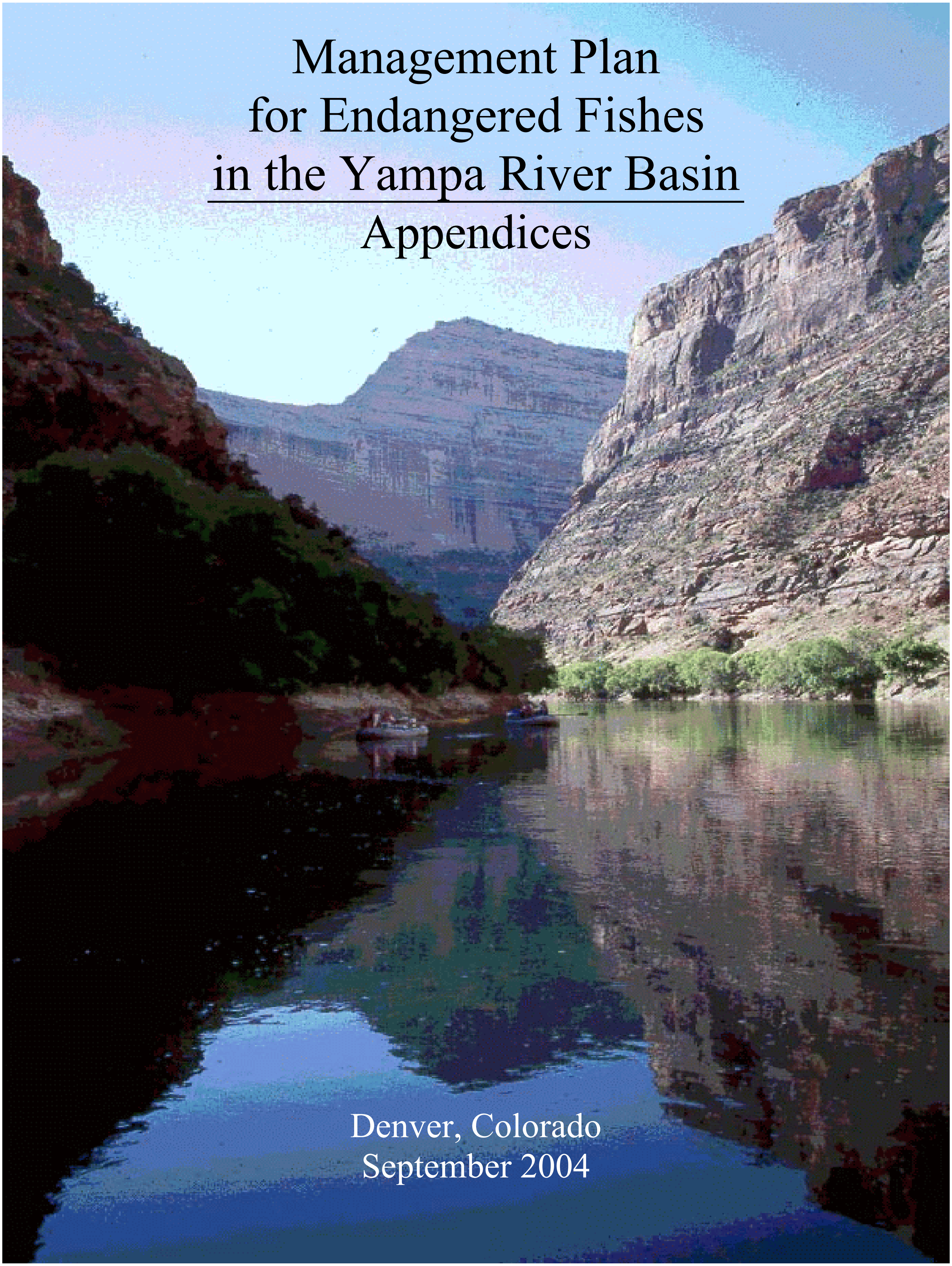
Management Plan for Endangered Fishes in the Yampa River Basin

Appendices



Denver, Colorado
September 2004

ACKNOWLEDGMENT
AND
DISCLAIMER

Publication of this document was funded by the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. The Recovery Program is a joint effort of the U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Western Area Power Administration, states of Colorado, Utah, and Wyoming, Upper Basin water users, environmental organizations, the Colorado River Energy Distributors Association, and the National Park Service.

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SECTION 7 CONSULTATION, SUFFICIENT PROGRESS AND HISTORIC PROJECTS AGREEMENT

Agreement

Section 7 Consultation, Sufficient Progress, and Historic Projects

Recovery Implementation Program for the Endangered Fish Species
in the Upper Colorado River Basin

October 15, 1993
Revised March 8, 2000

I. Background

The Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (RIP) is intended to go considerably beyond offsetting water depletion impacts by providing for the full recovery of the four endangered fishes. The RIP participants recognize that timely progress toward recovery in accordance with a well-defined action plan is essential to the purposes of the RIP, including both the recovery of the endangered fishes and providing for water development to proceed in compliance with State law, Interstate Compacts, and the Endangered Species Act (ESA). Recovery activities which result in significant protection and improvement of the endangered fish populations and their habitat need to receive high priority in future planning, budgeting, and decision making. The RIP participants accept that certain positive population responses to RIP initiatives are not likely to be measurable for many years due to the time required for the endangered fishes to reach reproductive maturity, limited knowledge about their life history and habitat requirements, sampling difficulties and limitations, and other factors. The RIP participants also recognize that further degradation of endangered fish habitats and populations will make recovery increasingly difficult.

II. RIP Recovery Action Plan (RIPRAP)

The Recovery Action Plan (RIPRAP) identifies actions currently believed to be required to recover the endangered fishes in the most expeditious manner possible in the upper basin. It has been developed using the best information available and the recovery goals established for the four endangered fish species. By reference, the RIPRAP is incorporated and considered part of this agreement. The RIPRAP will be an adaptive management plan because additional information, changing priorities, and the development of the States' entitlement may require modifications to the RIPRAP. The RIPRAP will be reviewed annually and modified or updated, if necessary, by September 30 of each year or prior to adoption of the annual work plan, whichever comes first. The RIPRAP will serve as a guide for all future planning, research, and recovery efforts, including the annual work-planning and budget decision process.

The RIP is intended to provide the reasonable and prudent alternatives for projects undergoing Section 7 consultation in the upper basin. While some recovery actions in the RIPRAP are expected to have more direct or immediate benefits for the endangered fishes than others, all are considered necessary to accomplish the objectives of the RIP.

Recovery actions which protect or improve habitat conditions and result in more immediate, positive population responses will be most important in determining the extent to which the RIP provides the reasonable and prudent alternatives for projects undergoing Section 7 consultation. In general, these actions will be given highest priority in the RIPRAP.

The Fish and Wildlife Service (FWS) will determine whether progress by the RIP provides a reasonable and prudent alternative based on the following factors:

a. Actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction.
b. Status of fish population.
c. Adequacy of flows.
d. Magnitude of the impact of projects.

Therefore, these factors were considered in the development and prioritization of the recovery actions in the RIPRAP.

III. Framework for Agreement

The following describes the agreement among RIP participants on a framework for conducting Section 7 consultations on depletion impacts related to new projects (as defined in Section 4.1.5 a. of the RIP) and impacts[1] associated with historic projects in the Upper Colorado River Basin. This agreement is meant to supplement and clarify the process outlined in Sections 4.1.5, 4.1.6 and 5.3.4 of the RIP. This agreement applies only to the four Colorado River endangered fishes in the Upper Colorado River Basin, excluding the San Juan River, and is not a precedent for other endangered species or locations.

1. Activities and accomplishments under the RIP are intended to provide the reasonable and prudent alternatives which avoid the likelihood of jeopardy to the continued existence of the endangered Colorado River fishes (hereinafter the "reasonable and prudent alternative") resulting from depletion impacts of new projects and all existing or past impacts related to historic projects with the exception of the discharge by historic projects of pollutants such as trace elements, heavy metals, and pesticides. However, where a programmatic biological opinion applies, the appropriate provisions of such an opinion will apply to future individual consultations.

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[1]All impacts except the discharge of pollutants such as trace elements, heavy metals, and pesticides.

The RIP participants intend the RIP also to provide the reasonable and prudent alternatives which avoid the likely destruction or adverse modification of critical habitat, to the same extent as it does to avoid the likelihood of jeopardy. Once critical habitat for the endangered fishes is formally designated, the RIP participants will make any necessary amendments to the RIPRAP to fulfill such intent.

2. The RIP is intended to offset both the direct and depletion impacts of historic projects occurring prior to January 22, 1988 (the date when the Cooperative Agreement for the RIP was executed) if such offsets are needed to recover the fishes. Under certain circumstances, historic projects may be subject to consultation under Section 7 of the ESA. An increase in depletions from a historic project occurring after January 22, 1988, will be subject to the depletion charge. Except for the circumstances described in item 11 below, depletion charges or other measures will not be required from historic projects which undergo Section 7 consultation in the future.

3. The Bureau of Reclamation (BR) and the Western Area Power Administration will operate projects authorized and funded pursuant to Federal reclamation law consistent with its responsibilities under Section 7 of the ESA and with any existing contracts. No depletion charge will be required on depletions from BR projects as long as BR continues its contributions to the RIP's annual budget.

4. The FWS will assess the impacts of projects that require Section 7 consultation and determine if progress toward recovery has been sufficient for the RIP to serve as a reasonable and prudent alternative. The FWS will use accomplishments under the RIP as its measure of sufficient progress. The FWS will also consider whether the probable success of the RIP is compromised as a result of a specific depletion or the cumulative effect of depletions. Support activities (funding, research, information and education, etc.) in the RIP contribute to sufficient progress to the extent that they help achieve a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction. Generally, sufficient progress will be evaluated separately for the Colorado and Green River subbasins (but not individual tributaries within each subbasin). However, the FWS will give due consideration to progress throughout the upper basin in evaluating sufficient progress.

5. If sufficient progress is being achieved, biological opinions will identify the activities and accomplishments of the RIP that support it serving as a reasonable and prudent alternative.

6. If sufficient progress is not being achieved, biological opinions for new and historic projects will be written to identify which action(s) in the RIPRAP must be completed to avoid jeopardy. Specific recovery actions will be implemented according to the schedule identified in the RIPRAP. The FWS will confer with the Management Committee on the identification of these actions within established timeframes for the Section 7 consultation. For historic projects, these actions will

serve as the reasonable and prudent alternative as long as they are completed according to the schedule identified in the RIPRAP. For new projects, these actions will serve as a reasonable and prudent alternative so long as they are completed before the impact of the project occurs. The FWS has ultimate authority and responsibility for determining whether progress is sufficient to enable it to rely upon the RIP as a reasonable and prudent alternative and identifying actions necessary to avoid jeopardy.

7. Certain situations may result in the FWS determining that the recovery action in previously rendered biological opinions are no longer serving as a reasonable and prudent alternative. These situations may include, but are not limited, to:

   a. Critical deadlines for specified recovery actions are missed;
   b. Specified recovery actions are determined to be infeasible; and
   c. Significant new information about the needs or population status of the fishes becomes available;

8. The FWS will notify the Implementation and Management Committees when a situation may result in the RIP not serving as a reasonable and prudent alternative. The Management Committee will work with the FWS to evaluate the situation and develop the most appropriate response to restore the RIP as a reasonable and prudent alternative (such as adjusting a recovery action so it can be achieved, developing a supplemental recovery action, shortening the timeframe on other recovery actions, etc.).

9. The RIP is responsible for providing flows which the FWS determines are essential to recovery of the endangered fishes. Whether or not a Section 7 review is required, the RIP will work cooperatively with the owners/operators of historic projects on a voluntary basis to implement recovery actions needed to recover the endangered fishes.

10. The responsibility for the efficiency and effectiveness of the RIP, and for its viability as a reasonable and prudent alternative, rests upon RIP participants, not with individual project proponents. RIP participants fully share that responsibility.

11. If the RIP cannot be restored to provide the reasonable and prudent alternative per item 8, above, as a last resort the FWS will develop a reasonable and prudent alternative, if available, with the lead Federal Agency and the project proponent. (RIP participants recognize that such actions would be inconsistent with the intended operation of the RIP). The option of requesting a depletion charge on historic projects or other measures on new or historic projects will only be used in the event that the RIPRAP does not or can not be amended to serve as a reasonable and prudent alternative. In this situation, the reasonable and prudent alternative will be consistent with the intended purpose of the action, within the Federal Agency's legal authority and jurisdiction to implement, and will be economically and technologically feasible.

12. This agreement becomes effective upon adoption of the RIPRAP by the Implementation Committee. Until the RIPRAP is adopted, the FWS will use the procedures in this agreement and the January 1993, draft RIPRAP as the basis for identifying reasonable and prudent alternatives.

13. Experience may dictate a need to modify this agreement in the future. This agreement may be modified or amended by consensus of all the RIP participants. A review of the agreement may be initiated by any voting member of the Implementation Committee.

APPENDIX B

COOPERATIVE AGREEMENT
TO IMPLEMENT THE MANAGEMENT PLAN

Draft Cooperative Agreement

To Implement the Management Plan for
Endangered Fishes in the Yampa River Basin

ENTERED BY

Colorado River Water Conservation District,
Colorado Department of Natural Resources,
Wyoming State Engineer's Office,
and U.S. Fish and Wildlife Service

1.1 The purpose of this Cooperative Agreement (Agreement) is to set forth our intent to implement the *Management Plan for Endangered Fishes in the Yampa River Basin* (hereinafter "Management Plan"; September 2004) as a component of the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program), in accordance with the Cooperative Agreement implementing the Recovery Program (entered into January 1988; extended December 2002), and consistent with the recovery plans for four endangered fish species of the Colorado River Basin, the humpback chub (*Gila cypha*), bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*) and razorback sucker (*Xyrauchen texanus*).

1.2 The Management Plan is designed to facilitate compliance with the federal Endangered Species Act (ESA) for current depletions of approximately 125,000 acre-feet in Colorado and 43,000 acre-feet in Wyoming and new depletions in excess of current levels of approximately 50,000 acre-feet in Colorado and 23,000 acre-feet in Wyoming. New depletions in Colorado have been divided into two increments—an initial increment of 30,000 acre-feet and a second increment of 20,000 acre-feet.

1.3 By entering into this Agreement, the U.S. Fish and Wildlife Service (FWS) has undertaken a federal action and has completed formal intra-Service consultation as required under Section 7(a)(2) of the Endangered Species Act (ESA). The product of that consultation was a Programmatic Biological Opinion (PBO) for the Yampa River Basin that concluded that the Recovery Program and the Management Plan can serve as the basis for offsetting impacts from depletions and for determining that the water depletions described in the Management Plan are not likely to jeopardize the continued existence of the endangered fishes.

1.4 When the first increment of depletions in Colorado approaches full development, the impacts of developing a second increment and the status of the endangered fish species at that time will be re-evaluated pursuant to the PBO for this Agreement to implement the Management Plan. If necessary, formal consultation under Section 7(a)(2) of the ESA would be reinitiated to address those impacts.

1.5 The Management Plan provides for the Recovery Program to augment base flows; manage nonnative fish populations; evaluate fish passage and entrainment at existing diversion structures and develop necessary and appropriate measures to remediate any problems; stock endangered fishes; and monitor habitat and fish populations.

1.6 The Management Plan applies only to the Yampa River and its tributaries in Colorado and Wyoming.

1.7 This Agreement will become effective on the date of the last signature of the approving officials of the respective parties who sign the Agreement.

1.8 Except as noted in Section 1.9 below, this Agreement shall remain in effect as long as any of the four endangered fish species remains listed and it is necessary to implement the Management Plan and thereby avoid jeopardizing the continued existence of the endangered fishes listed in Section 1.1. Prior to delisting any of these endangered fishes, conservation plans must be in place to ensure the long-term survival of the species pursuant to 16 U.S.C. 1533 (Endangered Act Species Act of 1973, as amended) and consistent with the recovery goals for the four endangered fish species. Once conservation plans are in place for all four of these species, these conservation plans shall be considered to supersede this Agreement.

1.9 This Agreement may be amended by mutual agreement of all parties hereto and may be terminated at any time by mutual agreement of all parties hereto. If any one or more of the parties gives 30 days written notice to all other parties of their intent to withdraw, the remaining parties must resolve differences with the party or parties giving such notice or otherwise take corrective action to ensure continued implementation of the Management Plan. The parties recognize that any such modification or termination may require that formal consultation under Section 7(a)(2) of the ESA be reinitiated for those actions covered by this Agreement and Management Plan.

1.10 This agreement cannot, and does not, in any way diminish, detract from, or add to the ultimate responsibility of the FWS to administer and abide by the provisions of the ESA, National Environmental Policy Act, or other applicable state and federal laws.

1.11 The parties recognize that certain actions may depend upon authorizations and appropriations beyond the direct control of the parties. No financial liability shall accrue to any of the parties for failing to implement those portion(s) of this Management Plan for which separate authorization(s), appropriations or allotment(s) of funds are required, but not provided.

1.12 No Member of or Delegate to Congress or Resident Commissioner or official of the United States, the State of Colorado or the State of Wyoming shall benefit from this Agreement other than as a water user or landowner in the manner as other water users or landowners.

1.13 The parties recognize that implementation of certain elements of the Management Plan requires the involvement and cooperation of the citizens of the Yampa Basin. To facilitate public involvement, the parties shall develop and maintain a cooperative process to implement the Management Plan, including recovery actions, and continue to work with and support the Yampa River Basin Partnership.

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For Colorado River Water Conservation District Date

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For Colorado Department of Natural Resources Date

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For Wyoming State Engineer's Office Date

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For U.S. Fish and Wildlife Service Date

APPENDIX C

TECHNICAL MEMORANDA FROM COLORADO AND WYOMING CONCERNING QUANTIFICATION OF CURRENT AND FUTURE DEPLETIONS FROM THE YAMPA RIVER BASIN

M E M O R A N D U M

TO: Yampa River Hydrology Subcommittee

FROM: Ray Alvarado

DATE: November 6, 2000

SUBJECT: Yampa River Modeling Assumptions under "Current Level" of Depletions

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As requested during the November 3, 2000 Hydrology Subcommittee conference call, I have written down the new modeling assumptions to be used for power, M & I and agriculture uses under "current level of depletions.

Demands

- For the period 1975-1998, irrigation demands will be taken directly from the Calculated data set. For the period prior to 1975, demands will be estimated using the average of the 1975-1998 Calculated demands for the same month and hydrologic condition, but *without* constraint of net cumulative decree. Does not include any fallow lands that maybe irrigated in the future.
- Municipal demands will be set to 1998 demand levels.
- Industrial demands will set to monthly averages over 1985-1998. Public Service as well as Tri-State will submit these monthly demands to the CWCB.
- Transbasin diversion demands will be set to average monthly diversions over the period 1975-1998.

M E M O R A N D U M

TO: Yampa River PBO Water Subcommittee

FROM: Ray Alvarado

DATE: November 21, 2000

SUBJECT: Yampa River Modeling Results

Pursuant to the Water Subcommittee's November 3 conference call, I have summarized the latest Yampa modeling results using the Subcommittee's revised assumptions for power, M & I and agricultural depletions under "current" levels of demand, as well as projected depletions under 2045 demand conditions. The following tables do not include Water District 56.

Depletions under "ideal" conditions assumed that water supply is not a limiting factor.

Table 1
Average depletions under "ideal" conditions, values in acre-feet

Use	Current Level	Change	2045 Level	Comments
Agriculture	92,258	0	92,258	No Change
M & I	5,202	10,105	15,307	BBC Projected Increase
Power	16,947	15,403	32,350	BBC Projected Increase
Exports	2,917	0	2,917	No Change
Evaporation	12,543	0	12,543	No Change
Totals	129,867	25,508	155,375	

Table 2 summarizes the modeling results when physical and legal availability constraints are placed on the "ideal" demands. There are changes from values listed in my June 26, 2000 memorandum. These are mainly due to "new" averages being used. For M & I, the decrease of 210 ac-ft is due to an incorrect starting value. This was corrected for this effort.

Table 2
Average modeled depletions , values in acre-feet

Use	Current Level	Change	2045 Level	Comments
Agriculture	87,765	-10	87,755	Affected by senior M&I and Power
M & I	5,201	9,899	15,100	BBC Projected Increase
Power	16,947	15,403	32,350	BBC Projected Increase
Exports	2,815	0	2,814	No Change
Evaporation	12,543	0	12,543	No Change
Totals	125,271	25,292	150,562	

The shortages shown in Table 3 are partly due to the increase power demands as well as physical supply limits. Some of the agriculture depletion shortages occur due to the operation of Wyoming's demands in Water District 54 as well as the method of calculating irrigation efficiencies.

Table 3
Average modeled depletion shortages from "ideal", values in acre-feet

Use	Current Level	2045 Level
Agriculture	4,493	4,503
M & I	1	207
Power	0	0
Exports	102	103
Evaporation	0	0
Totals	4,596	4,813

TECHNICAL MEMORANDUM

SUBJECT: **Green River Basin Plan**
Wyoming Depletions in the Little Snake River Basin

PREPARED BY: States West Water Resources Corporation
Revision made August 23, 2000 by Wyoming State Engineer's Office

Introduction

The Little Snake River is not directly tributary to the Green River in Wyoming. It is tributary to the Yampa River which ultimately flows into the Green in Dinosaur National Monument in northwestern Colorado. A programmatic biological opinion will be prepared to address the potential effects of the "Management Plan for Recovery of the Endangered Fishes of the Yampa River Basin and Continuation of Existing Human Water Uses and Future Water Development." The purpose of the Management Plan is to allow for the use and future development of Yampa River Valley water resources and to protect and promote the recovery of the four endangered fish species which reside in the Upper Colorado River Basin. The development of the Management Plan is occurring as an activity of the ongoing Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, which has been ongoing since 1988. The State of Wyoming is a participant in the Recovery Program and is participating in the development of the Management Plan. This memorandum documents current estimates of depletions due to activities in Wyoming, and presents estimates of depletions out to year 2045.

The average annual water yield from the Little Snake River Basin in total is 428,000 acre-feet (Hawkins and O'Brien, 1997). Sources of depletions in Wyoming include irrigated agriculture, environmental use, municipal use and transbasin diversions for the City of Cheyenne. As of 1994, total Wyoming depletions in the basin were estimated at 39,900 acre-feet annually (Burns & McDonnell, 1999, Appendix D).

No current depletions are explicitly associated with either industrial or domestic uses. Industrial uses are small and generally included within municipal demand estimates. Domestic uses are also small. To the extent they are comprised of individual small wells serving residential populations, domestic uses will not significantly affect surface water flows.

Therefore, determination of current and future demands consists of updating municipal, agricultural and City of Cheyenne depletions, and projecting them out to year 2045. Additional depletions are estimated for future environmental and industrial uses.

Municipal Depletions

According to Purcell (2000), municipal demands in the Little Snake River Basin are created by uses in the towns of Baggs and Dixon. Between the two, a total of 76 acre-feet of water is currently depleted. Burns and McDonnell (ibid.) provide a higher current municipal depletion of 106.8 acre-feet. Current population estimates are 375, 300 for Baggs and 75 for Dixon, for a current use rate of 0.20 acre-feet/person-year using Purcell's numbers. To project these depletions to year 2045, population projections outlined by Watts (2000) are used. While Watts proposes three growth scenarios, only the moderate growth scenario is used herein. This scenario is based on U.S. Census Bureau projections.

According to Watts, Baggs and Dixon, together, would experience total growth of 10.8 percent from 2000 to 2030. Projected to 2045, or another 15 years beyond the 2030 horizon looked at by Watts, gives a growth total of 16.2 percent. This projection is performed by linear extrapolation, which is satisfactory in this case because the moderate growth curve is linear in later years.

Therefore, projecting municipal demands consists of taking existing use and increasing it by the expected percentage population increase. A current depletion of 76 acre-feet annually, increased by 16.2 percent, gives a 2045 municipal depletion of 88 acre-feet per year.

City of Cheyenne Depletions

Part of the City of Cheyenne's water supply system is comprised of the Stage I and Stage II Projects. These projects consist of collection and transmission systems in the Little Snake River Drainage. Water is collected from several tributaries of the Little Snake River and delivered to a tunnel that transports the water under the continental divide to Hog Park Reservoir in the North Platte River Basin. Storage in Hog Park Reservoir is released to replace water diverted to Cheyenne through the Rob Roy supply components of the Stage I and II Projects, which transport water from the North Platte River Basin to the South Platte River Basin. The current amount of water diverted from the Little Snake Basin, based on the 1995-1997 usage period, is 14,400 acre-feet per year.

Maximum annual capacity of the Stage I/II system is dictated by the larger of the potential yield of this system (21,000 acre-feet, Black and Veatch, 1994) versus the one-fill limitation on Hog Park Reservoir (22,656 acre-feet). In this case, maximum potential depletion allowed to the Little Snake River Basin is therefore 22,656 acre-feet. The City of Cheyenne has no current plan to enlarge the Stage I/II system, however, its capacity will be reached in the 2040-2050 time frame under current growth estimates.

Agricultural Depletions

Agricultural depletions arise from the consumptive use of water by irrigated crops and pasture. Determination of this depletion requires estimates of the current irrigated acreage in the basin and of actual crop consumptive requirements.

O'Grady, et al, (2000) calculated the amount of irrigated lands in the Little Snake Basin using 1983-1984 aerial photography corrected by 1997-1999 infrared satellite imagery. This work resulted in an estimate of current irrigation of Wyoming lands totaling 15,929 acres. Crop distribution in the basin was previously estimated to be 75 percent grass hay, 11 percent alfalfa and 14 percent irrigated pasture (Western Water Consultants, 1992).

Maximum consumptive use of these crops is only achieved with a full water supply. Consumptive irrigation requirement (CIR) at Dixon, or that amount needed in excess of rainfall to produce a crop, was determined by Trelease et al. (1970), as modified by Pochop, et al. (1992) to be 22.78 inches (1.9 feet) for alfalfa and 20.96 inches (1.75 feet) for pasture grass (or grass hay). Modifications to these numbers to include mountain meadow hay were developed for the Green River Basin Water Plan. For this type of hay, it has been determined that the irrigated lands above Baggs would experience 19.59 inches (1.63 feet) of annual CIR. For purposes of depletion estimation, the following distribution was used: lands above Baggs were represented by 89 percent mountain meadow hay and 11 percent alfalfa, with lands below Baggs represented by 89 percent pasture grass/grass hay and 11 percent alfalfa. From irrigated lands mapping, there exist 11,571 acres above Baggs and 4,358 acres below Baggs.

Under the cropping and irrigated lands percentages given above, the total crop-weighted CIR would be as follows:

Crop	**Above Baggs**	**Below Baggs**	**Total**
Grass Acres	10,298	3,879	14,194
Meadow/Grass CIR, ft.	1.63	1.75	
Grass Total CIR, AF	16,786	6,788	23,574
Alfalfa Acres	1,273	479	1,755
Alfalfa CIR, ft.	1.9	1.9	
Total Alfalfa CIR, AF	2,419	910	3,329
Total CIR, AF	19,205	7,698	26,903

These CIR calculations equate on a crop-weighted basis to 1.66 feet of CIR above Baggs and 1.77 feet below Baggs. Estimates of actual agricultural depletions (and review of irrigation diversion records) have shown less depletion than full CIR would dictate, which is to be expected. Estimates of agricultural depletion, based on studies prepared for High Savery Reservoir (Burns and McDonnell, ibid.), indicate the basin to currently receive about a 75 percent supply without storage. Current agricultural depletions are therefore estimated to be 20,050 acre-feet per year. It is recognized that in practice full CIR is usually not achievable unless fields are flat and irrigation timing is precise. Nonetheless, full CIR values provide a reasonable calculation of the needs and demands of the aggregate irrigation in the basin.

High Savery Dam

Depletions associated with the High Savery Dam project are expected to average 7,724 acre-feet per year as given in the Record of Decision, Final Environmental Impact Statement, Little Snake Supplemental Irrigation Water Supply project (Department of the Army Corps of Engineers, June 5, 2000). Of this amount, approximately 869 acre-feet per year is attributable to evaporation from the reservoir itself, leaving 6,855 acre-feet as the depletion associated with supplemental irrigation practices. This project assumes no additional irrigated acres will be brought under production; it provides supplemental late-season water to existing lands. Adding the 20,050 acre-feet of existing depletion to 6,855 acre-feet due to High Savery provides a total agricultural depletion of 26,905 acre-feet, or essentially a 100 percent water supply based on full CIR. Because High Savery has already had a biological opinion issued, it is included in the environmental baseline under current depletions even though it has yet to be constructed.

Other Projects

In 1995, several dikes were permitted on Muddy Creek by the Little Snake River Conservation District with assistance from several state and federal agencies, including the Wyoming Water Development Commission, the Bureau of Reclamation, and the Bureau of Land Management. These dikes, and the impoundments behind them, are permitted for stock and wetland purposes, and have since been constructed.

According to the reservoir permit maps, the three constructed impoundments have a total surface area of 113.5 acres, resulting in an evaporative depletion of 284 acre-feet per year at a net evaporation rate of 30 inches.

Future Depletions

The projects listed below were developed in large part with input from the Little Snake River Conservation District, and reflect their plans and desired ability to further develop the water resources of the basin.

Environmental Uses

Additional Wetlands Construction

The Little Snake River Conservation District has demonstrated the desire and ability to construct wetland habitat for wildlife, stock and riparian benefits. As quantified earlier, the District in the last 5 years has constructed wetlands with estimated depletions amounting to almost 300 acre-feet per year. Future efforts by the District are anticipated to increase the amount of wetlands by a factor of three, thus creating a future depletion on the order of 1,000 acre-feet.

Little Snake River Basin Small Reservoirs Project

A feasibility report evaluating several small reservoirs in the basin was completed by Lidstone and Anderson in 1998. This report, sponsored by the Little Snake River Conservation District, looked at the feasibility of constructing up to 34 small impoundments for purposes of stock watering, rangeland improvement, and wildlife enhancement. The study resulted in a list of 12 reservoir sites to be considered for Level III design and construction funding. Currently, one reservoir is slated for construction with a second dependent on the availability of funding. For this estimate, the two slated for construction funding are considered as existing depletions, and the remaining ten considered as adding depletions for the 2045 scenario.

The two impoundments under existing funding are Ketchum Buttes 25 and Smiley Draw 27. State Engineer records indicate reservoir surface areas of 10.6 and 8.9 acres, respectively. Assuming a net evaporation of 30 inches (same as High Savery Dam, considered as representative), the total depletions for these impoundments average 49 acre-feet per year (27 and 22 acre-feet, respectively).

The 10 impoundments for possible future construction are as follows:

Reservoir	**Surface Area, ac.**	**Depletion, acre-feet**
Blue Gap 16	50.1	125
Blue Gap 27	14.6	37
Browns Hill 21	2.9	7
Garden Gulch 3	2.8	7
Garden Gulch 32	19.9	50
Ketcham Buttes 34	5.5	14
Peach Orchard Flat 34	88.6	222
Pine Grove Ranch 1	7.7	19
Pole Gulch 27	0.7	2
Riner 28	52.2	131
Total		**614**

Agricultural Uses

Miscellaneous Stock Reservoirs

The Little Snake River Conservation District has indicated that due to siltation and other causes of loss, stock reservoirs are being replaced and will continue to be replaced over the next 45 years. Hundreds of stock reservoirs currently exist in the basin, and at the rate of five per year over 200 new ponds will be constructed by 2045. These new ponds will vary in size, and it is estimated that up to 2,000 acre-feet of depletion will be attributable to their construction and storage.

Dolan Mesa Canal

Currently there is a water right and one enlargement for an irrigation supply project from Savery Creek, the Dolan Mesa Canal. Together, these rights are permitted to serve 1,600 acres. The lands are currently not irrigated, but the possibility exists that current or subsequent owners may try to bring the lands under irrigation. If all 1,600 acres were irrigated, depletion estimates (using 1.66 feet of CIR) would total 2,656 acre-feet.

Willow Creek Storage

Users in the State of Colorado are seeking to implement a storage project on Willow Creek, which flows into the Little Snake River south of Dixon, WY.. The Little Snake River Conservation District has expressed interest in becoming a joint applicant in the project to increase its size and serve lands in Wyoming. Under a Willow Creek reservoir, approximately 1000 acres would be served. The depletion associated with this use would amount to 1,660 acre-feet.

Cottonwood Creek

The Little Snake River Conservation District has indicated that a project is being considered that would have its source of supply water from Cottonwood Creek, tributary to the Little Snake River north of Dixon, WY. The project, anticipated to be brought before the Wyoming Water Development Commission in the fall of 2000, would add 500 acres of irrigation. The depletion associated with this use would amount to 830 acre-feet.

Grieve Reservoir

Grieve Reservoir, which washed out in the summer of 1984, is being considered for rehabilitation and enlargement. This reservoir, if enlarged, is anticipated to serve 300 acres in addition to the original grounds irrigated from the pre-existing structure. The depletion associated with this use would amount to 500 acre-feet.

Muddy Creek

The Muddy Creek Watershed is a candidate for diversions to irrigate up to 1,200 acres of pasture in the lower reaches north of Baggs, WY. At 1.77 feet of consumptive irrigation requirement, this project would result in depletions amounting to 2,100 acre-feet.

Focus Ranch

The Focus Ranch property has a need for supplemental irrigation for 200 acres. The source for this water, likely from storage, is the Roaring Fork near the National Forest boundary. At 0.5 acre-foot per acre supplemental need, this project would result in a depletion of 100 acre-feet.

Pothook – Beaver Ditch

The Little Snake River Conservation District has indicated that a project totaling approximately 400 acres could be brought into production near the confluence of Savery Creek and the Little Snake River. These lands may once have been considered to be served by the Beaver Ditch under an earlier study by the USBR as part of the Savery-Pothook project. At 1.77 feet per acre of consumptive irrigation requirement, this project would result in depletions amounting to 700 acre-feet.

The sum total of projected depletions for the additional agricultural projects listed above is 10,546 acre-feet annually.

Industrial Uses

In the Draft Environmental Impact Statement for Sandstone Reservoir, (Corps of Engineers, Omaha District, January, 1988) the ability to provide 20,000 acre-feet per year for a future industrial developer is presented. At that time a specific need for such water did not exist, although operation studies indicated such water was available for storage and development within the basin.

Industrial use projections outlined by Watts (2000) are used as a starting point to project future industrial use depletions to year 2045 for the Little Snake River Basin. Watts' industrial use projections do not purport to guess in what areas of the basin industrial use will grow, only that the growth will probably come from established industries. While Watts proposes three growth scenarios, only the moderate growth scenario is used herein (as was done with the projections for municipal use as described above). A reasonable approach given the non-spatial nature of industrial demand projections for the Green River Basin is to assign growth in industrial water demand on an area-weighted basis. To do otherwise would effectively discount that industrial growth will likely occur in the Little Snake River Basin. Wyoming's portion of the Little Snake River drainage (approx. 851,975 acres) is about 6.4 percent of the land area of the portion of the Green River Basin located in Wyoming (approx. 13,349,351 acres) (Chris Jessen, personal communication). Applying this basin area percentage (6.4 %) to the moderate industrial growth projection of 40,000 acre-feet per year yields 2,560, rounded to 3,000 acre-feet per year, of industrial water demand in year 2045. Application of the high industrial demand projection would yield an estimate of about 6,400 acre-feet per year. Maintaining the State of Wyoming's ability to provide industrial water when demand arises in the next 45 years is critically important. Based on the above, the future depletion estimate includes 3,000 acre-feet per year.
Summary of Current and Future Depletions

The following current depletion estimates are presented:

Current Use	**Depletion, AF/YR**
Municipal (In-Basin)	76
City of Cheyenne	14,400
Agricultural	20,050
High Savery Reservoir	7,724
Diked Wetlands	284
Small Reservoirs	49
Total	**42,583**

Future depletions (year 2045) are estimated to be:

Future Use	Depletion, AF/YR
Municipal (In-Basin)	88
City of Cheyenne	22,656
Agricultural	20,050
High Savery Reservoir	7,724
Diked Wetlands	1,284
Small Reservoirs	663
Additional Agricultural Uses	10,546
Industrial Use	3,000
Total	**66,011**

For comparison, these depletions are compared to annual flows seen at one gage on the Little Snake River. The gage, Little Snake River near Dixon, WY (9-2570) provides an indication of the annual flows seen in the river. In addition, two tributaries contributing to flow in the river not included in the gage data are Muddy Creek and Willow Creek. Estimates of flows in these tributaries are also provided. Data are taken from USGS reports, which would already reflect depletions.

Gage or Tributary	Average Annual Flow, AF
Little Snake River near Dixon (1911-1971)	372,600
Muddy Creek (1987-1991)	10,690
Willow Creek (1954-1993)	7,440
Total	**408,860**

Summary

These depletions are independent of the amount of water *available* to Wyoming under provisions of the Upper Colorado River Basin Compact and the Colorado River Compact. The State of Wyoming's apportionment of the waters of the Colorado River System exists in perpetuity. Wyoming therefore continues to retain the right to develop all its available water resources under those Compacts in accordance with current governmental permitting requirements.

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APPENDIX D

REVISED BASE-FLOW RECOMMENDATIONS FOR THE YAMPA RIVER

U.S. Fish and Wildlife Service
Mountain-Prairie Region (6)
Denver, Colorado

Approved: ____
Regional Director, Region 6, U.S. Fish and Wildlife Service

Date: _________________________

REVISED BASE-FLOW RECOMMENDATIONS FOR THE YAMPA RIVER
U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado

The following information is provided as the basis of flow recommendations for the Yampa River during the base-flow period (July-February). It formally supplements and amends previous flow recommendations of the U.S. Fish and Wildlife Service (Service) for the Yampa River (Modde and Smith 1995). The amended recommendations are intended to serve as the basis for instream flow augmentation from July through February as outlined in *A Management Plan for Endangered Fishes in the Yampa River Basin* (Roehm 2003).

Background

The Service first attempted to develop flow recommendations for the Yampa River in 1989 (Tyus and Karp 1989), in which the authors identified the life history and general habitat needs of the Colorado squawfish (now commonly known as the Colorado pikeminnow), humpback chub, razorback sucker and the bonytail. The report made some general observations about flows that appeared to be beneficial to the endangered fish based on historical hydrologic conditions. Although the report did not provide any discrete flow recommendations for the Yampa River, it identified a need to maintain both inter- and intra-annual variability typical of historical hydrographs. Flow recommendations were to be developed separately in a stand-alone document.

After completion and acceptance of this report, the Service released what was known as Phase II flow recommendations for the Yampa River on November 9, 1989. The Phase II report relied upon the biological information from Tyus and Karp (1989) and took into consideration water-project depletions backcast over historical monthly hydrologic records for the Yampa River to develop monthly flow recommendations at Deerlodge Park. The Phase II flow recommendations proved to be too general, and because they were based on flows at Deerlodge Park, they did not correlate with flows at the Maybell gage, which historically has been used for stream-flow accounting.

Modde and Smith (1995) developed flow recommendations for the Yampa river that updated interim recommendations for the Yampa River, which were promulgated by the Service in 1990 based on a review of biological data on endangered fishes developed by Tyus and Karp (1990). The approach used by Modde and Smith (1995) was selected following the failure of an Instream Flow Incremental Methodology (IFIM) Physical Habitat Simulation (PHABSIM) to demonstrate predicative cause-and-effect relationships between instream flows and distribution of endangered fishes in the Green River Basin (Rose and Hann 1989). Flows recommended in the Modde and Smith 1995 report relied heavily on biological information presented by Tyus and Karp (1989), but also included information generated by endangered fish monitoring activities carried out by the Upper Colorado River Endangered Fish Recovery Program; an instream flow report by Dr. Jack Stanford (Stanford 1993); a comparison by The Nature Conservancy of estimated historic and undepleted Yampa River flows at Maybell (O'Brien 1987); and generally accepted, published ecological principles.

The primary goal of the Modde and Smith 1995 report was to maintain a relatively natural hydrograph. High spring flows were identified as necessary to support biological processes, with relatively stable base flows to support fish through the late summer, fall and winter based upon natural variability (Table 1).

Table 1. Monthly base-flow targets (cfs) based on 80% exceedance of estimated undepleted daily flows[1] of the Yampa River at Maybell, Colorado (Modde and Smith 1995).

NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
172	157	187	221	305	1150	4153	3326	175	125	45	88

[1] Hydrosphere 1995

In their report entitled *Determination of Habitat Availability, Habitat Use, and Flow Needs of Four Endangered Fish in the Yampa River Between August and October*, Modde et al. (1999) took a new approach to estimate instream flow needs of the endangered fishes in the Yampa River during the base-flow period. After testing several approaches, the authors selected a curve-break analysis to estimate base-flow targets for the Yampa River. This approach simulated habitat availability at several different base-flow levels to identify available amounts of three different meso-habitats—riffles, runs and pools— as a function of discharge. Riffles are considered to be most sensitive to changes in stream flow. They also contribute significantly to the production of macroinvertebrates that serve as the basis of a food web for the endangered fishes. Therefore, habitat data from riffle transects were used in this analysis. The curve break was determined by plotting the availability of several important habitat parameters, such as depth, velocity and wetted perimeter (y-axis) against stream flow (x-axis) for each transect; calculating a linear regression of these data; and determining at what flow a residual (difference) between the curve and regression line was greatest. Using this methodology, an average curve break of all riffle transects, 93 cubic feet per second (cfs), was determined to be the target base flow for the Yampa River from August through October. The study concluded that flows of 93 cfs or greater would be sufficient to maintain instream riffle habitats critical for production of prey organisms for the endangered fishes during this period. However, the study also concluded that flows of this magnitude need only be achieved at their historical frequencies and durations. In other words, Yampa River flows had fallen below 93 cfs in the past and may do so in the future, as long as they do not fall below 93 cfs more frequently or for longer periods than had occurred in the past under otherwise similar hydrologic conditions (Modde et al. 1999).

Base-flow Recommendation

By adopting the Modde et al. (1999) August through October base-flow target of 93 cfs in an historical context, the Service has, in effect, modified its 1995 recommendations (Modde and Smith 1995; Table 1). Moreover, gage data indicate that Yampa River flows at Maybell occasionally have fallen below 93 cfs in July, as well as from November through February. Therefore, for the purpose of developing a base-flow augmentation strategy, the Service extended the base-flow period to include July through February. However, the Service recognizes that winter flow needs of the endangered fishes are not as clearly understood and, given these uncertainties, cannot justify extending the 93-cfs flow target beyond October. Nor can the Service reaffirm its 1995 winter flow recommendations based exclusively on statistical analyses of historical data, without any biological nexus. Therefore, as a contingency against these uncertainties, Service biologists and hydrologists recommended that a 33 percent buffer be added to the 93-cfs flow target (93 + 31 = 124 cfs) to meet the needs of the endangered fishes from November through February (Table 2). At Maybell, minimum flows of this magnitude or less occurred historically during the winter about 1 in 6 years. Modeling based on projections of future water development and a proposed base-flow augmentation protocol (Roehm 2003) indicates that instream flow augmentation would be needed, to some extent, to satisfy a 124-cfs winter flow target in an historical context an average of about 1 in 7 years, whereas some augmentation would be needed from July through August to satisfy the 93-cfs flow target an average of 1 in 2 years.

Table 2. Revised base-flow targets[1] (cfs) for the Yampa River at Maybell, Colorado

NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
124	124	124	124	No flow recommendation				93	93	93	93
Fall-winter base-flow period				Spring Runoff Period				Per Modde et al. 1999			

[1] Based on historical frequency, magnitude and duration. There are no specific numerical flow recommendations during spring peak-flow months (March-June).

Implementation Guidelines

The Service also recognizes that the proposed augmentation protocol and estimated volume of augmentation water supply (up to 7,000 acre-feet (AF) as needed according to the protocol) will not completely satisfy these flow recommendations in the driest 10 percent of years. In these years, 7,000 AF of augmentation will only partially satisfy base-flow needs. Based on the proposed augmentation rate of 50 cfs, a 7,000-AF augmentation pool would be exhausted in only 2 months. In such situations, it may be prudent to reduce the augmentation rate and extend the duration of augmentation. For example, reducing the rate to 25 cfs would allow augmentation to continue for 4 months. The Service's hydrologist will work cooperatively with the Upper Colorado River Endangered Fish Recovery Program (Program); reservoir operators; the Colorado Water Conservation Board; and Colorado State Engineer to make the best possible use of this limited resource. Other adjustments may be made in the augmentation protocol as deemed necessary and appropriate by the Service and the Program, in consultation with reservoir operators and the State of Colorado.

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APPENDIX E

SUMMARY OF PUBLIC SCOPING MEETINGS

PUBLIC SCOPING MEETINGS

—

PUBLIC COMMENTS AND QUESTIONS REGARDING
A MANAGEMENT PLAN FOR ENDANGERED FISHES
IN THE YAMPA RIVER BASIN

—

Steamboat Springs, Colorado
November 27, 2001

Baggs, Wyoming
November 28, 2001

Craig, Colorado
November 29, 2001

Centennial Hall – Steamboat Springs, Colorado

There were more than 28 people in attendance, including 12 from the Yampa Valley. Several individuals did not sign in. Prior to receiving public comments, Gerry Roehm (USFWS, Colorado River Recovery Program) gave a presentation on the management plan and development of an environmental assessment and programmatic biological opinion. Ray Tenney offered the perspective of the Colorado River Water Conservation District, which participated in plan development.

Attendance

Duncan Draper, Steamboat Springs, CO
Rhett Bain, Jackson, WY
Doug Allen, Steamboat Springs, CO
Susan Werner, Steamboat Springs, CO
Thomas R. Sharp, Steamboat Springs, CO
Carrie Sabin, Steamboat Springs, CO
Ron Normann, Steamboat Springs, CO
Bob Krautkramer, Steamboat Springs, CO
Doug Crowl, Steamboat Springs, CO
Michael Zopf, Steamboat Springs, CO
Tucker Burton, Steamboat Springs, CO
Mike Neumann, Steamboat Springs, CO
Bill Emerson, Steamboat Springs, CO
Ray Tenney, Glenwood Springs, CO
Julie Baxter, Steamboat Springs, CO
Ron DellaCroce, Hayden, CO
Bill Atkinson, Steamboat Springs, CO
Steve Henderson, Steamboat Springs, CO
John Armiger, Steamboat Springs, CO
Linda Kakela, Steamboat Springs, CO
Nadine Harrach, Steamboat Springs, CO
William Chace, Steamboat Springs, CO
Mark Oliver, Steamboat Springs, CO
Susan Dorsey, Steamboat Springs, CO
Eric Berry, Yampa, CO
Ben Beall, Steamboat Springs, CO
Libbie Miller, Steamboat Springs, CO
Gerry Roehm, Arvada, CO

Comments, Questions & Answers

Tom Sharp (Sharp and Steinke, L.L.C.) – submitted written comments. He provided a brief synopsis of those comments. His interest is in the Upper Yampa WCD. He supports the Plan, in general, but offered corrections to Stagecoach and Yamcolo pool capacities. He is concerned that the Plan emphasizes protection of peak flows, which may adversely impact water users ability to develop water under the allowed increment of depletions. Additional storage is likely in the Upper Yampa; enlargement of Stagecoach Reservoir is a viable option that is likely to impact peak flows. The UYWCD is counting on the Plan/PBO to alleviate any concerns over peak flow impacts. He supports alternative 12 (‘C’) as described in the draft plan, because it does not rely on Stagecoach for augmentation, and Stagecoach already is fully allocated.
Gerry Roehm – Noted that even without enlargement, Stagecoach or any other reservoir could impact peak flows if operated differently, such that the magnitude and/or frequency of spring storage is increased over historic operations.

Pat Martinez (CDOW) – Yampa is in sharp contrast with the Gunnison River, where flow is largely controlled. The NPS has raised concerns regarding flows both in the Gunnison and the Yampa. What is the NPS position regarding peak flow impacts on maintaining DNM habitats?

Roehm – The NPS has expressed concern in the past that peak flows not be diminished to the point that DNM resources are adversely impacted. Preliminary analyses suggest that impacts would be small, but more work needs to be done. Expects NPS to speak at the Craig meeting.

Sharp – The principal difference between DNM and the Black Canyon is that a federal reserve water right was granted (but unquantified) in 1978. No such water right exists for DNM in Colorado (i.e., the Yampa River).
Roehm – That is true, but Utah may grant NPS a water right for DNM (i.e., the Green River). But this would not require Colorado to deliver any additional water to Utah other than what is already required under Compact.

Mike Neumann (City of Steamboat Springs) – Where would the base flow be measured?
Roehm – Currently, Maybell has been our reference site and could be used in the future. This is due to its long and reliable history. However, measurement could be made farther downstream, possibly above the Little Snake River. The Deerlodge Park gage has been too unreliable.

Eric Berry (Town of Yampa) – Where is the critical habitat for the endangered fish?
Roehm – Critical habitat for all species is downstream from Craig. Only Colorado pikeminnow are know to occur that far upstream. Other species (razorback sucker, humpback chub) are restricted to the lower reaches in DNM. Therefore, actions taken in the Upper Basin would not directly impact the species. However, depletions basin-wide indirectly impact the fish and their critical habitat.

Bill Chace – Does not believe translocation (of northern pike) is cost effective. Thinks money can be better spent on habitat enhancement Supports a bounty to anglers to increase harvest.
Roehm – The nonnative fish control element of the Yampa Plan is excerpted from the CDOW Yampa Aquatic Wildlife Management Plan. CDOW has not ruled out bounties and would support locally sponsored fishing tournaments as a means of increasing harvest. Cost effectiveness should be a consideration, but the Yampa Plan itself does not prescribe nor prohibit any actions CDOW might propose.

Bob Krautkramer – Favors lethal control of northern pike over translocation.
Roehm – CDOW is trying to preserve a fishery for anglers in the basin. Subsistence anglers have expressed satisfaction with the translocation program. Sport fisherman (and outfitters) who float the river are more likely to be impacted.

Mike Zopf – Asked about the estimate of future trans-basin diversions. Why so few?
Roehm – No potential new trans-basin diversions were identified. Diversions from the Yampa River are expected to increase slightly (from Yamcolo), while diversions from the Little Snake River in Wyoming will increase more (for Cheyenne).
Zopf – Could water above Stillwater Res. be used for "exchange water"?
Roehm – The management plan does not restrict how and by what sector the increment of depletions is developed. Assignment of depletions by sector in the plan was for the purpose of estimating those depletions. Allocation of water will follow Colorado (and Wyoming) water law.
John Armiger – Why are Stillwater, Yamcolo or Bear Res. not on the list of potential augmentation sources?
Roehm – These reservoirs have relatively small capacities compared with Steamboat, Stagecoach or Elkhead and are located farther from the critical habitat where the water is needed. Use of them for this purpose also is limited by institutional constraints.
Sharp – Bear Reservoir is a CDOW facility; Stillwater and Yamcolo are 100% allocated to irrigation.

Duncan Draper – Asked about the cost and longevity of fish screens. Who pays initial and replacement costs? Where will screens be required and how many?
Roehm/Tenney – Estimated cost for a screen at Elkhead ~$1M, longevity uncertain. This is new technology; net is same material as used in climbing ropes–high resistance to abrasion, UV. Recovery Program is committed to install screen at Elkhead, if necessary.
Tenney/Martinez – Screens would be needed wherever warmwater gamefish are to be stocked, if escapement to the river is likely. Small ponds could be isolated and have screened outlets. Elkhead is a high priority of CDOW for warmwater fish, but CDOW currently is not stocking warmwater fish because of an agreement among CO, WY, UT and USFWS.

Chace – Number of angler days in Yampa Basin don't justify the expense of a screen; we don't need to perpetuate warmwater fisheries where they don't belong.
Draper – Putting northern pike into ponds near the river isn't effective, because anglers put them back in the river. Do pike reproduce in the river?
Roehm – Yes.

Libbie Miller (CDOW) – Need to work with counties to prevent expansion of nonnative habitat/ reproduction into gravel pits, etc.
Roehm – That's worth considering. Some thought has been given to creating nonnative "traps" from features such as gravel pits and natural sloughs and backwaters. Fish like northern pike could enter, but not exit easily. They would be available for anglers to harvest from these sites.

Kevin Rogers (CDOW) – Northern pike are a concern not only for endangered fish, but coldwater gamefish, as well. CDOW has not given up on stocking trout in Stagecoach, trying different strategies (e.g., stocking larger fish to reduce pike predation).
Unidentified – Can a lake like Stagecoach be poisoned with rotenone?
Rogers – Yes, but pike are a popular fish and probably would be replaced after poisoning.

Krautkramer – Little said of habitat modification. What about tamarisk control? Tamarisk has a great impact on channel margin.
Roehm – Some believe hydrologic modifications (loss of peak flows) has allowed tamarisk to become established, although it can tolerate a certain amount of flooding. It's not as big a problem (yet) in the Yampa as it is elsewhere. DNM may have a tamarisk control program in place. Tamarisk control complicated by the fact that it has displaced traditional willow habitat of the SW willow flycatcher (endangered bird), and replacement habitat (willows) need to be established before tamarisk is eradicated.

Draper – Peak flows also create habitat for pike.
Rogers – Pike do occupy same flooded bottomland habitat as listed fish.
Roehm – High flows that enable pike spawning is upper reaches (Hayden area) may flush adult pike from lower canyon-bound reaches. Pike unsuited for high velocity flows.
Draper – Can pike ever be eradicated from the river.
Roehm – No. But recent studies suggest that pike numbers can be reduced. Last year, about half as many pike were captured as during the previous year, but with twice the effort. At the same time, the number of Colorado pikeminnow increased. This is an encouraging trend.
Ron DellaCroce (CDPOR) – If Elkhead is enlarged, during the drawdown jet skis and other watercraft could wind up in the river.

Roehm – That is possible, but access and low water may limit use.

Draper – When, where and at what flow were bonytail stocked?
Roehm – Bonytail were stocked by CDOW in 2000 and 2001. In 2000, they were stocked in Lodore Canyon (Green River) and Echo Park (Yampa River). In 2001, the road to Echo Park was impassable, so all fish were stocked in the Green River in Brown's Park area. These fish were stocked before the spring peak with the idea that spring flows would help to disperse fish. There is no data yet on dispersal or survival of stocked fish.

Town Hall – Baggs, Wyoming

There were 19 people in attendance, including 14 from the Yampa Valley, 8 of whom were students. Prior to receiving public comments, Gerry Roehm (USFWS, Colorado River Recovery Program) gave a presentation on the management plan and development of an environmental assessment and programmatic biological opinion. John Shields (Wyoming State Engineer's Office) offered the perspective of the State of Wyoming, which has been involved in plan development.

Attendance

Mark Foster, Baggs, WY
Roger Pilgrim, Baggs, WY
Randy Shipman, Rock Springs, WY
Bernie Caracena, Baggs, WY
Pati Smith (Sen. Thomas), Rock Springs, WY
*Celia Weber, Baggs, WY
*Erica Kramer, Baggs, WY
Betty Wilkinson , Rock Springs, WY
Lynn Updike, Baggs, WY
Gerry Roehm, Arvada, CO
Pat O'Toole, Savery, WY
Sharon O'Toole, Savery, WY
Travis Menge*, Baggs, WY
David Barber*, Wamsutter, WY
Joanna Garum*, Baggs, WY
Justin Tolle*, Baggs, WY
Travis Foster*, Baggs, WY
C.J. Shepard, Baggs*, WY
John Shields, Cheyenne, WY
* students

Comments, Questions & Answers

Bernie Caracena (Mayor of Baggs) – Wanted to know if Baggs would be able to get the water it needs under this plan. Baggs has a 1901 (senior) water right, but cannot always get it.
Roehm – Wyoming's estimate of future depletions is based on certain expectations of population growth in Baggs and other communities. Actual allocation of water under the increment of future depletions would follow state water law.

Pat O'Toole (rancher) – Concerned that the plan will be used as leverage by the Lower Basin to provide water to Mexico (to restore and maintain river delta).
Mark Foster (rancher/outfitter) – LSR valley is near the headwaters; whatever goes downstream (to Lower Basin states) affects us. We're caught between downstream demand and upstream diversions (to Cheyenne). Joined the YRBP in order to be informed and involved in any decisions made that could affect his livelihood.

O'Toole – City of Cheyenne is diverting more than it is entitled to under WY water law. Need to monitor diversions and cut them off when they are out of priority. Is afraid the plan will exacerbate the problem.

Caraceno – Last summer, Baggs could not satisfy its 1901 water right, senior to Cheyenne's.
Roehm – Plan only anticipates 4,000 AF of future trans-basin diversions in CO (Yamcolo) and ~23,000 AF in WY (Cheyenne). But it doesn't restrict how water is actually allocated. That is the role of the states.
John Shields – SEO monitors diversion by Cheyenne, and is not aware of any misappropriation by Cheyenne, but will take this concern back to WY State Engineer.
O'Toole – Unhappy that oversight of Cheyenne's diversions comes from Rawlins. Need someone from SEO on this side of the divide to look after LSR interests.

Roger Pilgrim – What good are these fish? We've gotten by without the dinosaurs and we can get by without these fish.
Roehm/Shields – Bottom line is that ESA requires their protection, and this plan and PBO are the best options available to ensure both the fishes' survival and continued human use of water.

Lynn Updike – Resents tax dollars being spent on saving fish while additional (state) taxes are spent on projects that serve Cheyenne (against the interests of the West Slope). Also resents (water use) being dictated by "environmentalists" from elsewhere. Yampa River had the best fishing, but now funds are being spent on fish no one wants.
Roehm/Shields – ESA has broad support nationwide, not just among "environmentalists." It is here to stay for the foreseeable future.

Randy Shipman – Equated the situation in the Colorado River Basin with the Klamath, where water was removed from irrigation in order to provide flows for fish. Fears this plan would codify it.
Roehm/Shields – The Colorado River is unlike the Klamath basin in that the Colorado River Recovery Program is considered by water users and regulators alike as a reasonable means of meeting the needs of humans and fish, without federal intervention as happened in the Klamath.

Shadow Mountain Clubhouse – Craig, Colorado

There were at least 22 people in attendance, including 18 from the Yampa Valley. Several individuals did not sign in. Prior to receiving public comments, Gerry Roehm (USFWS, Colorado River Recovery Program) gave a presentation on the management plan and development of an environmental assessment and programmatic biological opinion. Dan Birch offered the perspective of the Colorado River Water Conservation District, which has been involved in plan development.

Attendance

Jeff Comstock, Craig, CO
Darryl Steele, Maybell, CO
Norton Anderson, Silt, CO
Don Jones, Craig, CO
Robert Grubb, Craig, CO
Tamara Naumann, Dinosaur, CO
Dean Gent, Craig, CO
Terry Carwile, Craig, CO
John Campbell, Craig, CO
Holmes M. Shefstead, Craig, CO
Bill Elmblad, Grand Junction, CO
Burt Clements, Craig, CO
Ray Tenney, Glenwood Springs, CO
Rick Hammel, Craig, CO
Dan Birch, Steamboat Springs, CO
Geoff Blakeslee, Hayden, CO
Betsy Blakeslee, Hayden, CO
Ann Davidson, Hayden, CO
T. Wright Dickinson, Craig, CO
Les Hampton, Craig, CO
Bob Plaska, Steamboat Springs, CO
Gerry Roehm, Arvada, CO

Comments, Questions & Answers

Darryl Steele (Maybell) – Recalled that the August 2000 consensus included construction and maintenance of fish screens, if needed to prevent entrainment (incidental take) of endangered fish by diversions. That provision does not appear to be in the current plan. Wants it included.

T. Wright Dickinson (Moffat Co. Commissioner, Rancher) – Wants incidental take protection extended to angling and other recreational uses.

Unidentified – What is the status of nonnative fish control? Is it having any effect?
Roehm – John Hawkins reported catching half as many pike this year as last, with twice as much effort this year. At the same time, the number of Colorado pikeminnow has doubled.
Unidentified – What is being done with pike collected below Cross Mountain? No transport of fish was observed. Are they being killed?
Roehm – Hawkins collected pike, but a different crew transported them. Fish were temporarily placed in cribs (wire cages) in the river. A second crew removed them daily and transported them in a hatchery truck to Rio Blanco. Pike collected in the Hayden area (Carpenter Ranch and Yampa State Wildlife Area) were placed in SWA ponds. The only fish that may have been killed were nonnative, nongame fish, such as carp and white suckers.

Unidentified – Has observed gillnets being used in Stagecoach Reservoir. Pike and trout were killed. Why is money being spent killing gamefish? Anglers didn't stock pike in Stagecoach, CDOW did (cites Denver Post article). Extermination effort at Williams Fork Reservoir failed.
Bill Elmblad (CDOW) – CDOW uses gillnets (and other gear types) to conduct population estimates. Some mortality is inevitable, but is not the objective. Pike were stocked in Elkhead Reservoir (~580 in 1977). No pike were ever stocked in Stagecoach by CDOW.

Unidentified – Will smallmouth bass be removed?
Elmblad – Smallmouth have increased dramatically in some areas of the Yampa, constituting as much as 38% of fish caught. Other species are being signficantly reduced in number. Removal of smallmouth is likely, but they will be moved to other waters accessible to anglers.
Roehm – Hawkins reports ~10x as many smallmouth as pike. Too many to process effectively. These were returned to the river alive. CDOW has requested a variance from the Nonnative Fish Stocking Procedures to allow smallmouth to be moved to Elkhead.

Unidentified – Why stock (nonnative) brown trout and rainbow in the Yampa? Why not stock native cutthroat?
Elmblad – Trout can be stocked in the river above critical habitat. Cutthroat do not fare as well in the river as they do in smaller headwater tributaries. Brown and rainbow trout seem to prefer the larger rivers; that is why CDOW stocks them there.
Roehm – The endangered fish are warmwater species. Only pikeminnow extend as far upstream as Craig, and trout are not likely to survive higher summer temperatures below Craig. Therefore, conflicts between trout and endangered fish should be minimal.
Elmblad – Trout have been found downstream from Craig, but that is exceptional.

Unidentified – Is tamarisk removal part of the plan?
Roehm – No. Tamarisk is a concern, but its effect on the fish is unknown. Another endangered species, the SW willow flycatcher, has occupied tamarisk as it displaces the bird's preferred (willow) habitat. There are other programs pursuing tamarisk control. What is DNM doing?

Tamara Naumann (DNM) – NPS plans to control tamarisk on DNM.

Unidentified – Is federal government seeking water rights from the Yampa?
Roehm – No. The State holds all water rights for instream flows. Water would be stored under relatively junior rights for release later in the year when needed. Deliveries would be treated just like any other contract delivery from storage.
Unidentified – What are "supply interruption contracts?"
Roehm – Willing water users would be paid not to divert water they would otherwise be entitled to take in priority. However, little water would be available from direct-flow water rights in dry years, and there would be no protection for water bypassed...other water users could divert it.
Unidentified – Are there opportunities for augmentation on the Little Snake?
Roehm – There are no specific flow recommendations for the Little Snake. The LSR influences only the lowest reaches of the Yampa. Its principal contribution to the Yampa/Green rivers is sediment, which is transported by high spring flows. Base flow augmentation for the Yampa is intended to benefit the reach from Craig downstream. Any additional flow the LSR contributes to this reach during base flow conditions is considered a bonus.

Dickinson – Recommends enlargement of Elkhead Res. for augmentation. Need to protect adjacent/downstream property owners. Plan must not (and does not) require water rights administration. Recovery Program must be willing to accept risk of losing some augmentation. Downstream water users will not intentionally take additional water provided by augmentation, but some incidental increase is expected. Water users should not have to adjust headgates to prevent this. "Good neighbor" policy is key to keeping the peace. Recovery Program agreed to pay for any improvements (e.g., gages, flumes) that may be necessary to ensure its deliveries.
Bob Plaska (CDWR) – If river administration requires diversion modifications specifically for fish deliveries, they would be paid for by Recovery Program. However, flumes and headgates are required by CO law, and would not be paid for by Recovery Program.

Geoff Blakeslee (Carpenter Ranch) – Will the proposed alternatives require different operations than current?
Roehm – Yes. Participating reservoir(s) perhaps will experience greater water level fluctuations.
Blakeslee – Will native stream flows be different?
Roehm – No. The objective of augmentation is to emulate historic conditions.

Unidentified – Is it really necessary to remove channel catfish. They have coexisted with the endangered fishes for 100 years, before dams. Endangered fish did not decline until after Flaming Gorge was built and the river poisoned. Catfish are highly valued by anglers and should not be removed. Will catfish removal continue next year?
Elmblad – Catfish are thought to be one of the biggest problems, especially in the lower reaches. Removing them from DNM will continue through 2003. They also will be removed from the river upstream from DNM and translocated to either Kenney Reservoir (White River) or Elkhead, where they would be available for anglers to harvest.
Roehm – A significant reason for catfish control in DNM is that there is little fishing pressure on them there. Access is limited, and people who float through DNM generally don't fish.

Dickinson – Offered to receive comments from the public for Moffat County to consider in preparing its comments. Requested that comments be submitted to Jeff Comstock.

APPENDIX F

NOTICE OF AVAILABILITY FOR THE JULY 2003 DRAFT PLAN/ENVIRONMENTAL ASSESSMENT; COMMENTS ON THE DRAFT PLAN/EA

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

Draft Environmental Assessment for the Management Plan for Endangered Fishes in the Yampa River Basin

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of document availability.

SUMMARY: The public is invited to comment on a draft Environmental Assessment for the Management Plan for Endangered Fishes in the Yampa River Basin. The Fish and Wildlife Service (Service) has prepared a draft Environmental Assessment under regulations implementing the National Environmental Policy Act of 1969 (NEPA). Council on Environmental Quality adopted regulations in 40 CFR 1501.3(b) state that an agency ''may prepare an environmental assessment on any action at any time in order to assist agency planning and decision making.'' The proposed action of the Service is to enter into a cooperative agreement with the States of Colorado and Wyoming to implement provisions of the Management Plan for Endangered Fishes in the Yampa River Basin. Future actions that may be undertaken pursuant to this management plan may be subject to additional NEPA documentation requirements on a case-by-case basis.

DATES: Written comments on this draft Environmental Assessment and Management Plan must be received by August 31, 2003. In lieu of or in addition to written comments, comments may be submitted at any of the three public meetings to be held in August 2003. Public meetings are scheduled Monday, August 11, 2003, in Baggs, Wyoming; Tuesday, August 12, 2003, in Steamboat Springs, Colorado; and Wednesday, August 13, 2003, in Craig, Colorado. All meetings are scheduled from 7 p.m. to 9 p.m.

ADDRESSES: Public meetings will be held at the Little Snake River Valley Library, 105 2nd Street, Baggs, Wyoming; Centennial Hall, 124 10th Street, Steamboat Springs, Colorado; and Shadow Mountain Clubhouse, 1055 County Road 7, Craig, Colorado.

Copies of the draft Environmental Assessment and Management Plan are available online at *http://www.r6.fws.gov/crrip/yampa.htm* or at the following Yampa Valley locations—Bud Werner Memorial Library, 1289 Lincoln Avenue, Steamboat Springs, Colorado; Hayden Town Hall, 178 W. Jefferson Avenue, Hayden, Colorado; Moffat County Public Library, 570 Green Street, Craig, Colorado; Little Snake River Valley Library, 105 2nd Street, Baggs, Wyoming.

Copies of the draft Environmental Assessment and Management Plan, either printed and bound or on CD-ROM, also are available by request. Requests for copies and written comments may be sent to Dr. Robert Muth, Director, by postal mail at Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, P.O. Box 25486, DFC, Denver, Colorado, 80225–0486; by fax at (303) 969–7327; or by e-mail at *ColoradoRiverRecovery@fws.gov.*

FOR FURTHER INFORMATION CONTACT: Dr. Robert Muth, Director, at telephone (303) 969–7322 (extension 268); Mr. Gerry Roehm, Instream Flow Coordinator (extension 272); Ms. Debra Felker, Information and Education Coordinator (extension 227); or at the postal and e-mail addresses above.

SUPPLEMENTARY INFORMATION: The Upper Colorado River Endangered Fish Recovery Program (Program) was established in 1988 by a cooperative agreement among the governors of Wyoming, Colorado, and Utah, Secretary of the Department of the Interior, and Administrator of the Western Area Power Administration for the purpose of recovering four endangered fish species endemic to the Colorado River Basin—the humpback chub (*Gila cypha*), bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*). In August 2002, the Service completed recovery goals for these species, which identify five threat factors that led to their decline. These factors, which include—(1) Destruction, modification, or curtailment of the species' habitat or range; (2) overutilization; (3) disease and predation; (4) inadequacy of existing regulatory mechanisms; and (5) other natural or manmade factors, must be removed or abated to ensure the species' recovery. The recovery goals specify that certain recovery actions be taken to achieve the demographic criteria necessary for the species' downlisting and eventual delisting. Flow modification, obstructions to fish passage, and the presence of competitive and predatory nonnative fishes are considered to present the most significant threats to recovery. Consistent with the recovery goals, Program participants developed a Management Plan for Endangered Fishes in the Yampa River Basin to facilitate recovery of listed fishes as water continues to be depleted from the river to serve the needs of the people of the Yampa Basin now and into the foreseeable future. This management plan identifies a package of recovery actions to be implemented in the Yampa River Basin, including instream flow augmentation, fish passage, and management of nonnative fish populations. The Service proposes to enter into a cooperative agreement to implement the plan. This Federal action requires that the Service fulfill the requirements of the NEPA, for which an Environmental Assessment has been prepared.

Dated: March 27, 2003.

Elliott N. Sutta,

Acting Regional Director, Denver, Colorado.

[FR Doc. 03–17696 Filed 7–29–03; 8:45 am]

BILLING CODE 4310–

STATE OF COLORADO

OFFICE OF THE EXECUTIVE DIRECTOR

Department of Natural Resources
1313 Sherman Street, Room 718
Denver, Colorado 80203
Phone: (303) 866-3311
TDD: (303) 866-3543
Fax: (303) 866-2115

DEPARTMENT OF NATURAL RESOURCES

Bill Owens
Governor

Greg E. Walcher
Executive Director

September 4, 2003

Mr. Gerry Roehm
Instream Flow Coordinator
Upper Colorado River Endangered Fish Recovery Program
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Re: Comments regarding the Draft Management Plan for Endangered Fishes in the Yampa River Basin.

Dear Gerry:

The Colorado Department of Natural Resources, together with the Division of Wildlife and the Colorado Water Conservation Board, have reviewed the above-mentioned Yampa Plan.

Inasmuch as representatives from the State have participated in most of the decisions spelled out in the Draft Plan, the Department offers primarily stylistic and editing comments for your purposes.

Nonnative Control

Nonnative control has generated likely more controversy than any other in this Recovery Program, and particularly in the Yampa Valley. Colorado urges Program policymakers to review and reexamine nonnative control policy with an eye toward articulating the most effective strategies to protect the endangered fishes while recognizing the concerns and suspicions of the angling community. Program managers need to demonstrate sensitivity to anglers **and** to state and federal officials who are charged with carrying out and enforcing nonnative control on behalf of the endangered fishes.

General Comments

Overall: The plan does not address water conservation as a critical component of water supply. It seems that one way of ensuring that there is water for fish is to look at ways of improving efficiency for water delivery to agricultural operations, and ensuring that municipalities and industry implement conservation measures.

Page 29: - In regards to much of the hesitation expressed regarding a state in-stream flow right, the Program is urged to look at the long-term benefits which could be derived from such a right throughout the balance of the Program while the endangered fishes are still listed. .

Page 52: In addition to the impact to the recreational amenities of Steamboat Lake from a drawdown, there are impacts to both the fish population and to the wetlands along the shores of the lake. The impacts to the fishery are mentioned in half a sentence on page 71, but there is no mention of the impacts of a drawdown to the wetland areas around the lake or to other critical aquatic habitats, including those for the endangered boreal toad.

Page 81: - Re: State-sponsored bounties for removal of non-native fish. In the earlier iterations of this plan, a reward program was being considered. With the heightened sensitivity to nonnative fish control and public criticism, the feasibility of such a program appears nil. At this time, there is little to no support for this idea in the field. Not only does it create a logistical nightmare, this concept will contribute to the perception that non-native fish are "trash" and that anglers do not need to follow other state regulations when they fish for them. Creating this perception is not the direction we want to take at a time when public scrutiny of consumptive wildlife users is intense. We have no problem with a privately sponsored fishing derby providing that ALL state statutes and regulations are in place, including the statute which requires that the angler provide for the human consumption of game fish.

Page 103: The last sentence states that "bald eagles are not known to nest in northwestern Colorado". This statement is not accurate. Bald eagles have nested in northwestern Colorado for many years. In fact in Routt County alone, we are aware of six nest sites along theYampa River. There are additional ACTIVE nests along the Yampa River in Moffat County. In banding eaglets, non-native fish remains are CONSISTENTLY found in eagle nests, suggesting a reliance on these species as a prey base.

Page 103: - Bald eagle - Listed reference is NOT in bibliography.

Page 105: Re: Canada lynx - This section states that there are no lynx north of I-70. This statement is also not true. Even in the absence of lynx north of I-70, there is extensive lynx habitat north of I-70, and released lynx have traveled as far north as Wyoming.

Page 119: - Threatened and endangered species:

1. Bald eagle - We would suggest that reduction in non-native fish may in fact have an effect on the nesting bald eagles by reducing their available food supplies. This effect assumes that there is no compensatory increase in native fish populations. It is possible that the impacts of nonnative, predatory gamefish have reduced the native fish forage historically available for eagles, but the current abundance of these species has apparently

provided a substitute food supply. Significant future reductions in gamefish abundance, either naturally due to loss of the native fish forage base or through mechanical removal by Recovery Program control projects, may create a food supply shortage for eagles during any lag time required for native fish populations to increase. Inasmuch as this creates yet another complication when setting nonnative control policy, it is valuable information to take into consideration.

2. Page 120: Discussion of endangered fish: While it appears that the reduction of peak flows will negatively impact the endangered fish, I think that this section does not make a compelling argument that increasing the baseflow in the summer will more than offset the impacts of the reduction of peak flows. The bottom line is that these fish evolved in the absence of dams, thus are dependent on the natural flow fluctuations in rivers. The jury still seems to be out on the impacts of non-native fish control on increasing the numbers of these endangered fish. So to say that non-native fish control will balance the negative impacts of the reduction of peak flows does not seem to be supported by the current scientific knowledge. There is an interplay of fish population-flow relationships and native fish-nonnative fish interactions in available habitat that are not understood. Implying trade-offs between potential impacts and benefits here is premature.

Conclusion

Colorado commends the Program for the research which has gone into this document. We look forward to discussions with Program staff regarding the above-mentioned issues.

Sincerely,

Tom Blickensderfer

Tom Blickensderfer
Endangered Species Program
Director

RECEIVED
SEP 5 2003
Co River Recovery Program

Ray Tenney
<rtenney@crwcd.org>

09/08/2003 05:26 PM

To: "Gerry Roehm (E-mail)" <gerry_roehm@fws.gov>
cc: Dan Birch <dbirch@crwcd.org>
Subject: Yampa Plan Comments

Just a few things:

There are several references in the plan document to the 2045 demand projection horizon. Some of these read as though the Plan is limited in time to 2045. I do not believe that you intended this and some editing may be in order.

The issue raised by Tom Pitts concerning the obligation of the water users with depletion activities occurring at the time the RIP was created needs to be resolved. (The emails dated 9-8-03 may have set the stage for this.) It was our understanding that depletions occurring at the inception of the RIP would have their direct and indirect impacts mitigated by RIP activities. The Yampa River basin water users have the same benefit under the RIP as those in the Colorado, Gunnison or Green river basins where the RIP is constructing fish screens and passages to mitigate direct and indirect impacts. If additional financing is necessary the Plan may need to identify that and the RIP would be committed to providing it.

On pg. 18 in the second paragraph under the description of the proposed action, second to the last line, I suggest that the language "...projects are proposed whose impacts were not fully evaluated..." is beyond the spirit of what the level of evaluation has been for any projects under the Plan. Alternative language such as "...projects whose impacts are beyond the range of anticipated impacts..." would be more appropriate.

On pg. 30 under depletion accounting, we believe the USBR Consumptive Uses and Losses Report is completed every 5 years, not 4 as stated in the Draft Plan. The depletion accounting for the Plan should be altered to match this schedule.

Table 15 should include a units of measure.

Table 27 the runoff months are described in the legend as "shaded in gray" which apparently did not print.

In case you did not know, diversions to Patrick-Sweeney are pumped making the entrainment of fish more difficult as there are trash screens on the pumps. Retrieval of pumped fish from the canals is unlikely. FYI.

Ayres was contracted to do feasibility design and cost analysis of the fish net at Elkhead Reservoir (in both the current and enlarged configurations). The actual design will be included in the URS contract for the enlargement, only if directed by the RIP and in accordance with design standards which have yet to be developed or accepted by the RIP. (Ref. pg. 79, Future Control Actions discussion)

There are 2 Montgomery Watson Yampa River Basin Small Reservoir studies in 2000, Phase I and Phase II. I can get you a copy of either or both. I do not know which one you are referencing in this document.

If I run across any more of this "small stuff" I'll let you know.

Ray Tenney

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500 (8EPR-EP)
DENVER, COLORADO 80202-2466

RECEIVED

AUG 28 2003

AUG 29 2003

Co River Recovery Program

Ref: 8EPR-N

Dr. Robert Muth, Director
Upper Colorado River Endangered Fish Recovery Program
U.S. Fish and Wildlife Service
P.O. Box 25486, DFC,
Denver, Colorado 80225-0486

Re: Draft Management Plan for the Endangered Fishes in the Yampa River Basin, Colorado and Wyoming, Draft Environmental Assessment

Dear Dr. Muth:

The U.S. Environmental Protection Agency Region VIII (EPA) has reviewed the draft environmental assessment (DEA) for the Endangered Fishes in the Yampa River Basin. Our review of this project was conducted in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act.

The proposed major federal action that triggered this NEPA compliance document is the U.S. Fish and Wildlife Service's (USFWS) intent to enter into a Cooperative Agreement with the States of Colorado and Wyoming to implement various elements of a management plan as part of the Endangered Species Act Recovery Program (Recovery Program). The management plan is intended to promote species recovery by offsetting impacts from new direct flow diversions, small tributary reservoir construction and/or expansion of existing reservoirs in the Yampa River basin in Colorado and Wyoming. The management plan is also to address other stressors to the species of concern and to describe specific recovery actions and criteria to measure success. The DEA evaluates 13 combinations of structural and non-structural methods to offset base flow reductions. These methods range from building new reservoirs to supply interruption contracts. The proposed action is to enlarge the existing Elkhead Reservoir and use the increased volume to store water during peak flow periods and release this water during low flow periods.

EPA's primary concern with the DEA is that it does not appear to meet a purpose of the document. The DEA (page 87) states that the DEA is being prepared to determine whether to prepare an EIS. However, our review of the DEA indicates that, with the exception of sediment transport analysis for the Yampa Canyon portion of the Yampa River watershed, almost no environmental impacts that may result from actions anticipated to occur when the agreement is implemented have been documented. EPA does not understand how a decision to

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prepare an EIS can be made based on this document. The DEA (page 88) also indicates that potential impacts of other Recovery Program actions included in the Cooperative Agreement -- restoring fish passage, reducing impacts of diversion structure maintenance, reducing/eliminating fish entrainment -- are not addressed in the document because the actions are too site specific to develop the impact analysis at this time. We have attached specific comments addressing aquatic resources where EPA believes the impact analysis for the flow augmentation alternatives needs to be improved. We also note that there is not a cumulative impact assessment in the DEA.

One other general concern is the approach of using a programmatic Environmental Assessment for this proposal. Council on Environmental Quality (CEQ) guidance concerning tiering of documents (48 Federal Register 146, page 34267) provides useful recommendations which would appear pertinent to this proposal. In particular CEQ references its regulations at 40 CFR 1508.23 to point out that often a proposal for a program, plan or policy may not be sufficiently developed to conduct a tiered, or programmatic, NEPA analysis. CEQ pointed out that the time to initiate the NEPA analysis is when the effects can be meaningfully evaluated. In the case of the Yampa River Management Plan, the DEA indicates that many of the effects of the preferred alternative, as well as other planned actions, cannot be evaluated at this time, and therefore will be examined later. This would suggest that the decision is not ripe for consideration.

The use of a programmatic EA, rather than an EIS, also brings up the possibility that a FONSI for the overall program could be developed at this time (although, as indicated above, EPA does not believe this EA contains sufficient information to support such a decision) but subsequent analysis of any particular part of the program could result in a finding of significant impact. Further information would be needed to support a conclusion that an overall program does not result in significant impacts while some of its parts result in significant impacts

We are available to assist your agency in the development of a NEPA document for the proposed action. Should you have any questions regarding these comments, please contact Dave Ruiter of my staff at (303) 312-6794.

Sincerely,

Cynthia G. Cody
Director, NEPA Program
Office of Ecosystem Protection and
Remediation

Enclosure - Specific comments

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EPA Region 8 Specific Comments
Draft Management Plan for the Endangered Fishes in the Yampa River Basin, Colorado and Wyoming, Draft Environmental Assessment

The primary test to determine the appropriate NEPA document is the significance of the environmental impacts. Review of the impact analysis in the DEA reveals the following:

Hydrology and Geomorphology:

The hydrology and geomorphology impact section addresses average peak flows and sediment yield within Yampa Canyon. (The Yampa Canyon is the bottom 45 miles of the Yampa River drainage.) The average peak flows would be reduced from 2% to 14% depending on the gauge and hydrologic condition. The discussion also concludes that these peak flow reductions would not significantly reduce the ability to deliver and remove sediment from the Yampa River, particularly through the Yampa Canyon. This summary analysis is supported by the detailed analysis of sediment conditions in Yampa Canyon and portions of the Green River in Appendix G of the DEA.

The hydrology and geomorphology impact analysis section should also address project related high flow impacts in other portions of the Yampa River Basin. The Yampa River mainstem is over 220 miles long just to Stagecoach Reservoir. Other tributaries which would be hydrologically modified under various alternatives, and future conditions, include Elkhead Creek, Elk River, and the Little Snake River. For example, the sediment deposition issues are associated with reduced peak flows in these streams also need to be addressed.

The impact analysis also refers the reader to Table 27 of the management plan for information on peak flow impacts for the various alternatives. This table is difficult to understand. It does not appear possible to determine, for example, what pre- and post-project peak flows in Elkhead Creek would be for the various alternatives. Such information is basic to an understanding of the impacts on sedimentation, aquatic life, water quality and other resource impacts. Information needs to be developed for each alternative, for critical reaches of the watersheds (e.g., those reaches where peak flows currently cause erosion problems and/or reaches where low flow conditions currently dewater the streams), so that the reader can understand the implications of the project and decision-makes will be able to determine if a significant impact will occur.

Water Quality:

The water quality analysis is brief and, while not stated, seems to address only turbidity issues in the Yampa Canyon, where it is argued that base-flow augmentation would mitigate

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"somewhat" for flow depletions during peak-flow periods. As above, this section needs to address water quality implications in all portions of the basin affected by the various alternatives, not just the Yampa Canyon reach. The EA needs to address the impacts of all alternatives, not just the proposed alternative. Other parameters which may be of concern, such as dissolved oxygen, and temperature and existing uses should be addressed.

The water quality section has a statement that while growth-related wastewater concerns may increase, the project is "neutral with respect to project growth," and growth impacts would not occur as a result of the proposed alternative. It is not clear why the proposed action is neutral with respect to growth because the is designed to offset future depletions (e.g. DEA Figure 8), at least some of which are attributable to growth. The impacts of growth are being projected for the basin and, if not indirect impacts of the project, they would represent cumulative impacts to the resources of concern and should be included in the analysis.

The impact assessment addresses only one side of the water conservation issue. While EPA understands that irrigation water conservation may result in improved T.S. conditions, the reduced irrigation return flows are likely to result in reduced stream flows and reduced wetlands. These implications of water conservation also need to be addressed.

Vegetation:

There needs to be analysis of the impacts of altered water levels and peak flows on riparian vegetation. The vegetation section concludes, based on the Appendix G Yampa Canyon sedimentation analysis, that vegetation impacts will be "relatively minor compared to historic conditions." The analysis in Appendix G only addresses the relatively short Yampa Canyon reach, while flow depletions, and hydro period modifications are likely to occur within other portions of the basin as well. Impacts of the actual construction and operation of the preferred alternative are deferred to some future site-specific NEPA analysis. More information is needed to determine if there is a significant project- related impact to wetlands and other vegetational resources.

Fisheries:

The fisheries impact analysis is extremely brief, and appears to address only the fisheries of the Yampa Canyon reach. The proposed plan and proposed action, and its alternatives, will have hydrologic implications in more portions of the Yampa River basin than just the Yampa Canon reach. This addition fishery analysis is needed to determine the significance for the proposed action, or any of the alternatives.

Patty SchraderGelatt

09/04/2003 03:24 PM

To: Gerry Roehm/R6/FWS/DOI@FWS
cc: Paul Abate/R6/FWS/DOI@FWS, Al Pfister/R6/FWS/DOI@FWS
Subject: Comments on Yampa EA

Gerry,

Attached are my comments on the Yampa EA.

Patty

Comments on the Yampa Plan EA.

Patty Schrader Gelatt, Fish and Wildlife Biologist
U.S. Fish and Wildlife Service, Ecological Services
764 Horizon Drive, Building B
Grand Junction, Colorado 81506
970-245-3920 ex. 26
or 970-243-2778
FAX: 970-245-6933

Comments on the Yampa Plan EA

General Comments

There is a lot of information provided in the plan and the appendices, however, in order to provide an adequate BA, information needs to be pulled together to specifically address impacts of the proposed action (water depletions) on the endangered fishes. I still recommend providing a separate BA.

The Plan and the EA identify spring peak flows as important for species recovery. However, there are no provisions in the plan to protect these flows from future water depletions. This may be something we can address in the reinitiation criteria of the BO. One way to address this would be to monitor peak flows and if they are impacted to a greater extent than anticipated in the BA, section 7 consultation will be reinitiated. Also, it should be stated that the intent of the plan is to provide for future water depletions as modeled in the hydrology analysis. It does not anticipate one large project that would take all project water from the peak.

Specific Comments on the EA

Page 93 - Vegetation - The Vegetation section states that "tree willow" occurs along the Yampa River, is this referring to narrowleaf cottonwood (*Populus augustifolia*)? I recommend visiting the Colorado Natural Heritage Program web site and searching for a report on riparian vegetation of the Yampa River. I have a draft report by CNHP "A Preliminary Classification of the Riparian Vegetation of the Yampa and San Miguel/Dolores River Basins" by Gwen M. Kittel and Nancy D. Lederer, February 26, 1993. The Vegetation section could be improved by providing a more accurate description of riparian vegetation and references.

Page 103 – Bald eagle -Bald eagles are know to nest in NW Colorado, in fact there is a nest on the Craig golf course. Contact Jerry Craig with CDOW for the latest bald eagle nesting information.

Page 103 – Mexican spotted owl - Mexican spotted owls have been reported in Dinosaur National Monument.

Page 103 – Southwest willow flycatcher – There are records of southwestern willow flycatchers nesting in southwestern Colorado, see 2003 Recovery Plan.

Page 104 – Mountain plover – The Service has withdrawn the proposal to list the mountain plover. The withdrawal will be published in the Federal Register in a few weeks.

Page 117 - Hydrology and geomorphology – This section needs to be expanded to include a more in depth summary of Appendix G. When you compare future average peak flows to historic flows, you need to explain the difference between "historic" and "undepleted". Also, you should provide information on changes in flow between "undepleted" flows and future flows.

The last sentence in this section states, "...implementation of this management plan would result in only minimum impacts to peak flows (Table 27)". Table 27 only addresses the impacts of flow augmentation alternatives, it does not address impacts of 200,000 AF of water depletions included in the plan. This should be the meat of the discussion in the BA – what are the impacts to endangered fishes from the reduction in peak flows due to existing and future water depletions? Because all existing water depletions are included in the plan, the environmental baseline for the endangered fishes will be undepleted flows.

Page 118 - Vegetation - In the 3rd paragraph, last two sentences, add "water" in front of "conservation measures". Under the ESA, "conservation measures" are measures that benefit endangered species that project proponents agree to include in their project description.

Page 118 – Wildlife – Last sentence states, "Species dependent on riparian/wetland habitats would be impacted only to the extent these habitats are impacted." You need to go on to explain how riparian habitats may be impacted.

Page 119 – Bald eagle - The 5th sentence states that no adverse impacts are expected to the mature riparian forest that eagles use for roosting. You need to give more of an explanation why adverse impacts are not expected.

Page 120 – Endangered fishes - This section needs to be expanded for the BA. This is where you need to bring together all the information that explains how the plan may adversely affect endangered fishes. The most significant impacts are from current and future water depletions and how they affect peak flows. I don't agree that Flaming Gorge Dam releases mask Yampa River peak flow impacts. According to Table G-1, peak flows in dry years will be reduced by 2,152 cfs from undepleted levels at Jensen. How will Flaming Gorge make up for this?

Will Elkhead Reservoir be screened after enlargement? This should be included in the discussion on affects of nonnative fishes.

Page 121 – Ute ladies'-tresses- I don't think we should say that peak flow reductions due to depletions from the Yampa can be offset by releases from Flaming Gorge. The Flaming Gorge flow recommendations depend on peak flows from the Yampa in order be effective. Peak flows on the Green have been greatly reduced because of Flaming Gorge. I recommend a determination of "may affect, not likely to adversely affect" for Ute ladies'-tresses.

Page 121 – Yellow-billed cuckoo – This section states that the cottonwood riparian forest along the middle reaches of the Yampa River is stable and relatively secure. Please provide references for this statement.

<u>Information Needed to Pull Together for a BA</u>

1. Incorporate appropriate information from the "Provide and Protect Instream Flows" section of the project description (page 32).

2. Summarized information from "Impacts to Peak Flow" section from the alternatives section (page 65).

3. Provide a summary of appendix G.

4. Provide a clear determination for each species, choose from the following:

1. No affect
2. May affect, not likely to adversely affect
3. May affect, likely to adversely affect

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To
FWS/R6
ES/UT
03-1170

September 9, 2003

Memorandum

To: Director, Upper Colorado River Endangered Fish Recovery Program, US Fish and Wildlife Service, PO Box 25486 Denver Federal Center, Denver, CO 80225

From: Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, West Valley City, Utah

Subject: Draft Environmental Assessment for the Management Plan for Endangered Fishes in the Yampa River Basin

We have reviewed the Draft Environmental Assessment for the Management Plan for Endangered Fishes in the Yampa River Basin dated July 2003. This EA and Management Plan assists in the recovery of four endangered fish species relative to water depletions from the Yampa River Basin. The plan identifies depletions from the present time through 2045 and recommends specific management actions to advance recovery of the listed species subject to those depletions. The following comments and recommendations are provided for your consideration.

The last paragraph on page 79 discusses the Future Control Actions for nonnative fish in the Yampa River Basin. Information in this section states that as part of these control actions, nonnative game fish captured out of the Yampa River will be translocated to Elkhead Reservoir prior to installation of escapement controls. We are concerned that the Management Plan does not adequately address potential impacts from escapement of predacious nonnative fish species such as smallmouth bass, channel catfish, and northern pike on endangered fish in Utah. It is not clear in your analysis if nonnative fish that escape from impoundments in the Yampa drainage would diminish effectiveness of ongoing recovery efforts to control nonnative fish in reaches of the Green River in Utah and if so, how impacts related to upstream management can be minimized.

We appreciate the opportunity to review and comment on this document. If you have questions regarding the comments provided in this memorandum or need further assistance, please contact Paul Abate, Ecologist, at the letterhead address or (801) 975-3330 ext. 130.

United States Department of the Interior
NATIONAL PARK SERVICE
INTERMOUNTAIN REGION
Intermountain Support Office - Denver
12795 W. Alameda Parkway
Post Office Box 25287
Denver, Colorado 80225-0287

IN REPLY REFER TO:

N1621 (IMSO-NT)

SEP 5 2003

Memorandum

To: Instream Flow Coordinator – U.S. Fish and Wildlife Service

From: Director, Intermountain Region

Subject: Review Comments on Draft Management Plan for Endangered Fishes in the Yampa River Basin and Environmental Assessment

Thank you for the opportunity to comment on the latest draft of the Management Plan and Environmental Assessment for the Yampa River Basin. The National Park Service continues to be particularly interested in the present and future condition of the Yampa River Basin and its associated resources as they affect critical resources at Dinosaur National Monument.

We have reviewed the subject document and we recognize and appreciate the efforts you have made to respond to many of our comments. The clarity of the document is improved over the previous version, and an environmental assessment (EA) has been added as your choice of requirement under the National Environmental Policy Act (NEPA). However, the choice of performing an EA, the impacts to resources from reductions in peak flows, and the treatment of non-native fish management continue to be concerns requiring additional evaluation. General and Specific comments on the document are offered for consideration in revising the document.

General Comments:

1. The level of NEPA analysis that appears appropriate for this planning effort is an Environmental Impact Statement (EIS) rather than an Environmental Assessment (EA). The CEQ (see 40 CFR 1508.27) definition of significance includes such factors as effects (whether beneficial or adverse) on park lands, wild and scenic rivers, and ecologically critical areas; uncertainty of effects; the possibility of cumulatively significant effects; and effects on endangered species and critical habitats, etc. There are potentially significant impacts of the proposed action and sufficient uncertainties of effects, both beneficial and adverse, to require an EIS.

2. Recent information on the complexity and severity of the effects of non-native fish does not appear to have been taken into consideration in developing the Plan. Factors that suggest the impacts of non-native species are increasing include (a) increased

abundance of smallmouth bass in the Yampa River and in the Green River below the confluence, (b) an increasing ratio of northern pike to Colorado pikeminnow, (c) extremely low abundance of forage fish, (d) the apparent absence of the 350-450 mm recruitment size class of adult Colorado pikeminnow, (e) evidence of northern pike attacks on native fish including Colorado pikeminnow, (f) continued delays in the implementation of some key actions to control non-native fish, and (g) no assurance or evidence that non-native control efforts are or will be effective. The consideration of future depletions should be deferred until there is a certainty that recovery actions have reduced these nonnative fish impacts sufficiently that the endangered fish populations can withstand the effects of another ecological stressor. The subject document does not contain the data or level of analysis sufficient to determine impacts from non-native fish in Dinosaur National Monument.

3. Impacts to river flows are considered in the Plan and EA, but impacts to resources as a result of changes in flows are not fully evaluated The EA dismisses the potential for increased risk of the non-native plant (tamarisk) invasion due to peak flow reduction on mid-channel bars without thorough analysis. In addition, the assessment does not adequately examine the impacts of reduced peak flows on the listed species *Spiranthes diluvialis* (Ute Ladies'-tresses). Peak flows from the Yampa are important for habitat rejuvenation at locations within the Monument on the Green River below the confluence of the Yampa. The document also does not discuss the impacts on Cottonwood regeneration or on overall riparian habitat.

4. Although non-structural alternatives were examined in more detail in this draft Plan than the previous draft, non-structural alternatives were addressed only individually, not in combination with each other or with various structural alternatives. We think that looking at alternatives in combination or combining the most desirable of these elements could provide base flow augmentation with less impact to peak flows than the proposed alternative. In the scoring of the various alternatives, the non-structural alternative #3 (Instream flow rights) had the second best score based on the developed criteria (page 71).

5. The proposed action, alternative 14, is not analyzed in the same detail as the first 13 alternatives. Alternative 14 requires not only the 5,000 AF enlargement of Elkhead Reservoir which was analyzed for impacts, but an additional expansion of 7,000 AF for a total of 12,000 AF. Such a large departure from the other alternatives surely warrants additional analysis. The 12,000 AF enlargement was only analyzed relative to cost, and in one short paragraph on pg 73.

6. The plan is unclear on how augmented flows would actually be protected. Uncertainties still remain regarding the certainty of water released for augmentation actually reaching the critical habitat reaches, due to the potential of that water being diverted by other users before reaching the critical habitat reaches. How does water released for flow augmentation under the preferred alternative have any greater protection than water released for augmenting flows under other alternatives to provide benefits to the fish? We submit that this plan should have a legal guarantee that water released for augmentation will reach its delivery point. Failure to guarantee water delivery would negate the benefit of the proposed action (Elkhead enlargement) for endangered fishes therefore obviating the need for the enlargement.

7. As the Plan constitutes a federal action, it is incumbent upon FWS as the lead federal agency, and a sister agency within the Department of Interior, to ensure that it does not violate the legislative direction under which the National Park Service operates. Of particular importance are the provisions of 16 U.S.C. 1, as amended, which direct the Secretary of Interior to manage NPS areas" ... in such manner and by such means as will leave them unimpaired...." The environmental analysis of recovery plan actions must provide information and analyses with sufficient certainty to determine whether proposed and alternative actions would individually or cumulatively adversely affect resources in Dinosaur National Monument. For example, the analysis of impacts to peak flows does not properly follow through with an analysis of what effects the anticipated reduction in peak flows would have on downstream resources in Dinosaur National Monument.

8. An additional issue recently brought to our attention that was not addressed in the Plan or EA is the invasion of tamarisk in the lower Yampa River, and the vulnerability of the Colorado pikeminnow spawning bar to this invasion. Tamarisk has been shown to invade riparian areas and stream bottoms in even relatively undeveloped river systems. The establishment of tamarisk stands within floodplains and inside bankfull perimeters, including mid-channel cobble bars, can cause narrowing of the river channel by incrementally anchoring banks and sediments sufficiently to withstand normal flushing flows. This process appears to have been accelerated in the Green River due to reduced peak flows. Many cobble bars in Lodore Canyon are now blanketed in sand and heavy tamarisk growth, which can no longer be removed by the available peak flows. If this process occurs at the Colorado pikeminnow spawning bar, it could be lost as spawning habitat. Loss of this spawning habitat would be a catastrophic blow to the Colorado pikeminnow population. Reduction in peak flows on the Yampa River could accelerate this process. Dinosaur National Monument has implemented research on the geomorphic effects of tamarisk invasion and removal, and the efficacy of removal methods. We submit that a tamarisk monitoring and removal program should be implemented in the lower Yampa River, as part of this Plan.

9. The importance of peak flows in the Yampa River and their contribution to a more natural hydrograph in the Green River is emphasized several times in the Plan; however, there are no peak flow recommendations in the Yampa River. The lack of high/peak flow recommendations in the Yampa River is a serious shortcoming. The reason given for no peak flow recommendation is that the Yampa River peak flows are relatively unaffected by development to date. However, with the anticipated reductions in peak flows as a result of the proposed action and future potential reductions, we submit that peak flow recommendations are necessary to protect this important aspect of the Yampa River hydrograph, and should be included in this Plan.

10. We are concerned that the Plan is unable to quantify the impacts of increased water development or the benefits of proposed recovery actions. In the absence of a credible approach to predicting the responses of endangered fish populations to the suite of proposed actions and allowed depletions, we believe that water development

should be contingent upon documented progress toward recovery (i.e. increased abundance and recruitment of the endangered fish species).

Specific Comments:

1. p. 13 graphs C and B are reversed.

2. p. 15, Table 2. Lists distribution of Colorado pikeminnow in the Duchesne River as the lower 6 RM above Green River confluence. However, Modde and Haines (2003) captured Colorado pikeminnow in the Duchesne River as far upstream as RM 33.3, while most were caught below the Uinta River (RM 14.4).

3. The plan acknowledges the impacts of development on the Yampa extend well into the middle Green River and that depletions from the Green River affect endangered fish in the Yampa; however, the plan and your response to our previous comments state the plan will not address the impacts of depletions from the Green River mainstem or any of its tributaries other than the Yampa. We maintain that because these systems are integrally related and because effects on the endangered fish in the Middle Green River also affect populations in the Yampa this points to the need for a cumulative impacts analysis in an Environmental Impact Statement. We recommend that the plan be revised to consider the relationships between depletions and other water management activities, and how they might exacerbate or ameliorate impacts on endangered fish and their habitats in both the Green and Yampa Rivers.

4. **Evaluation of Alternatives**. We recommend that this section be expanded to include an evaluation of incremental and cumulative effects on resources in Dinosaur National Monument. We would be pleased to work with you to develop this analysis.

5. Under **Framework for Recovery Actions and Cooperative Agreement**, the plan suggests that it specifies approaches to evaluate effectiveness of recovery actions. It would seem to us that it would be prudent for the Recovery Program to demonstrate the effectiveness of proposed recovery actions *prior* to adding another stressor to endangered fish populations and their habitats.

6. We also recommend that the **Background** under the **Reduce Negative Impacts of Nonnative Fishes** section be revised to discuss the current situation in the Yampa - the apparent loss of forage fish, greatly increasing numbers of northern pike and smallmouth bass, apparent loss of the recruitment-sized cohort of Colorado pikeminnow, northern pike bites on a substantial portion of large adult pikeminnow, etc. The current situation suggests a much greater potential impact to endangered fishes in the Yampa River than the document implies. Moreover, the increasing numbers of nonnative predators may presage a greater impact to endangered fish downstream into the middle Green River, an issue which should be discussed in an expanded examination of cumulative effects.

7. We have several comments regarding the text under **Proposed Control Actions for Nonnative Fishes in the Yampa River**:

   a. This section includes many statements that the Recovery Program "will" or "may" initiate various actions to reduce the impacts of nonnative fishes. Because these possible future actions are not spelled out in the plan, additional depletions should only be proposed to the degree that they can be demonstrated to insignificantly stress the endangered fishes and their habitats. The Plan should note that the effectiveness of current nonnative control efforts has not been demonstrated, and that many of the recommended non-native fish removal actions remain to be initiated.

   b. On p. 79, removal of angler bag and possession limits are discussed. The plan should be amended to acknowledge that much of the current fishing for nonnative fishes is catch-and-release, an activity that does little or nothing to reduce nonnative fish populations. Perhaps the plan should consider a proposal similar to that which the Colorado Division of Wildlife (CDOW) has imposed on east slope reservoirs - that any northern pike (and smallmouth bass) caught through angling must be removed from the river.

We look forward to working with you and others to strengthen and complete this Plan. Please call on Melissa Trammell at 801 539-4255 or John Reber at 303 969-2418 to discuss any questions you might have.

Karen P. Wade

cc:

Ralph Morgenweck, Regional Director, Region 6, U.S. Fish and Wildlife Service, 134 Union Boulevard, Suite 400, Lakewood Colorado 80228-1807
Assistant Regional Director for Natural Resources and Science, Intermountain Region
Colorado State Coordinator
Chief, Water Resources Division
J. Wullschleger, Water Resources Division
Supt. Dinosaur NM
T. Naumann, Dinosaur NP

"Water Consult"
<h2orus@WaterConsult.com>

09/08/2003 02:55 PM

To: "Gerry Roehm" <gerry_roehm@fws.gov>
cc: "Bob Muth" <robert_muth@fws.gov>
Subject: Water Users' Comments on "Draft Management Plan for Endangered Fish Species in the

Water Consult Engineering and Planning Consultants

535 N. Garfield Avenue, Loveland, Colorado 80537 Phone: 970-667-8690 FAX: 970-667-8692 E:mail: h2orus@waterconsult.com

MEMO TO: Gerry Roehm

cc: Bob Muth

Executive Committee, Colorado Water Congress Colorado River Project

FROM: Tom Pitts

SUBJECT: Water Users' Comments on "Draft Management Plan for Endangered Fish Species in the

Yampa Basin - Environmental Assessment"

Thanks for your thoughtful response to my concerns regarding the statements in the draft management plan and EA that might have resulted in requiring existing ditch owners to install fish screens and fish passages at their own expense. As I stated, this is contrary to fundamental agreements of the Recovery Program, including the Section 7 agreement.

I have no objection to acknowledging the budgetary constraints of the Recovery Program and stating that if fish screens or fish passages are found to be necessary, installation will be contingent upon appropriations by Congress and modification of the Recovery Action Plan by the Recovery Program. However, it needs to be made clear, as I requested in my comments, that the burden for any fish passages or fish screens on diversions with historic depletions will fall on the Recovery Program, not water users. If you need a reference for this, I would suggest you reference the appendix of the draft plan/EA that includes the Section 7 agreement.

I will be glad to review any language changes that are proposed for the relevant sections.

I appreciate your quick response and positive efforts on this issue.

(1802-22-04-03)

Gerry Roehm response to initial comments

Comments on
Draft Management Plan for Endangered Fishes in the Yampa River Basin
Environmental Assessment

Submitted by
Tom Pitts
Upper Basin Water Users Representative
Upper Colorado Endangered Fish Recovery Program
August 29, 2003

INTRODUCTION

The comments provided below are on behalf of the Upper Basin Water Users. In addition to these comments, I am submitting a marked up draft of the plan and EA under separate cover. The comments on the marked-up draft includes recommendations for clarity and editorial changes.

COMMENTS

1. Fatal flaw regarding assignment of responsibilities for fish passages and fish screens on "historic" structures.

P.31 – Framework for Recovery Actions and Cooperative Agreement: This section includes the following statements:

> "In addition, this plan requires the Program to identify and rectify problems of fish entrainment as structures **as these structures existed at the inception of the Program in 1988. However, if existing structures subsequently are proposed to be modified in such a way that they would likely impede passage of or entrain endangered fish, then additional modifications may be required of those projects to reduce or eliminate take.**"

Comment: As explained below, there is no basis for the qualification placed on Recovery Program responsibilities in the first sentence above, i.e., "as these structures existed at the inception of the Program in 1988."

P.82 – Restore Native Fish Passage and Reduce Impacts of Maintaining Diversion Structures

The 2nd paragraph states:

> "Nevertheless, new diversion structures constructed within critical habitat could affect fish passage. New structures, in this case, **include reconstruction of or other modifications to existing structures such that they impede migration**. The Program will develop guidelines to ensure that any diversion structures constructed/modified within critical habitat are designed to allow for fish passage with the incremental construction cost, if any, to be borne by the project proponent(s). However, if passage is built into the design of these structures, the Program anticipates such incremental costs to be negligible compared to the cost of retrofitting existing structures." *(emphasis added)*

In describing the proposed action (p.83), it is stated that

> " . . . the Program will provide "written guidelines to project proponents for construction of any new/modified diversions and other structures of critical habitat on the Yampa River to facilitate fish passage and to minimize impacts inherent to their routine maintenance . . . Adherence of these guidelines should be a condition of any federal permit(s) required for the project or, if no other federal action is involved, a condition of an incidental take permit issued by the Service pursuant to Section 10 of the ESA. The Service will coordinate with the U.S. Army Corps of Engineers to ensure that the Corps enforces compliance with any such guidelines when issuing permits under Section 404 of the Clean Water Act for new diversions structures and other potential barriers to fish migration."

Reduce/eliminate Entrainment of Colorado Pikeminnow at Diversion Structures (p.84). The 1st paragraph properly acknowledges that the Program will bear the capital costs of modifying diversions to minimize or prevent Colorado pikeminnow at two existing structures, and that the cost of operating and maintaining these structures shall be borne by the Program. However, the plan goes on to state:

> "The Program will also develop guidelines for plans and specifications to minimize or prevent entry of Colorado pikeminnow into canals at new facilities proposed for construction or significant modifications (e.g., replacing an ephemeral structure with a durable one). Adherence to these guidelines should be a condition of any federal permit(s) required for the project or, if no other federal action is involve, a condition of an incidental take permit issued by the Service pursuant to Section 10 of the ESA. The Service will coordinate with the U.S. Army Corps of Engineers to ensure that the Corps enforces compliance with any such guidelines when issuing permits under Section 404 of the Clean Water Act for new diversion structures." *(emphasis added)*

Comment: The proposals to require parties modifying diversion structures in existence at the inception of the Program to pay for fish passages and fish screens violates the agreements that underpin the Recovery Program. These terms must be deleted in order to make this Plan and EA acceptable. Furthermore, statements must be added that clearly exempt pre-1988 structures from paying for fish screens and fish passages. Such language must be included in the EA and the PBO.

The proposals to require parties diverting prior to January 22, 1988 to install fish passages and fish screens at their own expense is in direct violation of the Section 7 agreement adopted by the Program, and agreed to by USFWS. In particular, Section III.2 states as follows:

> "The RIP is intended to offset both the **direct** and depletion impacts of historic projects occurring prior to January 22, 1988 (the date when the Cooperative Agreement for the RIP was executed) if such offsets are needed to recover the fishes. Under certain circumstances, historic projects may be subject to consultation under Section 7 of the ESA. An increase in depletions from historic project occurring after January 22, 1988, will be subject to the depletion charge. Except for the circumstances described in item 11 below, depletion charges **or other measures** will not be required from historic projects which undergo Section 7 consultation in the future." *(emphasis added)*

Note: Paragraph 11 deals with a case where the RIP fails to serve as the reasonable and prudent alternative.

The Section 7 agreement and the fundamental agreements in the Recovery Program cannot be modified by a management plan, EA, or a programmatic biological opinion. Rather, those documents must be based on the fundamental agreements of the Recovery Program.

In order to be acceptable, the language in the plan must be modified to reflect that if fish passages or fish screens are needed at any structures in place as of January 22, 1988, the Recovery Program will bear the cost of those passages and screens. It is appropriate, under the Section 7 agreement, for structures constructed after January 22, 1988 to be evaluated, and for those structures to provide fish passages and fish screens, if needed to aid recovery.

On December 17, 2001, via memo from Tom Pitts to Gerry Roehm, on "Comments on "Management Plan for Yampa Basin" final draft October, 2001," I included the following:

> "4. On p.78, under the heading "Reduce/eliminate entrainment of Colorado pikeminnow diversion structures" statements are made that "New facilities, in this case, includes (sic) any re-construction or modification of existing structures such that their levels of incidental take, individually or cumulatively, exceed those anticipated by Yampa PBO." (2nd paragraph, p.78 and 4th paragraph p.78).
>
> I do not agree that re-construction or modification of existing structures require the owners to bear the entire cost of fish screens under the Recovery Program on the Yampa basin, or any other part of the Upper Basin, if existing depletions remain the same. Existing depletions are those defined in the Recovery Program as being in place as of January 21, 1988. On reconstructed facilities that maintain existing depletions, the Recovery Program will be responsible for providing fish screens, if the Recovery Program determines that such fish screens are necessary. Reconstructing a facility to maintain an existing depletion is not a basis for requiring that party to construct a fish screen at their own expense. The statements to this effect in the 2nd and 4th paragraphs on p.78 need to be deleted."

If the proponent of this approach had issues with my statement on December 17, 2001, I should have been informed.

The proposed actions need to be explicitly modified to include the fact that the Program will construct fish screens and fish passages at re-constructed "historic" structures, if needed. This concept needs to be <u>explicitly</u> carried forward into the programmatic biological opinion, so that there is no confusion on this matter in the future.

2. Appendix B – Proposed Draft Cooperative Agreement

The plan and EA should emphasize that the proposed draft cooperative agreement in Appendix B is a draft and may be modified in the future upon further review.

Note: Reference Section 7 agreement in Appendix A.

3. Proposed action for base flow augmentation (p.73)

Arrangements for base flow augmentation are described in this section. These arrangements include Recovery Program construction of 5,000 AF of reservoir space and a 20 year lease of up to 2,000 AF/yr of augmentation water from the River District.

It is indeed unfortunate that the Recovery Program is not purchasing the additional 2,000 AF of storage at Elkhead on a permanent basis, given the uncertainty of future actions that may be taken in 20 years, and the uncertainty associated with the continuation of the lease arrangement after 20 years to benefit the endangered fish.

We understand that the Recovery Program and River District have accepted these terms, even though financially they are detrimental to the District, i.e., the lease price does not pay for the cost of storage. For the record, however, I contend that in the long term it is a mistake not to purchase that storage and to provide additional certainty for the endangered fish.

WESTERN RESOURCE ADVOCATES
Formerly **Land and Water Fund of the Rockies**

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

September 4, 2003

RECEIVED
SEP 11 2003
Co River Recovery Program

Dr. Robert Muth
Director
Upper Colorado River Recovery Program
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Re: *Draft Management Plan for Endangered Fishes in the Yampa River Basin*

Dear Dr. Muth,

Thanks for you for the opportunity to comment on the U.S. Fish and Wildlife Service document, *Draft Management Plan for Endangered Fishes in the Yampa River Basin* ('Yampa Plan'). We commend the Service's collaborative effort and analytic rigor in preparing this draft management plan. However, we have several concerns regarding specific aspects of the proposed Yampa Plan:

1) **Peak Flow Monitoring:** The Yampa Plan states, "peak flows are particularly important in creating and maintaining spawning habitats for the endangered fishes in the Yampa River, as well as nursery habitats for Colorado pikeminnow and razorback sucker in the Middle Green River downstream from Yampa (p. xv)" and recommends that, "reductions in peak flows be minimized to the greatest extent practicable (p 33)." A modeling analysis (Appendix G) projects that future water development will have only a minimal impact (2-5%) on the peak flow magnitude and will not significantly impair the river's geomorphic capacity. The Program should track the impacts of future depletions to the peak flow regime and monitor the maintenance of peak-flow dependent habitat[1]. If monitoring indicates that peak flow impacts exceed projections and the program detects declines in species habitat, the U.S. Fish and Wildlife Service should consider the need to reinitiate consultation and supplement or amend its biological opinion.

2) **Non-native fishes:** Recent research suggests that the current abundance of non-native fish is perhaps the primary cause of the on-going decline of endangered fish in the Yampa.

[1] This is particularly critical with respect to tamarisk; although the environmental assessment concludes that projected reductions in peak flows "should not promote invasion of tamarisk in the canyon (p. 118)," diminished peak flows and the potential for increased tamarisk invasion should not simply be dismissed, given the potentially dire consequences for the fish, particularly to the pikeminnow spawning bar.

However, we are concerned that the Yampa Plan does not contemplate the aggressive management actions (including much more widespread removal) that are likely necessary to control non-natives and to reduce their impact on the endangered fish[2]. We urge the Recovery Program to acknowledge the non-native problem in the Yampa basin and to take every action possible to reduce the impact of non-natives on the endangered fish of the Yampa River. A $9 million investment in Elkhead expansion for baseflow augmentation and other actions to limit non-native stocking and escapement throughout the basin will be meaningless if non-native fish already in the system continue to decimate the remaining pikeminnow in the Yampa. The Yampa Plan should adequately reflect the magnitude of the non-native challenge, and we will continue to work with the Program to ensure that meaningful and effective non-native control activities are implemented as soon as possible.

3) **Base-flow augmentation alternatives:** Ultimately, the Yampa Plan selects a proposed action for base-flow augmentation that "differs from any of the (14) alternatives evaluated (p73)." While it may be reasonable to evaluate this proposed action as a combination of existing alternatives, we believe that an array of uncertainties still remains regarding the proposed action. In particular, we are concerned about several critical aspects of the proposed action, including operational protocols for the expanded Elkhead, priority of the augmentation water, legal protection of augmentation water through critical habitat, and some financial uncertainties. We will continue to work with the Recovery Program and CRWCD to resolve outstanding questions regarding the proposed action for base-flow augmentation. These questions should be resolved before the Program commits funding to this project.

We appreciate your efforts to produce a meaningful management plan for the Yampa River Basin, one that will recover the endangered fish while allowing existing and some future water depletions to continue. We look forward to continued cooperation in addressing the questions that we have identified above, and others that may arise through the public comment period.

Sincerely,

Dan Luecke
Implementation Committee Representative
Western Resource Advocates

Thomas M Iseman
Tom Iseman
Management Committee Representative
The Nature Conservancy

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[2] We eagerly await the results of this year's experiments on non-native control in the Yampa Basin, and the subsequent discussion of appropriate management response. But given our current understanding of the non-native problem, our comment stands.

STATE OF COLORADO

Bill Owens, Governor
Douglas H. Benevento, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department of Public Health and Environment

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SEP 4 2003
Co River Recovery Program

Gerry Roehm
Upper Colorado River Fish Recovery Program
U.S. Fish and Wildlife Service
P.O. Box 25486, Denver Federal Center
Denver, Colorado 80225

RE: Draft Management Plan Environmental Assessment – Yampa River Basin

Dear Gerry:

We have reviewed the draft plan EA dated July, 2003. It is recognized that you and your agency have devoted a lot of time and effort to this plan. Alternatives reviewed in the plan are appropriate and we are supportive of the recommended alternatives for basin flow augmentation.

The issue we present here concerns water quality. Our review of the document indicates that existing (ambient) water quality is not addressed to any extent in the EA, in terms of how it might affect endangered fish and their recovery. The primary contaminant of concern is selenium. Because there are stringent standards for selenium, specifically due to toxicity to aquatic life, we believe there is a need to look at water quality and how it might affect fish and future recovery.

The Water Quality Control Division has recently compiled water quality data for the Yampa Basin, both the upper and lower reaches, for the triennial review of water quality standards by the Water Quality Control Commission. Each of the stream segments described in our standards has been reviewed as to what data is available over the last five years. That data is compared to the applicable numeric standard for different contaminants or water quality measures.

The statewide numeric standard to protect aquatic life for selenium is 4.6 ug/l. One of the river segments of concern is Segment 3 of the Lower Yampa, which is described as the Yampa mainstem from the confluence of Lay Creek to the confluence of the Green River. Recent ambient data indicates the selenium concentration is 4.0 ug/l, which approaches the aquatic standard and appears to be on a rising trend. In the EA draft plan, in Table 30 on Page 91, selenium is not listed as a water quality parameter. There is no historical data for selenium in the report. In Table 30, other parameters listed show rising trends (higher concentrations) for parameters such as pH, dissolved solids, sodium, and sulfate.

Segment 5 of the Lower Yampa in our standards, described as the mainstem of Fortification Creek from the confluence of the North and South Forks to the Yampa confluence, indicates a selenium concentration of 4.95 ug/l, which exceeds the aquatic life standard. This segment is tributary to the Lower Yampa Segment 3. As I mentioned at the public meeting in Steamboat Springs on August 12, the water quality standard for selenium is primarily due to evidence presented to the Water Quality Control Commission by U.S. Fish and Wildlife. There has been discussion of a more strict standard for selenium in the range of 2.0 – 2.5 ug/l.

The primary preferred alternative in the EA is to increase the capacity of and release more water from Elkhead Reservoir. Limited data that we have indicates the concentration of selenium from Elkhead Creek sites is approximately zero. Introducing additional water to the Yampa with little or no selenium will likely have a small, positive effect on the Yampa. However, water quality in the lower reaches which are critical habitat for the endangered fish, could be a limiting factor in their recruitment and recovery.

We ask that you look at this issue in terms of the water quality assessment in the EA, and consider recommending that a water quality monitoring element be incorporated in the recovery program. The Water Quality Control Division and the U.S. Geological Survey would be willing to work with your agency on water quality monitoring issues associated with the fish recovery program. The Environmental Protection Agency, Region VIII is working with Fish and Wildlife to further develop criteria for selenium and toxicity to aquatic life.

We appreciate the opportunity to comment of the draft plan. The Division appreciates your long-standing dedication to the fish recovery effort, Gerry. Please feel free to contact me to discuss these issues, or Phil Hegeman of our Assessment Unit at 303-692-3518 or phil.hegeman@state.co.us. Thank You.

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APPENDIX G

EVALUATION OF PEAK-FLOW IMPACTS

EVALUATION OF PEAK-FLOW IMPACTS

INTRODUCTION

Peak flows are particularly important in creating and maintaining spawning habitats for the endangered fishes in the Yampa, as well as nursery habitats of the Colorado pikeminnow and razorback sucker in the Middle Green River downstream from the Yampa confluence to Ouray, Utah (Andrews 1978, 1986; Elliott et al. 1984; O'Brien 1987). These habitats are critical to the recovery of the Yampa/Green River populations of these fish species (Day & Crosby 1997; Holden 1978, 1980; Muth et al. 2000; Rakowski & Schmidt 1996; Schmidt 1996; Tyus 1987; Tyus & Karp 1991; Wick 1997). The Yampa River not only contributes as much volume as the Green River, but also provides a more natural shape to the hydrograph downstream from their confluence. Therefore, an evaluation of peak-flow impacts due to implementation of the *Management Plan for the Endangered Fishes in the Yampa River Basin* is considered essential to an overall assessment of environmental impacts. This evaluation is intended to show how peak-flow reductions due to depletions will affect sediment delivery and transport, particularly to and through the Yampa Canyon reach. Impacts to the Jensen-Ouray reach of the Green River also will be addressed.

METHODS

Stream flows were modeled with the Colorado River Decision Support System (CRDSS) developed specifically for the Yampa and Little Snake rivers by the Colorado Water Conservation Board (CWCB) in consultation with the Wyoming State Engineer's Office. The CRDSS encompasses a 90-year period (water-years 1909–1998) during which alternative demand conditions were applied to an historical hydrologic template. In this case, three demand conditions were evaluated: historic, undepleted and future. "Historic" demand conditions are considered representative of what actually occurred during the period of record, wherein both demand and hydrology varied over time. The "undepleted" data set uses the same set of underlying hydrologic conditions as the historic data set, but with no consumptive demand throughout the entire 90-year period. Therefore, undepleted flows generally are higher than their corresponding historic flows, although releases from storage under historic demand conditions occasionally could cause higher base flows relative to undepleted flows. Conversely, the "future" data set applies an arbitrary set of future demand conditions (in this case, 2045) upon the historic hydrology, resulting in generally lower flows than either undepleted or historic. The future demand data set, however, is driven by hydrologic conditions, as well. For example, cool, rainy, overcast conditions during the growing season would serve to reduce consumption, whereas hot, dry, windy conditions during this period would exacerbate consumption.

The output of the Yampa CRDSS is expressed as monthly discharges in acre-feet (AF) for a number of different "nodes" in the river system. Maybell was one of the nodes selected because the Maybell gage has the longest, most reliable record of any gage on the Lower Yampa River. It has been in continuous operation since 1916, and was the reference gage used in developing base-flow recommendations for the Yampa River (Modde et al. 1999). However, the Maybell gage is located 3 rivermiles downstream from the Maybell Canal, a major irrigation diversion, whose return flows are not reflected in the gage record. Conversely, several high-capacity irrigation pumps below Maybell may reduce river flows downstream from the gage.

The Deerlodge Park gage is located on the Yampa River 5 rivermiles downstream from the confluence of the Little Snake River, the largest tributary to the Yampa. The gage at Deerlodge Park captures inflows from the Little Snake, as well as return flows from Maybell Canal diversions and depletions by pumps downstream from the Maybell gage. Because there are no significant inflows or diversions downstream from the Little Snake River, the Deerlodge gage is most representative of Yampa River flows through Yampa Canyon to its confluence with the Green River. However, this gage has been in continuous operation only since 1982, and has experienced several lengthy interruptions in service and anomalous readings at other times due to heavy siltation from the Little Snake River. Therefore, flow modeling did not rely on the Deerlodge Park gage record alone.

A separate gage on the Little Snake River at Lily Park, 9 rivermiles upstream from the confluence of the Yampa, was selected to represent the influence of this important tributary. This gage has been in continuous operation since 1921 and has experienced neither the frequency nor the severity of problems as the gage at Deerlodge Park. Statistical analyses indicate a high correlation (99.9%) between Deerlodge Park gaged daily flows and the sum of Lily Park and Maybell gaged daily flows over their coincidental period of record (water-years 1982–1994). Deerlodge Park average gaged flows were 101.5% of the sum of the Lily Park and Maybell gages during this period (Figure G-1). Therefore, flows at Deerlodge Park were synthesized by adding Lily Park gaged daily average flows to daily average flows at Maybell.

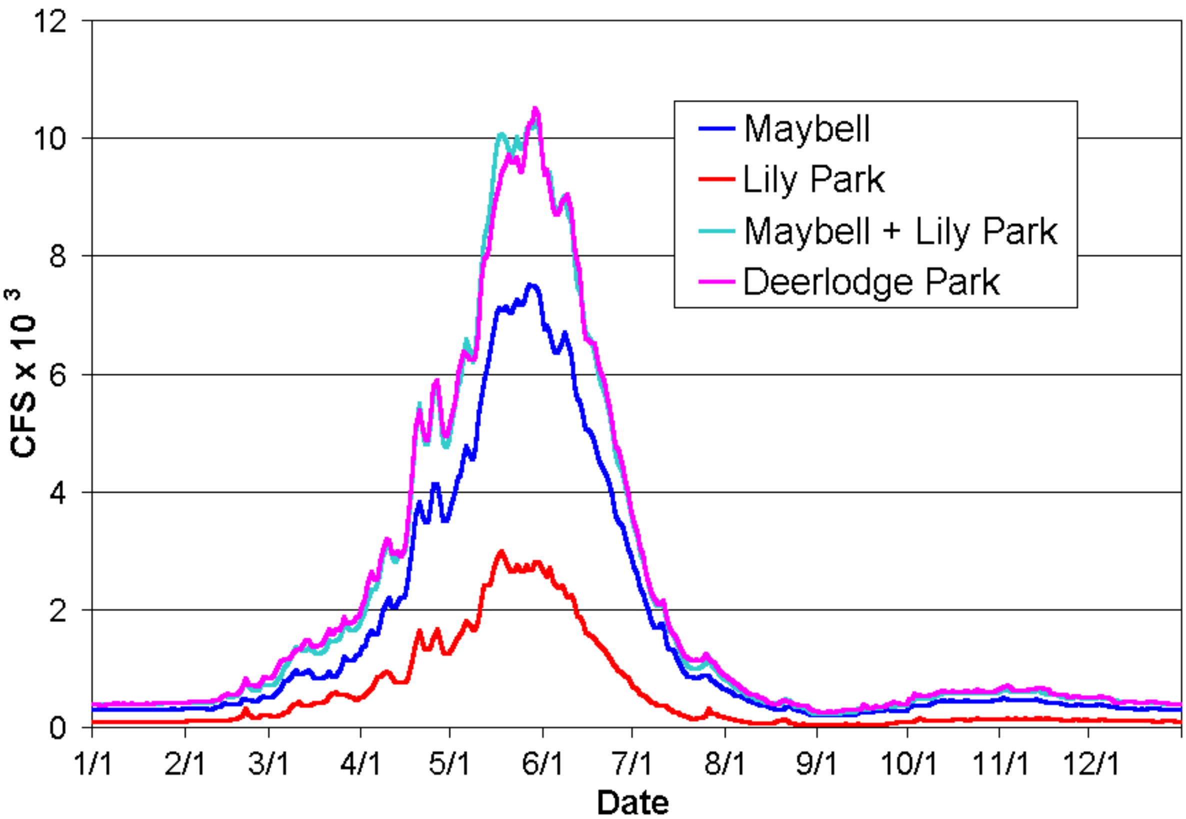

Figure G-1. Comparison of average annual hydrographs for the Yampa River at Deerlodge Park and Maybell and the Little Snake River at Lily Park, Colorado (October 1, 1982 - September 1, 1994)

Similarly, there is a high correlation (99.7%) between Green River flows at Jensen, Utah, and the sum of Deerlodge Park gaged flows plus Green River gaged flows at Greendale, Utah, where Jensen flows average 100.7% of the sum during the same period. This is not surprising given that there are relatively little inflows or depletions between the two upstream gages and Jensen. However, flows at Greendale and Jensen are influenced by operation of Flaming Gorge dam, which reduces peak flows and elevates base flows (Figure G-2).

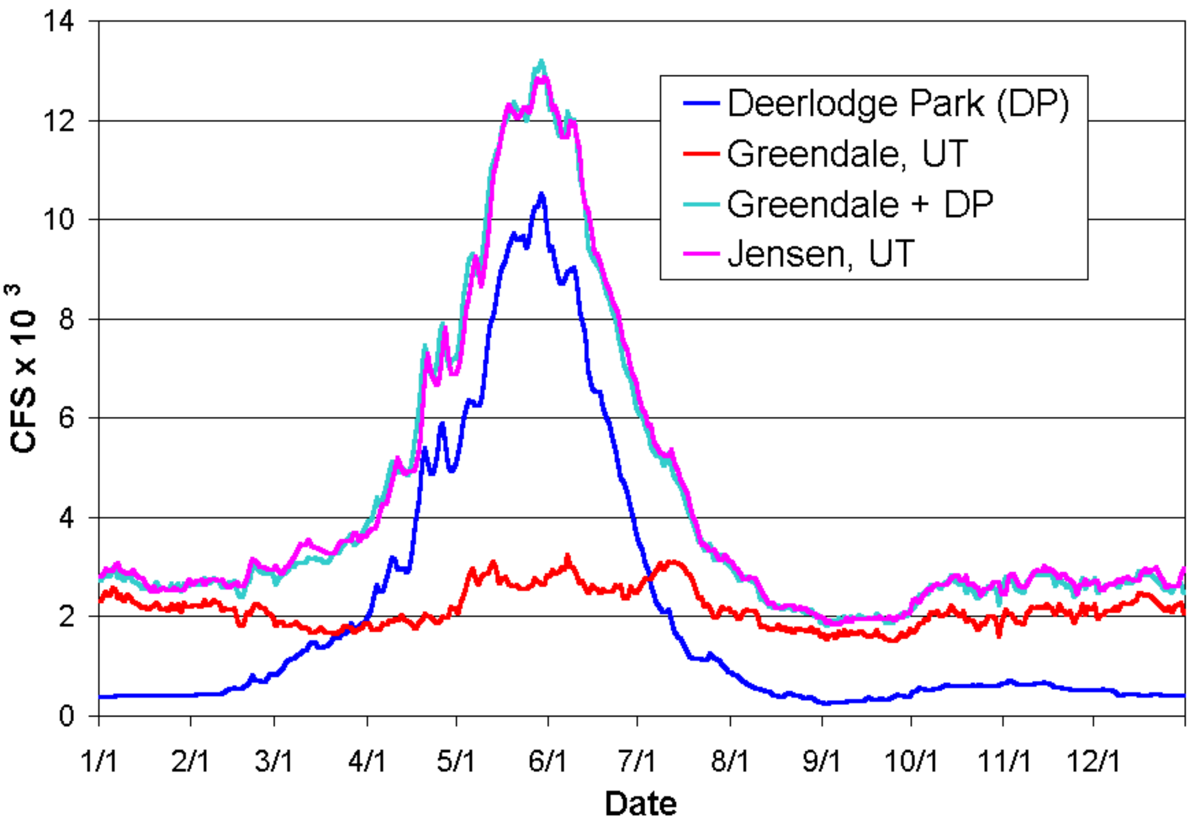

Figure G-2. Comparison of average annual hydrographs for the Yampa River at Deerlodge Park, Colorado, and the Green River at Greendale and Jensen, Utah (October 1, 1982 - September 1, 1994)

To derive, or disaggregate, daily flows from CRDSS monthly outputs, daily values were linearly interpolated between monthly data for each of the three demand conditions (Figure G-3, graph A) at each of two nodes (Maybell and Lily Park). To simulate the asymmetric distribution of flows, a "center-of-mass" date was calculated for each month from October 1921 through September 1998. The center-of-mass date is the day of the month by which half the total monthly gaged discharge occurred at Maybell. The same center-of-mass dates were used for Lily Park. These dates are the x-axis coordinates of monthly CRDSS data (diamonds in Figure G-3, graph A). The earliest center-of-mass date was the 5th (June 1934) and the latest was the 26th (March 1971). So, rather than 28, 30 or 31 days separating adjacent monthly data points, intervals ranged from 19 to 46 days. These intervals were used for interpolating daily values. Each of the Undepleted and Future daily values was divided by its corresponding Historic daily value to determine daily percentages relative to corresponding Historic flows (Figure G-3, graph B), where 100% indicates equality with historic flows. These daily percentages were multiplied by the actual gaged flows at Maybell and Lily Park to produce estimates of daily Undepleted and Future flows at these gages (Figure G-3, graph C).

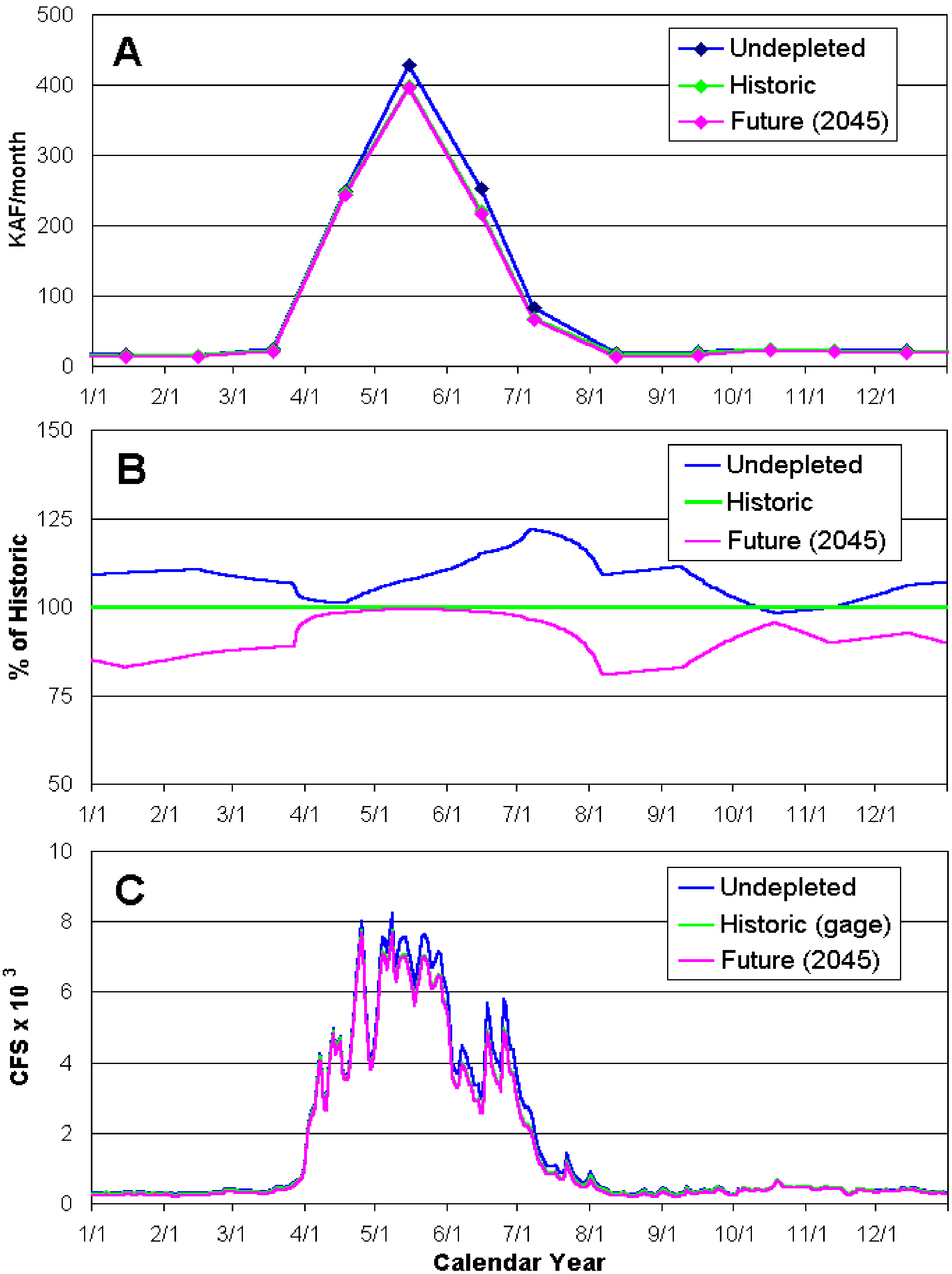

Figure G-3. **A**) Undepleted (◆), Historic (◆) and Future (◆) monthly discharges with interpolated daily values; **B**) Undepleted and Future daily values relative to Historic (%); **C**) gaged Historic and simulated Undepleted and Future daily flows (gaged flows multiplied by % Historic).

RESULTS

Disaggregating CRDSS monthly discharges into daily average flows, as described above, produced complete annual hydrographs for each of 76 calendar years (1922–1997). Partial hydrographs for 1921 (October-December) and 1998 (January-September) were not included. These 76 years were ranked, based on total undepleted discharge at Deerlodge Park, and placed into one of five different hydrologic categories (Table G-1). The "Wet" hydrologic category consists of the wettest 10% (i.e., ≤10% exceedance) or 8 out of 76 years . "Moderately wet" years are those in the >10–30% exceedance category (15 years); "Average" years, >30–70% exceedance (30 years); "Moderately dry" years, >70–90% exceedance (15 years); and "Dry" years, >90–100% exceedance (8 years).

Average annual historic discharges at Maybell and Lily Park were derived from actual gaged flows in each hydrologic category during this period, whereas the estimated annual historic discharges at Deerlodge Park are the sum of Maybell plus Lily Park discharges. Undepleted and future average annual discharges were derived by multiplying gaged flows by corresponding daily percentages of CRDSS undepleted and future flows relative to CRDSS historic flows (Table G-1, Figure G-4). Average peak flows for each hydrologic category were derived in a similar manner (Table G-1, Figure G-5). Flows at Jensen (Table G-1) were derived by adding synthesized undepleted, historic and future flows at Deerlodge Park to Greendale gaged flows for the period after Flaming Gorge Reservoir first filled (1964–1997). Alternative demand conditions were not applied to historic Greendale flows, because depletions from the Green River are beyond the scope of the Yampa River management plan. These data are provided to demonstrate that the effects of depletions from the Yampa River Basin are diluted farther downstream. In fact, the effects of this dilution are understated in terms of average annual discharge at Jensen, which is roughly twice the volume at Deerlodge Park. Therefore, the expected effect of depletions from the Yampa should be about half as great at Jensen as at Deerlodge (e.g., 5% reduction at Jensen versus 10% reduction at Deerlodge). However, the 34 years of the post-Flaming Gorge period (1964–1997) differ statistically from the 76-year period used for the Yampa. Moreover, the Greendale and Jensen gages reflect a somewhat different hydrologic regime from that of the Yampa. This difference is due, in part, to the geographic separation of the Upper Green River basin from the Yampa River basin and, in part, to the effects of regulation by Flaming Gorge Dam. Therefore, a direct statistical comparison between Jensen and the three Yampa basin gages is not practicable.

Although absolute differences, or delta (Δ), between undepleted and future average annual discharges decrease slightly from wet to dry categories, the percent change increases as undepleted discharge decreases. For example, at Deerlodge Park the absolute difference between undepleted and future average annual discharges under wet hydrologic conditions (210 KAF) is 19% greater than the absolute difference under dry conditions (175 KAF). But these reductions (Δ%) represent 8% and 22% of their corresponding undepleted discharges (2,582 and 802 KAF, respectively). Similar results were observed at Maybell (7–19%) and Lily Park (11–30%). On the other hand, the absolute difference in peak flows increases 24% from wet to dry conditions, representing peak-flow reductions from 7% (wet) to 24% (dry) at Deerlodge. Percent reductions are somewhat higher at Lily Park (12–32%) than at Maybell (5–23%) between wet and dry conditions, although absolute peak-flow reductions were fairly constant at Lily Park (796–940 cfs), while they more than doubled at Maybell (741–1,490 cfs). Differences in annual discharge and peak flow shown in Table G-1 can be more readily compared in Figures G-4 and G-5.

Table G-1. Comparison of Undepleted, Historic and Future average annual discharges and average peak flows for each of five hydrologic categories at Maybell, Lily Park and Deerlodge Park, Colorado, and Jensen, Utah

		Average annual discharge by Hydrologic Category							Average peak flow by Hydrologic Category						
		Undepl.	Historic			Future (2045)			Undepl.	Historic			Future (2045)		
	Hydrologic Category (*N*)[a]	KAF	KAF	ΔKAF	Δ%	KAF	ΔKAF	Δ%	cfs	cfs	Δcfs	Δ%	cfs	Δcfs	Δ%
Maybell	Wet (8)	1,885	1,790	-95	-5%	1,753	-132	-7%	15,714	15,050	-664	-4%	14,973	-741	-5%
	Mod. wet (15)	1,485	1,388	-97	-7%	1,347	-138	-9%	12,499	11,827	-672	-5%	11,709	-790	-6%
	Average (30)	1,150	1,062	-88	-8%	1,021	-129	-11%	10,609	9,856	-753	-7%	9,700	-909	-9%
	Mod. dry (15)	893	805	-88	-10%	768	-125	-14%	8,293	7,565	-728	-9%	7,434	-859	-10%
	Dry (8)	612	518	-94	-15%	494	-118	-19%	6,423	4,998	-1,425	-22%	4,933	-1,490	-23%
Lily Park	Wet (8)	697	657	-40	-6%	619	-78	-11%	7,140	6,749	-391	-5%	6,296	-844	-12%
	Mod. wet (15)	577	542	-35	-6%	501	-76	-13%	6,500	6,214	-286	-4%	5,704	-796	-12%
	Average (30)	434	402	-32	-7%	362	-72	-17%	5,162	4,758	-404	-8%	4,222	-940	-18%
	Mod. dry (15)	284	251	-33	-12%	217	-67	-24%	3,355	2,919	-436	-13%	2,558	-797	-24%
	Dry (8)	190	156	-34	-18%	133	-57	-30%	2,571	2,047	-524	-20%	1,756	-815	-32%
Deerlodge[b]	Wet (8)	2,582	2,447	-135	-5%	2,372	-210	-8%	22,542	21,534	-1,008	-4%	21,014	-1,528	-7%
	Mod. wet (15)	2,062	1,930	-132	-6%	1,849	-213	-10%	18,521	17,543	-978	-5%	16,927	-1,594	-9%
	Average (30)	1,584	1,464	-120	-8%	1,383	-201	-13%	15,323	14,225	-1,098	-7%	13,486	-1,837	-12%
	Mod. dry (15)	1,177	1,056	-121	-10%	985	-192	-16%	11,551	10,227	-1,324	-11%	9,704	-1,847	-16%
	Dry (8)	802	674	-128	-16%	627	-175	-22%	8,017	6,632	-1,385	-17%	6,126	-1,891	-24%
Jensen[c]	Wet (3)	5,376	5,231	-145	-3%	5,159	-217	-4%	29,894	28,605	-1,289	-4%	28,159	-1,735	-6%
	Mod. wet (7)	3,829	3,666	-163	-4%	3,597	-232	-6%	20,649	19,770	-879	-4%	19,285	-1,364	-7%
	Average (14)	3,296	3,140	-156	-5%	3,067	-229	-7%	19,592	18,313	-1,279	-7%	17,770	-1,822	-9%
	Mod. dry (7)	2,346	2,166	-180	-8%	2,114	-232	-10%	12,809	11,486	-1,323	-10%	11,127	-1,682	-13%
	Dry (3)	1,915	1,730	-185	-10%	1,685	-230	-12%	11,365	9,594	-1,771	-16%	9,213	-2,152	-19%

[a] Based on a statistical distribution of synthesized undepleted annual discharges at Deerlodge Park[b] (1922–1997), except Jensen for which synthesized undepleted annual discharges at Jensen[c] (1964–1997) were used.

[b] Average annual discharges at Deerlodge Park equal the sums of CRDSS annual discharges at Maybell and Lily Park. However, peak flows do not equal Maybell plus Lily Park peaks, because their respective peaks do not always occur on the same day(s).

[c] Average annual discharges at Jensen equal the sums of Deerlodge Park[b] and Greendale gaged flows, limited to the 34-year period after the initial filling of Flaming Gorge Reservoir (1964–1997). However, these data are not comparable with Deerlodge Park data above, because they are based on fewer years that are not normally distributed with respect to the longer period of Deerlodge Park.

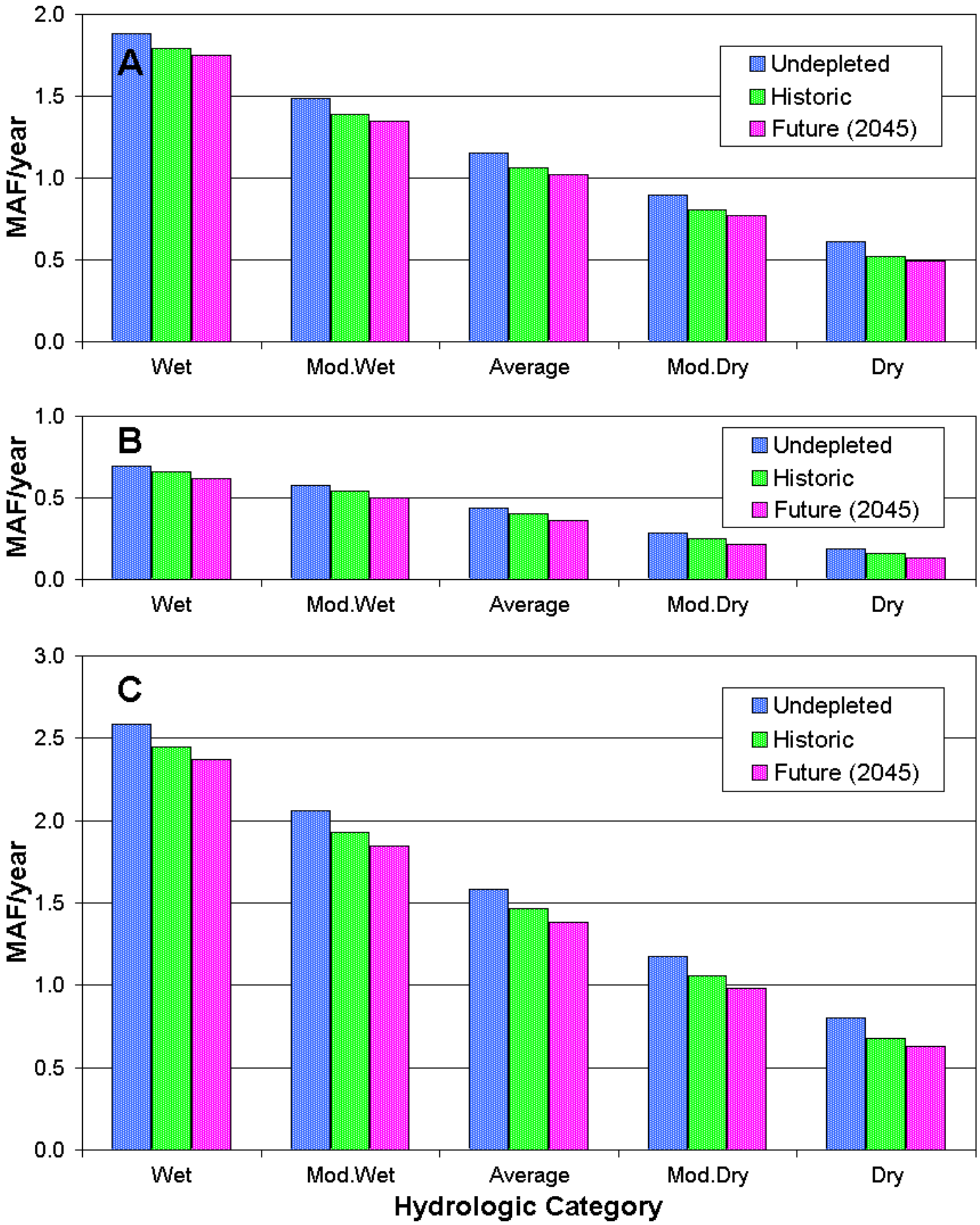

Figure G-4. Average annual discharge in millions of acre-feet (MAF) for each of five hydrologic categories at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park under Undepleted, Historic and Future demand conditions.

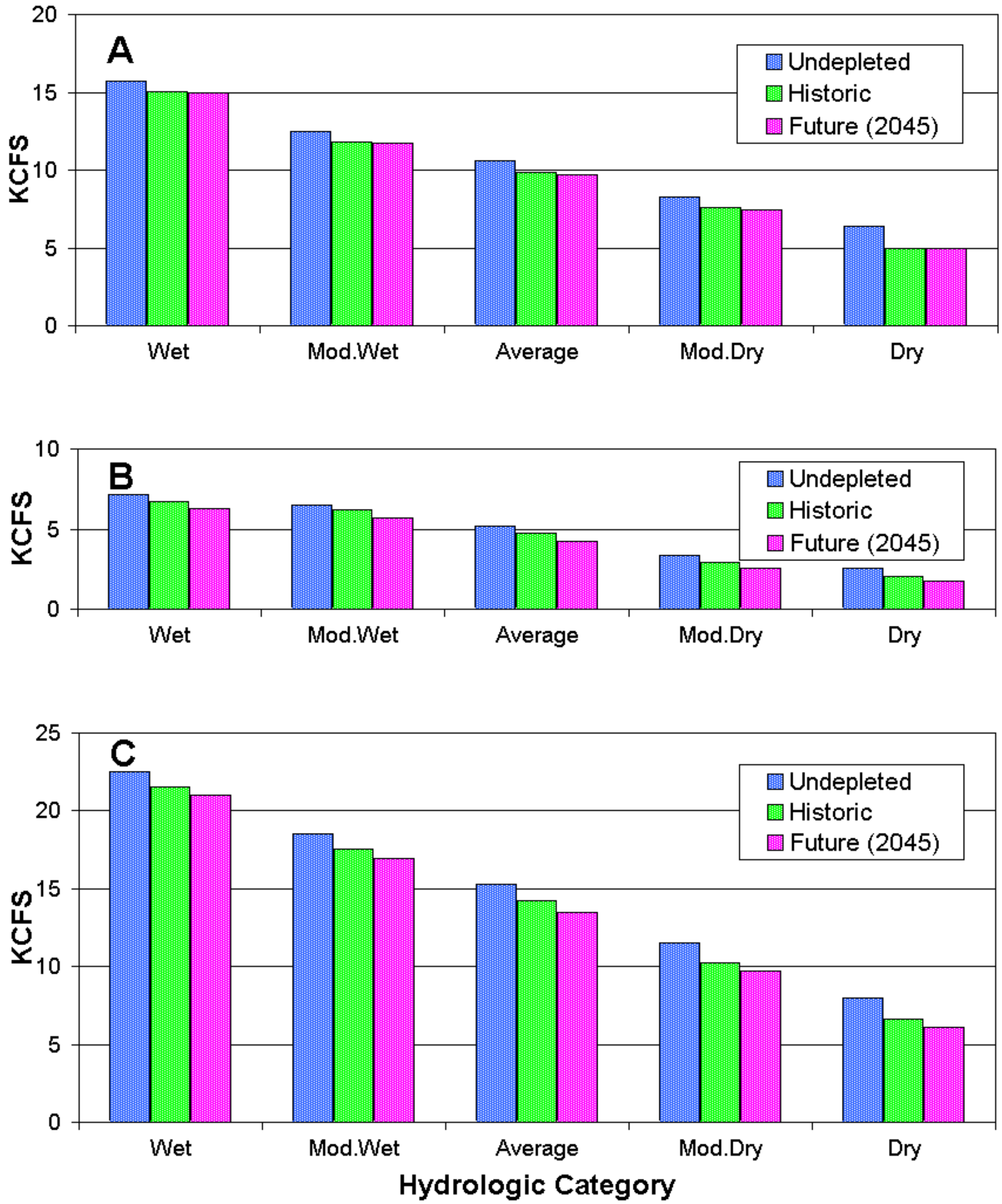

Figure G-5. Average peak discharge in thousands of cubic feet per second (KCFS) for each of five hydrologic categories at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park under Undepleted, Historic and Future demand conditions.

Five annual hydrographs (Figures G-6 through G-10) for each of three gages (Maybell, Lily Park and Deerlodge Park) were selected to represent each of the five hydrologic categories: Wet (1957), Moderately wet (1927), Average (1936), Moderately dry (1940) and Dry (1963). These are the median years of each hydrologic category (i.e., ~5%, 20%, 50%, 80% and 95% exceedance, respectively) based on their undepleted annual discharge at Deerlodge Park. However, hydrologic conditions in the Yampa River above Maybell and the Little Snake River above Lily Park may differ somewhat from those of Deerlodge Park (98.8% and 94.4% correlation with Maybell and Lily Park, respectively).

Wet years (Figure G-6) tend to mask the effects of depletions for two reasons: 1) depletions represent a smaller fraction of the higher volume of runoff in wet years, even if the volume of depletions is greater than in drier years; and 2) precipitation during the growing season can reduce depletions by satisfying irrigation demand, at least partially, even under future demand conditions. Hydrographs of moderately wet and average years also show no significant effect from depletions at any of the three gages (Figures G-7 and G-8). Moreover, there is little apparent annual or peak flow reduction between historic and future demand conditions above Maybell (Figures G-4 and G-5, graph A).

The effects of depletions become increasingly apparent under drier hydrologic conditions, especially in the Little Snake River, due to its smaller volumes of discharge relative to depletions (Table G-1, Figures G-9 and G-10). The undepleted average annual discharge of the Little Snake River at Lily Park is about 450 KAF, whereas annual depletions are projected to average about 85 KAF (19% of the undepleted discharge) by 2045. The undepleted yield of the Yampa River at Maybell is roughly 1,210 KAF per year with depletions above the Little Snake River projected to reach an annual average of 137 KAF (11% of the undepleted discharge) by 2045. It should be noted that values of average annual discharge and average annual depletions above are based on modeled monthly data for the entire 90-year CRDSS period of record (water years 1909–1998), rather than the 76-year Lily Park gage record (calendar years 1922–1997).

Depletions have the greatest apparent impact on the descending limb of the spring peak, as well as on base flows, especially in drier years. This finding is consistent with the pattern of depletions in the Yampa Basin, which increase dramatically with the onset of the irrigation season just as peak flows are subsiding in June and July (Figure G-11), and limited storage capacities of basin reservoirs that typically fill earlier on the peak. The late summer-early fall period (August-October) is the focus of instream flow augmentation proposed under the Yampa management plan, although augmentation could extent into the winter (November-February) if the 7,000-AF annual augmentation water supply has not been exhausted by then. Depletions during this winter period are due to power generation and M&I consumption, exclusively (Figure G-11). Depletions by these two sectors change relatively little from month to month, with M&I depletions increasing two-fold between February and July, and depletions for Power increasing by about 50% from April to August.

The ascending limb and peak of the spring hydrograph are considered to be most important for transporting sediment, preparing spawning beds and providing cues to Colorado pikeminnow that spawn in Yampa Canyon. Most sediment would be transported in wet and moderately wet years. During dry and moderately dry years, little sediment would be transported, because critical discharge generally would not be achieved regardless of depletions. This is especially true of the Little Snake, which provides 69% of the sediment to the Yampa River at Deerlodge Park, whereas the Yampa River at Maybell contributes only 27% (Andrews 1978). Without this sediment from the Little Snake, there would be little downstream transport regardless of flows in the Yampa River.

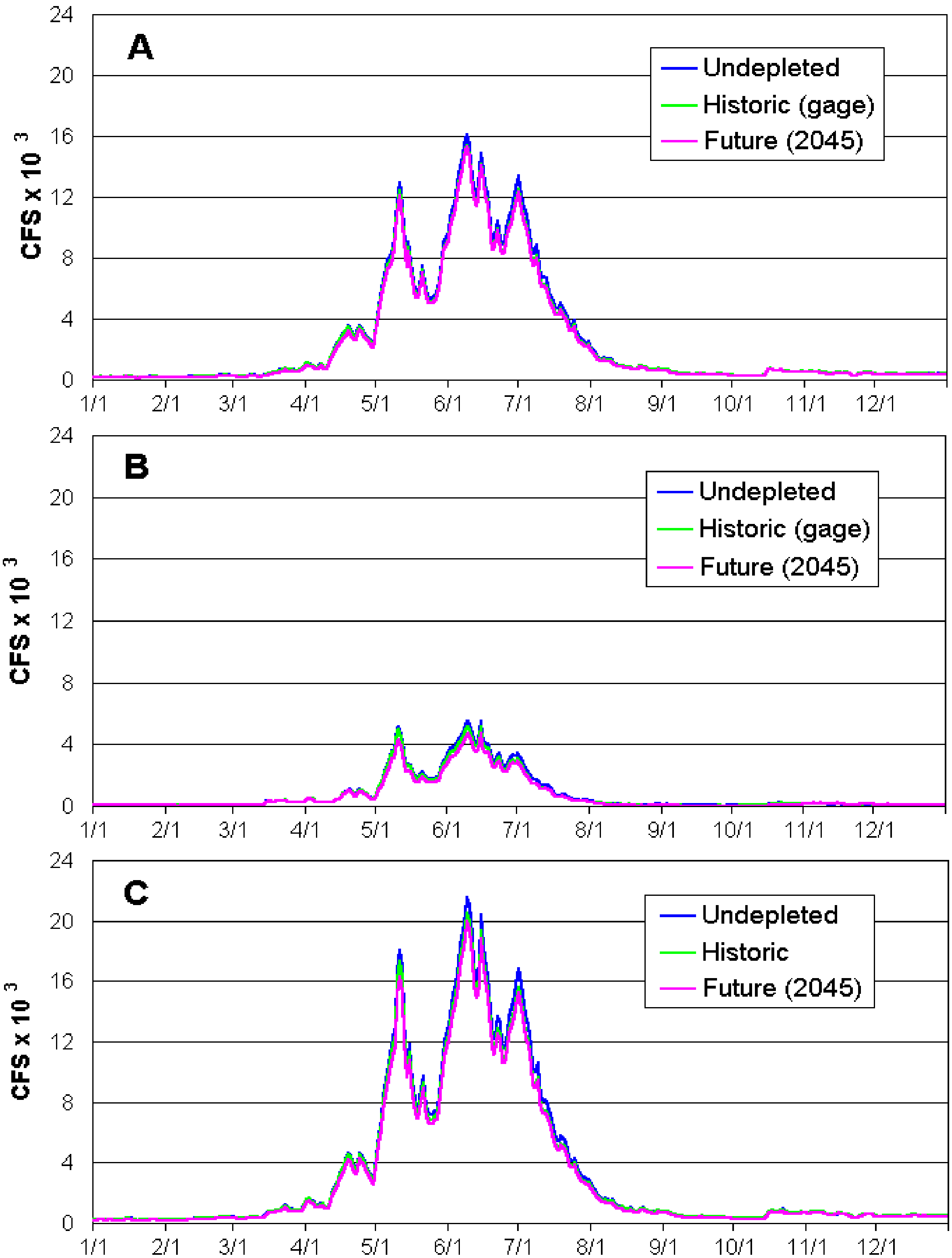

Figure G-6. Historic (gaged) and CRDSS-modeled Undepleted and Future annual hydrographs at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park during 1957, a median wet year (5% exceedance)

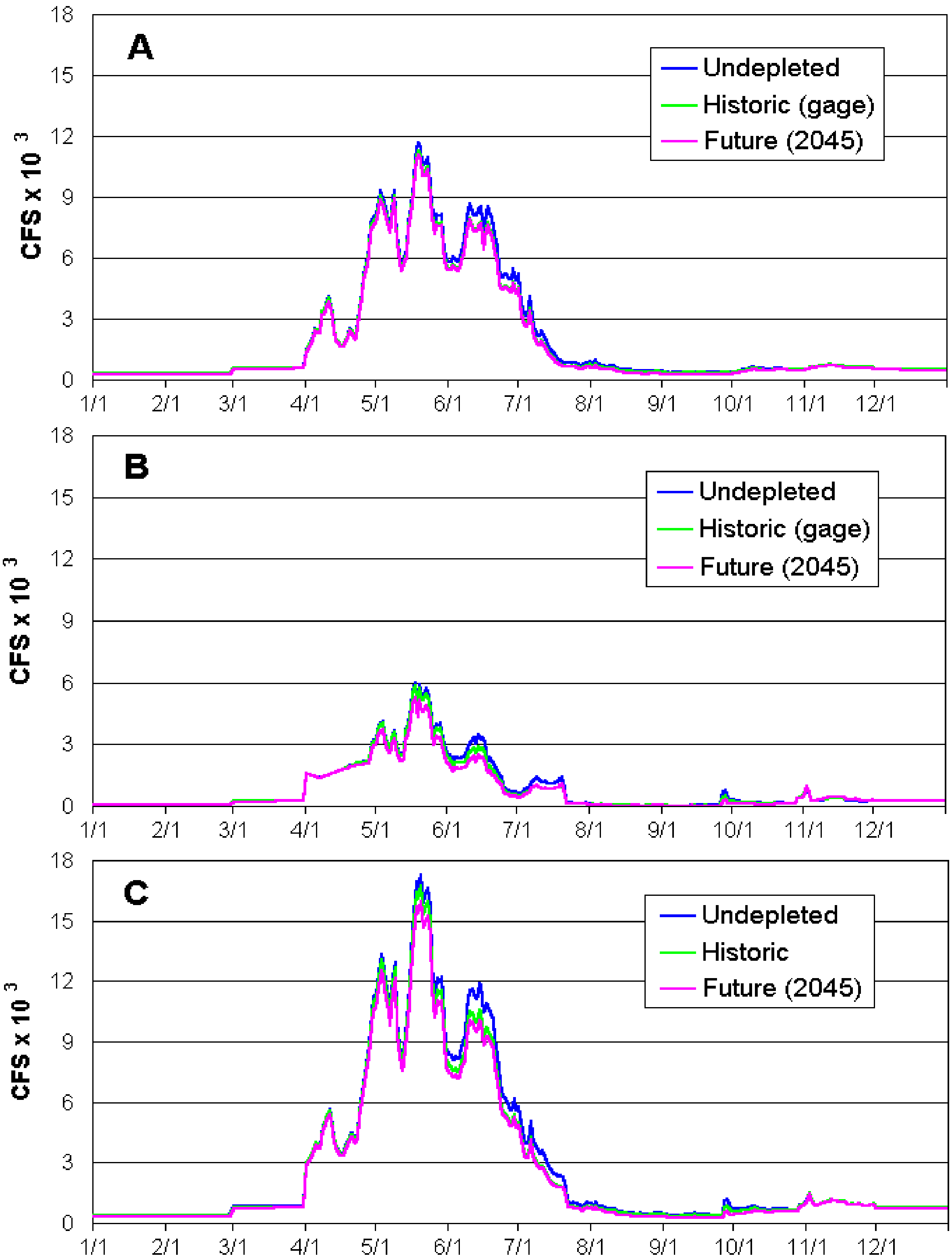

Figure G-7. Historic (gaged) and CRDSS-modeled Undepleted and Future annual hydrographs at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park during 1927, a median moderately wet year (20% exceedance)

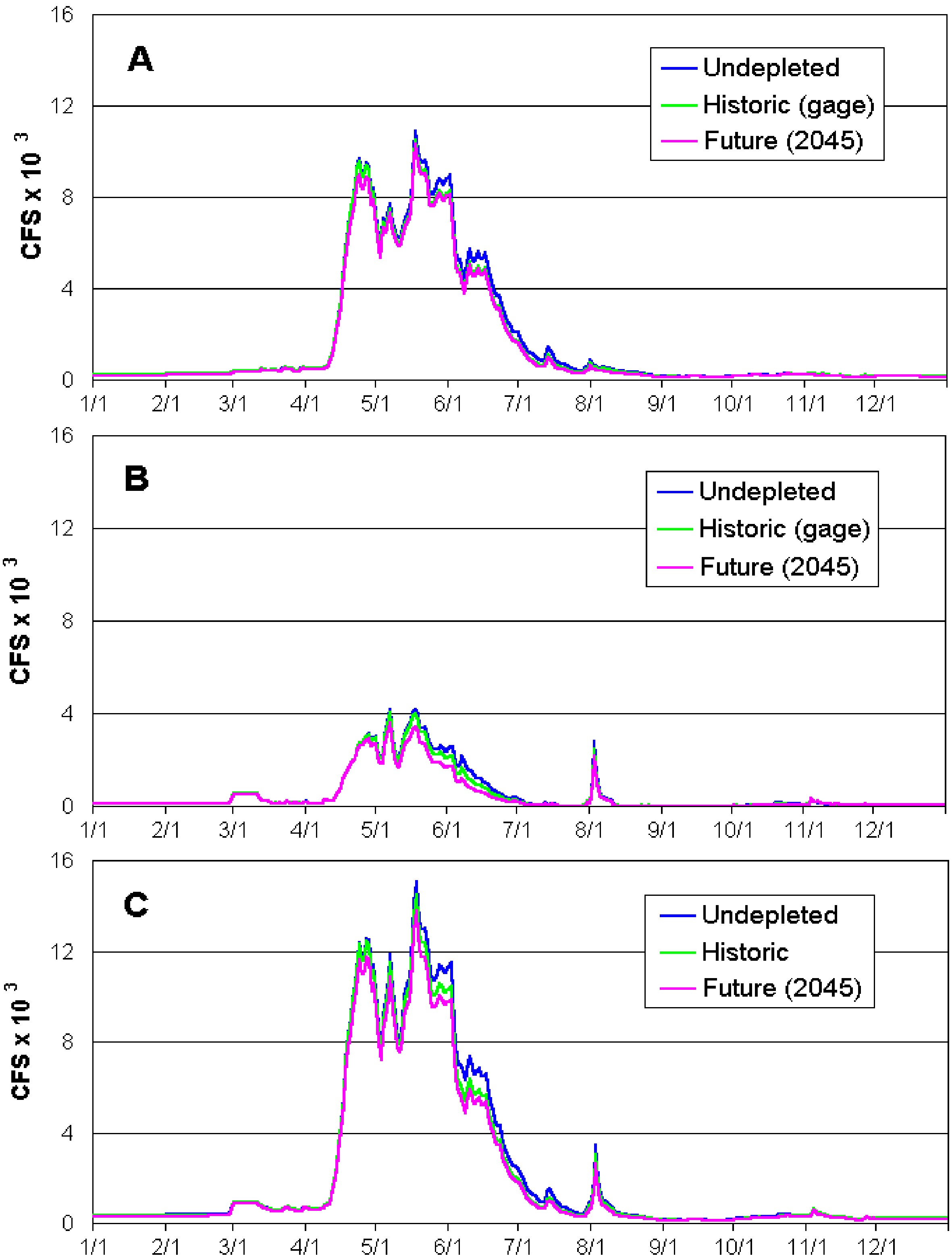

Figure G-8. Historic (gaged) and CRDSS-modeled Undepleted and Future annual hydrographs at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park during 1936, a median average year (50% exceedance)

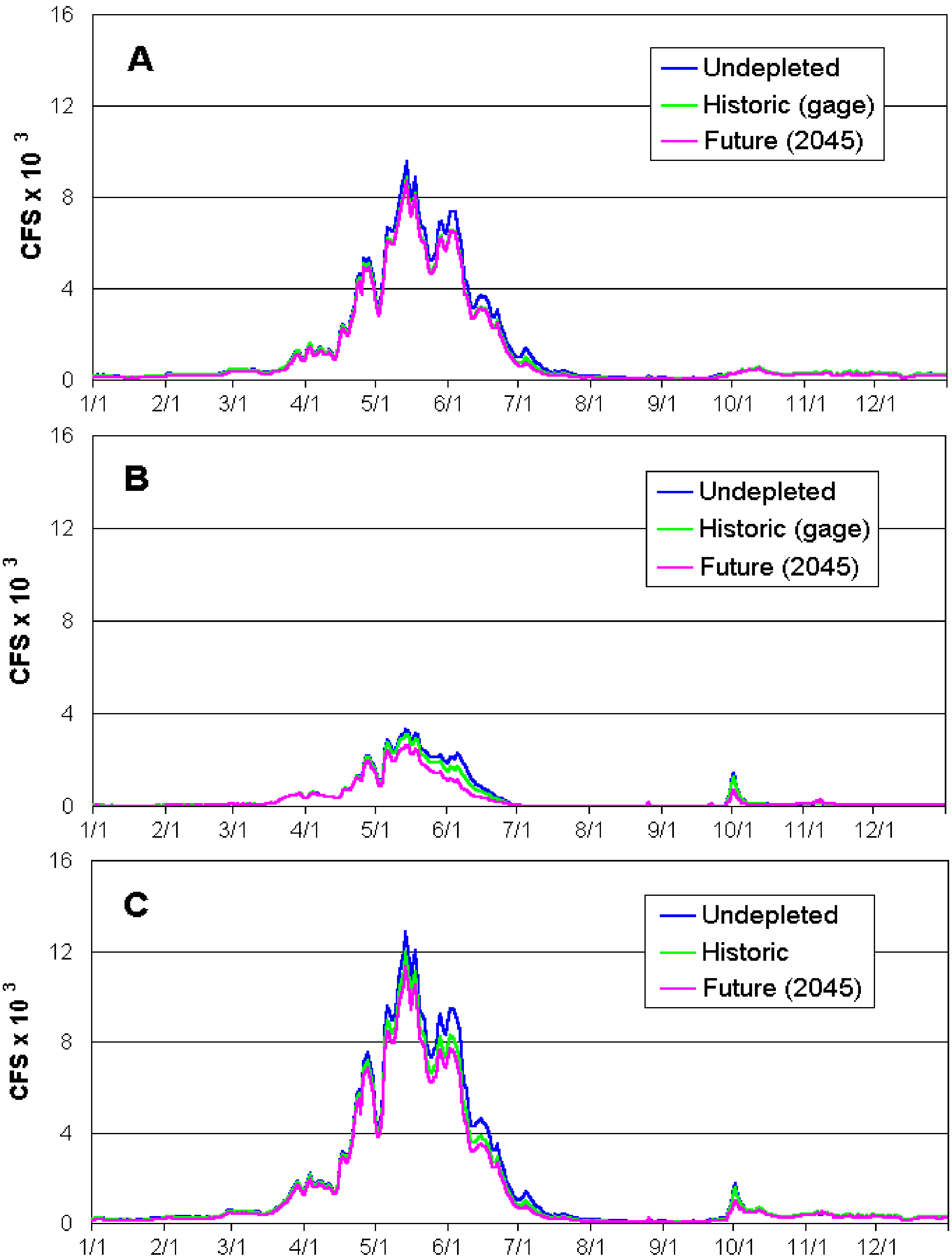

Figure G-9. Historic (gaged) and CRDSS-modeled Undepleted and Future annual hydrographs at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park during 1940, a median moderately dry year (80% exceedance)

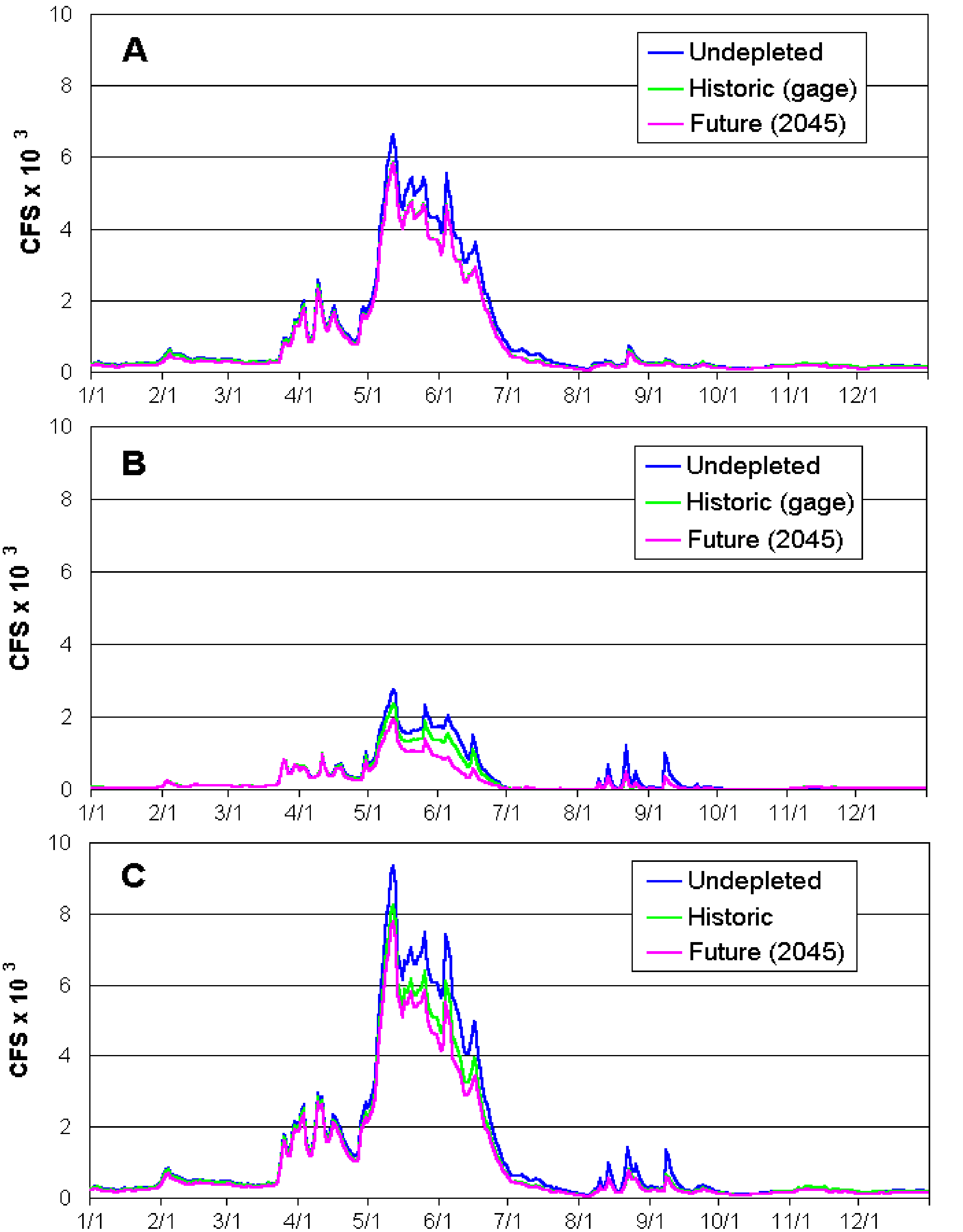

Figure G-10. Historic (gaged) and CRDSS-modeled Undepleted and Future annual hydrographs at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park during 1963, a median dry year (95% exceedance)

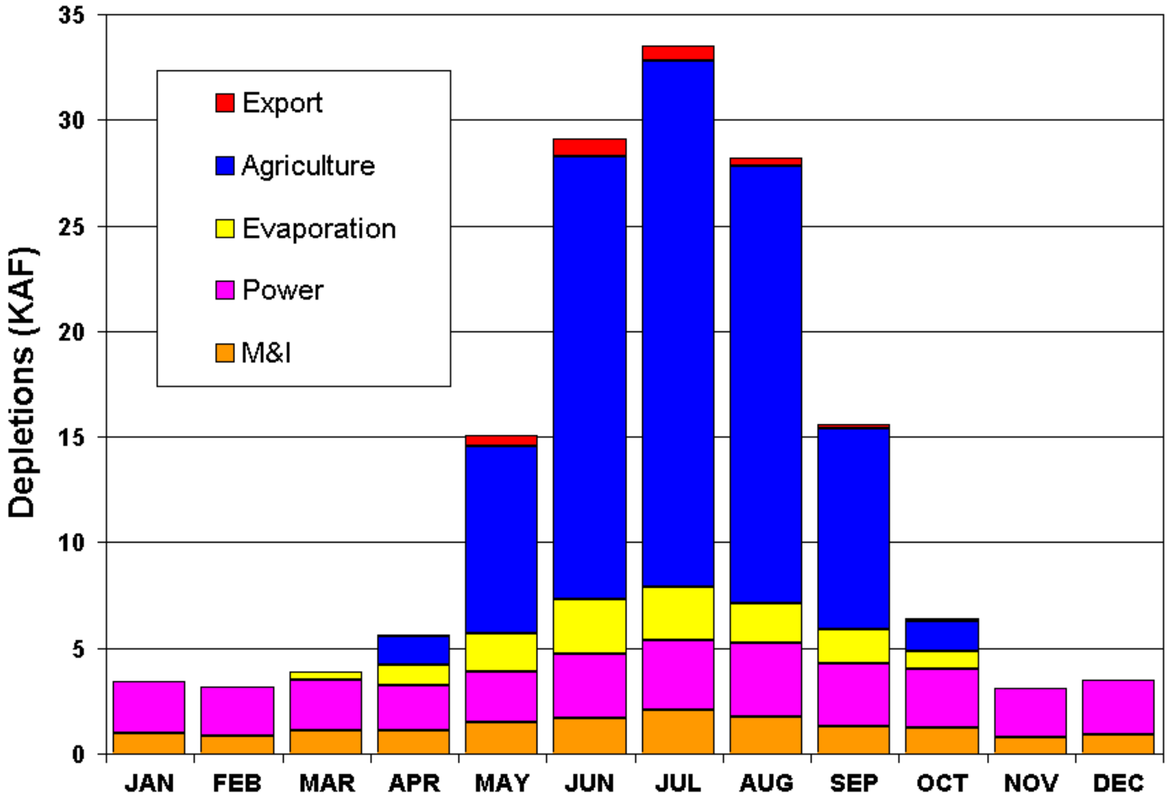

Figure G-11. Temporal distribution of projected future (2045) depletions from the Yampa Basin in Colorado by sector (stacked bar)

According to O'Brien (1987):

> *The potential for water resource development in the upper basins of the Little Snake and Yampa Rivers must be carefully evaluated because of the complex interdependence of the sediment load and water discharge in both rivers. While sediment load is beneficial to maintaining substrate conditions for viable spawning, an adequate sediment supply must be maintained for beach replenishment and riparian vegetation in the canyon.*

The same holds true for the Green River downstream from the Yampa, which relies upon the Yampa (and ultimately the Little Snake River) for roughly 60% of the sediment that builds and maintains floodplain nursery habitats in the Jensen–Ouray reach of the Green River (Andrews 1986).

O'Brien (1987) further states:

> *The effect of reducing the discharge in the Little Snake will be to reduce the sediment load in the canyon. Concomitantly, reducing the water supply in the Yampa River upstream of the confluence with the Little Snake River will have the effect of limiting the river's ability to transport the sediment load in the canyon.*

Andrews (1980) determined the effective discharges for a number of river reaches in the Yampa River Basin. He defined effective discharge as "the discharge that transported the most sediment during the period of record..." Andrews' effective discharge was 258 m^3/s (9,111 cfs) for the Yampa River at Maybell and 127 m^3/s (4,485 cfs) for the Little Snake River at Lily Park. Andrews found that the average durations of those discharges was 2.5% of the time at Maybell and 1.1% of the time at Lily Park. Using historic gage data from 1922–1997 and the CRDSS-estimated discharge data under undepleted and future demand conditions, Table G-2 provides a comparison of the effects of hydrologic conditions on durations of the effective discharge under various demand conditions.

Table G-2. Effective discharge average durations under various hydrologic/demand conditions [a]

		Undepleted		Historic		Future (2045)	
	Hydrologic Category [b]	Days/year	% year	Days/year	% year	Days/year	% year
Maybell (≥ 9,111 cfs)	Wet (n = 8)	34	9.3%	30	8.2%	30	8.2%
	Mod. Wet (n = 15)	19	5.2%	13	3.6%	12	3.3%
	Average (n = 30)	8	2.2%	6	1.6%	5	1.4%
	Mod. Dry (n = 15)	2	0.5%	1	0.3%	0	0.1%
	Dry (n = 8)	0	0.0%	0	0.0%	0	0.0%
	Wgt. Avg. (n = 76)	11	3.0%	8	2.2%	8	2.2%
Lily Park (≥ 4,485 cfs)	Wet (n = 8)	24	6.6%	19	5.2%	14	3.8%
	Mod. Wet (n = 15)	11	3.0%	8	2.2%	5	1.4%
	Average (n = 30)	6	1.6%	4	1.1%	1	0.3%
	Mod. Dry (n = 15)	0	0.0%	0	0.0%	0	0.0%
	Dry (n = 8)	0	0.0%	0	0.0%	0	0.0%
	Wgt. Avg. (n = 76)	7	1.9%	5	1.4%	3	0.8%

[a] Based on gaged historic and CRDSS-estimated undepleted and future hydrographs for 76-year period of record (January 1, 1922 – December 31, 1997)

[b] Wet (≤10% exceedance), Mod. Wet (>10–30% exceedance), Average (>30–70% exceedance), Mod. Dry (>70–90% exceedance), Dry (>90% exceedance)

Historically, the effective discharge was exceeded only 1.6% of the time at Maybell and 1.1% of the time at Lily Park during average hydrologic conditions. Even under undepleted demand conditions, the effective discharge was exceeded 2.2% of the time at Maybell and 1.6% of the time at Lily Park during average hydrologic conditions, and only 0.5% of the time at Maybell during moderately dry conditions. Effective discharge is never exceeded during drier-than-average conditions at Lily Park. Overall, effective discharge was exceeded 3% of the time at Maybell and 1.9% of the time at Lily Park under undepleted conditions, compared with 2.2% at Maybell under both historic and future conditions, and 1.4% and 0.8% at Lily Park under historic and future conditions, respectively.

Another approach is to estimate quantities of sediment that would be transported by gaged and CRDSS-simulated annual hydrographs through several key river reaches under various hydrologic conditions. This approach also provides an assessment of sediment balance between these reaches.

O'Brien (1987) found that annual sediment loads at Deerlodge Park were equivalent to those at Mathers Hole. Moreover, he concluded "sediment transported through the canyon was in approximate long-term equilibrium with the upstream supply." The Little Snake River supplies 69% of the sediment to Deerlodge Park (Andrews 1980), but sediment transport beyond Deerlodge Park is constrained by flow conditions (O'Brien 1987). Therefore, the sediment load at Deerlodge Park constitutes the sediment supply to Yampa Canyon. Predicted sediment transport capacity at Mathers Hole is greater than at Deerlodge Park, because of its steeper slope. However, because there are no significant sources of sediment downstream from Deerlodge Park, the sediment load at Mathers Hole is constrained by the ability of the upstream alluvial reach to supply that sediment (O'Brien 1987).

Bedload, sediment transported along the riverbed rather than in suspension, is less than 1% of the total load. Suspended sediment accounts for more than 99% of the total load and, therefore, was used to reflect the total historic load (O'Brien 1987). Suspended sediment as a function of stream flow can be estimated according to the following regression relationship:

$$Q_s = a\,Q^b$$

where Q_s = suspended sediment load (tons/day)
Q = daily average discharge (cfs)
a = regression coefficient (constant for any given reach)
b = regression exponent (constant for any given reach)

O'Brien (1987) applied a bias correction factor (C) to each regression coefficient to improve the accuracy of the sediment load estimate (Table G-3).

Table G-3. Correction factors applied by O'Brien (1987) to regression coefficients

River reach	Original		Corrected		Correction factor (C)
	a	b	a	b	
Yampa at Maybell	0.00129	1.69	0.00254	1.69	1.97
Little Snake at Lily Park	0.330	1.35	0.949	1.35	2.88
Yampa at Deerlodge Park [a]	0.125	1.35	0.166	1.35	1.33
Yampa at Mathers Hole	0.0855	1.39	0.121	1.39	1.42

[a] based on Elliot et al. 1984

These data were used to develop graphic long-term trends of sediment load only as a function of flow (Figure G-12). They do not reflect short periods of severe overloading. For example, intense storm events over easily erodible soils, typical of the lower Little Snake River basin, can deposit large quantities of sediment into the stream in excess of what might be expected based on flow alone. Moreover, actual measured sediment loads exhibit diurnal fluctuations, resulting in different regression relationships for rising and falling limbs of the hydrographs as shown in O'Brien's 1984 report (O'Brien 1987).

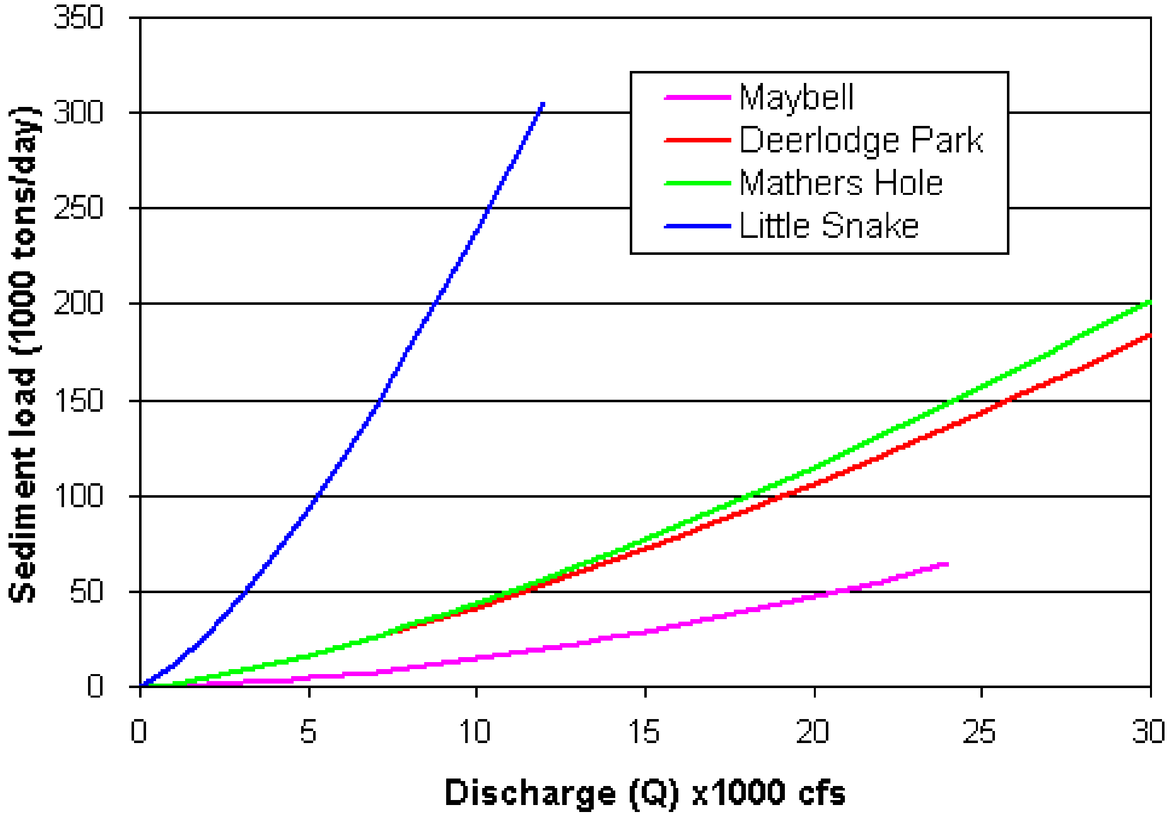

Figure G-12. Regression of sediment load versus discharge at four different river reaches: Yampa River at Maybell, Deerlodge Park and Mathers Hole, and the Little Snake River at Lily Park (based on the relationship $Q_s = a\,Q^b$, adapted from O'Brien 1987).

Figure G-12 shows that at the same levels of discharge, the Little Snake River at Lily Park transports significantly more sediment than does the Yampa River upstream from the Little Snake at Maybell. Downstream from the Little Snake River, the Yampa River at Deerlodge Park and Mathers Hole is intermediate between Maybell and Lily Park in its ability to transport sediment. These relationships indicate that larger quantities of sediment are transported during wetter years than during drier years (Table G-4, Figure G-13). Moreover, roughly 93% of the average annual sediment load at Deerlodge Park is transported during high spring flows between April 1 and July 31 (Table G-5, Figure G-14). Only 7% of the average annual load is transported by base flows during the remaining two-thirds of the year from August 1 to March 31 (Table G-6, Figure G-15).

Table G-4. Annual suspended sediment load under various hydrologic/demand conditions

	Hydrologic Category (N) [a]	Undepleted	Historic			Future (2045)		
		K tons	K tons	ΔK tons [b]	Δ% [b]	K tons	ΔK tons [b]	Δ% [b]
Maybell	Wet (8)	1,138	1,044	-94	-8.3%	1,021	-117	-10.3%
	Mod. Wet (15)	797	711	-86	-10.8%	692	-105	-13.2%
	Average (30)	528	462	-66	-12.5%	444	-84	-15.9%
	Mod. Dry (15)	349	290	-59	-16.9%	279	-70	-20.1%
	Dry (8)	184	142	-42	-22.8%	134	-50	-27.2%
	Wgt. Avg. (76) [c]	574	505	-69	-12.0%	489	-85	-14.8%
Lily Park	Wet (8)	5,624	5,159	-465	-8.3%	4,738	-886	-15.8%
	Mod. Wet (15)	4,530	4,100	-430	-9.5%	3,690	-840	-18.5%
	Average (30)	3,134	2,794	-340	-10.8%	2,394	-740	-23.6%
	Mod. Dry (15)	1,892	1,527	-365	-19.3%	1,244	-648	-34.2%
	Dry (8)	1,145	833	-312	-27.2%	607	-538	-47.0%
	Wgt. Avg. (76) [c]	3,217	2,841	-376	-11.7%	2,482	-735	-22.8%
Deerlodge Park	Wet (8)	5,400	5,008	-392	-7.3%	4,793	-607	-11.2%
	Mod. Wet (15)	4,106	3,728	-378	-9.2%	3,546	-560	-13.6%
	Average (30)	2,898	2,596	-302	-10.4%	2,416	-482	-16.6%
	Mod. Dry (15)	1,981	1,674	-307	-15.5%	1,548	-433	-21.9%
	Dry (8)	1,198	935	-263	-22.0%	832	-366	-30.6%
	Wgt. Avg. (76) [c]	3,040	2,716	-324	-10.7%	2,551	-489	-16.1%
Mathers Hole	Wet (8)	5,708	5,283	-425	-7.4%	5,055	-653	-11.4%
	Mod. Wet (15)	4,311	3,904	-407	-9.4%	3,711	-600	-13.9%
	Average (30)	3,015	2,692	-323	-10.7%	2,502	-513	-17.0%
	Mod. Dry (15)	2,038	1,714	-324	-15.9%	1,581	-457	-22.4%
	Dry (8)	1,213	939	-274	-22.6%	834	-379	-31.2%
	Wgt. Avg. (76) [c]	3,172	2,826	-345	-10.9%	2,652	-520	-16.4%

[a] Hydrologic categories based on exceedance intervals of 1–10%, 11–30%, 31–70%, 71–90%, and 91–100% of synthesized undepleted annual discharges at Deerlodge Park (1922–1997).
[b] Negative values signify a reduction in sediment load relative to undepleted demand conditions.
[c] 76-year averages weighted according to the number of years (N) in each hydrologic category.

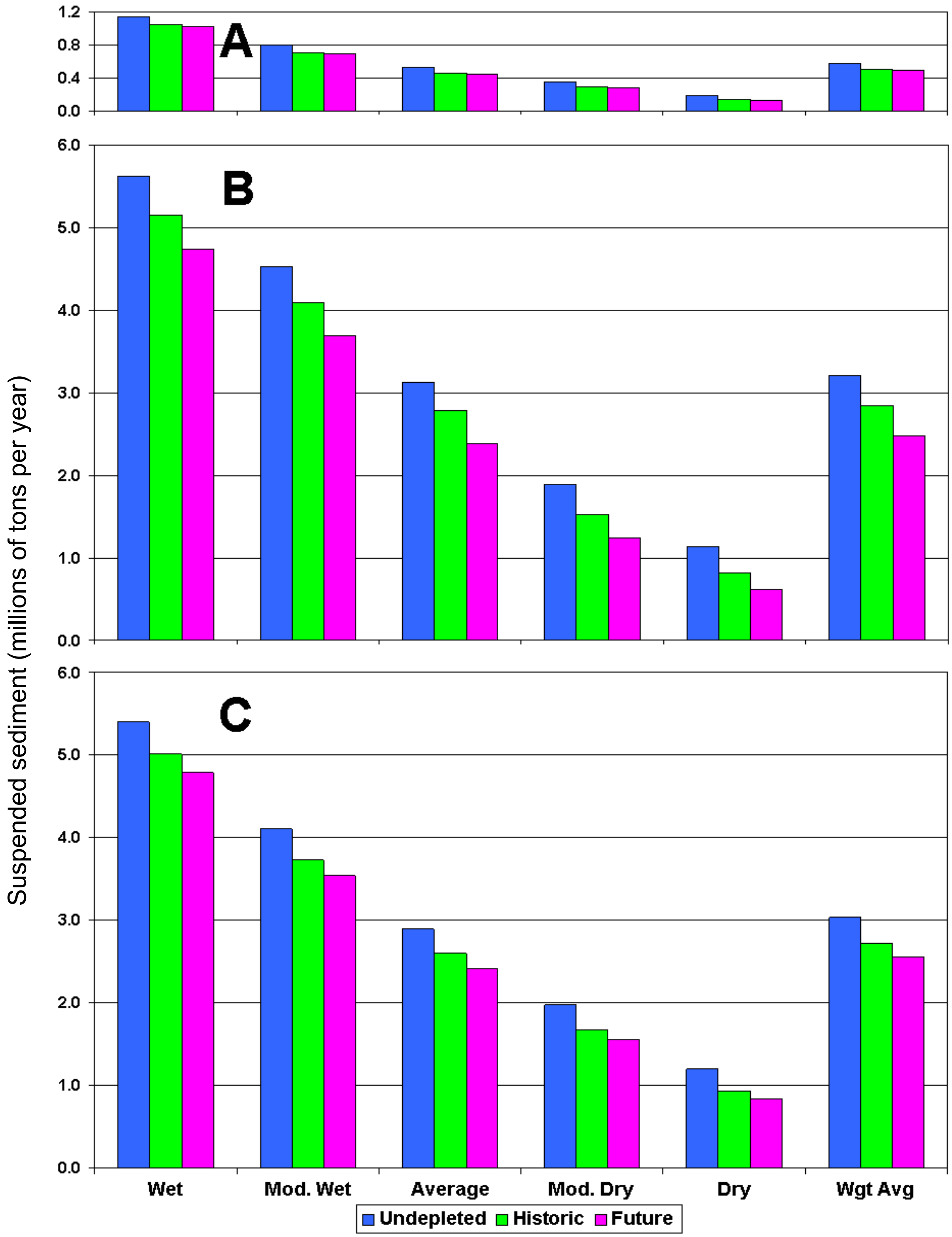

Figure G-13. Average annual suspended sediment in millions of tons per year for each of five hydrologic categories and long-term weighted average at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park under Undepleted, Historic and Future demand conditions.

Table G-5. Peak-flow suspended sediment load under various hydrologic/demand conditions

	Hydrologic Category (N) [a]	Undepleted	Historic			Future (2045)		
		K tons	K tons	ΔK tons [b]	Δ% [b]	K tons	ΔK tons [b]	Δ% [b]
Maybell	Wet (8)	1,092	1,001	-91	-8.3%	986	-106	-9.7%
	Mod. Wet (15)	776	692	-84	-10.8%	676	-100	-12.9%
	Average (30)	512	448	-64	-12.5%	432	-80	-15.6%
	Mod. Dry (15)	332	277	-55	-16.6%	267	-65	-19.6%
	Dry (8)	172	132	-40	-23.3%	127	-45	-26.2%
	Wgt. Avg. (76) [c]	553	487	-66	-11.9%	474	-79	-14.3%
Lily Park	Wet (8)	5,192	4,744	-448	-8.6%	4,338	-854	-16.4%
	Mod. Wet (15)	4,250	3,821	-429	-10.1%	3,424	-826	-19.4%
	Average (30)	2,922	2,589	-333	-11.4%	2,202	-720	-24.6%
	Mod. Dry (15)	1,712	1,355	-357	-20.9%	1,081	-631	-36.9%
	Dry (8)	1,013	690	-323	-31.9%	498	-515	-50.8%
	Wgt. Avg. (76) [c]	2,983	2,616	-367	-12.3%	2,267	-716	-24.0%
Deerlodge Park	Wet (8)	4,965	4,593	-372	-7.5%	4,440	-525	-10.6%
	Mod. Wet (15)	3,869	3,504	-365	-9.4%	3,345	-524	-13.5%
	Average (30)	2,709	2,417	-292	-10.8%	2,259	-450	-16.6%
	Mod. Dry (15)	1,807	1,520	-287	-15.9%	1,404	-403	-22.3%
	Dry (8)	1,055	812	-243	-23.0%	733	-322	-30.5%
	Wgt. Avg. (76) [c]	2,823	2,515	-308	-10.9%	2,374	-449	-15.9%
Mathers Hole	Wet (8)	4,371	3,968	-403	-9.2%	3,805	-566	-12.9%
	Mod. Wet (15)	3,758	3,374	-384	-10.2%	3,204	-554	-14.7%
	Average (30)	2,561	2,261	-300	-11.7%	2,099	-462	-18.0%
	Mod. Dry (15)	1,515	1,220	-295	-19.5%	1,117	-398	-26.3%
	Dry (15)	586	426	-160	-27.3%	360	-226	-38.6%
	Wgt. Avg. (76) [c]	2,573	2,262	-312	-12.1%	2,120	-454	-17.6%

[a] Hydrologic categories based on exceedance intervals of 1–10%, 11–30%, 31–70%, 71–90%, and 91–100% of synthesized undepleted annual discharges at Deerlodge Park (1922–1997).
[b] Negative values signify a reduction in sediment load relative to undepleted demand conditions.
[c] 76-year averages weighted according to the number of years (N) in each hydrologic category.

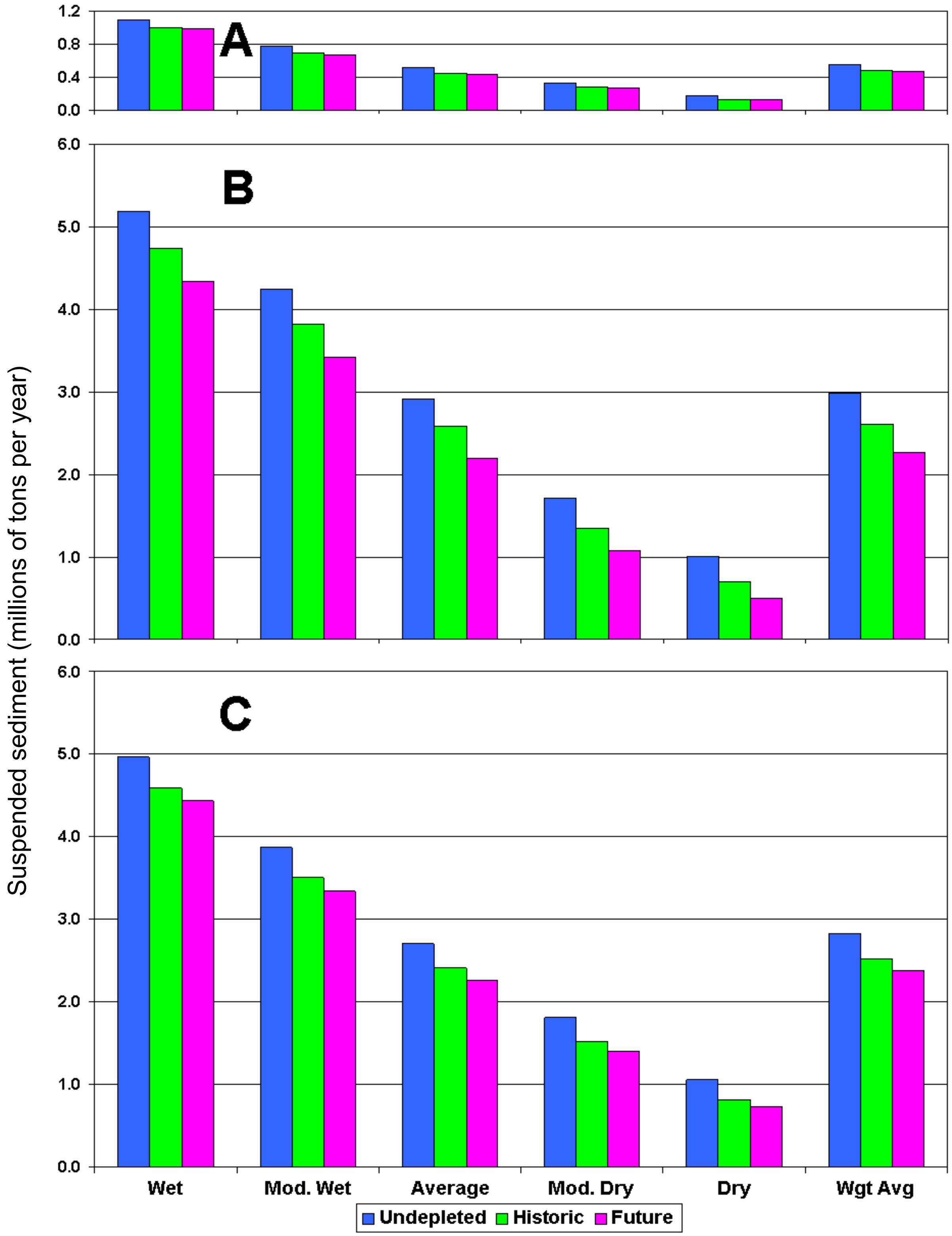

Figure G-14. Average annual suspended sediment in millions of tons during the peak-flow period for each of five hydrologic categories and long-term weighted average at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park under Undepleted, Historic and Future demand conditions.

Table G-6. Base-flow suspended sediment load under various hydrologic/demand conditions

	Hydrologic Category (N) [a]	Undepleted	Historic			Future (2045)		
		K tons	K tons	ΔK tons [b]	Δ% [b]	K tons	ΔK tons [b]	Δ% [b]
Maybell	Wet (8)	47	44	-3	-6.4%	35	-12	-25.5%
	Mod. Wet (15)	21	19	-2	-9.5%	16	-5	-23.8%
	Average (30)	16	14	-2	-12.5%	12	-4	-25.0%
	Mod. Dry (15)	17	13	-4	-23.5%	12	-5	-29.4%
	Dry (8)	12	10	-2	-16.7%	7	-5	-41.7%
	Wgt. Avg. (76) [c]	20	18	-2	-10.0%	15	-5	-25.0%
Lily Park	Wet (8)	432	415	-17	-3.9%	400	-32	-7.4%
	Mod. Wet (15)	280	279	-1	-0.4%	266	-14	-5.0%
	Average (30)	212	204	-8	-3.8%	192	-20	-9.4%
	Mod. Dry (15)	181	172	-9	-5.0%	163	-18	-9.9%
	Dry (8)	133	118	-15	-11.3%	109	-24	-18.0%
	Wgt. Avg. (76) [c]	234	226	-8	-3.4%	214	-20	-8.5%
Deerlodge Park	Wet (8)	435	415	-20	-4.6%	353	-82	-18.9%
	Mod. Wet (15)	237	224	-13	-5.5%	201	-36	-15.2%
	Average (30)	189	178	-11	-5.8%	157	-32	-16.9%
	Mod. Dry (15)	174	154	-20	-11.5%	143	-31	-17.8%
	Dry (8)	143	123	-20	-14.0%	99	-44	-30.8%
	Wgt. Avg. (76) [c]	216	202	-14	-6.5%	177	-39	-18.1%
Mathers Hole	Wet (8)	267	248	-19	-7.1%	226	-41	-15.4%
	Mod. Wet (15)	207	195	-12	-5.8%	166	-41	-19.8%
	Average (30)	167	158	-9	-5.4%	142	-25	-15.0%
	Mod. Dry (15)	171	146	-25	-14.6%	128	-43	-25.1%
	Dry (15)	80	65	-15	-18.8%	56	-24	-30.0%
	Wgt. Avg. (76) [c]	177	163	-14	-8.2%	144	-33	-18.8%

[a] Hydrologic categories based on exceedance intervals of 1–10%, 11–30%, 31–70%, 71–90%, and 91–100% of synthesized undepleted annual discharges at Deerlodge Park (1922–1997).
[b] Negative values signify a reduction in sediment load relative to undepleted demand conditions.
[c] 76-year averages weighted according to the number of years (N) in each hydrologic category.

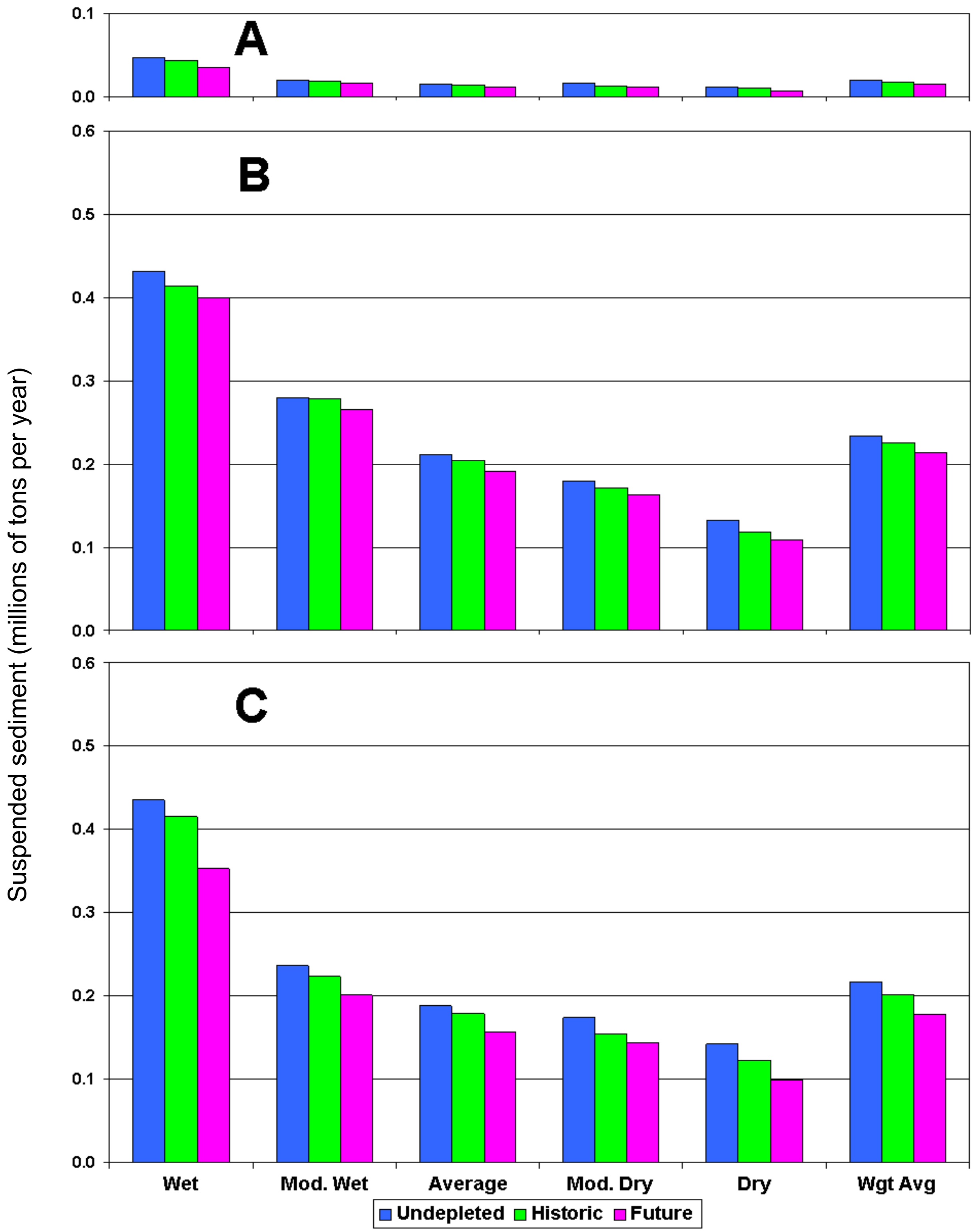

Figure G-15. Average suspended sediment in millions of tons during the **base-flow period** (August 1 – March 31) for each of five hydrologic categories and long-term weighted average at **A**) Maybell, **B**) Lily Park and **C**) Deerlodge Park under Undepleted, Historic and Future demand conditions.

Average annual sediment transport in all reaches and hydrologic categories is reduced under historic and projected future demand conditions relative to comparable undepleted conditions (Table G-4, Figure G-13). However, the differences in sediment transport were less apparent at Maybell, due to the relatively flat slope of its flow-sediment relationship (Figure G-12). Within each reach and demand condition, absolute changes in sediment transport were greatest during wet years, whereas the percentage of change was greatest during dry years. Within any hydrologic category, absolute changes in all reaches were always greatest during peak flows (Table G-5) compared to base flows (Table G-6); moreover, the percentages of change generally also were greatest during peak flows, except at Maybell under future demand conditions, where the percentages of change were greater during base flows. Within each reach and demand condition, percentages of change during peak flows increase roughly three-fold from wet to dry conditions (Table G-5), whereas trends between hydrologic categories are less predictable during base flows (Table G-6).

Relative to undepleted conditions, estimated future annual sediment supply is reduced by as little as 10% at Maybell under wet hydrologic conditions and by as much as 47% at Lily Park under dry conditions (Table G-4). Even though sediment supplied to Yampa Canyon is reduced, supply and transport remain roughly in balance under all conditions. That is, the reduction in the amount of sediment delivered to the head of Yampa Canyon is comparable to the reduction in the amount of sediment transported through the canyon. Sediment load at Deerlodge Park and Mathers Hole also are reduced from about 11% under wet conditions to about 31% under dry conditions (Table G-4). These estimates are not supply-limited, but are based solely on site-specific regression formulae (Table G-3) and gaged daily average flows (Q). They are well within the observed variability of measured sediment loads (O'Brien 1984). Therefore, long-term trends appear to indicate that Yampa Canyon would not suffer significant impacts due to excessive accretion or scouring of sediments.

Prior to the completion of Flaming Gorge Dam at rivermile (RM) 412 on the Green River in October 1962, mean annual sediment loads at Jensen (RM 307) and Ouray, Utah (RM 142) were estimated by Andrews (1986) to be ~6.92 x 10^{6} and ~12.8 x 10^{6} tons, respectively. After 1962, mean annual sediment discharge fell to ~3.21 x 10^{6} tons at Jensen and ~6.61 x 10^{6} tons at Ouray, of which ~1.9 x 10^{6} tons is derived from the Yampa River (Andrews 1986). These represent decreases of 54% and 48%, respectively, from those prior to 1962. According to Andrews:

> *An equilibrium between sediment supply and transport occurs downstream from the mouth of the Yampa River and may exist for some distance upstream* [on the Green River]. *Thus, the reach of active channel degradation* [downstream from Flaming Forge Dam] *is relatively short, no more than 68 miles. This result is a consequence of* [Flaming Gorge] *reservoir just upstream from the high sediment-yielding portion of the drainage basin.*

Two principal tributaries, the White and Duchesne rivers, enter the Green River upstream from the Ouray gage. These tributaries combine to deliver ~4.8 x 10^{6} tons of sediment per year (Andrews 1986), or 72% of the mean annual sediment load at Ouray. Andrews (1986) estimates that ~2.4 x 10^{6} tons/year have been deposited in this reach, resulting in significant aggradation since 1962, most of which was deposited immediately upstream from the Ouray gage. From the Duchesne River upstream to the confluence of the Yampa River, ~178 RM, Andrews (1986) concluded that sediment supply and transport in the Green River appear to be in long-term equilibrium since October 1962.

By 2045, depletions from the Yampa River Basin, including the Little Snake River, are projected to reduce sediment load at Mathers Hole about 3.73×10^5 tons/year under dry conditions, 6.89×10^5 tons/year under wet conditions, and 4.81×10^5 tons/year under average conditions (Table G-4). On this basis, the projected reduction in sediment supply to the Green River under median hydrologic conditions represents ~15% of the post-Flaming Gorge average annual sediment load at Jensen and ~7.3% of the average annual sediment load at Ouray. However, O'Brien's (1987) correction factors (Table G-3) applied to the calculation of sediment loads at Maybell and Lily Park increased their magnitudes relative to Andrews' (1986) data for the Green River.

The above data were normalized with respect to Andrews' (1986) data, by dividing Andrews' estimated Yampa River average annual sediment load (1.9×10^6 tons/year) by the weighted average sediment load at Mathers Hole (3.17×10^6 tons/year), calculated using O'Brien's (1987) correction factors and historic hydrology. Multiplying the dividend (0.6) by the calculated reduction in sediment load at Mathers Hole based on 2045 demand conditions (4.81×10^5 tons/year) results in an adjusted sediment load reduction of ~2.88×10^5 tons/year—roughly 9% of the average annual sediment load at Jensen or about 4% of that at Ouray. The reduction in median annual sediment load relative to historic conditions (~1.57×10^5 tons/year) would be less than 5% of the average annual sediment load at Jensen or roughly 2% of that at Ouray. Moreover, given the variability of inflows from other tributaries to the Green River downstream from Flaming Gorge Dam, and sediment input therefrom, on an annual basis the percentage of sediment lost from the Jensen–Ouray reach could be substantially less, especially during drier-than-average conditions in the Yampa Basin.

CONCLUSIONS AND RECOMMENDATIONS

Historically, supplies of sediment to and transport through the Yampa Canyon appear to be in long-term equilibrium. Moreover, depletions do not appear to threaten this equilibrium in the foreseeable future. Therefore, impacts to spawning bars and beaches in Yampa Canyon should be negligible.

However, the supply of sediment to the Green River will be reduced, and releases from Flaming Gorge Dam cannot mitigate this potential impact. Long-term reductions of 5–9% at Jensen and 2–5% at Ouray relative to undepleted flow conditions may deprive these reaches of sediment needed to build floodplain features, such as backwaters and floodplain depressions, considered important as nursery habitats for razorback and Colorado pikeminnow larvae.

Nevertheless, Andrews' (1986) finding that the Green River downstream from the Yampa River has been in long-term equilibrium since 1962 suggests that a comparison between historical post-Flaming Gorge (i.e., 1962–1986) data and comparable data for the same period under future demand conditions might provide a more accurate assessment of impacts. Such an analysis produces an adjusted sediment loss of ~9.6×10^4 tons/year, or about 3% of Andrews' estimated sediment load at Jensen and less than 1.5% of that at Ouray. These data suggest that the impact of depletions on the existing sediment equilibrium could be quite small. However, periodic measurements of suspended sediment, particularly during high spring flows, should be undertaken in the Green River at Jensen to ensure that these predicted results are reliable and accurate. Correlations between observed sediment loads and flows can be used in conjunction with periodic estimates of depletions to estimate losses of sediment attributable to those depletions.

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APPENDIX H

COLORADO WATER QUALITY STANDARDS FOR THE YAMPA RIVER BASIN

REGULATION NO. 33

CLASSIFICATIONS AND NUMERIC STANDARDS
COLORADO RIVER BASIN
(Region 12)

33.1 AUTHORITY

These regulations are promulgated pursuant to section 25-8-101 et seq.C.R.S., as amended, and in particular, 25-8-203 and 25-8-204.

33.2 PURPOSE

These regulations establish classifications and numeric standards for the Colorado River, the Yampa River, and the North Platte River, including all tributaries and standing bodies of water as indicated in section 33.6. The classifications identify the actual beneficial uses of the water. The numeric standards are assigned to determine the allowable concentrations of various parameters. Discharge permits will be issued by the Water Quality Control Division to comply with basic, narrative, and numeric standards and control regulations so that all discharges to waters of the state protect the classified uses. (See section 31.14). It is intended that these and all other stream classifications and numeric standards be used in conjunction with and be an integral part of Regulation No. 31 Basic Standards and Methodologies for Surface Water.

33.3 INTRODUCTION

These regulations and tables present the classifications and numeric standards assigned to stream segments listed in the attached tables (See section 33.7). As additional stream segments are classified and numeric standards for designated parameters are assigned for this drainage system, they will be added to or replace the numeric standards in the tables in section 33.7. Any additions or revisions of classifications or numeric standards can be accomplished only after public hearing by the Commission and proper consideration of evidence and testimony as specified by the statute and the Basic Standards and Methodologies for Surface Water.

33.4 DEFINITIONS

See the Colorado Water Quality Control Act and the codified water quality regulations for definitions.

33.5 BASIC STANDARDS

(1) All waters of Region 12 are subject to the following standard for temperature. (Discharges regulated by permits, which are within the permit limitations, shall not be subject to enforcement proceedings under this standard). Temperature shall maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deemed deleterious to the

resident aquatic life. Generally, a maximum 3°C increase over a minimum of a four-hour period, lasting 13 hours maximum, is deemed acceptable for discharges fluctuating in volume or temperature. Where temperature increases cannot be maintained within this range using Best Management Practices (BMP), Best Available Technology Economically Achievable (BATEA), and Best Practical Waste Treatment Technology (BPWTT) control measures, the Commission may determine by a rulemaking hearing in accordance with the requirements of the applicable statutes and the basic regulations, whether or not a change in classification is warranted.

(2) See Basic Standards and Methodologies for Surface Water, 31.11 for a listing of organic standards. The column in the tables headed "Water Fish" are presumptively applied to all aquatic life class 1 streams and are applied to aquatic life class 2 streams on a case-by-case basis as shown in the tables in 33.6.

33.6 TABLES

(1) Introduction

The numeric standards for various parameters in the attached tables were assigned by the Commission after a careful analysis of the data presented on actual stream conditions and on actual and potential water uses.

Numeric standards are not assigned for all parameters listed in the tables attached to 31.0. If additional numeric standards are found to be needed during future periodic reviews, they can be assigned by following the proper hearing procedures.

(2) Abbreviations:

The following abbreviations are used in the attached tables:

ac	=	acute (1-day)
Ag	=	silver
Al	=	aluminum
As	=	arsenic
B	=	boron
Ba	=	barium
Be	=	beryllium
Cd	=	cadmium
ch	=	chronic (30-day)
Cl	=	chloride
Cl_2	=	residual chlorine
CN	=	free cyanide

CrIII	=	trivalent chromium
CrVI	=	hexavalent chromium
Cu	=	copper
dis	=	dissolved
D.O.	=	dissolved oxygen
F	=	fluoride
F.Coli	=	fecal coliforms
Fe	=	iron
Hg	=	mercury
mg/l	=	milligrams per liter
ml	=	milliliters
Mn	=	manganese
NH_3	=	un-ionized ammonia as N(nitrogen)
Ni	=	nickel
NO_2	=	nitrite as N (nitrogen)
NO_3	=	nitrate as N (nitrogen)
OW	=	outstanding waters
P	=	phosphorus
Pb	=	lead
S	=	sulfide as undissociated H_2S (hydrogen sulfide)
Sb	=	antimony
Se	=	selenium
SO_4	=	sulfate
sp	=	spawning
Tl	=	thallium
tr	=	trout
Trec	=	total recoverable
TVS	=	table value standard

U	=	uranium
ug/l	=	micrograms per liter
UP	=	use-protected
Zn	=	zinc

In addition, the following abbreviations were used:

Fe(ch)	=	WS(dis)
Mn(ch)	=	WS(dis)
SO_4	=	WS

These abbreviations mean: For all surface waters with an actual water supply use, the less restrictive of the following two options shall apply as numerical standards, as specified in the Basic Standards and Methodologies at 31.11(6):

(i) existing quality as of January 1, 2000; or

(ii)

Iron	=	300 µg/l (dissolved)
Manganese	=	50 µg/l (dissolved)
SO_4	=	250 mg/l

For all surface waters with a "water supply" classification that are not in actual use as a water supply, no water supply standards are applied for iron, manganese or sulfate, unless the Commission determines as the result of a site-specific rulemaking hearing that such standards are appropriate.

(3) Table Value Standards

In certain instances in the attached tables, the designation "TVS" is used to indicate that for a particular parameter a "table value standard" has been adopted. This designation refers to numerical criteria set forth in the Basic Standards and Methodologies for Surface Water. The criteria for which the TVS are applicable are on the following table.

TABLE VALUE STANDARDS
(Concentrations in ug/l unless noted)

PARAMETER[1]	TABLE VALUE STANDARDS [2][3]
Ammonia	Cold Water Acute = 0.43/FT/FPH/2[4] in mg/l Warm Water Acute = 0.62/FT/FPH/2[4] in mg/l
Cadmium	Acute=(1.13667-[(ln hardness)* (0.04184)])*$e^{(1.128[\ln(hardness)]-3.6867)}$ Acute(Trout)=(1.13667-[(ln hardness)*(0.04184)])* $e^{(1.128[\ln(hardness)]-3.828)}$ Chronic=(1.10167-[(ln hardness)* (0.04184)])* $e^{(0.7852[\ln(hardness)]-2.715)}$

TABLE VALUE STANDARDS

(Concentrations in ug/l unless noted)

PARAMETER[1]	TABLE VALUE STANDARDS [2][3]
Chromium III[5]	Acute= $e^{(0.819[\ln(hardness)]+2.5736)}$ Chronic=$e^{(0.819[\ln(hardness)]+0.5340)}$
Chromium VI[5]	Acute = 16 Chronic = 11
Copper	Acute= $e^{(0.9422[\ln(hardness)]-1.7408)}$ Chronic= $e^{(0.8545[\ln(hardness)]-1.7428)}$
Lead	Acute= (1.46203-[(ln hardness)*(0.145712)])* $e^{(1.273[\ln(hardness)]-1.46)}$ Chronic=(1.46203-[(ln hardness)* (0.145712)])* $e^{(1.273[\ln(hardness)]-4.705)}$
Manganese	Acute= $e^{(0.3331[\ln(hardness)]+6.4676)}$ Chronic= $e^{(0.3331 [\ln (hardness)]+5.8743)}$
Nickel	Acute= $e^{(0.846[\ln(hardness)]+2.253)}$ Chronic= $e^{(0.846[\ln(hardness)]+0.0554)}$
Selenium[6]	Acute = 18.4 Chronic = 4.6
Silver	Acute= ½$e^{(1.72[\ln(hardness)]-6.52)}$ Chronic = $e^{(1.72[\ln(hardness)]-9.06)}$ Chronic(Trout) = $e^{(1.72[\ln(hardness)]-10.51)}$
Uranium	Acute= $e^{(1.1021[\ln(hardness)]+2.7088)}$ Chronic= $e^{(1.1021[\ln(hardness)]+2.2382)}$

TABLE VALUE STANDARDS
(Concentrations in ug/l unless noted)

PARAMETER[1]	TABLE VALUE STANDARDS [2][3]
Zinc	Acute= $e^{(0.8473[\ln(hardness)]+0.8618)}$ Chronic= $e^{(0.8473[\ln(hardness)]+0.8699)}$

TABLE VALUE STANDARDS - FOOTNOTES

(1) Metals are stated as dissolved unless otherwise specified.

(2) Hardness values to be used in equations are in mg/l as calcium carbonate. The hardness values used in calculating the appropriate metal standard should be based on the lower 95 per cent confidence limit of the mean hardness value at the periodic low flow criteria as determined from a regression analysis of site-specific data. Where insufficient site-specific data exists to define the mean hardness value at the periodic low flow criteria, representative regional data shall be used to perform the regression analysis. Where a regression analysis is not appropriate, a site-specific method should be used. In calculating a hardness value, regression analyses should not be extrapolated past the point that data exist.

(3) Both acute and chronic numbers adopted as stream standards are levels not to be exceeded more than once every three years on the average.

(4) $FT = 10^{.03\,(20-TCAP)}$;

Where TCAP is ≤ T ≤ 30

$FT = 10^{0.03(20-T)}$;

Where 0 is ≤ T ≤ TCAP

TCAP = 20° C cold water aquatic life species present

TCAP = 25° C cold water aquatic life species absent

FPH = 1; Where 8 <pH (9

$FPH = \frac{1 + 10^{(7.4-pH)}}{1.25}$; Where 6.5 ≤ pH ≤ 8

FPH means the acute pH adjustment factor, defined by the above formulas.

FT Means the acute temperature adjustment factor, defined by the above formulas.

T means temperature measured in degrees celsius.

TCAP means temperature CAP; the maximum temperature which affects the toxicity of ammonia to salmonid and non-salmonid fish groups.

NOTE: If the calculated acute value is less than the chronic value, then the chronic value shall be used as the acute standard.

(5) Unless the stability of the chromium valence state in receiving waters can be clearly demonstrated, the standard for chromium should be in terms of chromium VI. In no case can the sum of the instream levels of Hexavalent and Trivalent Chromium exceed the water supply standard of 50 ug/l total chromium in those waters classified for domestic water use.

(6) Selenium is a bioaccumulative metal and subject to a range of toxicity values depending upon numerous site-specific variables.

33.7 - 33.9 RESERVED

33.10 STATEMENT OF BASIS AND PURPOSE

(1) Introduction

These stream classifications and water quality standards for state waters in Eagle, Grand, Jackson, Pitkin, Routt, and Summit Counties implement requirements of the Colorado Water Quality Control Act, C.R.S. 1973, 25-8-101 et seq. They also represent the implementation for Planning Region 12 of the Commission's Regulations Establishing Basic Standards and an Antidegradation Standard and Establishing a System for Classifying State Waters, for Assigning Standards, and for Granting Temporary Modifications (the "basic standards").

The basic regulations establish a system for the classification of state waters according to the beneficial uses for which they are suitable or are to become suitable, and for assigning specific numerical water quality standards according to such classifications. Because these stream classifications and standards implement the basic regulations, that statement of basis and purpose (Section 3.1.16) must be referred to for a complete understanding of the underlying basis and purpose of the regulations adopted herein; therefore, that statement of basis and purpose is addressed to the scientific and technological rationale for the specific classifications and standards developed from information in the record established in the administrative process. Public participation was a significant factor in the development of these regulations. A lengthy record has been built through public hearings, and this record establishes a substantial basis for the specific classifications and standards adopted. Public hearings were commenced on August 20, 1979, to receive a testimony, and were continued on September 5, October 9, October 10, and November 5, 1979. A total of twenty-two persons requested and were granted party status by the Commission in accordance with C.R.S. 1973, 24-4-101 et seq.

(2) General Considerations

(a) These regulations are not adopted as control regulations. Stream classifications and water quality standards are specifically distinguished from control regulations in the Water Quality Control Act and it is the view of the Commission that they need not be adopted as control regulations pursuant to the statutory scheme. The Commission has specifically endorsed the view of the attorney general on this issue, which is a part of the record of these hearings.

(b) The Commission was requested in the public hearings to rule on the applicability of these and other regulations to the operation of water diversion facilities, dams, transport systems, and the consequent withdrawal, impoundment, non-release and release of water for the exercise of water rights. The Commission has determined that any such broad ruling is inappropriate in the context of the present regulations. While the request raises significant issues that must be addressed, the Commission is aware of the current practices of the Division. In addition, these questions are currently the subject of litigation and involve complex legal issues. It is anticipated that the Commission will address these issues in the proper context and upon a review of relevant information. The request does not raise specific questions as to proposed classifications and standards; however, the Commission has taken into account the fact that these issues are unresolved in assigning classifications and standards as is more fully discussed below.

(3) Definition of Stream Segments

(a) For purposes of assigning classifications and water quality standards, the streams and water bodies of Region 12 are identified according to river basin and specific water segments.

(b) Within each river basin, specific water segments are defined to which use classification and numeric water quality standards are assigned. These segments may constitute a specified lake or reservoir, or a generally defined grouping of waters within the basin (i.e., a specific mainstem segment and all tributaries flowing into that mainstem segment).

(c) Segments are generally delineated according to the points at which the use or water quality characteristics of a watercourse are determined to change significantly enough to require a change in use classification and/or water quality standards. In many cases, such transitiion points can be specifically identified from available water quality data. In other cases, however, the delineation of segments is based upon best judgments of where instream changes in uses of water quality occur, based upon upstream and downstream data.

(4) Use Classifications -- Generally

(a) The use classifications have been assigned in accordance with the provisions of Section 3.1.6 and 3.1.13 of the basic regulations. Each classification is based upon actual current uses or existing water quality. In the latter case, even though the use may not be in place, the classification is attached if existing water quality would allow that use.

(b) In all cases, the requirement of the basic regulations, Section 3.1.6(1)(c), that an upstream use cannot threaten or degrade a downstream use, has been followed. Accordingly, upstream segments of a stream are generally the same as or higher in classification than downstream segments. In a few cases, tributaries are classified at lower classifications than mainstems, where the flow from the tributaries does not threaten the quality of mainstem waters and where the evidence indicates that lower classifications for the tributaries is appropriate.

(c) The Commission has determined that it has the authority to assign classifications "High Quality Waters - Class 1" and "High Quality Waters - Class 2" where the evidence indicates that the requirements of Section 3.1.13(1)(e) has been determined on a case-by-case basis.

(d) The classification "High Quality Waters - Class 1" has been assigned where the following factors are present:

(i) waters are of a quality higher than necessary to protect specified uses;

(ii) waters constitute an outstanding state and national resource;

(iii) no known sources of pollution are present;

(iv) restrictions on use due to federal status are present; and

(v) waters are of a recreational and ecological significance.

(e) Not all segments located within wilderness areas have been classified "High Quality Waters - Class 1". In addition, rivers designated under the Wild and Scenic Rivers Act and streams providing unique habitats for threatened species of fish have not been classified "High Quality - Class 1". These segments have been classified "High Quality - Class 2", for the following reasons:

(i) waters are of a quality higher than necessary to protect specified uses;

(ii) evidence in the record indicates that presence of water diversions within these areas;

(iii) a question exists as to whether existing diversion structures can be maintained consistent with a "High Quality - Class 1) designation, due to the antidegradation requirement. Because of the questions regarding authority to regulate diversion, the Class 1 designation was deemed potentially too rigid. The Commission recognizes its authority to upgrade these segments if and when it is appropriate to do so.

(f) The "High Quality Class 2" classification was proposed for many segments located on National Forest Service lands and in other instances. These proposals have been rejected, and the segments classified for specific uses, for the following reasons:

(i) High quality classifications represent extraordinary categories, and their use is optional at the discretion of the Commission;

(ii) Due to the extraordinary nature of the classification, the Commission deems it appropriate to require more data on existing quality than present in the record to justify more extensive use of the classification;

(iii) Further monitoring may indicate in the future that many segments in this region should be upgraded to a high quality classification;

(iv) More reliable data is necessary with this classification in these cases because there are no guidelines other than instream values upon which to base water quality standards;

(v) It is important in these cases to assign specific water quality standards to protect the highest specific use classifications, and only specific use classifications provide the mechanism for assigning such standards.

(vi) Questions exist regarding "existing quality" in terms of historic activities that may have affected water quality;

(vii) Questions regarding the applicability of the high quality classification to diversions and the Commission's authority with regard to such diversions;

(viii) Questions exist as to whether the high quality classification applies only to point source discharges, or also to other activities;

(i) The Commission views the classification system as an ongoing process and recognizes its authority to upgrade specific stream segments. There is presently a need for the establishment of mechanisms for administering the "High Quality - Class 2" classification; and

(x) Location of a stream on national forest service lands provides no reason in and of itself to classify it as high quality.

(g) The Commission feels that the classifications are socially, economically, and technically justifiable.

(h) Qualifiers -- "Goal"

The "goal" qualifier (Section 3.1.13(2)(a), basic regulations) has been used in specific cases where waters are presently not fully suitable for the classified use, but are intended to become so. In all such cases, water quality standards have been assigned to protect the classified uses and temporary modifications have been granted for specific parameters.

(i) Qualifiers -- "Interrupted Flow"

The Commission has considered appending the "interrupted flow" qualifier to numerous stream segments in accordance with Section 3.1.13(2) (c) of the basic regulations; however, numerous questions have arisen as to its meaning and applicability. The intention of the provision is to allow the Commission to classify certain stream segments according to their water quality, despite the existence of flow problems. It has not been included in order to eliminate confusion as to its applicability to diminished, as opposed to interrupted, flows. It has also been eliminated in order to avoid any misimpression regarding benefits to dischargers. This qualifier is essentially a statement of the obvious, particularly in view of the provision regarding low flow exceptions (Section 3.1.9(1), basic regulations).

In addition, where flow characteristics permanently impair the suitability of the stream segment to provide a habitat for a wide variety of aquatic life, the "Class 2 - Cold Water Aquatic Life" classification has been assigned.

(j) Recreation - Class 1 and Class 2

In addition to the significant distinction between "Recreation - Class 1 and Recreation - Class 2" as defined in Section 3.1.13(1) of the basic regulations, the difference between the two classifications in terms of water quality standards is the fecal coliform parameter. "Recreation - Class 1" generally results in a standard of 200 fecal coliforms per 100 ml; "Recreation - Class 2" generally results in a standard of 2000 fecal coliforms per 100 ml.

The Commission has heard considerable testimony on the issue of applying these classifications and has deliberated on it at length. The Commission has decided to classify as "Recreation - Class 2" those stream segments where primary contact recreation does not exist and cannot be reasonably expected to exist in the future, and where municipal discharges are present which may be unnecessarily affected by the "Recreation - Class 1" classification, to their detriment and that of the aquatic life in the stream segment. The Commission has decided to classify as "Recreation - Class 1" those stream segments where primary contact recreation exists, or where the fecal coliform standard of 200 per 100 ml. is being met and no point source discharges exist, despite the absence of the primary contact use. The reasons for these decisions are as follows:

(i) The streams in this region are generally unsuitable for primary contact recreation because of water temperature and stream flows. The only known exception is stream segment 2 of the Upper Colorado River Basin.

(ii) Fecal coliform is an indicator organism. Its presence does not always indicate the presence of pathogens, depending on the source of the fecal coliform. If the source is agricultural runoff as opposed to human sewage, there my be no health hazard and therefore no significant need to reduce the presence of fecal coliform to the 200 per 100 ml. level. Also, control of nonpoint sources is very difficult.

(iii) Treating sewage to meet the 200 per 100 ml. level generally means the treatment plant must chlorinate its effluent to meet the limitation. The presence of chlorine in the effluent to meet the residual chlorine standard is expensive and often results in the addition of more chemicals which can be detrimental to aquatic life; therefore, reducing the need for chlorine is beneficial to aquatic life.

(iv) Even where a treatment plant in this region might treat its effluent to attain the standard of 200 per 100 ml., agricultural runoff and irrigation return flows below the plant may result in the rapid increase of fecal coliform levels; therefore, the benefits of further treatment are questionable.

(v) The fecal coliform standard of 2000 per 100 ml. has been established to protect water supplies. There is no significant difference in the two levels for water treatment plants because the conventional plant must provide the means for treatment at the higher level. The standard of 200 per 100 ml. is not intended to protect the water supply classification.

(5) <u>Water Quality Standards -- Generally</u>

(a) The water quality standards for classified stream segments are defined as numeric values for specific water quality parameters. These numeric standards are assigned as the limits for chemical constituents and other parameters necessary to protect adequately the classified uses in all stream segments.

(b) Not all of the parameters listed in the "Tables " appended to the basic regulations are assigned as water quality standards for Region 12. This complies with Section 3.1.7(c) of the basic regulations. Numeric standards, in some cases, have not been assigned for parameters on which there is no data and no knowledge of the occurrence in Region 12.

(c) A numeric standard for the temperature parameter has been assigned as a basic standard applicable to all waters of the region in the regulations. The standard of a 3 degree temperature increase above ambient water temperature as defined is generally valid based on the data regarding what is necessary to support an "Aquatic Life - Class 1" fishery. The standard takes into account daily and seasonal fluctuations; however, it is also recognized that the 3 degree limitation as defined is only appropriate as a guideline and cannot be rigidly applied if the intention is to protect aquatic life. In winter, for example, warm water releases from reservoirs (which might not be subject to the standard in any case) may be beneficial to aquatic life. It is the intention of the commission in assigning the standard to prevent radical temperature changes in short periods of time, which are detrimental to aquatic life.

(d) Numeric standards for organic substances have been assigned as basic standards applicable to all waters of the region in the same manner as the basic standards in Section 3.3.5(2)(a) of the basic regulations. These standards are essential to a program designed to protect the waters of the state regardless of use classifications because they describe the fundamental conditions that all waters must meet.

It is the decision of the Commission to assign these standards as basic standards for Region 12 even though their presence is not generally suspected. Also, these numbers are not detectable using routine methodology, and there is some concern regarding the potential for monitoring requirements. This concern should be alleviated by Section 3.1.14(5) of the basic regulations, but there is uncertainty regarding the interpretation of those numbers by other entities. Regardless of these concerns, because these parameters are highly toxic, there is a need for regulating their presence in state waters. Because the Commission has determined that they have uniform applicability here, their inclusion as basic standards for the region accomplishes this purpose.

(e) In many cases, the numeric water quality standards are taken from the "Tables" appended to the basic regulations. These table values are used where actual ambient water quality data in a segment indicates that the existing quality is substantially equivalent to, or better than, the corresponding table values. This has been done because the table values are generally considered to protect the beneficial use classifications of the waters of the state.

Consistent with the basic regulations, the Commission has not assumed that the table values have presumptive validity or applicability in Region 12. This accounts for the extensive data in the record of ambient water quality; however, the Commission has found that the table values are generally sufficient to protect the use classifications. They have, therefore, been applied in the situations outlined in the preceding paragraph, as well as in those cases where there is insufficient data in the record to justify the establishment of different standards. The documentary evidence forming the basis for the table values is included in the record.

(f) In many cases, instream ambient water quality provides the basis for the water quality standards (See (g) below). In those cases where the classified uses presently exist or have a reasonable potential to exist despite the fact that instream data reflects ambient conditions of lower water quality than the table values, instream values have been used. In these cases, the evidence indicates that instream values are adequate to protect the uses. In those cases where temporary modifications are appropriate, instream values are generally reflected in the temporary modification and table values are reflected in the temporary modification and table values are reflected in the corresponding water quality standard. (The "goal" qualifier is then appended to the classification).

Cases in which water quality standards reflect these instream values usually involve the metal parameters. On many stream segments, elevated levels of metals are present due to natural or unknown causes, as well as mine seepage from inactive or abandoned mines. These sources are difficult to identify and impractical or impossible to control. The classified aquatic life uses may be impacted and/or may have acclimated to the condition. In either case, the water quality standards are deemed sufficient to protect the uses that are present.

(g) In assigning standards based on instream ambient water quality, a calculation is made based upon the mean (average) plus one standard deviation (x+s) for all sampling points used on a particular stream segment. Since a standard deviation is not added to the water quality standard for purposes of determining compliance, this is a fair method as applied to discharges.

Levels that were determined to be below the detectable limits of the sampling methodology employed were averaged in as zero rather than at the detectable limit. This moves the mean down; but since zero is also used when calculating wasteload allocations, this method is not unfair to dischargers. A number of different statistical methods could have been used. All of them have pros and cons and the approach used is reasonable.

Metals present in water samples may be tied up in turbidity when the water is present in the stream. In this form they are not "available" to fish and may not be detrimental to aquatic life. Because the data of record does not distinguish as to availability, some deviation from table values, as well as the use of (x+s) is further justified, because it is unlikely that the total value in the samples analyzed is in available form.

(h) No water quality standards are set below detectable limits for any parameter, although certain parameters may not be detectable at the limit of the standards using routine methodology; however, it must be noted that stream monitoring, as opposed to effluent monitoring, is generally not the responsibility of the dischargers but of the state. Furthermore, the purpose of the standards is to protect the classified uses, despite the inconvenience monitoring may impose.

Section 3.1.14(5) of the basic regulations states that "dischargers will not be required to regularly monitor for any parameters that are not identified by the division as being of concern". Generally, there is not requirement for monitoring unless a parameter is in the effluent guidelines for the relevant industry.

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

REGION: 12 BASIN: Yampa River Stream Segment Description	Desig	Classifications	NUMERIC STANDARDS PHYSICAL and BIOLOGICAL	INORGANIC mg/l		METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
1. All tributaries to the Yampa River, including all wetlands, lakes and reservoirs, which are within the Mount Zirkel Wilderness Area.	OW	Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
2a. Mainstem of the Yampa River from the confluence of the Bear River and Wheeler Creek to the confluence with Elkhead Creek, except for segment 2b.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
2b. Stagecoach Reservoir.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
3. All tributaries to the Yampa River, including all wetlands, lakes and reservoirs, from the source to the confluence with Elk River, except for specific listings in Segments 1, 4, 5, 6, 7, 8, 10, 13 and 19. Mainstem of the Bear River, including all tributaries, wetlands, lakes and reservoirs from the boundary of National Forest lands to the confluence with the Yampa River.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
4. Mainstem of Little White Snake Creek from the source to the confluence with the Yampa River.	UP	Aq Life Cold 2 Recreation 2 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=2000/100ml	CN=0.005 S=0.002 B=0.75 NO_2=0.05	NO_3=10 Cl=250 SO_4=250	As(ac)=50 Cd(ac)=5 CrIII(ac)=50 CrVI(ac)=50 Cu(ch)=200	Fe(ch)=300(dis) Pb(ac)=50 Mn(ch)=50 Hg(ac)=2.0	Ni(ch)=100 Se(ch)=20 Ag(ac)=100 Zn(ac/ch)=2000	All metals are Trec unless otherwise noted.
5. Mainstem of Chimney Creek, including all tributaries, wetlands, lakes and reservoirs, which are not on National Forest lands, from the source to the confluence with the Yampa River.		Aq Life Cold 1 Recreation 2 Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=2000/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS	Cu(ac/ch)=TVS Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
6. Mainstem of Oak Creek, including all tributaries, wetlands, lakes and reservoirs, from the source to the point of discharge of the Oak Creek wastewater treatment plant.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

7. Mainstem of Oak Creek from the point of discharge of the Oak Creek wastewater treatment plant to the confluence with the Yampa River.		Aq Life Cold 1 Recreation 2 Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=2000/100ml	NH_3(ac)=TVS NH_3(ch)=0.05 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS	Cu(ac/ch)=TVS Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
8. Mainstem of the Elk River including, all tributaries, wetlands, lakes and reservoirs from the source to the confluence with the Yampa River, except for those tributaries included in Segment 1.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

REGION: 12 BASIN: Yampa River Stream Segment Description	Desig	Classifications	NUMERIC STANDARDS PHYSICAL and BIOLOGICAL	INORGANIC mg/l		METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
12. All tributaries to the Yampa River, including all wetlands, lakes and reservoirs, from the confluence with the Elk River to the confluence with Elkhead Creek, which are not on National Forest lands, except for specific listings in Segments 13a, 13b, 13c and 13d.	UP	Aq Life Cold 2 Recreation 2 Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=2000/100ml						
13a. Mainstem of Trout Creek, including all tributaries, wetlands, lakes and reservoirs, from the source to the confluence with the Yampa River, which are not on National Forest lands, except for specific listings in Segment 13b.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
13b. Mainstem of Foidel Creek, including all tributaries and wetlands. Mainstem Fish Creek, including all tributaries from County Road 27 downstream to the confluence with Trout Creek. Middle Creek and all tributaries, from County Road 27 downstream to the confluence with Trout Creek.		Aq Life Cold 1 Recreation 1 Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
13c. Mainstem of Trout Creek from headgate of Spruce Hill Ditch (approximately 2,500 feet north of where County Road 27 crosses Trout Creek) to its confluence with Fish Creek. All tributaries to Trout Creek from the headgate of Spruce Hill Ditch (approximately 2,500 feet north of where County Road 27 crosses Trout Creek) to County Road 179.		Aq Life Cold 1 Recreation 1 Agriculture **June through February** Water Supply	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 **June through February** NO_3=10 Cl=250 SO_4=WS	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS **June through February** As(ac)=50(Trec) CrIII(ac)=50(Trec)	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) **June through February** Fe(ch)=WS(dis) Mn(ch)=WS	Ni(ac/ch)=TVS Se(ac/ch)=TVS` Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS **June through February** Se(ch)=10(Trec)	
13d. Mainstems of Sage Creek and Dry Creek, including all tributaries, reservoirs and wetlands from their source to the confluence with the Yampa River.		Aq Life Warm 1 Recreation 2 Agriculture	D.O.=5.0 mg/l pH=6.5-9.0 F.Coli=2000/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ac)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
14. Mainstem of Elkhead Creek, including all tributaries, wetlands, lakes and reservoirs, from the boundary of the National Forest lands, to the confluence with the Yampa River.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
15. Mainstem of the East Fork of the Williams Fork river from the Routt/Rio Blanco county line to the confluence with the South Fork.		SEE LOWER	COLORADO	REGULATION					
16. Mainstem of the South Fork of the Williams Fork River from the Routt/Rio Blanco county line to the confluence with the East Fork.		SEE LOWER	COLORADO	REGULATION					

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

17. All tributaries to the Williams Fork River system in Routt County, including all wetlands, lakes and reservoirs, which are not on National Forest lands.		SEE LOWER	COLORADO	REGULATION					

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

REGION: 12 BASIN: Yampa River Stream Segment Description	Desig	Classifications	NUMERIC STANDARDS: PHYSICAL and BIOLOGICAL	NUMERIC STANDARDS: INORGANIC mg/l		NUMERIC STANDARDS: METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
18. Mainstem of the Little Snake River, including all tributaries, wetlands, lakes and reservoirs, from the confluence of the Middle Fork and South Fork to the Colorado/Wyoming border, which are not on National Forest lands.		Aq Life Cold 1 Recreation 1 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=200/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
19. All tributaries to the Little Snake River, including all wetlands, lakes and reservoirs, which are on National Forest lands in Routt County.		Aq Life Cold 1 Recreation 2 Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=2000/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl_2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=250	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=300(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=50 Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch) Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

EGION: 11 BASIN: LOWER YAMPA RIVER/GREEN RIVER Stream Segment Description	Desig	Classifications	NUMERIC STANDARDS PHYSICAL and BIOLOGICAL	INORGANIC mg/l		METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
1. Mainstem of the Yampa River from a point immediately below the confluence with Elkhead Creek to a point immediately above the confluence with Lay Creek.		Aq Life Cold 1 Recreation 1a Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E. Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005 S=0.002	B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
2. Mainstem of the Yampa River from a point immediately above the confluence with Lay Creek to the confluence with the Green River.		Aq Life Warm 1 Recreation 1a Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E. Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	
3a. All tributaries to the Yampa River, including all wetlands, lakes and reservoirs, from a point immediately below the confluence with Elkhead Creek to a point immediately below the confluence with Lay Creek, except for the specific listings in Segments 3b through 15.	UP	Aq Life Warm 2 Recreation 2 Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=2000/100ml E. Coli=630/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=0.75	As(ch)=100(Trec) Be(ch)=100(Trec) Cd(ch)=10(Trec) CrIII(ch)=100(Trec) CrVI(ch)=100(Trec) Cu(ch)=200(Trec)	Pb(ch)=100(Trec) Mn(ch)=200(Trec)	Ni(ch)=200(Trec) Se(ch)=20(Trec) Zn(ch)=2000(Trec)	
3b. Mainstems of Johnson Gulch, Pyeatt Gulch, Ute Gulch, Castor Gulch, No Name Gulch, Flume Gulch, Buzzard Gulch, Coyote Gulch, Deal Gulch, Horse Gulch, Elk Gulch, Ben Morgan Creek, Boxelder Gulch, Collom Gulch, Hale Gulch and Jubb Creek, including all tributaries from their sources to their mouths.	UP	Aq Life Warm 2 Recreation 1b Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E. Coli=205/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=5	As(ch)=200(Trec) Cd(ch)=50(Trec) CrIII(ch)=1000(tot) CrVI(ch)=1000(tot) Cu(ch)=500(Trec)	Pb(ch)=100(Trec)	Se(ch)=50(Trec) Zn(ch)=25,000(Trec)	
3c. Mainstem of Milk Creek, including all tributaries, wetlands, lakes and reservoirs, from Thornburgh (County Rd 15) to the confluence with the Yampa River except for the specific listings in Segment 3b and 3e.		Aq Life Warm 1 Recreation 1b Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E. Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	Temp modifications for inorganics and metals: existing ambient quality. Expiration date of 12/31/08.
3d. Mainstem of Temple Gulch, Lay Creek, and Morgan Gulch from their sources to their confluences with the Yampa River.		Aq Life Warm 2 Recreation 2 Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=2000/100ml E. Coli=630/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ac)=100(Trec) Cd(ac/ch)=TVS CrIII(ac)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	
3e. Mainstem of Good Spring Creek above Wilson Reservoir and Wilson Creek and their tributaries except for Jubb Creek.	UP	Aq Life Warm 2 Recreation 1b Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=325100ml E. Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	Temp modificaitons for inorganics and metals: existing ambient quality. Expiration date of 12/31/08.
3f. Big Gulch.		Aq Life Warm 2 Recreation 1a Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E. Coli=126/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=0.75	As(ch)=100(Trec) Be(ch)=100(Trec) Cd(ch)=10(Trec) CrIII(ch)=100(Trec) CrVI(ch)=100(Trec) Cu(ch)=200(Trec)	Pb(ch)=100(Trec) Mn(ch)=200(Trec)	Ni(ch)=200(Trec) Se(ch)=20(Trec) Zn(ch)=2000(Trec)	
4. Mainstem of the South Fork of Fortification Creek, including all wetlands, tributaries, lakes and reservoirs, from the source to the confluence with the North Fork of Fortification Creek.		Aq Life Cold 1 Recreation 1b Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E. Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=.01(Trec)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
5. Mainstem of Fortification Creek from the confluence of the North Fork and South Fork to the confluence with the Yampa River.		Aq Life Warm 1 Recreation 1a Agriculture	D.O. = 6.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E. Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ac)=100(Trec) Cd(ac/ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

REGION: 11 BASIN: LOWER YAMPA RIVER/GREEN RIVER Stream Segment Description		Desig	Classifications	NUMERIC STANDARDS PHYSICAL and BIOLOGICAL	INORGANIC mg/l		METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
6a.	All tributaries to Fortification Creek, including the North Fork of Fortification Creek and all wetlands, lakes and reservoirs, from the confluence of the North and South Forks to the confluence with the Yampa River, except for the specific listings in Segments 6b and 7.	UP	Aq Life Warm 2 Recreation 1b Agriculture	D.O.= 5.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E. Coli=205/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=0.75	As(ch)=100(Trec) Be(ch)=100(Trec) Cd(ch)=10(Trec) CrIII(ch)=100(Trec)	CrVI(ch)=100(Trec) Cu(ch)=200(Trec) Pb(ch)=100(Trec) Mn(ch)=200(Trec)	Ni(ch)=200(Trec) Se(ch)=20(Trec) Zn(ch)=2000(Trec)	
6b.	Freeman Reservoir.		Aq Life Cold 1 Recreation 1a Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E. Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
7.	Mainstem of the Little Bear Creek, including all tributaries, wetlands, lakes, and reservoirs, from the source to the confluence with Dry Fork.		Aq Life Cold 1 Recreation 1b Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E. Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
8.	Mainstem of East Fork of the Williams Fork River, including all tributaries, wetlands, lakes and reservoirs which are within the boundaries of the Flat Tops Wilderness Area.	OW	Aq Life Cold 1 Recreation 1a Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E. Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Mn(ch)=WS(dis) Hg(ch)=.0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
9.	Mainstem of East Fork of the Williams Fork River, including all wetlands, tributaries, lakes and reservoirs which are within the boundary of Routt National Forest, from the source to the boundary of Routt National Forest, except for the specific listings in Segment 8.		Aq Life Cold 1 Recreation 1b Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E.Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
10.	Mainstem of the East Fork of Williams Fork River, from the boundary of Routt National Forest to the confluence with the South Fork of the Williams Fork River.		Aq Life Cold 1 Recreation 1a Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
11.	Mainstem of the South Fork of Williams Fork River, including all wetlands, tributaries, lakes and reservoirs which are within the boundary of Routt National Forest, from the source to the boundary of Routt National Forest.		Aq Life Cold 1 Recreation 1b Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E.Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
12a.	Mainstem of the South Fork of the Williams Fork River and Beaver Creek from the boundary of Routt National Forest to their mouths, Milk Creek including all tributaries, wetlands, lakes and reservoirs from its source to Thornburgh (County Rd 15), mainstem of Morapos Creek from the source to the confluence with the Williams Fork River.		Aq Life Cold 1 Recreation 1b Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E.Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS	Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
12b.	Aldrich Lakes.		Aq Life Cold 1 Recreation 1a Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250	As(ch)=100(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS	Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

REGION: 11 BASIN: LOWER YAMPA RIVER/GREEN RIVER Stream Segment Description	Desig	Classifications	NUMERIC STANDARDS PHYSICAL and BIOLOGICAL	INORGANIC mg/l		METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
13a. Mainstem of the Williams Fork River from the confluence of the East Fork and South Fork to Highway 13/789 bridge at Hamilton.	UP	Aq Life Cold 2 Recreation 1a Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS	Hg(ch)=0.01(tot) Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
13b. Mainstem of the Williams Fork River from the highway 13/789 bridge at Hamilton to the confluence with the Yampa River.	UP	Aq Life Warm 2 Recreation 1a Water Supply Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.1 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac/ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	
14. All tributaries to the Yampa River including all wetlands, lakes, and reservoirs from a point immediately below the confluence with Lay Creek to a point immediately below the confluence with the Little Snake River.	UP	Aq Life Warm 2 Recreation 2 Agriculture	D.O.= 5.0 mg/l pH = 6.5-9.0 F.Coli=2000/100ml E.Coli=630/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=0.75	As(ch)=100(Trec) Be(ch)=100(Trec) Cd(ch)=10(Trec) CrIII(ch)=100(Trec) CrVI(ch)=100(Trec) Cu(ch)=200(Trec)	Pb(ch)=100(Trec) Mn(ch)=200(Trec)	Ni(ch)=200(Trec) Se(ch)=20(Trec) Zn(ch)=2000(Trec)	
15. Those portions of the Little Snake River which are in Colorado, from its first crossing of the Colorado/Wyoming border to a point immediately above the confluence with Powder Wash (Moffatt County).		Aq Life Cold 1 Recreation 1a Water Supply Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
16. Mainstem of the Little Snake River from a point immediately above the confluence with Powder Wash to the confluence with the Yampa River.		Aq Life Warm 2 Recreation 1a Agriculture	D.O.=5.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac/ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1100(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	Temporary modification: F.Coli=275/100ml Expiration date of 12/31/08.
17a. All tributaries to the Little Snake River from its first crossing of the Colorado/Wyoming border to a point immediately below the confluence with Fourmile Creek, except for the specific listing in Segments 17b and 18.		Aq Life Cold 1 Recreation 1b Agriculture	D.O.=6.0 mg/l D.O.(sp)=7.0 mg/l pH=6.5-9.0 F.Coli=325/100ml E.Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
17b. All tributaries to the Little Snake River from a point immediately below the confluence with Fourmile Creek to the confluence with the Yampa River except for the specific listings in Segment 18.	UP	Aq Life Cold 2 Recreation 2 Agriculture	D.O.= 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=2000/100ml E.Coli=630/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=0.75	As(ch)=100(Trec) Be(ch)=100(Trec) Cd(ch)=10(Trec) CrIII(ch)=100(Trec)	CrVI(ch)=100(Trec) Cu(ch)=200(Trec) Pb(ch)=100(Trec) Mn(ch)=200(Trec)	Ni(ch)=200(Trec) Se(ch)=20(Trec) Zn(ch)=2000(Trec)	
18. Mainstem of Slater Creek, including all tributaries, wetlands, lakes, and reservoirs, from the source to the confluence with the Little Snake River.		Aq Life Cold 1 Recreation 1b Water Supply Agriculture	D.O. = 6.0 mg/l D.O.(sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E.Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
19. Mainstem of the Green River within Colorado (Moffatt County).		Aq Life Cold 1 Recreation 1a Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	

STREAM CLASSIFICATIONS and WATER QUALITY STANDARDS

REGION: 11 BASIN: LOWER YAMPA RIVER/GREEN RIVER Stream Segment Description	Desig	Classifications	NUMERIC STANDARDS PHYSICAL and BIOLOGICAL	INORGANIC mg/l		METALS ug/l			TEMPORARY MODIFICATIONS AND QUALIFIERS
20. All tributaries to the Green River in Colorado, including all wetlands, lakes and reservoirs, except for the specific listings in Segments 21 and 22.; all tributaries to the Yampa River from a point immediately below the confluence with the Little Snake River to the confluence with the Green River, except for the specific listings in segments 15 through 18.	UP	Aq Life Warm 2 Recreation 1a Agriculture	D.O. = 5.0 mg/l pH = 6.5-9.0 F.Coli=200/100ml E.Coli=126/100ml	CN(ac)=0.2 NO_2(ac)=10 NO_3(ac)=100	B(ch)=0.75	As(ch)=100(Trec) Be(ch)=100(Trec) Cd(ch)=10(Trec) CrIII(ch)=100(Trec)	CrVI(ch)=100(Trec) Cu(ch)=200(Trec) Pb(ch)=100(Trec) Mn(ch)=200(Trec)	Ni(ch)=200(Trec) Se(ch)=20(Trec) Zn(ch)=2000(Trec)	
21. Mainstem of Beaver Creek, including all tributaries, wetlands, lakes, and reservoirs, from the source to the confluence with the Green River.		Aq Life Cold 1 Recreation 1b Water Supply Agriculture	D.O. = 6.0 mg/l D.O. (sp)=7.0 mg/l pH = 6.5-9.0 F.Coli=325/100ml E.Coli=205/100ml	NH_3(ac)=TVS NH_3(ch)=0.02 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05 NO_3=10 Cl=250 SO_4=WS	As(ac)=50(Trec) Cd(ac)=TVS(tr) Cd(ch)=TVS CrIII(ac)=50(Trec) CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=WS(dis) Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ch)=WS(dis) Mn(ac/ch)=TVS Hg(ch)=0.01(tot)	Ni(ac/ch)=TVS Se(ac/ch)=TVS Ag(ac)=TVS Ag(ch)=TVS(tr) Zn(ac/ch)=TVS	
22. Mainstem of Vermillion Creek, including all tributaries, wetlands, lakes and reservoirs, from the Colorado/Wyoming border to the confluence with the Green River.		Aq Life Warm 2 Agriculture June 1 to Aug. 31 Recreation 1b Sept. 1 to May 31 Recreation 2	D.O.=5.0 mg/l pH = 6.5-9.0 June 1 to Aug 31 F.Coli=325/100ml E.Coli=205/100ml Sept. 1 to May 31 F.Coli=2000/100ml E.Coli=630/100ml	NH_3(ac)=TVS NH_3(ch)=0.06 Cl_2(ac)=0.019 Cl2(ch)=0.011 CN=0.005	S=0.002 B=0.75 NO_2=0.05	As(ch)=100(Trec) Cd(ac/ch)=TVS CrIII(ac/ch)=TVS CrVI(ac/ch)=TVS Cu(ac/ch)=TVS	Fe(ch)=1000(Trec) Pb(ac/ch)=TVS Mn(ac/ch)=TVS Hg(ch)=0.01(tot) Ni(ac/ch)=TVS	Se(ac/ch)=TVS Ag(ac/ch)=TVS Zn(ac/ch)=TVS	

APPENDIX I

LIST OF THREATENED AND ENDANGERED SPECIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
764 Horizon Drive, Building B
Grand Junction, Colorado 81506-3946

IN REPLY REFER TO:
ES/CO:FWS-UCREFRP
MS 65412 GJ

September 11, 2000

Memorandum

To: Director, Upper Colorado River Endangered Fish Recovery Program, Regional Office, Region 6, Denver, Colorado, Mail Stop 65115

From: Assistant Field Supervisor, Ecological Services, Grand Junction, Colorado, Mail Stop 65412 *Allan R. Pfister*

Subject: List of Threatened and Endangered Species for the Yampa River Management Plan

This responds to your July 31, 2000, memorandum requesting a species list for the proposed Yampa River Management Plan. To comply with section 7(c) of the Endangered Species Act of 1973, as amended, Federal agencies or their designees are required to obtain from the Service information concerning any species or critical habitat, listed or proposed to be listed, which occur within the influence of the proposed action. Therefore, we are furnishing you the following list of species which may be present in the concerned area. Because the plan is still draft and a final alternative has not been selected, this list includes all listed species that may occur in the Yampa River basin or within the floodplain of the Green River downstream of the Yampa River.

FEDERALLY LISTED SPECIES

Bald eagle	*Haliaeetus leucocephalus*	Threatened
Mexican spotted owl	*Strix occidentalis lucida*	Threatened
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered
Mountain plover	*Charadrius montanus*	Proposed Threatened
Colorado pikeminnow[1]	*Ptychocheilus lucius*	Endangered
Razorback sucker	*Xyrauchen texanus*	Endangered
Humpback chub	*Gila cypha*	Endangered
Bonytail	*Gila elegans*	Endangered
Black-footed ferret	*Mustela nigripes*	Endangered
Canada lynx	*Lynx canadensis*	Threatened
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened

You should review your proposed action and determine if the action would affect any listed species. If the determination is "may affect" for listed species, you must request in writing formal consultation from our office. At that time, you should provide this office an intra-Service section 7 biological evaluation form or biological assessment and/or any other relevant information used in making the determination.

We would like to bring to your attention species which are candidates for official listing as threatened or endangered species [64 FR, Vol. 64, No. 205 (October 25, 1999)]. While these species presently have no legal protection under the Endangered Species Act, it is within the spirit of the Act to consider project impacts to potentially sensitive candidate species.

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[1] formerly squawfish

Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed.

FEDERAL CANDIDATE SPECIES

Boreal toad	*Bufo boreas boreas*

.If you have any questions please contact Patty Schrader Gelatt of this office at (970) 243-2778.

cc: FWS/ES, Lakewood

PGelatt:Yampa.SL:091100

APPENDIX J

PUBLIC NOTICE OF AN APPLICATION TO THE U.S. ARMY CORPS OF ENGINEERS BY THE COLORADO RIVER WATER CONSERVATION DISTRICT TO ENLARGE ELKHEAD RESERVOIR

US Army Corps
of Engineers

Sacramento District
1325 J Street
Sacramento, CA 95814-2922

Public Notice

Number: 200375136
Date: May 14, 2004
Comments Due: June 13, 2004

SUBJECT: The U.S. Army Corps of Engineers, Sacramento District, (Corps) is evaluating a permit application to construct the Elkhead Reservoir Expansion project, which would result in impacts to approximately 37.0 acres of waters of the United States, including wetlands, in or adjacent to Elkhead Reservoir and Elkhead Creek. This notice is to inform interested parties of the proposed activity and to solicit comments. This notice may also be viewed at the Corps web site at http://www.spk.usace.army.mil/cespk-co/regulatory/PNs/index.html.

AUTHORITY: This application is being evaluated under Section 404 of the Clean Water Act for the discharge of dredged or fill material in waters of the United States.

APPLICANT: Colorado River Water Conservation District
201 Centennial Street
Post Office Box 1120
Glenwood Springs, Colorado 81602
(970) 945-8522

LOCATION: The project site is located approximately 9.0 miles northeast of the City of Craig within Section 16, Township 7 North, Range 89 West, Moffat County, Colorado, and can be viewed on the Ralph White Lake, Colo., USGS Topographic Quadrangle.

PROJECT DESCRIPTION: The applicant is proposing to raise the base operational level of Elkhead Reservoir by 20 feet, which would increase the total reservoir capacity from 13,700 acre-feet (AF) to 24,877 AF. The surface area of the full reservoir pool would increase from approximately 435 acres to approximately 720 acres. The project would require the discharge of approximately 451,000 cubic yards (CY) of earth fill and 11,000 CY of concrete for dam and spillway construction, and approximately 50,000 CY of earth fill for temporary access raising of County Road 29. The project would result in the fill and inundation of approximately 37.0 acres of wetland which currently exist at the margins and delta of the existing reservoir, at the base of the existing dam embankment, and adjacent the existing County Road 29 embankment.

The earth fill material for the proposed expansion of the Elkhead Creek Dam project would originate from one on-site borrow area (Figure 3). The reservoir elevation would be lowered to accommodate a construction period of approximately two years. Dewatering of the reservoir would utilize the existing outlet works with the placement of fish retention screens down to an elevation of approximately 6,336 feet msl. The existing spillway would be partially demolished to facilitate maintenance of runoff conveyance at a lowered reservoir elevation. A new outlet would be constructed using the existing outlet structure and the partially demolished spillway to pass snowmelt and storm runoff. A new spillway would be constructed adjacent to the east dam abutment. At completion of the outlet works, the existing outlet structure would be backfilled and abandoned as part of dam embankment construction. During the dam embankment and spillway construction, the new outlet structure would continue to release runoff until construction was completed.

PURPOSE: The applicant's stated project purpose is to augment the flows of the Yampa River Basin in order to meet future human needs and to provide base flow augmentation to aid in the recovery of the four listed Upper Colorado River endangered fish species which include: Colorado pikeminnow **(Ptychocheilus lucius)**, humpback chub **(Gila cypha)**, bonytail chub **(Gila elegans)** and razorback sucker **(Xrauchen texanus)**. The applicant would fund, own and operate the portion of the proposed enlargement for enhancing Yampa River flows for human uses. Of the 6,751 AF of enlargement capacity to be owned by the applicant, 2,000 AF would be leased to the "Upper Colorado Endangered Fish Recovery Program (Recovery Program)"on an annual basis for additional flow augmentation for a period of 20 years, with renewal provisions based upon evaluation of water needs for recovery and human use needs. The additional 4,751 AF of the enlargement pool owned by the applicant is proposed for use as augmentation of flows in Elkhead Creek and the Yampa River to support human needs.

A 5,000 AF enlargement capacity for assisting in the recovery of the federally listed endangered fish species would be financed and owned by the participants in the Recovery Program. The State of Colorado and Recovery Program in accordance with Recovery Program capital improvements program would provide the funding. The State of Colorado would hold the 5,000 AF of enlargement capacity dedicated to endangered fish recovery on behalf of the Recovery Program. Operation of the 5,000 AF of enlargement portion would be at the direction of the U.S. Fish and Wildlife Service, consistent with the Yampa Management Plan and related implementation agreement. The attached drawings provide additional project details.

ADDITIONAL INFORMATION:

Environmental Setting: Elkhead Creek is a large perennial tributary to the Yampa River in Northwestern Colorado. The dam and reservoir are located within a watershed located southwest of the Elkhead Mountains that has a drainage area of approximately 250 square miles. The watershed ranges in elevation from 6,220 to 10,500 msl. Soils are high in silt and very susceptible to erosion if left exposed. The valley floor's
adjacent uplands have been utilized for grazing purposes since the 19th Century. Native vegetation within the upland portion of the project area is dominated by Wyoming big sagebrush **(Artemisia wyomingensis)**, needle-and-threadgrass **(Stipa occidentalis)**, Indian ricegrass **(Oryzopsis hymenoides)**, antelope bitterbrush **(Purshia tridentata)** and mountain snowberry **(Symphoricarpus oreophilus).** There are approximately 57.0 acres of palustrine emergent and scrub/shrub wetlands within the project area. The wetlands within the project area are dominated by Baltic rush **(Juncus balticus)**, broad-leaf cattail **(Typha latifoli)**, sandbar willow **(Salix exigua)** and small-winged sedge **(Carex microptera)**, with intrusions or local populations of small-fruit bulrush **(Scirpus microcarpus)**, blue-joint reedgrass **(Calamagrostis canadensis)**, beaked sedge **(Carex rostrata)**, Nebraska sedge **(Carex nebrascensis)** and other wetland species in smaller amounts.

Alternatives: The applicant's consultant is currently collating a project specific alternatives analysis from information gained during project development. The Corps of Engineers will review all alternatives considered during the project development process, including any alternatives identified during the public notice process.

Mitigation: The Corps requires and the applicant has considered use of all reasonable and practical measures to avoid and minimize impacts to aquatic resources. For the project which is the subject of this public notice, the applicant has provided a wetland mitigation plan for unavoidable impacts. The mitigation plan goal is to mitigate wetland impacts on-site and in-kind. Four separate sites (Figures 6, 6a, 6b, 6c, 6d and 6e) have been proposed to create approximately 42 acres of mitigation. Mitigation would be accomplished through 1; accelerated wetland development of the post construction delta by the placement of cross channel sheet-pile check dams to collect sediment and accelerate the development a new delta and subsequent revegetation with native plant materials present in the area, 2; excavation and placement of salvaged hydric soil from Brown's Gulch and revegetation of an island (Figure 6c) created due to the new operational pool elevation, 3; the placement of on-site salvaged hydric soils and revegetation at Mud Gulch (Figure 6e), and 4; creation of wetlands at the mouth of Brown Gulch by berming, backfill with salvaged hydric soils, and natural revegetation.

The applicant proposes to monitor the mitigation sites and collect data regarding the presence of hydric soils, hydrophytic vegetation and hydrologic conditions.
The applicant would be required to provide the Corps with site specific mitigation and monitoring plans, prior to issuance of a Department of the Army permit for the project.

OTHER GOVERNMENTAL AUTHORIZATIONS: Water quality certification is required under Section 401 of the Clean Water Act from the Colorado Department of Public Health and Environment for this project. The applicant has indicated they have applied for certification.

CULTURAL RESOURCES: A cultural resource inventory was conducted at the project site by Metcalf Archaeological Consultants, Incorporated on April 30-May 2, 2003. A total of 317 acres were surveyed on a combination of state and private land. One previously recorded prehistoric site was noted during their file search, but is located outside the project area. Two additional sites were discovered during the survey, however, neither site was recommended as eligible for inclusion on the National Register and cultural resource clearance was recommended.

ENDANGERED SPECIES: To comply with the Endangered Species Act, the U.S. Fish and Wildlife Service completed an intra-Service consultation. The product of this consultation is a Programmatic Biological Opinion (PBO) for the Yampa River basin. The purpose of the PBO is to evaluate the impacts to federally listed species due to current and foreseeable future water depletions and to consider management actions to offset anticipated impacts. Enlargement of Elkhead Reservoir is part of the endangered species recovery strategy for recovery of the four listed fishes. The Recovery Program, through direct financial participation in the proposed project, and through lease, is funding that portion of reservoir storage dedicated to stream flow augmentation for the listed fishes.

EVALUATION FACTORS: The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the described activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the described activity, must be balanced against its reasonably foreseeable detriments.

All factors which may be relevant to the described activity will be considered, including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people. The activity's impact on the public interest will include application of the 404(b)(1) guidelines promulgated by the Administrator, Environmental Protection Agency (40 CFR Part 230), or of their criteria.

The Corps is soliciting comments from the public, Federal, State, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

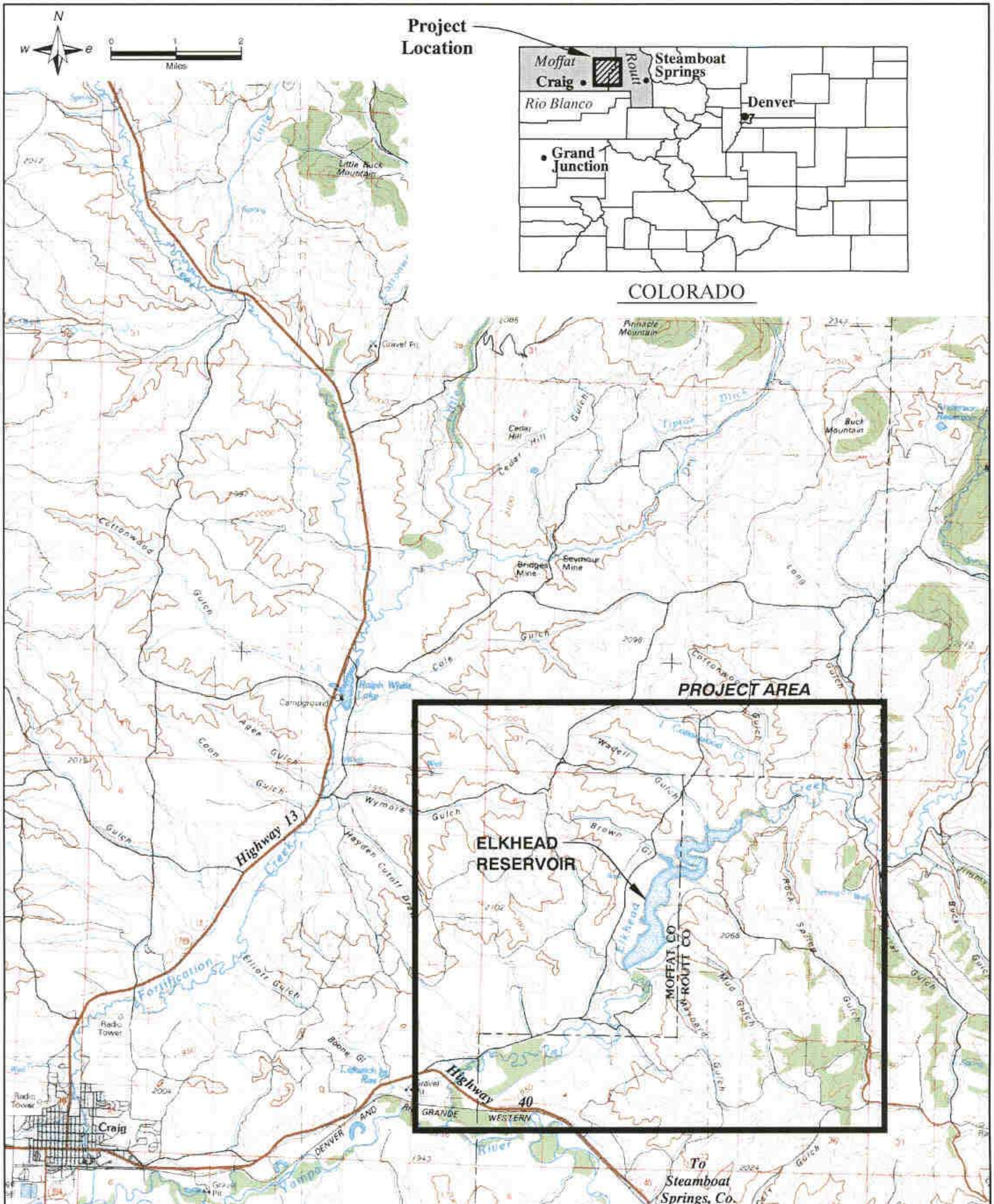
SUBMITTING COMMENTS: Written comments, referencing Public Notice 200375136, must be submitted to the office listed below on or before June 13, 2004:

Ken Jacobson, Project Manager
US Army Corps of Engineers, Sacramento District
Colorado/Gunnison Basin Regulatory Office
400 Rood Avenue, Room 142
Grand Junction, Colorado 81501-2563
Email: Ken.Jacobson@usace.army.mil

The Corps is particularly interested in receiving comments related to the proposal's probable impacts on the affected aquatic environment and the secondary and cumulative effects. Anyone may request, in writing, that a public hearing be held to consider this application. Requests shall specifically state, with particularity, the reason(s) for holding a public hearing.

If the Corps determines that the information received in response to this notice is inadequate for thorough evaluation, a public hearing may be warranted. If a public hearing is warranted, interested parties will be notified of the time, date, and location. Please note that all comment letters received are subject to release to the public through the Freedom of Information Act. If you have questions or need additional information please contact the applicant or the Corps' project manager Ken Jacobson, 970-243-1199, extension 11, Ken.Jacobson@usace.army.mil.

Attachments: 28 drawings



Sheet:	Applicant:	Title:	Consultant:
Figure 1	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	General Project Location	7 April 2004 404 Permit Mapping by: PIONEER Base map: USGS Digital Ortho-quad

Impact Site:

R1

Square Feet Impact:	Acre Impact:
1,042,645	23.9

Cubic Yards of Fill:

0

Wetland Type Impacted:

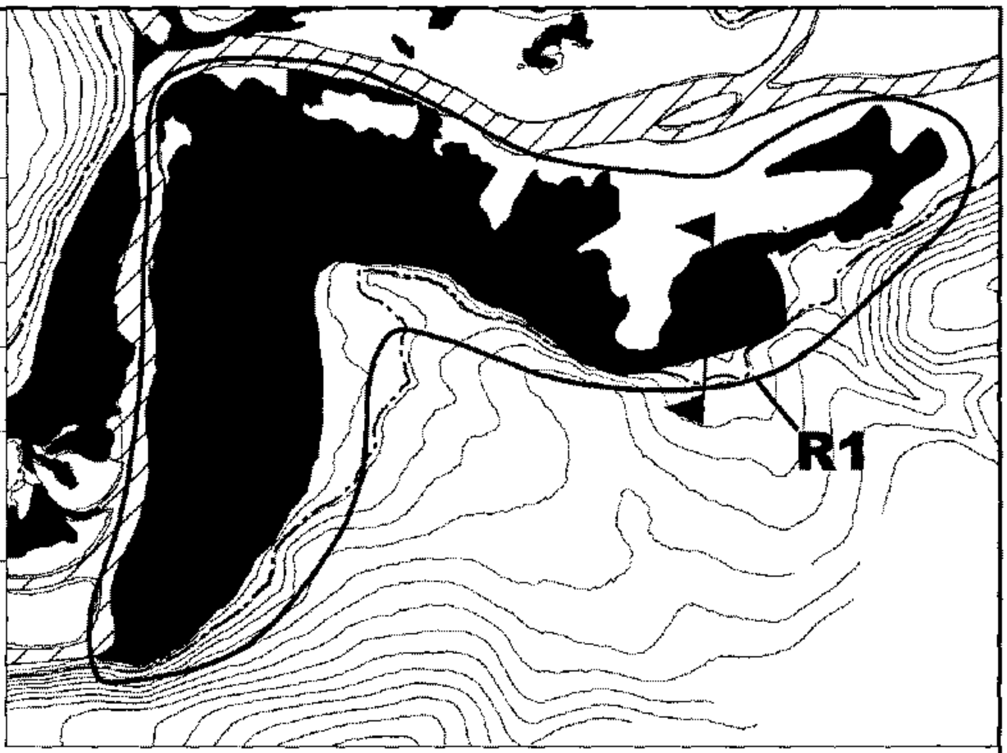
Palustrine Shrub/Scrub

Impact Type:

Reservoir Inundation

Impact Location:

Elkhead River Delta



N

0 250 500
FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

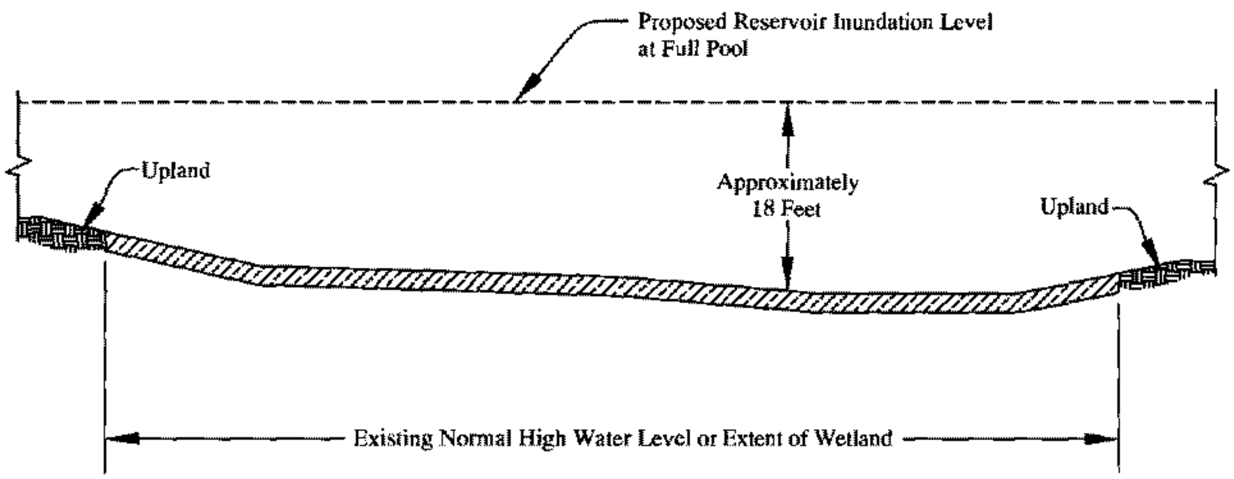
Waters of the US

Channels

Delineated Wetlands

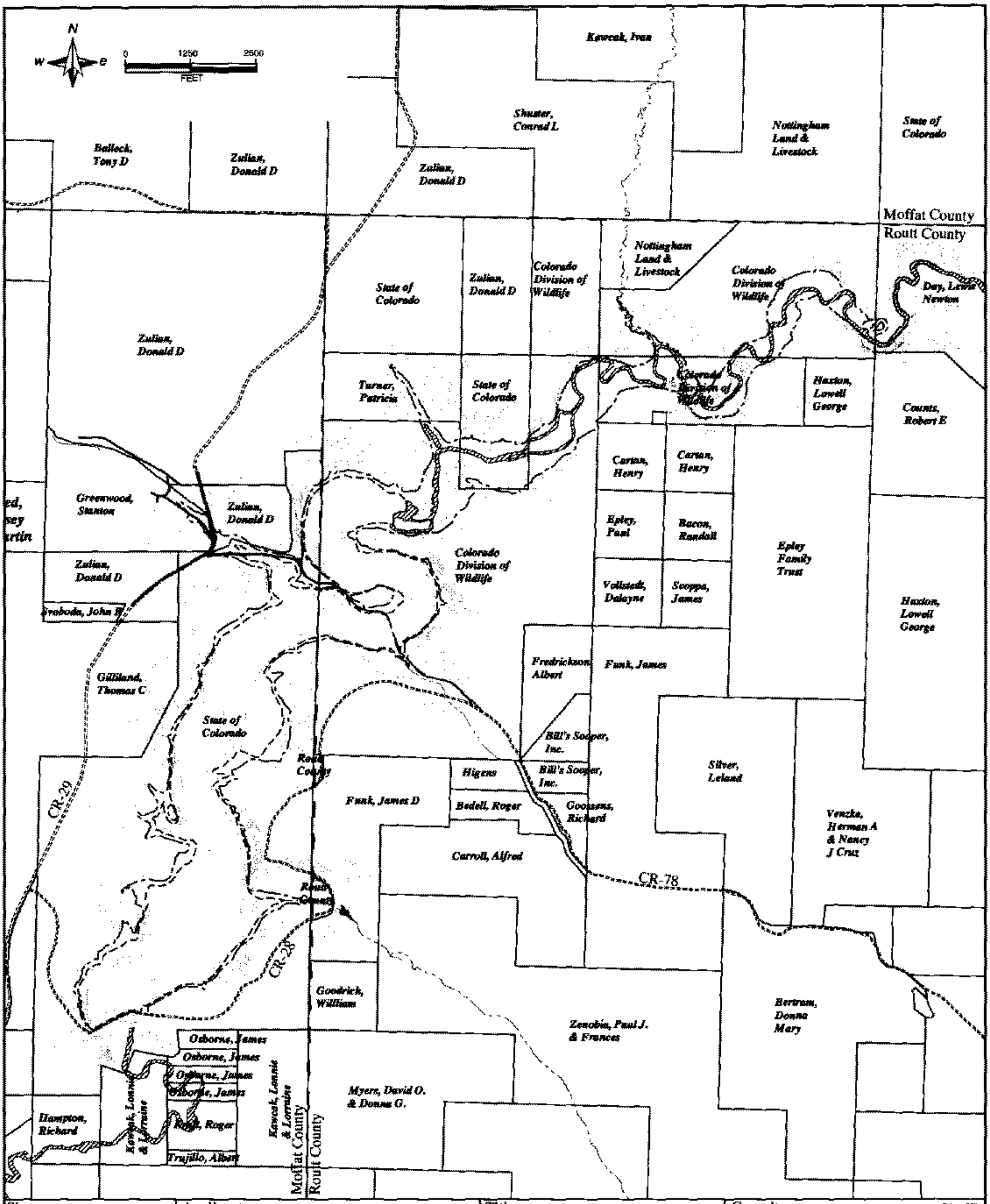
Wetland Impact Site

Proposed Mitigation Area

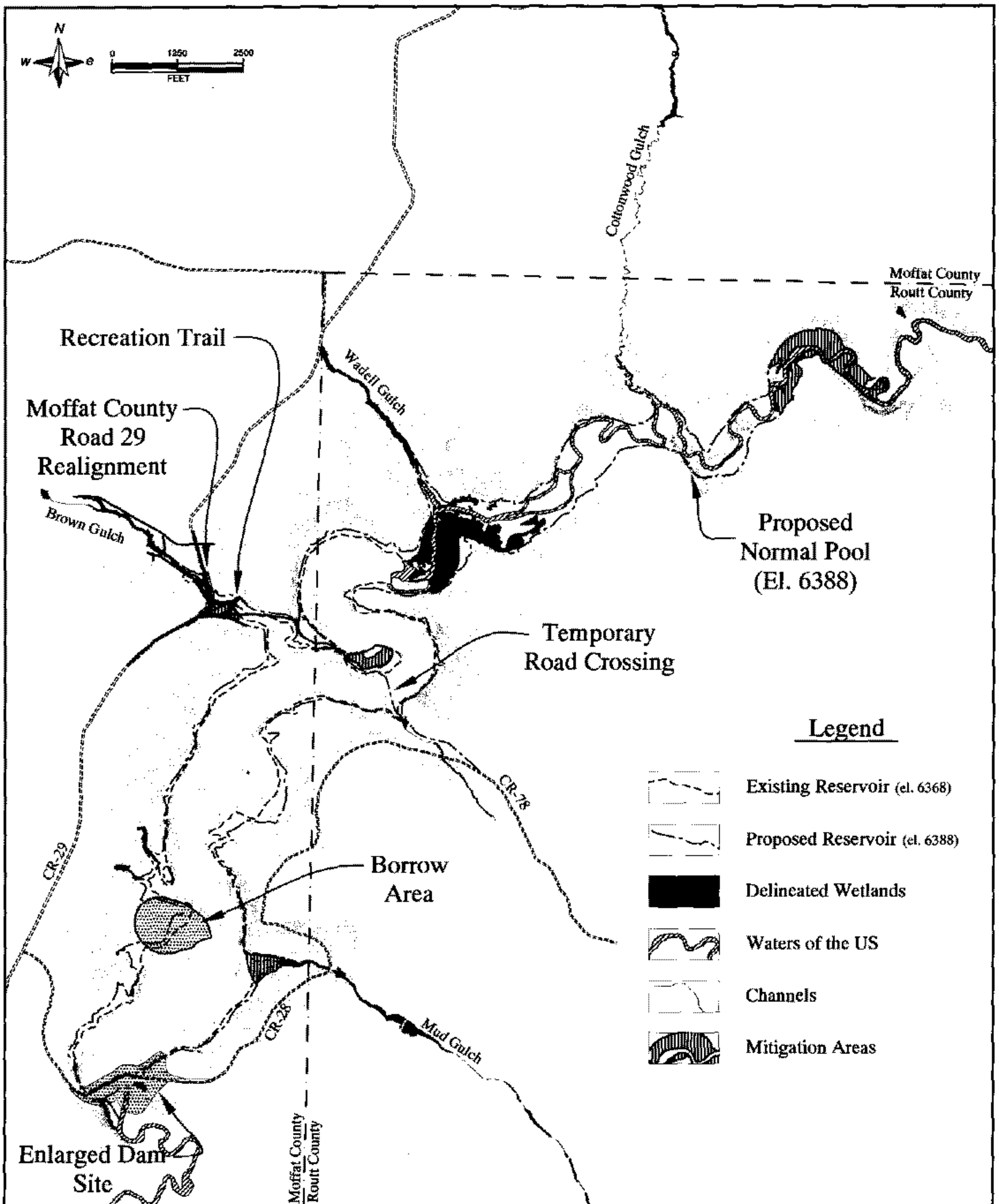


Profile
Not to Scale

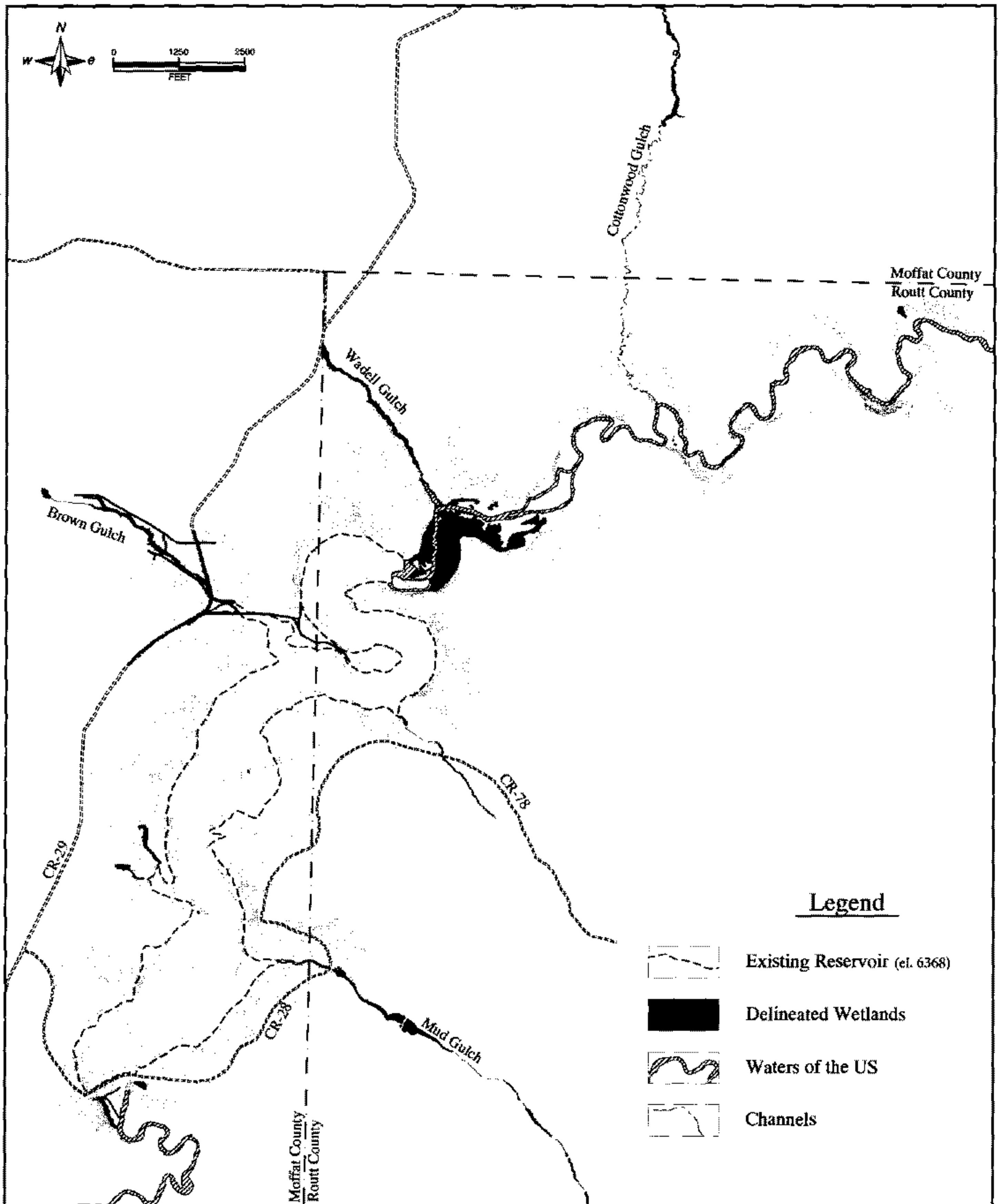
Sheet:	Applicant:	Title:	Consultant:
Figure 5a	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R1	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS



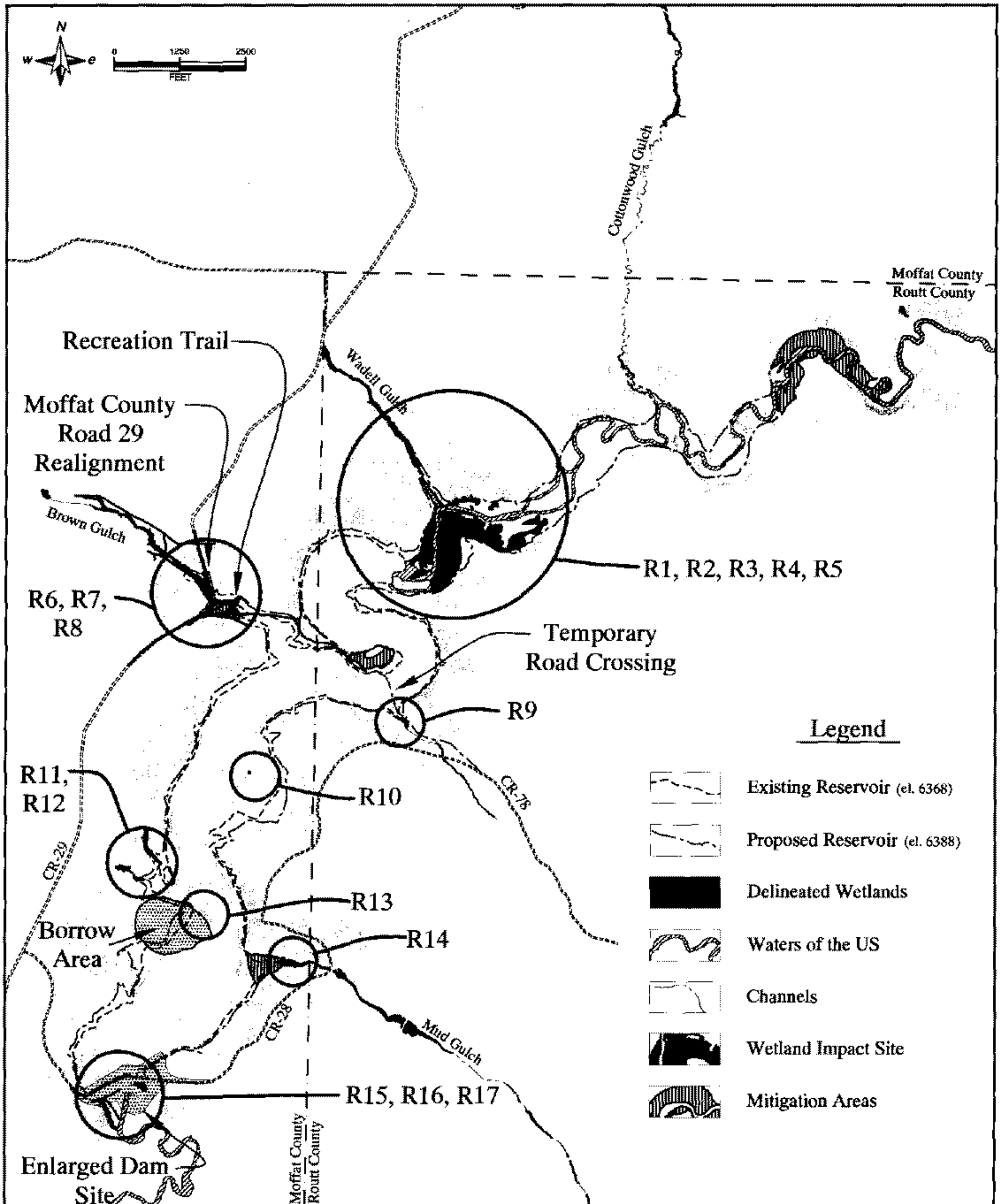
Sheet:	Applicant:	Title:	Consultant:
Figure 2	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Land Ownership near Elkhead Reservoir	7 April 2004 404 Permit Mapping by: Base map: Ayres Associates & URS



Sheet:	Applicant:	Title:	Consultant: 7 April 2004
Figure 3	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Proposed Elkhead Reservoir Expansion	404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS



Sheet:	Applicant:	Title:	Consultant:
Figure 4	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Delineated Wetlands and Waters of the US	7 April 2004 404 Permit Mapping by: Base map: Ayres Associates & URS



Sheet:	Applicant:	Title:	Consultant:
Figure 5	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Total Wetland Impacts within the Project Area	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:

R2

Square Feet Impact:	Acre Impact:
8,697	0.20

Cubic Yards of Fill:

0

Wetland Type Impacted:

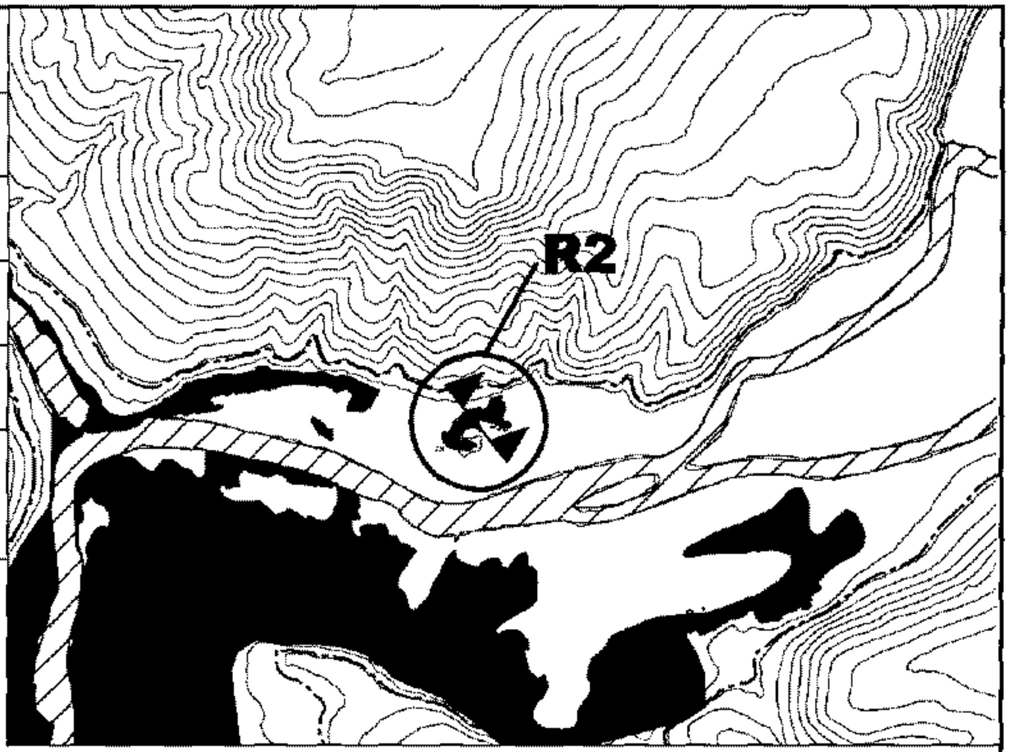
Palustrine Shrub/Scrub

Impact Type:

Reservoir Inundation

Impact Location:

Elkhead River Delta



N W E

0 250 500 FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

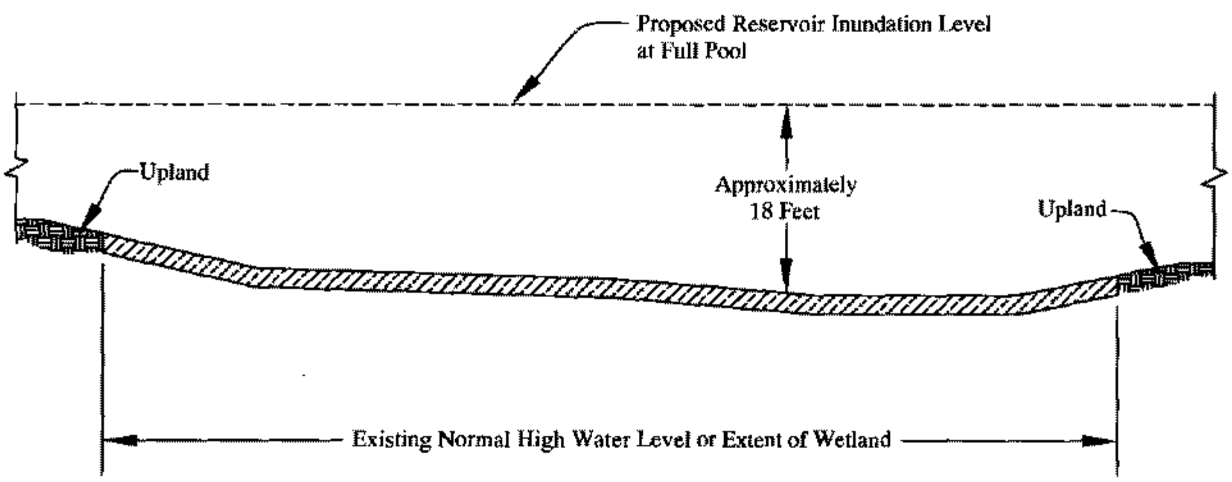
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile

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Sheet:	Applicant:	Title:	Consultant:
Figure 5b	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R2	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:

R3

Square Feet Impact:	Acre Impact:
1,330	0.03

Cubic Yards of Fill:

0

Wetland Type Impacted:

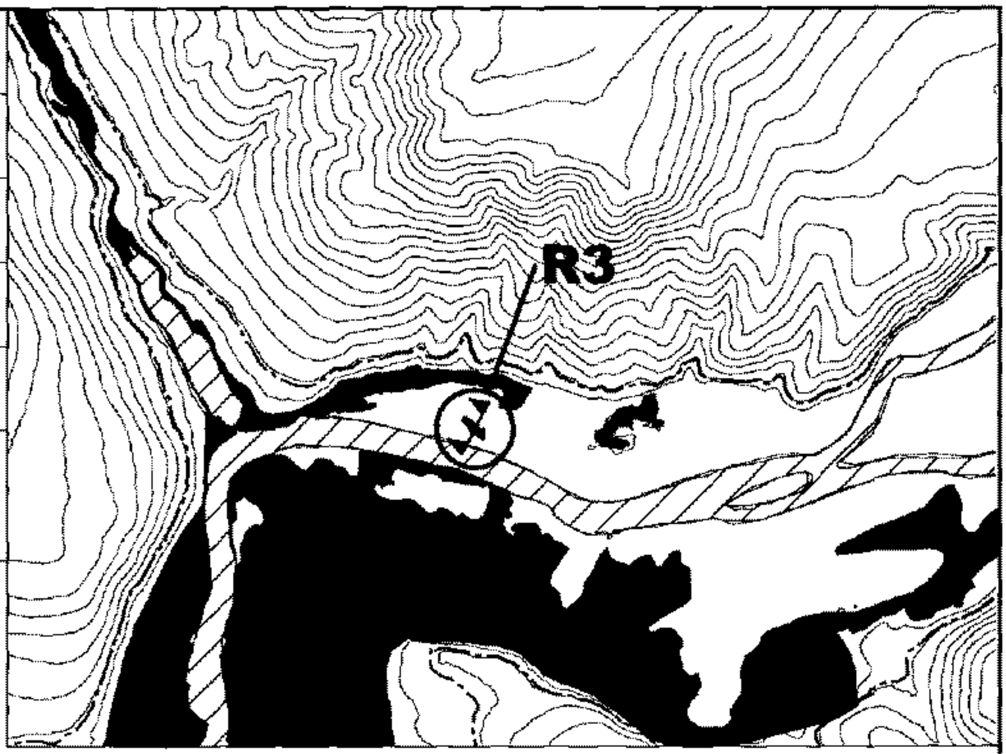
Palustrine Shrub/Scrub

Impact Type:

Reservoir Inundation

Impact Location:

Elkhead River Delta



N W E

0 250 500 FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

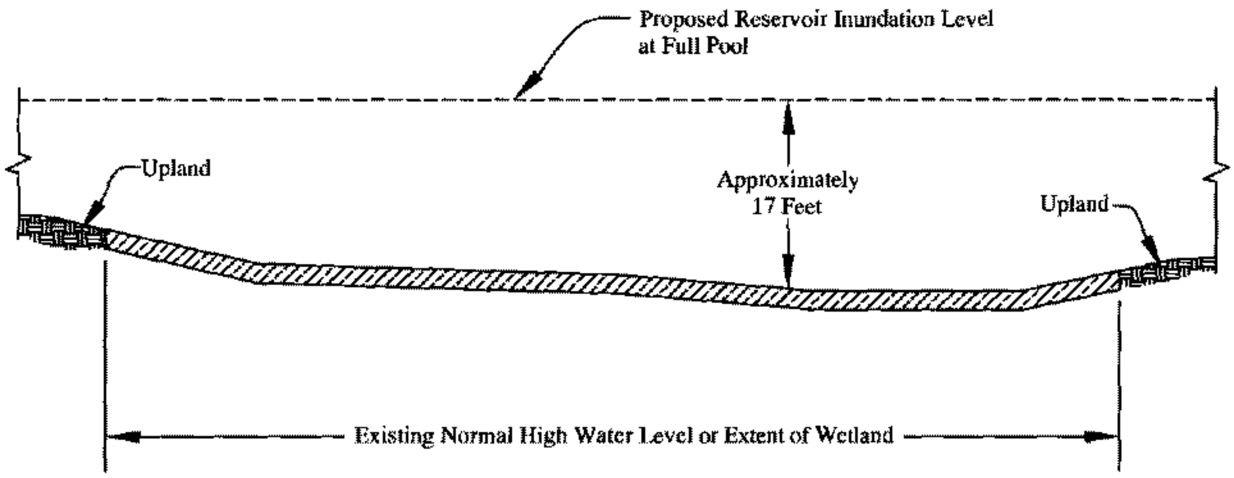
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile

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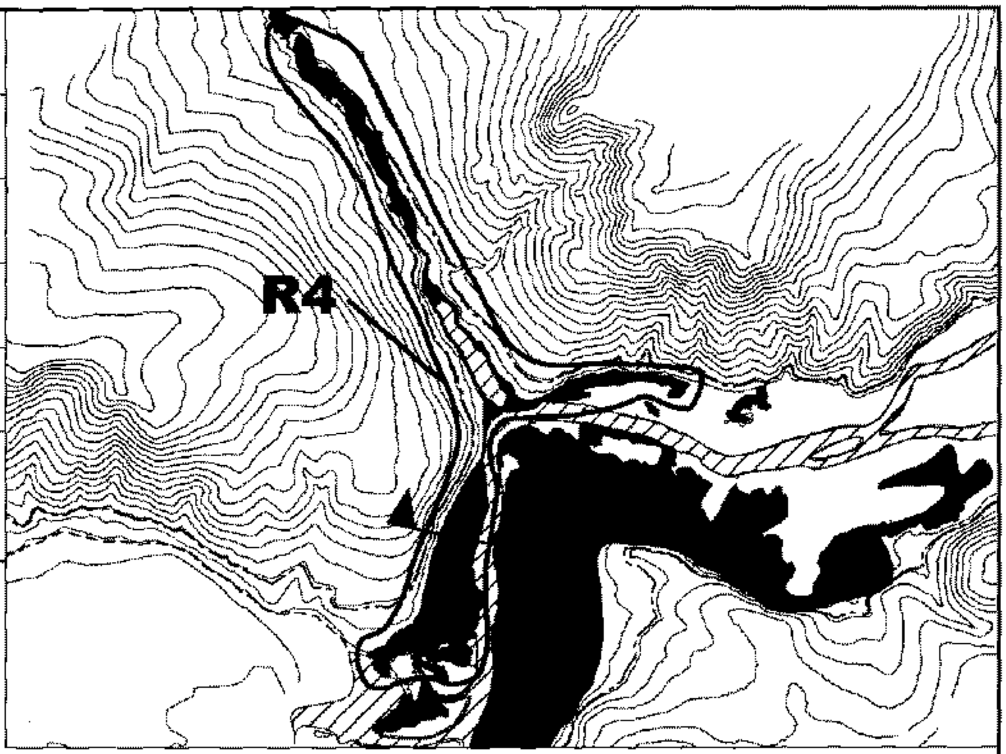
Sheet:	Applicant:	Title:	Consultant:
Figure 5c	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R3	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:	
R4	
Square Feet Impact:	Acre Impact:
286,736	6.58
Cubic Yards of Fill:	
0	
Wetland Type Impacted:	
Palustrine Emergent	
Impact Type:	
Reservoir Inundation	
Impact Location:	
Elkhead River Delta	



N W E

0 400 800 FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

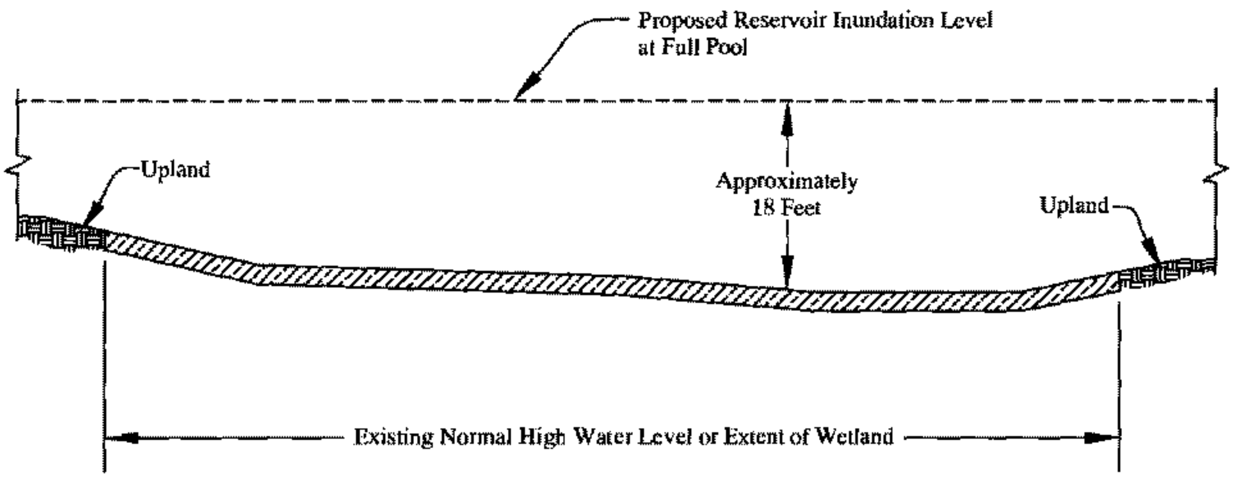
Channels

Wetland Impact Site

Waters of the US

Delineated Wetlands

Proposed Mitigation Area



Profile
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Sheet:	Applicant:	Title:	Consultant:
Figure 5d	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R4	7 April 2004 404 Permit Mapping by: Pioneer Base map: Ayres Associates & URS

Impact Site:
R5

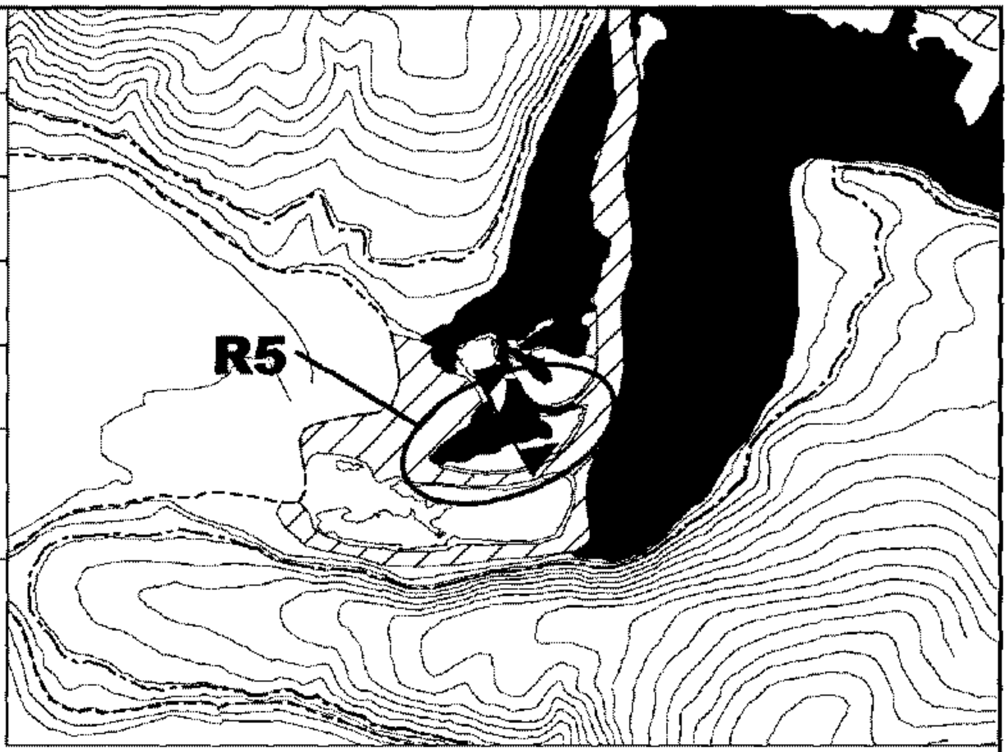
Square Feet Impact:	Acre Impact:
30,430	0.70

Cubic Yards of Fill:
0

Wetland Type Impacted:
Palustrine Emergent

Impact Type:
Reservoir Inundation

Impact Location:
Elkhead River Delta



N W E
0 250 500
FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

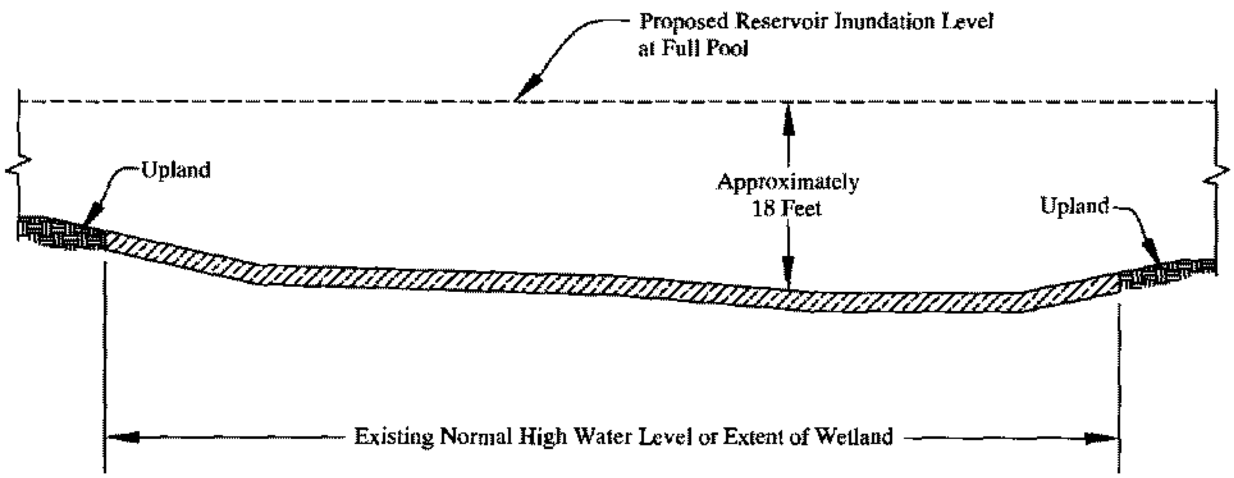
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile
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Sheet:	Applicant:	Title:	Consultant:
Figure 5e	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R5	7 April 2004 404 Permit Mapping by: Base map: Ayres Associates & URS

Impact Site:

R6

Square Feet Impact:	Acre Impact:
37,332	0.86

Cubic Yards of Fill:

416

Wetland Type Impacted:

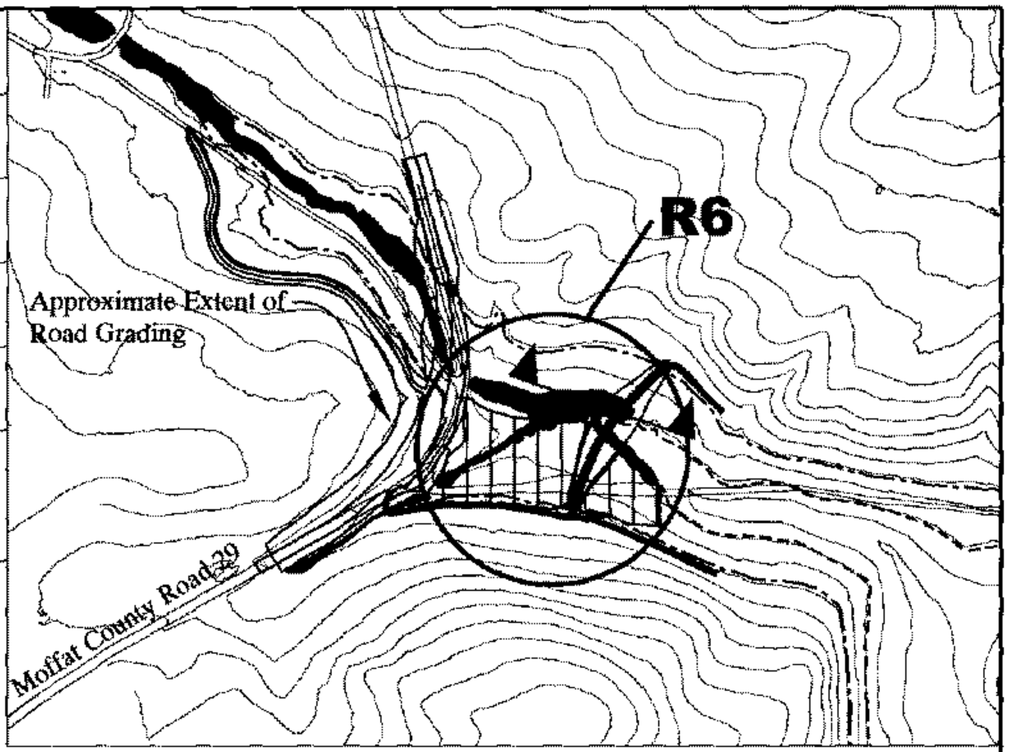
Palustrine Emergent

Impact Type:

Reservoir Inundation

Impact Location:

Brown Gulch at Moffat CR29



N W E

0 250 500 FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

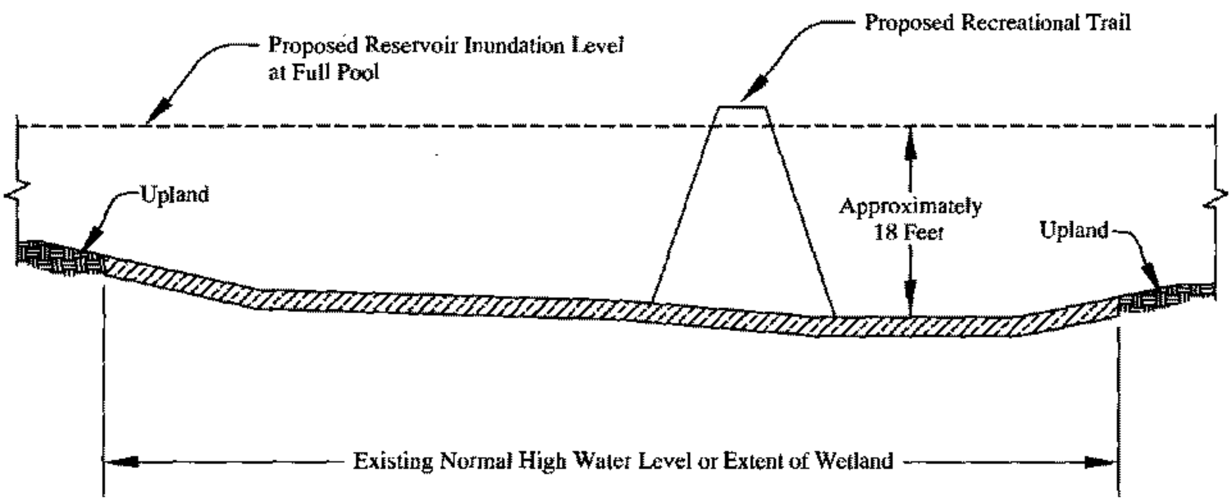
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile

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Sheet:	Applicant:	Title:	Consultant:
Figure 5f	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R6	7 April 2004 404 Permit Mapping by: Pioneer Base map: Ayres Associates & URS

Impact Site:
R7

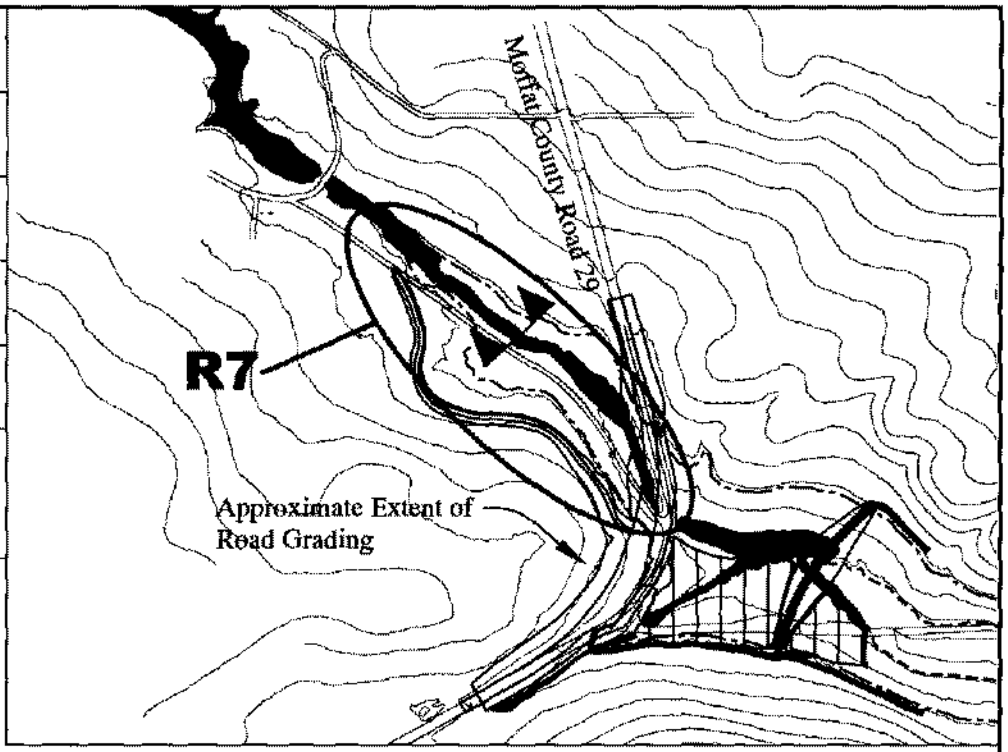
Square Feet Impact:	Acre Impact:
34,545	0.79

Cubic Yards of Fill:
0

Wetland Type Impacted:
Palustrine Emergent

Impact Type:
Reservoir Inundation

Impact Location:
Brown Gulch at Moffat CR29



N W E
0 250 500
FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

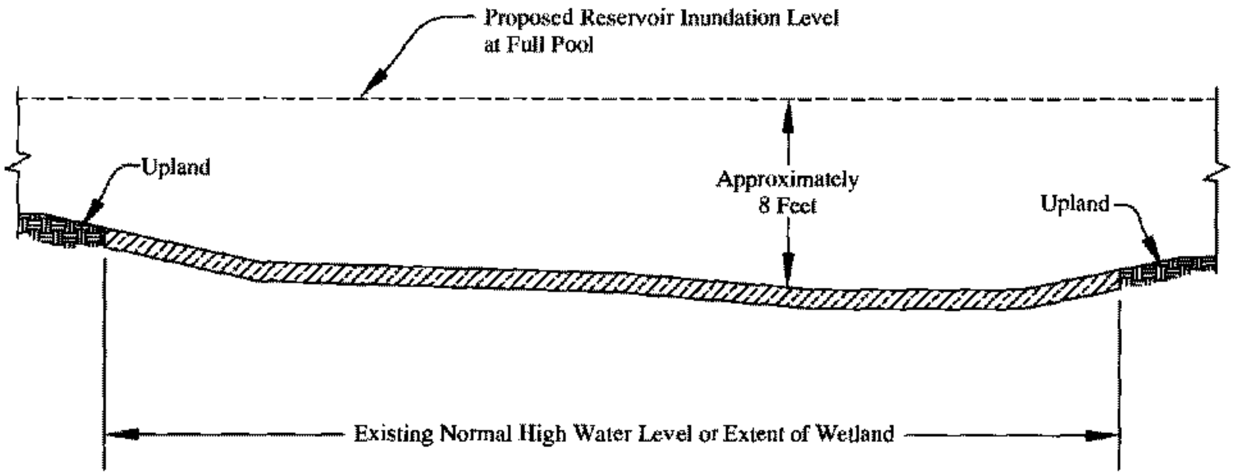
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile
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Sheet:	Applicant:	Title:	Consultant:
Figure 5g	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R7	7 April 2004 404 Permit Mapping by: Base map: Ayres Associates & URS

Impact Site:

R8

Square Feet Impact:	Acre Impact:
4,504	0.10

Cubic Yards of Fill:

334

Wetland Type Impacted:

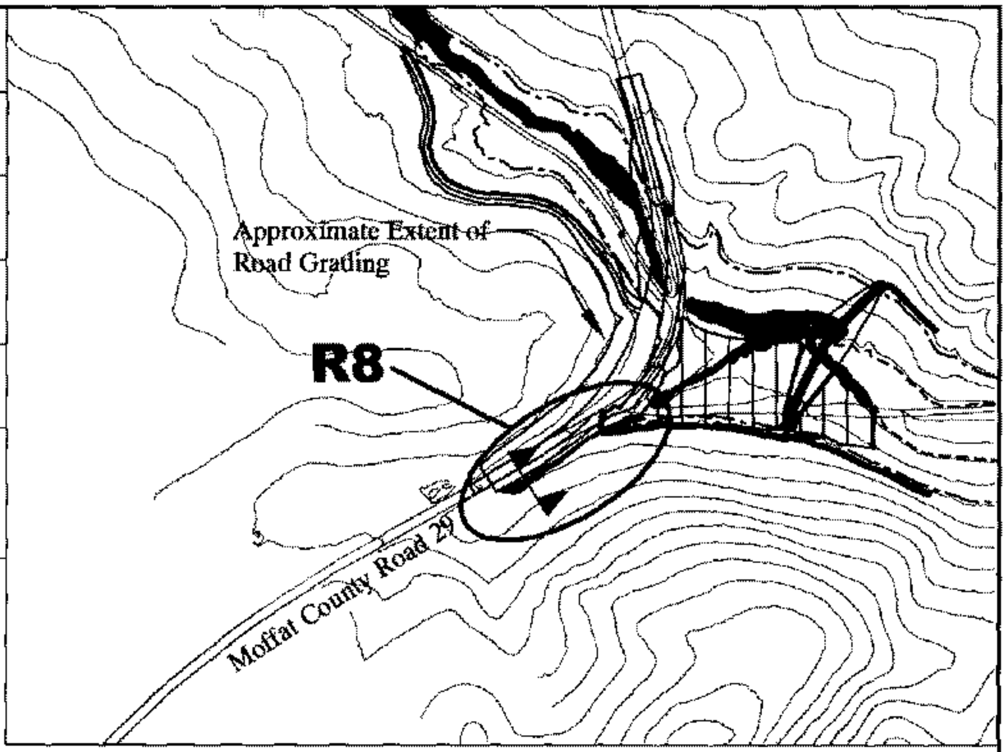
Palustrine Emergent

Impact Type:

Road Construction

Impact Location:

Brown Gulch at Moffat CR29



N W E

0 250 500 FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

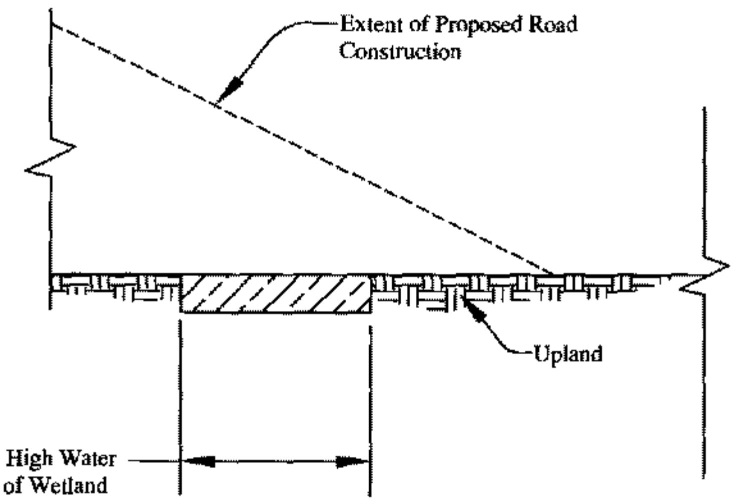
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile

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Sheet:	Applicant:	Title:	Consultant:
Figure 5h	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R8	7 April 2004 404 Permit Mapping by: Pioneer Base map: Ayres Associates & URS

Impact Site:

R9

Square Feet Impact:	Acre Impact:
4,078	0.09

Cubic Yards of Fill:

0

Wetland Type Impacted:

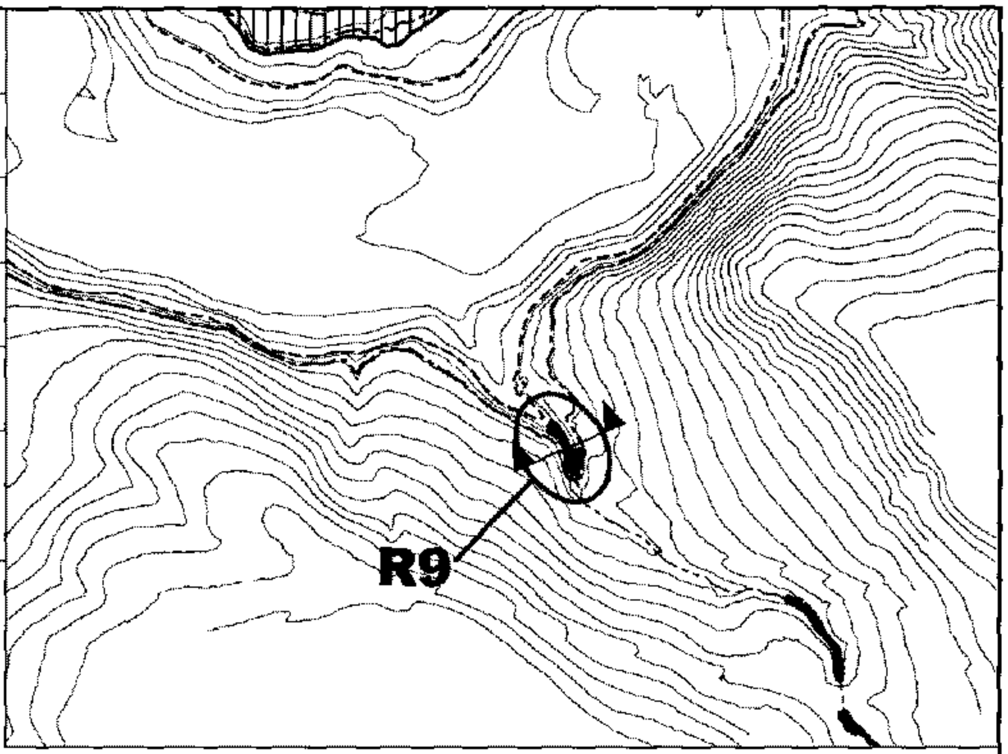
Palustrine Emergent

Impact Type:

Reservoir Inundation

Impact Location:

Island in Reservoir



N
w e
0 250 500
FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

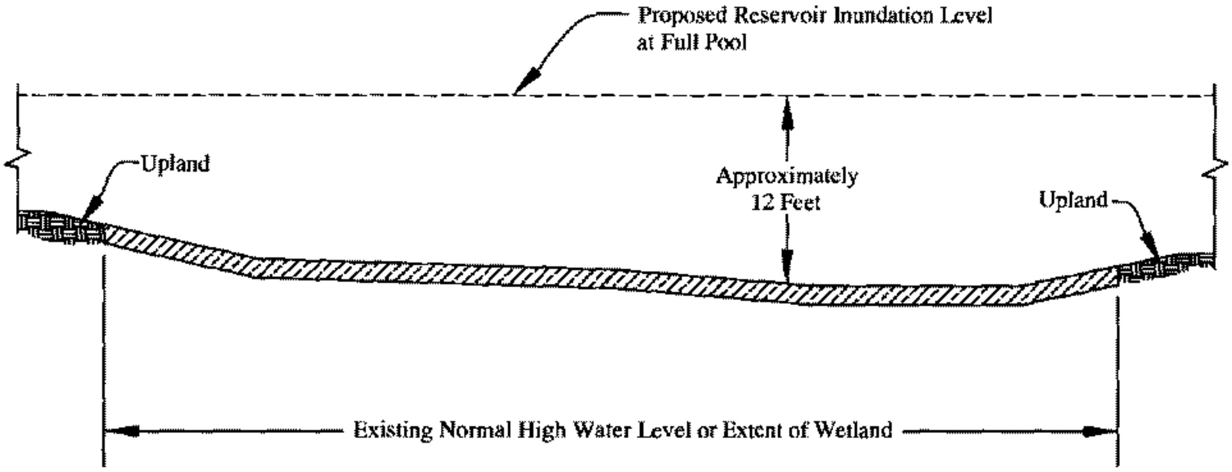
Channels

Wetland Impact Site

Waters of the US

Delineated Wetlands

Proposed Mitigation Area



Profile

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Sheet:	Applicant:	Title:	Consultant:
Figure 5i	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R9	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:

R10

Square Feet Impact:	Acre Impact:
1,218	0.03

Cubic Yards of Fill:

0

Wetland Type Impacted:

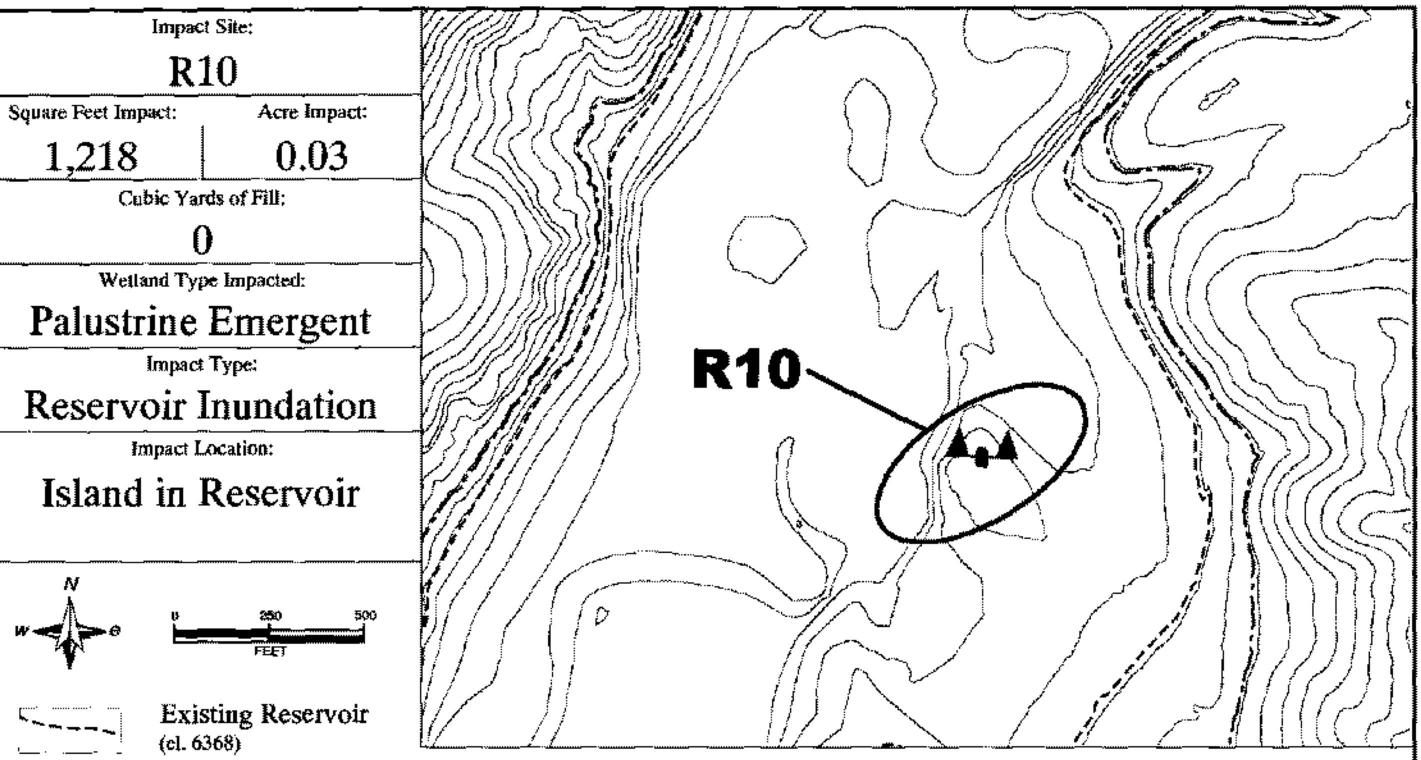
Palustrine Emergent

Impact Type:

Reservoir Inundation

Impact Location:

Island in Reservoir



Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

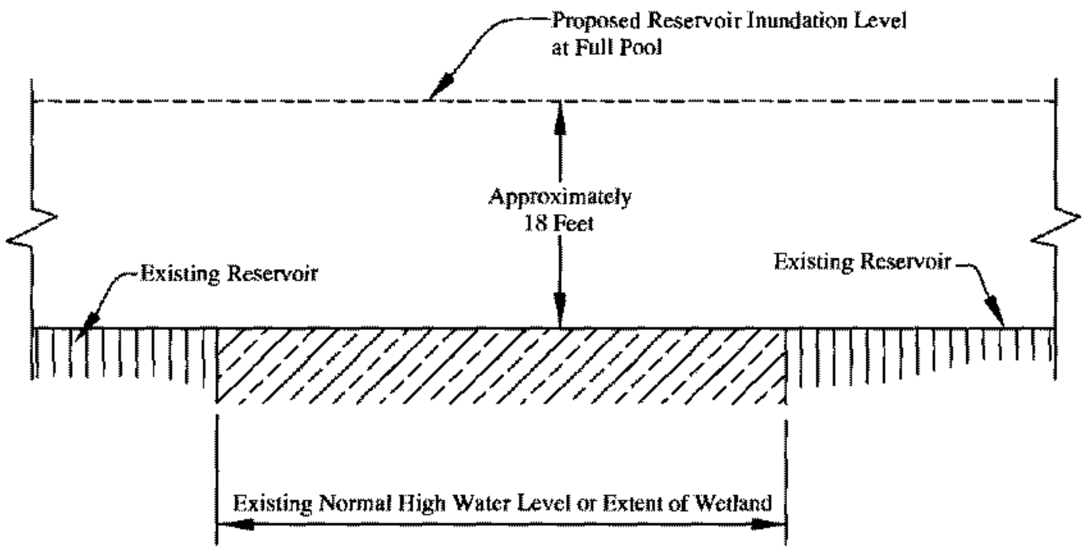
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile
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Sheet:	Applicant:	Title:	Consultant:
Figure 5j	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R10	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:

R11

Square Feet Impact:	Acre Impact:
16,516	0.38

Cubic Yards of Fill:

0

Wetland Type Impacted:

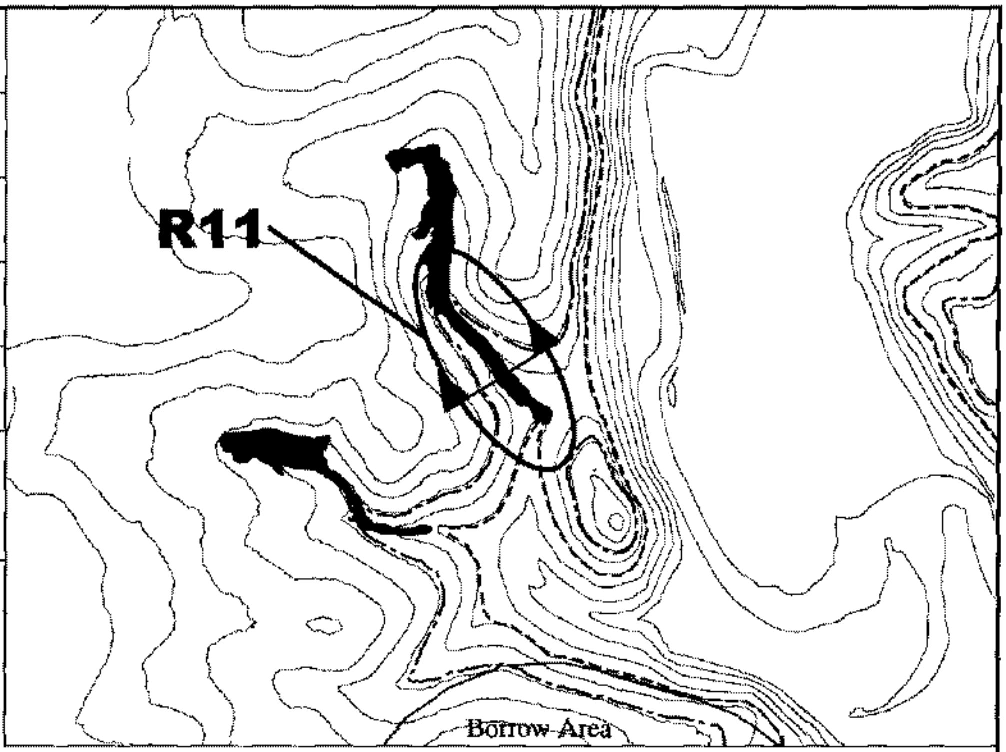
Palustrine Emergent

Impact Type:

Reservoir Inundation

Impact Location:

Southwest Shore of Reservoir



N W E
0 250 500 FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

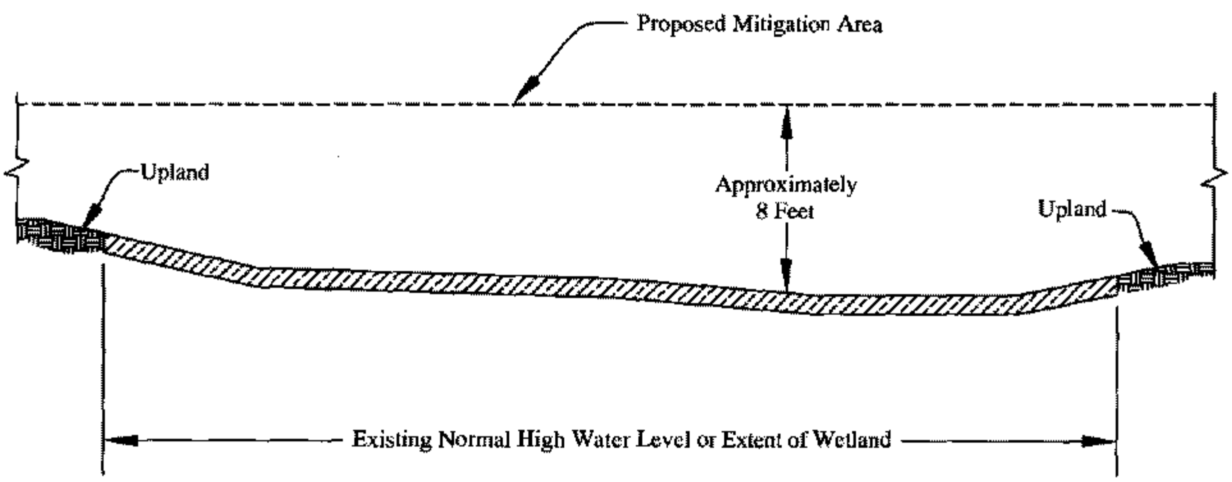
Channels

Wetland Impact Site

Waters of the US

Delineated Wetlands

Proposed Mitigation Area



Profile

Not to Scale

Sheet:	Applicant:	Title:	Consultant:
Figure 5k	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R11	7 April 2004 404 Permit Mapping by: Base map: Ayres Associates & URS

Impact Site:

R12

Square Feet Impact:	Acre Impact:
4,888	0.11

Cubic Yards of Fill:

0.0

Wetland Type Impacted:

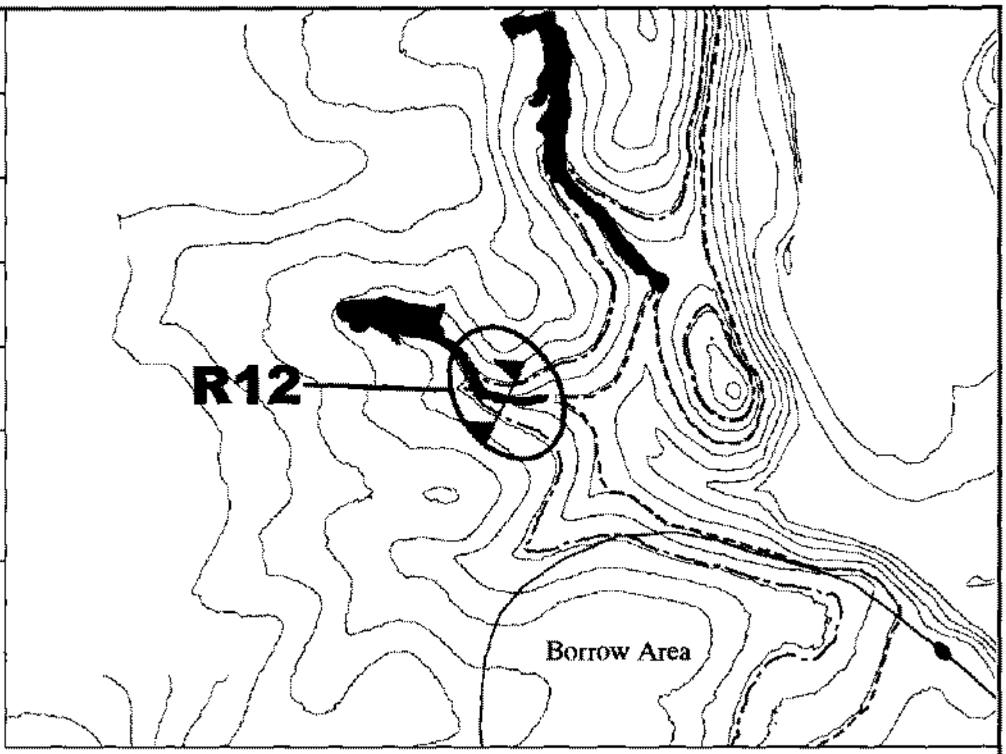
Palustrine Emergent

Impact Type:

Reservoir Inundation

Impact Location:

Southwest Shore of Reservoir



N W E
0 250 500
FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

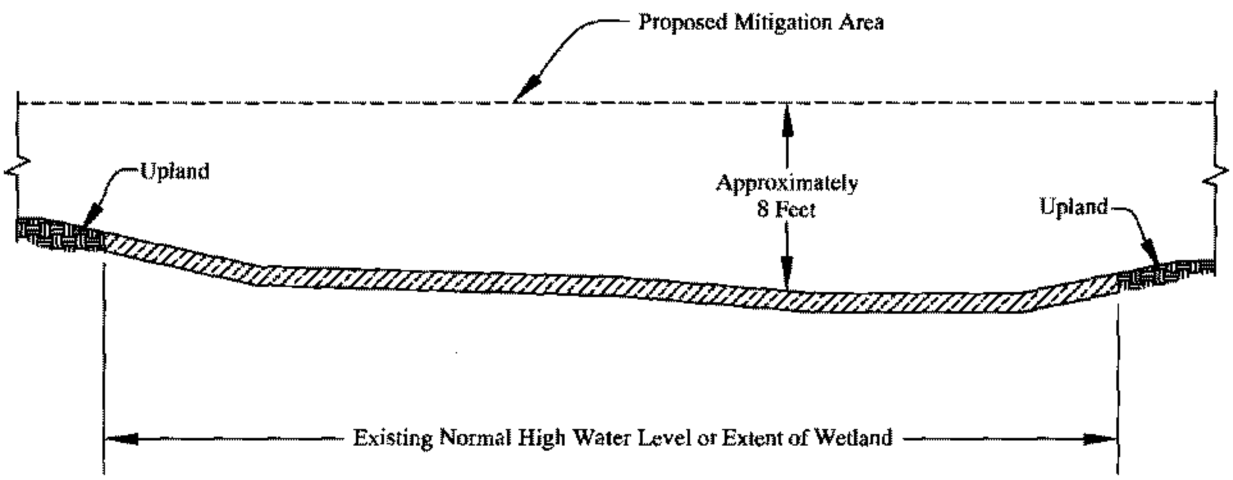
Channels

Wetland Impact Site

Waters of the US

Delineated Wetlands

Proposed Mitigation Area



Profile

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Sheet:	Applicant:	Title:	Consultant:
Figure 5L	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R12	7 April 2006 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:
R13

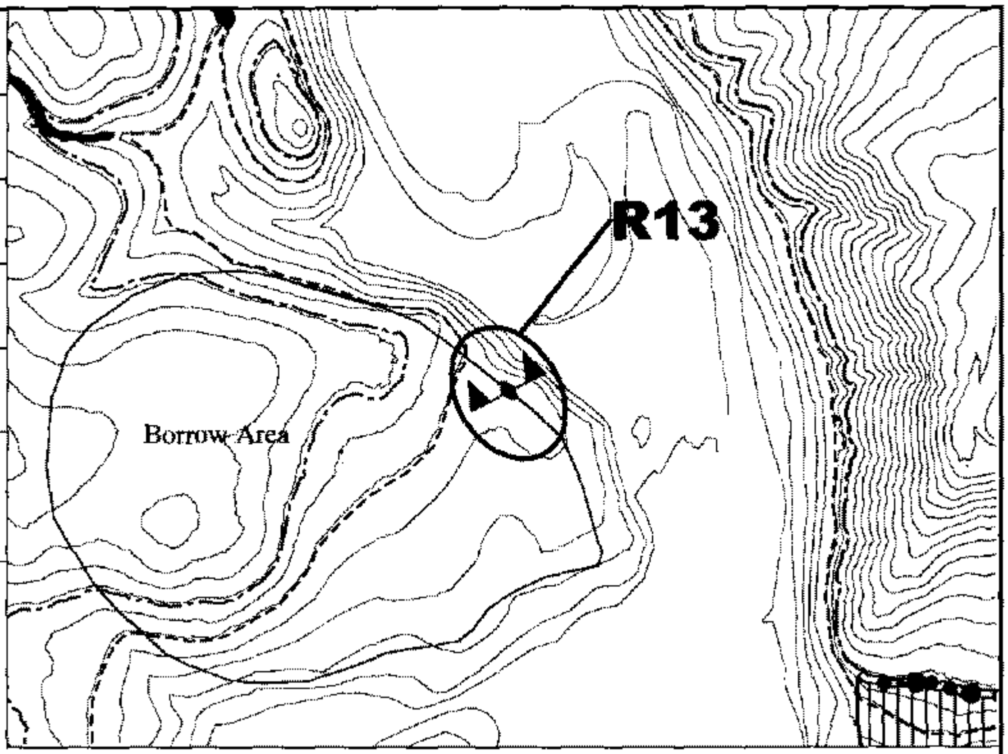
Square Feet Impact:	Acre Impact:
1,199	0.03

Cubic Yards of Fill:
0

Wetland Type Impacted:
Palustrine Emergent

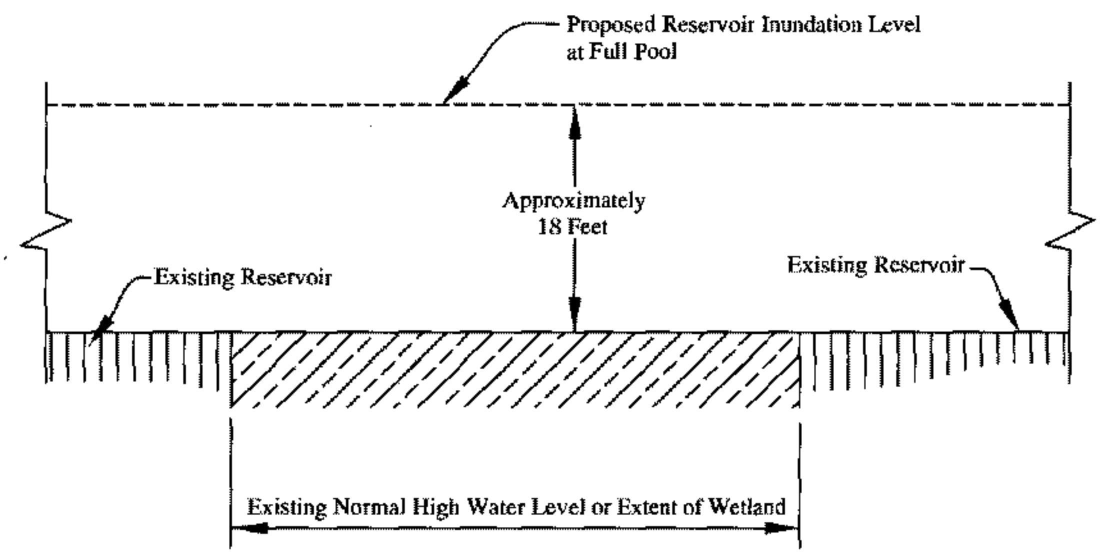
Impact Type:
Reservoir Inundation

Impact Location:
Island in Reservoir



N, W, E
0 250 500
FEET

- Existing Reservoir (el. 6368)
- Proposed Reservoir (el. 6388)
- Waters of the US
- Channels
- Delineated Wetlands
- Wetland Impact Site
- Proposed Mitigation Area



Profile
Not to Scale

Sheet:	Applicant:	Title:	Consultant:
Figure 5m	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R13	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:

R14

Square Feet Impact:	Acre Impact:
21,615	0.50

Cubic Yards of Fill:

0.0

Wetland Type Impacted:

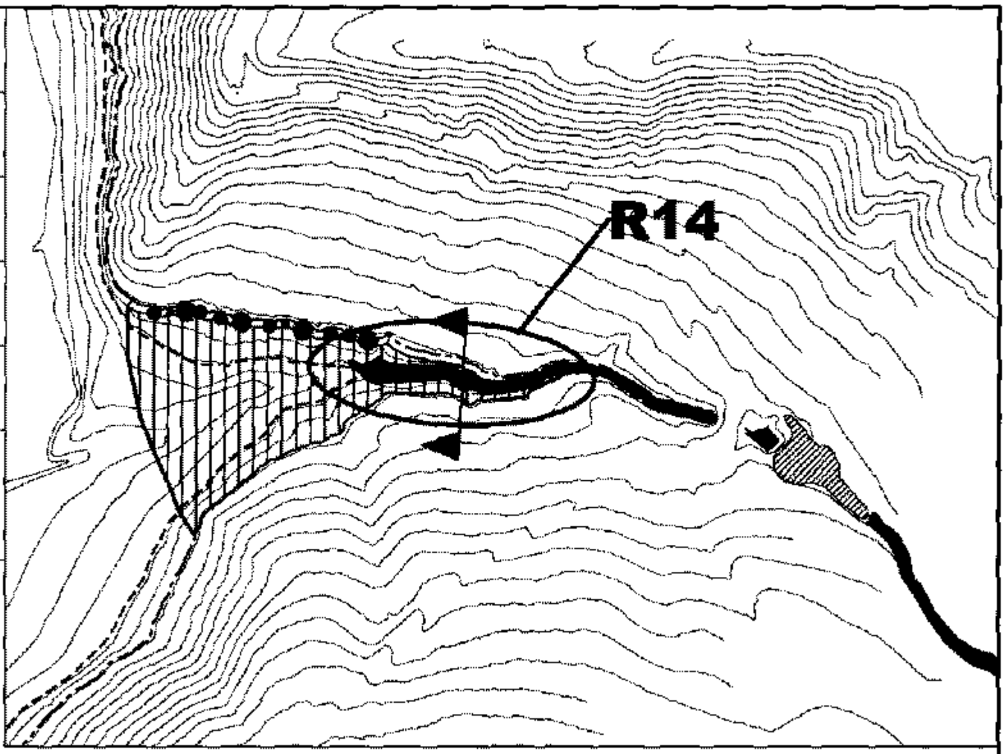
Palustrine Emergent

Impact Type:

Reservoir Inundation

Impact Location:

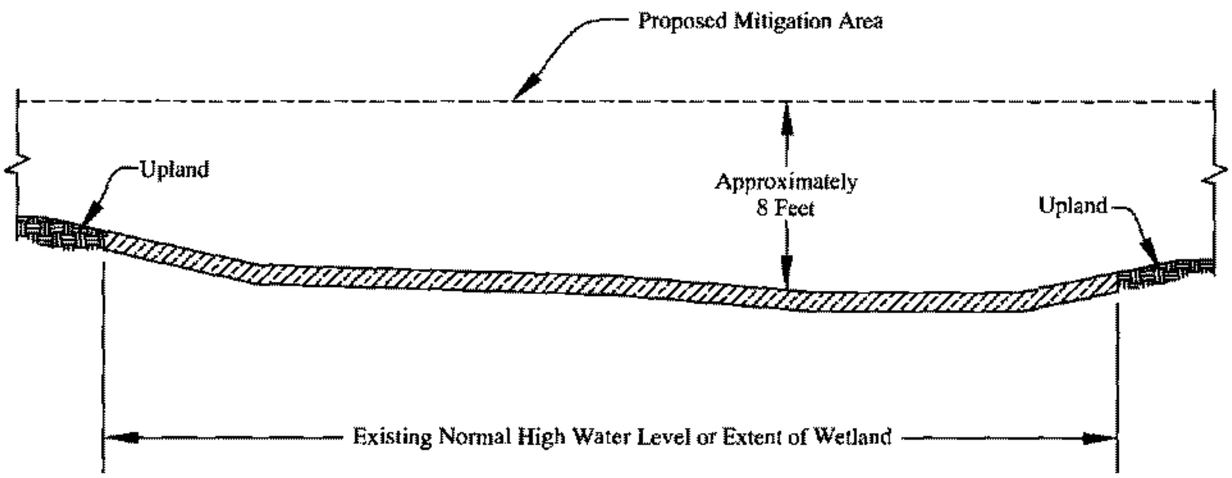
Island in Reservoir



N W E

0 250 500 FEET

- Existing Reservoir (el. 6368)
- Proposed Reservoir (el. 6388)
- Waters of the US
- Channels
- Delineated Wetlands
- Wetland Impact Site
- Proposed Mitigation Area



Profile

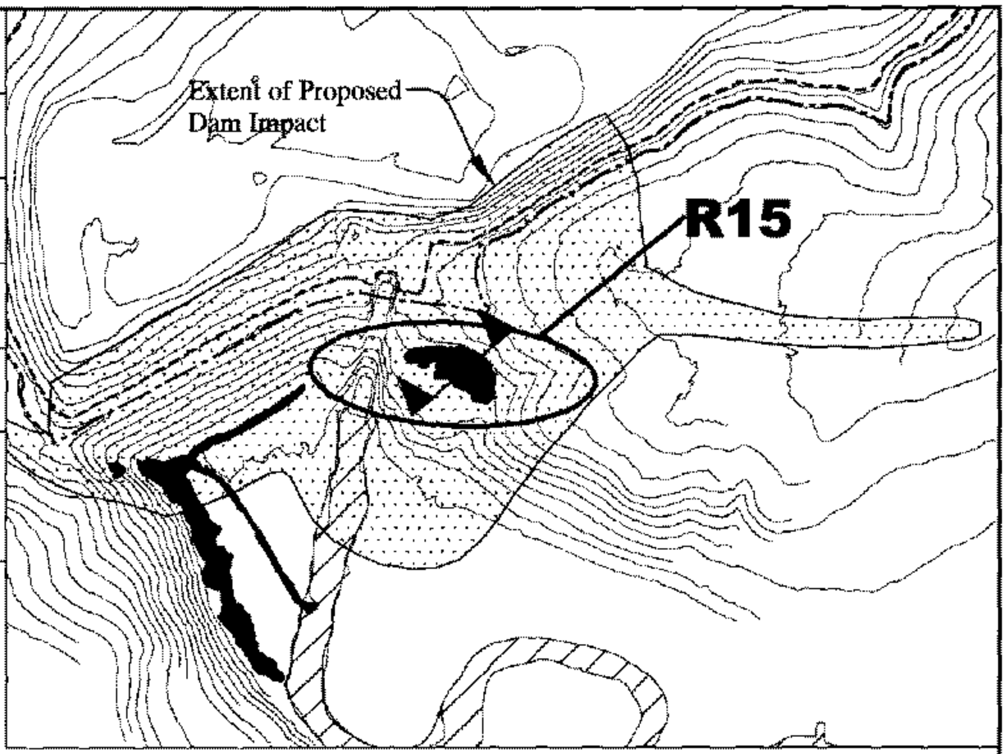
Not to Scale

Sheet:	Applicant:	Title:	Consultant:
Figure 5n	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R14	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:	
R15	
Square Feet Impact:	Acre Impact:
18,890	0.43
Cubic Yards of Fill:	
1,601	
Wetland Type Impacted:	
Palustrine Emergent	
Impact Type:	
Dam Construction	
Impact Location:	
Reservoir Dam Site	

N W e

0 250 500 FEET



Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

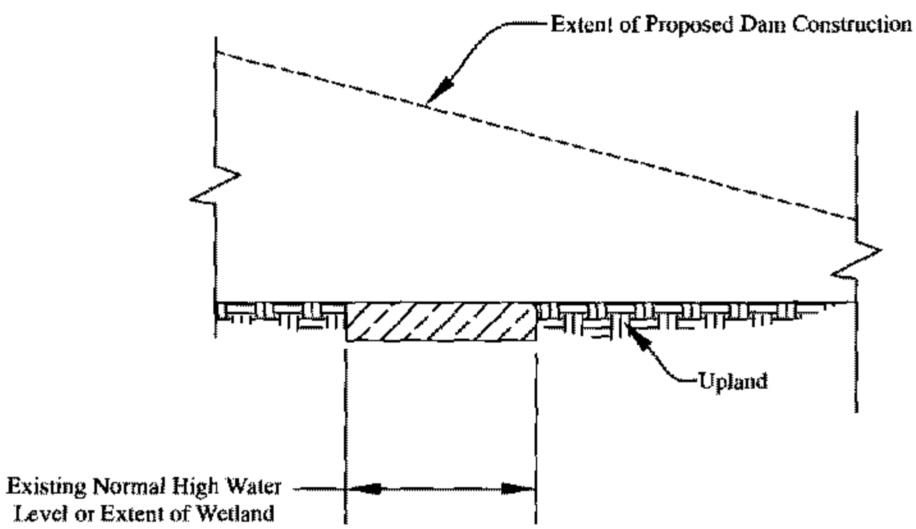
Channels

Wetland Impact Site

Waters of the US

Delineated Wetlands

Proposed Mitigation Area



Profile

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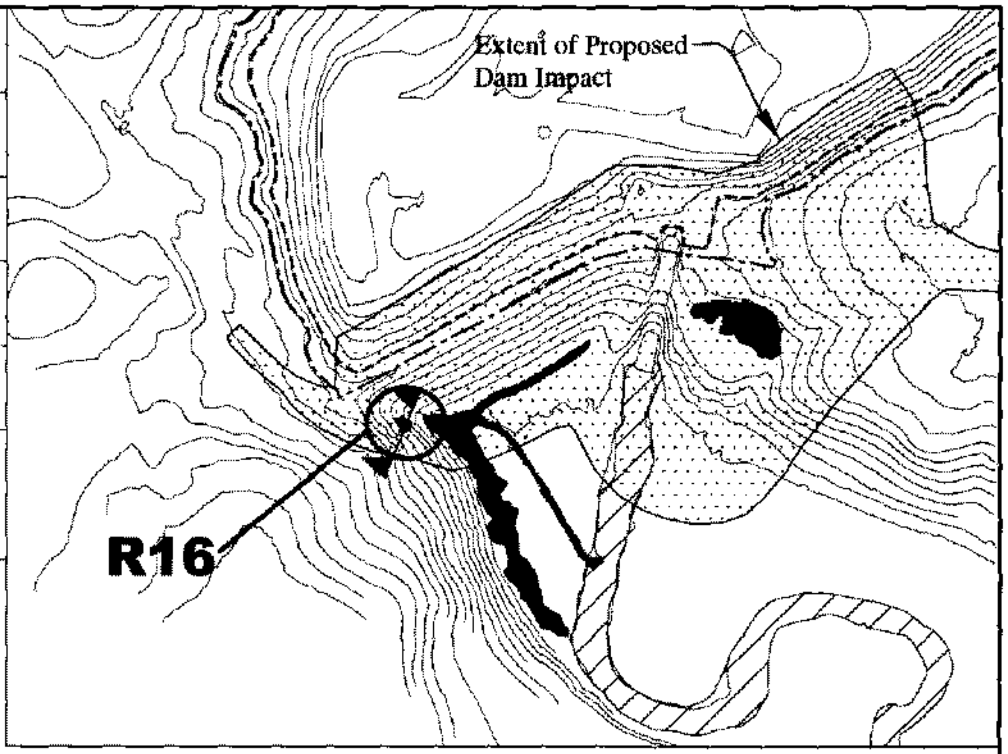
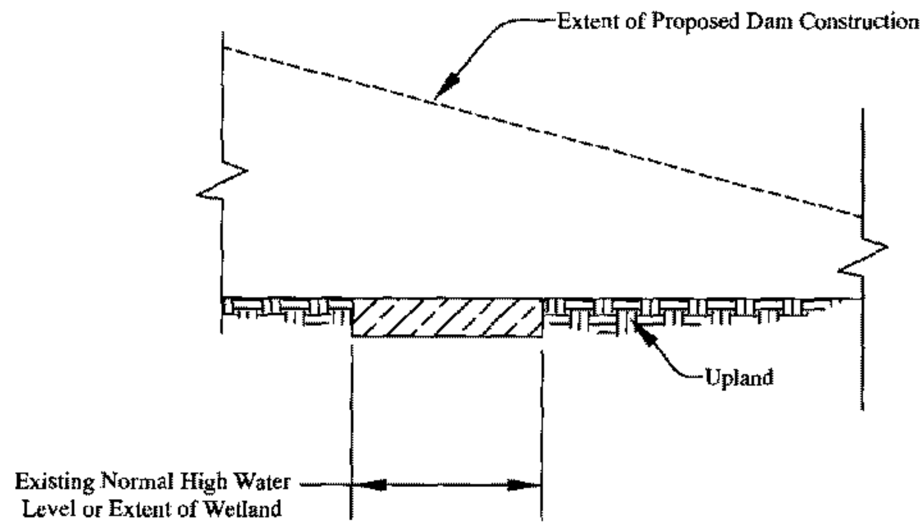
Sheet:	Applicant:	Title:	Consultant:
Figure 5o	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R15	22 Sept 2003 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:	
R16	
Square Feet Impact: 983	Acre Impact: 0.02
Cubic Yards of Fill: 73	
Wetland Type Impacted: Palustrine Emergent	
Impact Type: Dam Construction	
Impact Location: Reservoir Dam Site	



N W E
0 250 500
FEET

- Existing Reservoir (el. 6368)
- Proposed Reservoir (el. 6388)
- Waters of the US
- Channels
- Delineated Wetlands
- Wetland Impact Site
- Proposed Mitigation Area



Profile
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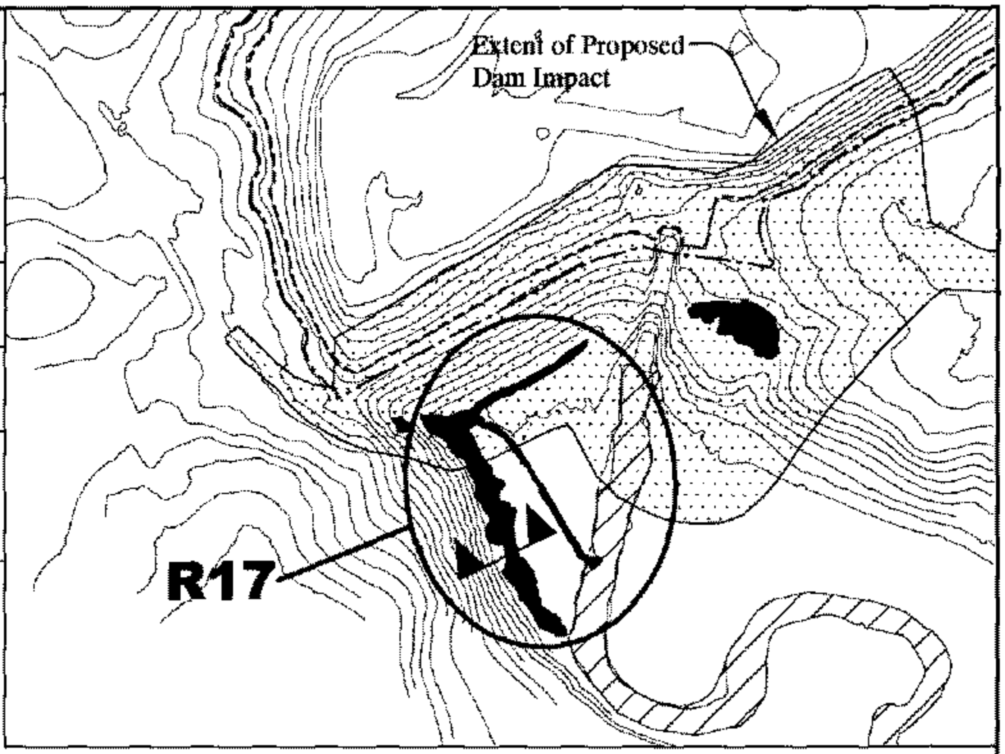
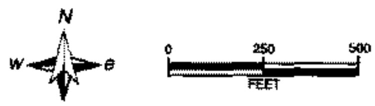
Sheet:	Applicant:	Title:	Consultant:
Figure 5p	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R16	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Impact Site:	
R17	
Square Feet Impact:	Acre Impact:
50,173	1.15
Cubic Yards of Fill:	
3,717	
Wetland Type Impacted:	
Palustrine Emergent	
Impact Type:	
Dam Construction	
Impact Location:	
Reservoir Dam Site	





Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

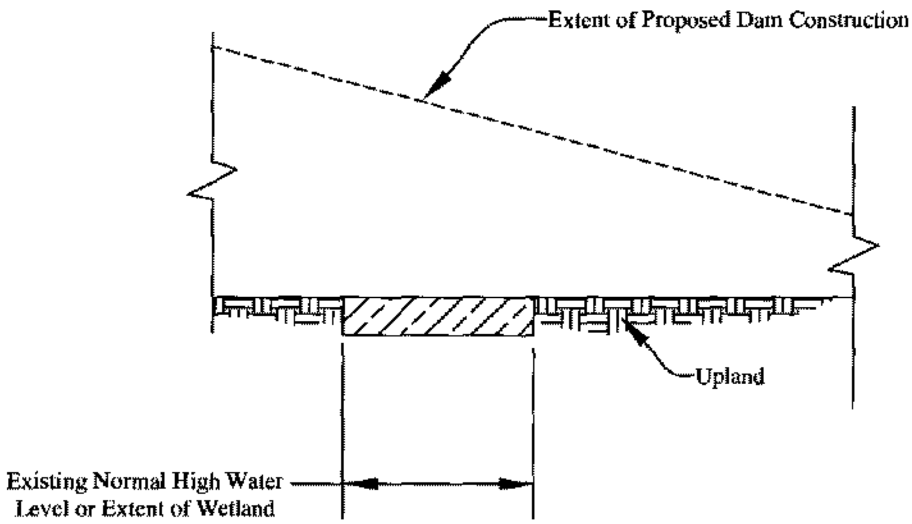
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile
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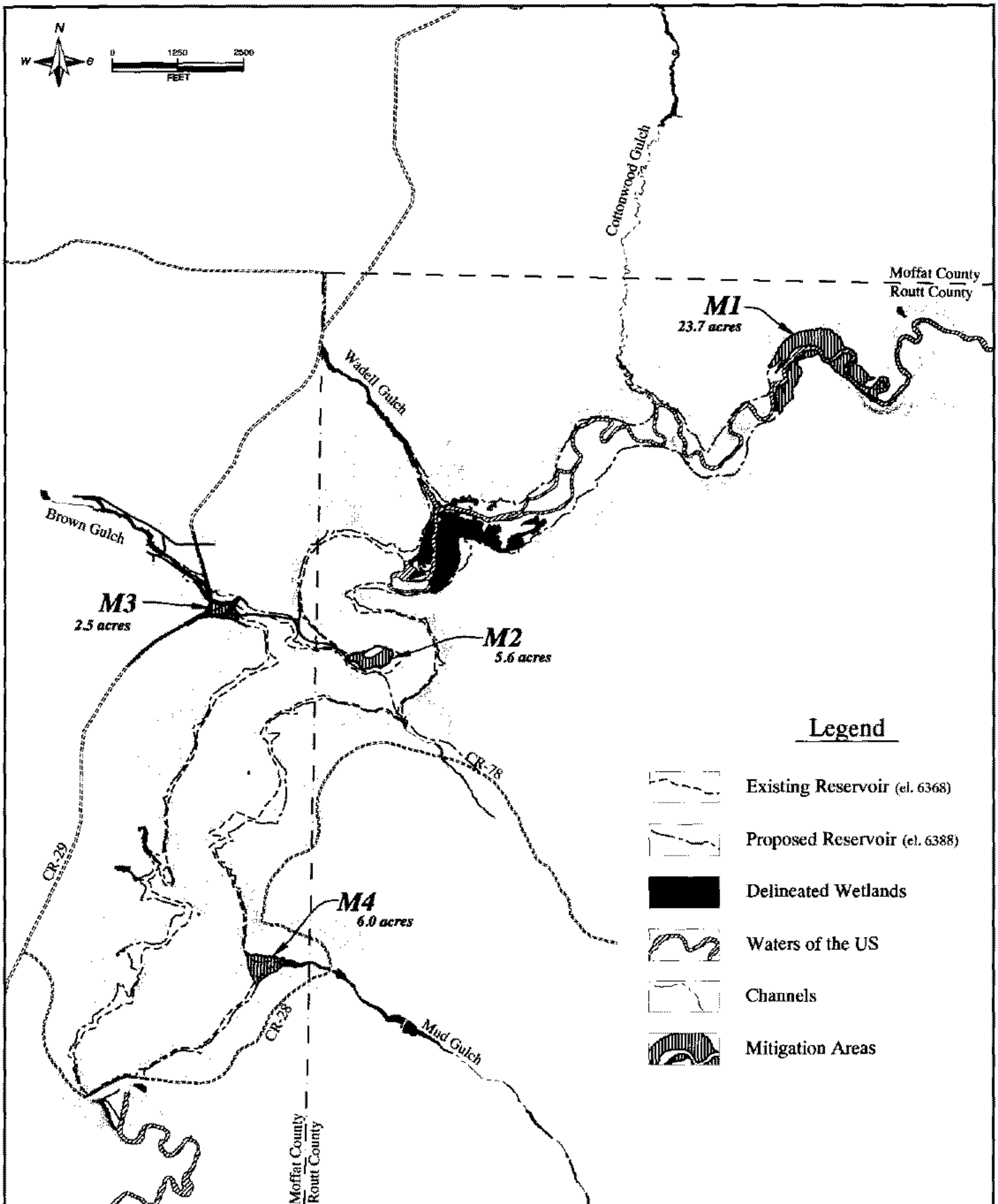
Sheet:	Applicant:	Title:	Consultant:
Figure 5q	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Impact Site R17	7 April 2004 404 Permit Mapping by: Pioneer Base map: Ayres Associates & URS



Sheet:	Applicant:	Title:	Consultant:
Figure 6	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Wetland Mitigation Areas within the Proposed Project Area	7 April 2004 404 Permit Mapping by: Base map: Ayres Associates & URS

Mitigation Area:

M1

Square Feet Created:

1,274,762

Acres Created:

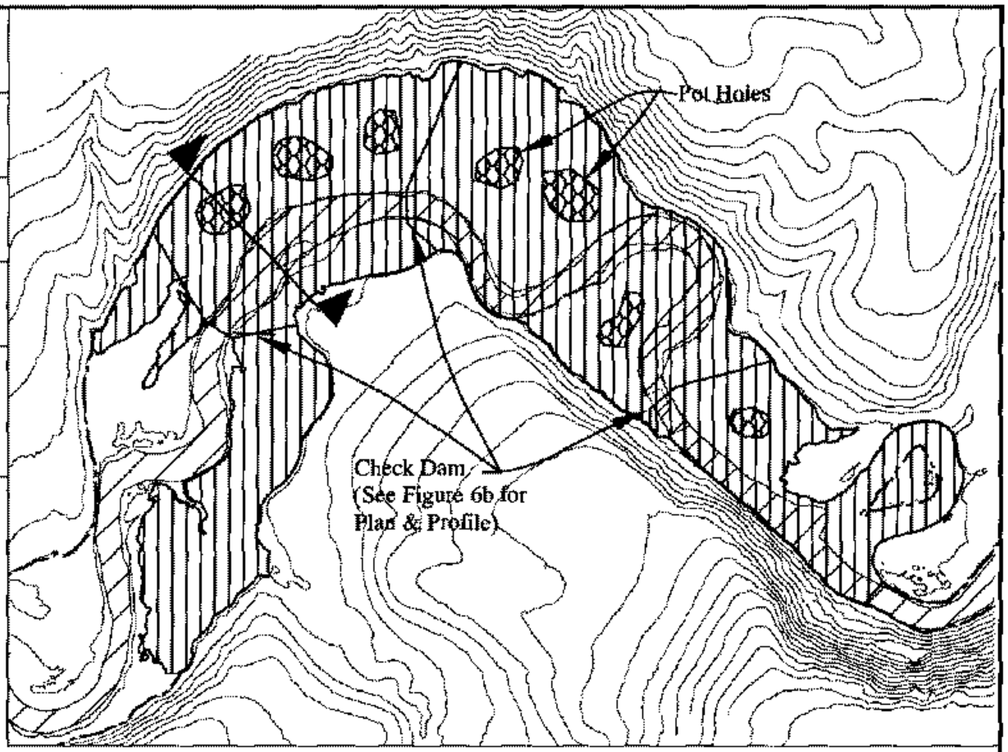
29.3

Wetland Type Created:

Palustrine Shrub/Scrub

Location:

Elkhead River Delta



N
W E
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FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

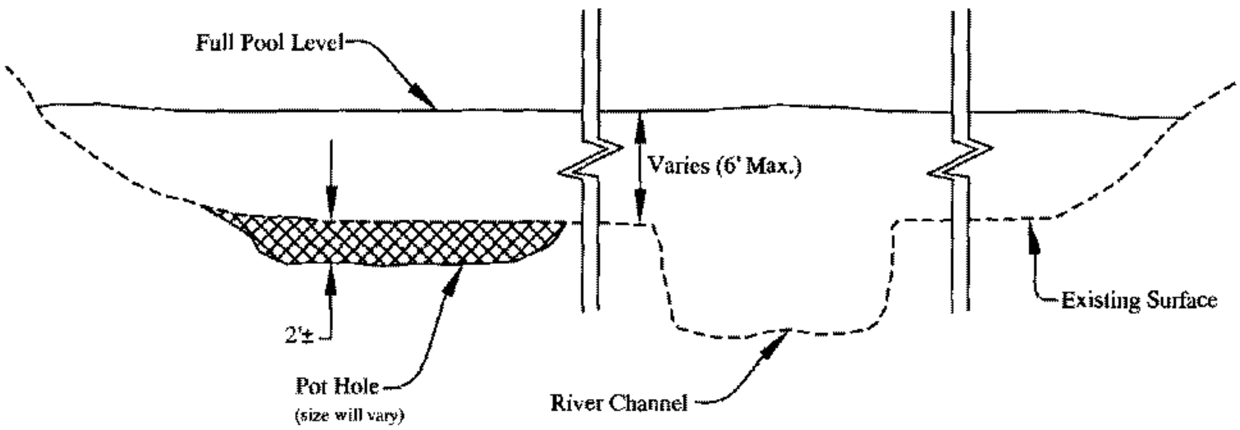
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile

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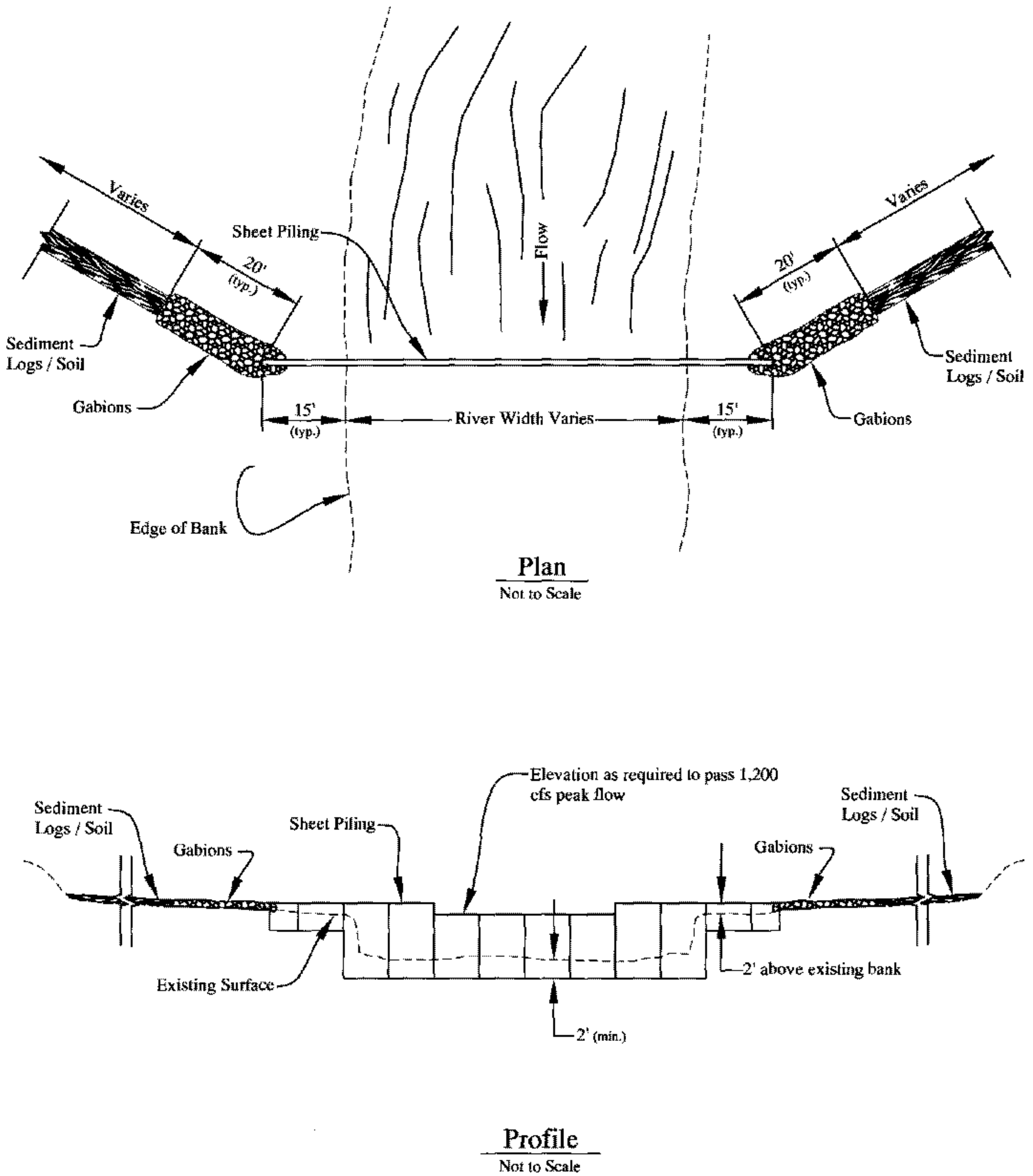
Sheet:	Applicant:	Title:	Consultant:
Figure 6a	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Mitigation Area M1	7 April 2004 404 Permit Mapping by: Pioneer Base map: Ayres Associates & URS



Sheet:	Applicant:	Title:	Consultant:
Figure 6b	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Typical Check Dam	404 Permit Mapping by: Base map: Ayres Associates & URS

Mitigation Area:

M2

Square Feet Created:

194,616

Acres Created:

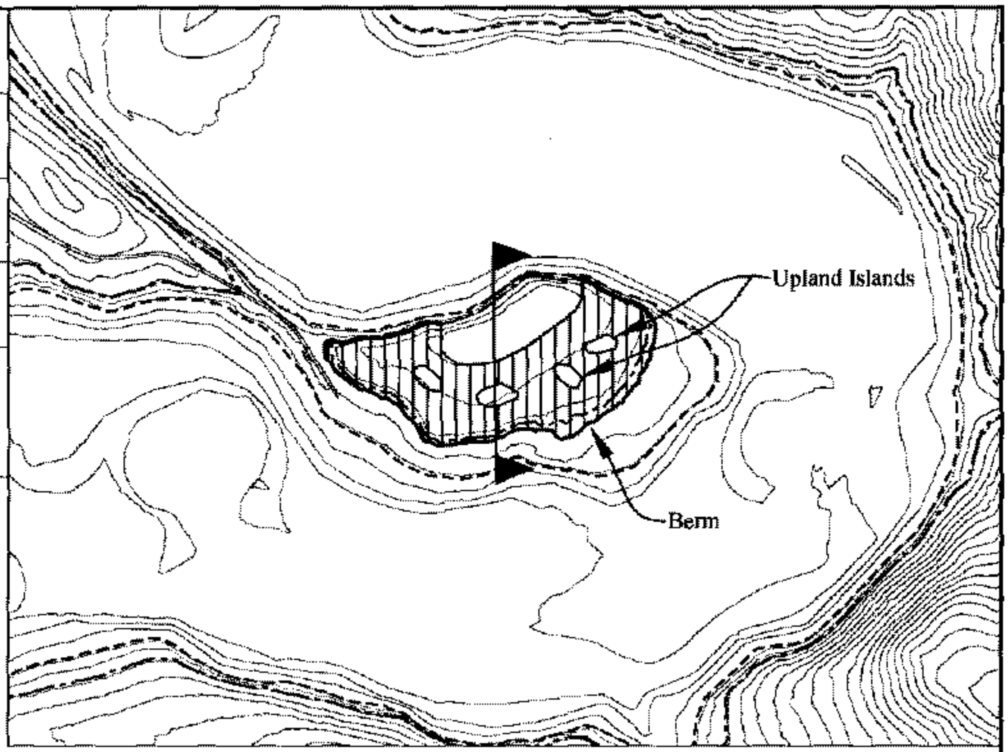
4.5

Wetland Type Created:

Palustrine Emergent

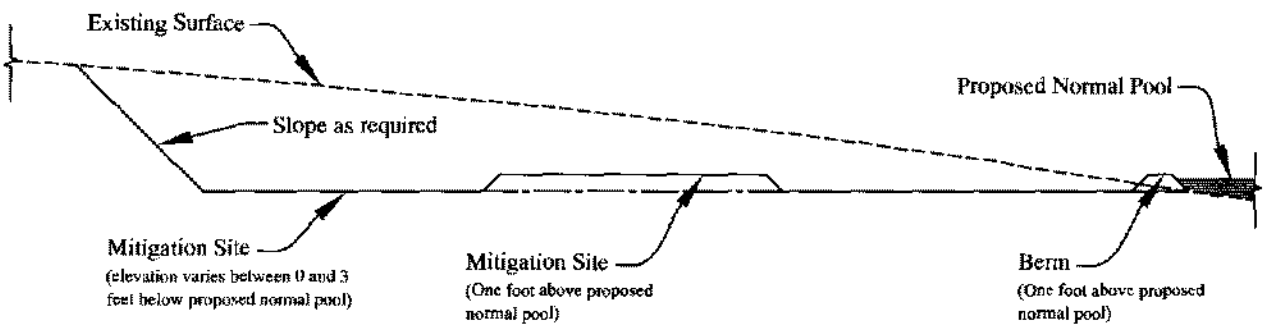
Location:

Island Creation



N W E
0 250 500 FEET

Legend		
Existing Reservoir (el. 6368)		
Proposed Reservoir (el. 6388)	Channels	Wetland Impact Site
Waters of the US	Delineated Wetlands	Proposed Mitigation Area



Profile
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Sheet:	Applicant:	Title:	Consultant: 7 April 2004
Figure 6c	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Mitigation Area M2	404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Mitigation Area:

M3

Square Feet Created:

126,788

Acres Created:

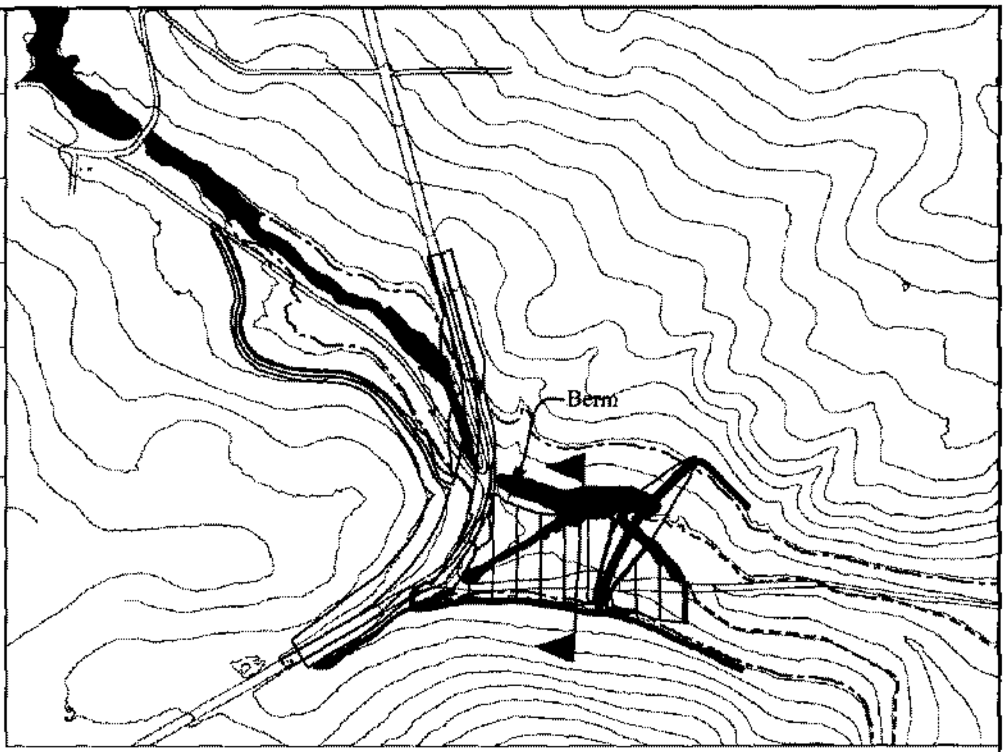
2.5

Wetland Type Created:

Palustrine Emergent

Location:

Brown Gulch



Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

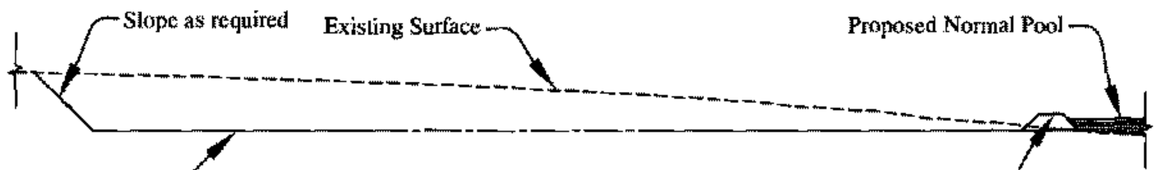
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile

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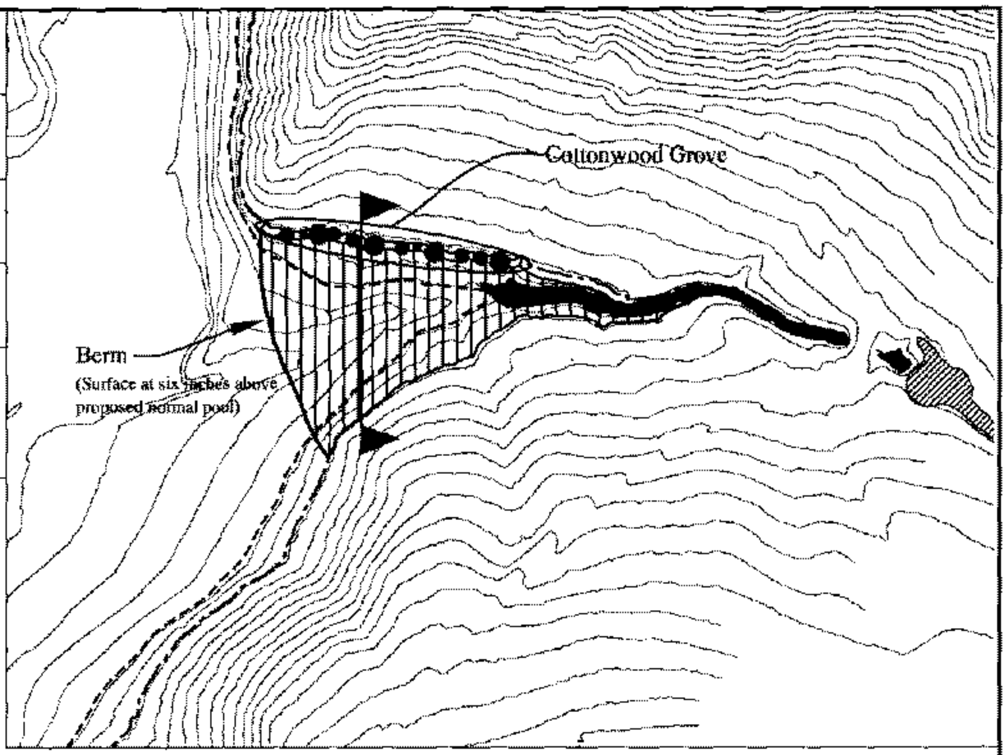
Sheet:	Applicant:	Title:	Consultant:
Figure 6d	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Mitigation Area M3	28 April 2003 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Mitigation Area:	**M4**
Square Feet Created:	**264,149**
Acres Created:	**6.0**
Wetland Type Created:	**Palustrine Emergent**
Location:	**Mud Gulch**



N W E
0 250 500
FEET

Existing Reservoir (el. 6368)

Proposed Reservoir (el. 6388)

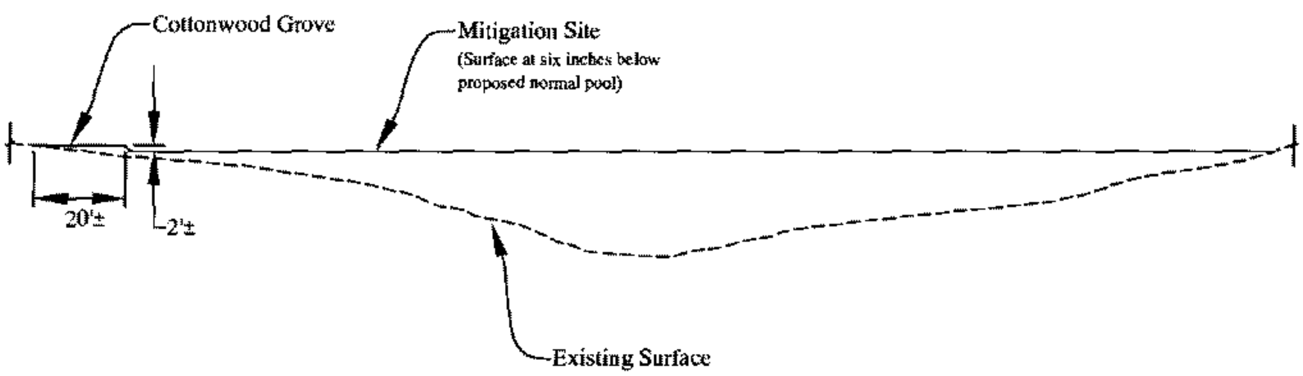
Waters of the US

Channels

Delineated Wetlands

Wetland Impact Site

Proposed Mitigation Area



Profile
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Sheet:	Applicant:	Title:	Consultant:
Figure 6e	Colorado River Water Conservation District 201 Centennial Street P.O. Box 1120 Glenwood Springs, Colorado 81602	Mitigation Area M4	7 April 2004 404 Permit Mapping by: PIONEER Base map: Ayres Associates & URS

Randall W. Bacon
46655 RCR 76
Hayden, CO 81639

Mr & Mrs Dennis Balleck
4905 County Road 20
Craig, CO 81625

Mr & Mrs Joe Balleck
5201 County Road 20
Craig, CO 81625

Mr & Mrs Tony Balleck
5203 County Road 20
Craig, CO 81625

Howard and Linda Becker
95951 East Highway 40
Craig, CO 81625

Roger and Cynthia Bedell
P.O. Box 901
Hayden, CO 81639

Lawrence Belton
1282 County Road 178
Craig, CO 81625-8911

Linda Bernhardt
1175 West 6TH Street A-26
Craig, CO 81625

Bill's Sooper
P.O. Box 969
Craig, CO 81625-0969

Marty and Catherine Blevins
2785 County Road 29
Craig, CO 81625

M.C. & Sandra Bowser
1474 N. Yampa #11
Craig, CO 81625

Q Dean & Marianne K Brosious Revocable Trust
876 School Street
Craig, CO 81625

Bureau of Land Management
PO Box 773853
Steamboat Springs, CO 80477-3853

Dustin Cade
10575 FM 740
Forney, TX 75126

Gordan Grandbouche
786 Industrial Avenue
Craig, CO 81625

Alfred Carroll
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Steamboat Springs, CO 80477

Henry Cartan
PO Box 77385
Steamboat Springs, CO 80477

Burt Clements
96500 East Highway 40
Craig, CO 81625

CO State Board of Land Com.
1313 Sherman Street
Denver, CO 80203

Colorado Division of Wildlife
PO Box 771879
Steamboat Springs, CO 80477

Robert E. Counts
5619 County Road 31
Craig, CO 81625

Hoyt Davenport
P.O. Box 587
Ducktown, TN 37326-0587

Chuck Davidson
P.O. Box 1010
Craig, CO 81626

Mr & Mrs Lewis Day
46655 RCR 76
Hayden, CO 81639

Ron Dellacroce
Yampa River State Park
P.O. Box 759
Hayden, CO 81639

T. Wright Dickinson
14883 M County Road 10N
Maybell, CO 81640

George & Evelyne Duziak
95445 E Highway 40
Craig, CO 81625

Patrick & Betty Ann Duziak
1358 County Road 178
Craig, CO 81625

Wilton Earle
97751 E US 40
Craig, CO 81625

Bill Earley
300 West 4th Street
Craig, CO 81625

Charles & Delia Eisenhauer
96502 East US 40
Craig, CO 81625

Paul J. & Tracey L. Epley
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Steamboat Springs, CO 80477

Jim Ferree
300 West 4th Street
Craig, CO 81625

Albert & Arlente Fredrickson
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Hayden, CO 81639

Mr & Mrs Kimble Frentress
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Craig, CO 81625

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514 Friendship Drive
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Tom Gilliand
P.O. Box 1749
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William Delin Goodrich Living Trust
P.O. Box 20
Craig, CO 81626

Jim Goossens
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Richard Goossens
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Hayden, CO 81639

Stanton & Ruth Greenwood
5501 County Road 29
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Mr & Mrs Todd Greenwood
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Craig, CO 81625

Les Hampton
221 W Victory Way
Craig, CO 81625

Georgia Haxton
1711 Bellevue Avenue
Richmond, VA 23227

Vincent & Joy Higens
153 Peachblow Road
Basalt, CO 81621

James & Roberta Hume
95848 East Highway 40
Craig, CO 81625

Lee & Patricia Jensen
97862 E Highway 40
Craig, CO 81625

John Shaw
5795 County Road 78
Hayden, CO 81639

Robert Jones
Box 518
Craig, CO 81626

Mr & Mrs Roy Karo
2381 County Road 29
Craig, CO 81625

Ivan & Regina Kawcak
7833 County Road 29
Craig, CO 81625

Mr & Mrs Lonnie Kawcak
1960 Yampa Avenue
Craig, CO 81625

Mr & Mrs Chriss Keiss
2610 County Road 29
Craig, CO 81625

Beryl & Velma Kleitz
P.O. Box 1667
Truth Or Consequences, NM 87901

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Lakewood, CO 80214

Mr & Mrs Larsen
42755 Routt County Road
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Leroy & Marymargaret Lawton
42625 Routt County Road 86
Craig, CO 81625

Don & Teresa Lindsay
2589 County Road 29
Craig, CO 81625

Rocky & Beth Mannon
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Meyers, Donna & David
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Michael Nottingham
Nottingham Land & Livestock
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Craig, CO 81626

James D. & Connie Osborne
PO Box 381
Craig, CO 81626

Harold & Helen Pankey
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Craig, CO 81625

Mr & Mrs Keith Pankey
96193 E. Highway 40
Craig, CO 81625

Winfield & Reva Pankey
339 County Road 29
Craig, CO 81625

Butch & Jenny Peed
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Craig, CO 81625

Casey Peed
P.O. Box 1131
Palisade, CO 81526

Lee & Jill Peed
P.O. Box 1131
Palisade, CO 81526

Orval W. & Virginia L. Peed
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Craig, CO 81625

Raymond & Jill Peed
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Palisade, CO 81526

Mr & Mrs Frank Pennington
2620 County Road 29
Craig, CO 81625

Roy & Carmelita Pitney
45870 Routt County Road 76
Hayden, CO 81639

Nancy D Pitman & Nancy D Roberts
2614 County Road 29
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Jim Ross
1620 E US Highway 40
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Kathleen Ross
5529 Highway 394
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Barry & Stephanie Van Matre
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Craig, CO 81625

Gary & Valerie Van Tassel
96525 E Highway 40
Craig, CO 81625

Vassek/Grandbouche
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Craig, CO 81625day

Doug & Eva Vaughn
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Dalayne Vollstedt
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Craig, CO 81626

Wadge Investment Company
P.O. Box 130
Hayden, CO 81639

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Paul Zenobia
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Craig, CO 81626