified at 43 U.S.C.

§ 666 (1994), in which Congress gave consent to join the United States as a party in a state water adjudication. On remand, the United States was joined as party to the Blue River water proceedings in state court. The United States then removed the entire case to the Federal Court where State Actions 1805 and 1806 were renamed Federal Actions 5016 and 5017. These actions were then consolidated with Federal Action 2782, the United States' earlier action. The entire proceeding became known as the "Consolidated Cases."

By a stipulation dated October 5, 1955, the parties substantially settled the Consolidated Cases. On October 12, 1955, the Federal Court entered a final decree and judgment (the "Blue River Decree") which incorporated the stipulation executed by the parties.[4] The Blue River Decree recognized the United States' right to fill and utilize the Green Mountain Reservoir with a priority date of 1935. The Blue River Decree also incorporated by reference the state decrees entered in State Actions 1805 and 1806 insofar as they described Denver's rights to the use of Blue River water and its tributaries. The state decrees contained the following provision regarding Denver's right to divert water upstream from Green Mountain Reservoir at Dillon Reservoir:

> Dillon Reservoir, as hereinbefore described, be, and it hereby is . . . awarded a conditional priority, the same being Reservoir Priority No. 8(C), as of the date of *June 24, 1946*, for an amount of water not exceeding 252,678 acre feet . . . of water out of the Blue River, Snake River or Ten Mile River, or any combination of them, upon the limitations and conditions herein provided, and there is hereby allowed to flow into Dillon Reservoir from said streams, under said Reservoir Priority No. 8(C) for the uses aforesaid and for the benefit of the parties entitled thereto, at any time when it does not interfere with prior appropriations of water from said streams, sufficient water to keep said reservoir reasonably well filled, and provided further, that as against junior appropriators, who need and can use the water capable of being impounded in said reservoir, only one filling shall be allowed each year.

(Emphasis added.) The stipulation incorporated by the Blue River Decree modified these state decrees slightly by limiting Denver's rights solely to municipal purposes.

Thus, Denver's water rights on the Blue River were subject to the senior rights of the United States. According to the decree, Denver could divert Blue River water only if the Secretary of the Interior determined that the diversion would "not adversely affect the ability of Green Mountain Reservoir to fulfill its function as set forth in [Senate Document No. 80]

. . . ." Denver also agreed to bypass quantities of water sufficient to meet all downstream calls, with priorities superior to Denver's, on the Blue River and the downstream segment of the Colorado River.

At the conclusion of the Blue River Decree, the Federal Court declared:

> [T]he titles to the rights to the use of water of the respective parties, the United States of America, the City and County of Denver, the City of Colorado Springs and the City of Englewood, be and the same are hereby quieted, and the respective parties and their successors or assigns are forever enjoined and restrained from asserting or claiming as against each other any different priorities than those specified in this Final Decree.

The Federal Court expressly retained continuing jurisdiction for the purpose of effectuating the objectives of the Blue River Decree.

After Denver began storing water in Dillon Reservoir in 1963, additional disputes arose. In decrees entered in 1964 and 1977, the Federal Court reaffirmed the following: (1) the United States' right to fill Green Mountain Reservoir each year was superior to Denver's right to fill Dillon Reservoir, (2) Denver's right to divert water from the Blue River or to make certain replacements or exchanges of Blue River water is subject to the approval of the Secretary of the Interior, and (3) Denver may not divert Blue River

water until Green Mountain Reservoir is either filled or assured of filling each year. *See Denver v. United States*, 935 F.2d at 1146-47; *United States v. Northern Colo. Water Conservancy Dist.*, 608 F.2d 422, 427 (10th Cir. 1979).

It is within this context that Grand Junction asserts that the Water Court lacked subject matter jurisdiction over Denver's application for a Dillon Reservoir refill right with a 1987 priority date. For the reasons set forth below, we find Grand Junction's arguments unpersuasive.

IV.

A.

Subject matter jurisdiction relates to a court's authority to deal with the class of cases in which it renders judgment. *See Dallas Creek Water Co. v. Huey*, 933 P.2d 27, 38 (Colo. 1997); *Monaghan Farms v. City & County of Denver*, 807 P.2d 9, 18 (Colo. 1991). An application for the determination of a water right or a conditional water right involves a "water matter" over which a water court has special statutory jurisdiction. *See* § 37-92-203(1), 10 C.R.S. (1997); § 37-92-302(1)(a), 10 C.R.S. (1997); *Bubb v. Christensen*, 200 Colo. 21, 25, 610 P.2d 1343, 1346 (1980). When a case involves a "water matter" assigned by statute to a water court, the court has jurisdiction over persons and property affected by the application. *See Dallas Creek Water Co.*, 933 P.2d at 38.

Additionally, we have held that subject matter jurisdiction vests in the water court upon the timely filing of the application and publication of the résumé notice. *See id.* at 32; *see also Bubb*, 200 Colo. at 25, 610 P.2d at 1346 (affirming water right that was obtained in full compliance with procedures prescribed by section 37-92-302). In this case, the Water Court found that "[a]ll notices required by law of the filing of this Application have been fulfilled and the Court has jurisdiction of this Application." Grand Junction does not contend that Denver failed to comply with any statutory procedures relating to application for adjudication of a water right.

Accordingly, the Water Court possessed subject matter jurisdiction over Denver's application, absent special circumstances divesting the court of jurisdiction. *See generally United States v. City & County of Denver*, 656 P.2d 1, 8 (Colo. 1982) (noting Congress's acquiescence "in comprehensive state control over the appropriation of water"). In order to show that the Water Court lacked jurisdiction, Grand Junction must demonstrate that such a special circumstance existed in this case.

B.

Grand Junction first asserts that the Water Court lacked jurisdiction over Denver's application because long-standing principles of water law prohibit a court from interpreting or enforcing a decree entered by another court. *See Hazard v. Joseph W. Bowles Reservoir Co.*, 87 Colo. 364, 367, 287 P. 854, 855 (1930); *Weiland v. Reorganized Catlin Consol. Canal Co.*, 61 Colo. 125, 128, 156 P. 596, 597 (1916). Because the Water Court necessarily interpreted the Blue River Decree in entering the decree in this case, Grand Junction claims that the Water Court exceeded its jurisdiction.

In *Weiland*, we explained:

> The statutes designate the District Court vested with exclusive jurisdiction to adjudicate priorities to the use of water for irrigation in a water district. When jurisdiction for that purpose has attached

> and a decree is entered, the statutes on that subject necessarily *inhibit any other court of coordinate jurisdiction from modifying, reviewing, or construing such decree;* otherwise there could be, in effect, more than one decree, by different courts, *affecting the same priority to the use of water* in the same water district, which it is the object of the statutes to avoid.

61 Colo. at 130-31, 156 P. at 598 (emphasis added); *see also Hazard*, 87 Colo. at 367, 287 P. at 855 (same). Both *Weiland* and *Hazard* involved the adjudication of the same rights by two different courts within the same water district. Given that "there is to be but one decree by one court in a given district," *Weiland*, 61 Colo. at 130, 156 P. at 598, we were concerned about possible conflicts in different decrees entered by different courts within the district. These concerns were realized in *Hazard*, where the second court did not merely maintain the priorities described in the first decree, but radically changed the provisions of the first decree and, in fact, entered a new and different decree. *See* 87 Colo. at 366, 287 P. at 854.

In *Faden v. Hubbell*, 93 Colo. 358, 28 P.2d 247 (1933), we revisited this issue. In that case, defendants objected to the jurisdiction of the Adams County District Court where the District Court of the City and County of Denver had already acquired jurisdiction to adjudicate rights in the water district. *See id.* at 364, 28 P.2d at 249. We rejected defendants' claims, however, finding that "there is no conflict of jurisdiction when the objects sought by the two courts were separate and distinct, indeed, when the present suit for an injunction was to attain an objective which could not have been accomplished in the [previous] adjudication." *Id.*

In *Faden*, the second court's judgment did not modify or impair previous decrees, but left them undisturbed. Therefore, we held that the assumption of jurisdiction by the first court did not preclude the second court from assuming jurisdiction over matters not adjudicated in the previous decrees and arising subsequent thereto. *See id.* at 365, 28 P.2d at 249. We also addressed the language of *Weiland* and *Hazard*, quoted above, that ostensibly prohibited a court from construing or reviewing the provisions of another court's decree, and we offered the following clarification:

> Of course, it is necessary for any court, in considering a plea of a former adjudication . . . to read and interpret such former decree, to the extent, at least, of determining what it is about or the identity of the subject-matter, and what the holding was, in order to ascertain its relation to the case in hand . . . The statutory decree in water district No. 2 did not give the district court of Denver a monopoly forever after to determine every other conceivable question that might later arise pertaining to the infringement of water rights in that water district, as to matters not interfering with the former decree. If no other court were permitted to examine or construe it at all for any purpose, it would seriously abridge its usefulness . . . [because] one court could not tell what the other had done.

Faden, 93 Colo. at 366-67, 28 P.2d at 250.

Moreover, in *City & County of Denver v. Consolidated Ditches Co.*, 807 P.2d 23 (Colo. 1991), we undertook an examination of the Blue River Decree itself. There, Denver argued that a 1940 agreement between the city and other appropriators of transmountain water was unenforceable as against the public policy of maximum beneficial use of water. *See id.* at 34-35. As support for this argument, Denver pointed to the Blue River Decree. The decree provided that Denver, "within all legal limitations and subject to economic feasibility," would exercise due care and diligence in accomplishing the objective of municipal reuse and successive use of Blue River water to reduce demands upon the Blue River. Because

the 1940 agreement predated the Blue River Decree, we construed the "legal limitations" provision of the Blue River Decree as acknowledging the limitations imposed by the 1940 agreement. *See id.* Consequently, after examining and determining the import of the Blue River Decree, we rejected Denver's reliance upon it.

In light of *Faden* and *Denver v. Consolidated Ditches*, we disagree with Grand Junction's claim that the Water Court exceeded its jurisdiction when it examined and construed the provisions of the Blue River Decree. We hold that the Water Court possessed the authority to review the Blue River Decree in order to ascertain whether Denver's application would interfere with the terms or objectives of the decree. In doing so, we also reaffirm the principle, described in *Weiland* and *Hazard*, that a court of coordinate jurisdiction does not possess the authority to enter a decree that modifies or interferes with the objectives or terms of another court's decree.

Consequently, the relevant question becomes: does the Water Court's decree effectively modify or conflict with the Blue River Decree? If so, the Water Court exceeded its jurisdiction. If, on the other hand, the effect of the Water Court's decree "is not to modify or impair existing decrees, either by enlarging or diminishing them; [and] it leaves them just as they were without interference," *Faden*, 93 Colo. at 365, 28 P.2d at 249, the Water Court acted within its jurisdiction. As explained below, we find that the Water Court acted properly.

C.

Grand Junction contends the Water Court's decree, by granting Denver's application for a new refill right for Dillon Reservoir, directly conflicts with the Blue River decree. In support of this argument, Grand Junction points to two provisions of the Blue River Decree: (1) the section that limits Dillon Reservoir to one fill per year "as against junior appropriators," and (2) the language declaring that "the respective parties and their successors or assigns are forever enjoined and restrained from asserting or claiming as against each other any different priorities than those specified in this Final Decree."[5] We address each provision in turn.

Firstly, the Blue River Decree prescribes a hierarchy of priorities among the various parties to the decree. Denver's right to divert Blue River water at Dillon Reservoir is senior to some priorities and junior to others. The plain language of the decree limits Dillon Reservoir to one fill *in priority* per year. The decree states, "[T]here is hereby allowed to flow into Dillon Reservoir from said streams, *under said Reservoir Priority No. 8(C)* for the uses aforesaid and for the benefit of the parties entitled thereto . . . sufficient water to keep said reservoir reasonably well filled, and provided further, that as against junior appropriators, . . . only one filling shall be allowed each year." (Emphasis added.)

Therefore, in the context of the priorities described in the decree, Denver can fill Dillon Reservoir only once.[6] In other words, all priorities to Blue River water awarded in the Blue River Decree are senior to Denver's rights, if any, to fill Dillon Reservoir more than once. In the instant case, Denver ultimately sought a refill right with a priority date of 1987, a date junior to all priorities described in the Blue River Decree.[7] Hence, Denver's new claim is entirely consistent with those terms of the Blue River Decree that relate specifically to refilling Dillon Reservoir.

The essence of Grand Junction's second claim is that the Blue River Decree forever prohibits Denver from asserting a new and distinct claim to Blue River water, even where the claimed priority is junior to

all those adjudicated in the Blue River Decree. We reject this broad interpretation of the decree and of the Federal Court's retained jurisdiction. In order to explain the proper scope of the Blue River Decree, it is necessary to address again two instances in which the Federal Court exercised its continuing jurisdiction to enforce the decree.

In 1964, the Federal Court assumed jurisdiction over a dispute between Denver and the United States over whether Denver could rely on the provisions of the Blue River Decree to make replacement releases from its William Forks Reservoir in order to satisfy the senior, downstream calls that were being filled by Blue River water that Denver desired to use to fill Dillon Reservoir. *See Denver v. United States*, 935 F.2d at 1146. The United States claimed that this practice violated the Blue River Decree's provisions requiring Denver to obtain permission from the Secretary of the Interior before exchanging or diverting Blue River water, and sought an order enforcing the decree. The Federal Court agreed with the United States, and entered a second decree (the "1964 Decree") which, inter alia, prohibited Denver from exchanging or diverting water in a manner inconsistent with the terms of the Blue River Decree.

In 1977, Denver refused the Secretary of Interior's requests to release from Dillon Reservoir over 28,000 A.F. of water necessary to complete the fill of Green Mountain Reservoir. The Federal Court found that Denver's actions violated the terms of both the Blue River Decree and the 1964 Decree. The Federal Court prohibited Denver from diverting Blue River water until Green Mountain Reservoir was assured of being filled each year. *See United States v. Northern Colo. Water Conservancy Dist.*, 608 F.2d at 429; *see also Denver v. United States*, 935 F.2d at 1147 (rejecting as contrary to the Blue River Decree Denver's unilateral attempt to exchange water from its new reservoirs on the western slope for additional Blue River water to be diverted to Denver).

The cases discussed above provide paradigmatic examples of behavior and claims that modify or interfere with the terms of the Blue River Decree. Thus, in those instances the Federal Court properly intervened to enforce the decree. In contrast, Denver's application for a refill right with a 1987 priority date does not concern or interfere with any provision of the Blue River Decree. The refill right is junior to all the appropriations adjudicated in 1955, and, according to the terms of the Water Court's judgment, cannot be exercised to the detriment of any priority awarded in the Blue River Decree. Hence, unlike the scenario in *Hazard*, the Water Court's decree does not radically change the existing decree or affect "the *same priority* to the use of water in the same district." *Hazard*, 87 Colo. at 367, 28 P. at 855 (emphasis added).

Furthermore, Denver's claim to a refill right at Dillon Reservoir was not even among the subjects addressed by the Blue River Decree. The refill right was not, and could not have been, before the Federal Court in 1955 because Denver's first appropriation date for the refill of the reservoir was 1965. *Cf. Faden*, 93 Colo. at 364, 28 P.2d at 249 (where the subsequent proceeding seeks "to attain an objective which could not have been accomplished" in the previous proceeding, there is no jurisdictional conflict).

As the Water Court explained, the Federal Court in the Blue River Decree addressed only those relative priorities at issue at the time of adjudication. The Federal Court enjoined the parties from asserting in the future any priorities different from those described in the Blue River Decree. Accordingly, the Federal Court has thwarted subsequent efforts by Denver to modify, intentionally or otherwise, the United States' senior rights to Blue River water. In this case, however, Denver's application does not injure or affect the rights of any priority described in the Blue River Decree, nor does Denver seek to modify a priority described in the Blue River Decree. Instead, Denver has sought adjudication of a new water right, entirely distinct from those adjudicated in the Blue River Decree.[8]

The Federal Court's continuing jurisdiction is limited to the purpose of effectuating the objectives of the Blue River Decree. As explained above, Denver's refill right does not interfere with the objectives of the Blue River Decree because Denver's refill right is subject to all of the provisions of the Blue River Decree. *See generally Aspen Wilderness Workshop, Inc. v. Hines Highlands Ltd. Partnership*, 929 P.2d 718, 724 (Colo. 1996) (senior rights are not injured by junior diversions as long as those diversions occur in priority). Denver can, and must, comply with the provisions of both the Blue River Decree and the Water Court's decree.

Consequently, Denver's application for a refill right with respect to Dillon Reservoir did not implicate the Federal Court's exclusive jurisdiction to implement the Blue River Decree. We hold, therefore, that the Water Court possessed subject matter jurisdiction over Denver's application.

V.

Denver's application for a refill right at Dillon Reservoir involved a water matter over which the Water Court had special statutory jurisdiction. Denver's application had neither the object nor the effect of modifying the provisions of the Blue River Decree. Thus, the application did not invoke the exclusive jurisdiction of the Federal Court to modify or enforce the Blue River Decree. Accordingly, the Water Court possessed jurisdiction to enter a judgment concerning Denver's application, and we affirm its judgment and decree.

---

[1] *See* discussion and definitions *infra* p. 11-15.

[2] Denver's application may have also been occasioned by the Colorado River Conservation Board's application for an "instream flow" right along the Blue River at Grand Junction. Denver seeks a priority date for its refill right that is senior to the pending "instream flow" application.

[3] Grand Junction, the appellant in this proceeding, also asserts that this court may lack appellate jurisdiction to consider this appeal because the Water Court's decree did not constitute a "final judgment." Grand Junction asserts that, if we find appellate jurisdiction lacking, we should treat this matter as an original proceeding under C.A.R. 21 in order to vacate the Water Court's judgment.

[4] The Blue River Decree also incorporated by reference Senate Document No. 80 and repeated the language of that document describing the manner in which the CBT facilities were to be operated.

[5] Grand Junction also relies on the provisions of the Blue River Decree that require Denver to exercise due diligence in taking, "with respect to return flow of water," all reasonable steps to accomplish a "reduction by such city of its Blue River water use," and to utilize return flow "so to reduce or minimize the demand of such city upon Blue River water." Because Grand Junction presents no argument or evidence that Denver's application for a refill right involves use of or failure to use "return flow" of Blue River water, we find no conflict between Denver's application and these provisions of the decree.

[6] This provision is consistent with other "one fill" limitations on reservoirs found in our case law. *See*

Orchard City Irrigation Dist. v. Whitten, 146 Colo. 127, 141, 361 P.2d 130, 137 (1961) ("[T]he statute which provides for these decrees forbids the allowance of more than one filling on one priority in any one year."); *Windsor Reservoir & Canal Co. v. Lake Supply Ditch Co.*, 44 Colo. 214, 223-24, 98 P. 729, 733 (1908) (same).

[7] Denver's claimed refill right is also junior to Grand Junction's 1947 priority to appropriate Blue River water.

[8] Similarly, in *City & County of Denver v. Colorado River Water Conservancy Dist.*, 696 P.2d 730 (Colo. 1985), Denver sought confirmation of an appropriation from Straight Creek, a tributary of the Blue River upstream from the Green Mountain Reservoir. In that case, no party objected to the state court's jurisdiction on the grounds that the Blue River Decree furnished the Federal Court with exclusive jurisdiction over the claim. We ultimately held that the state court had jurisdiction over Denver's application. *See id.* at 740.

United States Department of the Interior

BUREAU OF RECLAMATION
Eastern Colorado Projects Office
11056 West County RD 18E
Loveland, Colorado 80537-9711

IN REPLY
REFER TO:
E-700

JAN 1 0 1992

Subject: Record of Decision, Wolford Mountain Reservoir Water Substitution, Memorandum of Agreement (MOA) among the City and County of Denver (Denver), U.S. Bureau of Reclamation (Reclamation), Northern Colorado Water Conservancy District, and Colorado River Water Conservation District (NEPA)

Dear Interested Party:

Enclosed is the Record of Decision (ROD) addressing the substitution of water from Wolford Mountain Reservoir which was signed December 23, 1991, pursuant to the implementing regulations of the National Environmental Policy Act of 1969 (NEPA). Reclamation's decision was to execute the subject MOA that will enable Denver to take delivery of water in certain years indirectly from Wolford Mountain Reservoir through a process of substitution with Green Mountain and Dillon Reservoirs.

Reclamation was a cooperating agency in the NEPA process that led to the preparation and completion of the Rock Creek/Muddy Creek Final Environmental Impact Statement (FEIS) in February 1990. The U.S. Forest Service (USFS) and Bureau of Land Management (BLM) served as co-lead agencies. The USFS was responsible for management decisions involving a Rock Creek reservoir site alternative and issued its ROD in February 1990. BLM is responsible for decisions involving the Muddy Creek reservoir site (Wolford Mountain Reservoir) and issued its ROD in March 1991. Other cooperating agencies in the process were the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and Colorado Division of Wildlife.

The MOA was executed by Reclamation on December 30, 1991. Copies of the MOA may be obtained from the Project Manager, U.S. Bureau of Reclamation, Eastern Colorado Projects Office, 11056 West County Road 18E, Loveland, CO, 80537, telephone number: 303-667-4410.

Sincerely,

A. Jack Garner
Project Manager

Enclosure

RECORD OF DECISION
Wolford Mountain (Muddy Creek) Reservoir
Final Environmental Impact Statement
Rock Creek/Muddy Creek Reservoir

I. INTRODUCTION

This constitutes the record of decision of the Department of the Interior, Bureau of Reclamation (Reclamation) regarding the preferred alternative for the Wolford Mountain (Muddy Creek) Reservoir. The reservoir is the subject of the Final Environmental Impact Statement (FEIS) for Rock Creek/Muddy Creek Reservoir (FEIS-90-0005) developed in compliance with the National Environmental Policy Act (NEPA). The lead agencies for the FEIS are the Bureau of Land Management (BLM) and the Forest Service (USFS). Cooperating agencies are Reclamation, Fish and Wildlife Service (Service), Army Corps of Engineers (COE), and Colorado Division of Wildlife. The official designation for the Muddy Creek reservoir site has been changed to Wolford Mountain Reservoir which will be used hereafter in this record of decision.

In April 1985, The Colorado River Water Conservation District (District) applied for a Special Use Permit from the USFS for construction of a water storage reservoir on Rock Creek within Routt National Forest. The District's application was the result of an extremely complex and lengthy series of legal actions and negotiations involving the adjudication, permitting, and construction of the Windy Gap Project. The Azure-Windy Gap Supplemental Agreement of March 29, 1985, resulted in a cash payment of $10,200,000 from the Municipal Subdistrict of the Northern Colorado Water Conservancy District (NCWCD) to the District as compensation for the Windy Gap Project. This made the District the responsible organization for implementing a compensation project to offset Windy Gap Project Colorado River depletions. The District and Denver Water Board (Denver) agreement of March 3, 1987, establishes a lease arrangement that provides the District with additional funds to finance its water storage facility.

The USFS prepared an environmental analysis on the District's special use permit application. This analysis is documented in the Rock Creek/Wolford Mountain FEIS. In this analysis, the Wolford Mountain site, situated on lands administered by BLM, was identified and evaluated as an alternative water storage reservoir site. Consequently, BLM participated in the

environmental analysis as co-lead agency. The Draft Environmental Impact Statement (DEIS) was released for public comment in August 1987. A supplemental DEIS (SDEIS) providing additional analysis of the two proposed reservoir sites was issued in August 1988. The FEIS was issued in February 1990.

The project alternatives involved lands administered by two different Federal agencies, the BLM and the USFS, and their respective procedures for decision making. The USFS was responsible for management decisions involving the proposed Rock Creek reservoir site. The USFS issued its Record of Decision in February 1990 which was published in the FEIS. BLM was responsible for decisions involving the proposed Wolford Mountain reservoir site and issued its Record of Decision in March 1991.

Execution of a four-party agreement between the District, Denver, Northern Colorado Water Conservancy District (NCWCD), and Reclamation is required to enable Denver to utilize water from either proposed reservoir pursuant to the Denver-District lease arrangement. Furthermore, Green Mountain Reservoir, owned and operated by Reclamation pursuant to Senate Document No. 80 (75th Congress, 1st Session), is a critical component in Denver's ability to participate in the lease arrangement. The SDEIS and FEIS disclose the potential impacts associated with the execution of the four-party agreement.

In certain years, some of the water stored in Denver's Dillon Reservoir is owed to Green Mountain Reservoir to satisfy the requirements to fill Green Mountain Reservoir pursuant to the provisions of the stipulations and decrees entered in the Consolidated Federal Cases regarding the Blue River. Denver proposes to substitute water from the District's reservoir as provided for by the District-Denver agreement in lieu of releases from Dillon Reservoir.

Since releases from the District's reservoir pursuant to the District - Denver agreement cannot be made directly to Green Mountain Reservoir, the releases of water will become a substitute for the releases of water from Green Mountain Reservoir and such substitutions can only be made with the approval of and as directed by Reclamation. While releases will be made from Wolford Mountain Reservoir for several purposes, the frequency of these substitution releases is estimated to be 5 out of 30 years without construction of new east slope storage facilities by Denver and 12 out of 30 years with construction of east slope storage facilities.

II. RECOMMENDED DECISION

Reclamation's decision is to execute a four-party substitution agreement among the District, Denver, NCWCD, and Reclamation on behalf of the Secretary of the Interior. The agreement will enable Denver to take delivery of water indirectly from Wolford Mountain Reservoir through a process of substitution.

The District-Denver lease arrangement limits Denver to a maximum of 30,000 acre-feet in any single year or 45,000 acre-feet in any 3 consecutive years from Wolford Mountain Reservoir. Subsequent operation of this reservoir pursuant to the proposed four-party agreement could reduce the flow of the Blue River below Dillon and Green Mountain Dams up to 30,000 acre-feet in any single year or up to 45,000 acre-feet during any 3 consecutive years in which water is substituted.

The four-party substitution agreement to be executed on behalf of the Secretary of the Interior will include provisions to request the court in the Consolidated Federal Cases to enter a supplemental decree approving the terms and provisions of the agreement.

The decision of BLM was to approve the preferred alternative identified in the FEIS which entails development of a reservoir at the Wolford Mountain site. A zoned, earthfill dam would be constructed on public lands administered by BLM 4 miles north of Kremmling, Colorado. A majority of the proposed reservoir basin is situated on private land. The proposed dam is 120 feet high and would impound 60,000 acre-feet of water. The proposed reservoir would inundate 1,447 acres of land and extend about 5.5 miles upstream from the dam. BLM has approved the right-of-way (ROW) application for the Wolford Mountain reservoir site. Amendment of the Kremmling Resource Management Plan was necessary to accommodate ROW approval. Specifically, the resource management plan was amended to allow for anticipated recreational use of Wolford Mountain Reservoir.

In its record of decision issued February 1990, the USFS recommended selection of the Wolford Mountain alternative on BLM and private lands as the reservoir site, thus eliminating the need to issue a Special Use Permit for the Rock Creek Site. Since the proposed site on Rock Creek was not selected, the USFS has no role in implementing the recommended decision.

III. OTHER ALTERNATIVES CONSIDERED

In addition to the preferred alternative, two other alternatives were evaluated in the 1990 FEIS.

A. **Alternative 1 - No Action** This alternative would not require a substitution agreement. No new water storage reservoir would be developed. The USFS would not issue a Special Use Permit for reservoir construction at the Rock Creek site, and BLM would not issue the necessary right-of-way for reservoir construction at the Wolford Mountain site. There would be no change in the operation of Green Mountain Reservoir or the volume of flow in the Blue River below Dillon Dam or Green Mountain Dam. No action is the environmentally preferred alternative.

B. **Alternative 2 - Rock Creek Reservoir** This alternative requires a substitution agreement. A roller compacted concrete gravity dam would be constructed at the Rock Creek site. The dam would be 172 feet high and would impound 50,700 acre-feet of water. The proposed reservoir would inundate 1,070 acres of land and extend about 3 miles upstream. Construction of the reservoir could potentially reduce the annual flow of the Blue River below Green Mountain Reservoir up to 30,000 acre-feet when water is substituted. According to the substitution agreement, annual flow reductions in Blue River below Green Mountain Reservoir may not exceed 30,000 acre-feet in a single year or 45,000 acre-feet in any 3 consecutive years.

IV. BASIS OF DECISION AND ISSUES EVALUATED

The preferred alternative enables the District to fulfill its need to compensate for the Windy Gap project and provides for the development of additional water supply for Colorado while effectively minimizing and mitigating impacts to the environment. While the no action alternative is the environmentally preferred alternative, it would neither address the District's need to compensate for the Windy Gap project nor enhance Colorado's present and future water needs. The environmental commitments required of Reclamation and BLM as presented in section VI of this record of decision, provide assurance that all practicable means will be taken to avoid or minimize harm to the environment when implementing the preferred alternative.

Many factors and much data were considered in the decision making process that resulted in selection of alternative 3, Wolford Mountain Reservoir, as the preferred alternative. The following elements represent the primary management considerations used in selection of the preferred alternative.

A. Based on the environmental impact analysis, it was determined that no significant environmental impacts would result from implementation of the preferred alternative with appropriate mitigation.

B. Protection of threatened and endangered species associated with the preferred alternative would be provided pursuant to the conservation measures outlined in the biological opinion issued by the Service and also in the BLM mitigation plan.

C. Wetlands at the Rock Creek site are of higher quality. Effects on wetlands and related wildlife values at the Wolford Mountain reservoir site will be effectively mitigated.

D. Fishery resources at the Wolford Mountain site are poor to nonexistent compared to the high quality fishery resources at Rock Creek. The preferred alternative would enhance fishery values by creating a flat water fishery and possibly a tailwater fishery. The existing high quality stream fishery at Rock Creek will be preserved.

E. The preferred alternative would have a beneficial impact on local economic conditions.

F. Execution of the four-party agreement by the Secretary of the Interior, acting through Reclamation, is necessary for intended use of the water for all alternatives evaluated with the exception of the no action alternative.

G. The proposed substitution of water was determined to have no significant environmental impacts to the Blue River, either above or below Green Mountain Reservoir, or to the reservoir itself.

H. With the no action alternative, neither the Wolford Mountain Reservoir nor the Rock Creek Reservoir would be available as an additional water supply for Colorado.

V. PUBLIC INVOLVEMENT

Public scoping meetings were conducted in July 1985 in Kremmling and August 1985 in Yampa and Denver to identify major issues for the EIS process. Public hearings were conducted in October 1987 in Steamboat Springs, Denver, Kremmling, and Yampa to receive comments on the DEIS. DEIS comments and responses are contained in the FEIS. Public hearings were conducted in October 1988 in Denver, Kremmling, Oak Creek, and Grand Junction to receive comments on the Supplemental DEIS. Public hearing transcripts were prepared. The comments, responses, and hearing transcripts on the SDEIS are contained in the FEIS.

Five letters were received after the filing of the DEIS in August 1987, and the SDEIS in August 1988, that involve substantive issues regarding the substitution agreement and several

environmental and project-related issues. These letters were from the City of Grand Junction, Mesa County Water Association, Sierra Club Rocky Mountain Chapter, Mr. Paul H. Grant of Grand County, Colorado, and the Service.

The City of Grand Junction raised the issue that insufficient detail was provided in the DEIS on the substitution agreement for Wolford Mountain Reservoir and Green Mountain Reservoir. To address this issue, the SDEIS was expanded to include a more detailed discussion of the substitution agreement and its potential impacts.

The Mesa County Water Association raised the issue concerning what recourse water users on the Blue and Colorado Rivers upstream of McCoy or Kremmling would have to maintain suitable streamflows for irrigation, recreational, and commercial purposes. In response, it was stated that only a substitution of water between the proposed reservoir and Green Mountain is being contemplated. If any senior water rights were injured, recourse would be through the State of Colorado water rights system. No injury to such senior water rights is anticipated.

The Sierra Club Rocky Mountain Chapter raised the issues of the project's reliance on congressional authorization for approval and the allegation that there is no current market for the water yield of the project. In response, it was stated that the water substitution agreement could be implemented by Reclamation within existing legislation and authorities. Water demand data is consistent with the updated metropolitan Denver system-wide EIS.

Mr. Paul H. Grant raised the issues that the project would affect Grand County and dewater most of the Colorado River and all of the Fraser River. In response, Mr. Grant was advised that substitution of water would be limited to Wolford Mountain and Green Mountain Reservoirs. Therefore, the project will not impact that portion of the Colorado River Basin upstream of the Blue River including the Fraser River sub-basin. In the future, substitutions or exchanges with impacts different than those described in the SDEIS would require additional NEPA compliance.

The Service raised the issue that the SDEIS does not address impacts to the aquatic environment on the Colorado River above the Blue River confluence or impacts to the Williams Fork River below Williams Fork Reservoir. In response it was stated that the project will not change the historic functions of Williams Fork Reservoir and the diversions by the Moffat Tunnel diversion system. In the future, substitutions or exchanges different than those described in SDEIS would require additional NEPA compliance.

Following the filing of the FEIS with the Environmental Protection Agency (EPA), a comment letter dated March 30, 1990, was received by BLM from EPA concerning procedural and environmental issues. EPA brought up the issue that BLM had not adequately responded to previous comments provided by EPA and the Service regarding the methodology used for evaluating wetland impacts and the adequacy of mitigation for wetland impacts. EPA also took issue with the method of assessment of wetland mitigation credits and stated its position that proposals for mitigating lost wetland values should be based on in-kind value replacement.

EPA comments were addressed by BLM in official correspondence dated May 24, 1990. BLM indicated that responses to all agency comments on the DEIS and SDEIS were provided in the FEIS and asserted that their responses to comments were in full compliance with applicable Council on Environmental Quality (CEQ) regulations. BLM also asserted that the CEQ regulations do not require that responses to agency comments on the preliminary FEIS and mitigation plan be provided in the FEIS. In response to EPA comments on the methodology for evaluating wetland impacts and its implications on the mitigation plan, BLM concluded that the situation involves probable irreconcilable differences of professional opinion between the agencies on the assumptions used for the functional values of affected wetlands, rather than a matter of BLM ignoring EPA comments without adequate explanation.

In the letter dated May 24, 1990, the BLM also responded to other EPA concerns raised subsequent to filing of the FEIS. EPA requested withdrawal of the FEIS or that more time be granted to reach mutual agreement prior to completion of a BLM record of decision. BLM stated that withdrawal of the FEIS was unnecessary as it believes that the assertions made by EPA, to that date, were not convincing in terms of legal sufficiency or appropriate for purposes of NEPA. EPA asserted that the FEIS is not appropriate for the Clean Water Act, Section 404 permitting process. BLM disagreed with this conclusion and stated that the COE should assess the extent that it will use the FEIS in the Section 404 permitting process. BLM further elaborated that the EIS process was conducted with COE as a cooperating agency consistent with CEQ regulations.

Finally, EPA indicated that it would be unable to concur with the BLM record of decision, which did not fully address impacts on wetlands and the aquatic environment, or provide adequate mitigation since BLM did not adequately respond to comments on the FEIS as required by CEQ regulations. BLM reasserted that it had fully complied with applicable CEQ regulations and further elaborated that it responded to EPA and Service comments on the DEIS and SDEIS by supplementing, improving, and modifying the analyses pursuant to 40 CFR 1503.4(a)(3). Furthermore, BLM

stated that it was unaware of any requirement for EPA concurrence with its record of decision. BLM provided reassurance that the record of decision would fully comply with the provisions of all applicable State and Federal environmental permits, including those issued under the Clean Water Act, and that impacts to the environment would be adequately mitigated.

BLM received a letter from EPA dated April 10, 1991, which recommended changes to the March 1991 revised final Mitigation Plan for the Wolford Mountain Reservoir Project. EPA restated its previous efforts to ensure that the mitigation plan would be usable for Clean Water Act, Section 404 permitting, and that evaluation criteria for mitigation success were necessary. This letter contained detailed evaluation criteria specifically for wet meadow wetlands and water quality and a revised water quality monitoring program. EPA also suggested that BLM examine other evaluation criteria in the March 1991 revised mitigation plan to ensure that the criteria are enforceable and not ambiguous. The above mitigation plan concerns were addressed by BLM in official correspondence to EPA dated October 25, 1991. BLM stated that most of the EPA concerns were already incorporated in the final mitigation plan except for addressing the potential failure to achieve or maintain vegetative conditions. Subsequently, BLM has developed criteria to be incorporated in the plan of development that pertain to maintaining or achieving specified vegetative and grazing conditions. These criteria will be a required permit condition prior to any construction. BLM believes that with the inclusion of these criteria in the plan of development, the final mitigation plan adequately addresses wetland mitigation impacts associated with project implementation. Finally, the BLM indicated that the revised water quality monitoring plan would also be included in the Plan of Development and become a required permit condition. The District will be obligated to meet all of the permit conditions.

During the spring of 1990, Trans Mountain Hydro Corporation (Corporation) and Summit County (County) filed documents entitled "Protest to Amending The Kremmling Resource Management Plan and Comments Concerning the Substitution of Rock Creek/Wolford Mountain Water for Green Mountain Reservoir Water." The protest of March 29, 1990, and supplemental protest of April 27, 1990, filed by the Corporation, and the protest of April 12, 1990, filed by the County, primarily addressed the proposed substitution agreement. BLM informed the Summit County Board of County Commissioners that its letter of April 12, 1990, did not qualify as a protest. In its October 11, 1990, response to the Corporation, BLM did not formally recognize the Corporation's supplemental protest filed April 27, 1990. According to applicable BLM regulations, supplementation is allowed only after a determination by the BLM that a protest is incomplete and

requires supplementation. Following are the BLM responses to other issues raised by the Corporation and County:

A. The BLM decision to amend the Kremmling Resource Management Plan does not authorize the construction of the Wolford Mountain Dam and Reservoir. It only serves to modify land use allocations as a prerequisite to the proposed reservoir use. It is assumed in the environmental impact statement and plan amendment process that the substitution agreement to be developed by Reclamation is subject to Colorado water law and will be administered in accordance with water right decrees.

B. The FEIS on page 2-8 contains the following statement: "Trans Mountain Hydro Corporation has a direct flow right but no rights to the waters stored by the United States in Green Mountain." It is clear that the BLM Colorado State Director has acknowledged the existence of Trans Mountain Hydro Corporation's water right.

C. As provided for in the proposed substitution agreement, judicial authorization will be obtained for the substitution contemplated.

In its protest, the Corporation claimed that administration of Wolford Mountain Reservoir resulting from implementation of the substitution agreement constitutes a major operational change of the Green Mountain Reservoir, and therefore, requires the approval of the Congress. BLM stated that this is an issue more properly addressed by Reclamation. Consequently, Reclamation and the Secretary of the Interior have determined that the action would not constitute a major operational change; therefore, no approval of the Congress is necessary.

VI. IMPLEMENTING THE DECISION AND ENVIRONMENTAL COMMITMENTS

Reclamation and BLM are committed to the following stipulations to ensure the protection of environmental resources while making decisions on water substitutions, approval of ROW, and approval of the plan amendment to the Kremmling Resource Management Plan necessary to implement the preferred alternative.

A. Reclamation Commitments:

1. **Ensure that the agreement to provide for water substitution is limited to substitution between Wolford Mountain and Green Mountain Reservoirs, except in certain situations.** It is acknowledged in the FEIS that Denver may seek to use Wolford Mountain Reservoir to fulfill the historic functions of Williams Fork Reservoir if, for some unforeseen reason, Williams Fork Reservoir is not available or capable of serving those functions.

If Williams Fork Reservoir is not available to serve its historic function, the Secretary of the Interior, through Reclamation, would have the opportunity to review and approve any proposed substitution or exchange related to the availability of Williams Fork Reservoir on a case-by-case basis.

2. **Responsibility for establishing conditions under which a substitution made possible by the agreement, referenced in Item VI.A.1. above, will be implemented, and for ensuring appropriate NEPA compliance if future substitutions or exchanges are authorized which have impacts different from those disclosed in the FEIS.** The Colorado Water Conservation Board (CWCB) holds an instream flow decree (87CW293) for 50 cubic feet per second (cfs) or the inflow into Dillon Reservoir, whichever is less, on the Blue River below Dillon Dam. Approval of water substitutions by Reclamation shall be contingent upon the maintenance by Denver of a release below Dillon Dam to the Blue River of not less than 50 cfs to a maximum 1,000 acre-feet in excess of the inflow into Dillon Reservoir during the year following the request and approval of such substitution. Additionally, Reclamation generally maintains releases to the Blue River below Green Mountain Dam at rates of discharge that are equal to or greater than those incorporated in the instream flow decree (87CW299) obtained by the CWCB. The decreed rates of discharge are 60 cfs (May 1 through July 15) and 85 cfs (July 16 through April 30). No water substitution will be approved that would cause the releases from Green Mountain Dam to be less than the aforementioned instream flows.

3. **Responsibility for ensuring an annual public disclosure of proposed Wolford Mountain Reservoir operations.** This disclosure can be provided in association with the annual public involvement activities for the Ruedi Reservoir-Green Mountain Reservoir endangered species conservation releases for instream flows. The meetings will include concerned Federal, State, and local government agencies, and other involved parties including the public, water users, and special interest groups. Agency input and public comments will be addressed within the operational constraints, demands, and the flexibility of the water management agencies.

B. **BLM Commitments:**

1. **Commitments agreed to in relation to the Service endangered species Biological Opinion on Colorado River endangered fishes for the Wolford Mountain Reservoir Project issued on February 7, 1990:**

a. The District agreed to pay a lump sum water depletion charge in accordance with the formula included in the referenced

biological opinion to partially support recovery activities under the Recovery Implementation Program and;

b. The signing of a memorandum of understanding between the Service and the District that provides for water releases of 3,000 acre-feet from Wolford Mountain Reservoir during July 15 to October 15 to augment flows in the 15-mile reach of the mainstream Colorado River between Palisade, Colorado (river mile 170), and its confluence with the Gunnison River (river mile 185) on an interim basis until the Recovery Implementation Program has acquired and protected an equivalent amount of water.

2. **Commitments agreed to in relation to the Service endangered species Biological Opinion on Osterhout's milkvetch for the Wolford Mountain Reservoir Project dated February 7, 1990:**

a. Prior to construction, off-site compensation will be required. The District will provide 50 percent funding for acquisition of a 52.5-acre tract of land in the Troublesome Creek drainage which contains the milkvetch. This tract of land will be acquired through the cooperative efforts of the District, BLM, and the Nature Conservancy. The District will also purchase a tract of land at least 20 acres in size containing the milkvetch west of the reservoir site, subject to BLM approval in consultation with the Service. This land will be donated to BLM and managed in cooperation with BLM, the Service, and the Colorado Natural Areas Program.

b. For the life of the project, the District will manage the Wolford Mountain project area containing Osterhout's milkvetch as part of the recreation plan. Management strategies will include the location of developed recreation sites away from areas containing the plant and precluding activities such as vehicular access that will impact milkvetch habitat.

c. During construction, the District will have a qualified rare plant biologist inspect the flagged access road alignment and other construction activities in the areas of known plant occurrence and reroute these features where necessary if determined feasible by BLM.

d. Prior to filling the reservoir, a study will be conducted to determine the success of vegetative manipulation and transportation of seeds or adult specimens into new habitat. Commencement of the study is subject to permit approval by the Service under authority of the Endangered Species Act.

3. **Commitments specified in the January 1990 Mitigation Plan for the Wolford Mountain Reservoir Project, the November 1990 Supplement to Mitigation Plan for the Wolford Mountain Reservoir Project, and the March 1991 revised final Mitigation Plan for the Wolford Mountain Reservoir Project prepared by BIO/WEST, Inc., for mitigating impacts on wetland habitat, big game species, and Osterhout's milkvetch:** These commitments are part of the BLM approval of the ROW application and associated amendment of the Kremmling Resource Management Plan and will be incorporated in the BLM plan of development for the reservoir. In addition, criteria for maintaining or achieving specified vegetative and grazing conditions, and a revised water quality monitoring plan, as noted in Section V. above, will also be incorporated in the plan of development.

4. **Mitigation measures specified for soils, air quality, visual resources, cultural resources, transportation, aquatic resources, and recreation in the BLM Record of Decision for Wolford Mountain Reservoir.** Implementation of project actions will proceed according to the BLM compliance and monitoring plan approved in December 1990.

C. **The USFS Commitments:**

No environmental commitments apply to the USFS.

There are no unresolved issues.

Approved

Date Dec. 17, 1991

Regional Director

Date Dec 23, 1991

Deputy Commissioner

WBR:ABlevins:ew:12/16/91:6168
B:\USR\COMMON\154\WOLF3.ROD

DELANEY & BALCOMB, P.C.
ATTORNEYS AT LAW
DRAWER 790
GLENWOOD SPRINGS, COLORADO 81602

ROBERT DELANEY
KENNETH BALCOMB
JOHN A. THULSON
EDWARD MULHALL, JR.
ROBERT C. CUTTER
SCOTT BALCOMB
LAWRENCE R. GREEN
ROBERT H. NOONE
TIMOTHY A. THULSON

818 COLORADO AVENUE
TELEPHONE 945-8546
945-2371
TELECOPIER 945-8502
AREA CODE 303

September 10, 1991

RECEIVED
SEP 19 1991

Ms. Lynn Johnson
U.S. Dept. of Justice
Environment & Nat'l Resources Div.
999 18th Street, Suite 945
Denver, CO 80202

Re: Concerning the Application for Water Rights of the United States of America in Summit, Grand, Eagle, Routt, Mesa and Garfield Counties, Consolidated Case Nos. 2782, 5016, and 5017, United States District Court; and Case No. 88 CW 382, District Court, Colorado

Dear Lynn:

In response to your letter of September 5, we have reviewed the proposed stipulation in the above-referenced matter. Our review is from the prospective of the various parties represented by Delaney & Balcomb, P.C. as follows: Mobil Oil, Upper Eagle Regional Water Authority, Salvation Ditch, Copper Mountain Water and Sanitation District, Beazer East, Inc., and Exxon Corporation.

In addition, as you are aware, this matter is closely related to other items of ongoing litigation both in the United States District Court and in State Water Court. First, Denver has initiated several cases also captioned Consolidated Case Nos. 2782, 5016, and 5017, United States District Court, but differently identified in State Water Court as Case Nos. 87CW374 through 87CW379. Denver, the United States, and others are negotiating a proposed contract, allowing Denver to implement one of the many exchanges requested in Case No. 87CW379, the Muddy Creek Exchange.

At the same time, each of our clients has significant interests at stake. Many of them have filed applications in Water Division 5 and in the Federal District Court as follows:

88CW44	Salvation Ditch
88CW45	Beazer East, Inc.
88CW46	Upper Eagle Regional Water Authority
88CW48	Copper Mountain, Inc.
88CW51	Mobil Oil
88CW53	Exxon Corporation

EXHIBIT "A"

The purpose of these latter filings was to specifically adjudicate the Green Mountain Exchange so that it and its priority might be protected against the activities of others, such as Denver, and its filings in 87CW374 through 379.

In this extremely complicated setting, the United States now apparently takes the position that all counsel of record in the above-referenced matter must be prepared to immediately approve or reject the terms of the Stipulation for Decree which was contained with your September 5 letter. The following contains our observations and concerns concerning the proposed stipulation:

1. The stipulation in many respects is vague and uncertain of meaning and implementation. For example, the stipulation refers to "Senate Document No. 80 Purposes". These "purposes" are not defined and one seeking security in his water supply does not receive that from this stipulation.

As you know Senate Document No. 80 has been in effect for many years and Green Mountain Reservoir has been closed and operated pursuant to that document 35 or more years. Many unanswered questions about the meaning of Senate Document No. 80 and the Federal Court decrees implementing that document have arisen over the years. Each of the water user type clients represented by Delaney & Balcomb, P.C. desire only certainty in their water supply to the extent it can be achieved through Colorado (and federal) law. Each of these water users either has made (or plans to make) enormous expenditures in reliance upon the water supply. If some degree of certainty cannot be obtained in any stipulation which settles the above-referenced matter, then little of substance has been achieved by such settlement.

Another instance of unacceptable vagueness of the proposed stipulation lies in the fact that the "beneficiaries" of Senate Document 80 are not sufficiently identified to provide the requisite degree of comfort to the water users. The individual exchange cases filed by some of the individual beneficiaries which are noted above were filed because there is no protection by decree <u>that enumerates at least the water rights</u> that are entitled to Green Mountain protection. The result is to leave us at the "mercy" of the State officials charged with administration of water.

2. The Secretary of Interior pursuant to the 1964 decree is empowered to deny approval to the City and County of Denver to implement the City's Williams Fork Exchange. The only real purpose of requiring Secretarial approval of Denver is not to make sure that water is contained in Williams Fork Reservoir, a function which the Division Engineer in Division 5 can adequately perform. Rather, the Secretary's approval is a necessary process in order to enable him to fully meet his duties under Senate Document No. 80. The document clearly requires that Green Mountain is to provide water supply for those water users in existence at the time Congress passed Senate Document No. 80 in 1937, and in addition, water users then characterized as "future" users at least for domestic and irrigation purposes. The purpose of Secretarial approval of the Williams Fork Exchange is to enable him to protect those future users from injury to the benefits they might receive from Green Mountain Reservoir as a result of the Williams Fork Exchange.

This position enjoys much legal support. First, Senate Document No. 80 at paragraph 5(g) requires Green Mountain to be operated with a priority equivalent to the transmountain diversion facilities of the (rest of the) Colorado Big Thompson Project. At paragraph 5(h), SD 80 requires Green Mountain to be in place, completed, and operational prior to the first transmountain diversion. The reason for this protection is found both in the historical "contract" represented by Senate Document 80 and by the very real requirement imposed on Northern Colorado Water Conservancy District by 37-45-118 (1)(b)(II):

> Any works or facilities planned and designed for the exportation of water from the natural basin of the Colorado River and its tributaries in Colorado by any district created under this article . . . shall be designed, constructed, and operated in such manner that the present appropriations of water and, in addition thereto, prospective uses of water for irrigation and other beneficial consumptive use purposes, including consumptive uses for domestic, mining, and industrial purposes, within the natural basin of the Colorado River in the state of Colorado from which water is exported will not be impaired nor increased in cost at the expense of the water users within the natural basin. The facilities and other means for accomplishment of said purpose shall be incorporated in and made a part of any project plans for the exportation of water from said natural basin in Colorado.

To put it more succinctly, the United States jeopardizes not only the future users, to whom the Secretary is obligated under the terms of Senate Document 80, but the very operation of the Colorado Big Thompson project is a result of attempting to "ignore" the future users. To some extent you may respond by saying that the future users are not here to represent themselves and, if the Secretary is willing to take the risk of ignoring them, we should not complain. However, many of the upper Summit County water users, including Breckenridge Ski Area and Copper Mountain Ski Area as well as Copper Mountain Water and Sanitation District, have put the Secretary on notice of additional or "future" water demands that logically should be satisfied from Green Mountain Reservoir. Perhaps if these specific "future" demands are satisfied, these future users will not further complain. If they are not satisfied, however, you can rest assured that further complaint will be lodged.

3. The proposed stipulation apparently seeks to accommodate Denver's proposed Muddy Creek Exchange, at least in paragraph 4(c), recognizing that water may be released "from other reservoirs and substitution therefor [Green Mountain]". To the extent that this stipulation is a part of any agreement which prejudices the outcome of all the other litigation described hereinabove then we object to the United States' effort to "ram the stipulation down the throats of" the water users in Summit County and elsewhere in western Colorado.

4. It is our understanding that the courts have characterized the activities of the United States and the Secretary of the Interior under Senate Document 80 as those of a trustee for the water users in western Colorado. Should the trustee fail to take steps that adequately protect the interests of those water users, we believe that the law provides for us to continue on our own behalf and to advance the position the trustee would have advanced had he properly perceived his obligations.

We suspect that there are substantial political pressures being brought upon the Secretary of Interior to approve Denver's proposed Muddy Creek Exchange and to "dispose of" all litigation that adversely impacts the implementation of that proposed exchange. We do not necessarily oppose settlement of litigation, let alone litigation as complicated as that of which this is a part. We might even be persuaded to accept this proposal if all other elements are considered and simultaneously resolved in

acceptable fashion. However, we caution the United States against the attempt to forcefully implement a solution that ignores the legitimate property interests and expectations of many water users other than Denver and does so in a piecemeal fashion which will itself only lead to more litigation.

At the current time, we are not prepared to agree to the stipulation as proposed. You have spoken of the risk of adverse result if we proceed with the hearing on the 18th. From our point of view, an adverse result of the hearing on the 18th would differ little from the practical results under the proposed stipulation. Perhaps the stipulation might be modified to reflect this problem. You should be advised, however, that the "group" that apparently drafted the stipulation contains no member that represents the interests of the actual beneficial users of Green Mountain water. Perhaps the "trustee" should consider contacting those to be affected in time to incorporate them into the negotiation process.

We look forward to discussing these matters with you further at your convenience.

Very truly yours,

DELANEY & BALCOMB, P.C.

By _____
Scott Balcomb

SB:tb
xc: Copper Mountain Water and Sanitation
Avon Metropolitan District
Arrowhead at Vail
Basalt Water Conservancy District
Salvation Ditch
Beazer East, Inc.
Upper Eagle Regional Water Authority
Copper Mountain, Inc.
Mobil Oil
Exxon Corporation
Breckenridge Ski Area
John Hill
Rich Aldrich
Kevin L. Patrick

Timothy J. Beaton
M. Cole Emmons
Gregory L. Johnson
Mark Pifher
Kevin Lindahl
Jeffrey J. Kahn
Mary Mead Bammond
William A. Paddock
Mark A. Bermundstad
Charles B. White
Gary L. Greer
Stanley W. Cazier
Wayne B. Schroeder
Frederick G. Aldrich
Gale A. Norton
Linda E. White
Donald H. Bamburg
D. J. Dufford
Glenn E. Porzak
Mark J. Wagner
David W. Robbins
Jacques S. Ruda
Bennett W. Raley
Julianne M. Cruise
Gregory J. Hobbs, Jr.
Timothy J. Flanagan
James J. DuBois
David L. Harrison
Charles N. Woodruff
James R. Montgomery
James S. Lochhead
Loyal E. Leavenworth
David A. Bailey
Michael J. Norton
David C. Shilton
Richard B. Stewart
Robert L. Klarquist
Casey S. Funk
David E. Bellack
Jack F. Ross
John M. Dingess

DUFFORD, WALDECK, MILBURN & KROHN
ATTORNEYS AT LAW
600 VALLEY FEDERAL PLAZA
P. O. BOX 2168
GRAND JUNCTION, COLORADO 81502-2168
TELEPHONE (303) 242-4614
TELECOPIER (303) 243-7738

BETTY C. BECHTEL
WILLIAM H. T. FREY
ELIZABETH K. JORDAN
WILLIAM M. KANE
RICHARD H. KROHN
LAIRD T. MILBURN
LINDA E. WHITE

STEPHAN B. SCHWEISSING

D. J. DUFFORD
OF COUNSEL

WILLIAM G. WALDECK
OF COUNSEL

September 18, 1991

Lynn A. Johnson, Esq.
Department of Justice
1961 Stout Street
P.O. Box 3607
Denver, CO 80294

Re: Consolidated Case Nos. 2782, 5016, 5017, and 88CW382, Application of USA

Dear Lynn:

This letter is written to summarize our telephone conversation of September 11, 1991 and mention an additional point on exchanges as they relate to the Orchard Mesa Check.

In our telephone conversation I expressed concern that the 100,000 acre-foot pool would be subject twice to the priority system before it could be used by exchange on the Western Slope. That is, pursuant to paragraph 1 of the proposed Stipulation, Green Mountain water would be diverted into storage under a 1935 priority (paragraph 3(a)). Then in order to exercise exchange rights in the 100,00 a.f. pool, Green Mountain users would be factored back into the whole Division No. 5 tabulation (paragraphs 4(a) and 4(b)).

This is inconsistent with Colorado water law which provides for an injury analysis to determine whether an exchange can be decreed, and allowing the imposition of terms and conditions to prevent injury to all users on the impacted streams. 37-92-305(2)(5), 37-83-104, C.R.S.

An injury analysis as to use of Green Mountain water diverted under its 1935 priority cannot be extended to junior users in Division No. 5, except to the extent that a proposed exchange would injure them in excess of the impact on their rights of the initial Green Mountain 1935 fill right. Expanding the injury analysis beyond this standard would be contrary to Colorado law, in effect giving priority to junior rights over seniors by preventing actual use of the senior right. See 37-92-301(3), C.R.S. regarding administration and distribution of waters. ". . . All such priorities shall take precedence in their appropriate order over all other diversions of waters of the state . . ." See also People v. Hinderlider, 57 P.2d 894 (1936).

EXHIBIT "B"

For discussion purposes, Green Mountain Reservoir is easily analogized to a reservoir company whose bylaws are contained in Senate Document 80. Once water is diverted in priority into storage, the reservoir company may release it to its shareholders as needed based on the pro-rata share of each. Internal prioritization amongst Green Mountain beneficiaries could then be based on the Court's interpretation of Senate Document 80, and the statute governing priority of exchanges, 37-92-305(10), C.R.S.

Another difficulty with the proposed Stipulation is that paragraph 4(b) is contrary to the statute on exchanges. Under this statute, the priority of an exchange is given unique treatment as compared to the priority of other water rights. 37-92-305(10), C.R.S. provides ". . . the original priority date or priority dates of the exchange shall be recognized and preserved unless such recognition or preservation would be contrary to the manner in which such exchange has been administered." Under the terms of the Stipulation, the decree date rather than the more senior actual date of exchange would determine beneficiaries' places in the tabulation. The terminology "undecreed structure or structures" further hinders application of this paragraph, as decrees are given for water rights which are then diverted through certain structures. The structures themselves are not decreed except in connection with the water rights to be used with them.

To further complicate matters, paragraph 4 of the Stipulation implies that exchanges from the 100,000 acre-foot pool will be treated differently from exchanges from the 52,000 acre-foot pool. That is, paragraph 4, which establishes the various priorities, by its own terms applies specifically to the 100,000 a.f. pool. Thus, it appears that a separate tabulation would exist for the 52,000 a.f. pool, while the 100,000 a.f. pool would simply be combined with the Division No. 5 tabulation. The 1946 priority to be given to Denver's exchanges with Williams Fork creates a further administrative anomaly.

Another serious problem with the proposed Stipulation is the effect it would have on the Orchard Mesa Check. As you may be aware, the United States, Grand Valley Water Users' Association, Grand Valley Irrigation Company, the Colorado River Water Conservation District and the Orchard Mesa Irrigation District are negotiating operating arrangements for the Orchard Mesa Check. Enclosed is a copy of the most recent draft of the proposed agreement dated August 29, 1991.

Paragraph 3 on page 4 sets forth the intent of the United States, Orchard Mesa Irrigation District and the Grand Valley Water Users' Association to file an application in water court to

confirm the existing right of exchange at the Orchard Mesa Check with an exchange priority date of April 1, 1926.

Also enclosed are fully executed contracts among the above three entities dated June 19, 1990 reflecting the current operating policies of the Grand Valley Project, and Contract for the Lease of Power Privilege Among the United States of America, the Grand Valley Water Users' Association, Orchard Mesa Irrigation District and the Public Service Company of Colorado.

The historic 1926 priority date of exchange is critical to the operation of the check and, concomitantly the power plant. However, under the terms of the Stipulation, the Orchard Mesa Check would be junior to every other water right in Division No. 5. Therefore, the Grand Valley Power Plant would have no water available to it when it otherwise could have been diverting senior Grand Valley Irrigation Company rights through the power plant. The power plant would then have difficulty meeting its obligations under its Public Service Company contract, and the economic feasibility of the Grand Valley Power Plant would be in serious jeopardy. The proposed Stipulation is clearly at cross-purposes with existing and pending contractual obligations of the United States as to the Orchard Mesa Check.

The 100,000 a.f. pool is clearly stored for availability to the Western Slope (see page 3, paragraph (c), Senate Document 80) for both present and future users. Any stipulation, no matter how artfully crafted, regardless of how many parties agree to it, is void to the extent it conflicts with the provisions and purposes of Senate Document 80.

Should the United States, as trustee of Green Mountain Reservoir fail to represent and protect the interests of its beneficiaries, the beneficiaries may themselves appear and present their case. Denver v. Northern Colorado Water Conservancy District, 276 P.2d 992 (Colo. 1954).

We would be happy to further discuss our concerns with you at your convenience.

Sincerely,

/s/

LINDA E. WHITE

LEW/cgh
Enclosures
cc w/enc: Paul Calder
Raymond Schuster
Gregory O. Trainor
cc w/o enc: All attorneys of record

DELANEY & BALCOMB, P.C.
ATTORNEYS AT LAW
DRAWER 790
GLENWOOD SPRINGS, COLORADO 81602

ROBERT DELANEY
KENNETH BALCOMB
JOHN A. TAULBEE
EDWARD MULHALL, JR.
ROBERT C. CUTTER
SCOTT BALCOMB
LAWRENCE R. GREEN
ROBERT H. NOONE
TIMOTHY A. TAULBEE

818 COLORADO AVENUE
TELEPHONE 945-8063
945-2371
TELECOPIER 945-8082
AREA CODE 303

December 5, 1991

Lynn A. Johnson, Esq.
U.S. Department of Justice
Denver Field Office
999 - 19th Street, Suite 945
Denver, CO 80202

Re: Concerning the Application for Water Rights of the United States of America in Summit, Grand, Eagle, Routt, Mesa and Garfield Counties, Consolidated Case Nos. 2782, 5016, and 5017, United States District Court; and Case No. 88CW382, District Court, Colorado

Dear Ms. Johnson:

We have reviewed the Stipulation for Decree in Consolidated Case Nos. 2782, 5016 and 5017 (Case No. 88CW382) and believe, as previously indicated, that it violates the terms and intention of Senate Document No. 80 and does not protect the beneficiaries of such document. It impairs the ability of the beneficiaries of Senate Document No. 80 to receive Green Mountain Reservoir water. Accordingly, we will not approve the proposed stipulation, and are considering the necessity of proceeding on our clients' exchange cases.

Very truly yours,

DELANEY & BALCOMB, P.C.

By _____
Kenneth Balcomb

By _____
Scott Balcomb

Attorneys for Copper Mountain, Inc., Copper Mountain Water & Sanitation District, Breckenridge Ski, Mobil Oil Corporation, Upper Eagle Regional Water Authority, Salvation Ditch, Beazer East, Inc., Basalt Water Conservancy District and Exxon Company, U.S.A.

KB:bd

EXHIBIT C

DELANEY & BALCOMB, P.C.
ATTORNEYS AT LAW
DRAWER 790
GLENWOOD SPRINGS, COLORADO 81602

December 19, 1991

RECEIVED
DEC 23 1991

ROBERT DELANEY
KENNETH BALCOMB
JOHN A. THULSON
EDWARD KULHALL JR.
ROBERT C. CUTTER
SCOTT BALCOMB
LAWRENCE R. GREEN
ROBERT H. NOONE
TIMOTHY A. THULSON

818 COLORADO AVENUE
TELEPHONE 945-8546
945-2371
TELECOPIER 945-8502
AREA CODE 303

Lynn A. Johnson, Esq.
U.S. Department of Justice
Denver Field Office
999 - 19th Street, Suite 945
Denver, CO 80202

Re: Concerning the Application for Water Rights of the United States of America in Summit, Grand, Eagle, Routt, Mesa and Garfield Counties, Consolidated Case Nos. 2782, 5016, and 5017, United States District Court; and Case No. 88CW382, District Court, Colorado

Dear Ms. Johnson:

In response to Greg Hobbs' questions to me during the conference call of December 7, 1991, I indicated we would sign the Master Stipulation for the ski areas we represent if a satisfactory Clinton Gulch Agreement could be reached. I misspoke myself in so responding. What I meant to say is that in such event, the ski areas would not contest the Master Stipulation. They have not, as yet, bveen consulted on our signing.

I do not believe that the Colorado law of priority as to replacement has anything to do with Green Mountain Reservoir or Senate Document No. 80. The Master Stipulation is inappropriate in the special circumstances under which Senate Document No. 80 was negotiated. It violates the spirit and the letter of the Stipulation, Judgment and Decree in the referenced Consolidated Federal cases.

Denver has no right to make an exchange for Green Mountain water if any Western Colorado water user is thereby shorted. For the purpose of meeting Western Colorado demands for water, Green Mountain Reservoir by Senate Document #80 is treated as a private reservoir, the owners being Western Colorado users. If you have any doubt about this, you need only look at Ickes v. Fox! Denver's priority date should therefore be treated as meaningless for the purposes of exchange.

Very truly yours,

DELANEY & BALCOMB, P.C.

By _____
Kenneth Balcomb

cc: All counsel

EXHIBIT D

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO

Consolidated Case Nos. 2782, 5016, and 5017

and

DISTRICT COURT, WATER DIVISION NO. 5, STATE OF COLORADO

Case No. 88-CW-382

CONCERNING THE APPLICATION FOR WATER RIGHTS IN WATER DIVISION NO. 5

REPORT OF CASE MANAGEMENT COMMITTEE

COMES NOW the Case Management Committee by and through its chairman, Stanley W. Cazier, and herewith files this Report with the Court.

The Case Management Committee met by telephone conference on Tuesday, December 17, 1991, at 10:00 a.m. The Committee reviewed at length the progress that had been made in securing approval of a proposed stipulation for submittal to the Court, as well as the collateral negotiations that have been entered into by many of the active parties in the litigation. It was noted that substantial progress had been made in the negotiations and that those parties that had been directly involved in drafting the stipulation as well as the negotiations, felt very optimistic that the pending issues could be successfully resolved and that most of the parties would be in a position to sign off on the proposed stipulation; however, it was the feeling of the Committee that because of the number of parties involved as well as the complexities, that it would be prudent to apply to Court for an extension of 30 days for the hearing presently set for January 30, 1992.

The members of the Case Management Committee felt that if the Court would grant this extension that all the parties would have adequate time to resolve their concerns and allow for the greatest number of participants in this litigation to consent to the stipulation. It was also noted that the participants in the various negotiations have been extremely diligent and spent literally hundreds of man hours in attempting to resolve the pending

issues, as well as coming up with a stipulation that would be acceptable to as many parties as possible. The Case Management Committee felt that a 30 day extension would serve the best interests of justice by allowing a settlement to occur without the necessity of not only the January 30, 1992 hearing, but potentially prolonged litigation involving extremely complex issues besides the one that is presently in front of the Court on the Motions for Summary Judgment.

WHEREFORE, the Case Management Committee would respectfully request this Court to enter an order vacating the presently set oral argument with respect to the various motions scheduled for January 30, 1992, and reset that hearing as soon as feasible, thirty (30) days thereafter.

RESPECTFULLY SUBMITTED THIS 4th day of December, 1991.

Stanley W. Cazier, Chairman
Case Management Committee

CERTIFICATE OF MAILING

I do hereby certify that I mailed a true and correct copy of the foregoing Report of Case Management Committee to:

John R. Hill, Esq.
U.S. Department of Justice
Environment & Natural Resources Division
999 - 18th Street, Suite 945
Denver, CO 80202

Michael Pifher, Esq.
Anderson, Johnson & Giaunzio
Attorneys at Law
104 S. Cascade Avenue
Colorado Springs, CO 80901

David G. Hill, Esq.
Clarke G. Edwards, Esq.
Hutchinson, Black, Hill & Cook
1215 Spruce Street
Boulder, CO 80306

D. J. Dufford, Esq.
William G. Waldeck, Esq.
Dufford, Waldeck, Ruland & Milburn
900 Valley Federal Plaza
P.O. Box 2188
Grand Junction, CO 81502

Mark N. Williams, Esq.
327 North 7th
P.O. Box 23
Grand Junction, CO 81502

Donald H. Hamburg, Esq.
Ste 204, Mid-Continent Bldg.
P.O. Box 1120
Glenwood Springs, CO 81602

Gregory J. Hobbs, Esq.
Bennett W. Raley, Esq.
Davis, Graham & Stubbs
P.O. Box 185
Denver, CO 80201

Frederick G. Aldrich
Nelson, Hoskin, Groves
& Prinster
P.O. Box 40
Grand Junction, CO 81502

Jack F. Ross, Esq.
Saunders, Snyder, Ross
& Dickson, P.C.
707 - 17th Street, #3500
Denver, CO 80202

Anthony W. Williams, Esq.
Mark A. Hermundstad, Esq.
Williams, Turner & Holmes, P.C.
P.O. Box 338
Grand Junction, CO 81502

Glenn E. Porzak, Esq.
Holme Roberts and Owen
1401 Pearl Street, #400
Boulder, CO 80302

James R. Montgomery, Esq.
Charles N. Woodruff, Esq.
David L. Harrison, Esq.
James L. DuBois, Esq.
Moses, Wittemyer, Harrison
and Woodruff, Box 1440
Boulder, CO 80306

John M. Dingess, Esq.
Petrock, Fendel & Dingess
1630 Welton Street, #200
Denver, CO 80202

Jacques S. Ruda, Esq.
Attorney at Law
1331 - 17th Street, #510
Denver, CO 80202

Timothy J. Flanagan, Esq.
Kelly, Stansfield &
O'Donnell
550 - 15th Street, Suite 900
Denver, CO 80202

Kenneth Balcomb, Esq.
Scott Balcomb, Esq.
Robert M. Noone, Esq.
Delaney & Balcomb, P.C.
P.O. Drawer 790
Glenwood Springs, CO 81602

William A. Paddock, Esq.
John U. Carlson, Esq.
Mary Mead Hammond, Esq.
Carlson, Hammond & Paddock
1700 Lincoln Street, #3900
Denver, CO 80203

Herbert C. Phillips, Esq.
Hayes & Phillips, P.C.
1350 17th Street, #450
Denver, CO 80202-1527

Ms. Peggy Jordan, Water Clerk
Water Division No. 5
109 - 8th Street, Suite 104
Glenwood Springs, CO 81601

Charles B. White, Esq.
Wayne F. Forman, Esq.
Brownstein, Hyatt, Farber
& Madden
410 17th Street
22nd Floor
Denver, CO 80202

Gary L. Greer, Esq.
Sherman & Howard
633 17th Street, #2900
Denver, CO 80202

Barbara J.B. Green
Eagle County Attorney
P.O. Box 739
Frisco, CO 80443

Loyal E. Leavenworth, Esq.
James S. Lochhead, Esq.
Leavenworth & Lochhead
P.O. Drawer 2030
Glenwood Springs, CO 81601

David A. Bailey, Esq.
Parcel Mauro, Hultin
& Spaanstra
1801 California, #3600
Denver, CO 80202

David Robbins, Esq.
Hill & Robbins
1441 18th Street, #100
Denver, CO 80202

Kevin L. Patrick, Esq.
Kevin L. Patrick, P.C.
106 S. Mill St., Suite 200
Aspen, CO 81611

Wendy C. Weiss, Esq.
Asst. Attorney General
Natural Resources Section
Petroleum Club Building
110 16th St., 10th Floor
Denver, CO 80202

Wayne B. Schroeder, Esq.
Calkins, Kramer, Grimshaw
& Harring
1700 Lincoln Street, #3800
Denver, CO 80203

Jeffrey J. Kahn, Esq.
Grand, Bernard, Lyons
& Gaddis
515 Kimbark Street
P.O. Box 978
Longmont, CO 80502-0978

Anthony J. DiCola, Esq.
County Attorney
400 Byers Avenue
P.O. Box 312
Hot Sulphur Springs, CO 80451

Mr. Howard Holme
Mr. Kevin B. Pratt
One United Bank Center
Suite 2400
1700 Lincoln Street
Denver, CO 80203

J. Greg Whitehair, Esq.
Assistant U.S. Attorney
1200 Federal Office Building
P.O. Drawer 3615
Denver, CO 80294

Timothy J. Beaton, Esq.
Collins & Cockrel
390 Union Boulevard, #400
Denver, CO 80228

Ms. Linda White
Dufford, Waldeck, Milburn &
Krohn
900 Valley Federal Plaza
P. O. Box 2188
Grand Junction, CO 81502

by enclosing the same in a postpaid envelope and depositing said envelope in the United States mail at Granby, Colorado, on this 20th day of December, 1991.

Bonnie Brown

Rec'd 12-23-91

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO

Consolidated Case Nos. 2782, 5016, and 5017

and

DISTRICT COURT, WATER DIVISION NO. 5, STATE OF COLORADO

Case No. 88-CW-382

CONCERNING THE APPLICATION FOR WATER RIGHTS IN WATER DIVISION NO. 5

ORDER

At the suggestion of the Case Management Committee, the Court orders as follows:

(1) The oral argument presently set on the various Motions for Summary Judgment for January 30, 1992, is hereby vacated.

(2) The Court resets the oral argument with respect to the various pending Motions for Summary Judgment for the 6 day of March, 1992, beginning at 9:00 o'clock a.m.

DATED at Denver, Colorado, this 23 day of December, 1991.

BY THE COURT:

EDWARD W. NOTTINGHAM, Judge
United States District Court

Barbara Green, Esq.
POPHAM, HAIK, SCHNOBRICH
& KAUFMAN
2400 One Tabor Center
1200 17th St.
Denver, CO 80202

John Ct. Hill, Jr., Esq.
Environment & Natural Resources Div.
General Litigation Section
999 18th St., #945
Denver, CO 80202

Timothy E. Buchanan, Esq.
Laura Bassein, Esq.
3100 Arapahoe Ave., #204
Boulder, CO 80303

(9/91)

Deputy Clerk

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO

Consolidated Case Nos. 2782, 5016 and 5017

and

DISTRICT COURT, WATER DIVISION NO. 5, STATE OF COLORADO

Case No. 88-CW-382

CONCERNING THE APPLICATION FOR WATER RIGHTS IN WATER DIVISION NO. 5

COMMENTS ON REPORT OF CASE MANAGEMENT COMMITTEE

The following comments are submitted in response to the Report of the Case Management Committee dated December 19, 1991 (the Report) to avoid a possible misinterpretation of the status of settlement negotiations.

It is represented in the first paragraph of the Report that "substantial progress had been made in the negotiations." This representation puts a gloss on the actual situation which is more correctly expressed in the remainder of that paragraph which references "those parties directly involved in drafting the stipulation" and "most of the parties."

In fact, parties which have brought major flaws in the proposed stipulation to the attention of its proponents have been excluded from settlement negotiations. This exclusion has applied to the parties represented by the undersigned, as well as, it is my understanding, to those represented by Delaney & Balcomb.

While a certain number of parties may have reached agreement among themselves, this agreement is certainly not unanimous, nor is it likely to become so under the terms of the stipulation now proposed. The issues raised by the parties not included in the settlement negotiations are critical to the interpretation of Senate Document 80, not simply minor matters of form.

Issues of major concern are:

1. The proposed factoring of the priority of exchange rights of Green Mountain beneficiaries into the Division No. 5 tabulation, thus cutting-off the benefits of exchange to future Green Mountain beneficiaries who would, under the stipulation, be treated as other water users in Division No. 5, and junior to the rights of Denver and other major Eastern Slope users.

2. Inclusion of the Williams Fork Exchange as a kind of super-priority.

3. The failure of the United States as trustee to take adequate steps to protect the interests of Western Slope water users under Senate Document 80.

These issues and others have been brought to the attention of the parties to the action by means of the letters annexed hereto as Exhibits A, B, C and D. They are:

Exhibit A:	Letter from Delaney & Balcomb to the U.S. Department of Justice, Lynn Johnson, dated September 10, 1991.
Exhibit B:	Letter from Dufford, Waldeck, Milburn and Krohn to Lynn Johnson dated September 18, 1991.
Exhibit C:	Letter from Delaney & Balcomb to Lynn Johnson dated December 5, 1991.
Exhibit D:	Letter from Delaney & Balcomb to Lynn Johnson dated December 19, 1991.

Conclusion

The disputed issues in this case will not be resolved by the majority vote of negotiating parties who stand to benefit at the expense of Green Mountain beneficiaries. No progress has been made to resolve the concerns raised in the annexed Exhibits; therefore, postponement of the motion hearing set for January 30, 1992 will not tend to lead to settlement. It will only postpone resolution of this matter, resulting in continuing uncertainty on the part of Green Mountain beneficiaries as to their rights.

Dated this 30th day of December, 1991.

DUFFORD, WALDECK, MILBURN & KROHN

By: _____
D. J. DUFFORD #2913
Attorneys for Orchard Mesa Irrigation District, Clifton Water District, City of Grand Junction, CO
900 Valley Federal Plaza
P.O. Box 2188
Grand Junction, CO 81502
Telephone: (303) 242-4614

CERTIFICATE OF MAILING

The undersigned hereby certifies that a copy of the foregoing instrument was placed in the United States mail this 30th day of December, 1991, postage prepaid, addressed as follows:

Stanley W. Cazier, Esq.
Baker, Cazier & McGowan
P.O. Box 500
Granby, CO 80446

John R. Hill, Esq.
U.S. Department of Justice
Environment & Natural Resources
999 - 18th Street, #945
Denver, CO 80202

Michael Pifher, Esq.
Anderson, Johnson & Gianunzio
104 South Cascade Avenue
Colorado Springs, CO 80901

Mark N. Williams, Esq.
P.O. Box 23
Grand Junction, CO 81502

David G. Hill, Esq.
Clarke G. Edwards, Esq.
Hutchinson, Black, Hill
& Cook
1215 Spruce Street
Boulder, CO 80306

Donald H. Hamburg, Esq.
Suite 204, Mid-Continent Building
P.O. Box 1120
Glenwood Springs, CO 81602

Gregory J. Hobbs, Esq.
Bennett W. Raley, Esq.
Davis, Graham & Stubbs
P.O. Box 185
Denver, CO 80201

Timothy J. Flanagan, Esq.
Kelly, Stansfield & O'Donnell
550 - 15th Street, #900
Denver, CO 80202

Frederick G. Aldrich, Esq.
Nelson, Hoskin & Farina
P.O. Box 40
Grand Junction, CO 81502

Kenneth Balcomb, Esq.
Scott Balcomb, Esq.
Robert M. Noone, Esq.
Delaney & Balcomb
P.O. Drawer 790
Glenwood Springs, CO 81602

Jack F. Ross, Esq.
Saunders, Snyder, Ross
& Dickson, P.C.
707 - 17th Street, #3500
Denver, CO 80202

William A. Paddock, Esq.
John U. Carlson, Esq.
Mary Mead Hammond, Esq.
Carlson, Hammond & Paddock
1700 Lincoln Street, #3900
Denver, CO 80203

Anthony W. Williams, Esq.
Mark A. Hermundstad, Esq.
Williams, Turner & Holmes
P.O. Box 338
Grand Junction, CO 81502

Herbert C. Phillips, Esq.
Hayes & Phillips, P.C.
1350 17th Street, #450
Denver, CO 80202-1527

Glenn E. Porzak, Esq.
Holme Roberts and Owen
1401 Pearl Street, #400
Boulder, CO 80302

James R. Montgomery, Esq.
Charles N. Woodruff, Esq.
David L. Harrison, Esq.
James L. DuBois, Esq.
Moses, Wittemyer, Harrison
& Woodruff
P.O. Box 1440
Boulder, CO 80306

John M. Dingess, Esq.
Petrock, Fendel & Dingess
1630 Welton Street, #200
Denver, CO 80202

Jacques S. Ruda, Esq.
1331 17th Street
Suite 510
Denver, CO 80202

Loyal E. Leavenworth, Esq.
James S. Lochhead, Esq.
Leavenworth & Lochhead
P.O. Drawer 2030
Glenwood Springs, CO 81602

David Robbins, Esq.
Hill & Robbins
1441 18th Street, #100
Denver, CO 80202

Wendy C. Weiss, Esq.
Asst. Attorney General
Natural Resources Section
Petroleum Club Building
110 16th Street, 10th Floor
Denver, CO 80202

Jeffrey J. Kahn, Esq.
Grand, Bernard, Lyons
& Gaddis
515 Kimbark Street
P.O. Box 978
Longmont, CO 80502-0978

Ms. Peggy Jordan, Water Clerk
Water Division No. 5
109 8th Street, #104
Glenwood Springs, CO 81601

Charles B. White, Esq.
Wayne F. Forman, Esq.
Brownstein, Hyatt, Farber
& Madden
410 17th Street
22nd Floor
Denver, CO 80202

Gary L. Greer, Esq.
Sherman & Howard
633 17th Street, #2900
Denver, CO 80202

Barbara J.B. Green
Eagle County Attorney
P.O. Box 739
Frisco, CO 80443

David A. Bailey, Esq.
Parcel, Mauro, Hultin
& Spaanstra
1801 California, Suite 3600
Denver, CO 80202

Kevin L. Patrick, Esq.
Kevin L. Patrick, P.C.
106 S. Mill St., #200
Aspen, CO 81611

Wayne B. Schroeder, Esq.
Calkins, Kramer, Grimshaw
& Harring
1700 Lincoln Street, #3800
Denver, CO 80203

Anthony J. DiCola, Esq.
County Attorney
400 Byers Avenue
P.O. Box 312
Hot Sulphur Springs, CO 80451

J. Greg Whitehair, Esq.
Assistant U.S. Attorney
1200 Federal Office Bldg.
P.O. Box 3615
Denver, CO 80294

Mr. Howard Holme
Mr. Kevin B. Pratt
One United Bank Center
1700 Lincoln Street, #2400
Denver, CO 80203

Timothy J. Beaton, Esq.
Collins & Cockrel
390 Union Boulevard, #400
Denver, CO 80228

Carol Graves Hill
____

BRING TO THE BOARD MEETING

QUARTERLY REPORT

OF

ROLAND C. FISCHER, SECRETARY-ENGINEER

TO THE

BOARD OF DIRECTORS

COLORADO RIVER WATER CONSERVATION DISTRICT

January 18, 1994

The following is a discussion of some of the items that I have been working on that are of current interest to the Board. It is intended to be generally informative and serve as an introduction to questions, discussions and Board instruction concerning major issues before the Board. It is preliminary and will be supplemented verbally with additional and updated information at the Board Meeting.

WOLFORD MOUNTAIN PROJECT

Construction: Most construction activities have been curtailed for winter. We expect that construction activities will commence again in late February or early March. Prior to the restart of construction, we will be holding a second project "partnering" meeting among the engineers, the contractor and some of the sub-contractors. There will be further discussion of the status of the project construction at the Wolford Mountain Committee on Monday, January 17,1994.

HIGHWAY 40 RELOCATION: This is to request that the Board address the umbrella contract with the Colorado Department of Transportation (CDOT) covering the relocation of Highway 40 at the January 18, 1994 meeting. After the Board approves the contract with CDOT, we will bid the actual contract to construct the relocation of Highway 40 and it is probable that the actual construction contract will be awarded at or before the April 1994 meeting. The physical construction work should be completed by the end of calendar year 1994.

UTILITY RELOCATIONS: In December, the Board approved a settlement with Tri-State Generation and Transmission, Inc. Tri-State has been paid the money provided for in the settlement and they have signed the settlement agreement. In 1994, we will have several utility relocations to complete, but they will not involve Tri-State.

1994 WORK: In addition to the contract for the relocation of Highway 40, the new work scheduled for 1994 will include design of the Recreation Area (construction would occur in 1995) and finalize the design for the project support buildings (again the actual construction will likely occur in 1995).

OTHER ISSUES: The River District, the Colorado Water Conservation Board, Denver Water and Boyle Engineering will be jointly sponsoring a Wolford Mountain display at the Colorado Water Congress Winter Convention at the Holiday Inn, Northglenn. The Colorado Water Conservation Board will utilize the display to show its construction fund program.

YAMPA RIVER ISSUES

The Juniper-Cross Mountain Committee met on December 16, 1993, in Grand Junction. The Committee has given the staff general directions to meet with the Colorado Water Conservation Board staff to discuss a joint effort for the Yampa River Basin. Protecting existing water users is our first priority. The Juniper-Cross Mountain Committee will be meeting on Monday, January 17, 1994. Directors Signs, Visintainer or Smith may have additional comments.

GUNNISON BASIN ISSUES

TAYLOR PARK WATER MANAGEMENT AGREEMENT: For the last year or so the River District has been participating with the Upper Gunnison River Water Conservancy District, the Uncompahgre Valley Water Users Association and the Bureau of Reclamation to negotiate a Taylor Park Reservoir Water Management Agreement. The negotiations are essentially complete. A draft of the final agreement will be in the Board packets. The next step will be for Reclamation to conduct the necessary NEPA compliance on the proposed agreement. At this point, Reclamation plans to prepare an environmental assessment (EA) NOT a full environmental impact statement (EIS). Prior to starting the preparation of the EA, Reclamation requires a letter from each of the other parties that subject to no significant changes because of the EA, the parties will execute the agreement.

Background: In 1975, the River District, Uncompahgre, Upper Gunnison and Reclamation entered into the Taylor Park Reservoir Exchange Agreement. Under this agreement, water releases from Taylor Park Reservoir are temporarily stored in Blue Mesa Reservoir prior to final release to the Uncompahgre Valley Water Users for diversion through the Gunnison Tunnel into the Uncompahgre Valley, this utilization of Blue Mesa allows releases from Taylor Park to be made at different rates and on a different schedule than the actual need for water at the Gunnison Tunnel. Releases from Taylor Park are made for the benefit of fisheries, recreation and irrigation purposes upstream of Blue Mesa Reservoir. Under the 1975 Exchange Agreement, the River District and Upper Gunnison pay

a small amount annually to Uncompaghre to help offset the costs of operations and maintenance of Taylor Park Reservoir.

In 1986, Upper Gunnison applied for and ultimately received a second fill decree for Taylor Park Reservoir. The decree is for a total of 106,000 af of which approximately 44,000 af is absolute. Water stored under this second fill decree is above and beyond the water stored by Uncompahgre under the first fill decree. The refill decree purposes are for fishery, recreation and irrigation.

In 1990, the parties to the 1975 exchange agreement entered into a side agreement that removed the United States opposition to the second fill and provided that once the second fill decree was final, Upper Gunnison would convey the right to the Secretary of Interior. This conveyance has been made.

Why is the Taylor Park Water Management Agreement necessary? The Taylor Park Water Management Agreement goes beyond the 1975 Taylor Park Exchange because it allows Upper Gunnison to make releases of Taylor Park ~~Second Fill water to users downstream of~~ Blue Mesa. This means that releases for Taylor Park can be made to cover the depletions of irrigation rights that a junior in priority to the major downstream Gunnison calls which include the Gunnison Tunnel and the Redlands Water and Power Company.

This agreement is a water management agreement, it is not a water service contract. Under Reclamation Law, a water service contract would trigger the requirements of the Reclamation Reform Act (RRA). As written the water management agreement does not trigger RRA.

The River District is a party to this water management agreement because it is a party to the 1975 Exchange Agreement and the 1990 agreement. But nothing beyond what is already required by those agreements is required of the River District by the water management agreement. The only Board action necessary is a motion instructing the staff to inform Reclamation that subject to no changes due to NEPA compliance, the River District will sign the Taylor Park Water Management Agreement upon Reclamation completing the NEPA process. This is to request the Board consider such a motion. Directors Spann, Irby or Vickers may have additional comments.

The Taylor Park Water Management Agreement, once approved, will give Upper Gunnison a source of water in most years, however, we're not yet certain just how much water will be legally available to the second fill in very dry years. We have not been successful in determining how to utilize Blue Mesa to firm up the dry year yield in Taylor Park without triggering RRA; however, we are continuing to look at options with Reclamation. The Gunnison River is undergoing a number of potentially significant changes. These

changes will result in a much tighter administration of the mainstream rights on the Gunnison River. It is anticipated that Upper Gunnison will ultimately utilize its Taylor Park second fill water as part of an Upper Gunnison River Basin augmentation plan.

GUNNISON BASIN WATER MANAGEMENT AND PLANNING PROJECT: The planning model is in the final stages of completion. The end user testing of the model has been a slow and frustrating process. Once the model is operational, we hope to use it to address such issues as the yield available to the Taylor Park Reservoir Second Fill and the impacts on in-basin water users of various scenarios for the quantification of the United States water right for the Black Canyon National Monument. We hope to demonstrate the model capabilities to the Board at the April 1994 meeting.

BUREAU OF RECLAMATION - PARK SERVICE CONTRACT ON THE OPERATION OF BLUE MESA RESERVOIR: In 1992, the Park Service, Bureau of Land Management and Bureau of Reclamation announced their entering into negotiations for a contract covering the release of water from Blue Mesa Reservoir for the benefit of the Black Canyon National Monument and the adjacent Gunnison River Gorge. In 1993, the River District requested that it be made a cooperating agency for these negotiations and the subsequent NEPA compliance. Reclamation approved the River District's request. In July, 1993 Reclamation and Park Service held a meeting with the cooperating agencies. However, since that time nothing has happened. Our understanding is that the Park Service may be re-evaluating their overall strategy.

COLORADO RIVER MAINSTREAM: ORCHARD MESA CHECK CASE

Since the October 1993 Board meeting, we have had a number of meetings with the applicants and objectors in the Orchard Mesa Check Case (91CW247). Although the applicants' intentions when they filed this case were narrow (they desire to adjudicate the operation of the check which impacts approximately 10 river miles from the Roller Dam to the Grand Valley Irrigation Company Division Dam), the opponents are attempting to expand the case by raising a number of additional issues. The issues they have raised are:

1. When and how should the check be operated?

2. The administration of the major Colorado River mainstream water rights by the State Engineer and Division Engineer.

3. The adequacy of the Green Mountain Reservoir Operating Policy (published in December 1983, effective January 1984).

4. The question of how efficiently the major Grand Valley irrigation districts are utilizing their water and should their rights be curtailed because of " waste"?

In addition to the above issues, the case is complicated by the fact that the check operation (and the operation of Green Mountain Reservoir) impact flows in habitat that will be designated as critical for Colorado River endangered fishes, in "15 mile reach". The United States is an applicant in the case and any settlement to the check case will involve the Fish and Wildlife Service. The case has provided an opportunity for many of the opponents to raise many of the unresolved issues that were left over from the adoption of the Green Mountain operating policy.

Background: Prior to the adoption of the operating policy, Green Mountain Reservoir was operated under the original guidelines provided in Senate Document 80. Releases from the 100,000 acre foot pool were made to maintain a flow of 1250 cfs at the Dotsero gauge in Glenwood Canyon during the period of April 15th to October 15th. The administration of the mainstream Colorado River rights was relatively simple. When the river flow dropped below 1250 cfs at Dotsero, and there was a need for the water for irrigation or domestic purposes, the Division Engineer would curtail the transmountain diverters or require replacement releases and additional releases from the 100,000 af pool would then be made to bring the flow at Dotsero up to 1250 cfs. The Grand Valley irrigation districts had to make do with the 1250 cfs at Dotsero plus the inflow from Roaring Fork River and the other tributaries below Glenwood Springs. The Orchard Mesa check was operated as necessary based on the actual flow at Cameo.

In the early 1980's, an ad-hoc committee of West Slope attorneys and others negotiated the Green Mountain operating policy. The River District's role in the development of the operating policy was that of a facilitator. At the time of the negotiations of the operating policy, the ski areas and energy companies requested that water be made available from Green Mountain Reservoir for contract purposes. The irrigation districts (primarily in the Grand Valley) wanted to protect their historic benefits from Green Mountain. They also wanted to change the April 15 to October 15 time limitations and to get flexibility as to the 1250 cfs cap. Municipalities wanted to utilize Green Mountain Reservoir as an augmentation source on a year around basis. The operating policy ultimately adopted a compromise between several interests. In the drought year of 1977, approximately 66,000 af of water from the Green Mountain Reservoir 100,000 af pool was released. Thus, 66,000 af of Green Mountain water was set aside to protect domestic and irrigation rights perfected by use prior to October 16, 1977. The historic user pool water is used "to the extent necessary to permit diversions to the full amount of these decrees". This provision effectively removed the April 15 to October 15 time limits and the 1250 cfs at Dotsero. The remaining water yield from the 100,000 af pool (beyond the 66,000 af) was made available for marketing by the Bureau of Reclamation.

The operation of the Orchard Mesa check structure has, for

decades, been an issue of dispute. As the Board knows, the check can be used by Orchard Mesa to borrow water to be delivered to the Grand Valley Irrigation Company (GVIC) rights. Orchard Mesa uses the water to generate pumping and electrical power, then "check" it back to the river above the GVIC diversion dam. Operation of the check, though simple mechanically, is a complicated manner. The check is operated for the benefit of Orchard Mesa and the Grand Valley Water users and these parties benefit from hydropower revenues. The GVIC operates its diversion with two water rights, a senior right for 520 cfs and a more junior right for an additional 120 cfs. The GVIC's junior 120 cfs right is junior in priority to the Orchard Mesa rights, and the right is clearly a beneficiary of the 66,000 af pool.

By additional checking, tailwater from the Orchard Mesa pumping plant can be utilized to supply the 120 cfs right in stead of Green Mountain releases. Additional checking impacts Orchard Mesa by reducing the power head, the irrigation water supply and increasing operational costs. Orchard Mesa takes the view that they have no legal obligation to operate the check for the benefit of any junior right. Historically, the River District Board has agreed with Orchard Mesa on this position. During the negotiations on the operating policy, Northern Colorado Water Conservancy District took the position that the operating policy had to require the operation of the check. The River District Board responded in a strongly worded letter that there is no requirement to operate the check. A copy of the letter of August 10, 1983, is attached.

Prior to that in 1967, on advice of our then General Counsel, the River District took the position that the operation of the check was a private matter between the parties in the Grand Valley and the check need not be installed for the benefit of juniors. The General Counsel's opinion on this matter is attached. The operative language is on page 5.

Many of the opponents in the check case are concerned that unless the check is used to supply junior rights (as they claim it was in 1977) the Green Mountain Reservoir 66,000 af pool would be drained prior to the end of the irrigation season, leaving many of the beneficiaries without a source of augmentation water. This is a serious concern.

In our settlement discussions, we have suggested the development of a plan to manage the drawdown of the Green Mountain Reservoir 66,000 af pool to make a certain amount of water is always available. The checkcase applicants, the Bureau of Reclamation and some of the opponents have been willing to discuss the concept. It is our understanding that the parties have agreed to a standstill period until approximately April 1994 to continue negotiating a settlement to this case.

In trying to settle this case, there is a general consensus that the solution must not change the operating policy in a manner that could trigger a new " Section 7" consultation on Green Mountain Reservoir. Further any changes in either the operation of the check or the operation of Green Mountain will impact flows in habitat considered critical for endangered fish and changing the check operation would significantly reduce river flows in popular rafting reaches such as Glenwood Canyon or Lower Gore Canyon.

A full discussion of these issues related to operation of the check is expected. The parties who have written letters to Board members protesting our funding of the check litigation have been invited to attend.

ENDANGERED SPECIES/RECOVERY PROGRAM ISSUES

Critical Habitat Designation: The River District has submitted comments on the proposed designation of critical habitat. A copy of our comments is in the Board Packet. Because the U.S. Fish and Wildlife Service (FWS) is under a Federal court order to designate critical habitat it is a virtual certainty that some form of critical habitat will be designated (possibly with a slight modification in the now-proposed designation).

The designation of critical habitat raises serious concerns. It is not yet clear whether the existing Recovery Implementation Program will cover the alleged impacts caused by existing and future water projects on critical habitat. The FWS has stated that they expect that the Recovery Program, with modifications, will address critical habitat, but there are no guarantees. We do not know what modifications to the Recovery Program the Service may demand. Further, there are serious questions as to whether or not the Federal Government and the states of Colorado, Wyoming and Utah can actually meet existing requirements under the Recovery Program.

Additionally, the designation of critical habitat may result in a number of non-water related problems. The proposed designation includes the 100 year flood plain raising a number of land-use issues.

Recovery Program Funding: The River District has been actively involved in attempting to secure sufficient funding for the Recovery Program. I have written letters and spoken personally with Commissioner of Reclamation, Dan Beard. Mr. Beard's response was that he was not aware of the issue. While Reclamation's funding for FY94 appears in hand, it will be a continuing year to year problem to obtain the necessary federal funding support necessary for the success of the Recovery Program.

Grand Valley Water Management Study: At the October meeting, the

Board was briefed on the concept of the Grand Valley Water Management study. Briefly, the concept of the study is to determine the feasibility of making some water available to the 15 mile reach through improved delivery system efficiency on the Government Highline Canal. If feasible, the project could be funded through the Recovery Program and possibly the Salinity Control Project. A draft MOU with Reclamation is in the Board folders. Other parties to the MOU include; the state engineer, the CWCB, Denver, Northern and Grand Valley water users. The MOU requires only in-kind services. It does not require any cash funding from the River District or any party other than Reclamation. Board action on this agreement will be required.

INTERSTATE ISSUES

Water Supply for Southern Nevada: In early November, the Colorado River Commission of Nevada and the Southern Nevada water Authority held a joint meeting where they listened to proposals to meet Southern Nevada's future water needs. It was an entertaining show, attended by Eric Kuhn. The proposals included a secret underground river at least as large as the Colorado River, towing icebergs in baggies (big ones) from Alaska to Southern California to exchange for Colorado River water used in Southern California, the purchase of a number of Arizona water ranches, and six Colorado proposals (Dominquez, Natech, Cyde-Pure, Oak Creek Power, Rocky Mountain Power Co. and Roan Creek). All of the Colorado proposals involved the use of conditional water rights. The proponents of all of the Colorado proposals, except Roan Creek, suggested that Southern Nevada could utilize the subject Colorado rights forever. The Roan Creek proposal suggested a 30 to 50 year lease. All of the proposals are being evaluated by the Nevada agency staffs. A report will be issued with recommendations to the Boards sometime in early 1994.

Draft Glen Canyon EIS: The draft EIS covering the operation of the Glen Canyon Dam and Power Plant has been under preparation for what seems like forever. The draft document has finally been sent to the printer. As soon as it is received, we will be evaluating it and making comments as appropriate. We will also attend the appropriate public hearings.

Our principle concern is that the ability of the Upper Basin States to meet their compact delivery obligations is not impacted by any proposed operation. Power revenues are used to help in the repayment of participating projects, such as Bostick Park, Smith Fork, and others and these will be impacts on power generation.

Federal Salinity Control Program: Reclamation is rapidly approaching the authorized ceiling for expenditure of funds and this could impact the future of the salinity control efforts in the Grand Valley and Uncompahgre Valley. It is not clear that the Clinton administration will support an increase in authorization

ceiling. If the Federal Government does not continue to support salinity control efforts throughout the Colorado River Basin, entire projects may be more and more difficult to permit.

Another issue is the question of the operation of the Yuma Resalting Plant. To reduce costs, Reclamation is considering moth balling the plant. This could impact the national treaty obligations to Mexico concerning salinity. Ultimately there may be additional releases from Lake Powell or Lake Mead. Dave Merritt or Jim Lochhead, if present, may have additional comments.

FEDERAL & STATE LEGISLATIVE ISSUES

The Legislative and Congressional Affairs Committee met on Friday, January 7, 1994. Nine directors attended the committee meeting. The committee made a number of recommendations concerning proposed state legislation. Committee Chairman Jean Cole will present the committee recommendations to the full board.

There are a number of far reaching federal issues that the full board should discuss. Attorney General Janet Reno, Department of Interior Solicitor John Leshy, and Department of Agriculture Counsel James Gilliland have announces their intention to re-examine the existing federal policy by then Solicitor Ralph Tarr not to make claims for wilderness reserved water rights. The administration is seeking comments on the suspension of the Tarr opinion.

Because of a number of proposed downstream wilderness areas, including Cross Mountain Canyon and the pending California Desert Wilderness Bill, the action can have a significant impact on present and future application of water to beneficial use on River District decrees. The Legislative Issues Committee addressed this on January 7, 1994, but further Board discussion may be appropriate.

OTHER MATTERS

The Colorado Water Congress Winter Convention will be held at the Northglenn Holiday Inn on Thursday and Friday, January 20 & 21, 1994. The State Water Board will meet January 19 and 20 at the same location.

August 10, 1983

Mr. Bill E. Martin
Regional Director
Bureau of Reclamation
Building 20
Denver Federal Center
P.O. Box 25247
Denver, Colorado 80225

Re: Proposed Operating Procedures for Green Mountain Reservoir

Dear Mr. Martin:

At a meeting held in Montrose, Colorado on August 9, 1983, the Board of Directors of the Colorado River Water Conservation District (CRWCD) directed me to write to you regarding the letter of July 15, 1983 written to you by Mr. Larry Simpson, Manager, Northern Colorado Water Conservancy District (NCWCD). In that letter, NCWCD takes exception with the efforts you have made to arrive at an acceptable operating plan for Green Mountain Reservoir. Needless to say, the River District Board is dismayed at the position taken by NCWCD.

In Court actions and in private conversations over many years, NCWCD has consistantly taken the position that (1) the 52,000 acre foot pool in Green Mountain Reservoir is for replacement purposes for out-of-priority diversions made by the Colorado-Big Thompson Project in diverting water from Western Colorado to the eastern slope and (2) the 100,000 acre foot pool is compensatory storage exclusively for use by the western slope beneficiaies and to be used as those beneficiaries need the water. The CRWCD has agreed with NCWCD because this is the clear meaning of Senate Document No. 80. For some inexplicable reason NCWCD has now changed its position and wishes to dictate to you how the water from the 100,000 acre foot pool is to be used. For whatever motive NCWCD may have, it is ill advised to enter into the affairs of others.

In the opening paragraph of the letter, NCWCD complains that it "was not invited to participate in the work of the

committee". The ad hoc committee was, as the letter suggests, a committee of west slope representatives and, by its very nature, did not include eastern slope interest. If, in fact, NCWCD maintained its long standing opinion that it had no interest in the 100,000 acre foot pool, and that its only interest was in the 52,000 acre feet, it would have been a waste of its time to ask it to the meetings.

Also on page 1 of the letter, NCWCD seems to be saying that the proposed operating procedures must be in conformity with stipulations and order in the Consolidated Cases (Civil No. 2782, 5016, and 5017, U.S. District Court for Colorado) and Senate Document No. 80. The Proposed Operating Procedures on page 1 provides this in clear and unequivical language.

On page two of the letter, NCWCD desires to restrict the use of the 100,000 acre foot pool by indicating that it can be used only as a supplementary right to existing rights. Senate Document No. 80 makes it clear that it can be used as a supplementary right or the sole supply by providing that it may be used "for future use for domestic purposes and in the irrigation of lands thereafter to be brought under cultivation in western Colorado". We would certainly agree that the water can not be wasted just as the water diverted to the eastern slope cannot be wasted.

On page 2 the NCWCD would like to require that the State Engineer make certain that the "check" in the river be a requirement placed upon the Orchard Mesa Irrigation District. There is nothing in the law or decrees which requires Orchard Mesa Irrigation District to put in the "check". Neither NCWCD or the State Engineer have control over the Orchard Mesa Irrigation District nor can NCWCD require the State Engineer to do something that the law does not require him to do. We view this statement and, indeed, the entire letter, as an attempt of NCWCD entering into a matters in which it has no business.

Once again, let me thank-you for your efforts to resolve the Proposed Operating Procedures in conformity with the law and in an effort to beneficially use water in Colorado. Do not be dissuaded in your efforts by NCWCD's attempt to deal in the business of others.

Very truly yours,

Rial R. Lake, President
COLORADO RIVER WATER
CONSERVATION DISTRICT

RRL/lmc

NORTHERN COLORADO WATER CONSERVANCY DISTRICT

P.O. BOX 679 LOVELAND, COLORADO 80539 303-667-2437

July 15, 1983

Mr. Bill E. Martin
Regional Director
Bureau of Reclamation
Building 20,
Denver Federal Center
P. O. Box 25247
Denver, Colorado 80225

JUL 21 1983

COLORADO RIVER WATER CONSERVATION DISTRICT

Re: Proposed Operating Plan for Green Mountain Reservoir

Dear Mr. Martin:

By letter of June 10, 1983, you requested the support of the Northern Colorado Water Conservancy District for a proposed Green Mountain Reservoir operating policy which was developed by an ad hoc committee of West Slope representatives in consultation with your office. The District was not invited to participate in the work of the committee and we believe that the committee should have had representation from all signatories to the Consolidated Cases stipulations and decrees, but we do appreciate the opportunity to comment at this time. These comments have been reviewed with the Northern District Board and represent the Board's position with respect to the proposed operating policy.

First, it is indisputable that the Northern District is a beneficiary of Senate Document 80 and of the Green Mountain Reservoir. The operation of Green Mountain is the subject of stipulations and orders in the Consolidated Cases (Civil Nos. 2782, 5016, 5017, U.S. District Court for Colorado). The Court has retained jurisdiction over interpretation of the decree and Senate Document 80.

You explain in your letter that the proposed operating plan is offered as a "common interpretation of Senate Document 80." As a common interpretation, approval of all signatories to the Consolidated Cases stipulations who are beneficiaries of Green Mountain Reservoir will be required at a minimum. In addition, as an interpretation of Senate Document 80, the proposed policy should not contradict, expand, or limit the terms of the Consolidated Cases stipulations and decrees, or of Senate Document 80.

If common agreement cannot be reached between the signatories of the Consolidated Cases who are beneficiaries of Green Mountain Reservoir operation, at a minimum, the Court will be required to determine whether the proposed operating policy conforms to the stipulations and decrees.

Therefore, we wish to suggest the following changes to the draft document you have forwarded to us, in order to conform the proposed policy to the stipulations and decrees and to Senate Document 80.

Pursuant to the 1964 stipulation (p.2), Senate Document 80 "binds the parties" to that stipulation, which include the United States, the Northern District, Colorado River District, Denver, Middle Park Water Conservancy District, Orchard Mesa Irrigation District, and Grand Valley Irrigation Company, among others. Senate Document 80 (paragraph 5(c), Manner of Operation) provides that water from the 100,000 acre-foot pool will be released for "domestic" and "irrigation" purposes "within the period from April 15 to October 15 of each year." (emphasis added). This provision clearly governs the operation of Green Mountain Reservoir, and paragraph 2 of the proposed policy should be redrafted to state that:

> "Water will be released without charge from Green Mountain Reservoir within the period from April 15 to October 15 of each year from the 100,000 acre-foot 'power pool' to the extent necessary to permit diversions to the full amount of said decrees."

In addition, the State Engineer's administration of such releases, pursuant to paragraph 6 of the proposed policy, should clearly be guided and controlled by language which provides that the rights calling for water from Green Mountain Reservoir cannot be otherwise satisfied from the stream, must be used beneficially according to the decree, and be limited by historic consumptive use. In other words, the releases from Green Mountain should be a supplementary supply for rights which would not be filled because of low stream flow but which would be in priority if the stream had sufficient flow.

Administration by the State Engineer should include the requirement that Orchard Mesa Irrigation District continue to utilize the "check" as operated in the past.

Therefore, paragraph 7 of the proposed policy should be rewritten to add language as follows:

> "Releases of water from the 100,000 acre-foot power pool for perfected uses referred to in this policy shall be made only if the decreed priority of the user requesting such release cannot be filled from the supply otherwise available. The term 'perfected use' referred to in this policy means the historic consumptive use which has been applied beneficially pursuant to a decreed water right. Orchard Mesa Irrigation District shall continue to employ its 'check,' as in the past."

Paragraph 5 of the proposed policy should be rewritten to provide that an appropriate power interference charge will be levied if water otherwise available to the 100,000 acre-foot power pool is utilized but does not pass through the turbines at Green Mountain Reservoir. Therefore, we suggest the following addition to paragraph 5:

An appropriate power interference charge will be made with respect to utilization of water otherwise available to the 100,000 acre-foot power pool but which does not pass through the turbines at Green Mountain dam because of utilization of this water in some other fashion.

We appreciate the opportunity to make these initial comments and ask that our suggestions be incorporated into the proposal which will be noticed in the Federal Register. When that proposal is noticed we may have additional comments. We would be glad to meet with you and any other interested party regarding our comments in a continued effort to have this policy reflect the Consolidated Cases stipulations and decrees, as well as Senate Document 80. The Northern District at this time opposes any legislative change to Senate Document 80 or the Consolidated Cases stipulations and decrees.

Sincerely,

Larry Simpson, Manager
Northern Colorado Water Conservancy District

ccs: Signatories to the Consolidated Cases stipulations and decrees
Grand County Commissioners
Northwest Colorado Council of Governments
Board of Directors, Northern Colorado Water Conservancy District

DELANEY & BALCOMB, COUNSEL
FOURTH REGULAR MEETING OF THE BOARD OF DIRECTORS
COLORADO RIVER WATER CONSERVATION DISTRICT

October 17, 1967

Mr. A. Allen Brown, President
Board of Directors
The Colorado River Water Conservation District
Glenwood Springs, Colorado

Dear Mr. Brown:

We submit herewith in letter form our quarterly report on the activities of counsel for the District since July 17, 1967, the date of our last report.

A good period of counsel's time was devoted to the preparation of the petition for Writ of Certiorari regarding the Four Counties matter now filed and pending before the United States Supreme Court. I can elaborate on this petition if anyone desires to know more of it. Suffice to say, that Court will probably decide on the matter very shortly, as Four Counties must have filed its response by the 16th of October. Yesterday I received in the mail from counsel on the other side their briefs in opposition to the petition. We will have until Wednesday, a week from tomorrow, to file any answer we desire and the matter will then be presented to the Court. My understanding is that they will make a decision within 3 weeks after they receive the last filing. I might say about that, you may be interested, that we presented 3 questions arising out of the 4 Counties decision, the first that the decisions threatened the reclamation program in Colorado by taking from the United States water rights which should have been granted to them, that the decision establishes a dual standard, which will frustrate the reclamation program in that work that was sufficient for Four Counties to obtain a decree, was apparently insufficient before the Colorado Supreme Court for this District to obtain a decree for these projects, though the work was quite similar to what has been recognized by the Court before to be sufficient. Then we went into this other question about whether or not diligence was shown on behalf of the United States by the passage, or the work leading up to, and the passage of the Colorado River Storage Project Act, construction of Glen Canyon and other related facilities and matters of this nature. The only two points that are raised by counsel on the other side in an attempt to thwart this

approach are that the District Court and the Supreme Court of Colorado were deciding purely State questions and, therefore, no Federal questions were presented and, two, that the federal program was not affected in any way. You might be interested to know that I went back to Washington and spent about 4 days trying to get the Justice Department and, more important, the Solicitor General of the United States to appear in the matter as amicus curiae in the first instant and we were unable to do this because of departmental decisions in the Department of Justice. The best that I could get out of what they said was that they did not want to forsake the old sovereign doctrine of right based upon the sovereignty of the United States. I pointed out to them that I thought this was rather ridiculous because they had already recognized the sovereignty of Colorado over the water by the Curecanti assignment and construction of other projects and the taking of the water rights thereunder, such as Silt and Florida, etc., but they nonetheless would not go along. However, the Bureau of Reclamation did agree and finally did write us a letter, which we included as an appendix in the petition of Writ of Certiorari. I think it is rather interesting in the approach that they took. It is addressed to this District and says:

"UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Reclamation
Washington, D.C. 20240

August 10, 1967

"The Colorado River Water Conservation District
P. O. Box 282
Glenwood Springs, Colorado 81601

Gentlemen:

Pursuant to your request, I am forwarding the following data on Reclamation projects with water rights that may be threatened by the opinions of the Supreme Court of Colorado in Four Counties Water Users Association v. Colorado River Water Conservation District, 425 P. 2d 259 and Four Counties Water Users Association v. Middle Park Water Conservation District, 425 P. 2d 262.

Reconnaissance reports have been completed on the following projects:

"Project	Expended To Date 6/30/67	Estimated Total Cost
Rabbit Ear	$ 22,128	$ 4,846,600
Troublesome	19,407	5,387,700
Wessels	4,507	2,488,000
Toponas	25,768	7,779,000
Subtotal	71,810	20,501,300
Juniper (Includes the Great Northern Unit)	204,529	169,601,000
Burns	12,284	2,763,000
Hayden Mesa	16,967	11,671,000
Flattops	31,782	62,300,000
Parshall	48,919	12,026,000
Eagle Divide	16,326	3,498,200
Total	$ 330,807	$ 261,859,200

"Feasibility reports either have been or are being prepared on the following projects:

Yellow Jacket	538,561	36,325,000
Grand Mesa	527,790	36,541,000
Battlement Mesa	389,563	16,972,500
Bluestone	356,357	6,818,000
Upper Gunnison	429,309	8,899,000
Basalt	88,758	17,545,000
Dallas Creek	686,214	37,687,000
West Divide	1,010,497	99,800,000
Dolores	891,955	46,643,000
San Miguel	1,007,022	67,815,000
Animas-LaPlata	929,150	109,493,000
Total	$ 6,855,176	$ 484,538,500

"The following projects have been authorized for construction. The first four projects listed have been constructed, Curecanti, Silt, and Bostwick Park are under construction and advance planning preparatory to construction is in progress on Fruitland Mesa and Savery-Pot Hook.

"Project	Expenditure To 6/30/67	Total Estimated Cost
Collbran	$ 15,955,376	$ 15,955,376
Florida	11,096,866	11,144,287
Paonia	7,557,389	8,097,377
Smith Fork	4,455,130	4,622,728
Curecanti	68,024,736	97,950,000
Silt	7,089,041	7,657,120
Bostwick Park	1,190,027	5,650,000
Fruitland Mesa	347,140	28,204,000
Savery-Pot Hook	831,151	15,406,000
Total	$ 116,546,856	$ 194,686,888

Sincerely yours,

/s/ G. G. Staum
Assistant Commissioner "

If there are any questions about the litigation, I would be glad to answer them. As to what the U. S. Supreme Court is going to do, I can not say.

A decree has been entered by Judge Luby in Water District No. 53 and a copy thereof has been delivered to Mr. Smith. The District obtained decrees for a larger Azure Reservoir, the Gore Power Conduit, the Burns Project, part of the Toponas Project, and part of the Flattops.

Water District No. 37 has been opened and the District has filed statements of claim for the Wolcott Reservoir, the Wolcott Pumping Pipeline, the Hat Creek Feeder Canal and the Nolen Creek Feeder Canal. Proof will be offered on December 22, 1967.

H. A. Nottingham & Sons., Inc., a ranching enterprise on Eagle River, filed a suit to change the points of diversion for some 12.28 cubic feet of water per second of time from tributaries of the Eagle River to Eagle River itself. Mr. Smith and I felt that under the Edwards and Iron Mountain contracts the District was bound to object if the change might injure junior appropriators. Since the tributaries were short supply streams, the burden of the change would fall on Eagle River unless conditions were imposed. The Court allowed 7.28 cfs to be changed subject to various conditions which limit the amount divertable under

the change to that produced by the tributary from which the change was made.

Mr. Smith and I have met several times with representatives of the Grand Valley ditches and Region 4, Bureau of Reclamation with regard to Green Mountain Reservoir, and the necessity for checking at the Orchard Mesa Power Plant. The first problem relates to a division of the water in storage carried over each year between the compensatory pool and the power-irrigation pool, so that we will not end up each spring after power releases all winter with only water belonging to the Northern Colorado compensatory pool in storage. This year when we had that odd spring, as I reported earlier, the call came on Green Mountain down below. They first refused to release, and finally decided they had better. Their first statement was that it all belongs to the Northern Colorado Water Conservancy District. I think they are pretty well along on working out some sort of agreement between 4 and 7 as to some division on the two Green Mountain pools.

The second problem is rather unique. The major or large calls for water in the lower valley total about 2,231 cubic feet per second. Gates have been installed in the tailrace of the Orchard Mesa Power and Pumping Plant to raise the water level of the tailrace so that it returns to the river above the Grand Valley Canal to its diversion dam, thus reducing the water call to about 1,733 cubic second feet. It raises the water on the power and pumping plant draft tubes some eight feet, reducing substantially their efficiency and power and pumping capabilities.

When the flow of the Colorado at the Cameo guage falls to about 2,231, the State Engineer has, in the past, required the check to reduce the demand on the river and to avoid then shutting down the transmountain diversions. The effect is to deny to the power right owners the full power rights. This year, however, as soon as the check was started, Mr. Finley, the division engineer, shut off the transmountain diversions. It is the desire of the lower valley owners of the power rights to avoid checking until, as a matter of comity between themselves, the river flow, without interference from transmountain diversions interferes with irrigation. Then checking, if they desire to forego the power right, will provide better and more efficient irrigation use with water available in the lower valley. The District should, in my opinion, give them every aid in this endeavor. This will be one matter which will be discussed at the Western Missouri Basin Operating Plan Conference with the various parties involved. That meeting is presently set for October 26, 1967 at the Bureau of Reclamation offices in Denver and I anticipate that Region 4 and Region 7 representatives, people from Denver, Colorado Springs, etc. will be present and we can try to get this part of the matter resolved.

Additional discussions of both problems, as well as the need for the services of a hydrograph to aid the Division Engineer in this Irrigation Division, will be continued at the meeting of the interested parties on October 26, 1967 in Denver.

A claim was filed in Water District No. 40, and proof has been offered thereon, for the Huntsman Canal and the West Divide Tunnel, part of the West Divide Project. I don't know when a decree will be entered.

In accordance with the Board's direction, I initiated discussions with the Southwestern Water Conservation District to ascertain if some priority date adjustment between projects in their and our districts should be made to equalize the demands on an out of state call. Their attorney, Mr. Frank Maynes and Engineer, Mr. Clifford Jex, have apparently studying the matter, but nothing had at the time of preparation of this report been submitted by them. Mr. Maynes advised me by telephone that Mr. Jex had prepared a suggestion on this matter to hand to us this date. Mr. Jex called me and said in fact he did not have sufficient information to even make a suggestion and so out of our discussions it was finally agreed that Mr. Maynes and Mr. Jex will meet in Grand Junction in the near future with Mr. Smith and myself to try to come up with some satisfactory arrangement of spreading this out of state call across the projects. There are problems as to what projects we are going to be able to include in this equalization and, two, how are we going to get those people down there to share in this transmountain diversion problem so that they, instead of being willing that eastern Colorado use our water, develop a different attitude about it.

The Colorado Water Congress sponsored a trip to Glen Canyon in an attempt to acquaint members of the State legislature with the Colorado River Storage Project and Participating Projects. This District paid part of the expense. The trip was divided into two groups, one from Monday to Wednesday, and the other from Wednesday to Friday. Your President, Mr. Brown, and I attended on behalf of the District with the second group. I personally feel the trip and tour to have been a great success. I might add at this point that I was rather amazed, not at the misinformation, but at the lack of information which eastern slope Senators and Representatives have in this over all problem of the Colorado River, though they in part are dependent upon it. For an example, Mr. Keith Singer, who is, as I understand it, in the House of Representatives and Chairman of the Natural Resources Committee, had been informed by someone that apparently believed that there is no call for water from the western slope to the eastern slope at this time. So I bundled him up one of Mr. Smith's charts showing the various points of transmountain diversions, their total diversions over here, as well as their annual averages and mailed it to him, hoping it would enlighten him somewhat on this problem.

Additional discussions of both problems, as well as the need for the services of a hydrograph to aid the Division Engineer in this Irrigation Division, will be continued at the meeting of the interested parties on October 26, 1967 in Denver.

A claim was filed in Water District No. 40, and proof has been offered thereon, for the Huntsman Canal and the West Divide Tunnel, part of the West Divide Project. I don't know when a decree will be entered.

In accordance with the Board's direction, I initiated discussions with the Southwestern Water Conservation District to ascertain if some priority date adjustment between projects in their and our districts should be made to equalize the demands on an out of state call. Their attorney, Mr. Frank Maynes and Engineer, Mr. Clifford Jex, are reportedly studying the matter, but nothing had at the time of preparation of this report been submitted by them. Mr. Maynes advised me by telephone that Mr. Jex had proposed a suggestion on this matter to hand to me this date. Mr. Jex called me and said in fact he did not have sufficient information to even make a suggestion and so out of our discussion, it was finally agreed that Mr. Maynes and Mr. Jex will meet in Grand Junction in the near future with Mr. Smith and myself to try to come up with some satisfactory arrangement for spreading this out of state call across the projects. The two problems as to what projects we are going to be able to include in this equalization and, two, how are we going to get those people down there to share in this transmountain diversion problem so that they, instead of being willing that eastern Colorado use our water, develop a different attitude about it.

The Colorado Water Congress sponsored a trip to Glen Canyon in an attempt to acquaint members of the State legislature with the Colorado River Storage Project and Participating Projects. This District paid part of the expense. The trip was divided into two groups, one from Monday to Wednesday, and the other from Wednesday to Friday. Your President, Mr. Brown, and I attended on behalf of the District with the second group. I personally feel the trip and tour to have been a great success. I might add at this point that I was rather amazed, not at the misinformation, but at the lack of information which eastern slope Senators and Representatives have in this over all problem of the Colorado River, though they in part are dependent upon it. For an example, Mr. Keith Singer, who is, as I understand it, in the House of Representatives and Chairman of the Natural Resources Committee, had been informed by someone that apparently believed that there is no call for water from the western slope to the eastern slope at this time. So I bundled him up one of Mr. Smith's charts showing the various points of transmountain diversions, their total diversions over here, as well as their annual averages and mailed it to him, hoping it would enlighten him somewhat on this problem.

The case involving the Metropolitan Sewer District at Aspen over the respective rights of this District and the sewer district to use the area of the proposed Paepcke Reservoir for a reservoir so far as the District is concerned, or for a sewage disposal plant, was agreed in part, and taken under advisement by the Court. The question last presented is whether it is necessary that the sewer plant be located so as to destroy its availability as a reservoir site. Mr. Delaney may wish to enlarge on some phases of this report.

One other matter that was touched on by Mr. Smith, which I think can be discussed more fully by Mr. Jennings, if I am not in error, is the possible additional investigation of the Middle Park Projects and inclusion of the Azure Reservoir into an overall project, and if they can be all considered together. I think Mr. Jennings will go into that.

I will be most happy to answer any questions you may have.

Very truly yours,

DELANEY & BALCOMB

By /s/ Kenneth Balcomb

Counsel for the Colorado River
Water Conservation District

P. O. Drawer 790
Glenwood Springs, Colorado

KB/b

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF COLORADO

Civil Action Nos. 2782, 5016 and 5017

RE APPLICATION OF CITY AND COUNTY OF DENVER, ACTING BY AND THROUGH ITS BOARD OF WATER COMMISSIONERS WITH RESPECT TO ITS WATER RIGHTS IN THE BLUE RIVER AND ITS TRIBUTARIES IN SUMMIT COUNTY, COLORADO

see page 25

On November 2, 1989, motions to alter or amend the Memorandum Opinion and Order entered by this court on October 23, 1989 were filed by 1) the City and County of Denver and by 2) the United States of America, Colorado Water Conservation District, and Northern Colorado Water Conservancy District. Notice was given to all parties presently involved in this litigation, and on January 19, 1990, oral argument was heard by the court. After full consideration of the matters presented, the court enters the following Amended Memorandum Opinion and Order:

AMENDED MEMORANDUM OPINION AND ORDER

ARRAJ, District Judge

For over forty years, this litigation has been on the docket of this court, and, as this court has observed, "it will likely remain here so long as the Continental Divide partitions Colorado into western and eastern watersheds." United States of America v. Northern Colorado Water Conservancy Dist., consolidated civil action nos. 2782, 5016 and 5017, Memorandum Opinion and Order, at 2-3 (D. Colo. Nov. 2, 1977) ("1977 Opinion"). The present dispute between the parties concerns applications by the Denver Water Board, on behalf of the City and County of Denver ("Denver"), for changes of water rights and exchanges of water.

This matter is before the court on two motions of the United States o America ("the Government") under this court's continuing jurisdiction in Unite States of America v. Northern Colorado Water Conservancy Dist., civil action nos 2782, 5016 and 5017, Final Judgment, Final Decree and Stipulations (D. Colo. Oct 12, 1955) ("Blue River Decree"), codified at 43 U.S.C. § 620j (1982). The firs is a motion for summary judgment, or, in the alternative, for dismissal, o Denver's application for a change of water right, for approval of a plan fo augmentation and replacement and for an amendment to the Blue River Decre ("Change Application"). Contending that applicants for changes in water right must own those water rights and that Denver has no right, title or interest i the water right that it seeks to change, the Government maintains that there a no genuine issues of material fact to be decided by the court and that it i entitled to judgment at law. Alternatively, the Government claims that thi court lacks jurisdiction because the Change Application does not present a ca or controversy under Article III of the U.S. Constitution.

The second is a motion to dismiss Denver's application to confirm a approve rights of replacement and exchange under the Blue River Decree and change water rights ("Exchange Application"). The Government contends that th court lacks jurisdiction because Denver's Exchange Application does not prese a case or controversy under Article III of the U.S. Constitution.

Denver filed its Change and Exchange Applications in this court. It al filed related applications in the District Court, Water Division No. 5, Sta of Colorado.[1] In the Water Court, the Change Application was given Case N 87CW375; the Exchange Application was given Case No. 87CW378.

---

[1] The application related to the Change Application (87CW375) sou the Water Court's approval of a change of water right and plan for augmentati Change Application § III, at 8. The application related to the Excha Application (87CW378) requested that the Water Court approve a change of wa rights to specify that the water rights could be used by exchange for munici use within the Denver Metropolitan area. Exchange Application § 10, at 11.

Numerous parties have joined in one or both of the Government's motions. Trans Mountain Hydro Corporation and Summit County have joined only in the Government's motion for summary judgment, or, in the alternative, to dismiss the Change Application. The following have joined in both of the Government's motions: Avon Metropolitan District, Arrowhead at Vail, Basalt Water Conservancy District, Breckenridge Ski Area, Citizens for the Protection of Middle Park Water, Copper Mountain Water and Sanitation District, Copper Mountain, Incorporated, Exxon Corporation, Hydrowest, Koppers Company, Mobil Corporation, Main Elk Corporation and Upper Eagle Regional Water Authority; Jeris A. Danielson, Colorado State Engineer, Orlyn Bell, Division Engineer for Water Division No. 5 and the Colorado State Division of Wildlife, through the Colorado Attorney General; the Towns of Basalt, Collbran, DeBeque, Eagle, Gypsum, Palisade, and the City of Rifle, Harland Adams, Adams Ranch Homeowners' Association, Owl Creek Development Corporation, Donald Patton and the Diane M. Smith Trust. The Town of Frisco, Union Oil Company of California and Mount Powell Ranch Partnership join in both of the Government's motions, qualifying their support for the motion to dismiss the Exchange Application by urging dismissal without prejudice. The Colorado Water Conservation Board joins both of the Government's motions as to the case or controversy issue that has been raised concerning the application of C.R.S. § 37-92-305(3) (1974).

I. GOVERNMENT'S MOTION FOR SUMMARY JUDGMENT AS TO DENVER'S CHANGE APPLICATION (Case No. 87CW375)

Denver's Change Application requests that this court amend the Blue River Decree to incorporate a change of water right and plan for augmentation and replacement. Change Application § III, at 8. First, it proposes to change storage rights to the 154,645 acre feet of water in Green Mountain Reservoir to Dillon Reservoir as an alternate place of storage, id. § I.C, at 2, and to pump

and/or exchange water to Dillon Reservoir and/or Roberts Tunnel, Id. § I.C.1, at 2-3. Second, it proposes a plan for augmentation and replacement in which

> a reservoir or combination of reservoirs, as may be suitable to replace the functions of Green Mountain Reservoir under the Blue River Decree and as set forth in Senate Document 80, will be constructed and available for release of water to ensure that no injury occurs to other water users by virtue of the change in water right applied for herein of the Green Mountain Reservoir 1935 storage priority.

Id. § II, at 5. The plan proposes to add as an alternate place of use all area served or to be served by the Denver Municipal Water Works System, including storage, either directly or by exchange, in six existing reservoirs[2] and one unconstructed reservoir[3] on Colorado's Eastern Slope. Id. § I.C.2, at 3-4. To these ends, the Change Application requests amendment to the Blue River Decree to incorporate its proposed change of water right and plan for augmentation and replacement. Id. § III, at 8. As it contends in a brief filed with this court, "Denver seeks the head of the line privilege as against all others, including the United States, to make use of Green Mountain water in the Denver municipal area in the future." Denver's Response to the United States' Motion for Summary Judgment and Motion to Dismiss, consolidated civil action nos. 2282, 5016 and 5017, at 4-5 (D. Colo. filed June 13, 1988) ("Denver's Response Brief").

The Government (and parties joining its motion for summary judgment, or in the alternative, for dismissal of Denver's Change Application) contends that Denver cannot change rights to water it does not own. It claims that the court's changing of water rights or granting of conditional water rights to Denver would constitute a conveyance, which only Congress has the power to effect under the Property Clause of the U.S. Constitution, U.S. Const., art. IV, § 3, cl. 2. Since Congress has not conveyed the water rights at issue here, according to the

---

[2] These include Cheesman, Eleven Mile Canon, Marston, Antero, Chatfield and Strontia Springs Reservoirs.

[3] Two Forks Reservoir is an unconstructed reservoir to be located on the South Platte River in Jefferson and Douglas Counties.

Government, the court cannot grant Denver's request. In addition, the Government asserts that the functions of Green Mountain Reservoir are prescribed by Congress and may not be changed without Congressional approval. See 43 U.S.C. § 390b(d).[4] Finally, the Government claims that absent ownership of the rights it seeks to change, Denver lacks standing. Since there are no genuine issues of material fact and the Government is entitled to judgment as a matter of law, the Government argues that summary judgment should be entered in its favor and that Denver's Change Application should be dismissed. Alternatively, it claims that Denver's Change Application should be dismissed because it does not present a case or controversy.

In response, Denver claims that it seeks to have this court modify an existing water right that has already been decreed. Under Denver's view, the Change Application requires determination of threshold questions of fact concerning manifestations of its intent to appropriate and its overt acts of appropriation, see Elk-Rifle Water Co. v. Templeton, 173 Colo. 438, 484 P.2d 1211, 1214-15 (1971), and the non-existence of injury to vested water rights or conditional water rights, see C.R.S. § 37-92-305.

Before turning to the merits of the Government's motion, I must address two preliminary issues. The first involves a determination of the type of right Denver seeks. The second concerns an issue of statutory interpretation.

A.

Denver asserts in its Response Brief that it seeks a conditional water right. Denver's Response Brief at 2, 6. Its application, however, prays for an amendment to the Blue River Decree to "incorporate the change of water right

---

[4] The Government asserts that the modification proposed by Denver would require major operational changes and that those changes have not been approved by Congress as required by the statute.

and plan for augmentation and replacement sought herein." Change Applicatio § III, at 8 (emphasis added). Nowhere in that application does Denver mentio that it seeks a conditional water right.[3] As the Government points out, th purported appropriation described in the Change Application is a water righ already decreed absolutely to Green Mountain Reservoir in the Blue River Decre Therefore, Denver's application cannot be for a conditional water right.

B.

Under Colorado law, "ownership is a condition precedent to the right o a petitioner seeking to change the point of diversion of a water right." Stancato v. Friend, 146 Colo. 488, 362 P.2d 400, 401 (1961). See Hannen v Farmers' High Line Canal & Reservoir Co., 145 Colo. 379, 360 P.2d 417, 42 (1961). In Stancato and Hannon, the Colorado Supreme Court interpreted a earlier version of the statutory provision at issue here. The earlier versi provided, in pertinent part:

> Any owner or claimant of a decreed water right, desiring to secure i whole or in part the modification of his decree by changing the point o diversion of ditches or other structures for diverting water or by changi the location of reservoirs or other structures for storing water m present to the court which gave the adjudication decree a petition writing for such change . . . .

C.R.S. § 147-9-22 (1953) (emphasis added). In 1969, the legislature chang slightly the language of the statute. Section 37-92-302(1)(a) (Supp. 1988) n provides, in pertinent part:

> Any person who desires a determination of a water right or a condition water right and the amount and priority thereof, including a determinati that a conditional water right has become a water right by reason of t completion of the appropriation, a determination with respect to a char of a water right, approval of a plan for augmentation, quadrennial findi

---

[3] A conditional water right is "a right to perfect a water right w a certain priority upon the completion with reasonable diligence of appropriation upon which such water right is to be based." C.R.S. § 37-92-103 (1974). A change of water right is "a change in the type, place, or time of u a change in the point of diversion, . . . a change in the place of storage . . . or any combination of such changes." C.R.S. § 37-92-103(5) (1974).

> of reasonable diligence, approval of a proposed or existing exchange of water under 37-80-120 or 37-83-104, or approval to use water outside the state pursuant to section 37-81-101 . . . shall file with the water clerk in quadruplicate a verified application setting forth facts supporting the ruling sought, a copy of which shall be sent by the water clerk to the state engineer and the division engineer.

(emphasis added).

Denver urges a literal reading of the statute. It asserts that in changing the language in 1969, the legislature broadened the class of litigants who could secure modifications of water rights decrees. In short, Denver suggests that ownership of a water right is no longer a condition precedent to the right of a petitioner seeking to change the point of diversion of that water right.

I disagree:

> [W]here a statute would operate unjustly, or absurd consequences would result from a literal interpretation of terms and words used that would be contrary to its obvious and manifest purposes, the intention of the framers will prevail over such a literal interpretation.

People v. Sivola, 547 P.2d 1283, 1288, cert. denied, 429 U.S. 884 (1976). See 2A N. Singer, Sutherland Statutory Construction § 46.07, at 110 (4th ed. 1984) ("Although many expressions favoring literal interpretations may be found in the cases, it is clear that if . . . such interpretation leads to absurd results, the words of the statute will be modified to agree with the intention of the legislature.") (footnote omitted). In addition, the General Assembly's own canons for statutory construction direct that courts, in construing statutes, presume that "a just and reasonable result is intended . . . ." C.R.S. 2-4-201(1)(a) (1980). In constrast, the absurdity of the meaning that Denver urges is manifest. If this court, sitting as it is as a Colorado water court, adopted Denver's interpretation, anyone off the street would be able to petition the court to change someone else's water rights. Hannon and Stancato stated the law. They have not been overruled since. Moreover, "legislative inaction following contemporaneous and practical interpretation is evidence that the legislature intends to adopt such an interpretation." 2A Sutherland Statutory Construction.

supra, § 49.10, at 407 (footnote omitted). The Colorado Supreme Court has note that

> [b]ecause the legislature has met several times since [the Colorado Supre Court decided a case construing the Uniform Reciprocal Enforcement o Support Act] without amending the statute, we deem the construction whic we have placed on the statute to have approval of the people and to hav become a part of the law of this state.

Nye v. Dist. Ct., 168 Colo. 277, 450 P.2d 669, 671 (1960). In light o legislative inaction in the eight years after Stangate and Hannon, the chaot result urged by Denver could not have been the one intended by the legislatur The revised statute should be read in light of those cases. Therefore, I ho that ownership of water rights is still a condition precedent to the right o a petitioner seeking to change those rights under C.R.S. § 37-92-302(1)(a).

/

C.

Rule 56(c), Fed. R. Civ. P., provides that summary judgment "shall b rendered forthwith if the pleadings, depositions, answers to interrogatorie and admissions on file, together with the affidavits, if any, show that the is no genuine issue as to any material fact and that the moving party is entitl to a judgment as a matter of law." See Anderson v. Liberty Lobby, 477 U.S. 24 247 (1986); Burnette v. Dresser Industries, Inc., 849 F.2d 1277, 1284 (10th Ci 1988). It is not the trial court's function to weigh the evidence itself, make findings of fact or to determine the truth of the matter; its function to determine only whether there is a genuine issue for trial. Burnette, supr 849 F.2d at 1284, citing Anderson, supra, 477 U.S. at 249-50. A dispute genuine if a reasonable finder of fact could find for the nonmoving party. S id., citing Anderson, supra, 477 U.S. at 248.

The Government's claim that Denver's Change Application does not prese to this court a case or controversy under the U.S. Constitution is inappeal because this court retains continuing jurisdiction of these cases under the Bl

River Decree.

The Government is nonetheless entitled to summary judgment on two grounds. First, Denver does not have the right to petition this court to change water rights it does not have. Senate Document No. 80, S. Doc. No. 80, 75th Cong., 1st Sess. (1937), which has the force of law. Pub. Svc. Co. of Colorado, 754 F.2d 1555, 1561 (10th Cir. 1985), cert. denied, 474 U.S. 1081 (1986). Under Senate Document 80, Denver has no right, title or interest in Green Mountain Reservoir. United States v. Northern Colorado Water Conservancy Dist., consolidated civil action nos. 2782, 5016 and 5017, Supplemental Judgment and Decree ¶ 2, at 2 (D. Colo. Feb. 9, 1978) ("1978 Decree"); 1977 Opinion at 13, aff'd 608 F.2d 422, 431 (10th Cir. 1979) (Northern); United States v. Northern Colorado Water Conservancy Dist., consolidated civil action nos. 2782, 5016 and 5017, decree, ¶ 2, at 2 (D. Colo. Apr. 16, 1964) ("1964 Decree"); nor is it even a beneficiary of those rights, 1977 Opinion at 14. Rather, the Government has rights as trustee to store water in Green Mountain Reservoir. 1977 Opinion at 7, aff'd, Northern, supra, 608 F.2d at 430; City & County of Denver v. Northern Colorado Water Conservancy Dist., 130 Colo. 375, 276 P.2d 992, 1013 (1954). Because it is without the rights it seeks to change, Denver is not entitled to the relief it requests. Second, absent Congressional approval, 43 U.S.C. § 390b(d)[6] prohibits the change of water rights that it seeks. Denver seeks to change the entire Green Mountain water right to a different point of diversion, use and place of use. This, by any definition, is a major operational change which may be made only upon congressional approval.

---

[6] 43 U.S.C. § 390b(d) provides:

> Modifications of a reservoir project heretofore authorized, surveyed, planned, or constructed to include storage as provided in subsection (b) of this section which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes shall be made only upon the approval of Congress as now provided by law.

As to Denver's Change Application, the only material fact is the ownersh of the water rights Denver seeks to change. It is well-settled that those wat rights belong to the Government, not to Denver. Moreover, federal statute ba the proposed change unless and until Congress approves it. Since no reasonabl trier of fact could find for Denver, there is no genuine issue of material fa to be decided. Therefore, the Government is entitled to judgment as a matt of law. Summary judgment should be entered against Denver under Rule 56(c), Fe R. Civ. P.

II. GOVERNMENT'S MOTION TO DISMISS DENVER'S EXCHANGE APPLICATION (Case No. 87C

In its Exchange Application, Denver requests that this court modify t Blue River Decree to permit an exchange involving diversion of waters of t Blue River, Williams Fork and Fraser River and their tributaries into existi structures owned and operated by Denver on the Western Slope and thence to t Eastern Slope by way of the Roberts and Moffat Tunnels. Exchange Applicati § 8, at 10. Denver proposes to replace the diverted water by releasing wat from nine unconstructed reservoirs on the Western Slope.[7] Id. § 3.A, at 1- Once it has diverted the water, Denver proposes to use it directly or store in one or more reservoirs on the South Platte River or on its tributaries, § 3.C, at 6-8,[8] and to exchange or transfer water by the use of any public str or its water and substitution of this water supplied or taken by Denver; waters exchanged would be placed into the Denver Municipal Water Works, id. 7, at 8.

The Government (and parties joining its motion) contends that Denve

---

[7] These include Una, Redcliff, Azure, Gabriel, Wolcott, Eagle-Colora Rock Creek, Gunsight Pass and Ranch Creek Reservoirs.

[8] Eight of these reservoirs now exist, including Cheesman, Eleven M Canon, Marston, Antero, Gross, Ralston Creek, Chatfield and Strontia Spri Reservoirs. Two Forks Reservoir has not been constructed. See supra note

Exchange Application presents no case or controversy. Consideration of the merits of Denver's Exchange Application would involve a determination, required under C.R.S. § 37-92-305(3), that the proposed exchange would not injure any other vested water right or decreed conditional water right. The Government claims that since Denver has not received the required Executive approval for the exchanges it seeks to effectuate, a determination of the merits of the Exchange Application by the court would necessitate speculation about the impact of the change of water rights and exchange of water assuming one or more of the unconstructed replacement reservoirs are completed. Furthermore, since Denver seeks to change these functions through its application, this court's decision on Denver's Exchange Application would require it to pass on a non-justiciable political question. Finally, the Government maintains that since any such determination made by the court would be in the nature of an advisory opinion, the issuance of which is prohibited by Article III of the Constitution, the court must dismiss this case.

Denver claims that there is a case or controversy. This court sits as a Colorado water court; state substantive law applies. Denver urges that Colorado law permits "any person" to seek approval of a proposed or existing exchange of water under C.R.S. § 37-80-120 or § 37-83-104. C.R.S. § 37-92-302(1)(a). It also mandates court approval of an exchange if there is no injury to the owner of or persons entitled to use water under a vested water right or a decreed conditional water right. C.R.S. § 37-92-305(3). The state court is authorized to impose conditions it finds appropriate to insure no injury occurs. See C.R.S § 37-92-305(4).

As noted, supra at 8, the Government's claim that Denver's Change Application does not present to this court a case or controversy under the U.S. Constitution is inapposite because this court retains continuing jurisdiction of these cases under the Blue River Decree.

In the Blue River Decree, this court noted that

> [t]his obligation adequately to provide water for the priorities on th Blue River and the Colorado River antedating the respective priority date of [the City and County of Denver and the City of Colorado Springs], ma be fulfilled by replacement storage by and on the Blue River or on th Williams River, subject nevertheless to the requirement that the partie provide that the plans for replacement storage will first have bee approved by the Secretary of the Interior or his designated representativ . . . . The water to be exchanged shall be on hand and in storage whe the exchange is proposed.

Blue River Decree at 33 (emphasis added). In 1964, this court, in interpretin the Blue River Decree, reemphasized that passage:

> . . . without prejudice to the question whether Denver or Colorado Spring may make exchanges of other Western Slope water for Blue River water o the right of any signatories to the 1955 stipulation to contest th existence of such right, the right of Denver or Colorado Springs t exchange water lawfully impounded on the Williams Fork River or Blue River as provided for in paragraph 4(c) of said 1955 stipulation, is subject t the consent of the Secretary of the Interior. The Secretary will nc unreasonably withhold his consent whenever the following conditions exist [inter alia] . . . The water to be exchanged is on hand when the exchanc is proposed.

1964 Decree ¶ 5.B, at 4 (emphasis added).

Denver's Exchange Application must be dismissed for two reasons. First Denver has not received the requisite permission for the exchange from th Secretary of the Interior, as required by the Blue River and 1964 Decrees.

Second, the Blue River 1964 Decree requires that the water be on hand whe the exchange is proposed. This, however, does not preclude the Secretary' approval of a plan for exchange if the approval is conditioned upon th requirement that the water be on hand at the time of the actual exchang Notwithstanding any Secretary's approval of a proposed plan for exchange, su exchange may not be exercised until such time as the plan for exchange has be approved by the court and nothing herein shall imply that such exchange w. approved by the court in the Blue River decree; the proper priority of any su exchange is a matter to be determined in some future proceeding in this cas Furthermore, the approval requried of the Secretary for such additional exchan

would itself require Congressional approval if a major operational change of Green Mountain Reservoir is involved. 43 USC 390b(d).

Accordingly,

IT IS ORDERED that the Government's Motion for Summary Judgment as to Denver's Change Application (District Court, Water Division No. 5, State of Colorado, Case No. 87CW375) be, and hereby is, GRANTED.

IT IS FURTHER ORDERED that the Government's Motion to Dismiss Denver's Exchange Application (District Court, Water Division No. 5, State of Colorado, Case No. 87CW376) be, and hereby is, GRANTED.

Inasmuch as the court has granted summary judgment against Denver, that application is dismissed with prejudice; Denver's Exchange Application is dismissed without prejudice. Each party shall bear his/its own costs.

ENTERED at Denver, Colorado this 12th day of February, 1990, nunc pro tunc as of October 23, 1989.

BY THE COURT:

Alfred A. Arraj, Judge
United States District Court

UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO
DENVER, COLORADO 80294

ALFRED A. ARRAJ
JUDGE

CERTIFICATE OF MAILING

Civil Action Nos. 2782, 5016, 5

I hereby certify that a copy of a Amended Memorandum Opinion and Or dated February 12, 1990, were mailed this 12th day of February, 1990 to t following:

John R. Hill, Jr., Esq.
Lynn D. Johnson, Esq.
U.S. Department of Justice
Land and Natural Resources Division
Drawer 3607
Denver, Colorado 80294

J. Greg Whitehair
Assistant U.S. Attorney
1200 Federal Building
Denver, Colorado 80294

Wayne D. Williams, Esq.
Michael L. Walker, Esq.
Casey S. Funk, Esq.
City and County of Denver
1600 W. 12th Avenue
Denver, Colorado 80254

Kenneth Balcomb, Esq.
Scott Balcomb, Esq.
OKLANEY & BALCOMB
P.O. Drawer 790
Glenwood Springs, Colorado 81602

Donald H. Hamburg, Esq.
Suite 204, Mid-Continent Bldg.
P.O. Box 1120
Glenwood Springs, Colorado 81602

Bennett W. Raley, Esq.
DAVIS, GRAHAM & STUBBS
P.O. Box 185
Denver, Colorado 80201-0185

Frederick G. Aldrich, Esq.
NELSON, HOSKIN, GROVES & PRINSTER
P.O. Box 40
Grand Junction, Colorado 81501

Anthony W. Williams, Esq.
WILLIAMS, TURNER & HOLMES, P.C.
200 N. 6th Street, P.O. Box 338
Grand Junction, Colorado 81502

Gregory L. Johnson, Esq.
ANDERSON, JOHNSON & GIANUNZIO
P.O. Box 240
Colorado Springs, Colorado 8090

David G. Hill, Esq.
Reed D. Benson, Esq.
HUTCHINSON, BLACK, HILL & COOK
P.O. Box 1170
Boulder, Colorado 80306

Mark N. Williams, Esq.
P.O. Box 23
Grand Junction, Colorado 81502

Stanley W. Cazier, Esq.
BAKER, CAZIER & MC GOWAN
P.O. Box 588
Granby, Colorado 80446

Timothy J. Flanagan, Esq.
KELLY, STANSFIELD & O'DONNELL
550 15th Street, Suite 900
Denver, Colorado 80202

William A. Paddock, Esq.
John U. Carlson, Esq.
CARLSON, HAMMOND & PADDOCK
1700 Lincoln Street, Suite 275
Denver, Colorado 80203

D.J. Dufford, Esq.
William G. Waldeck, Esq.
DUFFORD, WALDECK, RULAND & MIL
Valley Federal Plaza, Suite 90
P.O. Box 2188
Grand Junction, Colorado 81502

Civil Action Nos. 2782, 5016, 5017

CERTIFICATE OF MAILING (CONT'D)

Herbert C. Phillips, Esq.
HAYES & PHILLIPS, P.C.
1350 17th Street, Suite 450
Denver, Colorado 80202-1517

John W. Savage, Esq.
P.O. Box 1926
Rifle, Colorado 81650

Glenn E. Porzak, Esq.
HOLME ROBERTS & OWEN
1401 Pearl Street, Suite 400
Boulder, Colorado 80302

James R. Montgomery, Esq.
Charles N. Woodruff, Esq.
David L. Harrison, Esq.
James J. DuBois, Esq.
MOSES, WITTEMYER, HARRISON & WOODRUFF
P.O. Box 1440
Boulder, Colorado 80306

Jacques S. Ruda, Esq.
1331 17th Street, #510
Denver, Colorado 80202

Loyal E. Leavenworth, Esq.
James S. Lochhead, Esq.
LEAVENWORTH & LOCHHEAD
P.O. Drawer 2030
Glenwood Springs, Colorado 81601

Kevin Lindahl
Eagle County Attorney
Post Office Box 850
Eagle, Colorado 81631

David W. Robbins, Esq.
HILL & ROBBINS
1441 18th Street
Denver, Colorado 80202

Linda E. White
Asst. Attorney General
Natural Resources Section
1525 Sherman Street, 3rd Floor
Denver, Colorado 80203

John M. Dingess, Esq.
PETROCK, FENDEL & DINGESS
1630 Welton Street, Suite 200
Denver, Colorado 80202

Gary L. Greer, Esq.
SHERMAN & HOWARD
633 17th Street, #2900
Denver, Colorado 80202

Charles B. White, Esq.
BROWNSTEIN, HYATT, FARBER & MADDEN
410 17th Street, 22nd Floor
Denver, Colorado 80202

Jeffrey J. Kahn, Esq.
GRANT, BERNARD, LYONS & GADDIS
P.O. Box 978
Longmont, Colorado 80502-0978

Kevin L. Patrick, Esq.
KEVIN L. PATRICK, P.C.
106 S. Mill St., Suite 200
Aspen, Colorado 81611

David A. Bailey, Esq.
PARCEL, MAURO, HULTIN & SPAANSTRA
1801 California, Suite 3600
Denver, Colorado 80202

T. Shaun Sullivan, Esq.
Wayne B. Schroeder, Esq.
CALKINS, KRAMER, GRIMSHAW & HARRING
1700 Lincoln Street, #3800
Denver, Colorado 80203

Anthony J. DiCola, Esq.
County Attorney
400 Byers Avenue
P.O. Box 312
Hot Sulphur Springs, Colorado 80451

Jack T. Ross, Esq.
SAUNDERS, SNYDER, ROSS & DICKSON, P.C.
707 17th Street, Suite 3500
Denver, Colorado 80202

Virginia Wentz
Secretary/Deputy Clerk

GRAND VALLEY WATER MANAGEMENT STUDY:

A CARROT OR A HAMMER?

Robert E. Norman[1] (1994)

ABSTRACT

The 15-Mile Reach of the Colorado River lies between Palisade, Colorado, and the confluence of the Colorado and Gunnison Rivers near Grand Junction. It is an important habitat for the endangered Colorado squawfish and razorback sucker. Recovery of these fish will require nearly optimal habitat conditions. Modification of the Government Highline Canal system would facilitate water management efficiency and thereby help maintain habitat conditions. Salinity control improvements have successfully decreased seepage from the system, but are lacking in ways to improve water management capabilities in the canal. The Grand Valley Water Users' Association (GVWUA) operates the canal and continues historic operation patterns since salinity improvements have not included facilities needed to maintain necessary water surface elevations on major portions of the canal system. To overcome this it has been proposed to automate the canal, install water surface elevation control structures (check structures) and formulate a new water management strategy for the system. Through canal system improvements it may be possible for the GVWUA to continue to meet its water delivery commitments, and also redirect some water to the Grand Valley Power Plant, and, ultimately to the 15-Mile Reach. Side channel storage would further help GVWUA meet short-term peak demands without increasing river diversions.

INTRODUCTION

Central to the "New Reclamation" is water management and Reclamation's increased emphasis on the environmental effects of our projects. The Grand Valley Water Management Study encompasses this entire arena. The study will address a new water management strategy for one of Reclamation's first projects, the operation of some of our reservoirs, and efforts to help with the recovery of endangered fish. The study stemmed from Reclamation's partici-

---

[1]Planning Team Leader and a member of the Water Acquisition Committee of the Recovery Implementation Program for the Endangered Fish Species of the Upper Colorado River Basin, Bureau of Reclamation, Grand Junction Projects Office, Grand Junction, Colorado.

pation in the Recovery Implementation Program of the Endangered Fish Species of the Upper Colorado River Basin.

BACKGROUND

The Recovery Implementation Program

In the late 1970's, the Fish and Wildlife Service (FWS) determined that new water projects could jeopardize the continued existence of listed endangered fish species. This determination threatened to embroil interested parties in a confrontation which was likely to delay progress toward recovery of the listed species and create uncertainty for future water resources development. To avoid this, an Upper Colorado River Basin Coordinating Committee was formed in 1984 to identify reasonable alternatives that would preserve the species while permitting water resources development to proceed. The Committee identified five areas of activities which they felt were needed to protect and recover endangered fish species in the Upper Colorado River Basin. One of these activities is habitat development and maintenance, of which, flow is a crucial element. The Recovery Implementation Program is overseen by the Implementation Committee consisting of representatives of environmental and water user groups. In January 1988, the Governors of Colorado, Utah, and Wyoming; the Administrator of the Western Area Power Administration; and the Secretary of the Interior executed a cooperative agreement to carry out the activities of the Recovery Implementation Program.

Grand Valley Water Management Study

The Grand Valley Water Management Study consists of three areas; technical, institutional, and legal. Improved system efficiency is only possible with the success in all three areas. This paper will not delve into technical and legal issues but will look at some institutional issues. The beneficiaries of the proposed improvements are the endangered fish with the water users realizing some indirect benefits through further system improvements.

General

The 15-Mile Reach provides significant in that it is habitat for at least two endangered fish species. Flows necessary for recovery have been identified in the reach; however, decreed irrigation diversions immediately upstream from the reach frequently deplete these flows below recovery thresholds.

It appears that modification and improvement of the Government Highline Canal system will facilitate enhanced water management and provide additional

flows to the 15-Mile Reach. Recent improvements to major portions of the canal system, through the Colorado River Salinity Control Program, decrease the changes required to implement this proposal. While salinity control improvements have successfully reduced seepage from the system, they have not addressed canal system water management. Consequently, the GVWUA must continue historic operation patterns since salinity improvements have only replaced historic facilities and have not addressed water management efficiency. However, it appears with canal system improvements it would be possible for GVWUA to decrease administrative spills and either deliver more water to the Grand Valley Power Plant and ultimately to the 15-Mile Reach or when all needs are met, divert less water from the river.

Those familiar with Colorado water law will recognize the legal challenges of such a proposal. In general, water no longer needed for beneficial uses within a system becomes water of the state and is available to other water users. To benefit the endangered fish, it will be necessary to prevent other users from diverting and using any water made available through increased system efficiency. Resolution to this challenge is not within the scope of the Grand Valley Water Management Study and will not be specifically addressed.

Location

The study area is located in the Grand Valley of Mesa County, in west-central Colorado. The communities in the project area are Palisade, Clifton, Grand Junction, Fruita, Mack and Loma. Mesa County's population is approximately 100,000, with Grand Junction being the largest urban center. Agribusiness generates $39 to $51 million annually within the county with peaches, apples, pears, cherries, hay, feed grain and onions as major crops. Grand Junction has an official elevation of 4586 feet (1398 meters).

The Grand Valley Project (Refer to Fig. 1)

Located in the Grand Valley, the Federally owned Grand Valley Project serves two active divisions: the Garfield Gravity Division, operated and maintained by the GVWUA under contract with the United States; and the Orchard Mesa Division, operated by the Orchard Mesa Irrigation District. Water is diverted from the Colorado River into the Government Highline Canal at the Grand Valley Diversion Dam, about 8 miles (mi.) (12.9 kilometers (km)) upstream from Palisade, Colorado. Although not part of the Grand Valley Project, water for Mesa County and Palisade Irrigation Districts is also diverted at the dam. The Garfield Gravity Division includes the Grand Valley Diversion Dam and the Government Highline Canal and lateral system. The Orchard Mesa Division includes the Colorado River siphon, the Orchard Mesa Power Canal,the Grand Valley Power Plant, the Orchard Mesa Pumping Plant and the Orchard Mesa Canal system.

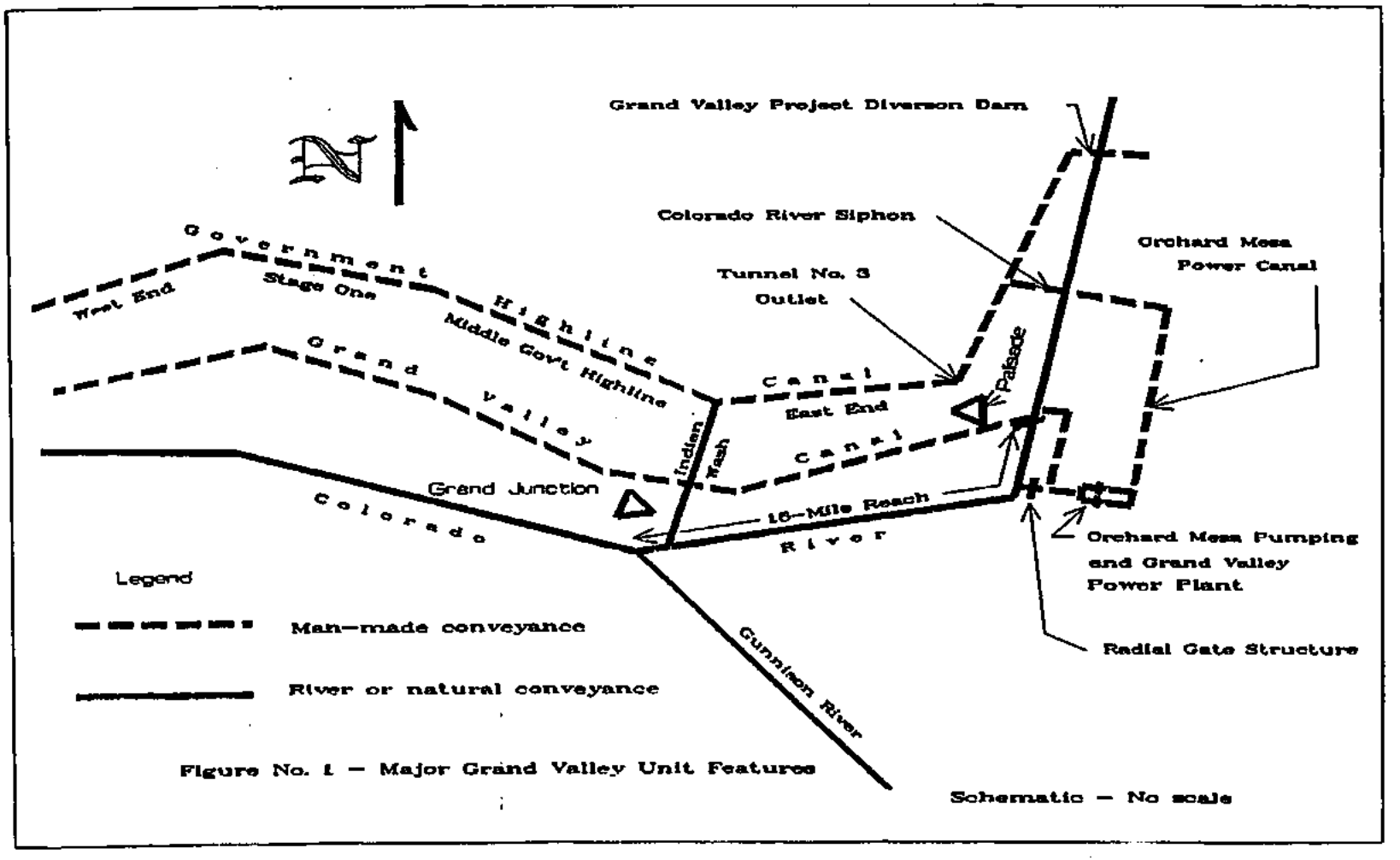


Figure No. 1 - Major Grand Valley Unit Features

The Orchard Mesa Division: The Orchard Mesa Irrigation District (OMID) operates and maintains the irrigation facilities in the Orchard Mesa Division delivering water to approximately 4,800 water users. The irrigated acreage of the OMID is approximately 6,900 acres (ac) (2790 hectares (ha)). The Orchard Mesa Division is located on the south side of the Colorado River. Water for the Orchard Mesa Division is diverted through the Grand Valley Diversion Dam and is conveyed through the Government Highline Canal up to the bifurcation at the inlets of Tunnel No. 3 and the Colorado River siphon. At the bifurcation, the water destined for the Orchard Mesa Division goes through the Colorado River siphon to the OMID Power Canal. About 17 cubic feet per second (ft^3/s) (0.5 cubic meters per second (m^3/s)) is delivered directly from the canal to irrigated lands. At the end of the power canal, the water is delivered to the OMID Pumping Plant and the Grand Valley Power Plant.

The pumping plant consists of four hydraulically driven pumps which pump water into two different canals. The canals, totalling about 34 mi. (55 km) deliver water to 37 mi. (59 km) of privately owned and operated laterals. The four hydraulically driven pumps use about 272 ft^3/s (7.7 m^3/s) to pump 171 ft^3/s (4.8 m^3/s) onto irrigated lands. The 272 ft^3/s (7.7 m^3/s) used to power the pumps normally returns through the pumping plant/power plant tailrace to the upstream end of the 15-Mile Reach.

The power plant consists of two units with one or both units operated depending on the available supply of water. After going through the power plant, the water is normally returned to the 15-Mile Reach.

At maximum irrigation-season diversion and usage levels, OMID can demand up to 460 ft^3/s (13 m^3/s) for irrigation/pumping. The sum of all the water rights which could be diverted at the Grand Valley Diversion Dam is approximately 1,720 ft^3/s (48.7 m^3/s), but due to a canal capacity constraint between the diversion dam and Tunnel No. 3, only about 1,620 ft^3/s (45.9 m^3/s) can be diverted. This restriction limits the Grand Valley Power Plant to 310 ft^3/s (8.8 m^3/s) during periods of peak irrigation demand. At less than full irrigation demand, up to 400 ft^3/s (11.3 m^3/s) can be used to generate hydroelectric power. The 90 ft^3/s (2.6 m^3/s) shortage (400 - 310) is due to the capacity constraint. Without this constraint, the Grand Valley Power Plant would receive 400 ft^3/s (11.3 m^3/s) throughout the irrigation season assuming water supplies were available. Consequently, if irrigation demand in the Garfield Gravity Division is reduced, up to 90 ft^3/s (2.6 m^3/s) of conserved water could be used for power generation.

The Orchard Mesa Division facilities also include a check structure and bypass channel located in the tailrace of the pumping and power plants and a supplemental pumping plant downstream on the Colorado River.

Other Irrigation Systems: Two irrigation districts, Palisade and Mesa County Irrigation Districts, also receive water from the Government Highline Canal through a carriage contract. The operation of these systems is not included in the on-going Grand Valley Water Management Study.

The Garfield Gravity Division: Through the Garfield Gravity Division the GVWUA delivers water to approximately 1,400 water users. The GVWUA system serves approximately 24,000 (10,500 ha) of the 70,000 (28,300 ha) irrigated acres in the Grand Valley. The Gravity Division's Government Highline Canal delivers water to 74 laterals totalling about 160 mi. (257.5 km). After completion of the Salinity Control Program, 30 mi. (48 km) of the 50 mi. (80.5 km) of canal will be lined and nearly all of the laterals are scheduled to be placed in pipe.

As shown in Fig. 1, 45 mi. (72 km) of the Government Highline Canal is divided into four sections. Beginning at the outlet of Tunnel No. 3 and moving west, the sections are; the East End Government Highline Canal, Middle Government Highline Canal, Stage One, and West End Government Highline Canal. All of these canal reaches, except the Middle Government Highline Canal, will be lined as part of the Colorado River Salinity Control Program to control seepage. Plans are to place all laterals, including those served by the Middle Government Highline Canal, in pipe.

East End Government Highline Canal: The first 10 mi. (16 km) of the Government Highline Canal is referred to as the East End Government Highline Canal (East End). The initial design capacity of the canal is about 850 ft^3/s (24.1 m^3/s). This portion of the canal also serves the lands of Mesa County and Palisade Irrigation Districts. About 120 ft^3/s (3.4 m^3/s) is delivered to the districts during the irrigation season. Portions of the East End have been membrane lined with the remainder scheduled to be lined by 1996.

Middle Government Highline Canal: The next reach of the Government Highline Canal is the Middle Government Highline Canal. The design capacity at the beginning of this section is 730 ft^3/s (20.7 m^3/s). The 20 mi. (32 km) of canal delivers water to 54 laterals and about 12,300 ac (4,980 ha). It is an unlined canal with no check structures. The required water surface elevation in the canal is maintained by adjusting the amount of water in the canal. The Middle Government Highline Canal is not scheduled for improvement.

Stage One: The next 7 mi. (11 km) of the Government Highline Canal is called Stage One. The design capacity of the beginning of Stage One is 360 ft^3/s (10.2 m^3/s). This section of canal delivers water to 12 laterals and about 6,300 ac (2,550 ha). All the laterals in this section of canal have been placed

in pipe. The canal is concrete lined and has four check structures which can maintain the upstream water surface elevation regardless of canal flow.

West End Government Highline Canal: The last 8 mi. (13 km) of canal is called the West End Government Highline Canal (West End). The design capacity of the beginning of the West End is 160 ft^3/s (4.5 m^3/s). It delivers water to 9 laterals and about 5,200 ac (2,100 ha). All the laterals in the West End have been placed in pipe. The canal is membrane lined and has four check structures which can maintain the upstream water surface elevation regardless of canal flow.

WATER MANAGEMENT IN THE GARFIELD GRAVITY DIVISION

Only the relevant aspects of canal operation regarding the potential for water management will be discussed. Operation of the current system is described by the manager of the GVWUA as an art. The intricacies and "art" of daily operations are extensive. This art is developed through years of observation of how the system responds to various conditions. It is through this experience that the manager makes daily decisions on how the canal should be operated. And it is the accumulation of this observed knowledge that makes the science of water management unwelcome and difficult.

Historic Water Management

During the early part of the irrigation season, about 1 April through 1 May, there is usually an abundant supply of water in the Colorado River. During this period, irrigation demand is often relatively low. Diversions into the canal system are used to flush and load the system and to meet any early irrigation demand. Typically, irrigation demand increases quickly and by early- to mid-May a full demand can be expected. With few exceptions, the canal runs at or near capacity until irrigation demand begins to decrease around mid- to late-August. From late-August to the end of October the amount of diversion gradually decreases but is generally higher than irrigation demand to keep the canal water surface elevation at required levels. Certain water surface levels are required in the canal to provide water service to high lands adjacent to the canal and to prevent damage to pipe laterals that can be caused by air entering the pipelines. The air that enters the pipeline can become trapped when the pipe inlets lose submergence and then are suddenly resubmerged. This trapped air can cause dangerous pressure surges in the pipeline.

Diversions in excess of demand can be administratively spilled at the six canal spillways or through the open laterals. It has been estimated that 60,000 acre-feet/year (74 Mm^3) of water are administratively spilled. This may seem high

but with a flow-through system without in-system storage and with the limited number of check structures, significantly more frugal operation is not feasible in light of delivery and water surface elevation control requirements. Historically, with 74 open laterals, it was possible to spill a small quantity of water down each lateral rather than concentrate the spills at the canal spillways. Administrative water in a lateral was more readily available to irrigators' along the laterals when an order was placed for water. This form of operation can optimize the use of water while not requiring frequent adjustment of canal spillway structures. Reduction of river diversions would reduce the amount of administrative spills but does not provide the ability to meet the ever-changing irrigation demand.

One aspect of operation which makes canal diversion adjustment difficult is the amount of time for a diversion adjustment to be delivered to the end of the system. Due to the canal configuration, it routinely takes about 3 days for an increased flow adjustment at the river diversion to reach the end of the system. The system takes about 2 days to respond to a decrease in flow. So, if there is a surplus of water within the system, it would take up to 2 days to decrease the flow into the canal and by that time the surplus may no longer exist.

Temporarily deviating from the focus of this paper and addressing the legal implications of the water management practice, the question arises at whether this is a reasonably efficient management practice. This issue has been addressed by the Colorado Water Conservation Board as follows:

> "What "reasonably efficient practices" means is central to statements about the efficiency and waste involved in irrigation water use. A common understanding is that beneficial use is a flexible concept which tolerates whatever degree of "inefficiency" is present in the prevailing irrigation methods of an area. Courts will likely be reluctant to require innovations with private investment that force any advance beyond those prevailing methods. Likewise, the State Engineer can probably not require state-of-the-art irrigation systems in an effort to reduce irrigation water diversions."[1]

Current Water Management

Closed pipelines have resulted in a major difference in administrative spill patterns because closed pipe systems cannot be used as spillways. Consequently, administrative spills are confined to the remaining open laterals and

---

[1] Colorado Water Conservation Board. January 22, 1992. AN ANALYSIS OF WATER SALVAGE ISSUES IN COLORADO. Steve Miller. p. 6.

the six canal spillways. As of the fall 1993, 34 of the 74 laterals have been placed in pipe. Over the next 5 to 7 years the remainder of the laterals are scheduled to be placed in pipe further limiting the open lateral options.

Potential Water Management

In order to manage water more efficiently, it is necessary to make canal adjustments quickly to meet demand and maintain canal water surface elevation with a reduced flow of water in the canal. To meet the ability for quick response, in-system storage and canal automation are being evaluated; and to maintain water surface elevation, additional checks are proposed. The amount of water which could be conserved through these efforts has not been established. As part of the study, the current system is being modelled and then modelled system improvements will be evaluated.

Benefits of Water Management

Benefits of increased system efficiency are in three general areas: the water users within the GVWUA system, other water users who divert from the Colorado River or one of its tributaries, and finally the endangered fish. There is a down side for those who have historically relied on lateral and administrative spill releases for a water supply. Within the State water law these users are entitled to the water only if it is there. There is no legal obligation to continue administrative spills.

Benefits to GVWUA Water Users: The GVWUA water users should experience fewer periods when it is necessary to pro-rate the available supply to their water users. When the demands exceed the system capacity, water users lower in the system sometimes experience temporary shortages. With enhanced management and off-channel storage, it may be possible to meet these short-term demands more effectively.

If water conserved by enhanced water management can be redirected through the Colorado River siphon, more power and more revenues can be generated.

The GVWUA would benefit from having the Middle Government Highline Canal improved as part of the Grand Valley Water Management efforts. This section of canal is the only portion not included in the Salinity Control Program.

As the State's administration of the Colorado River intensifies, administrative spills may be more closely scrutinized. Although the GVWUA system has progressed beyond "prevailing methods" due largely to the Salinity Control Program, these improvements would demonstrate GVWUA's diligence in

progressive water management and likely prevent any possible river administration confrontation.

Benefits to Other Colorado River Water Users: The water rights, diverted at the Government Highline Diversion Dam, are relatively senior on the Colorado River within Colorado. Consequently, under the priority system, these rights can block upstream junior water users from diverting water from the river. If the amount of water which was needed to fulfill the demand of Grand Valley water users could be reduced, and the water is not used to meet flow need of the endangered fish, then the impact to upstream water users would be diminished.

Some upstream junior water users enjoy the benefit of reservoir storage. When the Grand Valley Project would normally block these junior water users from diverting water, the junior users can request storage water. Again, by reducing Grand Valley water requirements, more water could be left in storage to further meet existing or future needs.

Benefit to the Endangered Fish: The two benefits above are common reasons for more efficient water management. A unique benefit in the Grand Valley is related to the location of where administrative spills return to the Colorado River. As mentioned above, the laterals in the East End are not operated by the GVWUA. Consequently, these laterals are not used for administrative spills. In addition, the first spillway on the Government Highline Canal is located at Indian Wash which flows into the Colorado River at the downstream end of the 15-Mile Reach. Therefore, administrative spills at Indian Wash would not benefit the flows in the 15-Mile Reach. However, if any excess water were simply left in the Colorado River rather than being diverted into the canal, the 15-Mile Reach would benefit.

The 15-Mile Reach has been labeled as important habitat for two endangered fish species, the razorback sucker and the Colorado Squawfish. Desired flows in this reach have been identified for recovery of the endangered fish. After spring runoff the flows in the reach frequently fall below the target flows. Reoperation of the Grand Valley Project could then help maintain desired flows in the 15-Mile Reach.

HURDLES TO SUCCESS

Technical

The technical portion of the hurdles to success, that is, what improvements should be made to the irrigation system and the new operational strategy, is the most achievable. Since most of the canal and lateral system either has

been or will be improved as part of the Salinity Control Program, the cost to implement system improvements will be limited to additional check structures, automation, within-system side channel storage, and any additional cost the GVWUA may experience for operation and maintenance of the improved system.

Legal

Under State of Colorado water law, if you do not need your entire diversion amount, the excess is simply returned to the "waters of the state." The water is then available to other water users for appropriation. This requirement does little to encourage change or to undertake costly measures, such as check structures and automation, to improve system efficiency. Water users who are forced to buy water, have shortages of water, or pump their water often make efficiency enhancements. However, due to the seniority of the water rights held for use by the GVWUA and the ability to rely on storage releases, the lack of water supply and the cost of water will not justify system improvements.

Institutional

From the perspective of the GVWUA why should they desire to participate? Are the improvements beneficial enough to the users or organization? The improvements would require increased maintenance due to the additional new structures and a perceived loss of irrigation water rights. Their irrigation system may be more stable with the improvements but they understand how their system operates now. They have learned the "art" of their system.

Is the GVWUA expected to feel some moral obligation to assist in recovering the endangered fish? Under current water law, the benefits of the proposed improvements are of such little value to the GVWUA that some form of encouragement will be required. Will this encouragement be a "carrot or a hammer?"

The Hammer

There is endless debate over whether Reclamation has a hammer to encourage water users. The environmental community would most likely swear that we do, the water user community would most likely swear that we don't, and would surely swear at us if we tried to use it. The debate focuses around the fact that Reclamation holds title to the irrigation systems and, as in the case of the Grand Valley Project, the water rights are in the name of the United States.

I am not confident that ownership provides a mechanism to facilitate participation. According to a court case cited in research conducted by Dr. Lawrence MacDonnell, ownership does not appear to completely rely on who owns water rights. MacDonnell summarizes the case by stating, ... "the U.S. Supreme Court has analogized the water delivery functions of federal reclamation facilities to that of a water carrier. Even though the U.S. may hold the state water rights governing the diversion and use of the water, it does so as an agent for those who apply the water to beneficial use."[2]

The threat of future consultation under Section 7 of the Endangered Species Act and the potential for a jeopardy opinion is thought by some to be a significant "hammer." While this threat is real, I do not believe the use of this or any other hammer would be in the best interest of either the water users or the endangered fish. It might be possible to force the GVWUA to sacrifice a certain quantity of water. Attempting to quantify "forced" savings would lead to conservatively low estimates. Consequently, even though the GVWUA may be able to save more water than a conservative estimate, there would be no motivation for them to do so.

A hammer may work to a degree, but the most modern canal improvements applying state-of-the-art technologies will not save a drop of water. The operators of the systems must desire to save water in order to reap the greatest benefits in water use efficiency. A hammer may be able to force compliance, but it will not create a desire to maximize benefits.

The Carrot

It is from this reference that we need to address the "why" or find the carrot for water user participation in water management and, ultimately, water savings. For an irrigation system which has been almost completely improved through the Salinity Control Program, the incremental benefit of automation is minimal. In fact, the general mood with the water users is that automation is a liability. There are some benefits derived from within system storage and the corresponding ability to meet short-term peak demands.

It is technically possible to continue to divert historic amounts of water but to deliver a larger portion to the Grand Valley Power Plant. More power could then be generated which would result is more revenue for the Grand Valley Project. The water used to generate the additional power would return to the Colorado River at the upstream end of the 15-Mile Reach.

---

[2] Natural Resources Law Center. December 1991. Facilitating Voluntary Transfers of Bureau of Reclamation-Supplied Water, Volume 1. Lawrence J. MacDonnell, Richard W. Wahl and Bruce C. Driver.

One GVWUA request that the Salinity Control Program has been unable to meet is lining the Middle Government Highline Canal. The managers of the Salinity Control Program have decided to indefinitely defer lining this portion of canal due to the unacceptable cost-benefits ratio. This will be the only portion of the canal not lined downstream from Tunnel No. 3. The GVWUA see this as a weak link and a detriment to their operation. It appears feasible to cost share lining this portion of the canal between the endangered fish program and the salinity program. This could be done by determining the maximum amount the salinity program would be willing to pay for the improvements and then having the endangered fish program pay the balance.

It may be possible to justify these improvements because, from an operational standpoint, these improvements would enhance the water management options and would lead to more water savings. In addition, initial studies indicate that the check structures would elevate the water surface in this portion of canal. Due to the enlarged wetted perimeter associated with the increased elevation, increased seepage is expected. Since the increased elevation would be wetting upper portions of the canal which have never, or infrequently, been wetted, the seepage rates are expected to be high. This increased seepage would be detrimental to salinity control and would reduce management opportunities.

There is a quiet mutual lack of trust between the water user and environmental communities. It is doubtful that the environmental community would tolerate, much less encourage, using recovery program funds to improve irrigation facilities on the hope that water would be saved. At the same time, until the improvements are complete, actual savings would be hard to determine. Actual savings would be partially dependent on the desire of the water users to save. Given enough encouragement, water users may be willing to construct on-farm irrigation improvements to further save water or even change cropping patterns to those crops which consume less water.

The most evident system of encouragement is financial. With this in mind a possible solution would be to pay the GVWUA on a per unit of volume saved. To provide up front funding of the large canal improvements, it may be possible to provide a low interest loan. Payments for water savings could then be used to pay off the improvement loan. If more revenue is generated by saved water payments than is needed to service the loan, the excess could be used to accelerate loan payments, pay for on-farm improvements, pay for additional system improvements, help pay for operation and maintenance cost for the existing system, or help pay for additional operation and maintenance payments associated with the salinity program facilities.

CONCLUSION

Technically, saving water within the Grand Valley Project is possible. The legal challenges will be monumental and costly, but also achievable. The institutional challenges will require effort and the desire from all sides to find a workable solution to this unique opportunity. The environmental community and water user community will need to gradually develop trust. The only apparent form of hammer the water users' have is resistance. It would be possible to defeat this strategy with a larger hammer but the political expense and the amount of time required, would be detrimental to all, especially the endangered fish. But a carrot could result in more water efficiency and would not alienate water users throughout the rest of the state in future recovery efforts.

MEMORANDUM OF UNDERSTANDING
NO. 4-FC-40-_____
CONCERNING
GRAND VALLEY WATER MANAGEMENT OPPORTUNITIES

Final Draft
January 5, 1994

I. Background

The Recovery Implementation Program for the Endangered Fish Species in the Upper Colorado River Basin has identified the 15-Mile reach of the Colorado River between Palisade, Colorado (Grand Valley Irrigation Company diversion structure) and the Gunnison River as important habitat for the Colorado squawfish and razorback sucker.

Recovery efforts have focused on providing a dependable water supply for this reach of the river. One possible source of water to supplement the flows in the 15-Mile Reach might result from the operation of the Bureau of Reclamation's Grand Valley Project. Consequently, the recently adopted Recovery Implementation Program Recovery Action Plan (RIPRAP) includes the Grand Valley Water Management Study as one of the water related elements to be completed by September 1996.

To explore the technical, legal and policy issues associated with a different operation a diversified group of water interests are sponsoring the Grand Valley Water Management Study. This group represents municipal, industrial and irrigation water users on both the east and west slope as well as Federal and state agencies.

The primary questions that need to be answered are:

A. What modifications are necessary to the existing canal system which would permit a different canal operation;

B. Quantification of the amount of water which could be conserved through structural and the corresponding operational modifications of the system;

C. What are the proposed uses of the conserved water; and,

D. What are the legal and institutional issues that need to be resolved to protect the conserved water to enhance flows in the 15-Mile Reach.

II. Sponsors

The study proposed under this Memorandum of Understanding (MOU) will be prepared by the Bureau of Reclamation under its General Investigations Program which requires a 50 percent non-Federal cost share. The Federal, state and local agencies and water user organization in the cost-shared study include:

- Bureau of Reclamation
- Grand Valley Water Users Association (GVWUA)
- Colorado Department of Natural Resources (DNR)

- Colorado Water Conservation Board (CWCB)
- Colorado Division of Water Resources (DWR)
- Colorado River Water Conservation District (CRWCD)
- Denver Water (DW)
- Northern Colorado Water Conservation District (NCWCD)

By participating in this study, no Sponsor is making an endorsement of, or commitment to support any change in the operation of the Grand Valley Project or any changes in the uses of the decreed water rights of the Project.

III. Outline of the Study

The proposed study will be conducted in three phases.

Phase I - The primary participants of the initial phase will be GVWUA and Reclamation. This phase will include an appraisal-level analysis of the alternatives available to modify and reoperate the project as well as a preliminary assessment of the economic, financial, environmental and institutional viability of each option. This will involve modeling the irrigation system and evaluating improvement options. Reclamation and GVWUA began work on the Phase I in Fiscal Year (FY) 1993. Reclamation and the GVWUA will continue modeling and monitoring of administrative spills as part of this MOU. As formal work on the Phase II begins, Phase I may be modified to address technical questions associated with legal or institutional issues. The results of this phase will be a recommendation of proposed modifications, modification costs, quantification of the volume of conserved water, and a proposed operation for the improved canal system.

Phase II - All Sponsors will participate in the second phase which will include an analysis of the legal and institutional issues concerning the protection of conserved water to enhance flows in the 15-Mile Reach. This phase will begin in February 1994 and will continue through calendar year 1995. During the first step of this phase the study Sponsors will develop a detailed work plan for evaluating the legal and institutional issues and provide recommendations for resolution.

Phase III - If a viable plan is identified in the first phase and a proposed solution to the legal and institutional issues can be identified in phase two, then the study will advance to the third phase. During the third phase Reclamation will prepare a feasibility-level Planning Report/NEPA compliance document while all study Sponsors implement the resolution to the legal and institutional issues. If a viable alternative is identified, the final implementation of this study is scheduled to be complete by September 1998.

IV. Study Schedule

The Grand Valley Water Management Study is one of the elements of the Recovery Implementation Program Recovery Action Plan (RIPRAP). The RIPRAP is a detailed long-term plan developed by the Recovery Program which identifies activities and schedules necessary to recover the endangered fish. The implementation of this study is scheduled to be complete in the RIPRAP in September 1998. The schedule for the activities listed below would permit completion of this study within the RIPRAP expectations.

Study Schedule

Study Phase	FY 94	FY 95	FY 96	FY 97	FY 98
Phase I	———	———			
Phase II	———	———			
Phase III			———	———	
Project Implementation					———

V. Funding

A. This MOU will be used to account for the resources the various organizations may invest to facilitate this process. Anticipated funding by organization is shown in the funding table. All non-Federal funding will be in in-kind services. No transfers of funds are anticipated under this MOU.

Funding Table [1]

Agency	FY 94	FY 95	FY 96	Total
GVWUA	$5,000	$6,500	$5,000	$16,000
CWCB	10,000	12,000	10,000	32,000
DWR	10,000	12,000	10,000	32,000
CRWCD	15,000	20,000	15,000	50,000
DW	5,000	6,000	5,000	16,000
NCWCD	5,000	6,000	5,000	16,000
Reclamation	50,000	62,500	50,000	162,500
	100,000	125,000	100,000	325,000

[1] Non-Federal contributions will be in the form of in-kind services. All non-Federal may be adjusted upon completion of the detailed work plan for Phase II. Amounts shown are the anticipated maximum amounts.

Date: _____

_____

Darius C. Lile, Director
Colorado Water Conservation Board

Date: _____

B. Cost Ceiling

Total expenditures either in in-kind services or cash contributions shall not exceed $325,000, unless modified under the terms of Section VI of this MOU.

C. Cost Sharing Guidelines

1. Cost sharing may consist of:
   a. Charges incurred by each Sponsor as project costs. (Not all charges require cash outlays by the Sponsor during the project period: examples are depreciation and use charges for building and equipment.)
   b. Project costs represented by services and real or personal property, or use thereof, donated by other non-federal public agencies and institutions, and private organizations and individuals.
   c. All contributions, both cash and in-kind, shall be accepted as part of the Sponsor's cost sharing and matching when such contributions meet all of the following criteria:
      (1) Are verifiable from the Sponsor's records;
      (2) Are not included as contributions for any other federally-assisted program; and
      (3) Are necessary and reasonable for proper and efficient accomplishment of project objectives.
2. In-kind services would include costs incurred for meeting attendance at Recovery Implementation Program or other meetings which specifically address this project. Institutional or legal work on water right analysis or other issues which address this study. In-kind services will include all compensation paid by an organization for services of employees rendered during the period of the award. It includes but is not limited to salaries, wages, director's and executive committee member's fees, travel, fringe benefits, and pension plan costs.
3. Travel costs are the expenses for transportation, lodging, subsistence, and related items incurred by employees who are in travel status on official business of the organization. Such costs may be charges on an actual basis, on a per diem or mileage basis in lieu of actual costs incurred, or on a combination of the two, provided the method used results in charges consistent with those normally allowed by the organization in its regular operations.

VI. Modifications

This MOU may be modified by mutual agreement of all parties signatory thereto. Any modification to this MOU shall be confirmed in writing and executed by the authorized signatory officials prior to performance of the modification.

VII. Termination

Any party may terminate its involvement in this MOU upon thirty (30) days written notification to all other parties.

AN ANALYSIS OF WATER SALVAGE ISSUES IN COLORADO

by Steve Miller
Staff

Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Adopted and Approved for Transmittal to the
Colorado General Assembly on January 22, 1992
Prepared pursuant to HB 91-1154

Table of Contents

I. Introduction

A provision of the Water Conservation Act of 1991, HB 91-1154, directed the Colorado Water Conservation Board (the "Board" or "CWCB") to "conduct an analysis of water salvage which may result from federal programs, including salinity control, and report its findings to the General Assembly by January 1, 1992." Section 37-60-106.5, C.R.S. This report presents the analysis conducted by the Board and the findings are hereby transmitted in fulfillment of the initial obligation to report to the General Assembly. Since HB 91-1154 did not contain specific instructions concerning the scope of the analysis, this report assumes the General Assembly was interested in a broad overview. CWCB anticipates that the General Assembly may seek additional follow up information after reviewing this report and would welcome an opportunity to work further on the complex issues raised by efforts to salvage irrigation water and more generally improve the efficiency of water use in Colorado.

Staff initially focused the analysis on recent proposals (HB 91-1110, SB 86-126; see Appendix A.) brought before the General Assembly to modify or clarify the law regarding irrigation efficiency improvements. Those proposals sought to recognize or create a transferable water right based on reduced irrigation water use. It was believed that such a right would provide an incentive for existing users to improve the efficiency of their systems. Comparing between the bills highlighted a key problem in irrigation efficiency improvement proposals, namely whether a credit to the original appropriator should be based on reductions in historical consumptive use, or the larger volume of water represented by changes in diversion rates.

Following initial discussions, the Board decided to expand the scope of the analysis to include a variety of activities being considered that might better conserve and manage the quality and quantity of surface and groundwater water available for current and future use statewide in Colorado. If specific rights to salvaged or saved water are to be recognized or created a balancing of complex factors must be undertaken. Accordingly, this analysis considers water salvage within the context of better use of scarce water resources and presents the interrelated technical, legal, and environmental issues that must be weighed.

The Board understood that an underlying reason for the General Assembly's request was a concern with the water development issues arising on the Colorado River near Grand Junction which HB 91-1110 sought in part to address. The Board recognized that competing demands for Colorado River water and the current activities of the Federal Salinity Control Program in the Grand Valley had created a situation requiring closer examination. Thus a second report has been prepared, addressing salvage potentials and water supply options in the Grand Valley. That supplemental report presents water salvage issues in a more concrete setting, and may lead to discussions of a negotiated solution to that particular situation.

The analysis herein, focuses on water use efficiency improvements and disposition of the water which may result from such activities. The terminology, both legal and technical, and the processes used to improve irrigation efficiency in particular, and other uses more generally, are described. Federal programs which may produce salvage water, as well as other stimuli to more efficient use are presented. The current legal framework surrounding water use and efficiency changes is reviewed. The resource impacts of changing water use efficiency are then described in general terms. Finally this analysis sets out what the Board believes to be the major policy questions and issues to be resolved through the legislative process.

II. Description and Definition of Water Salvage

Water salvage generally connotes a scheme where irrigation water use is reduced by using more efficient delivery and application methods. Salvage measures usually involve recovery, transfer, and use elsewhere of the water made available by the reduced irrigation use. Recent salvage bills provided that the original irrigator would retain the legal rights, including the priority date, for some portion of the recovered water, and allowed sale of it as an incentive to make the improvements to his delivery system.

Much of the debate over water salvage indicates that imprecise use of terminology creates needless confusion and often obscures the real policy considerations. A better evaluation of the role of salvage will be fostered by the use of consistent language and an understanding of irrigation water use. An irrigation water budget which identifies and quantifies water in the various stages as it passes through the hydrologic cycle is a useful tool to illustrate the terminology and physical processes related to irrigation water use.

A. Irrigation Water Budget

Examples of water use from a typical unimproved and improved irrigation system are shown in Appendix B. Water in its various locations can be quantified and tracked on a daily, weekly, monthly, or annual basis. A tabular quantification of the annual water budgets for the illustrated systems is shown in the accompanying table. A water budget becomes more complex if done on a short term basis because water moves through different parts of the system at different rates. Generally, water is stored in the soil and groundwater systems while stream diversions are taking place, and then returns to the stream from ground storage much later in the season. In a very large system diversions can occur several days prior to farm deliveries due to of the transit time required to move water through the canal and ditch system. With sufficient information about the ditch, soil, and groundwater systems these storage and time lag effects can be accurately computed. On an annual basis they tend to average out and can be ignored, unless precise timing of competing needs is important.

A review of the water budget indicates that after the initial headgate diversion losses of water from the delivery system begin to occur. These losses reduce the amount of water arriving at, and available for use by, the irrigated crop. Losses decrease the overall irrigation efficiency, measured as the ratio of crop use to headgate diversions. When losses occur between the headgate and the farm they are called conveyance or transit losses. After turnout to a particular farm field losses are referred to as field or on-farm losses.

Some of these losses are consumptive, meaning the water is permanently lost from the system and can not be recovered elsewhere in the basin. When water is consumed it is no longer available for other uses and the water supply is depleted or reduced by the actual consumptive use. Consumptive losses include: evaporation from water surfaces in ditches, ponds, and puddles on the farm, seepage which percolates into geologic zones not

hydraulically connected to the surface stream, and transpiration by non-agricultural vegetation along ditches and on the perimeter of cropped areas. These types of losses will be called "incidental" or "nonproductive" consumptive use in this analysis because they are unintended results which produce no economic gain for the irrigator. While these losses are not intentional, neither are they completely avoidable under practical irrigation techniques. Since part of this consumption of water occurs during the necessary process of moving water from the stream to the point of use, it probably can not be considered a non-beneficial use. The user receives benefit from these losses because they allow for a practical method of delivering his crop water needs.

A second category of losses illustrated in the water budget results in return flows, water returning to the stream from which it was diverted. These losses include deep percolation from ditches and fields into tributary aquifers, necessary or accidental water spills from the distribution system, and tailwater or unused irrigation water which runs off of the irrigated acreage. Since these losses can frequently be observed and can be as high as 50% of the amount diverted they are cited as indicating the waste and inefficiency of irrigated agriculture. However, by definition this water returns to the stream and is available for use by downstream appropriators, thus the pejorative term "waste" should not be automatically applied. To decide if water is "wasted" the observer must determine whether any other use (decreed or not) is deprived of water due to the losses resulting from the irrigator's actions, and whether or not those losses are reasonable and necessary. Often return flows help meet the late season water supply needs of other users. In the South Platte basin return flows get re-diverted as they move downstream and used some three times before reaching Julesburg.

The remainder of the water diverted for irrigation is available for consumptive use by the crop. This use involves root uptake of soil water delivered to the crop's root zone, and subsequent evapo-transpiration by the plant and incorporation into the plant tissues. This consumptive use is the ultimate beneficial use for which the diversion was made and represents the bulk of the depletions caused by irrigation.

When certain irrigation techniques are employed more water is delivered to the root zone than can be used by the plant or stored in the soil. Deep percolation occurs whenever gravity moves water from soil that is too wet, to a level below which a crop's roots can no longer reach it. This water continues moving downward until it reaches the water table, signifying the presence of an aquifer. Once in an aquifer (either seasonal or permanent) deep percolation water normally begins moving toward the stream from which it was diverted, unless an intervening geologic barrier creates an isolated basin of non-tributary water. In regions where the soil and/or the irrigation water supply contains salts some deep percolation is necessary to maintain a salt balance in the soil. Extra water is intentionally applied to the field to leach out salts deposited in the soil from previous irrigations. Leaching carries the salt below the root zone where it will not hinder plant growth. Much of this saline deep percolation water eventually drains back to the surface water system as return flow.

As illustrated by the water budget, an irrigation diversion results in depletions or consumptive uses and return flows. Depletions can be further divided into intentional, productive consumptive use and incidental, non-productive consumptive use. Return flows may be direct (over the land surface) or more typically by underground flow following deep percolation.

B. Definitions:

As the water budget demonstrates there can be a variety of water supply changes that occur when irrigation efficiency is improved. It is important to be precise when discussing a particular increment of the water involved. Terms must be consistent with accepted legal and technical understandings. For that reason a glossary of legal and technical terms used in describing water salvage and conservation is provided as Appendix C. The key technical terms have already been discussed in the water budget description. These include conveyance loss, depletion, deep percolation, evapo-transpiration, root zone, soil moisture, and return flow. Legal terms will be discussed in Section IV below.

The terms "salvaged", "conserved", and "saved" water have been given specific definitions in legislation brought before the General Assembly. These are:

saved water - "the amount of water which has been available to a direct flow water right in priority, and which an applicant claims will no longer be needed for diversion at the applicant's headgate because of modernization ...." HB 91-1110 (House Committee on Agriculture, Livestock, and Natural Resources Report January 31, 1991.)

salvaged water - "water which is part of an appropriated water supply that would be lost to users of the water source as a result of evaporation, transpiration, seepage, or otherwise and which is conserved or otherwise made available to beneficial use.... The difference between historical consumptive use and post-salvage consumptive use shall determine the quantity of salvaged water." SB 84-161 (as introduced)

conserved water - "the quantative difference between the historic consumptive use of the right and [the] lesser consumptive use ... no amount of water shall be included which historically constituted waste, after taking into account and giving effect to the then prevailing and accepted methods and norms for the agricultural water use." SB 85-95 (as introduced); SB 86-126 (as introduced)

Consistent with those definitions of "salvaged" water and "conserved" water and for the sake of clarity, we will only use the term "salvage" to describe reductions in historical consumptive use, signifying the retrieval of water previously lost to the system through

evaporation, evapotranspiration, or deep percolation to non-tributary aquifers. Likewise, the term "saved water" will be used to describe the larger increment of water produced by changes to historical diversion rates made possible with efficiency improvements.

C. Methods of Improving Irrigation Efficiency

An accepted measure of overall irrigation efficiency is the ratio of crop consumptive use to gross headgate diversions. This efficiency can be improved by either reducing diversions or increasing crop consumptive use (or by a combination of both). Generally, the expanded use doctrine limits adding new consumptive uses to a decreed Colorado water right. In some circumstances, such as when an irrigator who historically has never had enough water to satisfy his crop needs becomes able to get more water to his existing acreage, increased consumptive use is allowed. Efficiency changes considered herein will focus on the more common means of increasing irrigation efficiency - reducing losses thereby reducing the diversion side of the efficiency ratio.

Often, an increase in efficiency is endorsed as a reduction in "waste" without an attempt to define the term "waste". As already shown, non-consumptive losses generate return flows which are used by others and such water is not necessarily wasted. While frequently an increase in irrigation efficiency is promoted as conserving water supplies and in the public interest, such generalities fail to recognize the intricate movement of water within an irrigated region. Further, it is tempting to classify conveyance losses as non-beneficial uses of water, but, in fact, such water actually serves the necessary and beneficial purpose of moving the remaining water to its place of need. It is only when the method of conveyance is <u>not</u> "reasonable and appropriate under reasonably efficient practices" that these losses should be characterized as "non-beneficial." Section 37-92-193(4), C.R.S.

What "reasonably efficient practices" means is central to statements about the efficiency and waste involved in irrigation water use. A common understanding is that beneficial use is a flexible concept which tolerates whatever degree of "inefficiency" is present in the prevailing irrigation methods of an area. Courts will likely be reluctant to require innovations with private investment that force any advance beyond those prevailing methods. Likewise, the State Engineer can probably not require state-of-the-art irrigation systems in an effort to reduce irrigation water diversions. However, the legislature, as the best arbiter of public perceptions and desires, may be in better position to balance policy questions and decide to move water users towards more efficient practices. It can do so by providing incentives (funding or creating a marketable right as proposed in the salvage bills) or by regulating (i.e., by declaring which "reasonably efficient practices" are necessary or otherwise tightening the definition of beneficial use). Similar approaches have already been applied to municipal users, i.e., financial and technical assistance on the one hand and mandatory plumbing code revisions containing maximum fixture demands on the other.

Absent regulation, current conditions give some incentives for irrigators to make improvements to their systems. Some of the reasons cited by irrigators who have made

efficiency improvements include the labor savings which result from modern delivery and application systems, lower chemical (fertilizer and pesticide) and water costs when application rates are reduced, fear of liability resulting from open and/or leaky ditches, concern with local groundwater quality, increase available water supply to improve crop yields, and availability of financial assistance through existing federal and state programs.

Specific practices employed to reduce irrigation diversions generally effect both non-productive consumptive use and the return flow component of the irrigation water budget. Certain measures can have a larger impact on reducing incidental consumptive use than others. Ditch evaporation can be reduced by combining parallel ditches and replacing ditches with closed conduits, such as pipes. Reservoir operations can be modified to reduce evaporation. Field evaporation can be reduced by delivery methods that get water into the crop root zone faster than traditional flood irrigation methods, thereby reducing the amount of water exposed to the atmosphere. Phreatophyte consumptive use can be reduced or eliminated by clearing and cutting, or ditch lining which limits seepage into non-cropped areas and eliminates seasonally high water tables. Irrigation management, which involves the closer timing of irrigation deliveries to soil moisture content and crop needs, is also capable of reducing field evaporation and phreatophyte growth.

Non-consumptive losses are usually reduced by ditch lining and on-farm practices which reduce seepage and thereby deep percolation. Reuse of tail water from pump back pits will reduce diversions and return flows. Generally any method capable of reducing consumptive losses will also impact deep percolation and return flows to some extent.

The water budgets displayed in Appendix B represent the before and after conditions for two areas in Utah where irrigation improvements are proposed under the federal salinity control program. The improvements will mainly consist of replacing flood irrigation practices with sprinkler systems. Some minor ditch lining will also be provided. These areas historically have experienced short supplies due to junior water rights. Here, consumptive use (but not irrigated acres) will actually increase after the improvements are installed. The examples demonstrate the relative magnitude of the changes in non-productive consumptive use and return flows before and after a salinity project. Case III presents a calculated irrigation budget for each area with crop consumptive use held constant. The Case III budgets represent the situation that would occur if an area already had a sufficient or full water supply based on senior rights and did not experience shortfalls to existing irrigated acreage.

Comparison of the figures reveals that non-productive consumptive use by phreatophytes and evaporation can be reduced by as little as 1% up to 6% after a system is improved. Deep percolation and tailwater that return to the stream can be reduced, allowing reductions in diversions of up to 25%. Irrigation efficiencies are improved from below 40% to above 50%. In case II for the Uintah area, the amount of water deemed "conserved" or "salvaged" under the definitions previously set forth is only 420 af/year, or a half percent of

pre-improvement diversions. In that same case the amount of "saved water", measured as the difference in diversions, is 6,310 af/year, representing 8% of pre-improvement diversions. The amount of "saved water" actually available for new uses or transfer would depend on the legal status of the 12,000 af of reduced return flows in that particular setting. The difference between 420 af and 6,310 af (or 2,005 af and 18,190 af in Case III) highlights the distinction between salvaged and saved water.

While other improvement projects using a different mix of strategies will have different results, the order of magnitude and relative quantities in the example indicate an important distinction between "salvaged water" and "saved water". Generally, opportunities to reduce consumptive use are limited and do not appear capable of adding large quantities of new supplies to a watershed. Since the volumes of salvaged water are relatively small, a proposed transferable salvage water right may not create the economic incentive envisioned. The salvage water in the examples would come at a high price, ($300-600 per year per af), and may not provide a viable supply of new water. However, in the examples saved water appears to be available at an annual cost of $35 to $125 per af.

D. Municipal and Industrial Water Use Efficiency

Discussion of efficiency improvements and water salvage generally target irrigation use simply because agriculture makes 90% of the water diversions in Colorado. However, it would be misleading to imply that municipal and industrial users do not also have opportunities to improve their use efficiency. While some of the legal and economic issues may be different for these users, the General Assembly may not want to overlook salvage potentials available to non-agricultural users.

Municipalities are generally allowed to expand their use of decreed water rights in the sense that they need not divert the full decreed amount immediately to claim it. The "great and growing cities" doctrine allows a city to secure more water than it currently can use so that it may meet anticipated future needs. By conserving water cities are able to stretch out the time period over which they "grow into" their decreed rights, and forestall additional facility construction and water rights acquisitions. When cities establish effective conservation programs they are not inclined to transfer the saved increment to new uses. Rather they retain any savings for their own future customers, a form of expanded use which is allowed under Colorado law.

An additional reason municipalities do not need salvage rights is because a significant portion of their water supplies are considered fully consumable. Supplies which come from transmountain imports are considered developed water which is outside of the priority system. Converted irrigation rights have already been reduced to historical consumptive use during the change of water rights adjudication and can thus be used to extinction. With these sources of water there is no real distinction between diversion rights and historical consumptive use.

Industrial users divert and consume a small percent of the water used in Colorado. By modernizing equipment and production methods these users could reduce their consumption and/or diversion rates. Generally, they do so as a business decision spurred by several market factors. Typical industrial uses are junior to agricultural rights and must purchase existing rights to create firm supplies. To keep water purchase costs low, processes are designed with conservation in mind. Additionally, industrial and municipal return flows are subject to stringent permitting requirements under the Clean Water Act. To reduce investment in expensive waste water treatment facilities, production processes are designed and updated to minimize the amount of waste water produced. Still in a particular situation the same arguments advanced in favor of an irrigation salvage or saved water right could apply to older industrial plants.

III. Federal Programs Resulting in Salvage

HB 91-1154 directed that this analysis be limited to "water salvage which may result from federal programs, including salinity control." This limitation probably reflects the fact that irrigation efficiency improvements are already being installed in the Colorado River basin by the Federal Salinity Control Program. Participants in the salinity program were uncertain as to the effect these improvements would have on their water rights. HB 91-1110 was an attempt to clarify the status of their water rights after salinity improvements are made, and to grant participants a state recognized right to claim and transfer water no longer necessary for diversion as a result of the salinity program.

Another reason for limiting the salvage analysis to that resulting from federal programs may have been a belief that a saved water right could thereby be limited to the Western Slope. The major U.S. Bureau of Reclamation (USBR) projects, including the Colorado-Big Thompson and Fry-Ark, make their diversions on the West Slope. During debate on HB 91-1110 it became clear that the bill would be more acceptable if it did not apply statewide. The Arkansas and South Platte River basins were presented as extremely over-appropriated areas with extensive reliance on return flows. By excluding these basins, but avoiding the appearance of special legislation, the bill's chances were presumed to be improved.

Federal programs do have significant potential for generating saved or salvaged water as described below. The extent of those programs is very broad however, potentially reaching all corners of the State.

A. Federal Salinity Program

The Federal Salinity Control program was developed as a cooperative effort of state and federal agencies to manage high salt concentrations in the Colorado River. Salinity was a concern because of delivery obligations to Mexico, and also because it could interfere with beneficial uses of water in the basin states, particularly in California and Arizona. The program was established by the Salinity Control Act of 1974 and amended in 1984. 43 U.S.C. Sections 1571-1599. The primary federal salinity activities with regards to irrigation are construction of improved delivery systems by the USBR, and improved on-farm irrigation systems designed and partially funded by the Soil Conservation Service (SCS). Participation in either of these programs is entirely voluntary. In general USBR is lining large canals and replacing leaky main ditches. SCS is helping farmers to better manage and deliver water once it arrives on-farm with sprinkler systems and lined farm laterals. Both activities are designed to reduce salt load into the Colorado River by reducing the deep percolation which causes highly saline return flows in certain geographic areas. In Colorado those areas include the Grand Valley on the Colorado River, the Uncompahgre Valley in the lower Gunnison Basin, and the McElmo Creek area near Cortez, Colorado. The salinity control program also has procedures for addressing municipal and industrial salt discharges through state water quality regulation.

USBR salinity improvements are federally funded in recognition that the delivery of water to Mexico is a nationwide obligation and because the federal government owns a major portion of the saline land in the basin. A 25-30% repayment on USBR salinity project costs is made to the federal treasury from two basin funds which receive a surcharge from federally generated power revenues. Local project participants make no direct payment for the construction of USBR salinity improvements. While they are required to sign contracts obligating themselves to maintain and operate the newly improved systems, USBR fully reimburses participants for any additional maintenance expenses attributable to those new systems. The SCS program requires both cost sharing by each individual participant and repayment from the same electric surcharge fund used to repay the USBR. The final cost share breakdown for SCS on-farm measures is: 30% by local participants, 21% by power revenues and 49% by the U.S. There is no requirement tying participation in the USBR program to participation in the SCS program. A farmer can be in the salinity program without committing to expend any funds or making any on-farm changes.

Importantly, the salinity program makes no claim to any saved or salvaged water produced through the program. The fate of any produced water is left for allocation under state law. Specifically, "in implementing the units ... the Secretary shall comply with procedural and substantive state water laws." 43 U.S.C. Section 1592(b)(4), (1984 Amendment).

Finally, as federal agencies USBR and SCS have statutory duties to mitigate, to varying degrees, the environmental impacts caused by improved irrigation systems. These impacts are explained in Section V.D, below.

B. Other Federal Programs

Despite an apparent belief that "federal programs" would limit salvage proposals to the West Slope there are in fact a number of ways in which federal programs could result in water salvage or savings throughout the state.

1. Clean Water Act

The Clean Water Act (CWA) led to creation of an extensive system of water quality standards for the nation's surface waters. 33 U.S.C. 1313. These standards are designed to preserve and improve the chemical, biological, and physical quality of water for the benefit of all water users. Water quality programs in Colorado are administered by the Colorado Department of Health (CDOH) with the approval and assistance of the U.S. Environmental Protection Agency (EPA). The primary enforcement mechanism is the National Pollution Discharge Elimination System (NPDES) permit which all municipal and industrial water users must obtain. Waste water from a discrete or "point source" must be treated to acceptable levels before discharge into a receiving surface waterway. Although agricultural water use does result in discharges to surface water (return flows) these do not occur at discrete points and control of these "nonpoint" discharges was specifically left out

of the NPDES system. A less stringent nonpoint control program (CWA, Section 319) was established based on land management practices, in lieu of discharge permits and waste treatment technologies. Agriculture is a significant, but not the only contributor to nonpoint pollution. Others include mining, urban storm runoff, construction, and logging. There is some pressure to amend the CWA to provide additional regulatory control over agricultural return flows.

The nonpoint source program in Colorado is explained in two documents prepared by CDOH: "Colorado Nonpoint Assessment Report", November, 1989; and "Nonpoint Source Management Program", October, 1990. The Assessment Report identified specific stream segments impacted by nonpoint pollution from agricultural activities. Throughout the State over 500 stream miles were considered severely impacted, and over 2,000 miles experienced some impact. The main pollutants were sediment, salinity, and nutrients (nitrates and phosphorous), with some small critical segments effected by toxics (selenium, herbicides, and pesticides). It is important to note that irrigated agriculture alone is not responsible for this entire impact, since the agricultural category also included dryland crop production, grazing, and feed lot operations.

To control agricultural pollution the Management Program proposes a multi-agency approach with a combination of demonstration projects and educational programs. Demonstration projects will be targeted at priority watersheds having the worst pollution to illustrate effective control strategies. These strategies involve use of Best Management Practices (BMP's) defined as: "the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water/stream quality goals". Program, pg. 42. BMP's for irrigated areas may be structural such as: canal repair and lining, land leveling, sprinkler installation, and tailwater recovery; or non-structural such as: better scheduling of irrigation water, fertilizer budgets, and improved cropping and tillage methods.

Obviously, the nonpoint source control efforts are very similar to the federal salinity program since both seek to keep pollutants from agricultural lands out of the surface and groundwater systems. Like the salinity program, the improvements being undertaken are designed to reduce return flows and can yield saved and/or salvaged water. The nonpoint program already has BMP demonstration projects underway in the San Luis and Arkansas basins. Funds and technical assistance have been provided by EPA and USDA. In addition certain water user entities such as the Central and the Northern Colorado Water Conservancy Districts have begun their own studies to identify nonpoint problems and potential solutions within their service areas. There has been no suggestion that existing water law or the lack of an express right to claim any salvaged water produced through installation of BMP's has hindered the nonpoint program.

The regulation and protection of wetlands by the federal government arises out of Section 404 of the CWA. While wetlands protection does not generally result in saved or salvaged water, certain mitigation measures conceivably could require conversion of

historical irrigation water rights to wetland replacement purposes. More typically wetlands preservation has posed an obstacle to improving irrigation efficiency, since wetlands created by irrigation losses are jeopardized by reductions in those losses.

2. U.S. Army Corps of Engineers (Corps)

The Corps has dual roles, acting as an environmental regulator and also as a project developer and operator. Major facilities operated by the Corps include John Martin and Trinidad Reservoirs in the Arkansas basin and Chatfield, Bear Creek and Cherry Creek Reservoirs in the South Platte basin. Re-allocation of flood control capacity at federal reservoirs could result in new ways of managing irrigation water and possibly produce saved or salvaged water. Revised operating procedures at these facilities could reduce evaporation losses or in other ways lead to water salvage. Under its Section 404 permit responsibilities the Corps could require improved irrigation efficiencies as mitigation for wetland impacts of new irrigation development (similar to the conservation measures Denver was required to adopt during Two Forks permitting). The typical new irrigation development involves supplemental water for existing senior, but inadequate, water rights. Mandated conservation could result in salvage or savings of water available under those existing rights.

3. U.S. Bureau of Reclamation (USBR)

The USBR also is a project operator and developer outside of its role in the salinity program. It has programs to improve irrigation efficiency even where salinity is not a problem. While the federal subsidies are smaller, programs such as Rehabilitation and Betterment Loans are attractive to users of federally developed water and can result in water savings or salvage. USBR also has a statutorily mandated duty to require development of water conservation plans under the Reclamation Reform Act of 1982. While USBR is requiring such plans from all users taking water from their projects, they do not yet require implementation of those plans. Still, the plans themselves may lead users to take steps which result in water salvage, and in the future may become the basis for mandatory efficiency improvement efforts. As a project operator USBR is subject to the same environmental laws that all water users face, and has been required to modify project operations (eg. the Newlands Project in Nevada) to mitigate environmental impacts. Modification could result in water salvage which might be claimed by either USBR or local water users, depending on who held the project water rights or paid for the project modifications.

The USBR is also involved in efforts to extend the useful life of non-tributary aquifers, such as the Ogallala in eastern Colorado, by enabling well irrigators to become more efficient. The USBR's Closed Basin Project adjacent to the Rio Grande could be viewed as a federal salvage project already being implemented. This project salvages groundwater, in part produced by irrigation seepage, by pumping it out of the Closed Basin and into the Rio Grande, thereby making it available for water users according to their existing priorities and the Rio Grande Compact.

4. U.S. Department of Agriculture (USDA)

Like USBR the USDA currently has a variety of irrigation management programs not necessarily related to nonpoint pollution or salinity. These programs provide a mix of financial and technical assistance designed to encourage improved water efficiency and better protect impacted environmental values. Surplus crop and soil bank programs can lead to the temporary or permanent retirement of marginally productive lands which may result in saved or salvaged water based on historical practices. The potential for water salvage under these agriculture programs exists statewide.

5. Federal Energy Regulatory Commission (FERC)

Under the Federal Power Act of 1920 FERC licenses are required to generate hydroelectric power at most facilities in the U.S. These licenses must be periodically reviewed and renewed. During the licensing process FERC is required to consider a variety of environmental and hydrologic impacts caused by storage and diversion of water for hydropower and to impose license terms that protect these values. Such license terms could modify historical hydropower diversions leading to claims of saved water.

IV. Legal Standards Implicated by Water Salvage

Implicit in saved water proposals based on changes in historical diversions (such as seen in HB 91-1110), as opposed to reductions in consumptive use, is the claim that historical diversions are the property (or should be) of the diverter. The basic notion of Colorado water law is that a water right is the "right to use in accordance with its priority a certain portion of the waters of the state by reason of the appropriation of the same." Section 37-92-103(12) C.R.S. An appropriation is "the application of a specified portion of the waters of the state to a beneficial use". Section 37-92-103(3) C.R.S. Beneficial use is "the use of that amount of water reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made...." Section 37-92-103(4), C.R.S. (all emphasis added). Beneficial use, not a decreed diversion rate, has always been deemed the full measure and extent of any water right. Green v. Chaffee Ditch Co., 150 Colo. 91, 371 P.2d 775 (1962). Indeed, "to view a water right as a fixed tangible amount of water is to misunderstand the doctrine of prior appropriation." Navajo Development Corp. v. Sanderson, 655 P.2d 1374 (Colo. 1982).

The law of water rights has always recognized the extreme hydrologic importance of return flows to other water users. This recognition resulted in the "no injury" doctrine, which prevents a senior water right holder from making changes to his water right that would reduce the availability of water to others on the stream. Changes to the historical depletion caused by the senior's original decreed use are not allowed to interfere with other rights. The "no injury" rule is often expressed as the maxim that a junior water right holder is entitled to preservation of stream conditions as they existed on the date he made his appropriation. Return flows often provide the water supply for junior appropriators and the law has always protected their reliance on that source of supply.

When a change of water right is made, often the simplest and easiest way to prevent injury is to limit the volume of the change to the historical consumptive use that occurred under the right. This assures that only water previously lost from the system and upon which no one else could rely is moved. However, there appears to be no precise requirement that only the historical consumptive use can be changed. The legal limits on the ability to change a water right are prescribed by the amount beneficially used and by the "no injury" rule.

The water remaining after making beneficial use of a diversion becomes return flow if it can reach the stream and waste if it cannot. Return flows do not belong to the appropriator, but rather are a portion of the waters of the state, available for proper appropriation by the original appropriator or by others. Water Supply and Storage Co. v. Curtis, 733 P.2d 680 (Colo. 1987). The fact that no one will be injured by the original appropriator's reuse of return flows is not a sufficient basis upon which to claim a right to those return flows. Id. Rather, all the requisite elements of an appropriation must be met; i.e., concurrent intent to appropriate and overt acts to demonstrate that intent. Since return flows are available for use by present vested rights and to supply new appropriations, one

may not preempt "the development potential of water absent a demonstrated intent to put that water to beneficial use." Id, at 684. Thus, under current law the priority date for a plan to reuse return flows should be based on development of that plan, not the date of the original appropriation.

A concern presented by attempts to salvage water through the reduction of non-productive consumptive use, is the fact that this will be done in large part by either removing phreatophytic vegetation or depriving it of a water supply. A line of cases cited by those urging caution in creating a right to salvaged water holds that developed water can not be produced by the eradication of phreatophytes. SECWCD v. Shelton Farms, Inc., 187 Colo. 181, 529 P.2d 1321 (1974). Developed water is "new" water not previously part of the river system and is not administered within the priority system, i.e. it is not subject to curtailment by call. Id. Additional cases following Shelton Farms have held that elimination of non-phreatophytic vegetation also does not produce developed water. Giffen v. State, 690 P.2d 1244 (Colo. 1984). Nor may one dry up a marshy area, thereby allegedly reducing natural consumptive use and claim a right to the saved water outside of the priority system. R.J.A., Inc. v. Water Users Association, District 6, 690 P.2d 823 (Colo. 1984). After Shelton Farms the General Assembly also decided that a plan for augmentation could not "include the salvage of tributary waters by the eradication of phreatophytes." Section 37-92-103(9), C.R.S. However, the General Assembly has allowed gravel pit operators to take an augmentation credit for the "historic natural depletion ... caused by the preexisting natural vegetative cover ... permanently replaced" in the process of mining and exposing the water table to the atmosphere. Section 37-92-305(12)(a), C.R.S. This statute indicates that in some instances limited salvage is already allowed in Colorado. It should be noted that the above language allowing credit for preexisting vegetative cover in sand and gravel augmentation plans is being challenged in Central Colorado Water Conservancy District v. Danielson, Case No. 89CW170, Water Division No. 1.

Salvage and saved water proposals submitted to the General Assembly do not involve claims for developed water, rather the saved or salvaged water would continue to be administered within the priority system. Both salvaged and saved water transfers also would be subject to the no injury rule, a further recognition that this water was and remains part of the tributary water system. Thus Shelton, Giffen, and RJA do not directly apply to irrigation efficiency improvement projects. However, the Court in those cases did express concern for the environmental damage that may result if incentives are given for removing vegetation and drying up wetlands. Section 37-92-103(9), which prohibits "eradication" may be a obstacle to salvage plans because almost every transfer of water rights involves a plan for augmentation as the means of preventing injury to other rights. Often phreatophytes need not be directly, or "actively" eradicated (i.e. cut down and removed) to reduce consumptive use, rather water can be prevented from reaching their root zones by reducing the seepage which supplies their water needs. The result, death and loss of this type of vegetation, has been referred to as "passive" eradication. When phreatophyte loss follows seepage reductions, it is unsettled whether the courts will find that the legislature intended to prevent so called passive eradication and require water users to continue to provide a

water supply to this vegetation. It should be observed that phreatophyte protection and other resource trade offs require balances which the General Assembly is ideally suited to adjust. In the Shelton Farms line of cases the court has urged the General Assembly, in the strongest language, to develop policies and mechanisms to accomplish better water management after weighing the competing resource use issues.

Senator Glass introduced bills in 1984, 1985, and 1986 which would have created a right to sell, transfer, or reuse salvaged water (defined as any reduction in historical consumptive use) resulting from efficiency improvements under the original priority date. SB 84-161, SB 85-95, SB 86-126; see appendix A. Senator Glass explained that such a right might already exist with respect to a Colorado water right, but, due to uncertainty, water users were reluctant to become more efficient, or at least had less incentive to do so. The right to change a portion of the historical consumptive use of a water right while continuing the full level of activity under which that consumptive use previously occurred apparently has never been judicially approved. Such a plan might seem like an improper expansion of use, and yet the stream would be unaffected because actual depletion before and after the efficiency improvement would remain the same.

In 1991 a different approach to encouraging improved efficiencies was introduced by Representative Foster, HB 91-1110. That bill would have allowed the sale, transfer, or reuse of "saved water" defined as the reduction in historical diversion rates resulting from system modernization, which would otherwise be lost to appropriators in Colorado. A saved water right would retain the same priority date as the original appropriation. Any use or change of this saved water could only occur if it caused no injury to any downstream users. This proposal would appear to overturn the holding in Water Supply Co., supra that a reuse right only receives an appropriation date fixed by the formulation of the intent and "first step" to reuse the water.

During attempts to move HB 91-1110 out of the Senate Agriculture, Livestock, and Natural Resources Committee, an amendment limiting saved water to the Colorado River basin was considered. There was substantial support for the concept in Western Colorado and return flow reliance there is not as great as on the Front Range. Such an attempt to limit the statewide applicability of a salvage or saved water right may raise issues of special legislation and equal protection under the law. However, there may be valid reasons based on hydrology, compact provisions, and resource demands to target specific watersheds. Another potential constitutional problem arises from assigning a priority date which predates the actual intent to make an appropriation for reuse purposes. This may be inconsistent with the declaration that "The water of every natural stream, not heretofore appropriated ... [is] the property of the public, ... subject to appropriation .... The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied." Colo Const. Art XVI, Sections 5 and 6.

A final legal concept which needs to be considered is the authority of the State Engineer Office (SEO) to administer water rights, prevent waste, and determine that water rights have

been abandoned. The State Engineer is given broad powers to enforce priorities to water by curtailing diversions by junior rights when supplies are short. Section 37-92-502(2)(a), C.R.S. However, under the "futile call" doctrine he may not curtail a junior diversion, unless he is reasonably certain the water will actually benefit the calling senior right. Id. Under this doctrine the SEO refuses to curtail a junior right for the benefit of a wasteful water diversion. The SEO is also directed to investigate and remove abandoned water rights from the priority system. Section 37-92-402, C.R.S.

These powers and duties can draw the SEO into any irrigation efficiency program, even if there is no attempt to change the use of the water. Under current law, if efficiency improvements are made by a water right holder, the SEO may reduce the size of any call made by that right to the extent water is not needed for beneficial use. If actual diversion rates remain reduced for a sufficiently long time the SEO could, or may be forced to, find that a portion of the decreed water right of the improved system has been abandoned. However, such a determination, while it might reduce a portion of the diversion right, could not impair the irrigator's ability to continue to beneficially use the quantity of water actually used and needed for the perfected historical purposes of the original appropriation.

V. Resource Impacts of Water Salvage

When the efficiency of water used for any purpose is improved there are resulting changes to stream flows, depletions, and return flows. Changes potentially effect both the quantity and timing of water in the stream system. When a water right is transferred similar changes occur, but the "no-injury" rule has a counter balancing tendency to preserve stream conditions, at least to the extent other appropriators can demonstrate reliance on those conditions. Changes in the stream system result in a variety of related environmental impacts.

A. Water Supply Impacts

In an efficiency improvement project some combination of incidental consumptive uses and return flows will change in response to the typical mix of activities. The following discussion considers those changes separately to illustrate discrete impacts.

When incidental consumptive use is reduced by efficiency improvements depletions are reduced resulting in a gain, or accretion to the net available water supply in the basin. How that increased supply gets used depends on the hydrology of the particular basin, the location in the basin where the efficiency improves, demands for water, the distribution of water rights in the basin, and interpretations of water law. The increased supply might be picked up by the original diverter to meet new or existing needs, by other appropriators above or below the location of the improvements, or may flow downstream if there is no current demand for this new increment of water. While it is not possible to identify in absolute terms the final fate of a particular accretion to the basin supply, it is clear that any reduction in depletions by one user leaves more water in the stream for other users.

When an efficiency improvement reduces return flows the effect on the stream system, is even less clear. Return flows can be reduced as a result of increased consumptive use (if allowed) or lower water diversions made possible by reduction of conveyance and on-farm losses. If consumptive uses (either productive or incidental) are not reduced there will be no change in depletions and no gain to the basin water supply. In a basin which already has sufficient water to meet all potential depletions at any location there would be no impact on available supplies from reducing return flows. However, there can be significant impacts on the available water supply as a result of changing diversion rates and patterns in a basin where demand outstrips supply.

If a senior irrigator who historically has called out junior users to make its diversions becomes able to meet its needs with less water, then upstream juniors who previously had to bypass water to meet the senior's call will experience an increase in their available supply. If those juniors divert this water upstream depletions may be increased, causing a corresponding decrease in the available water supply downstream of those juniors. If other downstream users have sufficiently senior rights, they may continue to call the saved water past upstream users. Note that the no injury rule only applies when a water right is

changed, and that merely diverting less water to carry out the same historical decreed purpose is not considered a change of water right.

The holder of junior rights sees improved efficiency as a way to reduce losses so that more water can be consumed under the historical diversions available to him. This increases depletions (and reduces return flows) below the area. So long as this increased use is consistent with the original decreed water rights, there is no change of rights and no opportunity to apply the "no injury" rule. If the improver is not able to increase consumptive use it will then divert less water, consume the same amount, and return less water to the stream. In that case, and assuming upstream users already have an adequate supply, the reduced diversions will result in an increased supply below the headgate and a decreased late season supply in reaches below where return flows historically entered the stream.

B. Water Quality Impacts

There are two types of water quality impacts that result from efficiency changes: changes in the assimilative capacity of the stream and changes in the pollutant load entering the stream.

Irrigation return flows may pick up sediment, dissolved minerals, or agricultural chemicals as they travel across the field and through the soil. Return flows could then add pollutants to the watercourse. The size of the pollutant load depends on farming methods, soil types, underlying geology, and distance from the stream, but in general, any reduction in return flows will result in a lower pollutant load entering the stream.

The assimilative capacity of the stream measures its ability to absorb a given pollutant load without adversely impacting water quality. This process is more complex than simple dilution, because it depends on more than just the volume of stream flow (i.e., temperature, biological activity, chemical composition, etc.). However, in general terms, the ability of a stream to assimilate wastes does improve when the volume of stream flow increases. This tension between water quality and water quantity is already recognized in a number of ways, and may eventually limit diversion and use of surface water in Colorado. The precise effect of irrigation efficiency changes on the assimilative capacity of a stream will depend on downstream uses, types of pollution discharges entering lower reaches from other sources, timing of other discharges (i.e., seasonal irrigation return flows, intermittent industrial discharges, or year round municipal waste discharges), and the quantity of flows in the stream. For instance, the loss of return flows may reduce late fall and winter flows in smaller streams, making them less able to assimilate the discharges from municipal users.

C. Groundwater Impacts

Groundwater can be a renewable or a finite resource depending on whether overlying geology allows recharge of the aquifer.

Rechargeable aquifers are usually hydraulically connected, or tributary, to the surface water system. Colorado water law recognizes this physical connection and tributary groundwater is allocated and administered on the same basis as surface water. These tributary aquifers are recharged in many areas by irrigation water that infiltrates into the soil and deep percolates down to the aquifers. The water table then rises and groundwater flows to surface streams that intercept the aquifer. Reduced irrigation losses produce less deep percolation and less recharge. Declining recharge rates reduce the rise in the localized groundwater mounds and the regional water table, with potential impacts on well pumping levels and return flows. Pumpers are willing to reduce their well diversions to save on energy consumption and cost of agricultural chemicals (lower water application rates allow reduced applications of fertilizer). When tributary well pumpers become more efficient they have little absolute impact on the annual water table, because reduced pumping offsets any loss of recharge. However, when surface irrigators become more efficient they can decrease the supply of water available to the tributary aquifers, impacting well users who have come to rely on those return flows.

Non-tributary aquifers are geologically isolated from significant surface recharge. The incentive to improve the efficiency of uses of non-tributary aquifers, such as the Ogallala, is to conserve a vanishing resource. Significant efforts are now under way to reduce well pumping by using water more efficiently and thereby extend the life of this finite supply. The allocation and conservation of non-tributary groundwater is beyond the scope of this analysis, but may merit further attention and consideration if the General Assembly is going to create incentives to encourage improved irrigation efficiency.

D. Environmental Impacts

When stream flows and groundwater levels are changed, water dependent environmental values are impacted, some being degraded and others enhanced as a result of efficiency improvements.

As explained above, the water supply impacts of efficiency changes depend on basin characteristics and the relative priority of the improved right. Clearly, when consumptive use is decreased additional water is available in the basin. Depending on current and future needs in the basin this water may get consumed by others or may remain in the stream to improve aquatic and riparian values. Where return flows are decreased the effect is less clear. If those return flows are reduced by reducing diversion volumes it might be concluded that stream flows are improved. Actually, the lower diversion rate may only make it possible for some other upstream user to now divert and consume more water, in fact decreasing stream flows. If no upstream use of the reduced diversions occurs, instream flow will be increased between the headgate and the point(s) where return flows historically entered the stream. Below that point annual flows should be similar to historical levels, but the monthly pattern would vary, returning to a more natural flow distribution. In Colorado the pre-irrigation flow distribution often saw peak flows in spring and dry streams in the

summer and fall. Irrigation return flows have changed intermittent streams to perennial streams with a year-round water supply; improved efficiencies may reverse this trend.

Another environmental resource impacted by irrigation efficiency changes is wetlands. Losses from irrigation systems can augment the water supply for natural wetlands and often result in creation of new wetlands entirely dependent on irrigation for their water supply. Water that would otherwise return to the surface stream is consumed by wetland vegetation, creating a stream depletion. Incidental consumptive use within an irrigation system is often reduced with a corresponding loss of wetland acreage. Indeed, the Federal Salinity Control Program has been required to mitigate this type of wetlands loss caused by its projects.

There are also socio-economic impacts associated with improved irrigation efficiencies. The vegetation along ditches, which relies on conveyance losses for a water supply, has in some areas become a major community amenity. Ditch lining eliminates this vegetation, and replacing ditches with pipe eliminates both the vegetation and the artificial waterway. In urban areas ditches serve as aesthetic and recreational surrogates for a natural watercourse. On the other hand, transfer of increments of salvaged or saved water is presented as an alternative to the total conversion of agricultural water rights to municipal uses. Thus, rural communities may be spared the economic and environmental impacts associated with large scale total dry-up of irrigated acres.

VI. Policy Issues

A number of policy issues must be addressed and resolved before salvaged or saved water can be fully incorporated into the water rights system in Colorado.

A. Role of the State

Should Colorado take an active role in promoting and encouraging better water use efficiency? It has always been state policy that water should be used wisely and beneficially, and that waste is not tolerated. However, the state has primarily relied on private efforts in a free market to accomplish this goal. Water users have resisted suggestions that the state develop a comprehensive water management plan. Rather, the creation of a specifically defined and transferable property right to the use of water, has permitted economic forces to move water to its highest valued use. Is this a sufficient role for the future? Public perceptions about waste, inefficiency, and conservation may demand a more proactive approach. The equitable apportionment doctrine which invites federal judicial scrutiny of wise resource use, as well as Colorado's current efforts to maintain compact entitlements, may dictate a stronger state role.

If the state decides salvaged or saved water should be a component of a strategy to better use its water supply it must then determine what types of efficiency measures should be promoted. Salvage water, defined as changes in historical consumptive use, is least likely to interfere with return flows relied on by others, but also has limited potential to add significant supplies of water. Saved water, defined as changes in historical diversions can yield larger volumes of water for new uses, but will require close analysis of return flow patterns. Litigation over that analysis and the extent of the "no injury" rule can be expected. Requiring review of salvage or saved water applications by the State Engineer may simplify the fact finding process, and give other water users some protection without the expense of objecting in water court.

If the state wants to take a more active role in promoting efficiency it can do so using either a "carrot or stick" approach, with incentives or regulations. Examples of actions which might encourage more efficient operations are: removing current market barriers and reducing transaction costs, funding programs designed to improve efficiency, and creating new entitlements to water made available through conservation measures. Examples of actions which could force more efficient water use include: more specific and tighter definition of beneficial use, giving the State Engineer increased authority and resources to curtail wasteful or inefficient practices, and regulation of agricultural return flows as a nonpoint pollution source.

B. Resource Tradeoffs

Should wetlands, albeit artificial, be impaired to provide new water supplies? Does water consumed by vegetation along ditches and farm fields provide a valuable aesthetic and

habitat resource to the local community or is that water more valuable elsewhere? Do the improvements to water quality that will result from reduced return flows offset the likely loss of wetlands? Is preservation of artificial, irrigation-induced wetlands to be preferred over efficiency changes that result in improved streamflows and benefits to riparian habitat? Can salvage reduce the pressure to completely dry-up irrigated acreage as a source of municipal water? How can efficiency efforts by groundwater consumers and pumpers' reliance on surface irrigation losses be recognized and protected consistent with the state policy to encourage conjunctive use of tributary groundwater and surface supplies?

C. Legal Questions

Does strict enforcement of the "no injury" rule, as currently applied, prevent creative and more efficient use of our water supplies by focusing too narrowly on maintenance of the status quo, and do plans for augmentation provide adequate relief to rigid application of the "no injury" rule?

Does or should a water right include the right to transfer changes in historical diversions to new uses while retaining the original priority date, subject only to the "no injury" rule? Would such an entitlement reward previously wasteful or inefficient practices and give credence to the disputed maxim "use it or lose it"? Would retention of the original priority date for saved water be speculative in that it allows a priority date that predates actual formation of the intent to appropriate?

Do upstream junior water right holders have any reliance claims to saved water? Such claim would be based on their expectations, formed at the time of their appropriation, that inefficient, but senior downstream practices would someday be improved, thereby reducing the senior calls on their rights. Is such an expectation reasonable and justified, and is it protected by the "no injury" rule? Even if there was no such express expectation on the junior's part at the time of appropriation, does the prior appropriation system fairly imply a gradual attrition of senior rights through abandonment which eventually leads to a better water supply for juniors?

How should stateline delivery obligations created by compact or court decree be accounted for when evaluating a saved water proposal? Upstream juniors, potentially subject to a compact call, may assert that return flows which currently flow out of state benefit them and allow additional upstream depletions. Do we know enough about how and when a compact call will be administered in each basin to allow a senior the right to transfer return flows?

Does an adequate rationale exist for creating different salvage entitlements in various regions of the state? Each basin can be considered unique in terms of hydrology, water development, local economies, and compact obligations. The prior appropriation system, however, has always included the right to take water from any basin for use anywhere else in the state. Can or should a salvaged or saved water entitlement be limited to certain activities, such as "that resulting from federal programs"?

VII. Conclusion

The Board's analysis of water salvage reveals that opportunities to "maximize the beneficial use of Colorado's water resources" exist through improving water use efficiency, particularly agricultural water use. However, after accounting for the return flow dynamic the quantity of water supply made available for new uses through efficiency improvements may not be as large as some would suggest. Implementation of salvage opportunities will result in additional social, economic, and environmental gains and losses. Difficult policy questions and resource tradeoffs must be evaluated and balanced before any approach to water salvage or savings is adopted by the General Assembly.

The following points provide a framework for that evaluation.

A. Varying degrees of water conservation may be recognized.

1. Reduction in historical productive, beneficial consumptive use.

2. Reduction in any historical consumptive use.

3. Reduction in historical diversion volumes, where the differential amount would not be physically available to other users.

4. Reduction in historical diversion volumes, but subject to "no injury rule".

B. Various possible entitlements to salvaged or saved water can be recognized or created.

1. Water historically consumed and no longer needed belongs to the original user and can be used for new purposes or transferred since no injury will result when only consumptive use is transferred.

2. Water historically diverted, but no longer needed belongs to the original appropriator for transfer under the original appropriation date, but subject to the no injury rule.

3. Salvaged or saved water produced by efficiency improvements retains its original priority and belongs to the party causing the improvements to be made. A water user might be forced to allow someone else to improve his system and claim the salvage, provided historical consumptive use is not impaired in any way.

4. Water no longer needed for a decreed beneficial use belongs to the stream system and is available to existing and future appropriators for use under their own priorities.

C. Various roles for State of Colorado

1. Maintain status quo and make no changes to existing law.

    a. Let State Engineer move water users toward more efficient practices with his current authority and jurisdiction.

    b. Let those who want to improve efficiency proceed with only the current incentives to stimulate such activity.

    c. Let judiciary resolve entitlement to saved or salvaged water in a proper case with specific facts.

2. Clarify current entitlement to saved or salvaged water by legislative declaration with specific statutory changes to make that intent clear.

3. Support and encourage increased water conservation through enhanced efficiency.

    a. Clarify or change law in ways that create additional incentives.

    b. Provide additional state programs with technical and financial aid.

    c. Incorporate saved water into a comprehensive strategy to meet future water quantity and quality goals.

    d. Minimize transaction and litigation costs by allowing review and approval by State Engineer, leading to rebuttable presumptions.

4. Create a specific entitlement, if no present entitlement exists, to saved or salvaged water as an incentive to those who otherwise might not become more efficient. It may matter less who gets the entitlement, than that the right be clearly assigned. The market place will then determine where the saved water goes.

5. State could take a portion of saved water, and use for instream purposes and to offset potential injuries to others on stream system.

6. Regulate and mandate that water use efficiencies must meet specific minimum requirements. Authorize the State Engineer to vigorously eliminate wasteful or inefficient practices. Consider allowing private enforcement actions by those who can show a use for water currently denied to them by an inefficient water use.

Appendix A.

Salvage and Saved Water Bills Previously Considered by the General Assembly

LDO NO. 84 0075/1 Fifty-fourth General Assembly SENATE BILL NO. 161

STATE OF COLORADO

BY SENATORS Glass, Beatty, Hefley, MacManus, Peterson, Stewart, and Baca;
also REPRESENTATIVES Herzog, Campbell, Hume, Davoren, and Reeves.

AGRICULTURE, NATURAL RESOURCES & ENERGY

A BILL FOR AN ACT

CONCERNING SALVAGED WATER.

w/

Bill Summary

(Note: This summary applies to this bill as introduced and does not necessarily reflect any amendments which may be subsequently adopted.)

Permits the affirmation of salvaged water subject to vested water rights and subject to the same laws and procedures as apply to appropriation under the priority system. Declares that the acquisition and application of salvaged water is a beneficial use of water when affirmed as being from an original appropriation.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Article 82 of title 37, Colorado Revised Statutes, as amended, is amended BY THE ADDITION OF A NEW SECTION to read:

37-82-107. Affirmation of a water right to salvaged water. (1) As used in this section, "salvaged water" means water which is part of an appropriated water supply that would be lost to users of the water source as a result of evaporation, transpiration, seepage, or otherwise and which is conserved or otherwise made available for beneficial use. The

difference between historical consumptive use and postsalvage consumptive use shall determine the quantity of salvaged water.

(2) To ~~encourage the conservation and~~ maximize the beneficial use of all the waters of this state, ~~the acquisition and application of salvaged water in this state is~~ declared to be a beneficial use of water from an ~~original appropriation when affirmed as being salvaged from an original appropriation as provided in this section~~.

(3) (a) Any person who desires an affirmation of a water right or a conditional water right, a change of water right, or an approval of a plan for augmentation to salvaged water shall file an appropriate application therefor with the body having jurisdiction over the original appropriation from which the salvaged water is derived and comply with the requirements of this section in addition to any other requirements, terms, and conditions provided or authorized by law pertaining to such application.

(b) The acquisition and application of salvaged water shall not be valid until an application for affirmation therefor is filed and approved by the state engineer, the ground water commission, or the water judge, as the case may be. Before affirming the acquisition and application of salvaged water as being from the original appropriation and the original appropriator's right to the salvaged water, such body processing the application must first find that the

proposed plan to salvage water will not injure vested water rights by depriving other appropriators of quantities of water to which they are entitled.

(4) In determining the quantity of water salvaged, the applicant must submit evidence to prove the claim to the satisfaction of the body processing the application. The date of priority of any affirmation of salvaged water shall be the appropriation and adjudication date of the original appropriation from which it is derived, regardless of the date of filing.

(5) All awards affirming the acquisition and application of salvaged water from a water source shall be subject to reconsideration by the awarding body in the same manner set forth in section 37-92-304 (6). Notice of all awards under this section shall be sent to the state engineer.

(6) All salvaged water shall be administered within the priority system and, as otherwise allowed by law, may be used, sold, or transferred by the appropriator of the original water right without restriction on place of use. Salvaged water shall also be available for reuse as provided in section 37-82-106.

(7) The state engineer shall maintain separate records regarding claims and affirmations of salvaged water rights and shall submit reports to the general assembly thereon and on the implementation of this section, including, but not limited to, data concerning the number of claims and affirmations and

their location, selected comments from affected government agencies and objectors, and recommendations relating to the affirmation of salvaged water. Such reports shall be submitted by December 31, 1984, and June 30, 1985.

SECTION 2. 37-82-104, Colorado Revised Statutes, is amended to read:

37-82-104. Not to impair vested rights. Nothing in sections 37-82-103 to 37-82-105 OR SECTION 37-82-107 shall be construed to amend or repeal section 37-82-102; or impair, diminish, or destroy any valid appropriation of water for any beneficial use which has been made or decreed in accordance with law; or modify, amend, or affect any decree of court or the statutes limiting the time wherein appropriators must appear for determination of priorities of right for diversions from natural streams or the decisions of the courts construing the statutes.

SECTION 3. 37-82-106, Colorado Revised Statutes, as amended, is amended to read:

37-82-106. Right to reuse of imported water. (1) Whenever an appropriator has lawfully INTRODUCED SALVAGED WATER INTO A STREAM SYSTEM OR HAS introduced foreign water into a stream system from an unconnected stream system, such appropriator may make a succession of uses of such water by exchange or otherwise to the extent that its volume can be distinguished from the volume of the streams into which it is introduced. Nothing in this section shall be construed to

impair or diminish any water right which has become vested.

(2) To the extent that there exists a right to make a succession of uses of foreign, nontributary, SALVAGED, or other developed water, such right is personal to the developer or his successors, lessees, contractees, or assigns. Such water, when released from the dominion of the user, becomes a part of the natural surface stream where released, subject to water rights on such stream in the order of their priority, but nothing in this subsection (2) shall affect the rights of the developer or his successors or assigns with respect to such foreign, nontributary, SALVAGED, or developed water, nor shall dominion over such water be lost to the owner or user thereof by reason of use of a natural water course in the process of carrying such water to the place of its use or successive use.

SECTION 4. Effective date. This act shall take effect July 1, 1984.

SECTION 5. Safety clause. The general assembly hereby finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

LDO NO. 85 0619/1 Fifty-fifth General Assembly SENATE BILL NO. 95

STATE OF COLORADO

AGRICULTURE, NATURAL RESOURCES & ENERGY

BY SENATORS Glass, Lee, Fenlon, and Peterson;
also REPRESENTATIVES Herzog, Hume, and Underwood.

A BILL FOR AN ACT

CONCERNING WATER RIGHTS FOR CONSERVED AGRICULTURAL WATER.

Bill Summary

(Note: This summary applies to this bill as introduced and does not necessarily reflect any amendments which may be subsequently adopted.)

Provides that, when the owner of an absolute agricultural water right uses conservation methods to reduce the historic consumptive use of the water right, he may use, sell, lease, exchange, or make available for augmentation or substitute supply the amount of water which he conserves. Further provides, however, that no injury can occur to the owners of water rights or persons entitled to use water under a water right. Requires that a change of water right decree must be obtained before the use of the conserved water is changed. Provides that conserved water does not include water which was wasted historically. Calculates the measure of conserved water as the difference between the historic consumptive use and the reduced consumptive use of the agricultural water right. Contains a savings proviso which recognizes that articles of incorporation, bylaws, or contractual arrangements of a ditch or reservoir company may prevent transfer or change of water out of the ditch or reservoir.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Article 82 of title 37, Colorado Revised Statutes, as amended, is amended BY THE ADDITION OF A NEW SECTION to read:

Capital letters indicate new material to be added to existing statute.

37-82-107. Conserved agricultural water. The owner of an absolute agricultural water right who employs methods to use water from that water right more efficiently than it was utilized prior to the effective date of this section shall be entitled to utilize, sell, lease, exchange, or make available for augmentation or substitute supply, for any beneficial use, that amount of conserved water which is the quantitative difference between the historic consumptive use of the right and his lesser consumptive use, so long as a change of water right decree is obtained pursuant to law before any change in use of the conserved water is made. The change of water right decree shall insure that such change will not injuriously affect the owner of, or persons entitled to use, water under a vested water right or a decreed conditional water right. In calculating the measure of conserved water for purposes of the change of water right decree, no amount of water shall be included which historically constituted waste, after taking into account and giving effect to the then prevailing and accepted methods and norms for the agricultural water use. This section shall not be construed to allow the use, sale, lease, exchange, or use for augmentation or substitute supply of any water of a ditch or reservoir company in derogation of the articles of incorporation, bylaws, or contractual arrangements of the ditch or reservoir company.

SECTION 2. Safety clause. The general assembly hereby finds, determines, and declares that this act is necessary

LDO NO. 86 0286/1 SENATE BILL NO. 126

STATE OF COLORADO

AGRICULTURE,
NATURAL RESOURCES & ENERGY

BY SENATOR: Glass;
also REPRESENTATIVES Scherer and Allison.

A BILL FOR AN ACT

CONCERNING WATER RIGHTS FOR CONSERVED AGRICULTURAL WATER.

Bill Summary

(Note: This summary applies to this bill as introduced and does not necessarily reflect any amendments which may be subsequently adopted.)

Provides that, when the owner of an absolute agricultural water right uses conservation methods to reduce the historic consumptive use of the water right, he may use, sell, lease, exchange, or make available for augmentation or substitute supply the amount of water which he conserves. Further provides, however, that no injury can occur to the owners of water rights or persons entitled to use water under a water right. Requires that a change of water right decree must be obtained before the use of the conserved water is changed. Provides that conserved water does not include water which was wasted historically. Calculates the measure of conserved water as the difference between the historic consumptive use and the reduced consumptive use of the agricultural water right. Contains a savings proviso which recognizes that articles of incorporation, bylaws, or contractual arrangements of a ditch or reservoir company may prevent transfer or change of water out of the ditch or reservoir.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Article 82 of title 37, Colorado Revised Statutes, as amended, is amended BY THE ADDITION OF A NEW SECTION to read:

37-82-107. Conserved agricultural water. The owner of

Capital letters indicate new material to be added to existing statute.

an absolute agricultural water right who employs methods to use water from that water right more efficiently than it was utilized prior to the effective date of this section shall be entitled to utilize, sell, lease, exchange, or make available for augmentation or substitute supply, for any beneficial use, that amount of conserved water which is the quantitative difference between the historic consumptive use of the right and his lesser consumptive use, so long as a change of water right decree is obtained pursuant to law before any change in use of the conserved water is made. The change of water right decree shall insure that such change will not injuriously affect the owner of, or persons entitled to use, water under a vested water right or a decreed conditional water right. In calculating the measure of conserved water for purposes of the change of water right decree, no amount of water shall be included which historically constituted waste, after taking into account and giving effect to the then prevailing and accepted methods and norms for the agricultural water use. This section shall not be construed to allow the use, sale, lease, exchange, or use for augmentation or substitute supply of any water of a ditch or reservoir company in derogation of the articles of incorporation, bylaws, or contractual arrangements of the ditch or reservoir company.

SECTION 2. Safety clause. The general assembly hereby finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

First Regular Session

Fifty-eighth General Assembly

LLS NO. 91 0295/1 HOUSE BILL 91- 1110

STATE OF COLORADO

BY R

A BILL FOR AN ACT

CONCERNING WATER WHICH IS SAVED.

Bill Summary

(Note: This summary applies to this bill as introduced and does not necessarily reflect any amendments which may be subsequently adopted.)

Provides for the adjudication of conservation water rights for the owners of direct flow water rights who meet certain requirements and can show that a certain amount of water will be saved by virtue of any modernization, improvement, or change in an applicant's method of operation. Specifies the procedures to be followed by applicants for such adjudications. Specifies that an applicant's original water right will be reduced by the amount of water saved due to the modernization, improvement, or change in operation of the applicant and that such an applicant will be granted a conservation decree for the amount of water saved.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Part 3 of article 92 of title 37, Colorado Revised Statutes, 1990 Repl. Vol., is amended BY THE ADDITION OF A NEW SECTION to read:

37-92-301.5. Conservation water right - application - adjudication. (1) AS USED IN THIS SECTION, "SAVED WATER"

Capital letters indicate new material to be added to existing statute.
Dashes through the words indicate deletions from existing statute.

MEANS THE AMOUNT OF WATER WHICH AN APPLICANT CLAIMS WILL NO LONGER BE NEEDED FOR DIVERSION AT THE APPLICANT'S HEADGATE BECAUSE OF MODERNIZATION, IMPROVEMENT, OR CHANGE IN THE APPLICANT'S METHOD OF OPERATION.

(2) AN OWNER OF A DIRECT FLOW WATER RIGHT WHICH HAS BEEN USED FOR AT LEAST SEVEN OF THE LAST TEN YEARS AS LISTED IN THE LATEST QUADRENNIAL TABULATION MAY APPLY TO THE WATER CLERK FOR ADJUDICATION OF A CONSERVATION WATER RIGHT AS SPECIFIED IN THIS SECTION. THE PROCEDURE FOR ADJUDICATION OF A CONSERVATION WATER RIGHT SHALL BE THE SAME AS THAT FOR THE ADJUDICATION OF OTHER WATER RIGHTS UNDER THIS ARTICLE UNLESS SUCH OTHER PROCEDURES WOULD BE IMPRACTICABLE OR IN DIRECT CONFLICT WITH ANY SPECIFIC PROVISIONS OF THIS SECTION. AN APPLICATION FOR A CONSERVATION WATER RIGHT SHALL AT A MINIMUM SET FORTH THE LOCATION, AMOUNT, AND USE OF ANY DECREED WATER RIGHT WHICH FORMS THE BASIS OF THE APPLICATION FOR A CONSERVATION WATER RIGHT. SUCH APPLICATION SHALL ALSO INCLUDE ANY MODERNIZATION, IMPROVEMENT, OR CHANGE TO BE MADE IN THE APPLICANT'S METHOD OF OPERATION AND THE AMOUNT OF SAVED WATER WHICH WILL RESULT FROM ANY SUCH MEASURE. AT THE OPTION OF THE APPLICANT, AN ADJUDICATION OF A CHANGE IN A POINT OF DIVERSION OF A WATER RIGHT MAY BE COMBINED WITH THE ADJUDICATION OF A CONSERVATION WATER RIGHT PURSUANT TO THIS SECTION. THE WATER CLERK SHALL INCLUDE ANY APPLICATION FILED UNDER THIS SECTION IN THE MONTHLY RESUME OF APPLICATIONS FILED IN THE DIVISION AND MADE AVAILABLE TO THE PUBLIC PURSUANT TO SECTION 37-92-302

(3).

(3) IF THE REFEREE OR WATER JUDGE IS SATISFIED THAT AN APPLICANT WILL UNDERTAKE THE MODERNIZATION, IMPROVEMENT, OR CHANGE IN THE APPLICANT'S METHOD OF OPERATION AND THAT ANY SUCH CHANGES CAN OCCUR WITHOUT INJURY TO DOWNSTREAM USERS, THE COURT SHALL ENTER A DECREE ADJUDICATING SUCH A CONSERVATION WATER RIGHT. SUCH A RIGHT SHALL REDUCE THE ORIGINAL WATER RIGHT OWNED BY THE APPLICANT BY THE TOTAL AMOUNT OF WATER SAVED, AND THE ORIGINAL DECREE SHALL BE AMENDED ACCORDINGLY. A CONSERVATION WATER RIGHT SHALL ENTITLE THE APPLICANT TO THE AMOUNT OF SAVED WATER IN THE FORM OF A CONDITIONAL WATER RIGHT WITH THE SAME PRIORITY AS THE APPLICANT'S ORIGINAL WATER RIGHT.

(4) IN CONSIDERING EVIDENCE ON AN APPLICATION FOR A CONSERVATION WATER RIGHT, THE COURT SHALL ACCEPT AS CONCLUSIVE EVIDENCE THE AMOUNT OF WATER LISTED IN THE QUADRENNIAL TABULATION AS THE AMOUNT OF WATER ADJUDICATED TO THE APPLICANT FOR THE WATER RIGHT FORMING THE BASIS OF THE APPLICATION FOR A CONSERVATION WATER RIGHT PURSUANT TO THE PROVISIONS OF THIS SECTION.

SECTION 2. Safety clause. The general assembly hereby finds, determines, and declares that this act is necessary for the immediate preservation of the public peace, health, and safety.

Appendix C - Definitions

1. Terms defined by Statute:

abandonment - "the termination of a water right in whole or in part as a result of the intent of the owner thereof to discontinue permanently the use of all or part of the water available thereunder." Section 37-92-103(2), C.R.S. [F]ailure for a period of ten years or more to apply to a beneficial use the water available under a water right when needed by the person entitled to use same shall create a rebuttable presumption of abandonment of a water right with respect to the amount of such available water which has not been so used;" Section 37-92-402(11), C.R.S.

appropriation - "the application of a specified portion of the waters of the state to a beneficial use pursuant to the procedures prescribed by law;" Section 37-92-103(3), C.R.S.

beneficial use - "the use of that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made...." Section 37-92-103(4), C.R.S.

change of water right - "a change in the type, place, or time of use, a change in the point of diversion, ... a change in the means of diversion, a change in the place of storage, a change from direct application to storage and subsequent application, ... or any combination of such changes." Section 37-92-103(5), C.R.S.

diversion - "removing water form its natural course or location ... by means of a ditch, canal, flume, reservoir, bypass, pipeline, conduit, well, pump, or other structure or device." Section 37-92-103(7), C.R.S.

plan for augmentation - "a detailed program to increase the supply of water available for beneficial use ... by the development of new or alternate means or points of diversion, by a pooling of water resources, by water exchange projects, by providing substitute supplies of water, by the development of new sources of water, or by any other appropriate means. "Plan for augmentation" does not include the salvage of tributary waters by the eradication of phreatophytes, nor does it include the use of tributary water collected from land surfaces which have been made impermeable, thereby increasing the runoff, but not adding to the existing supply of tributary water.: Section 37-92-103(9), C.R.S.

water right - "a right to use in accordance with its priority a certain portion of the waters of the state by reason of the appropriation of the same." Section 37-92-103(12), C.R.S.

2. Terms specifically defined in case law:

developed water - "new water not previously part of the river system, i.e., it is imported or non-tributary water." R.J.A., Inc., v. Water Users, 690 P.2d 823 (Colo. 1984). (relying on Shelton Farms).

"duty of water" - "measure of water which by careful management and use, without wastage is reasonably required to be applied to any given tract of land ... variable according to conditions." Weibert v. Rothe Brothers, 618 P.2d 1367 (Colo. 1980).

expanded use - increase in historical consumptive use even if the amount diverted is unchanged or does not exceed that amount stated in decree Danielson v. Kerbs Ag. Inc., 646 P.2d 363 (Colo. 1982).

historical consumptive use - diversions minus return flows, Danielson.
amount of water applied to a beneficial use minus return flows. May v. U.S., 756 P.2d 362 (Colo. 1988).

historical use - actual diversion over a period of time
SECWCD v. Fort Lyon Canal, 720 P.2d 133 (Colo. 1986).
This term has sometimes been used interchangeably with "historical consumptive use" creating some confusion and uncertainty as discussed in the Ft. Lyon case.

return flow - water not fully consumed by a beneficial use Water Supply & Storage Co. v. Curtis, 733 P.2d 680 (Colo. 1987).

salvaged water - "water in the river or its tributaries (including aquifer) which ordinarily would go to waste, but somehow are made available for beneficial use." SECWCD v. Shelton Farms 529 P.2d 1321 (Colo. 1974). Tributary water made available for beneficial use through elimination of waste." R.J.A., Inc.

waste - "to divert more than can be used beneficially." Weibert

3. Terms with commonly accepted technical meanings:

conveyance loss - That portion of a diversion that does not reach the crop area due to evaporation, seepage, and/or spills from the ditch system, sometimes called carriage water. Diversions - conveyance loss = farm delivery.

deep percolation - The downward movement of infiltrated water below the vegetation root zone, eventually reaching the water table. Deep percolation may enter tributary or non-tributary aquifers depending on geology of an area.

depletion - The net reduction to stream flow caused by the consumptive use of an activity, and after accounting for return flows.

evaporation - The process by which liquid water becomes vapor and enters the atmosphere.

evapotranspiration (ET) - The combination of evaporation from soil and water surfaces and plant transpiration that occurs on a vegetated area. Equivalent to consumptive use.

farm delivery - The portion of a diversion which reaches the farm field and is applied for crop use.

infiltration - The process by which surface water enters the soil profile.

phreatophyte - Deep rooted plant which consumes water from the water table. Examples include willows, cottonwood, and salt cedar.

root zone - That portion of the soil profile from which crops can withdraw water through their roots. The depth of the root zone varies with vegetation types.

salt balance - Maintaining the salt concentration in the root zone at an acceptable level by flushing the salt added to the soil with irrigation water out of the root zone. Accomplished by applying an amount of water above crop needs and causing intentional deep percolation.

soil moisture - the percent by weight of water in a unit of soil, that will not freely drain out of the soil under the force of gravity.

tailwater - Surface runoff from a farm field, generally collected in drainageways and returned to the stream.

transpiration - The process by which plants withdraw water from the soil, utilize it and expel water into the atmosphere.

water table - The elevation below which the soil and underlying material is constantly saturated and from which water will freely drain if given an outlet.

appendix A

IRRIGATION WATER SALVAGE ISSUES IN THE GRAND VALLEY OF COLORADO

A Supplement to: An Analysis of Water Salvage Issues in Colorado

Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Adopted and Approved for Transmittal to the Colorado General Assembly on January 22, 1992

response to this, the Congress passed the Colorado River Basin Salinity Control Act (1974) and the states formed the Seven Basin States Salinity Control Forum. The purpose of the Act and the Forum was to reduce the amount of salt entering the river from irrigation and other uses and thereby improve the water quality. One of the initial salinity projects authorized by the Act was the Grand Valley Unit which is currently being implemented.

The salinity program aims to reduce salt loading by reducing saline return flows through improved irrigation systems. These improvements are capable of reducing consumptive use and also irrigation diversions while historical irrigated acreage remains constant and crop yields improve. Improvements consist of canal and lateral lining or piping and on-farm practices which will reduce irrigation diversion requirements. A by-product of these improved systems is "salvaged" and "saved" water. These two terms are defined as follows:

"salvaged" water: the difference between historical consumptive use and consumptive use occurring in a more efficient system.

"saved" water: the amount of water no longer needed for diversion at the headgate because of system modernization.

Within the last decade, several species of fish native to the Colorado River Basin have been listed as endangered under the Endangered Species Act by the U.S. Fish and Wildlife Service (FWS). Two of these, the Colorado Squawfish and Razorback Sucker, are found between Cameo and the Colorado Utah stateline. Recovery efforts for the endangered fish species have focused on preserving a segment of this habitat, "the 15-Mile Reach", found between the GVIC diversion dam near Palisade, Colorado and the Gunnison River confluence. The recovery program goal is to provide sufficient instream flows through this reach to meet the habitat needs of the endangered fish. The FWS has determined that present flow levels in the reach are not adequate and is leading an effort to find new sources of water to augment existing flows.

III. The Federal Salinity Control Program

The Federal Salinity Control program was developed as a cooperative effort of state and federal agencies to manage salt concentrations in the Colorado River, which were of concern because of delivery obligations to Mexico, and also because high salinity levels could interfere with beneficial uses of water in the basin states. The program was established by the Salinity Control Act of 1974 and 1984 amendments, 43 U.S.C. Sections 1571-1599. The primary federal salinity activities with regard to irrigation are improved delivery systems installed by the U.S. Bureau of Reclamation (USBR) and improved on-farm irrigation systems installed by the Soil Conservation Service (SCS). Participation in either of these programs is entirely voluntary. In general USBR is lining large canals and ditches, while SCS is helping farmers to better manage and deliver water on-farm with sprinkler systems and piped or lined laterals. Both programs aim at reducing salt load into

the Colorado River by reducing the deep percolation which causes highly saline return flows in areas like the Grand Valley. The program is also active in the Uncompahgre Valley of the Gunnison Basin, and the McElmo Creek area near Cortez, Colorado.

USBR salinity improvements are federally funded in recognition that the Mexican delivery is a nationwide, rather than a basin specific, obligation and because of the vast land holdings of the U.S. in the basin. A 25% repayment on USBR salinity project construction costs is made to the federal treasury from the Lower Colorado and the Upper Colorado River Basin Funds. Local project participants pay no share of USBR project costs. While they are required to sign contracts obligating themselves to maintain and operate the newly improved systems, USBR fully reimburses participants for any additional maintenance expenses caused by those new systems. The SCS program requires both cost sharing by individual project participants and repayment from the same Basin Funds used to repay the USBR. Ultimately, the SCS on-farm measures are paid for in the following proportion: 30% by individual participants, 21% from the Basin Funds, and 49% by the U.S. There is no requirement tying participation in the USBR program with participation in the SCS program. Therefore, a farmer could benefit from an improved ditch without committing to expend any funds or making any on-farm changes.

Construction of salinity control features in the Grand Valley has been underway since 1980 when a 6.8 mile segment of the Government Highline Canal near Mack, Colorado was concrete lined as a demonstration project, Grand Valley Unit Stage I. Using salinity data and design information gained in Stage I a comprehensive program to remove 139,500 tons per year of salt from the Colorado River was proposed as Grand Valley Unit Stage II. Portions of Stage II are currently being constructed, other portions are being designed, and some have been deferred or eliminated as new cost estimates indicate they are no longer cost effective. As currently configured Stage II will remove approximately 108,000 tons per year of salt load from the Colorado River when fully implemented. As of early 1990 Stage I had already reduced salt load by 21,900 tons per year and the completed portion of Stage II reduced the load by another 26,000 tons per year.

Segments of the GVIC system involving approximately 217 miles of earthen laterals to be replaced with gravity pressure pipe were included in the Stage II plan. The improved GVIC segments were estimated to reduce saline seepage return flows to the Colorado River by 6,500 AF per year. This volume of seepage reduction was at the core of efforts to enact HB 91-1110, with several GVIC water users strenuously promoting their right to retain and sell any of this water not needed for diversion as "saved" water. As of July, 1991 this seepage reduction will not occur, since GVIC shareholders voted not to participate in the Salinity Program, and this particular increment of "saved water" will not materialize.

The federal Salinity Act creates no claim to any saved or salvaged water produced through the program. The fate of this water, if any, is specifically left for allocation under state law. The Salinity Control Act states that "in implementing the units ... the Secretary shall comply with procedural and substantive state water laws," 43 USC Section 1592(b)(4),

(1984 Amendment). Reinforcing the Salinity Program's general deference to state water law is detailed language in various contracts and documents pertaining to the Grand Valley Unit wherein the United States disclaimed any right to the salvaged or saved water, leaving the allocation of any such water to be decided under state law. "Nothing in this contract shall be construed to alter, amend, modify, or conflict with the right of the Association to make use of all water adjudicated for use within the Gravity Division in a manner consistent with the laws and constitution of the State of Colorado; provided, however, that any water saved by the rehabilitation and operation of project facilities may be applied only to those lands within the Gravity Division which are classified as irrigable...in a manner which shall not result in any material increase of salinity inflow to the Colorado River." Grand Valley Water Users Association-USBR Contract for Rehabilitation, Operation, and Maintenance of Distribution Facilities, April 10, 1986. "The Districts have agreed not to use this saved water [an estimated 1,760 AF per year from reduced seepage] in a manner which would materially increase the salinity contribution to the Colorado River. Beyond that requirement, the (sic) Reclamation and the salinity program defer to Colorado State water law to determine the destiny of the salvaged water." Price-Stub Ditch Improvements, Draft Environmental Assessment, June 1990, page 16.

Participants in the program agree not to use the improved systems or saved water in any way that would cause additional salt loading to the river. This agreement effectively prevents participants from using "saved water" to add new irrigated acres under an improved ditch system. Colorado water law similarly would prevent use of an existing decreed right on new irrigated acres as an expanded use.

Environmental impacts caused by improved irrigation systems must be mitigated to some degree. The USBR is required to provide replacement of wetland and wildlife habitat to offset the losses to these values caused by the improved conveyances it is constructing. Participants in the SCS program are encouraged to participate in a voluntary program to replace wetland and wildlife habitat lost as a result of the program.

IV. Availability of Salvage or Saved Water in the Grand Valley

The Bureau and the SCS have been analyzing salt loading and water use in the Grand Valley since the early 1970's. Hydrosalinity models analyze water use and salt movement by measuring and projecting water flows and salt concentrations at various gages in the Grand Valley. The model is based on a mass balance approach that tracks all water and salt inflows into the valley, accounts for water use in the valley, and checks against known outflows. The Bureau and SCS then formulate and design project features to reduce saline return flows in the most effective manner by targeting those areas that produce the highest salt load. These plans have been developed in phases, and refined based on experience and data gained from earlier phases. Table 2 summarizes the current components of Stage II of the Grand Valley Salinity Control Unit.

The abatement of saline return flows is accomplished by reducing irrigation system conveyance losses and on-farm losses. While the salinity control program is aimed at reducing the seepage that causes return flows, it also reduces the "non-productive" or "incidental" consumptive use that occurs during irrigation. The incidental consumptive use of water involves permanent, but unintentional, loss of water from the basin by evaporation from exposed water surfaces and evapotranspiration by noncrop vegetation. These incidental losses are reduced by combining ditches, replacing open ditches with pipe, eliminating standing water, drying up water logged soils, and reducing wetland acreage. Based on climate data for the Grand Valley it is estimated that every mile of 2-foot wide lateral placed in pipe reduces evaporation losses by 1 AF per year. Every acre of wetland lost will yield approximately 2 AF per year of reduced incidental consumptive use. Data in the 1986 Grand Valley Stage II verification memorandum indicate that at full build-out Stage II would line or pipe 325 miles of canals or laterals and reduce wetland acreage by 300 acres. This scale of project would reduce historical incidental depletions and thereby produce 950 AF per year or less of "salvaged water" from the Grand Valley. With a construction cost of $37 million (excluding all overhead and design costs) this salvaged water would have an annual cost of approximately $3,700 per AF.

The original Stage II program proposed by the Bureau was expected to reduce total seepage losses by 42,900 AF per year, 6,500 AF of which were from the GVIC system. Nearly all this seepage historically returned to the Colorado River system within the Grand Valley. As more is learned about salinity in the Grand Valley, as construction costs increase, and as the voluntary participants opt in and out of the program, it is unlikely that all increments will remain cost effective and some will be deleted from the final implementation plan. Recent estimates indicate that the combined salinity program of USBR and SCS in the Grand Valley will reduce irrigation seepage by approximately 70,000 AF per year. As of December 1990, the USBR/SCS program in the Grand Valley had reduced irrigation seepage by approximately 27,000 AF per year. It is important to understand that these seepage reduction estimates are made for the purpose of determining salt loading, not quantifying water availability. As the hydrosalinity model data are revised, these seepage estimates may also change.

The majority of the irrigation water potentially made available through improved efficiencies was not previously lost through consumption, but returned to the Colorado River below the confluence with the Gunnison. While these return flows are not lost to the river system, they historically have not been of benefit to users in Colorado because of the proximity of the Utah state line, the adequate supply of water that exists in the Colorado River below the Gunnison River, and lack of demand below Grand Junction. Those return flows support instream uses in the Colorado River between Grand Junction and Utah. Current demands for Colorado River water, and shortfalls in supply are in the headwaters areas, and the water that eventually becomes return flow has already been called past those demands. This water called past upstream headgates does provide significant instream values between the headwaters of the Colorado and the Cameo diversions.

V. Grand Valley Project

The Grand Valley Project was built by the Bureau between 1912 and 1917 and is operated by the Grand Valley Water Users Association (GVWUA), Orchard Mesa Irrigation District (OMID), Palisade Irrigation District (PID), and the Mesa County Irrigation District (MCID). USBR retains a key role in the functioning of this project. As a federal entity USBR has its own responsibilities under the Endangered Species Act, which it is currently addressing by participation in the endangered fish recovery program. USBR has looked at ways that the Grand Valley project and other projects it is involved in can lessen impacts on critical habitat and be operated to augment flows in the "15-Mile Reach". Draft Report, July, 1990: Study of Alternative Water Supplies for Endangered Fishes in the "15-Mile Reach" of the Colorado River.

During operations studies of the Grand Valley Project, the USBR has identified several feasible measures which can reduce irrigation headgate diversions without impairing crop deliveries. USBR believes it would be possible to structurally improve the Government Highline Canal by installation of automated level control gates ("checks") so that administrative spills from the system could be reduced. Currently the canal must be kept full of water throughout its 55 mile length to provide a sufficient volume and height of water to all delivery points. When irrigation demands are less than anticipated, canal water is spilled or "wasted" back to the river. At certain times this spilled water has been called past upstream juniors. It is also not available to the reach of critical habitat between the canal headgate and the waste discharge point. USBR estimates that some 60,000 AF is spilled annually and preliminary indications are that 60% of these spills could be avoided with improved facilities and management techniques. On this basis USBR estimates 36,000 AF per year of saved water potential from operational changes in the Government Highline System. These estimates are based on a very preliminary analysis of operational changes in the system and water users do not necessarily agree with these estimates.

VI. Disposition of "Salvage" Water Produced in the Grand Valley

Water salvaged (no longer consumed) or saved (no longer diverted), if any proves to be physically available, could be allocated to various water users pursuant to the following scenarios, depending on how legal and policy issues are resolved.

Under existing state law and the Salinity Control Act there is no barrier to the original appropriator using saved or salvaged water to make up current shortfalls in their own supply, provided no additional irrigated acres are added. Despite the seniority of the Cameo call there are indications that shortfalls do exist during peak irrigation periods in the Grand Valley. This occurs despite the fact that the full decreed amount is being diverted, because that rate is not large enough to provide for all the deliveries that may be required at a particular moment. Better scheduling and rotating demands may alleviate this situation. Current information indicates that a major portion of the water previously lost to seepage may continue to be diverted to meet short term peak irrigation demands, unless ditch systems become able to better schedule and meet demands.

A second scenario for use of water available through better irrigation efficiency assumes that diversions in the Grand Valley will be reduced in some proportion to the reduced conveyance and on-farm loss. That would effectively reduce the size of the Cameo call, leaving more water available for other users to divert under existing or future appropriations. Currently the Cameo call is satisfied in part by releases from Green Mountain Reservoir and a reduction in the size of the call would allow other uses of this stored water. The reduction in Grand Valley diversions could be voluntary, recognizing that less water is needed to accomplish the same purposes, or administratively enforced by the State Engineer.

A third scenario assumes that an entitlement to the saved and/or salvaged water currently exists or is legislatively created as an attribute of the original water right. Such an entitlement conceivably could be assigned to the original appropriator or to the entity that invests in conservation measures and produces the saved water. Once a property right is assigned the saved water could be transferred or temporarily leased to any use in or out of the basin. There are two current demands which might be expected to acquire rights to this water: the U.S. Endangered Fishes Recovery Program seeking water for the "15-Mile Reach" at Grand Junction, and junior water rights upstream of the Grand Valley. A transferable salvage right might also be of interest to a revived oil shale industry located upstream of Grand Junction or to the CWCB as the basis for a senior instream flow right on the Colorado River.

A fourth scenario assumes that any return flows from the Grand Valley should remain in the reach of the Colorado River below Grand Junction. This requirement could arise from junior downstream conditional water rights claiming reliance on those return flows for a water supply. Any future CWCB instream flow right for endangered fish or other purposes would also be a downstream junior, possibly relying on Grand Valley return flows. The Colorado River and the Upper Colorado River Basin Compacts apportion the amount of Colorado River water each of the basin states can use. As a result, some water must flow out of the state of Colorado to satisfy apportionments made to downstream states. These apportionments are not unlike a downstream water right capable of calling water from upstream users. Upstream rights junior to the Compacts may argue that they relied on the availability of Grand Valley return flows to help meet downstream apportionments and that they should not be placed at risk of having their own diversions curtailed in the future for compact purposes by a change of historical return flows.

VII. Legal and Policy Issues

The same range of policy and legal issues presented in the more comprehensive Analysis of Water Salvage Issues in Colorado generally apply in the particular case of the Grand Valley.

A. Legal Issues

The main legal issues surrounding salvage and saved water in the Grand Valley involve the entitlement to claim historical diversion levels, and thus return flows, as an attribute of the original appropriation. Current law appears to fix the priority date for a plan to use return flows to the date such an intent is formed and manifested, not the date of the original appropriation. Water Supply and Storage Co. v. Curtis, 733 P.2d 680 (Colo. 1987). The availability of the "no injury" rule to upstream juniors who have not made physical use of return flows, but wish to assert reliance on those return flows will be at issue if a right to reuse or transfer saved water is recognized. The issue of reliance on return flows will be further complicated by uncertainties over how Colorado River Compact apportionments will be met and the role of return flows in meeting those apportionments.

B. Policy Issues

The prospect of finding some increment of "new" water in an over-appropriated basin raises water supply allocation policy questions, particularly where the status of that water within the priority system is unclear. If the priority system does not provide a basis for allocating this water, the courts or the General Assembly may have to allocate it on policy grounds.

The Endangered Species Act requires federal resource and permitting agencies to do everything in their power to avoid jeopardizing endangered native Colorado River fish. Those powers include review and approval of non-federal water development projects. Potential solutions to the habitat needs of endangered fish may depend upon a consensus within the water user community. Until the habitat needs are protected all future Colorado River depletions, and to some extent current depletions, are at risk, regardless of where the end use of those depletions occurs.

There are also important environmental and economic policy questions, involving protection of wetlands and fair recognition of federal taxpayer investment in local water supply projects. The environmental price for saved water may be high. In the Grand Valley the main beneficiaries of irrigation losses are wetlands and ditch and field tree borders. The seepage from the Government Highline Canal, for instance, supports a vegetated corridor through otherwise barren range and cropland, used extensively by wildlife and for local recreation. The Salinity Program will be mitigating some portion of its environmental impacts, but if a broad incentive for further irrigation efficiency is created, there may be no mechanism to prevent environmental damage from private conservation efforts. On the other hand, if municipal demands are forced to look elsewhere for water, the environmental consequences may be worse than the loss of phyreatophytes or artificial wetlands.

Some believe that since the U.S. has funded the bulk of the efficiency improvements which produce salvaged or saved water, its claims to control that water are superior to that of the original appropriators. The Salinity Act requires that the Grand Valley Unit be

designed and operated in compliance with state water law. If state law is changed or found to currently allow claims to salvaged or saved water, the federal government may make equitable or legal arguments that this water should accrue to the U.S.

Another policy raised by salvage in the Grand Valley relates to interstate compacts and whether the extent of an eventual compact call is too speculative to be factored into present day water allocation decisions. A related compact issue is the difficult question of how to use the Board's instream flow authority near statelines in a manner that will preserve important Colorado environments along the State's borders while not impairing the State's ability to fully consume compact entitlements.

VIII. Findings

Based on the foregoing analysis and the discussion undertaken by the Board with respect to broad questions of water salvage and saving, the following findings can be made:

a) Based on present knowledge of salinity control activities in the Grand Valley some unquantified amount of salvage/saved water may be available.

b) To quantify the amount that is now or may become available in the future would require detailed engineering and operation studies of the Grand Valley Project and the Grand Valley Irrigation Company.

c) Salvage/saved water from the Grand Valley Irrigation Company system is not likely to become available because GVIC shareholders voted not to participate in the salinity control program.

d) If the availability of salvage/saved water is established, the legal and policy issues affecting water management described in the report can be addressed.

bj294a.rpt

Table 1

Water Rights Comprising the Cameo Call

Operating Entity	Structures	Irr. Acres	Decreed Rights	
			Amount (cfs)	Priority Date
G.V.I.C.	Grand Valley Canal	4,230		
	Mesa County Ditch	1,090	520.81	1882
	Grand Valley Highline Canal	7,240	119.47	1914
	Kiefer Extension Ditch	5,970		
	Grand Valley Mainline Canal	7,760		
	Independent Ranchmen's Ditch	2,310		
		28,600		
P.I.D.	Price Ditch	3,710	80.	1889
			23.5	1918
O.M.I.D.	Orchard Mesa Canal No. 1	7,390	10.2	1898
	Orchard Mesa Canal No. 2		450	1907
	Orchard Mesa Power Canal		400 *	1908
M.C.I.D.	Stub Ditch	900	40	1903
G.V.W.U.A.	Government Highline Canal	25,900	730	1908
TOTAL		66,500	2,373.98	

G.V.I.C. = Grand Valley Irrigation Company

P.I.D. = Palisade Irrigation District

O.M.I.D. = Orchard Mesa Irrigation District

M.C.I.D. = Mesa County Irrigation District

G.V.W.U.A. = Grand Valley Water Users Association

* P.S.C.C. = Public Service Company of Colorado, operates the power plant at the end of the Orchard Mesa Power Canal, using the 400 cfs right.

All structures except for G.V.I.C. divert at the Grand Valley Diversion Dam, 0.25 miles above the confluence with Plateau Creek.

The G.V.I.C. Dam is approximately 8 miles downstream, near Palisade, Colorado.

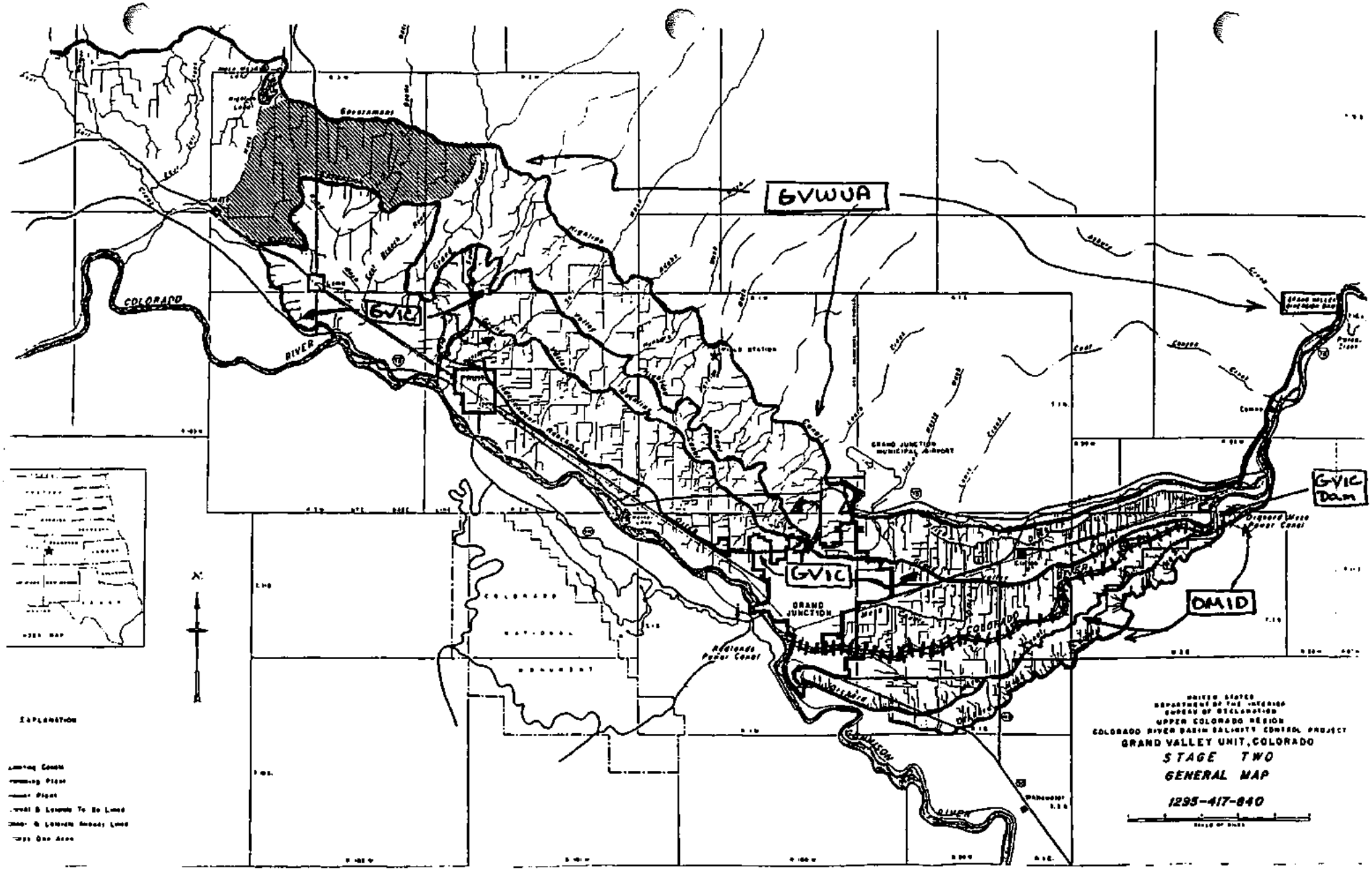

GVWUA
GVIC
COLORADO
RIVER
GVIC
Dam
GVIC
OMID
GRAND
JUNCTION
Redlands
Power Canal
Grand Valley
Power Canal
GRAND JUNCTION
MUNICIPAL AIRPORT
EXPLANATION
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
UPPER COLORADO REGION
COLORADO RIVER BASIN SALINITY CONTROL PROJECT
GRAND VALLEY UNIT, COLORADO
STAGE TWO
GENERAL MAP
1295-417-840

Table 2
Incremental cost-effectiveness analysis
Stage Two plan of development
(Verification Memorandum) 1/

Lateral and canal increments	Costs: Total investment ($1,000) 2/	Costs: Annual OM&R ($1,000) 3/	Total annual ($1,000)	Tons removed	Cost effectiveness: Increment ($/ton)	Cost effectiveness: Cumulative ($/ton)
Price Ditch laterals	10,270	7	625	15,800	40	40
Stub Ditch laterals	1,452	1	88	1,500	59	41
East end portion, Government Highline Canal laterals	6,844	-4	408	6,400	64	47
West end portion, Government Highline Canal laterals	21,556	-12	1,285	20,000	64	55
East end portion, Government Highline Canal	24,280	128	1,589	24,300	65	59
* Grand Valley Canal laterals 4/	9,326	6	567	7,200	79	61
Middle portion, Government Highline Canal laterals	32,848	-18	1,958	23,300	84	66
* Kiefer Extension laterals	5,655	3	343	3,400	101	67
West end portion, Government Highline Canal	9,509	50	622	5,600	111	70
* Grand Valley Highline Canal laterals	10,977	7	667	5,600	119	72
* Grand Valley Mainline Canal laterals	16,249	10	988	8,700	173	77
* Middle portion, Government Highline Canal	41,012	218	2,686	15,300	176	88
* Orchard Mesa Canal No. 1 laterals	9,439	6	574	3,100	185	90
* Independent Ranchmen's Ditch laterals	3,456	2	210	1,100	191	91
* Orchard Mesa Canal No. 2 laterals	1,829	2	233	1,200	194	92
Total	206,730	407	12,841	139,500		

1/ Based on January 1985 preconstruction-level data at 5 5/8 percent for a 50-year time period.

2/ Includes prorated share of wildlife, Irrigation Management Services, moss and debris removal structures, and interest during construction.

3/ Represents increase or savings in operation, maintenance, and replacement expenses as compared with the present system.

4/ Includes the Mesa County Ditch laterals.

* Increment is deferred or not currently proposed for construction

Appendix B

Irrigation Water Budget

Figures 1-6

Tables 1-2

Uintah Basin Unit Expansion - Flow Diagram

CASE I

Future Without Project
March 1991
Annual Flow in AC-FT
20,800 Irrigated Acres

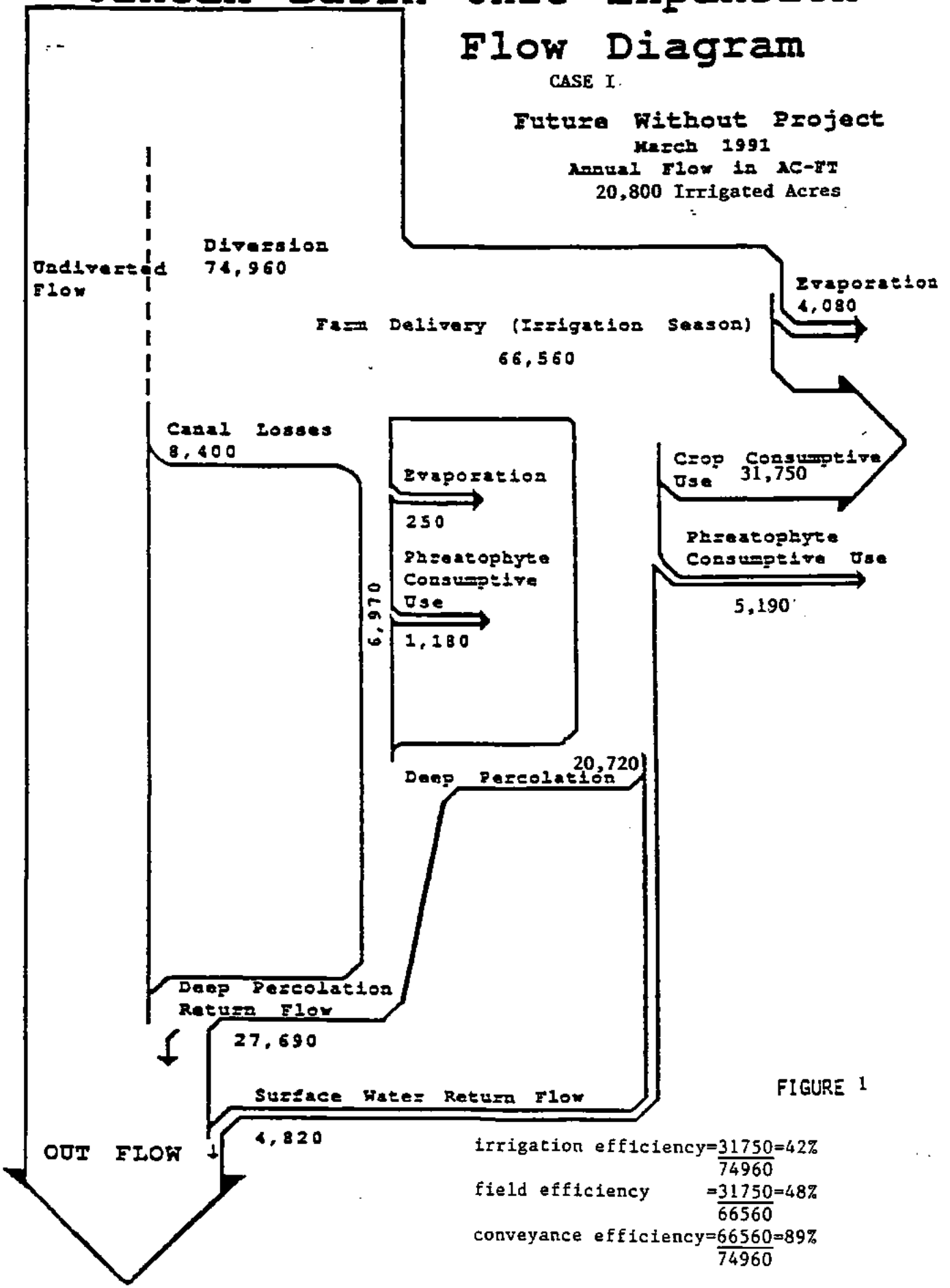


FIGURE 1

irrigation efficiency = $\frac{31750}{74960}$ = 42%

field efficiency = $\frac{31750}{66560}$ = 48%

conveyance efficiency = $\frac{66560}{74960}$ = 89%

Uintah Basin Unit Expansion - Flow Diagram

CASE II

Future With Project
March 1991
Annual Flow in AC-FT

20,800 Irrigated Acres

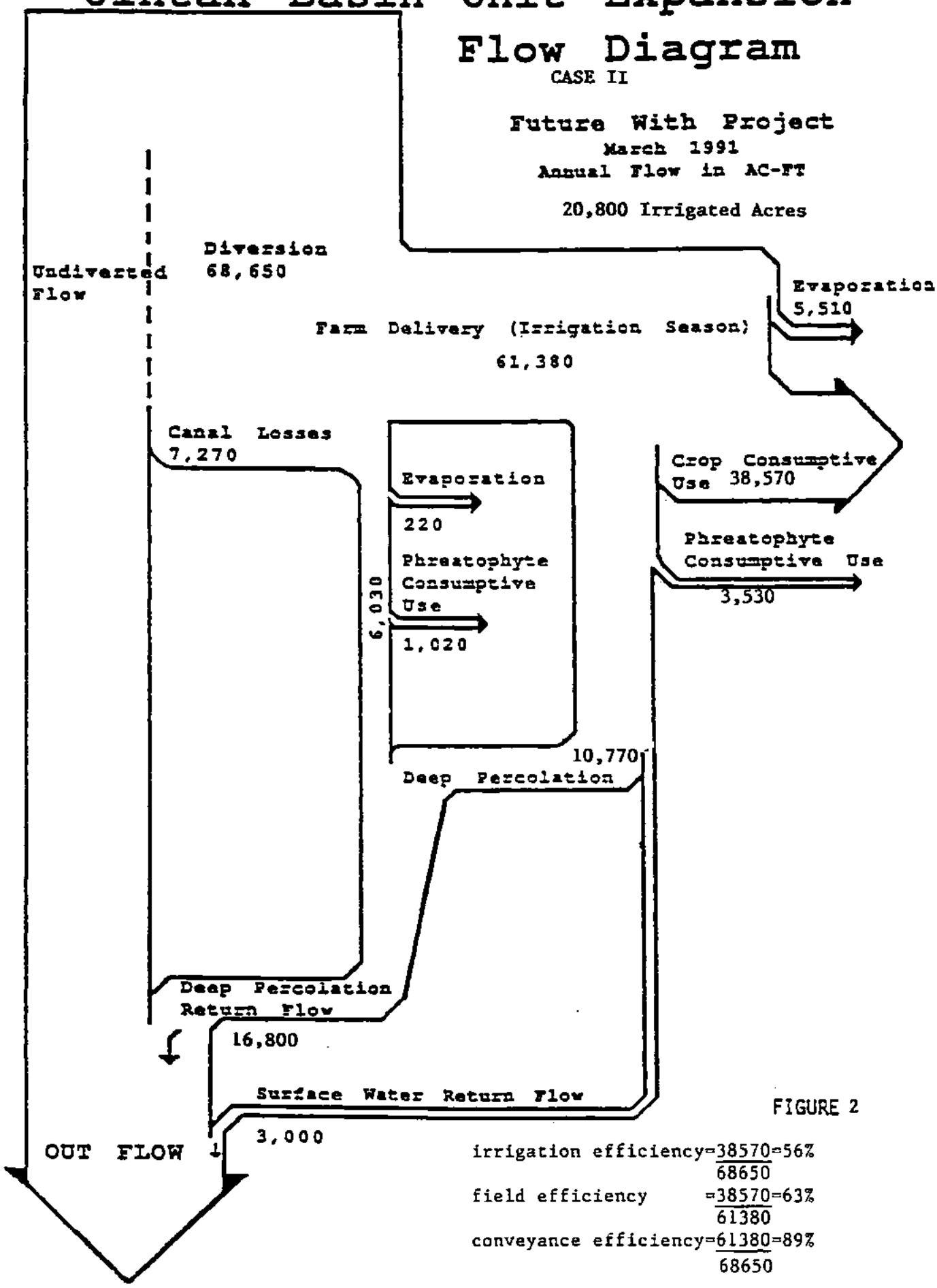


FIGURE 2

irrigation efficiency = $\frac{38570}{68650}$ = 56%

field efficiency = $\frac{38570}{61380}$ = 63%

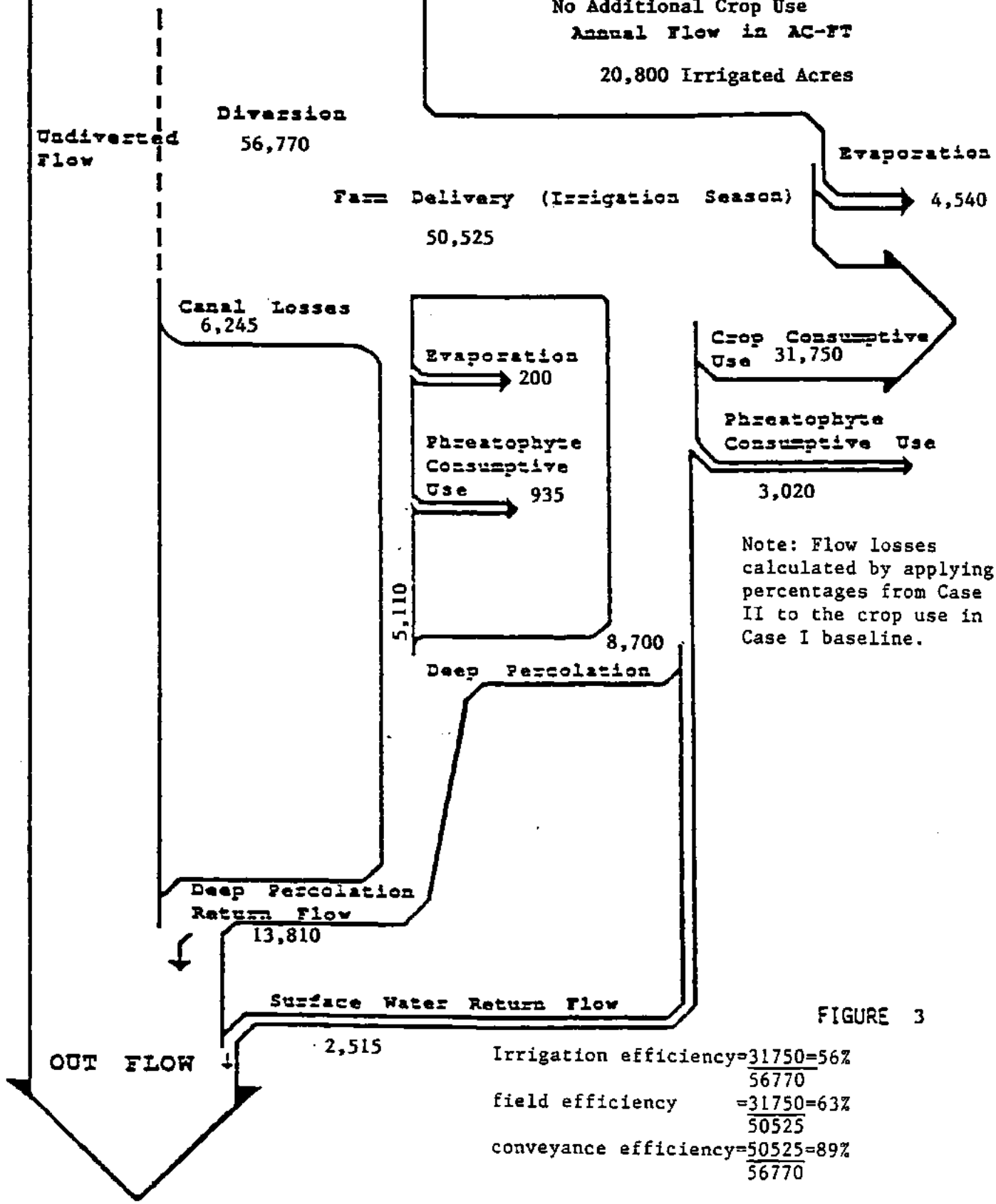
conveyance efficiency = $\frac{61380}{68650}$ = 89%

Uintah Basin Unit Expansion - Flow Diagram

CASE III

Future With Project
No Additional Crop Use
Annual Flow in AC-FT

20,800 Irrigated Acres



Note: Flow losses calculated by applying percentages from Case II to the crop use in Case I baseline.

FIGURE 3

Irrigation efficiency = $\frac{31750}{56770}$ = 56%

field efficiency = $\frac{31750}{50525}$ = 63%

conveyance efficiency = $\frac{50525}{56770}$ = 89%

PRICE-SAN RAFAEL RIVERS UNIT

Flow Diagram

CASE I

Future Without Project

Annual Flow in AC-FT

45,280 Irrigated Acres

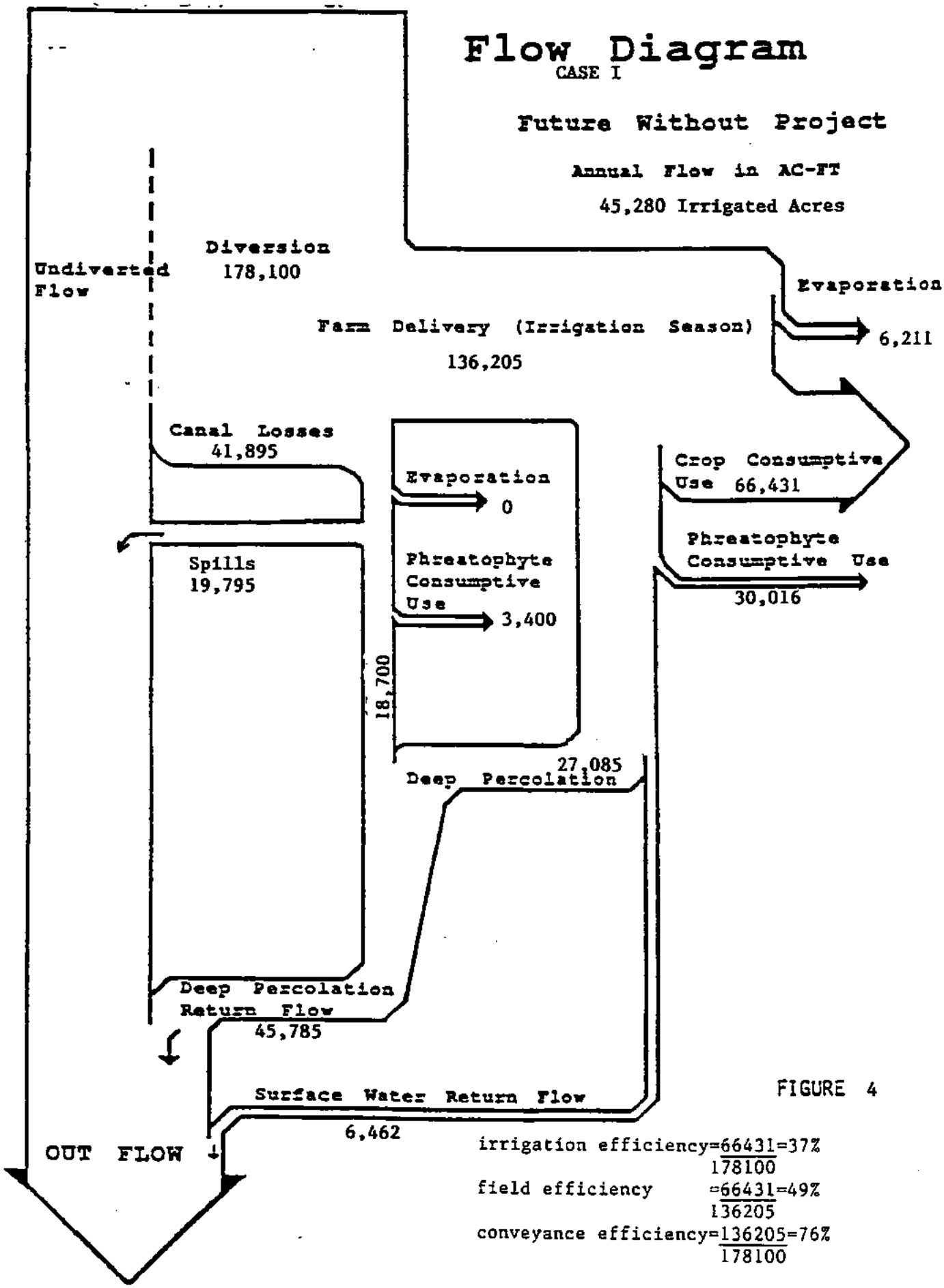


FIGURE 4

irrigation efficiency = $\frac{66431}{178100}$ = 37%

field efficiency = $\frac{66431}{136205}$ = 49%

conveyance efficiency = $\frac{136205}{178100}$ = 76%

PRICE-SAN RAFAEL RIVERS UNIT

Flow Diagram

CASE II

Future With Project

Annual Flow in AC-FT

45,280 Irrigated Acres

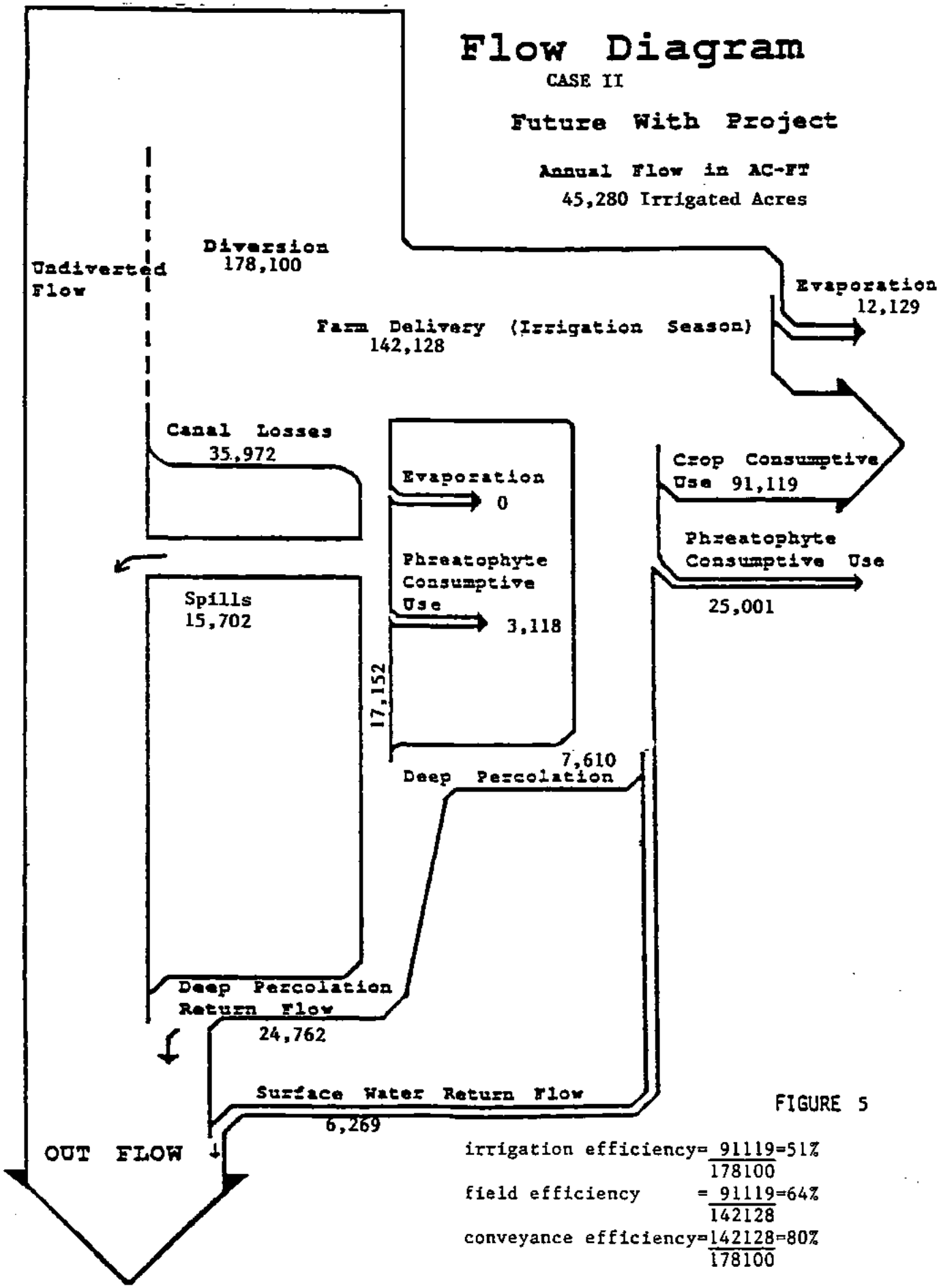


FIGURE 5

irrigation efficiency= $\frac{91119}{178100}$=51%

field efficiency = $\frac{91119}{142128}$=64%

conveyance efficiency=$\frac{142128}{178100}$=80%

PRICE-SAN RAFAEL RIVERS UNIT

Flow Diagram

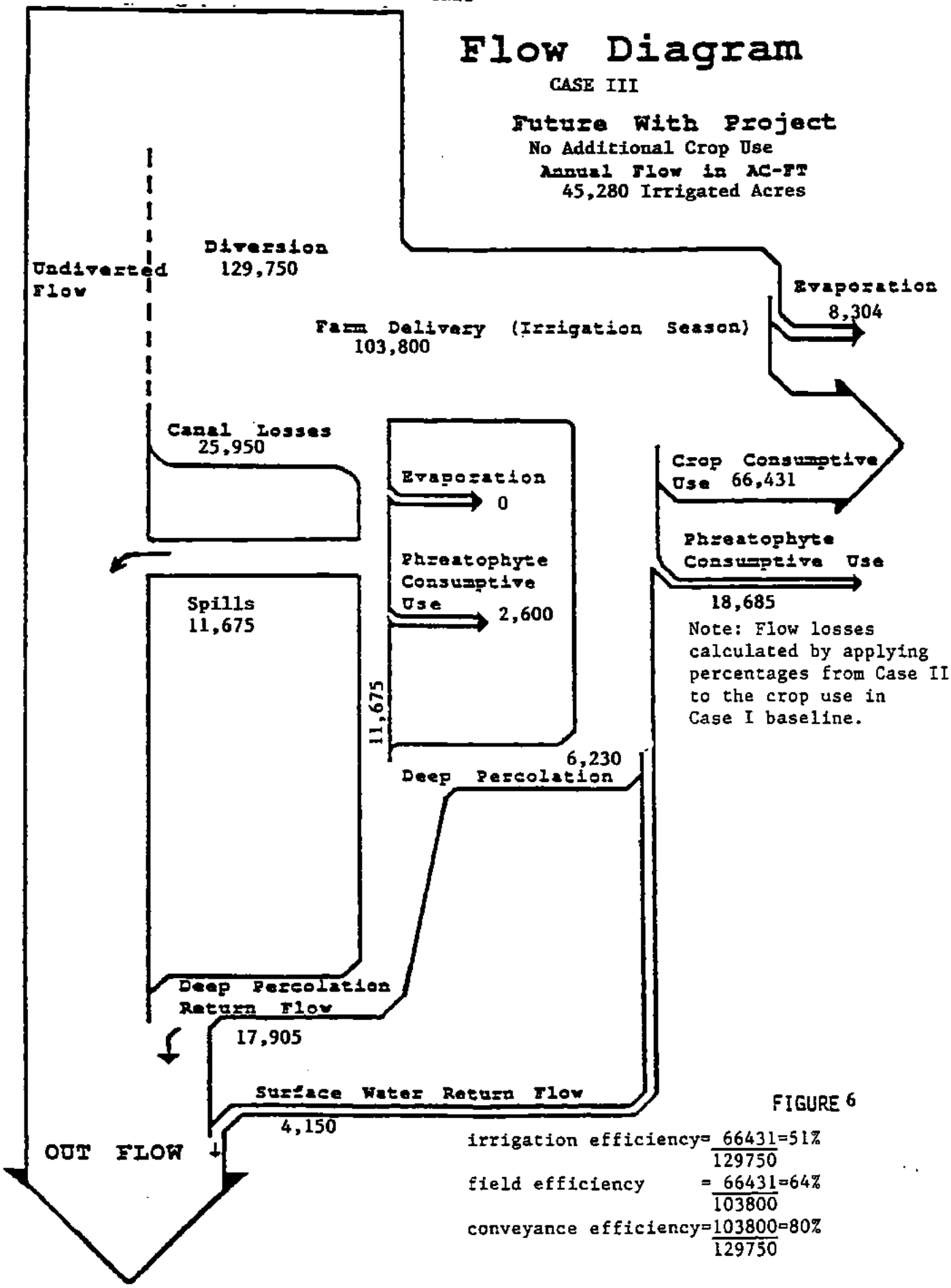
CASE III

Future With Project

No Additional Crop Use

Annual Flow in AC-FT

45,280 Irrigated Acres



Note: Flow losses calculated by applying percentages from Case II to the crop use in Case I baseline.

FIGURE 6

irrigation efficiency= $\frac{66431}{129750}$=51%

field efficiency = $\frac{66431}{103800}$=64%

conveyance efficiency=$\frac{103800}{129750}$=80%

	UINTAH BASIN UNIT								PRICE SAN RAFAEL RIVERS UNIT							
	Existing I		Improved II[2/]		Improved III[3/]		Change (AF)		Existing I		Improved II[2/]		Improved III[3/]		Change (AF)	
	AF	%[1/]	AF	%[1/]	AF	%[1/]	II-I	III-I	AF	%[1/]	AF	%[1/]	AF	%[1/]	II-I	III-I
DIVERSION	74,960	100%	68,650	100%	56,770		- 6,310	-18,190	178,100	100%	178,100	100%	129,750	100%	0	-48,350
CONVEYANCE LOSSES																
Spills	0		0		0				19,795	11	15,702	9	11,675	9	- 4,093	- 8,120
Phreatophytes	1,180	2	1,020	2	935	2	- 160	- 245	3,400	2	3,118	2	2,600	2	- 282	- 800
Evaporation	250		220	0	200		- 30	- 50	0		0		0		0	0
Deep Percolation	6,970	9	6,030	9	5,110	9	- 940	- 1,860	18,700	11	17,152	9	11,675	9	- 1,548	- 7,025
SUBTOTAL	8,400	11%	7,270	11%	6,245	11%	- 1,130	- 2,155	41,895	24%	35,972	20%	25,950	20%	- 5,923	-15,945
FARM DELIVERY	66,560	89%	61,380	89%	50,525	89%	- 5,180	-16,035	136,205	76%	142,128	80%	103,800	80%	+ 5,923	-32,405
FARM LOSSES																
Tailwater	4,820	7	3,000	5	2,515	5	- 1,820	- 2,305	6,462	5	6,269	4	4,150	4	- 193	- 2,312
Phreatophytes	5,190	8	3,530	6	3,020	6	- 1,660	- 2,170	30,016	22	25,001	18	18,685	18	- 5,015	-11,331
Evaporation [4/]	4,080	6	5,510	9	4,540	9	+ 1,430	+ 460	6,211	4	12,129	8	8,304	8	+ 5,918	+ 2,093
Deep Percolation	20,720	31	10,770	17	8,700	17	- 9,950	-12,020	27,085	20	7,610	6	6,230	6	-19,475	-20,855
SUBTOTAL	34,810	52%	22,810	37%	18,775	37%	-12,000	-16,035	69,774	51%	51,009	36%	37,369	36%	-18,765	-32,405
CROP CONSUMPTIVE USE	31,750	48%	38,570	63%	31,750	63%	+ 6,820	0	66,431	49%	91,119	64%	66,431	64%	+24,688	0
LOSSES BY FATE																
Incidental Depletion																
Evaporation [4/]	4,330	10	5,730	19	4,740	19	+ 1,400	+ 410	6,211	5	12,129	14	8,304	13	+ 5,918	+ 2,093
Phreatophyte	6,370	15	4,550	15	3,955	16	- 1,820	- 2,415	33,416	30	28,119	32	21,285	34	- 5,297	-12,131
SUBTOTAL	10,700	25%	10,280	34%	8,695	35%	- 420	- 2,005	39,627	35%	40,248	46%	29,589	47%	+ 621	-10,038
Return Flows																
Surface	4,820	11	3,000	10	2,515	10	- 1,820	- 2,305	26,257	24	21,971	25	15,825	25	- 4,286	-10,432
Groundwater	27,690	64	16,800	56	13,810	55	-10,890	-13,880	45,785	41	24,762	29	17,905	28	-21,023	-27,880
SUBTOTAL	32,510	75%	19,800	66%	16,325	65%	-12,710	-16,185	72,042	65%	46,733	54%	33,730	53%	-25,309	-38,312
TOTAL LOSSES	43,210	100%	30,080	100%	25,020	100%	-13,130	-18,190	111,669	100%	86,981	100%	63,319	100%	-24,688	-48,350

Irrigation Water Budgets

Table 1

Salvage. tab

Notes to Table 1 Irrigation Budgets

1/ Percentages shown for "conveyance losses" and "farm delivery" based on diversions. Percentages shown for "farm losses" and "crop consumptive use" based on farm delivery.

2/ Improved Case II is salinity project as proposed, allowing crop consumptive use to increase where irrigation supplies have historically been inadequate.

3/ Improved Case III is modified project holding crop consumptive use at baseline levels based on assumption that historical irrigation supplies provided maximum crop demand.

4/ On-farm evaporation increases when sprinkler spray irrigation replaces flood irrigation methods.

SUMMARY OF SALVAGED AND SAVED WATER
POTENTIALLY AVAILABLE FROM UINTAH AND
PRICE-SAN RAFAEL SALINITY CONTROL PROJECTS

rrigation Efficiency mprovement Levels	"Saved" Water Reduction in Diversions		Saved Water Annual Cost	Salvaged Water Reduction in Cons. Use			% 1/	Salvage Annual Cost	Reduction Return Flow	Change in River Flow below	
										headgate	return flow entry
	AF	% 1/	$/AF/yr 2/	Crop c.u.	Incid.c.u.	Net c.u.	% 1/	$/AF/yr 2/		AF	AF
INTAH BASIN Case II Improved - Case I Existing System	6,310	8%	$100	<6,820>	420	3/	--	---	12,710	+ 6,310	-6,400
Case III Improved (no additional crop cons. use) - Case I	18,190	24%	$ 35	0	2,005	2,005	3%	$325	16,185	+18,190	+2,005
RICE SAN RAFAEL Case II Improved - Case I Existing System	0	-	--	<24,688>	<621>	3/	--	---	25,309	0	-25,309
Case III Improved (no additional crop cons. use) - Case I	48,350	27%	$125	0	10,038	10,038	6%	$595	38,312	+48,350	+10,038

Percent of pre-improvement diversion levels: Uintah at 74,960 AF/yr, Price-San Rafael at 178,100 AF/yr

Annual Project Costs from USDA/USBR Planning Documents
Uintah Basin Construction Cost = $6.74 million, Annual Cost = $652,000
Price-San Rafael Construction Cost = $72.14 million, Annual Cost = $5,986,000

Consumptive Use Increases because area has a current shortfall in irrigation water availability, no salvage results.

Table 2

Colorado Interbasin Compact Committee (IBCC)

Meeting Notes
Sheraton West Denver
Lakewood, CO
February 2, 2007
12:00 PM – 5:00 PM

Attendees

Interbasin Compact Committee Members

Peter Binney (via telephone)
Dan Birch
Marc Catlin
Stan Cazier
Kent Crowder
Rita Crumpton
Kathleen Curry
Jeris Danielson
T. Wright Dickinson
Alan Hamel
Melinda Kassen
Eric Kuhn
John Porter
Jenny Russell
Doug Scott
Harris Sherman, Chairman
Mike Shimmin
Bill Trampe
Steve Vandiver
Wayne Vanderschuere
Eric Wilkinson
Raymond Wright

State Staff

Eric Hecox
Rick Brown

Facilitation Team

Chris Moore, CDR Associates
Diane Tate, CDR Associates

Members of the Public

Tom Crumpton
Kelly DiNatale
Don Glaser
Polly Hays
Diane Hoppe
Doug Kemper
Harold Miskel
Sue Morea
Mark Pifher
Roy Smith
Joe Shbruk
Phyllis Thomas
Jerry Winner

Meeting Notes

The CDR Associates facilitators opened the meeting with a welcome, and members of the IBCC introduced themselves. The facilitators asked the group for their permission to depart from the agenda distributed before the meeting to allow time for Harris Sherman, the newly appointed Director of the Department of Natural Resources and Chairman of the Interbasin Compact Committee, to address the group and hear their thoughts on the process.

Conversation with Harris Sherman

Mr. Sherman began his remarks by stating his desire to help this process work, and his hope that in this meeting and other IBCC members would provide candid feedback and work with him to make the process a success. He presented five questions to the group:

- How do the Roundtables and the IBCC fit with each other? Is the coordination process working, and what would you suggest to strengthen it?
- Are the state agencies traditionally involved in water issues and the IBCC and Roundtables working well together, at both policy and staff levels? Are we coordinating our work at a staff level to avoid duplication? Looking at the right statewide issues?
- Have we provided the right kind of educational materials and opportunities to the roundtables? How are needs assessment activities perceived?
- How are basins working with each other? We have statewide water issues that must be addressed – is this process helping the basins work closely with one another?
- A number of major water issues are in progress right now that are not part of this IBCC process – when and where do we try to integrate these efforts?

The facilitator asked the group for feedback on each question.

<u>Question 1: How do the Roundtables and the IBCC fit with each other? Is the coordination process working, and what would you suggest to strengthen it?</u>

- *Jeris Danielson:* The process has worked extremely well, and has been responsive to roundtable requests.

- *Ray Wright:* The IBCC has spent a lot of time working on process, and connectedness has not been fully explored. Not much has come up that has been challenging.

- *Dan Birch:* It will take 6 months to a year for the substance to unfold, and I would not support mucking around with this process. If we start pushing it, it will fall apart.

- *Bill Trampe*: Our Roundtable is extremely protective of the grassroots concept. Having DNR provide us with a starting point for the bylaws, and the IBCC Charter, helped us get it done. We have spent lots of time working on process, and may be behind the times in developing the needs assessment, but finally it looks like we're beginning to turn a corner. If the roundtables felt there was a change in philosophy, the whole thing might come to a halt.

- *Marc Catlin*: It takes a certain amount of time to develop trust between people before they feel comfortable or safe discussing how they feel. You'd think locally that wouldn't take much time, but it may be the hardest part – knowing everyone and figuring out where we can find middle ground, and what things are sacred. This group is a great opportunity for us to learn some things about how to build that trust and how to run our Roundtables. Now it's going to come back to you (referring to Harris Sherman) – it will take a little bit of time to learn about you and trust you, and when we go home and are able to say that the new Director would like to see this process work that will help, because everybody is hoping that this will work. No one is trying to sabotage or be less than forthright. It may take us a while, longer than we want, but I think it has a chance of working.

- *John Porter*: This is a grassroots effort, and it came about because of the failure of Referendum A. Anybody that thinks they are a stakeholder is a stakeholder. This process starts at the grassroots, and it is long and slow, but we have to give it a try. Now, we are just to the point where we're beginning to see applications come in for use of the Senate Bill 179 money. It may take a while for us and the Colorado Water Conservation Board (CWCB) to figure out priorities and the best way to utilize and implement the program.

- *Rep. Kathleen Curry:* A lack of clarity in division of labor has raised its head with regard to the projects bill. We need to make sure cooperation between CWCB and the 1177 process is working, and that one doesn't get ahead of the other. The Legislature still feels there are members that need to be brought into this dialogue. I'm concerned with the process, not the specific study that was proposed as a part of the projects bill. We need to stress that the process is supposed to work from the ground up. The precedent we set in the Capitol this year on that will be important for other studies.

- *Eric Wilkinson:* When issues come up that are of interest to the entire state, the IBCC needs to receive information from the Roundtables. How we go about conducting needs assessments needs to be resolved on a statewide basis. SWSI was able to look at statewide issues using a common framework. A key role of the IBCC is to take feedback from Roundtables and incorporate it into the discussion. Roundtables feed the process, but I would like us all to recognize that there has to be a common denominator – a common technical platform, common criteria – and it is the role of this group to find that with input from Roundtables.

Deleted: key role

Question 2: Are the state agencies traditionally involved in water issues and the IBCC and Roundtables working well together, at both policy and staff levels? Are we coordinating our work at a staff level to avoid duplication? Looking at the right statewide issues?

- *Melinda Kassen:* CWCB and IBCC worked well together to develop the criteria and guidelines for use of SB 179 funds. I think issues in terms of coordination between the CWCB and IBCC is coming. If I look at the CWCB projects bill, I see one million dollars for studies of things like the value of non-consumptive uses. I think the problem

Deleted: issues in

that you need to help us solve is that this bill is going to go through soon and all of this money CWCB will have is for the sort of things that we had talked about doing in our Charter. To avoid duplication, either the CWCB should do these studies, or the IBCC should do them, but not both. One thing the IBCC has going for it is that we haven't made too many people mad. A number of communities are still very skeptical of CWCB as an honest broker. When the recreational community sees $150,000 in the projects bill for CWCB to "evaluate" recreational water use, they get worried. CWCB may think that the only way to prove they can be objective is do a study, but the recreational community doesn't think they can do that. If the bill goes through, and the CWCB gets funding for these studies, what is the role of the IBCC? We have a statutory obligation to do interstate compacts, but I don't see any on the horizon. Our only other obligation is to public education, but I question whether we have a meaningful role if CWCB does all of this other stuff. And if they do the study, how do you convince various interests that they're unbiased?

- *Rita Crumpton:* One thing we need to decide: this process was set up to be voluntary. The projects bill represents the Legislative response to constituents – they came forward voluntarily with the idea for the proposed study. So is this going to continue to be a voluntary process, or do we want to exercise more control?

- *Dan McAuliffe, Deputy Director, CWCB:* Many members of the IBCC are either past or present members of the CWCB. At the same time that the General Assembly passed House Bill 1177 and House Bill 1400 to fund this process, they also created a new section within the CWCB to continue SWSI and to address Colorado's future water resource challenges. The CWCB was directed in legislation to support the IBCC process. At some point, the conversation needs to include both entities. At every CWCB meeting, they now want to hear a report from the IBCC process, and want to have that ongoing relationship. There are some things the IBCC can do well, and some things the CWCB can do well. Where do those come together? Because the Governor makes appointments to both entities, the cabinet transition gives us an opportunity to work on any relationship issues.

Deleted: directed in

Deleted: to support

- *Eric Kuhn (General Manager, Colorado River Water Conservation District):* When the 1177 process began, our board approached the concept with some questioning and accepted it with deference to Russ George. Our approach since has been to actively engage both the IBCC and the CWCB. If we're going to be a part of the policy making process addressing things like water supply for the Front Range and protection of recreation and environmental interests, we want to do it in a transparent way and through the Roundtables because they represent the stakeholders in those areas – cities, counties, etc.

Deleted: front range

- *Bill Trampe:* The Gunnison approached the process with some skepticism in the beginning, and many thought it was just another way to get water for the Front Range. The river district gave deference to Russ, some of us thought it might be our last chance to have a say in how things develop. Transparency in the relationship between the CWCB and the IBCC is critical, as is maintaining the grassroots nature of the process.

- *Jenny Russell:* The IBCC should not become an arm of the CWCB. We need to be careful about appearances as well – for example, there are many CWCB staff members around the table today, and even though they are here because of the discussion about Colorado River issues we'll have later, I'm concerned about how that looks.

- *Wayne Vanderschuere:* The challenge before us is to find the strengths in what the IBCC brings, and in what the CWCB brings. We need to get past the easy stuff and move on to the hard stuff, and I agree with Jenny that we wouldn't want to be subservient to the CWCB. Right now, our shared experience is implementation of SB 179. The tight time frame was necessary, but didn't allow enough room for expression of all viewpoints.

- *Eric Wilkinson:* SWSI is the best thing the state has done in terms of water planning, and we wouldn't be here today without that process. CWCB needs to continue in that role. SWSI has attempted to look at non-consumptive uses, but it wasn't totally successful. The CWCB has statutory responsibilities on the Colorado River with regard to compact administration, and has purview over some state policy decisions that aren't up for discussion. The relationship between the IBCC and the CWCB should be rich, fruitful, and supportive. As a CWCB Board member, I know I'm working to support this process, and I think other board members feel the same.

- *Rep. Kathleen Curry:* Why couldn't we set as a goal better communication between IBCC and CWCB? An example of where things could have been done better is the recent projects bill, which could have been run by the IBCC before now.

- *Stan Cazier:* We started the IBCC process because something about the system wasn't working. At one point in time, districts and board members were closer together. Now Colorado is so big with so many diverse interests that it's difficult to get everyone together. The Roundtables accomplish that. There is a perceived in gap of information and SWSI did not fully evaluate non-consumptive use – how much water has to be left in the stream. That's the most difficult question to answer. SWSI staff have done a good job working with the Colorado River Roundtable, and any study you have is going to have gaps.

Deleted: evaluate non

- *Alan Hamel:* Staff from both organizations have done a great job and offered a great deal of support. Being able to have facilitators has helped. Processing applications for SB179 money through the Roundtables is difficult and time consuming, since everyone is a volunteer. How do you organize the administrative side of the Roundtables to at least keep that going? The Roundtable process has brought people together that haven't historically been involved with water issues. IBCC and CWCB staff have done a great job, but we've been pushed sometimes – had to turn some applications around in 24 hours.

- *Jeris Danielson:* We're a new organization, but have had two major successes: different interests learning about each other within the Roundtables, and IBCC members learning about other parts of the state.

- *T. Wright Dickinison:* What been most encouraging to me is seeing the learning Jeris talked about happening. This state can't be driven from the top and is abhorrent to state water planning – this is what they told me when I started – but what we lack is a way to bring people together to understand the greater good. You can't lead us, but if it is our idea, it will work. The trick is to lead without pushing. I would hope the new state administration would take time to see what's working before making changes. It is the responsibility of everyone here to bring the important things to this table to discuss. Are the major players comfortable enough with this process to bring things to the table? With the emergence of our new energy economy, think about what that does to the economics of pumping on the Ogallala. High value corn could cause us to drain it dry. This is where we can actually lead by showing the courage and foresight to use this forum to bring things forward.

Question 3a: Have we provided the right kind of educational materials and opportunities to the roundtables?

- *Rita Crumpton:* The Public Outreach, Participation, and Education Working Group have talked at length about defining our audience. Is it the IBCC? Roundtables? Other state agencies? Some don't know we exist or what we do, or why we exist. We've begun reaching out to those not included, and want to bring them in. Many organizations are wondering where they can fit in to help this education effort.

Deleted: has

- *Steve Vandiver:* Roundtables are taking the initiative to educate their own members, and have been able to present information on water administration, etc. that impact people in basin, but they didn't know anything about. This has helped to clarify and correct what is being said in the coffee shops, and the discussion with Roundtable members has been beneficial.

Question 3b: How are needs assessment activities perceived?

- *Marc Catlin:* The Gunnison basin needs assessment committee has met, and will make recommendations Monday night on how to spend our 1400 money. Looking at the SWSI needs assessment, there is some information missing because small communities were reluctant to participate. The SWSI staff has been very professional working with us, and we would like to see that relationship continue.

- *Ray Wright:* The Rio Grande basin didn't feel an extensive re-work of the SWSI needs assessment was necessary. The 1400 money we've requested to this point will be used for groundwater investigations needed to move forward with the primary objective of the Rio Grande Roundtable, which is to address issues of sustainability within the basin.

- *Stan Cazier:* The biggest issue the Colorado Roundtable hopes to address in the needs assessment is non-consumptive use. This is a very big task. Our consumptive use numbers are in SWSI. Headwaters impacts are always an issue, and the farther down you go the harder it is to locate projects.

- *Mike Shimmin:* On the South Platte, our Roundtable decided SWSI had done a good job of assessing future needs for our area, and we adopted that assessment. Clearly the South Platte basin is under pressure to make sure we're fully utilizing our resources before we look elsewhere for additional supplies. We're doing a full analysis of where unappropriated water, if any, exists in South Platte. Also looking at places where multiple developers are looking for same water source. Our needs are about obtaining information to refine how our water gets used.

- *Dan Birch:* On the Yampa/White, SWSI provided a fair assessment of water needs for the basin. The exception is water needs related to energy development (to include oil shale and other potential areas of energy development). The Roundtable approved an initial scope of work to look at those issues, in a combined study with the Colorado River basin. Local interests continue to be concerned about how water needs can be met. At one of our next meetings, the Roundtable will look at scope of work to determine non-consumptive needs. Local ranchers have proposed a model project combining small storage and irrigation efficiencies to yield improved in-stream flows. Because agriculture can't afford to pay for storage, and in some cases on-farm efficiencies, this model will look at bringing those entities and interests together.

Deleted: Dan Birch

- *Kent Crowder:* On Tuesday, the North Platte Roundtable finalized a task order to get started on our needs assessment. We want to quantify the unappropriated waters on the North Platte. It is always talked about as an over appropriated basin, but we think there is unappropriated water at some times of the year. Also, SWSI didn't fully look at non-consumptive uses, and we want to start identifying and quantifying those. Through this process, we have started to see some of the information coming out of the Platte decision support system. Our other need is to quantify and address consumptive use of high altitude pasture grass. Our basin is different than others in Colorado because all of our water runs out to Wyoming, and we're not arguing too much with one continuous basin.

- *Alan Hamel and Jeris Danielson:* On the Arkansas, we'll be looking for more information on recreation and environmental needs in the basin. For municipal, industrial, and agriculture, we're comfortable with SWSI numbers.

- *Doug Scott and Peter Binney:* The Metro Roundtable is an artificial construct out of the South Platte basin. Virtually everything is municipal and industrial use. Overall, we're comfortable with the SWSI estimates for the metro area. We need to develop a common number for municipal and industrial demand to be used for population-based projections. We're concerned about opposition to undertake future work to address the water supply gap that was in the CWCB Projects Bill, because to study our water use we need to be able to go beyond our borders and look at the basins where the water originates. The Metro area can't survive without relationships with other basins. We know what we'd like to see 50 years from now – the problem is how to get there.

- *Jenny Russell:* The task order summary request for the Southwest Roundtable is together and will be discussed and voted on this Wednesday. We want to check with the

municipal water suppliers to make sure that all SWSI assumptions were correct. Our big challenge is non-consumptive use. The Roundtable wants to take hard look at that and take a look at alternatives to permanent agricultural dry up, and will look at the results of SWSI II to determine what additional studies we need.

Question 4: How are basins working with each other? We have statewide water issues that must be addressed – is this process helping the basins work closely with one another?

- *Eric Kuhn:* The IBCC and Roundtables have no legal authority to enter into contracts, appropriate water, and implement projects. At some point in time, every Roundtable that wants to implement something which requires construction or owning water will have to turn to another entity. The concern is that there are lots of discussions going on in parallel, including NEPA processes and water rights discussions. How can we be both transparent (to get buy-in) and maintain appropriate confidentiality? Right now, we're trying to walk fine line of doing both. In Gunnison, how do we put back together the pieces of Black Canyon? The same issues will be faced in other basins.

- *T. Wright Dickinson:* Bringing these tough issues to the table in a way that promotes discussion and helps people understand the issues is a major challenge for us. The Yampa doesn't want to be sacrificial lamb for the rest of state – if that happened, all water would be flowing downhill, and that brings no sustainability to the basin. Most folks won't understand that unless they hear discussion in a forum like this. How are you going to keep the state whole and vibrant?

- *Mike Shimmin:* We've known for a long time how to fight with each other. The recent trend has been negotiation on a project by project basis. The IBCC process attempts to reach a new level of cooperation, with the goal of building a water project we could call a Colorado water project. Existing water processes work really well at doing a lot of things, but haven't worked well at figuring out how to cooperate with each other.

Question 5: A number of major water issues are in progress right now that are not part of this IBCC process – when and where do we try to integrate these efforts?

- *Harris Sherman:* We welcome further ideas you have in coming weeks and months. The process needs time to work and evolve, and it's going to take experimentation. Some issues are difficult – parallel processes, how do they proceed in conjunction with IBCC? The opportunity to set a framework for relationships between basins will continue. We need to give more attention to the ongoing processes, and look at how to bridge the needs for both transparency and confidentiality.

- *Jeris Danielson:* A large part of the success of this process to date is due to the work that Eric Hecox has done, and the fact that he has credibility with the Roundtables, and they know he speaks for the Director. Need to maintain his ability to do that.

- *Rod Kuharich:* One of the goals of the IBCC process was to place the burden on members to rise above the individual positions they bring to table. The CWCB is here to

Deleted: positions they

do whatever we can to foster communication and help. We'll put every IBCC member on the mailing list to receive complete board packets for every board meeting, and urge everyone to become part of the process of developing the projects bill.

Colorado River Basin Compact Activities and Issues

Presentations

Rod Kuharich, CWCB Director, provided an introduction to the Colorado River Compact, and an overview of the diverse Compact issues in which the CWCB is involved. Kuharich serves as the lead negotiator for the State of Colorado on Colorado River Compact and Upper Colorado River Compact issues, handling interstate discussions to protect the rights of the State. He addressed several topics currently being discussed by the basin states, including shortage of water deliveries to Mexico. In addition, compact states are considering weather modification to augment upper basin snow pack, and exploring improvements to irrigation system storage and controls as a way to improve efficiency. Augmentation with non-tributary groundwater or desalinated brackish groundwater has also been raised as a potential supply source. The work of the Salinity Control Forum continues, focused primarily on the water quality requirements for delivery to Mexico. Both the Colorado and San Juan rivers have ongoing recovery programs for endangered fish.

Kuharich highlighted that Colorado has developed a decision support system for the Colorado River Basin which is an important tool that can help improve management of Colorado's water resources. Also ongoing is the creation of a document archive which makes important information resources widely accessible over the Web. He stressed the desire of the CWCB to serve as an information resource and partner for the IBCC as it moves forward.

Deleted: developed a
Deleted: the Colorado
Deleted: is an
Deleted: help improve

Randy Seaholm, Section Chief of Water Supply Protection at the CWCB, gave a presentation on the nuts and bolts of the Colorado River Compact (1928), the Upper Colorado River Compact (1948), and the Coordinated Long-Range Operating Criteria (1970). (Presentation available separately.) He referenced three areas of ongoing discussion under the Colorado River Compact: deliveries to Mexico; how to consider tributaries within the compact framework; and system-wide accounting. Seaholm discussed the Upper Colorado River Commission's role in apportioning curtailment, if necessary, between upper basin states, and the means by which avoiding curtailment factors should be factored into basin storage criteria.

Eric Kuhn, General Manager of the Colorado River Water Conservation District, continued the discussion by presenting three questions for the group. His questions and observations are recorded below.

> **Question 1.** An assumption often made in hydrology is that the future will look like the past. This assumption involves examining historical data on climatology, hydrology and river flows, and assuming that the same pattern -- highs, lows, average rainfall, mix of

wet and dry years, etc. – will continue into the future. He asks "Is that a good assumption in today's world?"

Many studies suggest the world is getting warmer, which could trigger an increase in consumptive use. In a warmer world, the same precipitation would result in lower stream flows. Given that there is a lot of confusion over what will happen in the future, how might or should we adjust our assumptions?

Question 2. Should we approach full development of the Colorado River from a firm yield or average yield basis? For planning purposes, Denver Water looks at the 1953 to 1956 drought, and analyzes the ability of their system to make water deliveries to customers under those conditions. Denver uses a firm yield approach, because they need to make sure all of their customers get water, even in a drought. Other systems use different time periods for planning.

The rationale behind using firm yield is that we can be safe, and deliver water through a reasonably dry period. However, average yield takes advantage of times when there is a lot of water, and doesn't leave any on the table. It would be helpful for IBCC members to have conversations with the roundtables about these issues, and get their perspectives.

Question 3. How do we approach full development from the interstate compact perspective? The 1922 Compact helped avoid application of the appropriation doctrine on an interstate basis. The negotiators knew the Supreme Court had looked at the issue of adjacent states sharing water, and upper basin states worried that if their development had to compete on the basis of priority with California or other states, which have large rights already in place, there would be no water left for future development in the upper basin. The Compact allowed development independent of priority in the lower basin.

Is the appropriation doctrine the way to reach full development of the resource in Colorado? Are we headed toward a series of intrastate compacts between the four major basins in Colorado that contribute to the Colorado River and the Front Range, or do you allow the appropriation doctrine to control? Do we need to know how a Compact call would be administered within the state? Kuhn advised the Colorado River Water Conservation District that the answer is yes – the only way to assess the risk of development and over development is to know how a Compact call should it occur would be administered. Going back to the second question, using the firm yield approach would lead to rare compact calls. The average yield system would probably make calls more frequent.

Kuhn concluded by expressing the view that transparency is critical, and these three big-picture issues need to be discussed with the Roundtables.

Rick Brown, Intrastate Water Development & Management Section Chief at CWCB, provided an observation regarding Colorado's approach in interstate negotiations. He clarified that the positions taken by the State in Compact discussions were designed to protect the State's ability to use the maximum amount of water legally allowed under the Compact, in order to give those

Deleted: regarding Colorado's

Deleted: in interstate

within the state the maximum amount of flexibility in deciding how to manage these water resources.

Gauged river flows and calculations of Colorado's current consumptive use indicates that between 450,000 ac-ft and 1,200,000 ac-ft of Colorado River water may be remaining in the river and its tributaries. The lower end of the estimate takes into consideration water that is available under a multiple year drought (i.e., firm yield approach). The upper end of the estimate reflects the maximum legal availability to Colorado under the Colorado River compact. Brown stressed that all water rights are subject to legal and physical availability. He also pointed out the differences in water accounting between the Colorado and other compacts – noting that the Colorado compact accounting is based on a 10-year running average.

Deleted: use indicates

Deleted: compact .

Deleted: other compacts

Questions and Discussion

IBCC members and CWCB staff spent significant time discussing issues related to the river compacts, and pending legislation that would fund a CWCB study of the Colorado River. Comments made are presented below grouped by discussion topic, and in the order in which the comments were made while discussing that topic.

Feedback on Presentations

- *Eric Wilkinson*: I agree with the three questions Eric Kuhn proposed. We need to do engineering studies to get more information, and address the important policy questions that need to be answered and decisions that need to be made. If hydrology is indeed changing, and the past is not a predictor of the future, we need to do studies that will help us make an educated guess at future conditions. Firm yield versus average yield is a question of risk tolerance and engineering management.

  Several factors have contributed to what happened on the South Platte. If the South Platte had used firm yield to make decisions, development would have stopped in 1900. However, the decision was made to allow appropriation based on average yield, and infrastructure was built to make that possible. The storage to yield ratio on the South Platte is high.

  I agree that how a compact call on the Colorado River will be administered is one of the key questions. Will it be apportioned among all four upper basins? Will junior users be curtailed? These questions must be answered before you can do a risk analysis.

  The decisions that were made on the South Platte were based on administration as we understand it, and we need to understand how administration works or will work on the Colorado. We must undertake three steps before permitting more development of the Colorado: studies to better understand future hydrology; clarification of what will happen if there is a compact call; and a risk analysis of development scenarios, considering legal and physical availability of water in the basin.

Can determining State policy regarding a compact call be a democratic process? Would that compromise our negotiating position as a state? Input from the Roundtables on how various administrative choices, such as proportional curtailment based on flow from each sub-basin, could impact them might be useful. However, ultimately the decision on how to administer a compact call is a policy decision that must be made by the State of Colorado.

- *Ray Wright*: In my view, the answer to the question "is the [hydrological] future going to look like the past" is "no." In the Rio Grande valley, we are coming to terms with an unsustainable level of well pumping that has gone on for 30 years, and provided a big boost to the valley's economy during those years. Future decisions should take into account risk factors when maximizing benefit.

- *Eric Kuhn*: HB 1177 asks roundtables to do a needs assessment, and also an assessment of unappropriated water in their basin. How are the basins that are part of the Colorado River Basin supposed to do that? The process that Eric Wilkinson suggested makes sense – we could take the time to get buy-in from the roundtables, which may mean that the study doesn't get funded this year, but can be done in a way that supports the roundtable process.

Firm Yield vs. Average Yield

- *Melinda Kassen*: In the Constitution, what is the distinction between firm yield and average yield? On the Rio Grande, junior users can appropriate water, but they must augment seniors against any future impacts to those water rights. It sounds like the development on the Colorado we're discussing is "new water" but how do we protect the seniors?

- *Eric Kuhn*: The 602a water held in storage protects future uses by ensuring that enough water is available to keep the 10-year moving average where it needs to be. We need to avoid the mistakes we've made in other basins. The best example is on the South Platte, where junior appropriators using groundwater had to shut down, with economic impacts to those families and communities. New projects must find financing, and financiers will want to know that the water is available. In addition, the people who will be paying the assessments to repay the loan must also buy into the project.

- *Rod Kuharich*: This is a sensitive issue. If we don't allow people to appropriate available water, is that premature curtailment? The Supreme Court has also addressed this issue. If you build a project and no water comes, the investors lose; but if water does come, the whole state wins, that is the risk of over-development.

Deleted:

Deleted: That

Administration of a Compact Call

- *T. Wright Dickinson*: As a state, we haven't had a broad discussion of this information before. This demonstrates the need for this process and we should let it play itself out. To add to the list of questions Eric Kuhn suggested, I would add, "What are the intrastate impacts of the Upper Basin Compact"? For example, if a compact call comes, and it is determined that Colorado's obligations will be met by curtailment of junior appropriators within the state without regard to basin, the fact that many of the rights in the Yampa/White/Green Basin are junior to other rights within the state could mean that the call would have a disproportionate impact on that area. I have a feeling the water rights holders in Yampa would be vocal about their disapproval if that happened.

Pending CWCB Projects Bill

- *Rep. Kathleen Curry*: The CWCB Projects bill currently at the Legislature provides funding for a Colorado River water availability analysis. Does the CWCB have the lead role in compact analysis? The bill will start in the House, then go to the Senate, and because we don't have another IBCC meeting until next month, it would be helpful to get any input IBCC members have on the project bill and specifically the funding of a water availability analysis today.

- *Rod Kuharich*: Where the CWCB's authorizing statute speaks to the Compact specifically, we have a definite role. Where no role is specifically given, we're required to support those that do have a role. The Director of CWCB is the head of the Colorado delegation, and the Upper Colorado River Compact identifies a role for the Colorado commissioner.

- *Melinda Kassen*: If the IBCC wants to provide some value in this process, can we do that with the current wording of the legislation? Right now the line item says that CWCB will work with the Roundtables. Could the IBCC help by engaging in dialogue with the Roundtables, disseminating information, and asking the Roundtables to consider the information we've heard today? Involving the IBCC might be a way to ensure some of the discussion we've had today is considered in the process.

- *Eric Wilkinson*: The current wording of the bill directs the CWCB and Roundtables to work together in developing the scope of work for the study. This was an effort by CWCB to ensure that Roundtables would be involved. If this line item goes through, the funding will be available in July of 2007, and I am worried that if we wait, we won't get the funding until July of 2008. This study is too fundamental to delay, and offers an opportunity to foster cooperation between the CWCB, the Roundtables and the IBCC. I don't think adding IBCC to the language would be outside the intent of the bill.

- *Bill Trampe*: The Gunnison Roundtable feels strongly that the grassroots nature of the process should be preserved, and would oppose adding language that would specifically involve the IBCC to the legislation.

- *Eric Hecox*: Negotiating the scope of work for the study between the CWCB and several Roundtables could become logistically difficult. Perhaps if the IBCC is in the language

The group reached general agreement that the line item providing funds for a study of Colorado River water supply should stay in this year's project bill, as written, without specifically adding or defining a role for the IBCC.

Public Comment

No public comments were offered.

Future Meetings

IBCC members reviewed possible agenda items for future meetings, including the business items (working group reports, etc.) not covered during this meeting and more discussion about Colorado River issues. The group agreed to cover these topics at the March meeting. T. Wright Dickinson asked to place another issue on a future agenda – small storage projects, and the difficulty of implementing them given administrative and environmental process requirements. Ray Wright suggested an overview of projects moving forward outside the Roundtable process, and Wayne Vanderschuere raised the study of water requirements for energy development proposed by the Yampa/White and Colorado basins as an important topic for the IBCC to learn more about. Jeris Danielson proposed that the IBCC hear a presentation from recreational and environmental interests on non-consumptive uses.

Rick Brown pointed out that the IBCC has a specific role in the SB 179 criteria and guidelines to work with the Roundtables in developing the Roundtables application, review and approval process for grants and loans. Rick asked IBCC members to discuss with their Roundtables the process and the importance to do outreach to potential candidates for SB 179 funding. The CWCB receives a large volume of calls asking for information on how to approach the Roundtables. Several IBCC members indicated that it is difficult to coordinate and develop work products with volunteer members. Mr. Brown offered to put together fact sheets about each Roundtable's process with information provided by the Roundtables. Eric Hecox provided each member with a document in their meeting packet that outlines questions to discuss with Roundtables about process. Rick Brown also made available a draft document containing answers to frequently asked questions about the 179 process, for committee input.

Deleted: do outreach

Deleted: offered to

The group reviewed dates for future meetings. Several members raised conflicts with the proposed April 6th meeting, and asked DNR to poll the group via email for alternate dates.

1574 L Road
Fruita, Colorado 81521

July 16, 1992

Mr. George Smith
Division of Water Resources
U.S. Fish and Wildlife Services
P.O. Box 25486, DFC
Denver, CO 80225

Mr. Jack Garner
Projects Manager, Bureau of Reclamation
11056 W. County Road 18E
Loveland, CO 80537

Dear Sirs:

I am writing this letter in response to your public meeting June 9, 1992, in Glenwood Springs re: Ruedi Releases and to the Bureau of Reclamation's (BOR) report "Study of the Alternative Water Supplies for the Endangered Fish Species in the 15-Mile Reach," January 1992, amended March 30, 1992. As a shareholder in the Grand Valley Irrigation Company (GVIC), I have an interest in the releases and the impact the use of this water has on the Grand Valley water users.

First, I will state my concerns succinctly and offer a solution. Second, I will follow with an account of the circumstances that have led to the current predicament.

My concerns are:

1.) The Orchard Mesa Irrigation District (OMID) is no longer required to implement the check.
2.) The Bureau of Reclamation placed a cap of 66,000 af on Green Mountain Reservoir releases to satisfy the Cameo Call and the junior rights downstream.
3.) The endangered fishes require a flow window of 600 to 1,200 cfs.
4.) In certain future dry years, junior rights, including GVIC's 120 cfs, will not be filled.

The solution is:

Remove the 66,000 af cap from the Green Mountain Reservoir operating policy.

During the past twenty years, in addition to the Endangered Species Acts, Congress has passed the Clean Water Act, the Salinity Control Program for the Colorado River Basin, and the Reclamation Reform Act. These programs impact water users on the western slope of Colorado.

Within the past ten years, a series of tightly conceived ideas has been executed and the desired flows for the fishes for the first time frame studied are approaching fulfillment.

Commencing with the dry water year of 1976-77, a sequence of events started. At that time, tight water management in the Grand Valley demanded optimum use of the OMID check. By implementing the check, the water could be used twice, but no water was left in the Colorado River below GVIC's diversion dam. The operation of the check coupled with Green Mountain Reservoir releases totalling 66,000 af kept water flowing.

Construction of Stage I, Colorado River Salinity Control Program, Grand Valley Unit, was built and completed during 1981-83.

New management for OMID instigated a hard stance against the use of the check in 1982. The OMID and the Grand Valley Water Users Association (GVWUA) had no obligation to install the check for junior rights. OMID lost irrigation water and power revenues when the check was in operation. The check was no longer required. The state engineer concurred.

Based on the release of 66,000 af during the dry 1977, BOR in 1983 recorded a new operating policy in the Federal Register which placed a cap on future Green Mountain Reservoir releases for the west slope beneficiaries at 66,000 af from the 100,000 af pool.

Stage II of the Grand Valley Unit, Salinity Control Program commenced construction in 1986.

In June 1987, the biological opinion of the Fish and Wildlife Service for the in-stream flow requirements for the endangered fishes was published. It specified the stream flow needed for the fishes in the 15-mile reach. This reach starts below the GVIC diversion dam on the Colorado River and extends to the confluence with the Gunnison River. The desired flow window is between 600 cfs to 1,200 cfs. Conservation releases from Ruedi and Green Mountain Reservoirs for the fishes are conditions imposed by Reclamation prior to water marketing.

In 1989 a contract was signed by the United States (BOR), GVWUA, and OMID which provides for the delivery of Ruedi Reservoir releases for the endangered fishes to the Grand Valley Power Plant (located next to OMID's pumping plant) when space is available in the power canal.

Contract amendments were completed in 1990 among the BOR, GVWUA, and OMID. In part, they clarified the diversion amount at the government project's roller dam as 1,620 cfs and specified that the OMID power canal can now carry approximately 860 cfs (460 cfs is available to OMID for pumping power and irrigation and 400 cfs for power generation). It was agreed that during times of water shortages the power right would be curtailed first.

In the power contract among the BOR, GVWUA, OMID, and Public Service Company of Colorado, 1990, potential check use was restated and an agreement followed that OMID will make no claim against the GVWUA or the BOR for expenses incurred by implementing the check.

The private agreement among the BOR, OMID, and GVWUA concerning the check use and non-use became subject to public controversy after these three agencies filed on check use as a right of exchange, with a 1926 use date, in Division V Water Court in December 1991.

As a final act, a contract was signed in early 1992 among the BOR, OMID, GVWUA, GVIC, and the Colorado River Water Conservation District for the operating arrangements of the Orchard Mesa check. Of interest is the statement that the "District (OMID) has no obligation to implement the check to protect any water right junior... to the water rights of the Association, the District or the U.S.A...." GIVC in addition to holding the most senior right of the Cameo call of 520 cfs also holds the most junior of 120 cfs, adjudicated in 1941.

The results of these occurrences is positive for the fishes. It continues the non-implementation of the check which immediately puts 582 cfc into the river at the tail race of OMID and BOR pumping and power plants, which is the start of the 15-mile reach. An increase in power capacity from 310 cfs during the irrigation season to 400 cfs, if water is available from irrigation, adds another 90 cfs to the 15-mile reach, a total of 672 cfs. The report suggests 700 cfs is the desired goal. As a result of GVWUA's participation in the salinity program, an accrued positive water balance of approximately 29,000 af could be shifted to assist in keeping the power water up to 400 cfs. Surface and ground water return flows contribute up to an additional 300 cfs in the reach which when added to the natural occurring flows gives the fishes hope.

The water for the fish report 1992 is interesting and fantastical. It is spelled out in the beginning of the report that the check is the key. If the check is not implemented, 582 cfs will flow out of the tail race. Water releases from Ruedi are happening. 3,000 af is committed for the fishes from Wolford Mountain Reservoir after construction.

Salinity control improvements may allow a limited shift of water within the GVWUA's and OMID's canals possibly to the benefit of the fish. The Reclamation Reform Act has committed federal irrigation projects to institute conservation measures which are being fulfilled by the GVWUA via the salinity control program.

Water users' calls for water from green Mountain will intensify as the check is not used for the benefit of junior rights. There may be times when the water from the power and pumping plants should be checked back and used twice, but the fishes' needs will keep this from happening. Junior rights as GVIC's 120 cfs could be curtailed along with others. The 66,000 af cap could stop Green Mountain Reservoir releases.

The 66,000 af cap was registered in 1983 after the check was used to its fullest extent in dry 1977 and before the Check operation was changed to non-use. The 66,000 af cap was instituted before the flow needs of the endangered fishes were established by the Fish and Wildlife Service at 600-1,200 cfs in 1987. The 100,000 acre foot pool is for the benefit of the west slope water users.

In 1989 the state engineer called 73,000 af from Green Mountain Reservoir to meet the call. This is 7,000 af above the 66,000 af cap. Releases should be allowed to continue fully in the future when dry conditions require water above the 66,000 af cap. As originally stated in Senate Document No. 80, there is a 100,000 af pool for west slope beneficiaries

The 66,000 af limit on Green Mountain Reservoir releases from the 100,000 af pool should be removed.

Thank you for your attention.

Sincerely,

Ruth P. Hutchins

Ruth P. Hutchins

cc: Bob Norman
Others

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Mountain-Prairie Region

IN REPLY REFER TO:

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228

TAKE PRIDE IN AMERICA

FWE/CR/Ruedi Reservoir
Mail Stop 65115

FEB 28 1992

Robert A. Jackson, Chairman
Colorado Water Conservation Board
1313 Sherman Street
Denver, Colorado 80203

Dear Mr. Jackson

At the September 1991, meeting of the Colorado Water Conservation Board (Board) the Board requested that the Fish and Wildlife Service (Service) report on the water released from Ruedi Reservoir for endangered fish. The enclosed report responds to that request and serves as a concluding document to fulfill the Service's contractual obligation with the Bureau of Reclamation. The report covers releases from Ruedi Reservoir and the effects of the releases on the endangered fish in the 15-Mile Reach of the Colorado River near Grand Junction. The Bureau of Reclamation will provide a separate report addressing the impacts of the releases on recreation in Ruedi Reservoir and the Fryingpan River, hydropower production, and the Fryingpan River trout fishery.

The Service will attend at the Board meeting on March 6, 1992, to address any questions or concerns the Board may have.

Sincerely,

Angela T. Kantola
FOR
John Hamill
Director, Colorado River Recovery
Implementation Program

Enclosures (6)

cc: John Musick
Attorney at Law
P.O. Box 4579
Boulder, CO 80306-4579

Mark Fuller
County Development Manager
Pitkin County Courthouse
530 E. Main Street
Aspen, CO 61611

Mesa County Water Association

P.O. Box 572 Fruita, Colorado 81521

CALENDAR AND STATUS OF COMING EVENTS

TUESDAY, MAY 19, 1992
7:00 P.M.
County Commissioners' Room 205
750 Main Street
Grand Junction, Colorado
(8th Street entrance)

MESA COUNTY WATER ASSOCIATION MONTHLY MEETING
Agenda:
1. Intern update
2. Summer meetings?
3. W.A.T.E.R. Initiative
4. Gunnison River flows

TUESDAY, MAY 19, 1992
9:00 A.M.
Gunnison County Fairgrounds
275 South Spruce
Gunnison, Colorado

BUREAU OF RECLAMATION
Environmental Scoping Meetings:
For proposed contract to deliver water to the Black Canyon of the Gunnison National Monument

WEDNESDAY, MAY 20, 1992
2:00 P.M. & 7:30 P.M.
Pavilion
1800 Pavilion Drive
Montrose, Colorado

Public Meetings for Public Initial Input

Call B.O.R. Jone Wright 248-0636 for informational packets and additional information

THURSDAY, MAY 21, 1992
2:00 P.M. & 7:30 P.M.
Columbine Senior Services Building
247 Meeker
Delta, Colorado

or

John Welch — 249-7036 BCGNM
Allan Belt — 249-6047 BLM
Gene Jencsok — 866-3441 CWCB

MINUTES - MESA COUNTY WATER ASSOCIATION, INC.

Tuesday, April 21, 1992

Mesa County Commissioners' Hearing Room, 750 Main Street, Grand Junction, Colorado

Meeting called to order at 7:15 P.M. by Secretary, Ruth Hutchins.

No business was transacted; general discussion ensued.

Meeting adjourned at 8:30 P.M.

Ruth P. Hutchins

Ruth P. Hutchins
Secretary

STATE OF COLORADO
Roy Romer, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER
Perry D. Olson, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

REFER TO

COLORADO · DIVISION OF WILDLIFE ·

For Wildlife– For People

Mr. John Hamill
U.S. Fish and Wildlife Service
Box 25486 - DFC
Denver, CO 80225

February 24,1992

Re: Ruedi Reservoir Water Releases

The 20,000 acrefeet of water released from Ruedi Reservoir in 1991 fell within our guidelines for angler acceptance and within IFIM guidelines for providing good fish habitat. The data from Fish and Wildlife Service indicate that maximum flows in the Fryingpan River remained below the 250 cfs limit that Barry Nehring established as a fishable upper limit. The flow range of 150-250 cfs provides beneficial habitat for fingerling, juvenile and adult life stages of brown trout, rainbow trout and brook trout. Flows below 100 cfs and above 300 cfs should be avoided. The Bureau of Reclamation indicates that lake levels remained within historic levels of the past five years.

The data from Fish and Wildlife Service indicate that the Ruedi releases were measured in the Grand Valley and in some cases the releases were 20% of the total flow in the river, which is very significant. Some re-regulation of reservoirs in the upper basin may have significant positive effects on Big River fishes; however, it is important to keep such activities from damaging existing fisheries.

Sincerely,

Robert H. Caskey

Robert H. Caskey
Regional Manager

cc. P. Olson (DOW)
G. Jencsok (CWCB)

TABLE 5.

RUEDI RELEASES AND FLOWS IN THE FRYING PAN RIVER AND THE 15-MILE REACH

OCTOBER

CFS

DAY	FRYING PAN FLOWS	RUEDI ENDANGERED FISH RELEASE	HEAD OF 15-MILE REACH	END OF 15-MILE REACH	REACH GAIN
1	210	150	799	1123	324
2	201	150	680	980	300
3	198	150	658	945	287
4	201	150	619	909	290
5	201	150	549	849	300
6	201	150	592	826	234
7	166	150	604	849	245
8	196	150	600	849	249
9	195	150	590	849	259
10	189	150	588	838	250
11	192	163	573	814	241
12	210	190	555	802	247
13	210	190	575	778	203
14	210	190	583	826	243
15	210	190	570	802	232
16	213	190	586	826	240
17	213	190	598	838	240
18	213	190	650	873	223
19	213	190	698	933	235
20	213	190	715	968	253
21	213	190	734	992	258
22	213	190	737	992	255
23	213	190	785	1028	243
24	213	190	1280	1538	258
25	200	173	1230	1560	330
26	196	140	1030	1419	389
27	196	140	1000	1264	264
28	153	127	1230	1465	235
29	127	83	1100	1407	307
30	127	50	1150	1431	281
31	128	50	1580	1762	182
AVERAGE	194.65	157.94	781.87	1043.06	261.19

EFFECT OF 1991 FLOW RELEASES FROM RUEDI RESERVOIR ON ENDANGERED FISH HABITAT IN THE 15-MILE REACH

BY

Douglas B. Osmundson
Fishery Biologist

George R. Smith
Hydrologist
U.S. Fish and Wildlife Service

Background

The 15-Mile Reach of the Colorado River between Palisade, Colorado, and the confluence of the Colorado and Gunnison Rivers at Grand Junction is important habitat for the endangered Colorado squawfish and razorback sucker (Osmundson and Kaeding 1989). Management of the reach during the summer months is primarily aimed at providing quality habitat conditions for adult Colorado squawfish (Kaeding and Osmundson 1989).

Using the Physical Habitat Simulation Method (PHABSIM), Hann and Rose (1989) determined that the maximum amount of run, pool, and riffle habitat for adult Colorado squawfish in the 15-Mile Reach occurs at flows of 1000 cubic feet per second (cfs), while 95 percent of the maximum available habitat occurs at flows between 700 and 1200 cfs. Kaeding and Osmundson (1989) recommended that 700-1200 cfs be provided in the 15-Mile Reach during the July-September period during years of normal or of above normal precipitation. During dry years, when the flow recommendation would be more difficult to meet, 600 cfs was considered an acceptable lower limit for the flow window. In a later report (Osmundson and Kaeding, 1991), the Service recommended extending the same flow recommendations to the end of October for the benefit of adult Colorado squawfish. These flow recommendations were reviewed by the staff of the Board and ultimately accepted by the Board as being acceptable for appropriating and acquiring water.

In 1989, the Bureau of Reclamation began releasing water from Ruedi Reservoir during the summer months to supplement flows downstream in the 15-Mile Reach to help meet the habitat needs of the endangered fish. During 1989 and 1990, 10,000 acre feet (ac ft) of water per year was released from Ruedi Reservoir for this purpose. An additional 10,000 ac ft (a total of 20,000 ac ft) was released from Ruedi Reservoir pursuant to a three party agreement signed by Reclamation, Service, and the Board in September 1991. This report briefly summarizes the extent to which the 1991 Ruedi releases helped meet the targeted July-October flow regime in the 15-Mile Reach and thus benefitted the endangered fish in the 15-Mile Reach.

1991 Ruedi Releases

Releases of the first 10,000 ac ft began on August 13, and continued through September 30, 1991. The release of the second 10,000 ac ft began on October 1 and continued through November 2, 1991. The releases made for endangered fish in 1991 are summarized in Table 1 below and the complete data sets are enclosed.

Table 1.

Units CFS

Month	Fryingpan River Flow	Ruedi Endangered Fish Release	Head of 15-Mile Reach	End of 15-Mile Reach [1]	Reach Gains
August[2]	209	82	783	1091	308
September	167	91	950	1204	254
October	195	158	782	1043	261
November[3]	120	34	1815	2003	188

Prior to August 13, 1991, flows in the 15-Mile Reach either fell within or were in excess of the recommended 700-1200 cfs range. From August 13 - October 31, 1991, there were 80 days from when Ruedi provided supplemental flows for the 15-Mile Reach. This included an 8-day period when the extra releases were temporarily suspended in response to excess water in the reach as a result of heavy rainstorms.

During the 80-day period, Service hydrologists determined the amount needed for release on a daily basis (Monday through Friday) by monitoring flows at the Palisade gage and calculating how much was required to bring the total to 900 cfs. A temporary gage was operated by Richard D. Piland and Associates at the lower end of the reach during August to December of 1991. Preliminary data from this gage indicates that cumulative return flows amounted to an average of 223 cfs in August, 254 cfs in September, and 260 cfs in October. Considerable rain during 1991 inflated these returns above what would normally be attributed to irrigation return only.

Estimates of the effect the additional releases from Ruedi had on meeting the 15-Mile Reach flow recommendation can be made by comparing the actual discharge (gage readings) during the 80-day period with what the discharge would have been if the releases had not been made. A comparison of the 'with' and 'without' flows at the top and the bottom of the 15-Mile Reach is illustrated in Figure 1.

---

[1] Based upon preliminary data provided by Richard Piland and Associates

[2] Based upon flows from August 13-31

[3] Based upon flows for November 1-2

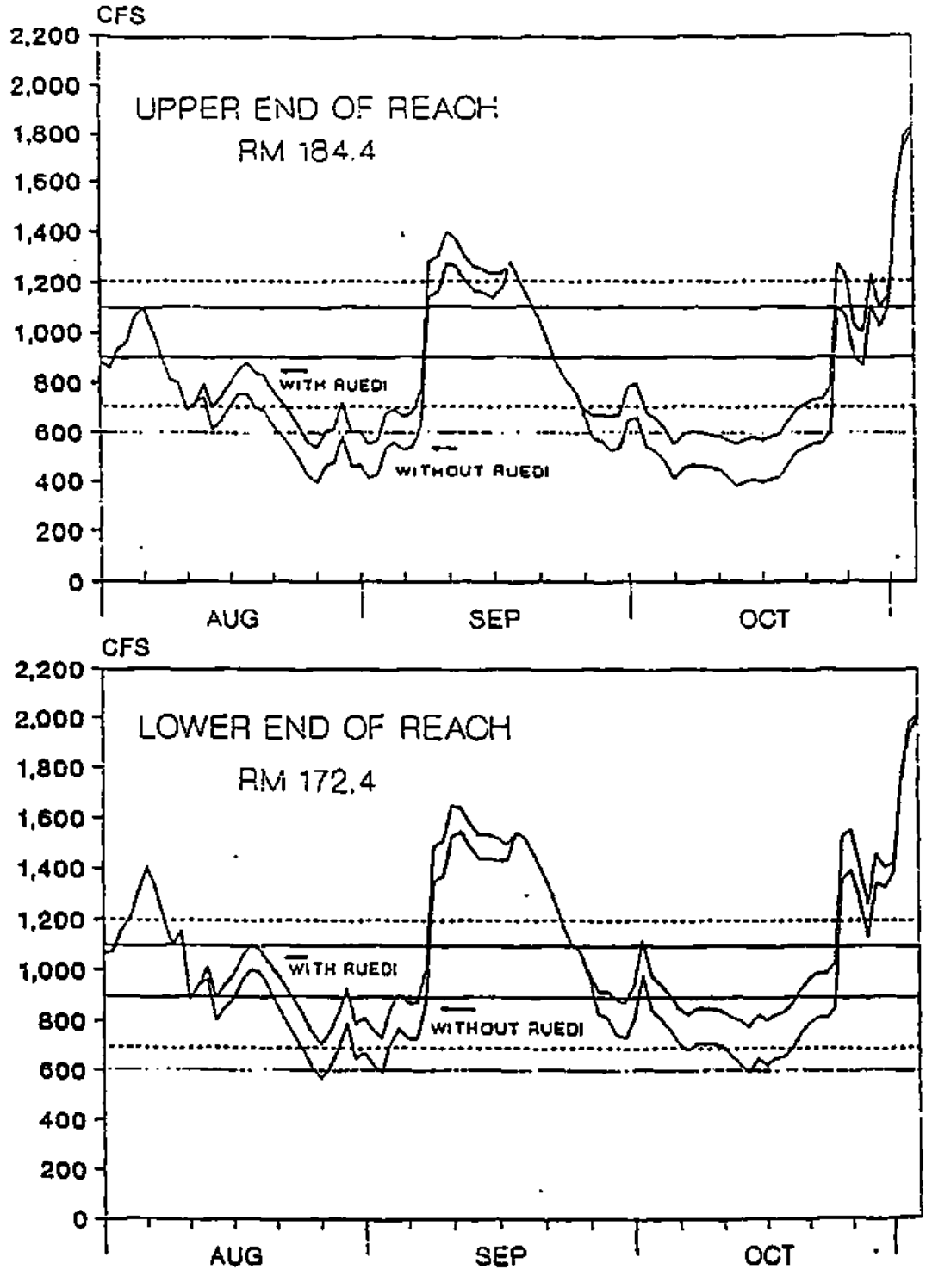


Figure 1. Discharge (cfs) at two sites within the 15-mile reach of the upper Colorado River during August-November 1991. Upper of two time series lines in each graph represents actual discharge as measured by gage; lower time series line is the estimated discharge if the Ruadi Reservoir, endangered fish releases had not been made (see text). Solid horizontal lines indicate optimum flow window (900-1100 cfs) for adult Colorado squawfish; dashed horizontal lines indicate 95% optimum flow window (700-1200 cfs); dotted line indicates lowest recommended flow during 'dry' years (600 cfs). RM = river mile from Green River confluence.

During the 80-day period, there were 21 days when natural flows reaching the upper gage were in excess of 900 cfs thus precluding the need for supplemental releases. There were 59 days when supplemental releases from Ruedi provided needed water to the 15-Mile Reach. With the releases, the 700 cfs minimum was met at the upper gage 37.3 percent of the 59 days compared to 15.3 percent if the releases had not been made. Water year 1991 is considered a below normal water year and the 600 cfs minimum for dry years was met 74.6 percent of the 59 days compared to 30.5 percent if the releases had not been made. The Ruedi releases significantly increased the number of days when flows fell within the range for providing high quality Colorado squawfish habitat in the 15-Mile Reach.

During the period when flows were low (i.e., below the recommended flow), the supplemental Ruedi releases also had a beneficial effect on habitat conditions in the 15-Mile Reach. For instance, a release of 190 cfs on October 15 resulted in a flow at the top of the 15-Mile Reach of 570 cfs; without the release the flow would have been an estimated 393 cfs. Thus, the supplemental release resulted in a 45 percent increase in flow during a time when available habitat would have otherwise been limited. During the 59 days when flows would otherwise have been below 900 cfs, Ruedi releases resulted in an average daily flow increase of 26 percent at the Palisade gage. Table 2. displays the relative amounts of habitat available at various flows, and demonstrates that significant increases in habitat resulted from the availability of the supplemental releases.

Conclusions

Endangered fish releases from Ruedi Reservoir have proven to be an effective means for augmenting flows in the 15-Mile Reach during the critical summer months. Improved planning and monitoring would result in an even more effective use of available Ruedi water. During 1991, there were 18 days in which water was released when flows were in excess of the recommendations. This resulted in the loss of 3,875 ac ft that could have been used when additional water would have been more beneficial. While it is not possible to anticipate natural events such as rainstorms, the number of days in which excess flows occur could be reduced by closer monitoring.

The release scheduling problem was compounded by not knowing much water would be available for supplemental flows. At the beginning of August 1991, only 10,000 ac ft of water were available for endangered fish releases. This resulted in rationing the 10,000 ac ft so that water would be available until October 31. If there had been earlier approval the full 20,000 ac ft, higher releases could have been made in late August and early September when flows in the 15-Mile Reach were in greatest need of augmentation.

Response of the 15-Mile Reach population of Colorado squawfish to improved habitat conditions will be difficult to assess until targeted flow regimes can be met for an extended number of consecutive years. Improved habitat should, over time, translate to a higher carrying capacity for this stretch of river resulting in an increase in population size, assuming that proper flow and habitat conditions are met during the other months of the year. At present, the 15-Mile Reach remains an important stretch of river for the Colorado squawfish. During spring 1991, a total of 23 adults were captured and released there; on a

number-per-mile basis, catch rates were more than double that of anywhere else in the Colorado River. Results of the 1991 larval sampling in the 15-Mile Reach have not yet been processed, consequently it is uncertain whether there was an improvement in spawning success and larval survival in 1991.

Information on flows in the Fryingpan River below Ruedi Reservoir were provided to the Colorado Division of Wildlife for their review. The daily volumes were reviewed by biologist for the Colorado Division of Wildlife to identify benefits to trout sports fishery in the Fryingpan. Based upon these reviews the Colorado Division of Wildlife found that the maximum flows in the Fryingpan River remained below the 250 cfs limit that Barry Nehring established as a fishable upper limit. The flow range of 150-200 cfs provides beneficial habitat for fingerlings, juveniles, and adult life stages of brown trout, rainbow trout, and brook trout.

Literature Cited

Kaeding, L.R., and D.B. Osmundson. 1989. Biologically defensible flow recommendations for the maintenance and enhancement of Colorado squawfish habitat in the '15-mile reach' of the upper Colorado River during July, August and September. Final Report. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado. 165 pp.

Osmundson, D.B., and L.R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the '15-mile reach' of the upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final Report. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado. 85 pp.

Osmundson, D.B., and L.R. Kaeding. 1991. Recommendations for flows in the 15-mile reach during October-June for maintenance and enhancement of endangered fish populations in the upper Colorado River. Final Report. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado. 82 pp.

Table 2 Habitat (ft^2/1000 linear ft of stream) vs. discharge (ft^3/sec) relations at the Palisade PHABSIM site for July, August and September, based on two sets of habitat suitability index (HSI) curves.

	HSI Curve			
	Set A		Set B	
Discharge	Habitat	(% max.)	Habitat	(% max.)
300	56,028	(69)	57,592	(69)
450	67,297	(83)	72,157	(87)
600	73,952	(92)	78,080	(94)
750	77,237	(96)	79,808	(96)
900	80,319	(100)	83,254	(100)
1100	80,701	(100)	83,059	(100)
1300	70,046	(87)	72,721	(87)
1500	64,367	(80)	66,760	(80)

Source: Osmundson, D.B., and L.R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the '15-mile reach' of the upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final Report. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado.

TABLE 3.

RUEDI RELEASES AND FLOWS IN THE FRYING PAN RIVER AND THE 15-MILE REACH

AUGUST CFS

DAY	FRYING PAN FLOWS	RUEDI ENDANGERED FISH RELEASE	HEAD OF 15-MILE REACH	END OF 15-MILE REACH	REACH GAIN
13	159	54	794	1016	222
14	195	100	706	897	191
15	196	100	745	945	200
16	215	100	798	980	182
17	215	100	851	1052	201
18	215	133	882	1099	217
19	181	150	840	1087	274
20	196	150	831	1040	209
21	201	150	773	992	219
22	201	150	728	945	217
23	204	150	686	885	199
24	216	150	627	826	199
25	216	150	563	755	192
26	218	150	533	707	174
27	223	150	605	755	150
28	230	150	616	826	210
29	237	150	725	933	208
30	231	150	601	790	189
31	217	150	608	814	206
AVERAGE	208.74	81.84	783.13	1005.87	222.74

TABLE 4.

RUEDI RELEASES AND FLOWS IN THE FRYING PAN RIVER AND THE 15-MILE REACH

SEPTEMBER

CFS

DAY	FRYING PAN FLOWS	RUEDI ENDANGERED FISH RELEASE	HEAD OF 15-MILE REACH	END OF 15-MILE REACH	REACH GAIN
1	217	150	552	767	215
2	217	150	567	732	165
3	218	150	675	849	174
4	218	150	699	909	210
5	218	150	665	873	208
6	211	150	680	873	193
7	201	150	775	1004	229
8	198	150	1280	1490	210
9	198	150	1300	1513	213
10	182	133	1400	1655	255
11	160	100	1370	1644	274
12	151	100	1300	1585	285
13	153	100	1260	1538	278
14	153	100	1250	1538	288
15	155	100	1230	1525	295
16	139	67	1240	1502	262
17	114	0	1280	1548	268
18	114	0	1200	1525	325
19	114	0	1130	1454	324
20	114	0	1060	1383	323
21	114	0	968	1301	333
22	114	0	877	1194	317
23	113	0	814	1111	297
24	113	0	772	1076	304
25	126	17	699	992	293
26	162	100	672	921	249
27	187	117	674	921	247
28	215	150	662	885	223
29	215	150	676	873	197
30	211	150	787	945	158
AVERAGE	167.17	91.13	950.47	1204.20	253.73

Contract No. 9-07-40-RO900

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CONTRACT AMONG THE UNITED STATES OF AMERICA,
THE GRAND VALLEY WATER USERS ASSOCIATION AND THE ORCHARD MESA IRRIGATION DISTRICT PROVIDING FOR THE DELIVERY OF RUEDI RESERVOIR ENDANGERED FISH RELEASES TO THE GRAND VALLEY POWERPLANT

This contract, is made this 14 day of August 1989, pursuant to the act of June 17, 1902 (32 Stat. 388), and acts amendatory thereof and supplemental thereof, between the UNITED STATES OF AMERICA, hereinafter referred to as the United States, acting through the Bureau of Reclamation; the GRAND VALLEY WATER USERS ASSOCIATION, a corporation organized and existing under the laws of the State of Colorado, with principal place of business at Grand Junction, Colorado, hereinafter referred to as the Association; and the ORCHARD MESA IRRIGATION DISTRICT, an irrigation district organized and existing under the laws of the State of Colorado with its principal place of business at Grand Junction, Colorado, hereinafter referred to as the District.

WITNESSETH THAT:

WHEREAS, the U.S. Fish and Wildlife Service on June 15, 1987, issued the final biological opinion for the Ruedi Reservoir Round II and Green Mountain Reservoir water sales, hereinafter referred to as Biological Opinion. The Biological Opinion is hereby incorporated by reference into this agreement.

WHEREAS, the Biological Opinion is based upon conservation measures that the Bureau of Reclamation has agreed to incorporate into their water sales program. These conservation measures include in part the storage,

release, and delivery of water from Ruedi Reservoir to occupied endangered fish habitat in the reach of the Colorado River between the Grand Valley Irrigation Company (GVIC) diversion dam and the Gunnison Rivers confluence, hereinafter referred to as 15-Mile Reach.

WHEREAS, the United States agrees, as part of the conservation measures to set aside for release to the 15-Mile Reach 5,000 acre-feet of the marketable yield from the regulatory capacity of Ruedi Reservoir as an aid to the recovery of the endangered Colorado Squawfish.

WHEREAS, the United States agrees to provide an additional 5,000 acre-feet of water from the regulatory capacity for release to the 15-Mile Reach during the months of July through October through operational changes at Ruedi Reservoir. Such additional water will be provided at least 4 out of 5 years.

WHEREAS, the 10,000 acre-feet of water to be released from Ruedi Reservoir or another source at the option of the United States is hereinafter referred to as Ruedi Releases.

WHEREAS, the United States will benefit since this agreement will assist in meeting prerequisites to the sale of the Ruedi Round II water sales and in protecting the habitat of an endangered fish.

WHEREAS, the Association and District benefit from the Ruedi releases through potential increased water supply for the generation of hydroelectric energy and powerplant revenues.

WHEREAS, the biological opinion stated the United States would work with the Colorado State Engineer, Colorado Water Conservation Board and others to develop a means of delivery of Ruedi releases to the 15-mile reach pursuant to State law.

WHEREAS, the Association and District operate features of the Grand Valley Project necessary for the delivery of Colorado River water to the Grand Valley Powerplant.

WHEREAS, All parties are desirous of diverting and carrying Ruedi Releases from the Grand Valley Diversion Dam, locally referred to as the roller dam, to the Grand Valley Powerplant and returning the water to the 15-mile reach below the GVIC diversion dam when system capacity exists.

NOW THEREFORE, it is agreed as follows:

1. Water which has been lawfully stored in priority under the Ruedi decree will be released by the United States from Ruedi Reservoir for use at the Grand Valley Powerplant. The United States pursuant to the Biological Opinion will at its discretion determine time and quantity of Ruedi Releases and be responsible for requesting administration by the State Engineer of the Ruedi Releases. The United States expressly reserves possession, dominion, and control over the Ruedi Releases together with the right to use, re-use, successively use, and otherwise dispose of the Ruedi Releases through lease or otherwise to other parties. The State Engineer will account for transportation losses between Ruedi Reservoir and the head of the 15-mile reach using established procedures.

2. The Association and District will carry Ruedi Releases in their respective project canals to the Grand Valley Powerplant and the District will return the Ruedi Releases to the Colorado River immediately below the GVIC diversion dam whenever total water available in priority to the Association and District for irrigation and to the United States for power is less than the capacity of the Government Highline Canal at the diversion dam. For the purpose of this agreement a release under the radial gate at the check structure is considered to be immediately below the GVIC diversion dam.

3. The District and Association will not be charged for the use of Ruedi Releases.

4. The United States agrees that delivery of Ruedi Releases to the Grand Valley Powerplant will not impair the District's or Association's rights to use of Green Mountain Reservoir water pursuant to Senate Document 80 (June 15, 1937, 75th Congress) and the December 1983 Operating Policy as amended (Federal Register, September 11, 1987, Vol 52, No. 176).

5. At its expense, the United States will install, operate, maintain, and replace any water flow measuring structures and recording gauges necessary to implement this contract.

6. The United States reserves the right to supply Ruedi Releases from water which has been lawfully stored in priority in storage reservoirs other than Ruedi Reservoir.

7. The District agrees not to pump water released for endangered fish purposes at the 29 and C Roads pumping facility, but is in no other way limited under their decree to pump Colorado River water or Green Mountain Reservoir releases.

8. This contract will remain in effect until one of the following occurs, which ever is first:

a. The Association and District are no longer signatory to a contract for the operation and maintenance of the Grand Valley Powerplant, or

b. The United States has determined that the Ruedi Releases are no longer needed to avoid jeopardy to the endangered Colorado Squawfish in the 15-Mile Reach, or

c. The United States has determined that an alternate method has been implemented to deliver Ruedi Releases to the 15-Mile Reach.