

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GREAT PLAINS REGION
EASTERN COLORADO AREA OFFICE
LOVELAND, COLORADO

FINDING OF NO SIGNIFICANT IMPACT

Ruedi Reservoir 2012 Agreement

**Ruedi Reservoir
Fryingpan-Arkansas Project
Colorado**

FONSI NO. EC-1300-02-01

Approved: _____

[Signature]
Area Manager

Eastern Colorado Area Office

Date: _____

MAY 22 2003

ACTING FOR

In accordance with the National Environmental Policy Act of 1969, as amended, and based on the following, the United States Bureau of Reclamation (Reclamation) has determined that the implementation of Alternative B would not result in a significant impact to the human environment. Alternative B includes a Memorandum of Agreement (2012 Agreement) with the Colorado Water Conservation Board (CWCB) and the United States Fish and Wildlife Service (Service) to make 10,825 acre-feet (af) of water available annually (through the year 2012) for delivery from Ruedi Reservoir to the 15 Mile Reach of the Colorado River. Implementation of Alternative B would also allow the west slope water users' interim commitment of 5,412 af to be supplied from unused contracted water or available uncontracted water in Ruedi Reservoir an estimated 1 out of 10 years. This Finding of No Significant Impact (FONSI) describes Reclamation's environmental conclusions regarding implementation of Alternative B.

INTRODUCTION

In 1968, Ruedi Dam and Reservoir were constructed as part of the Fryingpan-Arkansas Project in order to provide storage for replacement of out-of-priority diversions to the east slope and for regulatory storage for west slope users. To benefit the west slope water users, a water marketing program was initiated, and in 1982 Reclamation concluded the first round (Round I) of Ruedi Reservoir water sales. In response to additional demand in the late 1980's, Reclamation initiated action to provide additional water sales through the Ruedi Reservoir Round II Water Marketing Program (Round II).

In 1988, the Secretary of the Interior, Administrator of the Western Area Power Administration, and the Governors of Colorado, Utah, and Wyoming signed a cooperative agreement establishing the Upper Colorado River Endangered Fish Recovery Program (Recovery Program). The goal of the Recovery Program is to recover the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub while providing for the continued future water development in the Colorado River basin above the confluence with the Gunnison River.

In April of 1994, critical habitat was listed for all four of the Colorado endangered fish. Critical habitat for the Colorado pikeminnow and the razorback sucker included the Colorado River downstream of Rifle. This is an area affected by depletions that are, in part, caused by the Ruedi water marketing program and includes the 15 Mile Reach of the Colorado River. The 15 Mile Reach extends along the mainstem Colorado River 15 miles upstream from its confluence with the Gunnison River to the Grand Valley Irrigation Company Diversion Dam near Palisade, Colorado.

The ability of Colorado River water users to continue developing water in the Colorado River basin upstream of the 15 Mile Reach is dependent upon the success of the Recovery Program. The Recovery Program has determined that increased summer and fall flows in the 15 Mile Reach are necessary for recovery of the endangered fish.

PURPOSE

The purpose of the proposed agreement is to supply additional flows to the 15 Mile Reach, pursuant to the *1999 Final Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of the Recovery Program Actions in the Upper Colorado River Above the Confluence with the Gunnison River*, to enhance habitat and ensure continued progress towards recovery of endangered fish, which will facilitate the continued development and use of water from the Colorado River basin upstream of the 15 Mile Reach.

NEED

In May of 1995, Reclamation received a jeopardy Biological Opinion (BO) on the marketing of up to 17,000 af of Round II water. The BO contained two Reasonable and Prudent Alternatives (RPAs) for Reclamation to implement prior to proceeding with Round II. Reclamation was to (1) continue providing 5,000 af of water annually and 5,000 af in 4 out of 5 years commitments; and, (2) make the remaining uncommitted portion of the marketable yield (estimated at 21,650 acre feet) available through an agreement

with the Service and the CWCB for up to 15 years to enhance flows in the 15 Mile Reach. Reclamation was unable to implement the second RPA (an agreement to which all parties could agree). Consequently, in July 1997, Reclamation reinitiated consultation to develop a new RPA. In the fall of 1997, water users, environmentalists, Reclamation, and the Service began discussing the elements of a Programmatic Biological Opinion (PBO) to address the effects of all historic depletions affecting the 15 Mile Reach, including those from Ruedi Reservoir, using this process to develop new RPAs. An amended BO incorporating a new RPA was finalized in January 1999.

In December of 1999, the PBO (which takes precedence over the January 1999 amended BO) was finalized and issued to Reclamation. The PBO discusses Reclamation's commitment to provide 5,000 af per year and 5,000 af in 4 out of 5 years and to seek an agreement to provide up to 21,650 af of Ruedi Reservoir water to the Recovery Program through the year 2012 in order to improve flows in the 15 Mile Reach. However, the PBO states that when the west and east slope water users dedicated 10,825 af to the Recovery Program, Reclamation's commitment would be reduced from 21,650 af to 10,825 af of Ruedi Reservoir water. In 2000, west and east slope water users committed 10,825 af of water to the Recovery Program, so Reclamation's commitment to the Recovery Program is currently 10,825 af annually. Additionally, the PBO provides that when an agreement is signed committing Reclamation to make 10,825 af of Ruedi water available to enhance flows in the 15 Mile Reach through 2012, Reclamation may contract for the remainder of the 17,000 af. Finally, per the PBO, with the water users providing their 10,825 af, Reclamation may contract for the other half of the 21,650 af original commitment (the half not committed in the 2012 Agreement described below), if demand materializes and new depletions allowed under the PBO will not be exceeded.

PREFERRED ALTERNATIVE

Reclamation evaluated the effects of four alternatives: 1) The No Action Alternative - Reclamation does not execute the 2012 Agreement, reverts to the provisions of the January 1999 amended BO, and Round II contracting is limited to 6,135 af; 2) Alternative A - Reclamation executes the 2012 Agreement to make 10,825 af available for endangered fish through the year 2012; 3) Alternative B - Reclamation executes the 2012 Agreement and also makes 5,412 af available approximately 1 out of 10 years to meet the west slope water users' interim commitment; and 4) Alternative C - Reclamation executes the 2012 Agreement and also makes an additional 10,825 af available for endangered fish. Reclamation has selected Alternative B as the alternative to implement.

By implementing Alternative B, Reclamation would enter into the 2012 Agreement with the CWCB and the Service to make 10,825 af of water available annually, through the year 2012, for release from the marketable yield of Ruedi Reservoir. The water released pursuant to the 2012 Agreement will be delivered to the 15 Mile Reach of the Colorado River for summer and fall base flow augmentation. Alternative B also allows the west slope water users' interim commitment of 5,412 af, to be supplied from unused contracted water or available uncontracted water within the marketable yield of Ruedi Reservoir. The water would be made available through a one-year temporary water service contract. This need is estimated to arise 1 out of 10 years, or 10% of the time.

The Recovery Program has established target flows for the 15 Mile Reach, relying on multiple water sources, including Ruedi, to supplement flows. The Service established a range of target flows which are based on estimated annual runoff and snowpack conditions. Consequently, each spring Recovery Program personnel review winter snowpack data to characterize the type of runoff year and determine which 15 Mile Reach target flow is appropriate for that year.

Reclamation will generally release water upon the request of the Service between early July and late October of each year up to the amount needed to contribute toward meeting target flows in the 15 Mile Reach. The amount, timing, and rate of the releases will be determined by Reclamation in consultation with the Service. The Service and Reclamation will consult with CWCB during the release period. The current forty-year agreement between Reclamation and the CWCB to provide up to 10,000 af of water per year (5,000 af annually and 5,000 in af 4 out of 5 years) for the 15 Mile Reach will remain in full force and effect when the Preferred Alternative is implemented.

OPERATIONAL MEASURES

Reclamation recognizes that opportunities exist to develop operational measures that respond to concerns raised during the public scoping and comment period. The following are identified in the final EA as operational measures common to all of the alternatives. Implementation of these measures will improve operations at Ruedi Reservoir to maintain consistency with multiple Project purposes.

1. Reclamation will continue to attempt to make release adjustments of no more than 50 cfs increments when feasible and consistent with multiple Project purposes. This measure strives to minimize potential impacts of rapidly changing flows on aquatic biota, rescue activities, recreation interests, and stream bank stability, while providing Reclamation the operational flexibility to comply with Colorado water law.
2. Reclamation will evaluate the final results of the Roaring Fork Conservancy (RFC) fishery study being conducted by Miller Ecological Consultants, Inc. Reclamation will coordinate with the Colorado Division of Wildlife (CDOW) to assess recommendations in the study and work toward implementing those appropriate measures and monitoring techniques that are feasible and consistent with the multiple Project purposes.
3. In an effort to address concerns of decreased wadeability of the Fryingpan River when flows exceed 250 cfs, efforts will be made to limit cumulative flows to 250 cfs or less when consistent with the multiple Project purposes and reasonable to do so; so long as future fishery research does not indicate that flows in excess of 250 cfs are important for Fryingpan or Roaring Fork River fishery maintenance or enhancement.

FINDINGS

During the environmental review process, potential effects from the Preferred Alternative were identified, either by the general public, other agencies, or Reclamation staff. Reclamation used potential effects to help focus the environmental review process, to structure the EA, and to identify opportunities for mitigating or avoiding adverse effects from the Preferred Alternative.

HYDROLOGY

Erosion and Scour: Neither fluctuations in release quantities nor maximum release rates in association with the Preferred Alternative are anticipated to differ significantly from those experienced over the past fourteen years of endangered fish releases. Modeled release patterns are not outside the typical fluctuations in the drainage and would not be expected to accelerate erosion. Additionally, during higher releases of 250-350 cfs, the velocities created are not anticipated to significantly increase scour of the streambed.

Water Contracts: As a result of the 2012 Agreement, the amount of water available to Ruedi Round II contractors will expand from 6,135 af to 17,000 af. Also per the PBO, an additional 10,825 af will be available for contracting if demand materializes and new depletions allowed under the PBO have not been exceeded. Implementing the Preferred Alternative will result in up to 5,412 af per year less water being available approximately 1 out of 10 years.

AQUATIC WILDLIFE

Sport Fisheries: No significant impacts to the fisheries of the Fryingpan or Roaring Fork Rivers are anticipated as a result of implementing the Preferred Alternative, nor are future or cumulative effects anticipated. The Preferred Alternative will not increase the occurrence of large flow fluctuations on the Fryingpan River. Additionally, any increased fluctuations will occur mostly outside of critical brown and rainbow trout early development life stages specific to the Fryingpan River. Implementation of the Preferred Alternative is not expected to significantly affect winter releases from Ruedi Reservoir. Macroinvertebrate populations are not anticipated to be affected.

Threatened and Endangered Species: The Preferred Alternative will provide 10,825 af through 2012 to improve endangered fish habitat and ensure continued progress towards recovery of endangered fish.

RECREATION

Ruedi Reservoir: As a result of implementing the Preferred Alternative, in dry years, Aspen Yacht Club and Dearhamer boat ramps would only be usable until early July. In moderate years, Aspen Yacht Club and Dearhamer boat ramps would only be usable until late August/early September. In wet years, all boat ramps would be usable through the recreation season. The effects of the Preferred Alternative are equivalent to the effects of the No Action Alternative on recreation at Ruedi Reservoir.

Although Reclamation does not believe the Preferred Alternative warrants mitigation measures to offset impacts, we do recognize the potential for enhancing recreation at Ruedi Reservoir. Reclamation will work with the USFS to 1) try to get a mast raising pole installed at Ruedi Marina boat ramp, 2) attempt to keep Ruedi Marina boat ramp clear of debris and sediment during the late summer when water levels are low, and 3) address concerns about low water hazards.

Fryingpan Fishing: The Preferred Alternative reduces the estimated number of days with potential flows >250 cfs from the No Action Alternative by approximately 9 days in dry years, 12 days in moderate years, and 12 days in wet years, thereby increasing the number of wadable days on the Fryingpan River. Reclamation does not believe implementation of the Preferred Alternative will significantly affect either fishing or fish populations in the Fryingpan River.

Roaring Fork Fishing: Smaller releases would provide less benefit to Roaring Fork fishing than the No Action Alternative. Fewer releases would mean less potential supplemental flows to aid boating and fishing from boats on the Roaring Fork. Reclamation does not believe implementation of the Preferred Alternative will significantly affect either fishing, fish populations, or boating on the Roaring Fork River.

ECONOMIC/SOCIAL ENVIRONMENT

Effects to local economies, as a result of implementing the Preferred Alternative, would be directly related to recreation and development impacts on the west slope.

- Recreation activities at Ruedi Reservoir, on the Fryingpan River downstream of Ruedi, and on the Roaring Fork River can all potentially be impacted by Ruedi Reservoir endangered fish releases. However, the Preferred Alternative will cause less impact than the No Action Alternative by decreasing both the volume of water released from Ruedi for endangered species purposes (compared to past endangered fish releases) and the potential for flow days >250 cfs on the Fryingpan River. Additionally, the Preferred Alternative will not significantly affect the occurrence of rapidly changing flows on the Fryingpan River.
- Based on current requests for Ruedi Round II contracts, the availability of Wolford Reservoir to meet at least some of the demand, and the term of the 2012 Agreement, Reclamation does not believe implementing the Preferred Alternative will result in lost development opportunities on the west slope.

HYDROPOWER PRODUCTION

Implementing the Preferred Alternative reduces the estimated number of by-pass days, as compared to the No Action Alternative, by approximately 9 days in dry years, 12 days in moderate years, and 12 days in wet years. Additionally, due to the opportunistic nature of the license granted to the Town of Aspen under the FERC program, all releases from Ruedi Reservoir are considered a benefit.

CULTURAL RESOURCES

An archaeological survey conducted on Ruedi Reservoir indicated no archaeological sites between the 7700 and 7800 elevation contours. The Preferred Alternative will not cause reservoir levels to fluctuate beyond these elevations in dry, moderate or wet years, nor will the Preferred Alternative result in significant change to the streambed downstream.

INDIAN TRUST ASSETS AND ENVIRONMENTAL JUSTICE

There are no anticipated effects to either Indian Trust Assets or minority or low-income populations and communities as a result of the Preferred Alternative.

This **Finding of No Significant Impact** has been prepared and signed to document environmental review and evaluation of the Preferred Alternative in compliance with the National Environmental Policy Act of 1969, as amended.

RUEDI RESERVOIR 2012 AGREEMENT

***Final* Environmental Assessment**

EA NO. EC-1300-02-01

Fryingpan-Arkansas Project

**U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Eastern Colorado Area Office**

March 2002

Contents

	<i>Page</i>
Chapter 1 – Project Scope	
1.1 Background.....	1-1
1.2 Purpose and Need.....	1-4
1.3 Proposed Action.....	1-4
1.4 Issues and Concerns.....	1-4
Chapter 2 – Alternatives	
2.1 Alternative Descriptions.....	2-1
2.1.1 Assumptions Common to All Alternatives.....	2-1
2.1.2 Operational Measures Common to All Alternatives.....	2-2
2.1.3 No Action Alternative.....	2-3
2.1.4 Alternative A	2-3
2.1.5 Alternative B.....	2-3
2.1.6 Alternative C.....	2-4
2.2 Alternatives Considered But Dropped From Further Consideration.....	2-5
2.2.1 Continuation of the 5,000 af Annually and 5,000 af 4 out of 5 Years Contract with No Additional Endangered Fish Releases From Ruedi Reservoir Alternative.....	2-5
2.2.2 Release Restriction Alternative.....	2-5
Chapter 3 – Affected Environment	
3.1 Hydrology.....	3-1
3.1.1 15 Mile Reach Augmentation Water.....	3-3
3.1.2 Water Contracts.....	3-5
3.2 Aquatic Wildlife.....	3-6
3.2.1 Sport Fisheries.....	3-6
3.2.2 Threatened and Endangered Species.....	3-9
3.3 Recreation.....	3-10
3.3.1 Ruedi Reservoir.....	3-10
3.3.2 Fishing.....	3-10
3.4 Economic/Social Environment.....	3-12
3.5 Hydropower Production.....	3-14
Chapter 4 – Environmental Consequences	
4.1 No Action Alternative.....	4-1
4.2 Alternative Analysis.....	4-3
4.2.1 Hydrology.....	4-3
Erosion and Scour.....	4-6
Water Contracts.....	4-8
4.2.2 Aquatic Wildlife.....	4-9
Sport Fisheries.....	4-9

	<i>Page</i>
4.2.2 <i>Continued</i>	
Threatened and Endangered Species.....	4-12
4.2.3 Recreation.....	4-13
Ruedi Reservoir.....	4-13
Fishing.....	4-17
4.2.4 Economic/Social Environment.....	4-22
4.2.5 Hydropower Production.....	4-27
4.2.6 Cultural Resources.....	4-27
4.2.7 Indian Trust Assets and Environmental Justice.....	4-28
4.3 Summary of Environmental Effects.....	4-29

Chapter 5 – Consultation and Coordination

5.1 Public Involvement.....	5-1
5.2 Consultation and Coordination with Other Agencies.....	5-3
5.3 Public Response to Ruedi 2012 Agreement Draft EA.....	5-3

Attachment A – Model Description

Attachment B – Bibliography

Attachment C – List of Preparers

Tables

<i>Table</i>	<i>Page</i>
1.1 Ruedi Reservoir Water Marketing History.....	1-6
1.2 Issue Summary and Disposition.....	1-7
3.1 Ruedi Reservoir Pool Volumes.....	3-2
3.2 Minimum Instream Flows for the Fryingpan and Roaring Fork Rivers.....	3-3
3.3 Current Ruedi Reservoir Round I and Round II Water Contracts.....	3-6
3.4 Approximate Time and Duration of Spawning, and the Critical Early Development Life Stages for Brown and Rainbow Trout in the Fryingpan River Below Ruedi.....	3-9
3.5 Distribution of Total Outfitter/Guide Days in Percent by Year.....	3-13
4.1 Comparison of Certain Aspects of Historic and Modeled Endangered Fish Releases for Ruedi Reservoir.....	4-5
4.2 Distribution of the Marketable Yield for Each Alternative.....	4-6
4.3 Historic 15 Mile Reach Endangered Fish Releases from Ruedi Reservoir by Monthly Acre-Feet Quantities and Monthly Number of Days Greater Than or Equal to 250 cfs in the Fryingpan River.....	4-7
4.4 Mean Monthly Releases from Ruedi Reservoir for the Past Twelve Winter Seasons.....	4-11

4.5	Mean high and low water levels at Ruedi Reservoir	4-28
4.6	Summary of Environmental Effects.....	4-29
5.1	Summary of Comments and Disposition	5-2
5.2	Public Comments to Ruedi 2012 Draft EA and Responses.....	5-5

Figures

<i>Figure</i>	<i>Page</i>	
1.1	Location Map.....	1-2
2.1	Percent of Endangered Fish Releases Provided from Each Source by Alternative.....	2-4
2.2	Simulated Historic Ruedi Reservoir Content for Representative Dry, Moderate, and Wet Years.....	2-7
2.3	Simulated Historic Fryingpan River Flows for Representative Dry, Moderate, and Wet Years.....	2-8
2.4	Simulated Historic 15 Mile Reach Flows for Representative Dry, Moderate, and Wet Years.....	2-9
3.1	15 Mile Reach Late Summer Target Flows (in cfs) Based on Winter Snowpack.....	3-4
3.2	Historic Quantity and Percentage of Water Made Available for Endangered Fish Releases.....	3-5
3.3	Total Number per Hectare Brown and Rainbow Trout Greater Than 35 cm.....	3-8
3.3a	Total Kilograms per Hectare Brown and Rainbow Trout in Fryingpan River.....	3-8
3.4	Recreation Facilities at Ruedi Reservoir.....	3-11
4.1	Dry Year (1977) Simulated 15 Mile Reach Flow.....	4-14
4.2	Moderate Year (1988) Simulated 15 Mile Reach Flow.....	4-15
4.3	Wet Year (1996) Simulated 15 Mile Reach Flow.....	4-16
4.4	Dry Year (1977) Simulated Ruedi Reservoir Content.....	4-18
4.5	Moderate Year (1988) Simulated Ruedi Reservoir Content.....	4-19
4.6	Wet Year (1996) Simulated Ruedi Reservoir Content.....	4-20
4.7	Dry Year (1977) Simulated Flows in the Fryingpan River Below Ruedi Reservoir.....	4-23
4.8	Moderate Year (1988) Simulated Flows in the Fryingpan River Below Ruedi Reservoir.....	4-24
4.9	Wet Year (1996) Simulated Flows in the Fryingpan River Below Ruedi Reservoir.....	4-25

CHAPTER 1 - PROJECT SCOPE

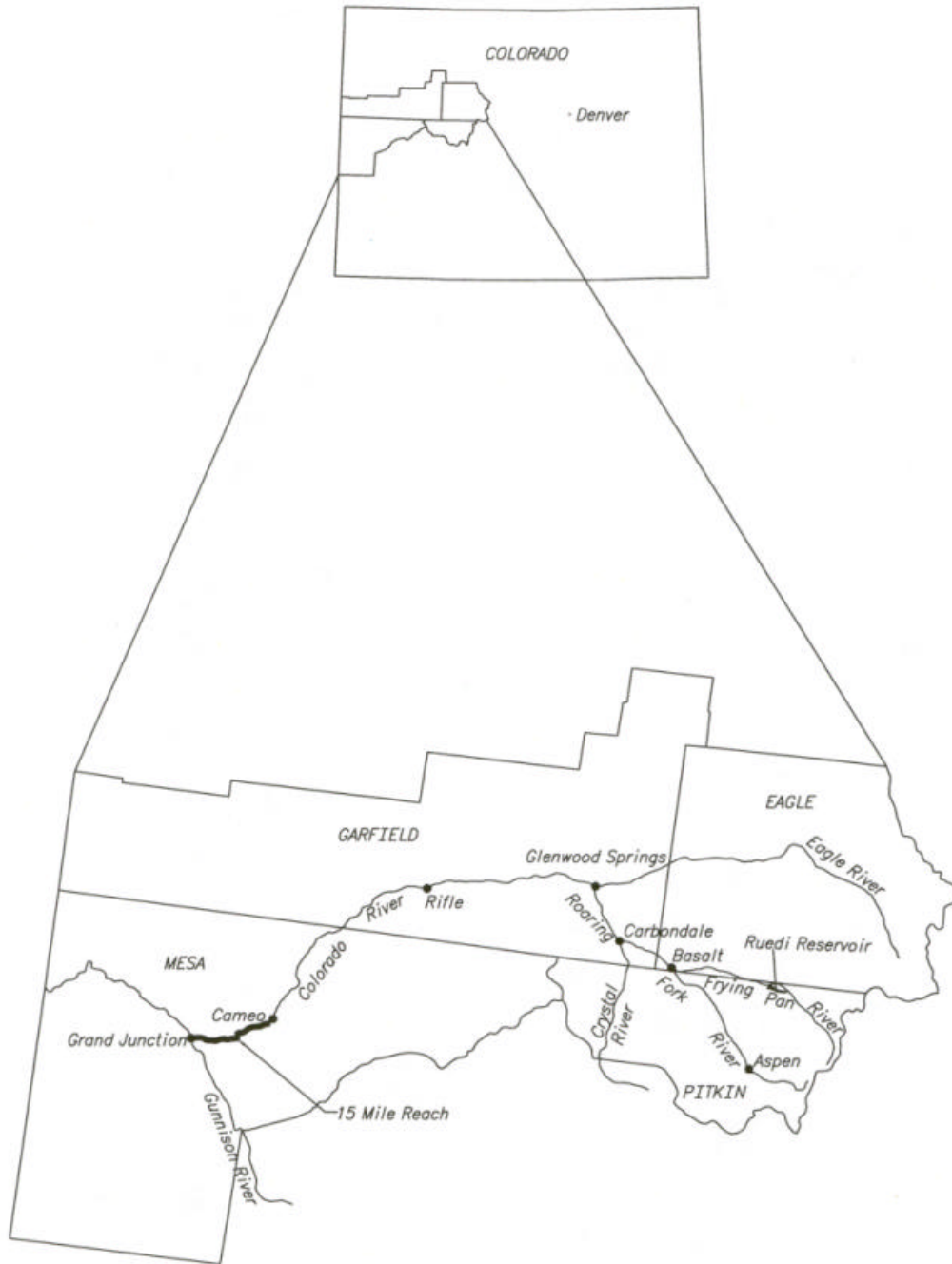
1.1 Background

The Fryingpan-Arkansas Project (Project) is a multi-purpose, trans-basin water diversion and delivery project located in Colorado. The Project diverts water from the Fryingpan River, and other tributaries of the Roaring Fork River, on the western slope of the Rocky Mountains to the Arkansas River basin on the eastern slope.

The Bureau of Reclamation (Reclamation) completed construction of Ruedi Reservoir, the initial feature of the Fryingpan-Arkansas Project, in 1968. A portion of the storage available in Ruedi Reservoir was intended to be used for the benefit of west slope water users; therefore Reclamation initiated a water-marketing program to contract available water for west slope water uses. In 1982, Reclamation concluded the first round (Round I) of Ruedi Reservoir water sales. In response to additional demand in the late 1980's, Reclamation initiated action to provide additional water sales through the Ruedi Reservoir Round II Water Marketing Program (Round II). The U.S. Fish and Wildlife Service (Service), through formal Section 7 consultation with Reclamation, issued an opinion stating Round II would not jeopardize the continued existence of the endangered Colorado pikeminnow, humpback chub, or bonytail chub provided certain conservation measures were implemented. Specifically, Reclamation was to fund additional research and make 5,000 acre-feet (af) of water available annually and 5,000 af available in 4 out of 5 years through reregulation from Ruedi Reservoir to enhance flows in the 15 Mile Reach of the Colorado River (15 Mile Reach). The 15 Mile Reach extends from the confluence of the Gunnison River upstream 15 miles to the Grand Valley Irrigation Company Diversion Dam near Palisade, Colorado (Figure 1.1). This commitment was documented in the Ruedi Reservoir, Colorado, Round II Water Marketing Program Final Supplement to the Environmental Statement (FSES) and Record of Decision (January, 1990).

In 1988, the Secretary of the Interior, Administrator of the Western Area Power Administration, and the Governors of Colorado, Utah, and Wyoming signed a cooperative agreement establishing

Figure 1.1. Location Map.



the Upper Colorado River Endangered Fish Recovery Program (Recovery Program), which remains active today. The goal of the entire Recovery Program is to recover the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub in the Colorado River and its tributaries above Lake Powell.

In October 1991, the razorback sucker was listed as endangered and in April of 1994, critical habitat was listed for all four Colorado River endangered fish. Critical habitat for the Colorado pikeminnow and the razorback sucker includes the Colorado River and major tributaries from Rifle to Lake Powell, however the area most affected by Round II contracting is the portion downstream of Rifle to the confluence with the Gunnison River, which includes the 15 Mile Reach. With the 1991 and 1994 listings, Reclamation reinitiated Section 7 consultation on Round II contracting.

In May of 1995, Reclamation received a jeopardy Biological Opinion (BO) on the marketing of up to 17,000 af of Round II water. The BO contained two reasonable and prudent alternatives (RPAs) for Reclamation to implement prior to proceeding with Round II water contracts. Reclamation was to: (1) continue the 5,000 af annually and 5,000 af in 4 out of 5 years commitments; and, (2) make the remaining uncommitted portion of the marketable yield (estimated at 21,650 acre feet) available through an interim agreement with the Service and Colorado Water Conservation Board (CWCB) for up to 15 years to enhance flows in the 15 Mile Reach. Reclamation was unable to implement one of the RPAs (an interim agreement to which all parties could agree) so in July 1997 Reclamation reinitiated consultation to develop a new RPA.

In the fall of 1997, water users, environmentalists, Reclamation, and the Service began discussing the elements of a Programmatic Biological Opinion (PBO) to address the effects of all historic depletions affecting the 15 Mile Reach, including those from Ruedi Reservoir. Rather than proceed with developing a separate RPA for the Round II program, Reclamation decided to pursue a new RPA through the PBO process. However, development of the PBO took longer than originally anticipated and west slope water users were urging Reclamation to reinitiate Round II contracting to address immediate water sale needs. As a result, in the spring of 1998 Reclamation again reinitiated consultation with the Service to develop a new RPA for the Round II program. In January 1999, Reclamation received and accepted a final amendment to the May 1995 biological opinion on the Round II program, which allowed contracting for up to 6,135 af to meet immediate needs out of a total projected demand of 17,000 af of Ruedi Reservoir water. Reclamation proceeded with this contracting.

In December 1999, agreement was reached and the PBO finalized. The PBO states that, "it is the Service's biological opinion that the proposed action (Reclamation operations) is not likely to jeopardize the continued existence of the Colorado pikeminnow, razorback sucker, bonytail, or humpback chub and is not likely to destroy or adversely modify the designated critical habitat of these species." The PBO addresses the recovery of the four endangered fish in the Colorado River above the confluence with the Gunnison while providing for continued and future water developments in the Colorado River basin above the confluence with the Gunnison River. Reclamation committed to continue to provide 5,000 af per year and 5,000 af in 4 out of 5 years and to seek an agreement to provide up to 21,650 af of Ruedi Reservoir water to the Recovery Program through the year 2012 to improve flows in the 15 Mile Reach. However, the PBO states that when the east and west slope water users dedicate a total of 10,825 af to the Recovery

Program, Reclamation's commitment will be reduced from 21,650 af to 10,825 af of Ruedi Reservoir water. This occurred in 2000. Finally, when a long term (through year 2012) agreement is signed committing Reclamation to make 10,825 af of Ruedi water available to enhance flows in the 15 Mile Reach thru 2012, Reclamation may, per the PBO, contract for the 10,865 af remainder of the 17,000 af (17,000 af minus the 6,135 af to meet immediate needs).

Table 1.1 summarizes key events related to development of the Ruedi Round II Water Marketing Program.

1.2 Purpose and Need

Reclamation has identified a need for contracting up to 17,000 af of Ruedi water for use on the west slope, however critical habitat in the 15 Mile Reach is adversely affected by such upstream water depletions. The Recovery Program through the PBO stipulates that a long term agreement to provide at least 10,825 af of water (for the benefit of endangered fish on the Colorado mainstem through calendar year 2012) from Ruedi must be executed before contracting can continue on the balance of the 17,000 af (10,865 af) available for Round II water contracting. The proposed agreement will meet the requirements of this stipulation in the PBO.

The ability of Colorado River water users to continue development and use of water in the Colorado River basin upstream of the 15 Mile Reach is dependent upon the success of the Recovery Program. The Recovery Program has determined that increased summer flows in the 15 Mile Reach for enhancement of endangered fish habitat and species health are necessary for recovery of the endangered fish. The purpose of the proposed agreement is to supply additional flows to the 15 Mile Reach to enhance habitat and ensure continued progress towards recovery of the endangered fish, which will facilitate the continued development and use of water from the Colorado River basin upstream of the 15 Mile Reach.

1.3 Proposed Action

Reclamation proposes to enter into a Memorandum of Agreement (2012 Agreement) with the CWCB and the Service to make 10,825 af of water available annually for delivery from Ruedi Reservoir to the 15 Mile Reach of the Colorado River through the year 2012.

The agreement would be implemented in accordance with the authorized Project purposes.

Reclamation's forty-year agreement with the CWCB, hereafter the contract, to provide up to 10,000 af of water per year (5,000 af annually and 5,000 af in 4 out of 5 years) from Ruedi Reservoir will remain in full force and effect regardless of the decision made on the proposed action. The 5,000 af annual commitment was removed from the marketable yield of the reservoir and reduced the marketable yield from 51,500 af to the current 46,500 af marketable yield. The 5,000 af in 4 out of 5 years will be available through reregulation of the reservoir.

1.4 Issues and Concerns

The scoping process to identify significant issues and concerns associated with the proposed action began in March 2000 with issuance of a scoping document outlining the proposed action and need for action. Subsequent to this, a public meeting was conducted in May 2000 to field questions and identify additional issues and concerns related to the proposed action. Press

releases were issued in coordination with both the scoping document mailing and the public meeting. Reclamation received a number of responses to these efforts and developed Table 1.2 to summarize the issues and concerns expressed regarding the proposed action, and where they are addressed in this document. Additionally, several meetings have been held with the Colorado River Water Conservation District (CRWCD) and other interested parties to discuss the hydrologic modeling and environmental analysis for the proposed action. Issues and concerns are summarized in Table 1.2. Operational measures that address these concerns are discussed in section 2.1.2.

Table 1.1. Ruedi Reservoir Water-Marketing History

Contracting	Endangered Species Act Consultation
<p>Early 1980's: Reclamation began marketing water from Ruedi Reservoir.</p> <p>May 1982: Round I Contracts (Four 40-year contracts) executed for a total of 7,850 af.</p> <p>Feb 1990: 40-year agreement to provide 5,000 af annually and 5,000 af 4 out of 5 yrs from Ruedi for 15-mile reach.</p> <p>Sep 1991: Initial 1-yr contract for additional 10,000 af for 15-mile reach.</p> <p>Sep 1992: Reclamation began Round II water-marketing program.</p> <p>Aug 1996: Round II contract with Glenwood Springs for 500 af and initial 1-yr contract for 21,650 af for 15 Mile Reach.</p> <p>Oct 1996: Round II contract to Westbank Ranch Homeowners Assoc for 20 af.</p> <p>Jul 1997: Reclamation suspended Round II contracting program.</p> <p>Jul 1999: Reclamation resumed Round II contracting.</p> <p>May 2000: Executed six Round II contracts for 1,713 af. Mailed out 10 proposed Round II contracts for a total of 2,560 af.</p> <p>Mar 2002: 1,551 af remaining out of the 6,135 af of Round II immediate need.</p>	<p>Jun 1984: Reclamation requested consultation on Round II.</p> <p>Jun 1987: Reclamation received opinion from Service: 5,000 af annually and 5,000 af 4 out of 5 yrs from Ruedi to enhance flows in the 15 Mile Reach and fund research.</p> <p>Jan 1990: FSES and Record of Decision for Round II.</p> <p>Oct 1991: Razorback sucker listed as endangered.</p> <p>Apr 1994: Critical habitat for Colorado River endangered fish listed: main stem of Colorado River from Rifle downstream.</p> <p>Feb 1995: Reclamation requested reinitiation of consultation.</p> <p>May 1995: Reclamation received opinion with two RPA's:</p> <ol style="list-style-type: none"> 1. Continue 5,000 and 5,000 af commitment. 2. Make remaining uncommitted yield of the regulatory pool (21,650 acre feet) available for 15 yrs to enhance flows in the 15 Mile Reach. <p>Jul 1997: Reclamation informed Service of inability to implement 1995 BO, requests reinitiation of consultation to develop a new RPA.</p> <p>Summer 1997: CWCB informed Service and Reclamation that CWCB would not approve temporary one-year contract for water from Ruedi to benefit endangered fish until Reclamation resumed Round II contracting.</p> <p>Fall 1997 thru Spring 1998: Development of new RPA was put "on hold" pending issuance of a final PBO.</p> <p>Spring 1998: Development of new RPA was put "back on the table" because a final PBO for 15 Mile Reach was not anticipated prior to August 1998, when water to benefit endangered fish in the 15 Mile Reach would be needed.</p> <p>Jan 1999: Reclamation received amendment to the May 1995 BO for Round II w/ revised RPA's:</p> <ol style="list-style-type: none"> 1. Continue 5,000 af/yr and 5,000 4 out of 5 yrs 2. Provide up to 21,650 af of Ruedi Reservoir water to Recovery Program through 2012 to improve flows in 15 Mile Reach. 3. When the PBO is finalized and water users dedicate 10,825 af to the Recovery Program, reduce 21,650 af commitment from Ruedi Reservoir to 10,825 af. 4. Contract for 6,135 af of immediate need Round II water sales upon Reclamation's acceptance of the BO. 5. When the PBO is finalized and a long-term agreement signed, contract for balance of 17,000 af of Round II water. <p>Dec 1999: PBO finalized and issued to Reclamation.</p> <p>Jan 2000: Reclamation accepts PBO:</p> <ol style="list-style-type: none"> 1. PBO takes precedence over Jan. 1999 BO. 2. Continue 5,000 and 5,000 in 4 out of 5 yr commitment 3. Upon Reclamation's acceptance of the BO, Round II water may total up to 6,135 af. 4. Upon signature of an agreement to deliver 21,650 or 10,825 af to 15 mile reach; Reclamation may contract for remainder of 17,000 af.

Table 1.2. Issue Summary and Disposition.

ISSUE/CONCERN	DISPOSITION
<p>1. a) Flows from Ruedi Reservoir releases made under the proposed agreement will destroy fisheries in the Fryingpan River.</p> <p>b) Flows from Ruedi Reservoir releases made under the proposed agreement will negatively impact brown trout redds and the natural reproduction of the species.</p> <p>c) Flows from Ruedi Reservoir releases made under the proposed agreement may cause low flow releases from the reservoir during the winter, negatively affecting wintering habitat for fish.</p>	<p>a) Discussed in Environmental Consequences Section 4.2.2; addressed in Section 2.1.2.</p> <p>b) Discussed in Environmental Consequences Section 4.2.2; addressed in Section 2.1.2.</p> <p>c) Discussed in Environmental Consequences Section 4.2.2; addressed in Section 2.1.2.</p>
<p>2. Flows from Ruedi Reservoir releases made under the proposed agreement will negatively impact economies of the Fryingpan and Roaring Fork valleys.</p>	<p>Discussed and addressed in Environmental Consequences Section 4.2.4.</p>
<p>3. a) Flows greater than 250 cfs from Ruedi Reservoir releases made under the proposed agreement negatively impact recreation in the Fryingpan and Roaring Fork valleys.</p> <p>b) Flows from Ruedi Reservoir releases made under the proposed agreement may reduce water levels and negatively impact recreation at the reservoir.</p>	<p>a) Discussed in Environmental Consequences Section 4.2.1 and 4.2.3; addressed in Section 2.1.2.</p> <p>b) Discussed in Environmental Consequences Section 4.2.1 and 4.2.3.</p>
<p>4. Flows from Ruedi Reservoir releases made under the proposed agreement will cause physical damage to the stream banks of the Fryingpan River.</p>	<p>Discussed in Environmental Consequences Section 4.2.1; addressed in Section 2.1.2.</p>
<p>5. Fluctuating flows from Ruedi Reservoir releases made under the proposed agreement will negatively impact macro invertebrate production.</p>	<p>Discussed in Environmental Consequences Section 4.2.2; addressed in Section 2.1.2.</p>
<p>6. Concern exists that the west slope water users' commitment to provide 5,412.5 af/year from Wolford Mountain Reservoir may not be achievable some years due to extraordinary operation and maintenance circumstances, yet there may be unused contracted water available in Ruedi Reservoir. Shortages such as this can occur due to events beyond human control and may be as frequent as 1 out of every 10 years.</p>	<p>Developed Alternative B in response to this issue.</p>
<p>7. Interest has been expressed in using 10,825 af of Ruedi Reservoir's uncommitted yield to enhance 15 Mile Reach flows and/or fulfill water users' obligations. (This request to make 10,825 af of the uncommitted yield available would be in addition to the 10,825 af made available through the proposed long-term agreement.)</p>	<p>Developed Alternative C in response to this issue.</p>
<p>8. The Proposed Action will negatively affect the hydropower plant at Ruedi Reservoir.</p>	<p>Discussed in Environmental Consequences Section 4.2.5.</p>

CHAPTER 2 – ALTERNATIVES

2.1 Alternative Descriptions

2.1.1 Assumptions Common to All Alternatives

First, the contract with the CWCB to provide 5,000 af annually and 5,000 af in 4 out of 5 years for the 15 Mile Reach will remain in full force and effect under each of the alternatives.

Second, none of the alternatives considered in detail contain measures that involve the Fryingpan-Arkansas Project yield, and none of these alternatives would impact the Fryingpan-Arkansas Project yield (i.e. water available for east slope diversions).

Third, the Colorado River Water Conservation District's (CRWCD) Wolford Mountain Reservoir currently contributes up to 11,412 af to the 15 Mile Reach, which is composed of the west slope water users' 5,412 af as identified in the PBO and up to 6,000 af through a previous commitment that is continued in the PBO. The west slope water users' 5,412 af commitment does have shortage provisions, however, for the purposes of this analysis, if it is part of an alternative it was considered to be wholly available. The alternative descriptions following this section indicate whether the 5,412 af is included in a particular alternative.

Fourth, 6,000 af of space in Wolford was made available to the Fish and Wildlife Service as part of the environmental permitting for the construction of that reservoir. The space fills using a portion of total inflow to the reservoir pro-rated amongst all the pools in the reservoir and the volume in those pools. The formulas for the fill proportions are set out in the reservoir's permit. Thus, depending upon inflow and the amounts in the other pools, the 6,000 af of space may or may not fill and be available to the Recovery Program in any one year. In the modeling for the 2012 Agreement, CRWCD provided Reclamation with an estimate of how much of the 6,000 af

would be available in each year modeled. The estimated amounts available are presented in Attachment A.

Fifth, east slope users have committed to releasing 5,412 af for 10 years to the 15 Mile Reach from William's Fork Reservoir to meet their obligation under the PBO. Similar to the west slope commitment, if an alternative includes the 5,412 east slope commitment, it is considered to be wholly available.

Last, Green Mountain Reservoir is currently committed to releasing surplus Historic User Pool (HUP) water up to the amounts available and necessary to assist in meeting the target flows in the 15 Mile Reach. The surplus HUP water is released pursuant to conditions set forth in the settlement of the Orchard Mesa Check Case (Div. 5 case no. 91CW247). On average approximately 20,000 af of surplus HUP water may be released annually benefiting Grand Valley water users and the 15 Mile Reach. Improvements to the Government Highline Canal in the Grand Valley are anticipated to result in an additional 10,000 af of surplus water at Green Mountain Reservoir. These improvements may be completed as early as late summer of 2003, and would result in a total of 30,000 af being available to benefit the 15 Mile Reach. Because these improvements are anticipated to be completed so early in the tenure of the 2012 Agreement, the 30,000 af quantity is used in this analysis to represent Green Mountain Reservoir's contribution to the 15 Mile Reach. Since the amount of surplus is variable dependant upon the hydrology of the year modeled, a percent availability dependant upon the type of runoff year was applied to the 30,000 af of surplus water. The percentages are presented in Attachment A.

Figure 2.1 shows the percent of endangered fish releases that each source, Ruedi, Green Mountain, Wolford Mountain, and Williams Fork Reservoirs, will be contributing under the various alternatives. The No Action Alternative distribution of releases reflects the anticipated effects of not entering into the 2012 agreement, described in detail in Section 4.1.

2.1.2 Operational Measures to be Included in all Alternatives

The following operational measures will be implemented as part of each alternative. They are not intended to mitigate adverse effects of the Proposed Action, but are being implemented to improve operations of Ruedi Reservoir, to maintain consistency with multiple Project purposes including enhancement of the Fryingpan River fishery, and to increase the usability of the river for recreational opportunities.

1. Reclamation will continue to attempt to make release adjustments of no more than 50 cfs increments when feasible and consistent with multiple Project purposes. This measure strives to minimize potential impacts of rapidly changing flows on aquatic biota, rescue activities, recreation interests, and stream bank stability, while providing Reclamation the operational flexibility to comply with Colorado water law.
2. Reclamation will evaluate the final results of the Roaring Fork Conservancy (RFC) fishery study being conducted by Miller Ecological Consultants, Inc. Reclamation will coordinate with the Colorado Division of Wildlife (CDOW) to assess recommendations in the study and work toward implementing those appropriate measures and monitoring techniques that are feasible and consistent with the multiple Project purposes.

3. In an effort to address concerns of decreased wadeability of the Fryingpan River when flows exceed 250 cfs, efforts will be made to limit cumulative flows to 250 cfs or less when consistent with the multiple Project purposes and reasonable to do so; so long as future fishery research does not indicate that flows in excess of 250 cfs are important for Fryingpan or Roaring Fork River fishery maintenance or enhancement.

2.1.3 No Action Alternative

Reclamation would not enter into an agreement to make 10,825 af of water available for endangered species habitat enhancement within the 15 Mile Reach through 2012, as presented in the PBO. If Reclamation does not enter into the proposed agreement and reverts to providing 21,650 af of Ruedi water to enhance flows in the 15 Mile Reach, it is unlikely that the east and west slope water users would continue to provide their 10,825 af. In summary, the No Action alternative would include the following contributions from Ruedi Reservoir:

- 5,000 af annually and 5,000 af 4 out of 5 years
- 21,650 af annually of Ruedi water to enhance flows in the 15 Mile Reach

2.1.4 Alternative A

Reclamation would enter into a Memorandum of Agreement (2012 Agreement) with the CWCB and the Service to make 10,825 af of water available annually for release from Ruedi Reservoir to be delivered to the 15 Mile Reach of the Colorado River through the year 2012. The water would be available to help meet flow targets in the 15 Mile Reach any time of year, but is expected to be used in the summer and fall, primarily during the period of July to October.

The anticipated effects of this alternative are based on the assumption that all of the water is delivered from July to October. The Proposed Action alternative would include the following contributions from Ruedi Reservoir:

- 5,000 af annually and 5,000 af in 4 out of 5 years
- The 2012 Agreement for 10,825 af annually as described above

2.1.5 Alternative B

This alternative responds to west slope water users' concerns regarding potential inability to meet their commitment to provide 5,412 af of water to the 15 Mile Reach, due to extraordinary circumstances.

Alternative B would provide for the 2012 Agreement described in the Proposed Action and allow the west slope water users' interim commitment of 5,412 af, to be supplied from unused contracted water or available uncontracted water within the marketable yield of Ruedi Reservoir. The water would be made available through a one-year temporary water service contract. This need is estimated to arise 1 out of every 10 years, or 10% of the time. In summary, Alternative B would include the following contributions from Ruedi Reservoir:

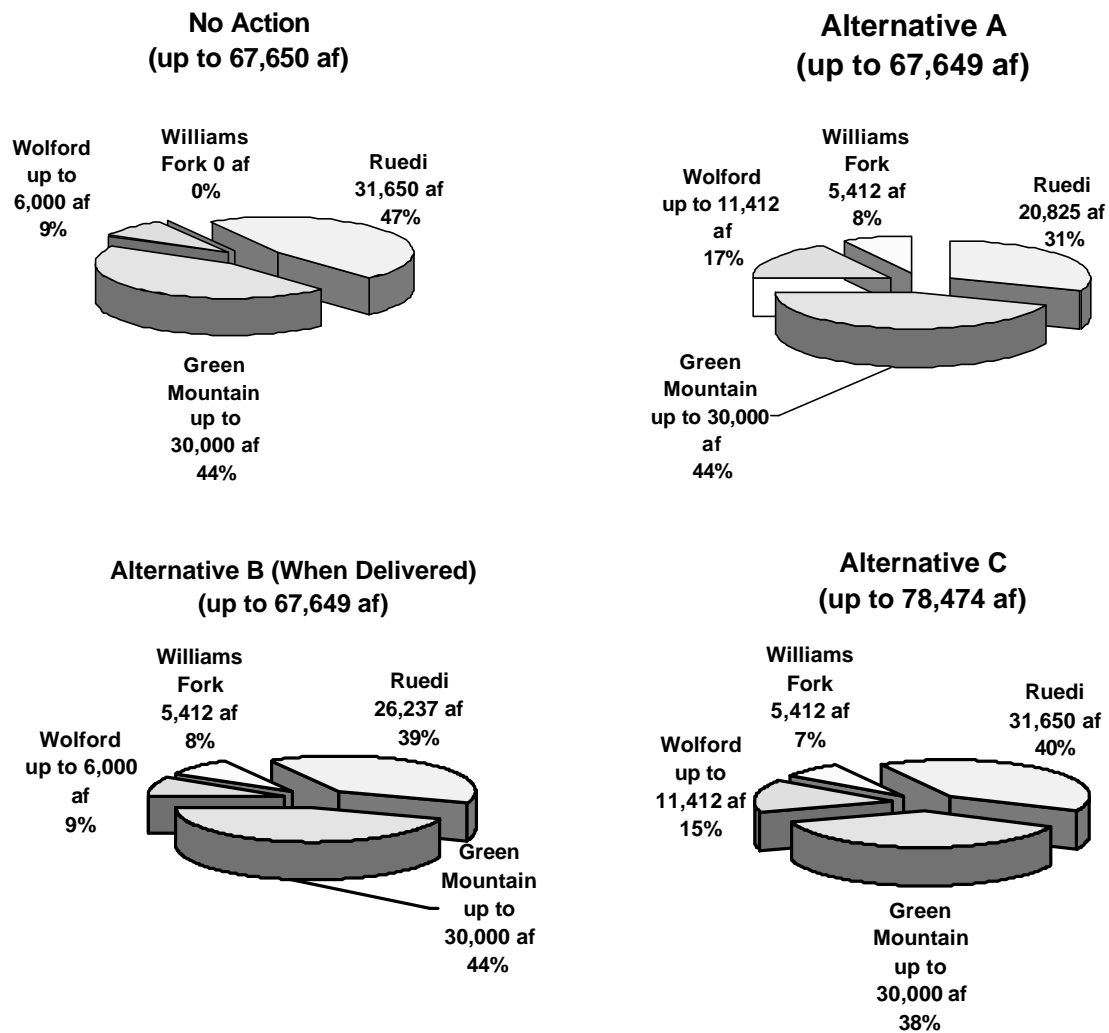
- 5,000 af annually and 5,000 af in 4 out of 5 years
- The 2012 Agreement for 10,825 af annually as described in the Proposed Action
- 5,412 af available to meet the west slope water users' commitment an average of 1 out of 10 years (10% of the time)

2.1.6 Alternative C

This alternative responds to interests that an additional 10,825 af out of the uncommitted yield of Ruedi Reservoir be made available to meet demands for endangered fish habitat enhancement within the 15 Mile Reach. Alternative C consists of the following contributions from Ruedi Reservoir:

- 5,000 af annually and 5,000 af in 4 out of 5 years
- The 2012 Agreement for 10,825 af annually as described in the Proposed Action
- An additional 10,825 af of uncommitted water available annually for the 15 Mile Reach

Figure 2.1. Percent of Endangered Fish Releases Provided From Each Source by Alternative.



2.2 Alternatives Considered But Dropped from Further Consideration

2.2.1 Continuation Of Only The 5,000 af Annually and 5,000 af in 4 Out Of 5 Years Contract With No Additional Releases From Ruedi Reservoir For Endangered Fish

On several occasions during this process, requests were made to consider an alternative that included only releases for Round I contracts (7,850 af), Round II contracts already executed (4,469 af), and the existing contract to make 5,000 af annually and 5,000 af in 4 out of 5 years of Ruedi water available to the 15 Mile Reach as the No Action Alternative. However, this alternative does not consider stipulations in both the PBO and BO, which must be implemented should the 2012 Agreement not be executed, such as PBO re-initiation criteria and interim water releases required in the BO. Furthermore, such an alternative does not reflect actions that will be triggered if the 2012 agreement is not executed, which may also affect the quantity of releases made from Ruedi Reservoir (see Section 4.1 for a further description of effects). For this reason, it is not accurate or appropriate to use this alternative as the No Action Alternative.

However, because such strong interest was displayed in seeing such an alternative presented in this document, limited information is being provided in this section to describe this scenario. Hydrologic model runs were performed using the releases associated with such a scenario. Parameters identical to those used for modeling the alternatives were used (see Attachment A) including the 5,412 af commitment from each of Wolford and Williams Fork reservoirs. The results of the model runs for this scenario are displayed in Figures 2.2, 2.3 and 2.4. So that modeling runs would more closely reflect likely operations, a 350 cfs modeling constraint was placed on flows in the Fryingpan River downstream of Rocky Fork Creek. The 350 cfs is not an actual limit or target. It is merely a constraint incorporated into the model to try and reflect the actual human decision making process used to determine Ruedi releases. It is hereafter referred to as the “Fryingpan River modeling constraint”.

2.2.2 Release Restriction Alternative

Under a program administered by the Federal Energy Regulatory Commission (FERC), the City of Aspen was granted a license to build a hydropower plant at the base of Ruedi Reservoir. Aspen’s power plant utilizes the head generated by and the flows released by Ruedi Reservoir for the reservoir’s authorized purposes to generate power for the City. Ruedi Water and Power Authority (RWPA) and the City of Aspen (Aspen) have expressed concern regarding releases of more than 250 cfs from Ruedi Reservoir. The plant has a maximum flow capacity of approximately 300 cfs, but is functionally limited to around 250 cfs; flows greater than this must bypass the plant’s turbines. RWPA and Aspen feel that flows in excess of 250 cfs are a lost opportunity for power generation and revenue, and potentially cause less water to be available in the winter for power generation.

The FERC program under which the plant was built allows private entities to build power plants on federal facilities without having to incur the costs of reservoir development including design, construction, water rights acquisition and environmental compliance. Generally, private entities may build a power plant on a federal facility with the understanding that they are allowed to benefit from the releases made by the federal facility to serve that facility’s authorized purposes but that the federal facility’s operation will not be changed in response to the private entity’s benefit. The Memorandum of Agreement between Reclamation and the City of Aspen for operation of the power plant states that Reclamation has “sole discretion” over release rates from

Ruedi, and that Aspen may benefit from these releases. Using the potential impacts on a private facility to determine Ruedi's operation and imposing a release constraint of 250 cfs would not be consistent with the nature of the FERC program. While the releases under the alternatives analyzed here may have an impact to power production at the Aspen power plant, all of these releases are considered to be beneficial to the Aspen plant under its FERC licensed program.

Another release concern involves the loss of fisherman wading access when releases are made for endangered fish. Specifically, comments indicate that flows greater than or equal to 250 cfs reduce fishing access along the Fryingpan River below Ruedi Dam.

Reclamation considered developing an alternative that limited releases from Ruedi Reservoir to less than 250 cfs. However, it is important to recognize that, at any given time, releases from Ruedi Reservoir are composed of a variety of release quantities for operational and contractual purposes. These purposes alone may cause Fryingpan River flows to exceed 250 cfs. Thus, development of an alternative that limits endangered fish releases to 250 cfs would not necessarily keep flows in the Fryingpan River below 250 cfs. Therefore, for an alternative to be effective in addressing this concern, it must limit the total quantity of releases from Ruedi Reservoir to less than 250 cfs. If a cumulative limit of 250 cfs were imposed on releases from Ruedi, it would be necessary to develop a method to curtail endangered fish, operational and contractual releases once flows reach 250 cfs. Curtailing releases would unduly constrain reservoir operations and compromise Reclamation's ability to meet authorized Project purposes and Reclamation's obligations in the PBO.

Development of such an alternative does not meet the purpose and need for the proposed action: to enhance endangered fish habitat, ensure continued progress towards recovery of the endangered fish, and thereby protect continued water development in the Colorado River Basin upstream of the 15 Mile Reach. Alternatives which do not meet the purpose and need are outside the scope of analysis and not appropriate for alternative development. Consequently, the above-described alternative was dropped from further consideration.

Figure 2.2. Simulated Ruedi Reservoir Content with No Additional Releases from Ruedi Reservoir For Endangered Fish For Representative Dry, Moderate, and Wet Years. Modeling Includes Existing 1,500 af of Water Contract Demand, 5,000+5,000 af of Endangered Fish Contract, the Fryingpan River Modeling Constraint, and Available Water from Sources other than Ruedi.

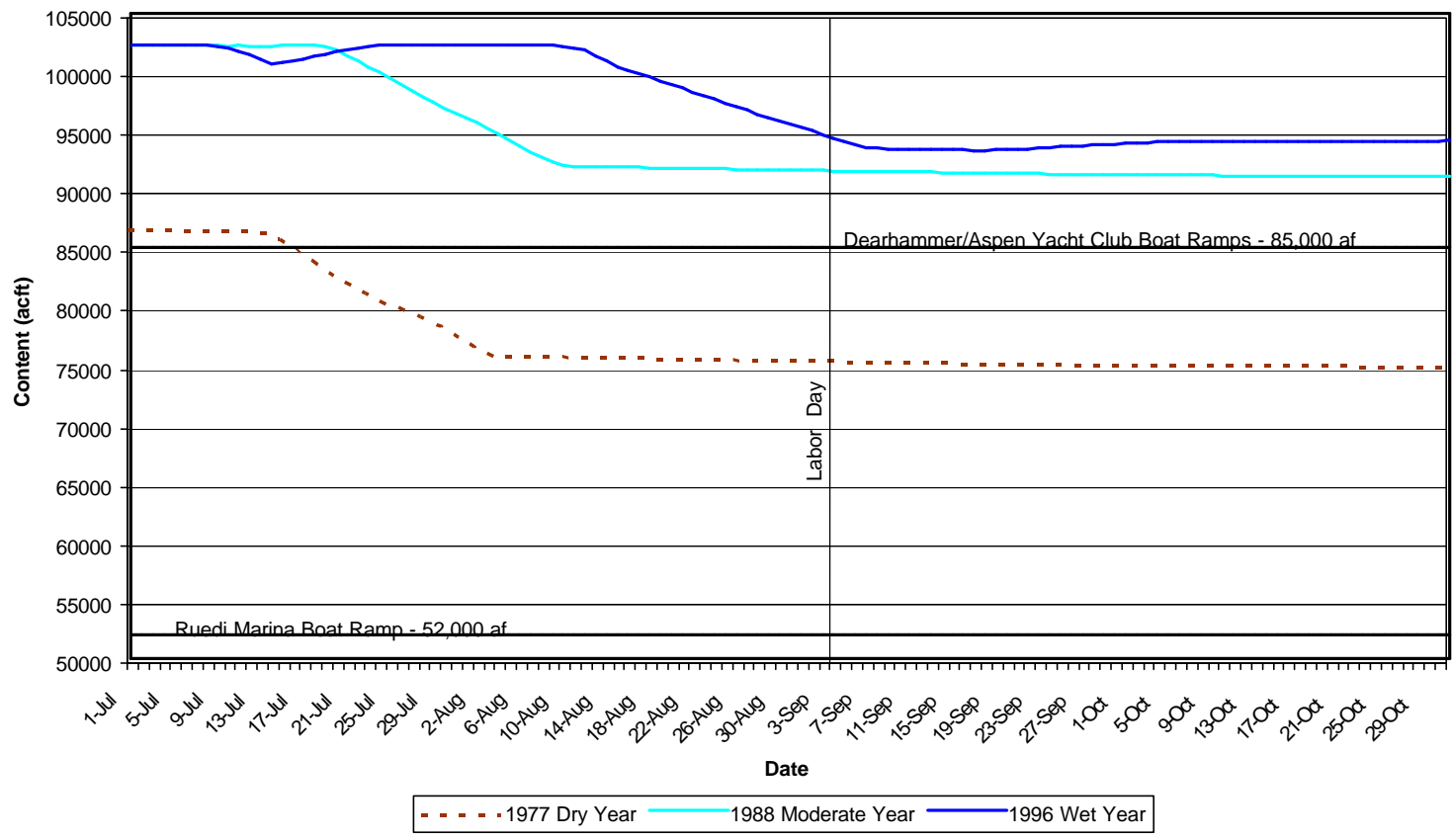


Figure 2.3. Simulated Fryingpan River Flows with No Additional Releases from Ruedi Reservoir For Endangered Fish For Representative Dry, Moderate, and Wet Years. Modeling Includes Existing 1,500 af of Water Contract Demand, 5,000+5,000 af of Endangered Fish Contract, the Fryingpan River Modeling Constraint, and Available Water from Sources other than Ruedi.

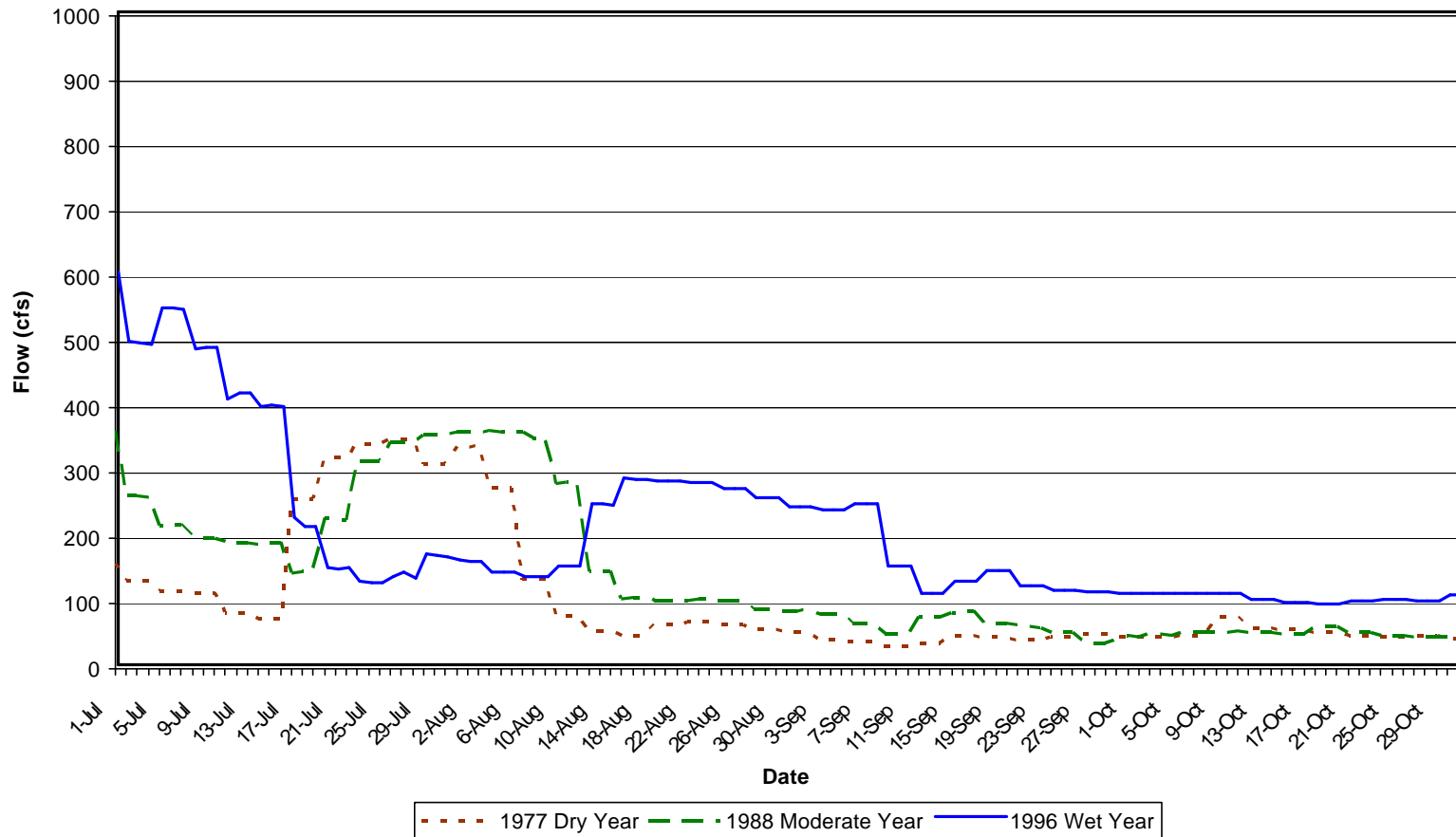
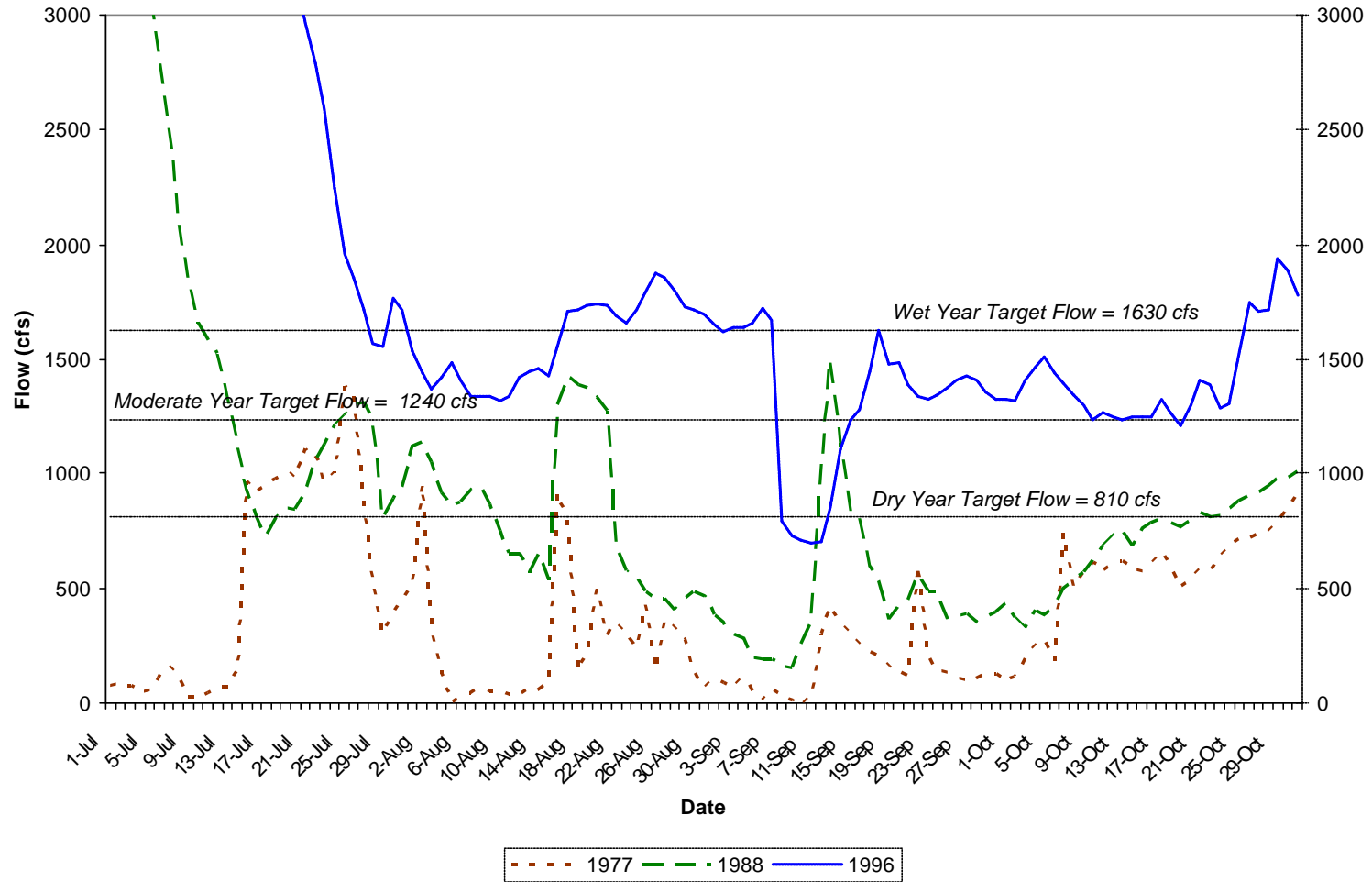


Figure 2.4. Simulated 15 Mile Reach Flows with No Additional Releases from Ruedi Reservoir For Endangered Fish For Representative Dry, Moderate, and Wet Years. Modeling Includes Existing 1,500 af of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, the Fryingpan River Modeling Constraint and Available Water from Sources other than Ruedi.



CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 Hydrology

The primary source of streamflow in the Upper Colorado River basin above the confluence with the Gunnison River is the spring melting of accumulated winter snowpack. The annual hydrograph of rivers in the study area shows the highest streamflows occurring during the late spring and early summer months. Streamflow is at its lowest during the winter months.

Streamflows in the Fryingpan River are stored in Ruedi Reservoir during the peak runoff period, and then released later in the year for use in downstream reaches of the Fryingpan, Roaring Fork and Colorado Rivers.

Ruedi Dam and Reservoir is a major structural feature of the Fryingpan-Arkansas Project (Project). The reservoir has an active conservation capacity of 102,373 af at an elevation of 7,766.0 feet. Ruedi Reservoir's replacement capacity provides for replacement of water diverted out of priority from the west slope to the east slope by the Project. Ruedi's regulatory capacity provides for other uses on the west slope. Table 3.1 displays these pools and the volumes associated with each.

The replacement capacity and the regulatory capacity deserve additional description. The Operating Principles for Ruedi Reservoir describe the replacement capacity as that needed to replace water diverted out of priority to the Arkansas Basin by the Fryingpan-Arkansas Project. The original replacement reservoir, which was not constructed, would have had a capacity of 28,000 af. The final construction of Ruedi Reservoir also provided a regulatory capacity that would serve west slope users. The marketable yield pool represents the portion of the regulatory capacity of Ruedi Reservoir, which was established for water marketing purposes. For the purpose of analyzing marketable yield for west slope users, the replacement pool of Ruedi Reservoir was assumed to be 28,000 af.

“The Roaring Fork River below the Fryingpan confluence is a boulder- and cobble-bed channel, which is well incised into the alluvial valley deposits along most of its length. The channel has adequate capacity for the mean annual flood except in some low-lying flood plain areas. The streamflows in the Roaring Fork River are typical of the natural runoff cycle of high mountain watersheds.”

The Fryingpan Arkansas Project Operating Principles establish the minimum releases from the reservoir for the protection of recreational values, including fishing, in the following manner: During the period from November 1 to April 30, the minimum release from the reservoir is the lesser of inflow or that which would produce 39 cfs in the Fryingpan River immediately below the confluence with Rocky Fork. During the period from May 1 to October 31, the minimum release from the reservoir is the lesser of inflow or that which would produce 110 cfs in the Fryingpan River immediately below the confluence with Rocky Fork. These minimums would only be seen in a very dry year when the reservoir is being operated for filling or retention of water without making releases for other purposes.

The CWCB also has established minimum instream flows for the Fryingpan and Roaring Fork. For the Fryingpan, the CWCB minimum instream flows are 39 cfs from November 1 to April 30 and 110 cfs from May to October 31. The CWCB’s instream flows for the Fryingpan and Roaring Fork are junior in priority to the minimum release requirements established for Ruedi.

Table 3.2. CWCB’s Established Minimum Instream Flows for the Fryingpan and Roaring Fork Rivers.

River	Season	Minimum Instream Flow
Fryingpan – Rocky Fork Creek to Roaring Fork River	5/1-10/31	110.0 cfs
	11/1-4/30	39.0 cfs
Roaring Fork – Fryingpan to Crystal River	4/1-9/30	145.0 cfs
	10/1-3/31	75.0 cfs
Roaring Fork – Crystal to Colorado River	N/A	No Minimum Instream Flows Established

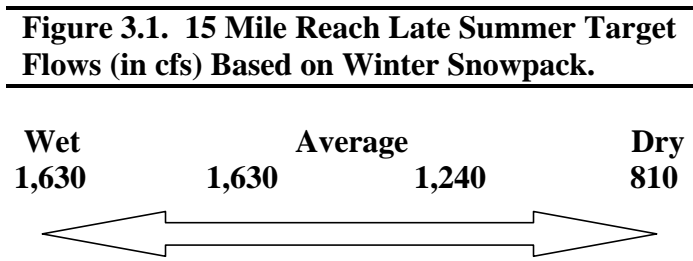
3.1.1 15 Mile Reach Augmentation Water

The Recovery Program has established target flows for the 15 Mile Reach, which their research indicates are necessary for recovery of the endangered fish. A range of target flows for each major season was established to allow the Recovery Program to be responsive to variations in annual runoff based on snowpack conditions. Consequently, each spring, Recovery Program personnel review winter snowpack data to characterize the type of runoff year and determine which 15 Mile Reach target flow is appropriate for the upcoming spring and summer of that year. The characterization may change during the year in response to changing hydrologic conditions.

A program known as Coordinated Reservoir Operations (CRO) addresses spring peak flow targets by attempting to augment the peak flows through voluntarily releasing inflows to participating reservoirs during a seven to ten day period around the peak. Coordinated Reservoir Operations is a separate program from the 15 Mile Reach summer augmentation addressed by the Ruedi 2012 Agreement analyzed here. The premises of CRO include that participation is voluntary and that the operations do not affect the timing or ultimate attainment of fill by any

participating reservoir. Because of this, Ruedi Reservoir’s participation in CRO in any year will not affect filling Ruedi or provision of water through any of the alternatives analyzed here.

After runoff season is complete, and reservoirs have attained whatever fill they can for a particular year, the focus of operations shifts to summer demands and the late summer target flows for the 15 Mile Reach. Figure 3.1 illustrates the target flows used for late summer augmentation.

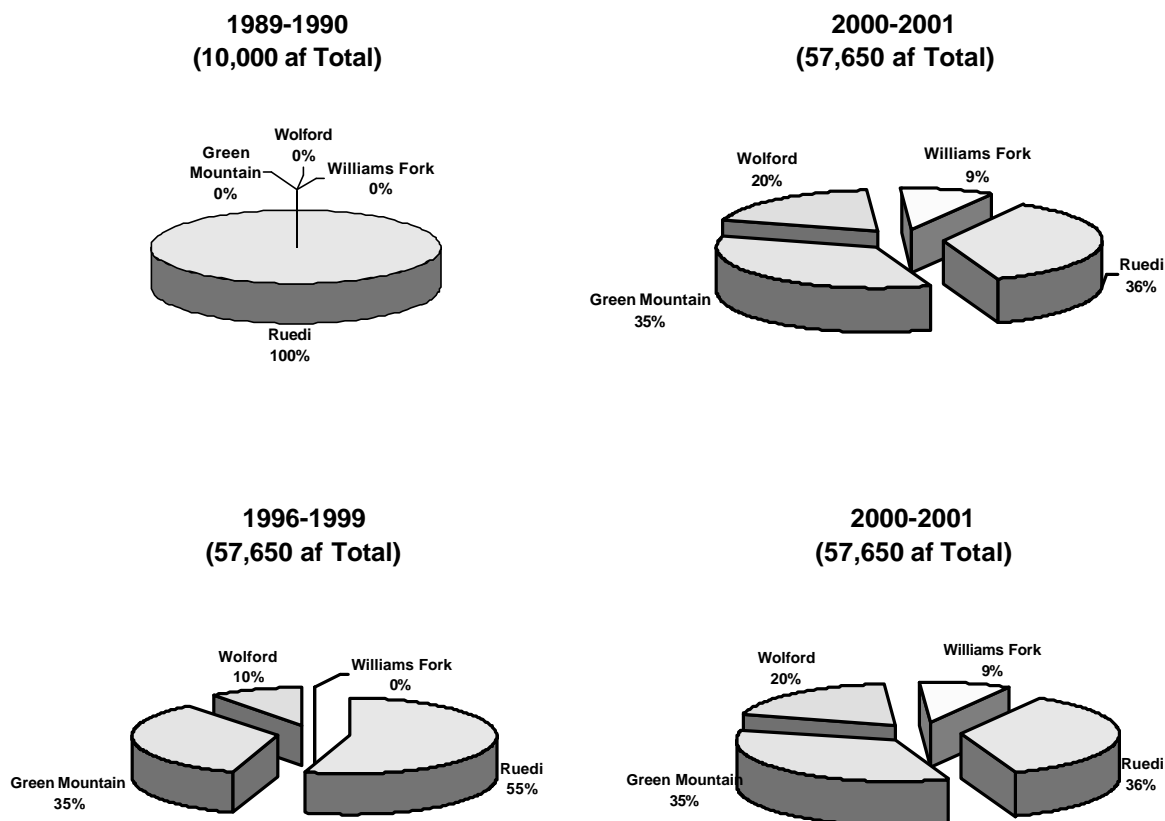


The Recovery Program relies on multiple water sources to supplement flows within the 15 Mile Reach, including Ruedi, Green Mountain, Wolford Mountain, and Williams Fork Reservoirs. The quantity from each of these sources has changed significantly over time. Historic quantities of water and sources of water available for endangered fish releases are reflected in Figure 3.2.

Water in Green Mountain Reservoir that may be available to augment flows in the 15 Mile Reach would be from the Historic Users Pool (HUP) in accordance with conditions established in the settlement of the Orchard Mesa Check Case (91CW247). The HUP consists of up to 66,000 acre-feet of water in Green Mountain Reservoir available to provide for the needs of users with irrigation or domestic water rights in western Colorado, perfected by use prior to October 15, 1977, whose water rights would otherwise be curtailed by administration of the Colorado River. In some years these users do not require the entire 66,000 acre-feet of water. In those years, the portion of the HUP which is not needed to meet HUP beneficiary needs is made available, through several different agreements, to assist in meeting late summer target flows in the 15 Mile Reach. On average, it is estimated that about 20,000 acre-feet may be made available annually. It is expected that up to an additional 10,000 acre-feet may be made available on an average annual basis when the Grand Valley Water Management Program is fully implemented.

A team including west and east slope water users, the CWCB, the State Division Engineer, the Service, and Reclamation, hold conference calls weekly and have frequent communication between conference calls to discuss flow needs of HUP beneficiaries and how to assist with the 15 Mile Reach targets. This group considers how best to manage releases from all sources in order to meet their representative interests and the interests of the Recovery Program. In the case of releases from Ruedi, the Service, in conjunction with the CWCB, requests flow releases from Ruedi for endangered fish releases. Reclamation is responsible for ordering releases from Ruedi for operational and contractual needs, including the Service’s release requests.

Figure 3.2. Historic Quantity and Percentage of Water Made Available for Endangered Fish Releases, 1989-2001.



3.1.2 Water Contracts

Ruedi Reservoir is an important source of municipal and industrial water for Colorado River basin water users upstream of Grand Junction, Colorado (See Table 3.3). In Colorado, water users with senior water rights are first in priority to divert water, whether from wells or surface water diversions. The quantity of water established by decree for each diversion is tracked and attributed to specific drainages. Water rights within the same drainage, which are junior to more senior water rights, are legally obligated to curtail their water use when their use of water would impede the senior water right holder from utilizing water due to them. To avoid having to curtail water use, junior water right holders may acquire augmentation water, which is released to insure senior water right holders are not “injured”. Junior water right holders may enter into contracts with Reclamation to obtain augmentation water from Ruedi Reservoir to provide the protection described above. These contracts comprise most of Reclamation’s long-term water marketing sales conducted in Ruedi Round I and Round II contracting. Releases from Ruedi Reservoir to meet contract demands may occur at any time of the year, but are primarily associated with dry seasons and seasons of peak water demand, mainly July through October.

Table 3.3. Current Ruedi Reservoir Round I and Round II Water Contracts.

<u>Contractor</u>	<u>Type of Use</u>	<u>Acre-Feet</u>
Round I Contracts		
Basalt Water Conservancy District	Municipal	500
Battlement Mesa, Inc.	Municipal	1,250
Exxon Mobil Corporation	Industrial	6,000
West Divide Water Conservancy District	Municipal	100
Subtotal of Round I Contracts		7,850
Round II Contracts		
Bailey, Thomas	Municipal & Industrial	35
Basalt Water Conservancy District	Municipal & Industrial	490
Town of Basalt	Municipal & Industrial	200
Town of Basalt	Municipal & Industrial	300
Town of Carbondale	Municipal	250
Colorado River Water Projects Enterprise	Municipal & Industrial	700
Colorado River Water Projects Enterprise	Municipal & Industrial	500
Town of DeBeque	Municipal	100
City of Glenwood Springs	Municipal	500
LPG-ONI Partnership	Municipal	21
Mid-Valley Metropolitan District	Municipal & Industrial	300
Town of New Castle	Municipal	400
Town of Parachute	Municipal	75
City of Rifle	Municipal	350
Ruedi Water and Power Authority	Municipal	185
Starwood Water District	Municipal & Industrial	43
Vaughan, Ted and Hilda	Municipal & Industrial	15
Westbank Ranch Homeowners	Municipal	20
Wildcat Ranch Association	Municipal & Industrial	100
Subtotal of Round II Contracts		4,584
Total of Round I and Round II Contracts		12,434

3.2 Aquatic Wildlife

3.2.1 Sport Fisheries

The Fryingpan River between Ruedi Dam and the confluence with the Roaring Fork River is considered a Gold Medal Water. Brown and rainbow trout are distributed throughout this portion of the river, along with smaller populations of brook and Colorado River cutthroat trout.

Brown trout populations have dominated this segment of the Fryingpan for several years, increasing in numbers dramatically throughout the late 1980's and remaining fairly steady with a

slight increase through the 1990's (Nehring, 2000). At one time, the river hosted significantly higher populations of rainbow and brook trout than are found in the river now. No studies have been done to prove or disprove the hypothesis, but indications are that brown trout predation on the young of other trout species is partially the cause for the population drops of other trout species (Nehring, 2000). Other factors such as undesirable river temperatures during the spring rainbow trout egg incubation also may have an impact on this species. Rainbow trout populations appeared to be rising through the 1970's, but then dropped in the early 1980's. A stocking program began in 1982 and their numbers increased until they hit record highs in the late 1980's, but dropped off significantly again in the early 1990's and have remained relatively steady since that time (Nehring, 2000). Rainbow trout stocking slowed in the late 1980's and early 1990's, and only occurred once (in 1998) since 1992. Even without stocking, the Fryingpan River supports some of the highest fish populations and highest number of large fish per unit area in Colorado. (Figure 3.3 and 3.3a) Brown trout populations have been fairly constant at about 1,500 fish/ha since 1992 and rainbow trout populations averaged about 300 fish/ha from 1992 to 1996 (Strange, 1998).

The onset of a viable population of opossum shrimp (*Mysis relicta*) in Ruedi Reservoir in the mid-1980's, which subsequently began flushing through the outlet tubes of Ruedi Reservoir, has enhanced both the biomass and numbers of both brown and rainbow trout, especially for the first few miles just below Ruedi Dam (Nehring, 1991 & Nehring, 2000). The larger fish that result from this diet are probably particularly predatory on the young of other trout species, especially when flows decrease and less opossum shrimp are available (Nehring, 2000). The releases of opossum shrimp have clearly altered the diet of brown and rainbow trout in the reach immediately below the dam (Nehring, 1991). Figures 3.3 and 3.3a illustrate the trend in brown and rainbow trout populations in that reach of the Fryingpan River immediately downstream of Ruedi Dam. Estimates for the total number of brown and rainbow trout greater than 35 cm per hectare show similar trends.

Whirling disease has been detected in the Fryingpan River since 1995, however effects have only recently been observed and only in rainbow trout populations. The disease is most prevalent in the lower reaches of the river, where sources for the disease have been identified in private ponds that spill into the Fryingpan (Nehring, 2000).

Figure 3.3: Total Number per Hectare Brown and Rainbow Trout Greater than 35 cm in Fryingpan River Immediately Downstream Ruedi Dam (Colorado Division of Wildlife, 2001)

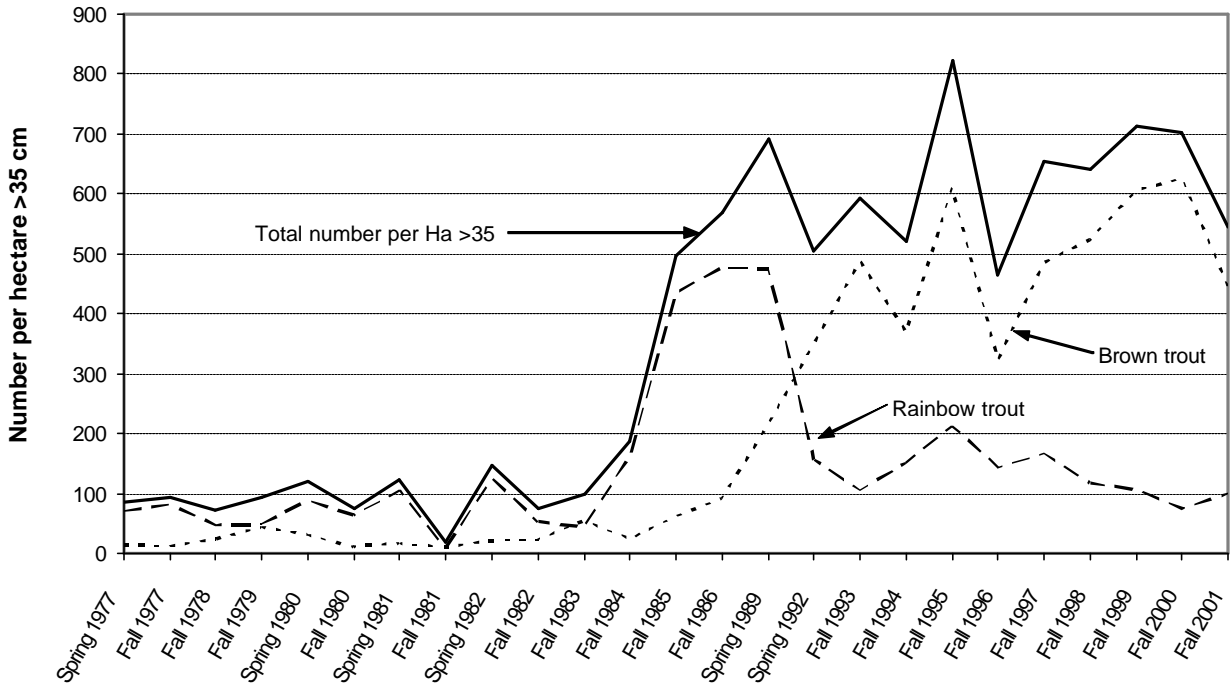
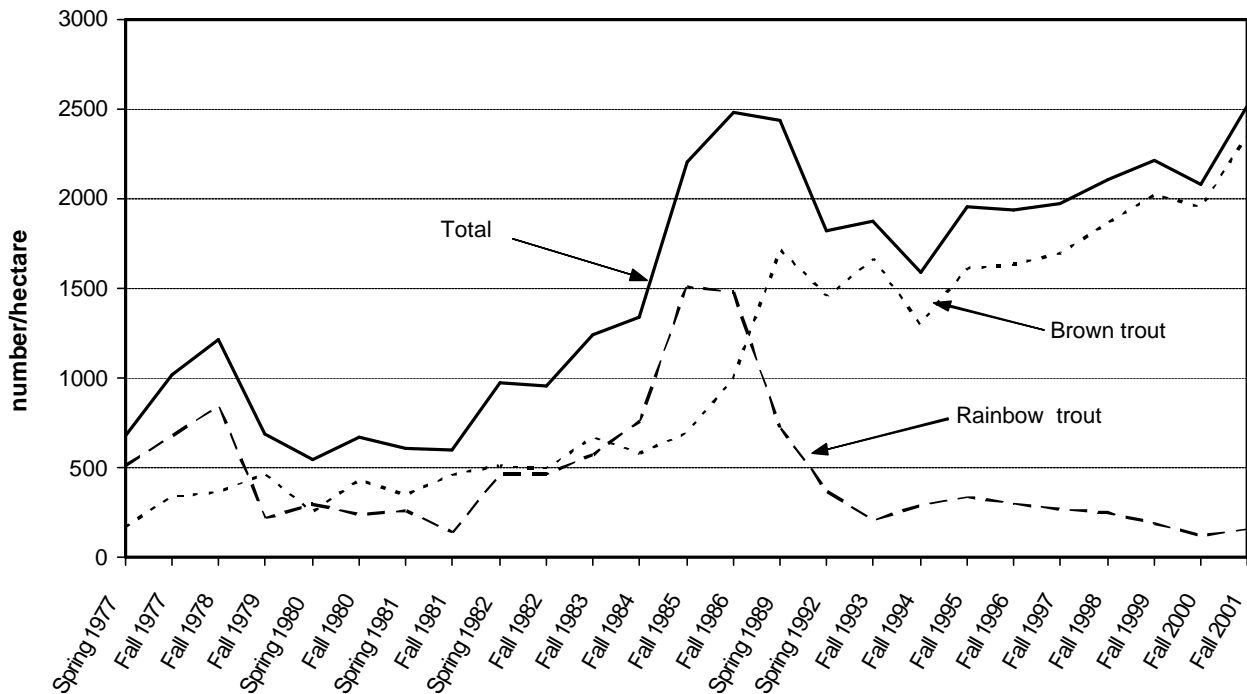


Figure 3.3a: Total Number per Hectare Brown and Rainbow Trout in Fryingpan River Immediately Downstream Ruedi Dam (Colorado Division of Wildlife, 2001)



Both brown and rainbow trout use similar redds (gravel beds) for spawning, but beyond this have significantly different reproductive cycles as shown in Table 3.4.

Table 3.4. Approximate Time and Duration of Spawning, and the Critical Early Development Life Stages for Brown and Rainbow Trout in the Fryingpan River Below Ruedi Dam.

SPECIES	ADULT SPAWNING	EGG INCUBATION	EGG HATCHING	FRY EMERGENCE
Brown trout	10/15-11/15	10/15-5/1	4/1-6/1	5/15-6/15
Rainbow trout	4/1-5/1	4/1-6/15	6/1-7/1	6/15-7/15

(Nehring and Anderson, 1993)

3.2.2 Threatened and Endangered Species

The Colorado River basin upstream of Lake Powell is home to 14 native fish species, four of which are now endangered. These four fish – the Colorado pikeminnow, razorback sucker, bonytail and humpback chub – evolved in the Colorado River basin and exist nowhere else on earth.

Critical habitat for two of the four endangered fish, the Colorado pikeminnow and razorback sucker, occurs within the 15 Mile Reach and upstream to Rifle, Colorado, an area affected by the Proposed Action. The fish use backwaters and side channels along this stretch of the Colorado River to reproduce, feed and grow. In recent times, multiple factors have contributed to the loss of habitat and decline of these native species. One contributor, loss of stream flows in the 15 Mile Reach, caused by depletions in the watershed upstream of 15 Mile Reach directly impacts sustainability of the two species. Insufficient flows limit both the quantity and quality of the habitat for the Colorado pikeminnow and razorback sucker, and directly affect key reproductive life stages. The existing depletions in the Upper Colorado River Basin above the confluence with the Gunnison River are estimated at approximately 1 million af/year (USDI, 1999)

There are currently two contracts that make Ruedi Reservoir water available for the 15 Mile Reach to benefit endangered fish. The first, executed in 1990, is a forty-year contract with the CWCB for 10,000 af of water for the 15 Mile Reach. The contract stipulates that 5,000 af will be made available annually, and an additional 5,000 af will be made available at least 4 out of 5 years through re-regulation. The second contract is a short-term (one-year) agreement with the CWCB and the Service to make 10,825 af of water available to the 15 Mile Reach. This short-term agreement would be replaced by the agreement identified in the proposed action of this Environmental Assessment.

There are several other contracts and agreements associated with other reservoirs that directly and indirectly enhance endangered fish habitat in the 15 Mile Reach, such as the Municipal Recreation Agreement among Reclamation and the municipalities of Grand Junction, Palisade and Fruita, and the west and east slope Water Users' Agreements to make 10,825 af available for the 15 Mile Reach. These contracts deliver water from a variety of water sources including Green Mountain, Wolford Mountain, and Williams Fork Reservoirs.

3.3 Recreation

3.3.1 Ruedi Reservoir

Ruedi Reservoir is a developed recreation attraction on the west slope, offering a wide variety of recreation opportunities. Lands adjacent to Ruedi Reservoir were transferred from Reclamation to the U.S. Forest Service (USFS) in 1968. Today, the USFS operates four campgrounds, two day-use areas, and the Ruedi Marina as shown in Figure 3.4. Three of the campgrounds, the Mollie B, Little Maud, and Little Mattie, are located adjacent to Ruedi Marina and offer a total of 68 developed campsites. Ruedi Marina facilities include a boat ramp, day use area and 12 campsites. Dearhamer Campground is located at the east end of the reservoir and includes 13 developed campsites, a day use area, and a boat ramp. Picnicking and beach facilities are available at the Freeman Mesa day-use area located along the middle of the north shore. The Black Bess day-use area is located along the south shore just around the corner from Dearhamer Campground and offers picnicking facilities.

There is one privately owned facility on the reservoir, the Aspen Yacht Club (Yacht Club). The Yacht Club maintains a small boathouse, single-lane concrete boat ramp and floating dock on the north shore. The Yacht Club has 75 family memberships and 45 boat slips (which are usually all occupied). It hosts at least one regatta every summer; the two-day regatta in the summer of 2001 drew 60 boats and 250-300 people. The Yacht Club hosts youth sailing classes once a week during the summer season.

There are a total of three boat ramps located at the reservoir: Ruedi Marina, Dearhamer, and Yacht Club. The Ruedi Marina boat ramp has a toe elevation of 7,704 feet, and becomes unusable at approximately 51,800 af of storage. Dearhamer and Yacht Club boat ramps are usable when reservoir levels are at or above an elevation of 7,747.5 feet or 85,000 af of storage.

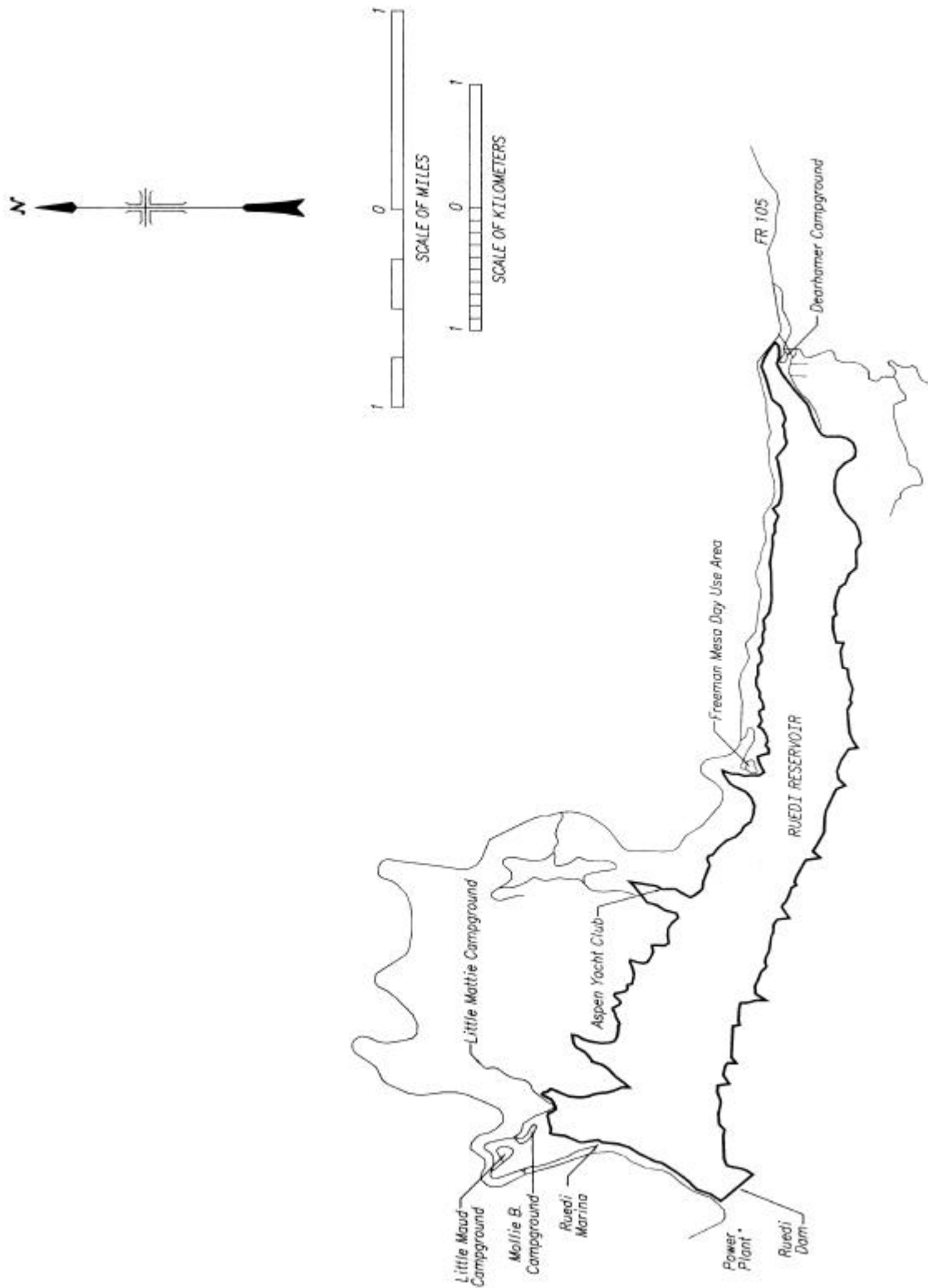
The general season of use at Ruedi is Memorial Day through the weekend after Labor Day, with the heaviest use occurring from July 4th to Labor Day. Use of the area decreases after Labor Day, when campgrounds begin to close and other services end for the season, although use has been increasing during this shoulder season. Fall/winter recreation activities at the reservoir primarily include camping (associated with hunting), fishing and, when available, ice fishing (Keneally, 2001).

Data from the *Fryingpan Valley Economic Study* (Roaring Fork Conservancy, 2002) indicates that approximately 72 percent of visitors to the reservoir participate in some form of watercraft-related activity including motor boating (30 %), sailing (20 %), personal water craft use (10 %), kayaking/canoeing (7 %) and sailboarding (5 %). In addition, the study indicated that camping (50 %), fishing (53 %) and sightseeing (35 %) were also popular activities of visitors to the reservoir. Approximately 65 percent of Ruedi Reservoir use is attributed to local users, many of whom make multiple trips during the season of use (Roaring Fork Conservancy, 2002). Forest Service records indicate that there were a total of 15,306 visitor days at Ruedi Reservoir during the 2001 summer season, not including use at the Yacht Club.

3.3.2 Fishing

The Fryingpan River between Ruedi Dam and the confluence with the Roaring Fork River has been designated by the Colorado Division of Wildlife as a Gold Medal Water. This designation indicates rivers and streams having a greater than average potential in which to catch trophy trout. Of the over 9,000 miles of streams in Colorado, only 170 miles have been designated Gold

Figure 3.4. Recreation facilities at Ruedi Reservoir



Medal. In addition, this portion of the river has restrictions requiring catch and release of all trout, except brown trout, and catch and release of any brown trout over fourteen inches.

Ruedi Reservoir operations have moderated natural flows along the portion of the Fryingpan River below Ruedi Dam. Moderation of the stream flow has tended to improve the sport fishery, especially for brown trout (Strange, 1998).

Only about 7.5 miles of the 14-mile stretch of the Fryingpan River below Ruedi Dam are available to the public for fishing and other recreation activities. Roaring Fork Conservancy (2002) estimated total annual visitor day use for the public land segments of this portion of the Fryingpan at 34,248 for the year surveyed, November 2000 through October 2001. (The Roaring Fork Conservancy also indicated that there may be as many as 4,880 additional visits per year not accounted for in their surveys given that anglers often fish during the early morning and late evening hours, which was outside the surveying timeframe.) 72 percent of this use was estimated to occur on the portion of public land just below the reservoir (Ruedi Dam to just below Baetis Bridge) (Roaring Fork Conservancy, 2002). They also estimated that: 86 percent of the users were anglers, 71 percent of the visits occurred during the on-season, and 84 percent of survey respondents came from outside the Roaring Fork Valley.

The Forest Service currently permits four outfitter-guides along the public land portions of the Fryingpan River below Ruedi Dam for a total of 1,521 service days (visitors per year). These commercial trips account for approximately 5.2 percent of the total annual visitor days on the lower Fryingpan River (Roaring Fork Conservancy, 2002). Outfitter-guide operations generally run from the beginning of May through the end of October, with 69 percent or more of historic user trips occurring in July, August and September (Table 3.5). Data for 1998-2000 is not broken out by season of use but the distribution of use from 1987 to 1997 is fairly consistent and is expected to be similar for the 1998-2000 timeframe.

The Roaring Fork River supports a commercial fishing industry based on float fishing from rafts and drift boats. Several segments of the Roaring Fork River also are Gold Medal Waters and have catch and release requirements. The Forest Service permits six outfitter/guides along the public land portions of the Roaring Fork.

3.4 Economic/Social Environment

The Fryingpan and Roaring Fork Rivers are located in west central Colorado in Pitkin, Eagle and Garfield counties. The Town of Basalt, (pop. 2,681), is the only major community located along the Fryingpan and is situated at the confluence of the Fryingpan and the Roaring Fork Rivers. Upstream from Basalt along the Fryingpan, there are numerous private parcels, most of which have been developed as single-family dwellings.

There are several communities located along the Roaring Fork River downstream of its confluence with the Fryingpan River, the most prominent being Carbondale (pop. 5,196) and Glenwood Springs (pop. 8,288). Other than localized urban development around community centers, the Roaring Fork River valley has significant rural development between the Roaring Fork's confluence with the Fryingpan and the confluence with the Colorado River. Historically, ranching interests occupied a majority of the lands in the valley. However, within the last ten years this area has seen an increase in real estate development, generally for single-family dwellings, businesses, and resorts.

Table 3.5. Distribution of Outfitter/Guide Days During the Summer/Fall Recreation Season

YEAR	Total outfitter/guide days used	MAY 1-SEPT. 30		JULY 1-SEPT. 30	
		Guide days	Percent	Guide days	Percent
1987	316	295	93%	266	84%
1988	204	186	91%	151	74%
1989	543	513	94%	488	90%
1990	539	486	90%	421	78%
1991	314	286	91%	220	70%
1992	374	348	93%	258	69%
1993	365	338	93%	251	69%
1994	926	862	93%	694	75%
1995	1215	1127	93%	916	75%
1996	1152	1080	94%	911	79%
1997	670	574	86%	480	72%
1998	933				
1999	922				
2000	970				

Recreation activity associated with Ruedi Reservoir, the Fryingpan River and the Roaring Fork River benefits the valley economy and communities such as Basalt and Carbondale, where recreation visitors purchase goods and services. Of the total direct spending by Fryingpan River and Ruedi Reservoir visitors within the Roaring Fork Valley, 49 percent is estimated to occur in the Basalt/El Jebel area (Roaring Fork Conservancy, 2002). In the *Fryingpan Valley Economic Study* (Roaring Fork Conservancy, 2002), survey information indicates that total annual expenditures in the Basalt area from Ruedi Reservoir and lower Fryingpan River visitors is \$1,352,063 or 1.55 percent of Basalt's \$87 million total sales for 2001. Total annual expenditures in the entire Roaring Fork Valley by these visitors are estimated to be \$2,755,532. To aid in putting this information in relative context with other historic endangered fish release years, 2001 could be characterized as a slightly below average precipitation year. In addition, this was the second highest year in terms of quantity of endangered fish releases at 20,825 af, and resulted in nine days over 250 cfs on the Fryingpan River between July 1 and November 1.

Ninety-five percent of the spending cited above is attributed to visitors to the lower Fryingpan River (Roaring Fork Conservancy, 2002). Visitors to the lower portion of the Fryingpan River, as opposed to Ruedi Reservoir visitors, are more likely to stay at commercial lodging and generally spend more on their visits than visitors to Ruedi Reservoir. This is primarily because Ruedi Reservoir visitors are typically from the area, and those that are not local often camp, resulting in more modest expenditures in the Roaring Fork Valley.

Within the Roaring Fork Valley, \$1.52 million annually in total income (for businesses and employees) and an estimated 69 jobs are linked to the economic activity generated by lower

Fryingpan River visitors. Ruedi recreation activities are responsible for creation of \$86,750 in total annual income and four jobs (Roaring Fork Conservancy, 2002).

River rafting on the Roaring Fork River was estimated to be responsible for \$328,600 in direct spending in 2001 (Colorado River Outfitters Association, 2001).

3.5 Hydropower Production

Aspen is licensed by the Federal Energy Regulatory Commission (FERC) to operate a hydropower facility at Ruedi Dam and Reservoir. In their license with FERC, Aspen agreed that their hydropower production objectives are subordinate to the operation of Reclamation's facilities. The license allows Aspen to benefit by generating electricity with any flows that result from the operation of Ruedi Dam and Reservoir.

Aspen's facility has a maximum design capacity of approximately 300 cfs. However, based on information from High Country Engineering, the hydropower facility operator, equipment limitations make it undesirable to operate at flows in excess of 250 cfs and releases above 250 cfs bypass the facility (High Country Engr., 2001). Additionally, the hydropower facility can only effectively use flows above 40 cfs and must cease operation below this level. Operations under the different alternatives analyzed here provide varying degrees of benefit to Aspen. The basis of the FERC program under which the Aspen power plant was built is that Ruedi's operations cannot be driven by the degree of benefit that Aspen accrues.

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

4.1 No Action Alternative

As defined by regulation, the no action alternative consists of not implementing the proposed action. The scope of a no action alternative includes actions and effects that are reasonably anticipated to occur as a result of not implementing the proposed action. A no action alternative is not defined as the future with no management or no future actions.

The No Action Alternative for this analysis, or not entering into an agreement to release 10,825 af of water annually to the 15 Mile Reach through the year 2012, would trigger a series of events, which are not entirely predictable due to the complexity and numerous entities involved. However, some of the initial anticipated actions, and their effects, can be identified.

Failure to execute the 2012 Agreement would jeopardize Section 7 consultation for past, existing, and continued operation of five Reclamation Projects that contribute to depletions to the 15 Mile Reach (Colorado-Big Thompson, Fryingpan-Arkansas, Collbran, Grand Valley, and Silt Projects). Furthermore, not entering into the 2012 Agreement would constitute lack of sufficient progress in fulfilling Reclamation's commitment to the Recovery Program as described in the PBO. Thus, the terms and conditions of the PBO would not be satisfied by Reclamation, and, per the PBO (pg 73, item c), would require re-initiation of Section 7 consultation with the Service. If Section 7 consultation is reinitiated under the PBO, the Service will reinitiate consultation first on Category 2 projects¹ and second on Category 1 projects². The details of subsequent Section 7 consultations cannot be predicted, but it is anticipated that the Service and

¹ Defined in the 1999 PBO as all new depletions up to 120,000 acre-feet/year; including depletions not included in Category 1 that occur after 1995 regardless of whether section 7 consultation has been completed.

² Defined in the 1999 PBO as existing depletions from the Upper Colorado River Basin above the confluence with the Gunnison River occurring on or before Sept. 30, 1995; depletions associated with 154,645 acre-feet/year of Green Mountain Reservoir, including the power pool and Colorado Big-Thompson Replacement pool; Ruedi Reservoir Round I sales and Round II sales up to 6,135 acre-feet, and the Fryingpan Arkansas Project Replacement pool as governed by the Operating Principles.

Recovery Program will remain interested in securing augmentation water from Ruedi Reservoir for the 15 Mile Reach.

Absent the PBO, the 1995 Biological Opinion (BO) on Round II sales and the 1999 Amendment (RPA) of the BO contain direction for endangered species mitigation of Round II water sales. The provisions of these two documents are as follows:

1. Continuation of the environmental commitments made in the Round II Final Supplemental Environmental Impact Statement for Ruedi Round II water sales; specifically, delivering 5,000 af of Ruedi water through the 15 Mile Reach annually and 5,000 af of Ruedi water through the 15 Mile Reach in 4 out of 5 years.
2. Through short-term and long-term agreements make 21,650 af of Ruedi Reservoir water available to the Upper Colorado River Endangered Fish Recovery Program through the year 2012. This water is in addition to the commitment for 5,000 af annually and 5,000 af every 4 out of 5 years.
3. Reclamation may contract for up to 6,135 af of Round II water and contract for the full 17,000 af of Round II water upon execution of a long-term agreement to deliver 21,650 af to the 15 Mile Reach as described above.

The consequences to previously executed and pending Round II contracts are uncertain. In all likelihood, if the PBO is not available to cover these contracts, Reclamation would be responsible for implementing the BO's RPA summarized above. Round II contracts would be limited to 6,135 af unless a long term agreement for 21,650 af from Ruedi Reservoir to the 15 Mile Reach is executed. Reinitiation of Section 7 consultation may be necessary in order to contract for greater than 6,135 af and may require reevaluating all of the existing Round II contracts. If this occurs, contract holders may be responsible for funding the expenses associated with consultation, as well as any mitigation that may result from consultation. Consultation expenses for municipalities and water districts may be passed on to those they serve and potentially have short-term localized effects on area economies, such as raised utility rates or taxes.

If a long-term agreement is not executed under either the PBO or BO, Reclamation may not contract for more than 6,135 af of Round II water. In all likelihood, the inability to contract for more than 6,135 af through 2012 would only have a minor impact, because:

1. Many of the water districts and municipalities in the Roaring Fork Valley have contracted for sufficient augmentation water to meet their foreseeable needs.
2. The initial 6,135 af of Round II water has not been exhausted.
3. Development of the oil shale industry within the Colorado River watershed has not materialized as anticipated in the original assessment of Round II water marketing.

However, if the 6,135 af is exhausted prior to 2012, those individuals and entities who require augmentation water due to their junior water rights would no longer have Ruedi contract water available to them. In time, this may have a negative effect on community and economic growth within the Roaring Fork Valley.

The PBO allows all existing depletions, including Round I and II contracts, to continue and allows up to an additional 120,000 af of depletions provided there is continued progress towards recovery. If Reclamation does not execute the 2012 agreement and re-initiates consultation on

the PBO, the allowance for future depletions would likely be curtailed. Future developments, that result in depletions or changes in the patterns of delivery to the 15 Mile Reach, whether Federal or private, could be directly affected. Any action that decreases the flow determined to be necessary for critical habitat could be considered a “taking”, which the Service can address under Section 9 of the Endangered Species Act, whether on federal or private lands. Existing contracts or actions that have been implemented under the PBO may be subject to individual Section 7 consultations.

If Reclamation provides 21,650 af under the BO rather than the 10,825 af it would provide under the PBO, the other 10,825 af from Ruedi would not be available as a potential permanent source for the east and west slope water users to provide their 10,825 af commitment. Moreover, the 10,825 af could not be made available for contracting if demand materializes.

If Reclamation provides 21,650, it is likely that both the east and west slope water users would cease providing their 10,825 af (5,412 each) to augment flows in the 15 Mile Reach. Therefore, even if Reclamation provided 21,650, it is not expected to result in any additional water to the 15 Mile Reach.

Finally, development of the PBO and the Proposed Action for this document are the culmination of over five years of work by two Reclamation Regions (Upper Colorado and Great Plains), the Western Area Power Administration, the Service, State of Colorado (CWCB), State of Wyoming, State of Utah, east and west slope water users, and multiple environmental organizations. Selection of the No Action Alternative would result in the loss of much of the effort expended by these entities to reach this negotiated mitigation of impacts to endangered species. Furthermore, unless the No Action Alternative is approved by the Recovery Program as a change to the Recovery Action Plan, its adoption by Reclamation would lead to re-initiation of Section 7 consultation on Reclamation projects identified in the PBO. The subsequent re-initiation of consultation would most likely require a significant expenditure of effort by these same entities to seek a new resolution to this matter and could result in impacts to the water supplies to both east and west slope beneficiaries of these projects.

4.2 Alternative Analysis

4.2.1 Hydrology

A hydrologic model was developed to simulate reservoir and streamflow conditions for the various alternatives. The model is based on average historic operations of the reservoir, administration of Colorado water rights, Fryingpan-Arkansas Project Operating Principles, the terms and conditions of the existing and pending water contracts, and the 15 Mile Reach flow targets established for various precipitation years (i.e. dry, moderate, or wet years). A description of the model and the parameters used for this analysis are presented in Attachment A.

There are two items from the description in Attachment A that should be discussed to aid the reader in understanding information discussed and/or displayed in this chapter. The first is the Fryingpan River modeling constraint. In order for modeling runs to reflect likely operations, a 350 cfs modeling constraint was placed on flows in the Fryingpan River downstream of Rocky Fork Creek. The 350 cfs is not an actual limit or target. It is merely a constraint incorporated into the model to try and model the actual human decision making process used to determine Ruedi releases.

The second item worth highlighting is the total water quantity used for contract releases. Currently, Round I (7,850 af) and Round II (4,584 af) contracts total 12,434 af of water under contract. However, releases for water contracts are only made when there is a need for the water. Consequently, the majority of the water may not be released in any given year. In fact, release records indicate the average historic amount released for Round I and Round II contracts is approximately 1,500 af, and this trend is anticipated to continue through at least 2012. Therefore, for the purpose of modeling, 1,500 af was used to represent releases for Round I and Round II contracts. In 2002, approximately 1,943 af of Ruedi water was delivered directly for Ruedi contractors' use between April 1 and September 30. These releases were in response to demands during the worst drought in Colorado in recorded history. Given the low probability that such a year will occur within the term of the 2012 Agreement, 1,500 af to represent releases for Round I and Round II contracts is reasonable.

The hydrologic model used for this analysis is useful for comparing and displaying differences between alternatives. However, the model does have limitations. Table 4.1 lists substantive differences between historic endangered fish releases and the modeling.

The primary reason for the differences shown in Table 4.1 is the human decision-making introduced when the Service, in coordination with others, must decide how to best meet 15 Mile Reach target flows throughout a four month period with a finite quantity of water. The model is mathematically driven and cannot imitate the weekly, and sometimes daily, decision-making that occurs among the group balancing the multiple demands involved with making reservoir releases from multiple sources. The 15 Mile Reach flow predictions, weather patterns and predictions, water user needs, operational outages of facilities contributing flow releases, and other factors, are highly variable. This model, as well as other hydrologic models, does not have the ability to precisely portray this process and would not be expected to replicate the continuous interactions and adjustments involved in providing endangered fish releases from Ruedi Reservoir.

Nevertheless, the model does provide valuable information for comparing the alternatives in this analysis. The model considers target flows in the 15 Mile Reach, determines how much water is needed to achieve the target flows and then, based on distribution rules, calculates how much water should be released from each contributing water source. For every precipitation regime, dry, average, or wet, the 15 Mile Reach historic data used in the model indicates the need for substantial augmentation water. Consequently, in each of the regimes used for the modeling, the flows below Ruedi jump to 350 cfs as soon as demand is indicated, and remain there until the available supply is depleted. This is not anticipated to be a realistic representation of future endangered fish releases (see above paragraph for explanation). In fact, releases are expected to continue to resemble the pattern exhibited in the past; where strong attempts were made to limit flows to less than 250 cfs, releases are rationed over the release period, and releases tend to occur later in the release period. However, Reclamation believes that the Fryingpan River modeling constraint more accurately predicts releases than either an unconstrained model run or a run constrained at another flow level.

Table 4.1. Comparison of Certain Aspects of Historic and Modeled Endangered Fish Releases for Ruedi Reservoir.

	Historic	Model
Timing	Releases have generally occurred mid to late (August to October) in the augmentation period, because biologists tend to be conservative to ensure water is available throughout the augmentation period.	Releases generally occur earlier in the release period (July to August), because the model releases water as soon as the flow targets are not being met and continues releases until the available water is exhausted.
Duration	The Service attempts to ration flows, thus prolonging the duration of flows from Ruedi; even to the point of allowing 15 Mile Reach flows to drop below targets.	Releases are made to fully maintain target flows in the 15 Mile Reach irrespective of other conditions, such as weather, which could decrease the needs. The model makes releases at a higher rate than actual practice and uses available water faster. Consequently, the release duration is abbreviated.
Flow Rates	The Service strives to limit cumulative flows in the Fryingpan to 250 cfs, but at times have had to request higher releases; nearly 98% of flows during the augmentation period have been less than 350 cfs.	Automatically releases the maximum amount allowed or the amount needed in the 15 Mile Reach to meet target flows. This tends to result in releases of 350 cfs (Fryingpan River modeling constraint) until the acre-feet quantity available under the given alternative is depleted or target flows are met.
Flow Changes	Typically flow releases are adjusted by Reclamation, at the Service’s request, one to two times per week. However, the Service is able to respond to changes in the 15 Mile Reach and basin, and adjust other reservoir releases within a few hours, if needed.	Changes occur every three days in order to “smooth” the graph lines.

Table 4.2 provides a breakdown of the distribution of the Marketable Yield pool for each of the alternatives. This provides a tabular comparison of the differences in contract water and endangered fish quantities for each of the alternatives as well as the amount of additional water that will be available for contracting during the term of the 2012 Agreement.

Past endangered fish releases can also be used as a source of information for determining potential effects produced by the alternatives. Ruedi water has been made available for the 15 Mile Reach every year since 1989 (Table 4.3). In the past fourteen years, releases for endangered fish have been made in amounts of 10,000 af to 31,650 af. Timing of releases ranged from June to November with releases in most years occurring from July through October. During this time frame, there were three years when no releases were necessary because sufficient runoff existed to meet targets in the 15 Mile Reach. Releases have only exceeded 21,000 af in one year, 1999.

Table 4.2. Distribution of the Marketable Yield for Each Alternative.

	<u>Marketable Yield</u>			
	No Action	Alternative A	Alternative B (when delivered)	Alternative C
Round I Contracts	7,850	7,850	7,850	7,850
Round II Contracts				
• Initially Available	6,135	6,135	6,135	6,135
• Available w/2012 Agreement	N/A	10,865	10,865	10,865
Round II Mitigation	*5,000	*5,000	*5,000	*5,000
• Uncommitted Used for Endangered Fish	21,650	10,825	10,825	21,650
• Assist Meeting Other Obligations			**5,412	
Unavailable for Contracting	***10,865			
Remain in Reservoir to Enhance Recreation Until Needed for Contracting		10,825	5,412	
Total additional water available for contracting between 2003 and 2012	0	21,690	16,277	10,865
<p>*An Additional 5,000 af is available 4 years out of 5 through reregulation of the reservoir. **Quantities for Alternative B are the same as Alternative A except an estimated 1 in 10 years when 5,412 af would be needed to meet the water users obligation. ***Assumes a long term agreement to provide 21,650 af; would likely stay in reservoir and enhance recreation.</p>				

In seven of eleven years that releases were made, releases were between 18,800 af and 20,804 af. There were no flows above 250 cfs during endangered fish releases for five of the fourteen years. As Table 4.3 indicates, the majority of releases occurred later in the release period, August through October.

Erosion and Scour. Endangered fish releases would not be anticipated to create any significant adverse effects in terms of erosion or scour within the Fryingspan River. Bank erosion is most likely to occur when flow drops dramatically over a short timeframe. This type of event exposes water saturated stream banks, which are more fragile and unstable than when water is lowered slowly and the stream banks are allowed to “drain” and firm. Daily fluctuations in Fryingspan River flows below Ruedi over the past fourteen years of endangered fish releases only exceeded 50 cfs for 2.1 percent of the days, and typically adjustments were in much smaller amounts. Small fluctuations in flow quantities, such as this, represent relatively little vertical change in the water level, and thus less opportunity of exposing fragile, water saturated stream banks. By comparison, the native inflows to Ruedi Reservoir during the same period of endangered fish releases had more than twice (4.7 %) as many days when daily flow fluctuations exceeded

Table 4.3. Historic 15 Mile Reach Endangered Fish Releases From Ruedi Reservoir By Monthly Acre-Feet Quantities And Monthly Number Of Days Greater Than Or Equal To 250 CFS In The Fryingpan River.

Month	1989		1990		1991		1992		1993	
	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs
July	0	0	0	0	0	0	0	0	0	0
August	243	0	2,872	17	4,734	0	1,893	0	0	0
September	5,714	0	4,196	5	5,420	0	6,264	16	0	0
October	4,042	0	2,692	0	9,710	0	10,745	28	0	0
November	0	0	239	0	135	0	0	0	0	0
Total	9,999	0	9,999	22	19,999	0	18,902	44	0	0
Total Available	10,000	----	10,000	----	20,000	----	20,000	----	20,000	----

Month	1994		1995		1996		1997		1998	
	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs
July	323	0	0	31	0	7	0	0	0	0
August	6,478	0	0	9	3,888	15	0	0	1,420	6
September	11,048	0	0	0	8,448	29	0	0	10,366	11
October	2,151	0	0	0	8,108	19	0	0	9,018	15
November	0	0	0	0	0	0	0	0	0	0
Total	20,000	0	0	40	20,444	70	0	0	20,804	32
Total Available	20,000	----	20,000	----	31,650	----	10,000	----	31,650	----

Month	1999		2000		2001		2002	
	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs	Endangered Fish Releases (af)	Fryingpan Days ≥ 250 cfs
June	0	0	0	0	0	0	625**	
July	0	9	3,505	18*	1,004	0	4,741	0
August	0	0	11,040	29	6,290	0	4,066	0
September	7,856	24	4,774	0	11,227	9	1,543	11
October	11,797	20	1,041	0	2,304	0	0	0
November	748	1	0	0	0	0	0	0
Total	27,401	54	20,360	47	20,825	9	10,975	11
Total Available	31,650	----	20,825	----	20,825	----	15,825	----

*Seven days were prior to beginning endangered fish releases in 2000

**This release occurred outside the typical augmentation period due to severe drought in 2002

50 cfs. This suggests that endangered fish release patterns are not outside of typical fluctuations in the drainage and thus would not be expected to accelerate erosion.

Similarly, during higher release rate periods, 250-350 cfs, the velocities created would not be anticipated to significantly increase scour of the streambed because of the high velocity threshold needed to move bed materials in a cobble- and boulder-bed stream channel such as the Fryingpan. Releases of 500 cfs from Ruedi Reservoir have occurred, although not in association with endangered fish releases, with no reported scouring of the Fryingpan River streambed. In August 1998 Reclamation was requested by the Colorado Division of Wildlife to release flows in excess of 500 cfs to flush fine sediments that were deposited in the Fryingpan River from a small dam failure on a north bank tributary. Reclamation made the releases, which were successful in removing the sediments, but there was no significant movement of gravels in the Fryingpan River bed. Nor was there any significant bank erosion as a result of the requested flushing releases.

Neither fluctuations in release quantities nor maximum release rates for the alternatives in this analysis are anticipated to differ appreciably from those experienced over the past fourteen years of endangered fish releases.

Alternative Effects: Alternatives A, B and C are not anticipated to negatively affect erosion or scour within the Fryingpan River in and of themselves or when compared against the No Action Alternative. Likewise, as the above information indicates, the No Action Alternative is not anticipated to affect erosion or scour within the Fryingpan River.

Water Contracts. Demand for Round II water contracts fluctuates based on several factors, many of which are tied to the regional economy and growth patterns, such as real estate development, industrial development and municipal planning. The demand for Round II contracts has not been as vigorous as originally contemplated in the 1980's. Approximately 75 percent of the initial 6,135 af of Round II water has been contracted for, and interest exists for a portion of the remaining amount. As this initial allocation is contracted, the need to make the remaining 10,865 af available for water contracting will become more important. The Colorado Department of Local Affairs (2001) predicts population growth in Planning Region 12, which includes the Fryingpan and Roaring Fork Valleys, at approximately 34 percent from 2001 to 2012. This is one indication that demand for water contracts could be expected to continue through this timeframe, as the economy, industry and population expand.

If Ruedi water is not available for contracting, entities may seek other sources of augmentation water such as purchasing existing water rights and water contracts, and/or development of new water storage sites. The economic and environmental effects of such actions are not predictable due to the broad range of scenarios that could result.

Between now and 2012, uses of contract water are not anticipated to exceed the 1500 af of average historic use. Much of the water under contract has been purchased to meet municipalities' future needs or similar circumstances, where the need is expected to develop over time.

Alternative Effects: Alternatives A, B and C all meet the obligations outlined in the PBO, which has a beneficial effect on water contracting by allowing contracting to proceed for the remaining 10,865 af of Round II water. As shown in Table 4.2, Alternative A results in the largest amount

of water available for contracting. Additionally, Reclamation is able to contract the 10,825 af that is part of Reclamation's reduced commitment to the 15 Mile Reach as a result of the water users commitments. The No Action Alternative does not meet PBO requirements, which will restrict water contracting to the initial 6,135 af of Round II water made available in the BO and adversely affect water contracting.

4.2.2 Aquatic Wildlife

Sport Fisheries. No negative impacts to the fisheries of the Fryingpan or Roaring Fork Rivers have been observed due to endangered fish releases from Ruedi Reservoir since 1989 (the first year of endangered fish releases). The best evidence of this is provided by current fish populations and population trends. CDOW information shows relatively constant brown trout and rainbow trout population levels since about 1990 (Figures 3.3 and 3.3a). Brown trout populations in the Fryingpan River are self-sustaining, while rainbow trout populations are essentially self-sustaining having only been supplemented with stocking one year in the last decade.

In general, endangered fish releases occur in a manner that does not adversely affect trout habitat in the Fryingpan River. A recent study conducted on the Arkansas River (Smith and Hill, 2000), identified a number of key recommendations to sustain the trout fishery of that river. Many of the recommendations fall outside the timeframe of Ruedi endangered fish releases suggesting in part, endangered fish releases occur outside of critical trout fishery early development life stages (spawning, incubation, hatching and fry emergence). This assertion is supported by Table 3.4, which indicates the endangered fish releases occur outside of critical brown and rainbow trout early development life stages specific to the Fryingpan River.

One recommendation from Smith and Hill's study that may apply to this situation is the recommendation to limit the amount of change in daily fluctuations. At the time, it was common for flows on the upper Arkansas River to fluctuate dramatically, from a few hundred cfs to well over a thousand cfs in the span of a day. Such changes were believed to negatively affect the trout fishery, so a recommendation was made to limit daily changes in river flows to 25 percent. Looking at past endangered fish releases on the Fryingpan River, changes in flows greater than 25 percent have occurred an average of 1-2 days per year, usually at the very beginning and end of endangered fish releases. This would not be anticipated to result in a significant direct or cumulative impact on the fishery, because of the limited occurrence of large fluctuations and the fact that these isolated occurrences are outside of critical brown and rainbow trout early life stages. Future endangered fish releases are not anticipated to differ appreciably from the manner in which releases have been made in the past; an operational measure guiding this effort is discussed in section 2.1.2.

A recent CDOW study investigating the causes of whirling disease indicated that fluctuations in stream flows are not a significant causal agent of species losses. The study states,

“Suggestions that fluctuations in habitat quantity and quality significantly contribute to the unusual mortality observed in year classes of wild rainbow trout are not supported by our findings. The loss of rainbow trout year classes has occurred in major reaches of the Cache la Poudre, Colorado, Dolores, Fryingpan, Gunnison, Rio Grande, South Fork of the Rio Grande, South Platte, and Williams Fork Rivers in below average, average, and significantly above average water years with no corresponding impact occurring among

brown trout year classes. This invalidates the argument that drought, floods, and the concomitant fluctuations in stream discharge are implicated in the loss of rainbow trout year classes. Similarly, a stressful thermal regime cannot be implicated in the unusual loss of rainbow trout recruitment”, (CDOW, 2001).

Macroinvertebrates represent a significant food source for trout species, and their presence is important to maintaining a productive fishery. Of the basic physical requirements necessary to sustain macroinvertebrate populations, river depth and flow velocity are the most critical (Nelson and Roline, 1996). Significant fluctuations in flow velocity and depth can have negative effects on macroinvertebrates. The flow fluctuations seen below Ruedi dam as a result of endangered fish releases, which are typically kept under 50 cfs per day, would not be expected to have a negative effect on macroinvertebrates. This variation is typical for a high mountain environment, such as the Fryingpan River, where summer storm events are common, and these species are adapted to fluctuations of this nature (Roline, 2001).

Maintaining winter flows at a level sufficient to sustain macroinvertebrate populations is also important; if the river is allowed to freeze over entirely or in large part, fewer individuals may survive the season. The Fryingpan Arkansas Project Operating Principles, as amended, stipulate that releases of water from Ruedi Reservoir are either the lesser of inflow or that which would produce 39 cfs in the Fryingpan River immediately below the confluence with Rocky Fork. Winter mean monthly releases, as shown in Table 4.4, indicate that between 1989 and 2001 average winter releases were 123 cfs; a flow level which would not be anticipated to create a high risk for macroinvertebrate loss (Roline, 2001). These flows are not expected to change significantly during the term of the proposed contract. Additionally, winter flows have been maintained at a relatively constant flow between November 1 and April 30, 1989 through 2001, as shown on Table 4.4. This would tend to maximize the success of brown trout spawning activities in the Fryingpan River.

The CWCB has also established a minimum instream flow right of 39 cfs for the Fryingpan River below Ruedi from November 1 to April 30. The CWCB instream flows for the Fryingpan River are junior in priority to the minimum release requirements established for Ruedi. To reduce the potential that use of released contract water would cause a violation of the CWCB instream flows, Ruedi contracts and agreements issued after the establishment of an instream flow are subject to any and all requirements to maintain the CWCB’s minimum instream flows as set forth in either the contractor’s or subcontractor’s water rights decree or augmentation plan.

During the term of the 2012 Agreement, none of the alternatives are expected to significantly affect winter releases from Ruedi.

CDOW has indicated there are potential benefits for both the Roaring Fork and Fryingpan fisheries from endangered fish releases. Mid to late summer flow in the Roaring Fork typically drops to a point that conditions promote stress and disease in fish, resulting in fish die-offs. Supplemental flow aids in maintaining better environmental conditions for the fishery and thereby reducing the potential for die-offs. In addition, CDOW indicated flows \geq 250 cfs

Table 4.4. Monthly Averages, Winter Averages, and Low Flows in the Fryingspan River below Ruedi Dam and Inflows to Ruedi Reservoir for the Past Twelve Seasons

Year	Month																		Average Winter Releases (cfs)
	November			December			January			February			March			April			
	Avg. Inflow (cfs)	Releases Low (cfs)	Releases Average (cfs)	Avg. Inflow (cfs)	Releases Low (cfs)	Releases Average (cfs)	Avg. Inflow (cfs)	Releases Low (cfs)	Releases Average (cfs)	Avg. Inflow (cfs)	Releases Low (cfs)	Releases Average (cfs)	Avg. Inflow (cfs)	Releases Low (cfs)	Releases Average (cfs)	Avg. Inflow (cfs)	Releases Low (cfs)	Releases Average (cfs)	
1989-1990	48	79	80	46	79	81	40	76	78	32	79	79	43	78	80	109	75	79	79
1990-1991	51	106	115	33	119	121	32	121	121	30	113	123	40	121	122	85	123	166	128
1991-1992	62	85	94	47	85	87	41	83	86	36	82	84	36	84	84	131	71	107	90
1992-1993	66	105	109	45	100	102	43	92	94	45	91	93	36	97	174	98	234	237	135
1993-1994	71	62	122	66	128	129	44	131	131	37	131	138	47	187	210	137	176	196	154
1994-1995	42	81	95	33	72	88	27	70	73	31	73	73	49	69	72	93	71	81	80
1995-1996	75	28	182	73	221	224	69	220	228	65	234	244	69	256	280	193	238	296	242
1996-1997	89	53	115	78	115	119	75	118	127	65	130	130	92	149	154	174	145	213	143
1997-1998	79	44	131	60	131	151	41	151	152	37	153	155	54	206	209	92	207	211	168
1998-1999	60	66	75	28	64	65	29	64	65	28	64	64	47	63	65	86	91	93	71
1999-2000	44	64	115	43	94	96	44	94	95	40	96	96	43	96	97	174	97	177	113
2000-2001	46	72	73	37	70	71	34	68	70	31	68	69	38	70	71	120	70	104	76
Monthly Avg.	61		109	49		111	43		110	40		112	50		135	124		163	123

in the Fryingpan River may have the benefit of reducing pressure/impacts to fish due to the reduced number of fishermen wading the river and catching fish (Czenkusch, 2000).

Alternative Effects: Alternatives A, B, and C, and the No Action Alternative are not anticipated to have significant direct, indirect, or cumulative effects to the fisheries of the Fryingpan or Roaring Fork Rivers.

Threatened and Endangered Species. The Service has determined that all four species of endangered fish and their critical habitat are adversely affected by upstream water depletions; one of which is Round II water marketing. The 15 Mile Reach is affected more than other reaches because it is located downstream of several large diversions and upstream of the confluence with the Gunnison River. Extremely low water conditions that occur during the late summer and early fall months especially limit habitat. Providing summer and fall augmentation water to the 15 Mile Reach and additional measures being implemented by the Recovery Program mitigate the depletion effects of Round II water marketing and other depletions.

Figures 4.1, 4.2, and 4.3 show the model simulated dry, moderate and wet year flows, respectively, in the 15 Mile Reach for each alternative, as well as estimated flow without endangered fish releases. The graph lines for Alternatives A, B, C and No Action include endangered fish releases from the sources (Ruedi, Green Mountain, Wolford Mountain, and Williams Fork Reservoirs) given in section 2.1.

Results charted in the dry year graph, Figure 4.1, indicate with Alternatives A and C, the dry year target flow of 810 cfs is met approximately 15 percent of the 123 day late summer 15 Mile Reach augmentation season. Target flows are met 11 and 6 percent of the season under Alternative B and the No Action Alternative respectively. Without additional augmentation, the flow target is met less than 3 percent of the season. Overall, flows are improved with the endangered fish releases, but remain well below the target flow for the majority of the season. Although the net quantity of endangered fish release from all sources is the same between Alternatives A, B and the No Action Alternative, Alternative A provides greater benefit to the 15 Mile Reach. Figure 4.1 also indicates that while Alternatives B, C and the No Action Alternative provide some benefit to the 15 Mile Reach over a longer duration, the target flows are not met for as many days. It is anticipated that actual operations will result in the target flows being met for a longer duration under Alternative A than modeled due to the model's inability to mimic the human decision making.

The moderate year estimate, Figure 4.2, shows results similar to the dry year graph. The target flow of 1,240 cfs for the 15 Mile Reach is achieved for approximately 22 and 24 percent of the season with the aid of endangered fish releases under Alternatives A and C, and only 11 percent of the season without additional augmentation releases. Alternative C provides some benefit to the 15 Mile Reach for a greater duration than Alternative A, but it results in generally a lower level of flows than Alternative A. Again, it is anticipated that actual operations will increase the duration of flows that meet the target flows over that indicated by the model.

Figure 4.3, the wet year estimate, shows that without additional endangered fish releases target flows in the 15 Mile Reach are achieved approximately 28 percent of the time. Under Alternatives A and B the target flow is reached slightly more than 50 percent of the season, and under Alternative C and the No Action Alternative 59 and 55 percent of the season respectively.

Alternative Effects: The modeled results presented in Figures 4.1, 4.2 and 4.3 indicate that Alternative B and the No Action Alternative generally provide less benefit to the 15 Mile Reach in terms of reaching target flows than do Alternatives A and C in dry and moderate years though they provide augmentation for a longer duration while Alternative C and the No Action alternative result in the greatest percentage of days above the target flows for the wet year.

Because the contracts for endangered fish releases would be short-term agreements subject to annual approval by Reclamation, the Service and CWCB, the No Action Alternative may be considered less desirable than Alternative A, B or C for meeting the purpose and need of the proposed action. Alternatives A, B and C would benefit habitat in the 15 Mile Reach by making 10,825 af available by agreement through 2012, thus firmly establishing the availability of water to improve habitat and displaying support for endangered fish recovery efforts. Alternative B would have the additional benefit of providing a safeguard should certain circumstances interrupt the ability of west slope water users to release a portion of their 15 Mile Reach augmentation water, but would provide the same total amount of water to the 15 MR as Alternative A (a portion of Wolford's releases would shift to Ruedi). Alternative C would provide the greatest benefit to the 15 Mile Reach of the alternatives. Alternative C would not only provide the benefits associated with the 2012 Agreement cited above, but also make an additional 10,825 af of water available from Ruedi Reservoir for the 15 Mile Reach.

4.2.3 Recreation

Ruedi Reservoir. The model simulations shown in Figures 4.4, 4.5 and 4.6 can be used to describe some of the relative effects of alternatives on recreation experience at Ruedi Reservoir, although the model simulations differ from anticipated reservoir levels. Timing and duration of reservoir draw-downs are the most distinct differences. As stated previously, the model tends to release water earlier in the season and at a higher rate than has occurred in the past or is anticipated to occur in the future. Consequently, the model indicates reservoir levels dropping faster and earlier in the season than is anticipated.

In a dry year, Figure 4.4 indicates there would be no difference in the impacts to use of the Dearhamer and Yacht Club boat ramps between the No Action Alternative, and Alternatives A, B and C. The reservoir would not be anticipated to fill, and Dearhamer and Yacht Club boat ramps would only be useable, if at all, for a short time prior to releases including those for endangered fish. The Ruedi Marina boat ramp is anticipated to be available throughout the heaviest portion of the recreation season, July 4 through Labor Day under all of the alternatives. More water would remain in Ruedi Reservoir under Alternative A than Alternative B, when delivered, and both would retain more than the No Action Alternative and Alternative C. This is probably not a significant factor because the lowest water levels would occur after the heaviest portion of the recreation season, when recreation activity is dropping off significantly for the season.

Figure 4.1. Dry Year (1977) Simulated 15 Mile Reach Flow. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryngpan River Target.

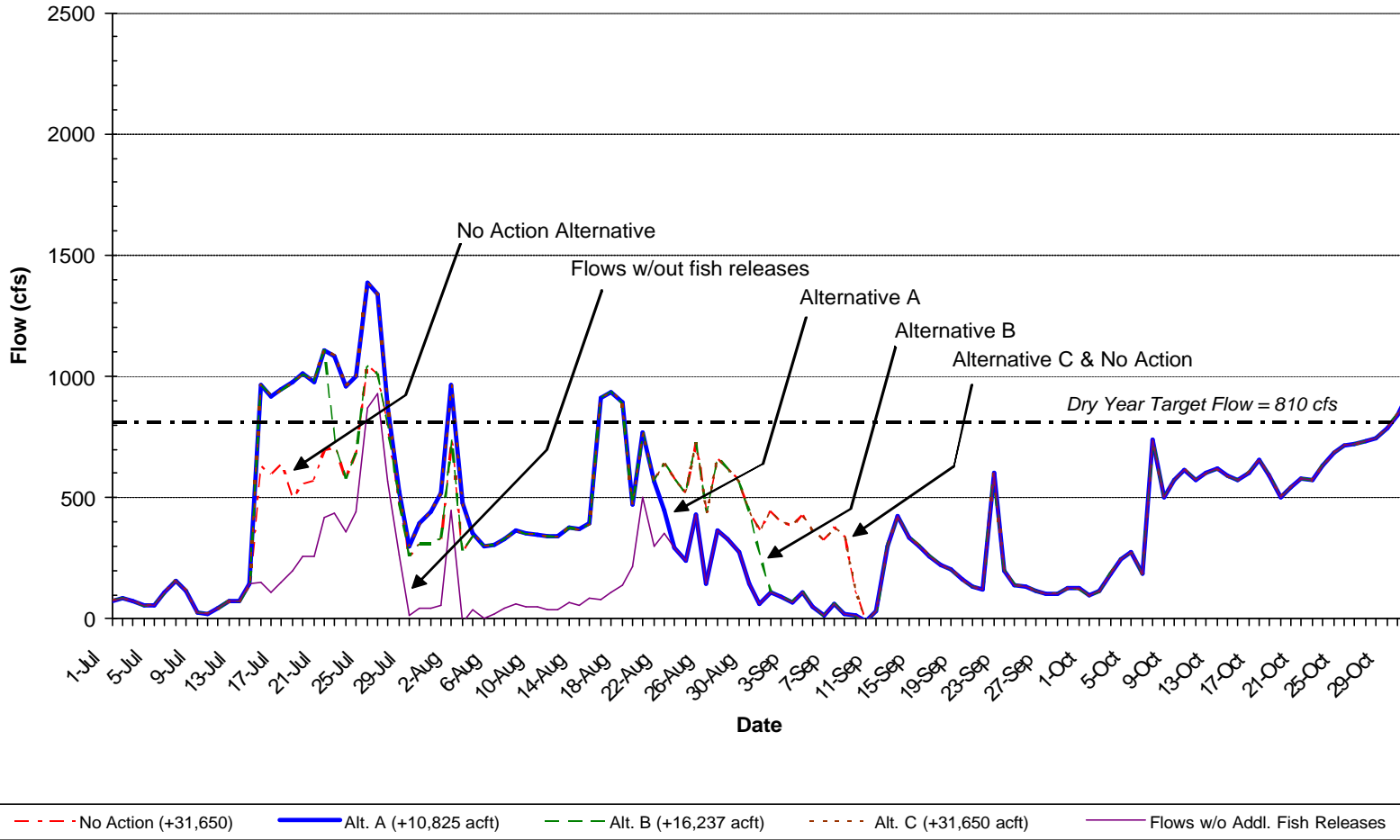


Figure 4.2. Moderate Year (1988) Simulated 15 Mile Reach Flow. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryngpan River Target.

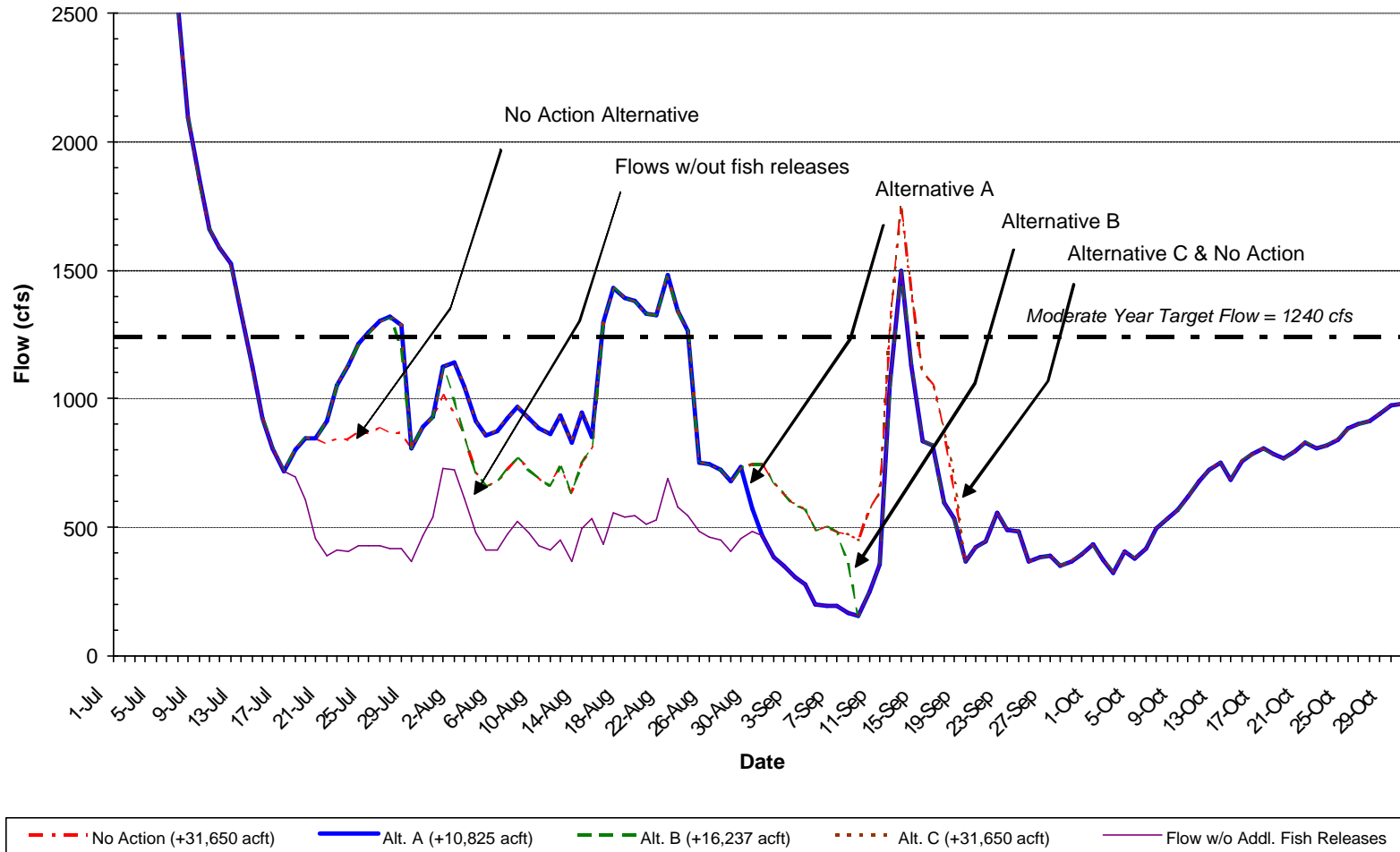
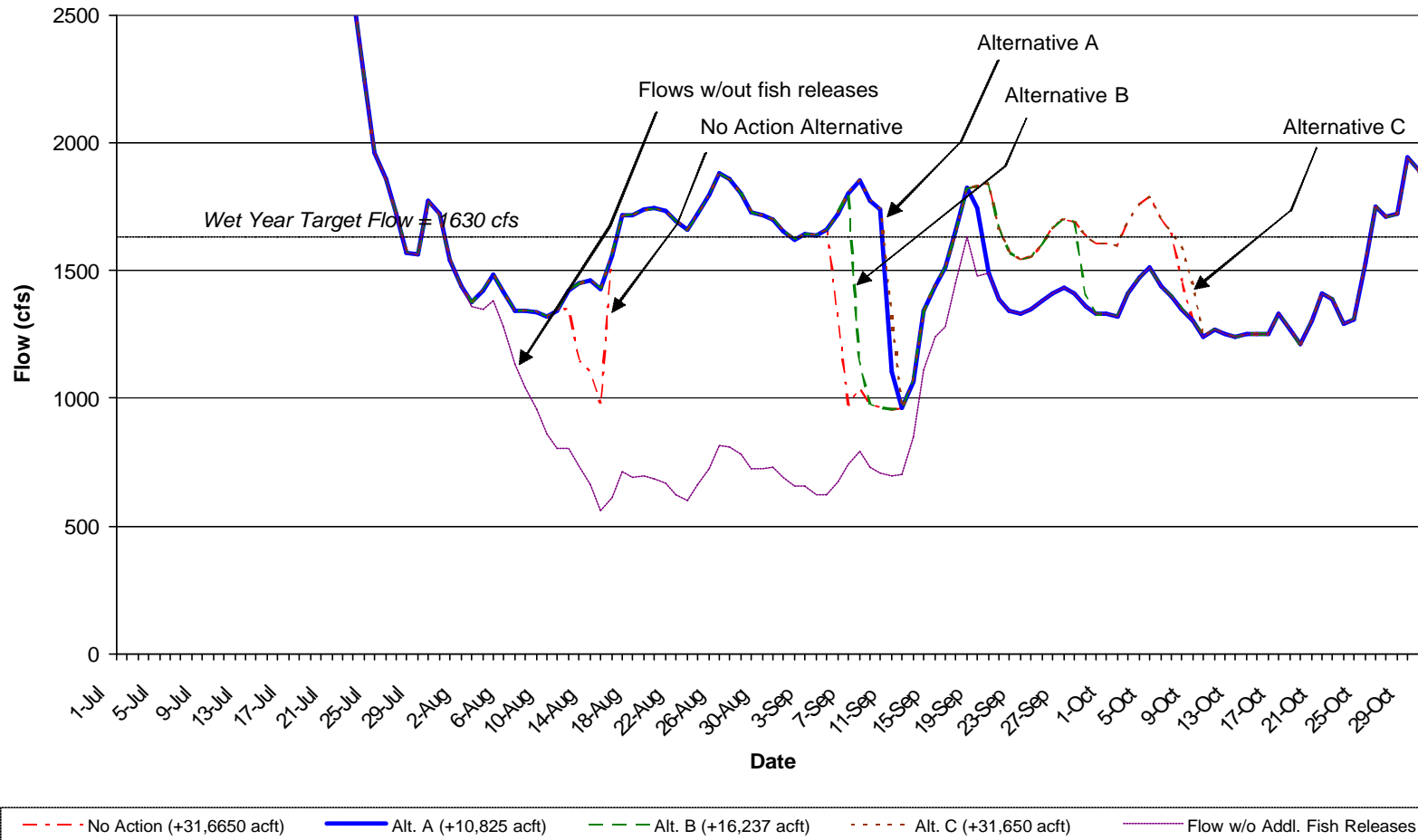


Figure 4.3. Wet Year (1996) Simulated 15 Mile Reach Flow. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryngpan River Target.



Modeling results depicted in Figure 4.5 indicate no difference between alternatives in their impact upon the availability of the Dearhamer and Yacht Club boat ramps and the volume of the reservoir through most of the recreation season up until nearly Labor day. Although Figure 4.5 indicates the reservoir content during a moderate year would drop below 85,000 af prior to Labor Day, in actual operations this would not be anticipated to occur. Past endangered fish release practices indicate releases are made later and rationed over a longer period than the model simulations reflect. Between 1989 and 2001, end of month Ruedi Reservoir volumes for June, July and August did not fall below 85,000 af except in August 2001. This is a good indication that reservoir levels should remain above 85,000 af throughout the late portion of the recreation season (prior to Labor Day) in all but the driest of years. Thus, when past endangered fish release practices are considered, it is likely that all of the boat ramps at Ruedi reservoir would remain available through Labor Day.

Results depicted in Figure 4.6 indicate that during wet years there is an insignificant difference between alternatives and more than sufficient reservoir storage should be available to maintain use of all of the boat ramps through Labor Day.

The three graphs, Figures 4.4, 4.5 and 4.6, show no appreciable difference between the alternatives during the recreation season for wet, moderate and dry years. Furthermore, in a given year, the alternatives would not result in a noticeable difference in reservoir storage until after Labor Day, when recreation visitation significantly declines.

Alternative Effects: No impacts to Ruedi Reservoir recreation are anticipated as a result of Alternatives A, B, and C. The No Action Alternative and Alternatives A, B, and C are all projected to create similar reservoir storage levels during the portion of the recreation season of use when endangered fish releases would occur (July 4th – Labor Day).

Fishing. Fishermen continue to express concern about access along the Fryingpan River below Ruedi Dam. Both commercial outfitters and private fisherman point to difficulty in being able to wade 100 percent of the Fryingpan channel once flows exceed 250 cfs, limiting the parts of the river accessible for fishing, as well as access to the opposing shoreline. This, compounded by the fact that access to about half of the fourteen miles of riverbank in this reach is controlled by private land ownership, can lead to overcrowding along publicly-owned portions of streambanks and diminish user experience when flows limit wading.

The figures generated by the hydrologic modeling offer some insight on the relative effects of the alternatives. As previously explained, common to all model alternatives are the Fryingpan River flow constraint of 350 cfs, 1,500 af of releases for existing contracts, and the 5,000 af annually and 5,000 af in 4 out of 5 years for endangered fish contract, as described in section 4.2.1.

Figures 4.7 and 4.8 display the model's simulated flows in the Fryingpan River for dry and moderate years, respectively. The two figures indicate each alternative has identical release patterns during initial release periods for each respective precipitation year type. The only

Figure 4.4. Dry Year (1977) Simulated Ruedi Reservoir Content. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryngpan River Target.

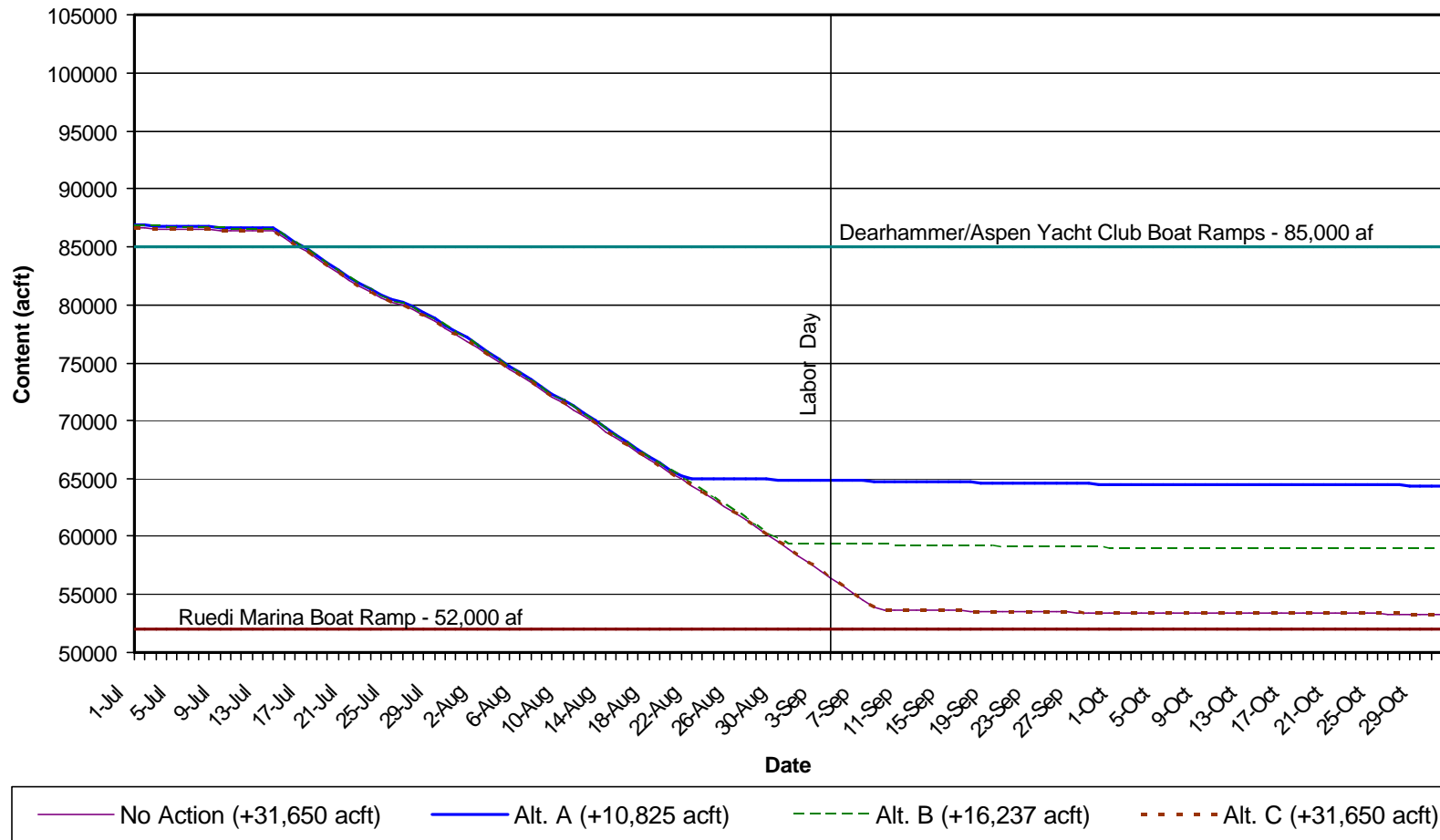


Figure 4.5. Moderate Year (1988) Simulated Ruedi Reservoir Content. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryingpan River Target.

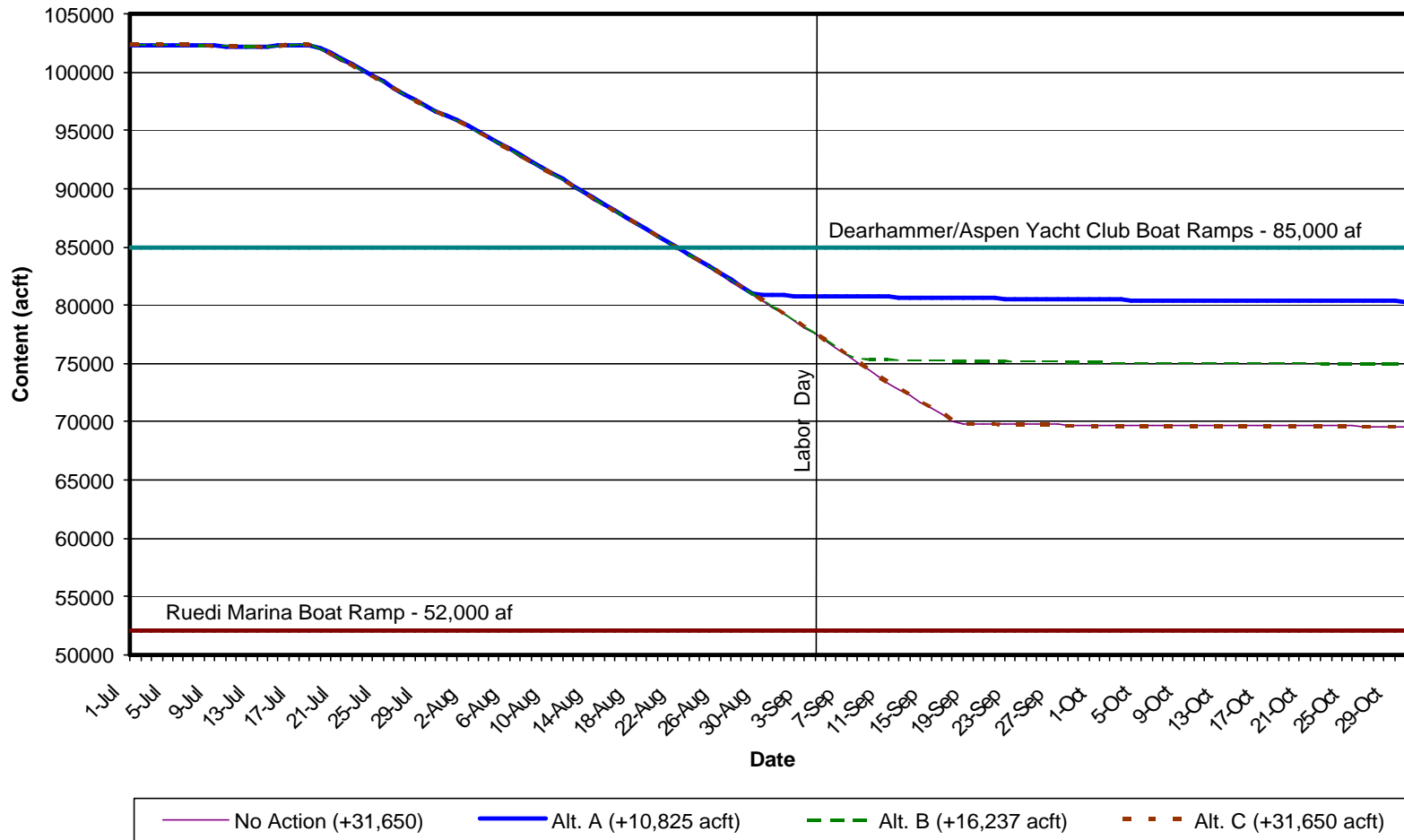
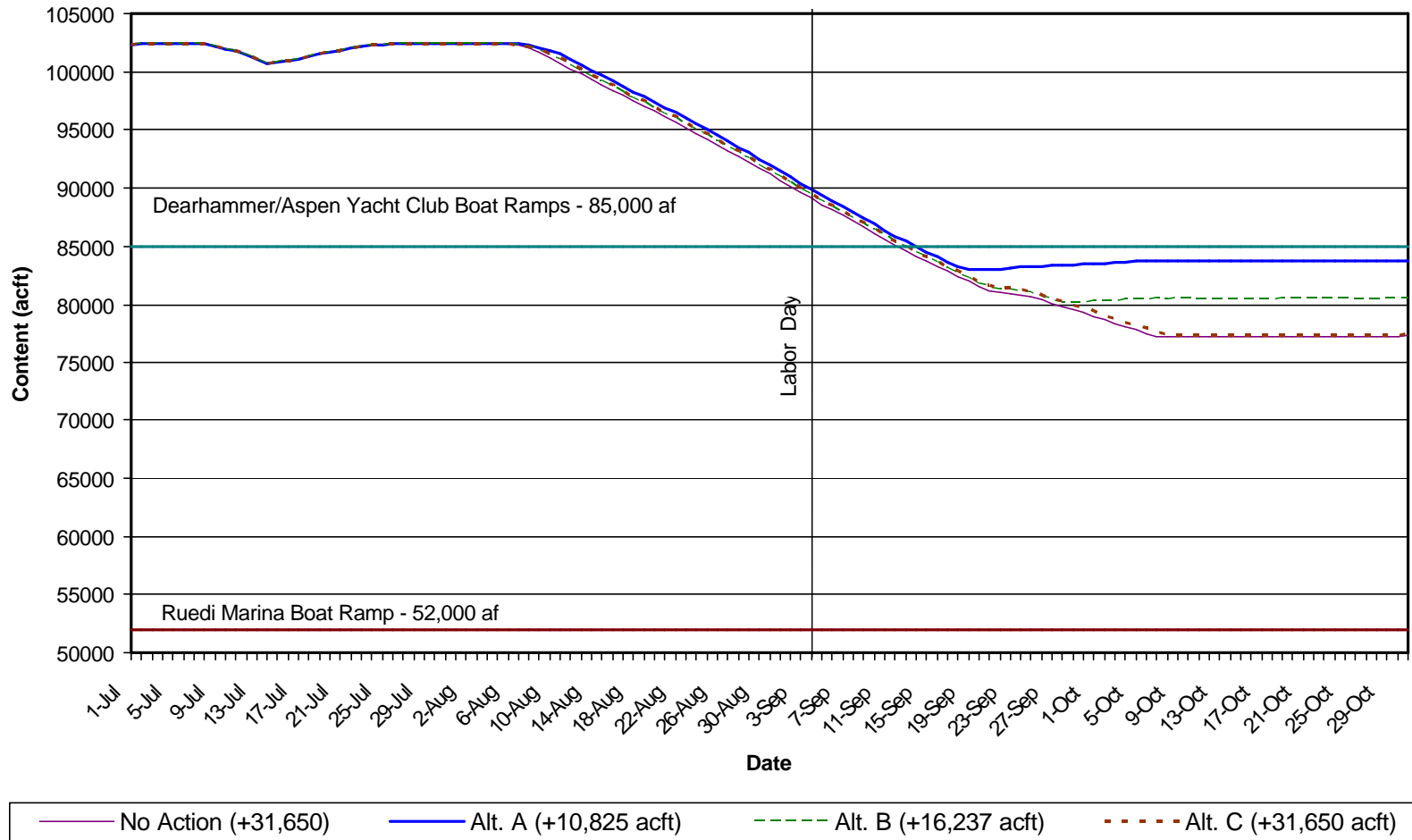


Figure 4.6. Wet Year (1996) Simulated Ruedi Reservoir Content. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryirngpan River Target.



differences arise as a result of the quantity of water made available under each alternative, which serves to extend the release period. The dry year simulation, Figure 4.7, indicates there would be approximately 39 days \geq 250 cfs in the Fryingpan River below Ruedi Dam under Alternative A, approximately 48 days for Alternative B, when delivered, and approximately 57 days for the No Action Alternative and Alternative C. The moderate year simulation, Figure 4.8, indicates approximately 46 days \geq 250 cfs under Alternative A, approximately 55 days for Alternative B, when delivered, and approximately 67 days for the No Action Alternative and Alternative C.

Figure 4.9, wet year flow simulations for the Fryingpan River, indicates there are only minor differences in the periods of flows near 350 cfs between alternatives at the end of the release period. There is approximately a two week period where flows rise above 250 cfs to the mid 270 cfs range under Alternative C and the No Action alternative. The figure shows there would be approximately 55 days \geq 250 cfs in the Fryingpan River below Ruedi under Alternative A, 61 days \geq 250 cfs under Alternative B, when delivered, 70 days \geq 250 cfs under Alternative C and 73 days \geq 250 cfs under the No Action Alternative.

Historically, endangered fish releases have a low occurrence (3.24 percent) of equaling or exceeding 250 cfs. However, when endangered fish releases are combined with operational and contract releases, and runoff from Rocky Fork Creek just below Ruedi Dam, the occurrence of flows in excess of 250 cfs in the Fryingpan River below Ruedi increases to 27.36 percent. Again, the modeling tends to result in a higher number of days with flows above the 250 cfs level than is anticipated under real operations due to the model being driven by mathematical algorithms. In requesting releases, the Fish and Wildlife Service historically has tended to be more sensitive to keeping flows at or below 250 cfs. The Service also has desired to stretch the availability of their water through out the season.

During the past fourteen years, there were six years when combined flows did not exceed 250 cfs during endangered fish releases. In the eight years when flows went above 250 cfs below Ruedi Dam, each had extended periods with flows above this level, ranging from 32 to 61 days, with the exception of 2001 and 2002 when only nine and eleven days, respectively, above 250 cfs occurred.

The CDOW has indicated there are some benefits to the Roaring Fork River due to endangered fish releases. The additional flows in the Roaring Fork from endangered fish releases can, at times, increase opportunities for boating and fishing from boats (Czenkusch, 2001). The outfitter/guide industry using the Roaring Fork has indicated similar feelings that their season can on occasion be extended due to these late season releases.

Alternative Effects: Alternative A will beneficially affect fishing experiences along the Fryingpan River in comparison to the No Action Alternative. Alternative A, which reduces the potential occurrence and duration of flows in excess of 250 cfs, makes a smaller quantity of water available than the No Action Alternative. The smaller water quantity associated with Alternative A would, however, provide less benefit to the Roaring Fork than the No Action Alternative. Fewer releases would mean less potential supplemental flows to aid boating and fishing from boats on the Roaring Fork.

Alternative B would have effects similar to Alternative A, except in those years (predicted to be one in ten years) when releases are made on behalf of the west slope water users. In those years, more water would be made available from Ruedi Reservoir than Alternative A, but less water

than the No Action Alternative. Consequently, there would potentially be less benefit to the Fryingpan River fishing than Alternative A, but more benefit to Roaring Fork River fishing.

Alternative C will have no effect on Fryingpan or Roaring Fork River fishing when compared to the No Action Alternative. Roaring Fork River fishing by boating could potentially see some benefit from additional releases made due to Round II water contracting.

4.2.4 Economic/Social Environment

In large part, the concerns expressed regarding economic impacts by the public have been focused on the Town of Basalt (Basalt) economy and, to a lesser extent, the Roaring Fork Valley (Valley) economy. Outdoor recreation in the Roaring Fork Valley is an important draw for tourists and important to the quality of life for area residents. During the winter, the major recreational activity is alpine skiing, while during other seasons fishing is a top attraction. Because recreation in the Roaring Fork Valley is a draw for tourists, impacts on recreation activities can result in impacts to the local economies.

Within the Basalt area, Ruedi Reservoir and Fryingpan River recreation accounted for an estimated \$1,352,063 or 1.55 percent to Basalt's \$87 million total sales for 2001 (Roaring Fork Conservancy, 2002). Total annual expenditures in the entire Roaring Fork Valley during 2001 for recreation visitors are estimated to be \$2,755,532. To put these figures in relative context, water year 2001 is considered a slightly below average precipitation year. In addition, endangered fish releases reached the second highest level of quantity released over the past fourteen years – 20,825 af, and there were nine days at or above 250 cfs on the Fryingpan River below Ruedi Dam.

Recreation activities at Ruedi Reservoir, on the Fryingpan River downstream of Ruedi, and on the Roaring Fork River can all potentially be impacted by Ruedi Reservoir endangered fish releases. However, minimal impacts to recreation at Ruedi Reservoir are expected as a result of action alternatives (see Section 4.2.3), and effects on Roaring Fork River rafting is expected to be limited (see Section 4.2.3, *Alternative Effects*). Consequently, minimal effects on the economy are expected as a result of impacts to recreation activities at Ruedi Reservoir and on the Roaring Fork River. Ruedi releases to enhance flows in the 15 mile reach have the greatest potential to affect recreation activity on the Fryingpan River below Ruedi. Fryingpan River recreation, especially fishing, generated nearly 50 percent of the direct recreation expenditures in the Fryingpan Valley. These recreation expenditures accounted for approximately 3 percent of the total estimated \$87 million gross sales in Basalt in 2001 (Roaring Fork Conservancy, 2002). Annual direct spending on lodging related to Lower Fryingpan River recreation was about \$292,000 or 31percent of the 2001 gross lodging sales of \$944,750 (Roaring Fork Conservancy, 2002). Therefore, analyzing the effects on Fryingpan River fishing is crucial to estimating effects on the economy.

Figure 4.7. Dry Year (1977) Simulated Flows In The Fryingspan River Below Ruedi Reservoir. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryingspan River Target.

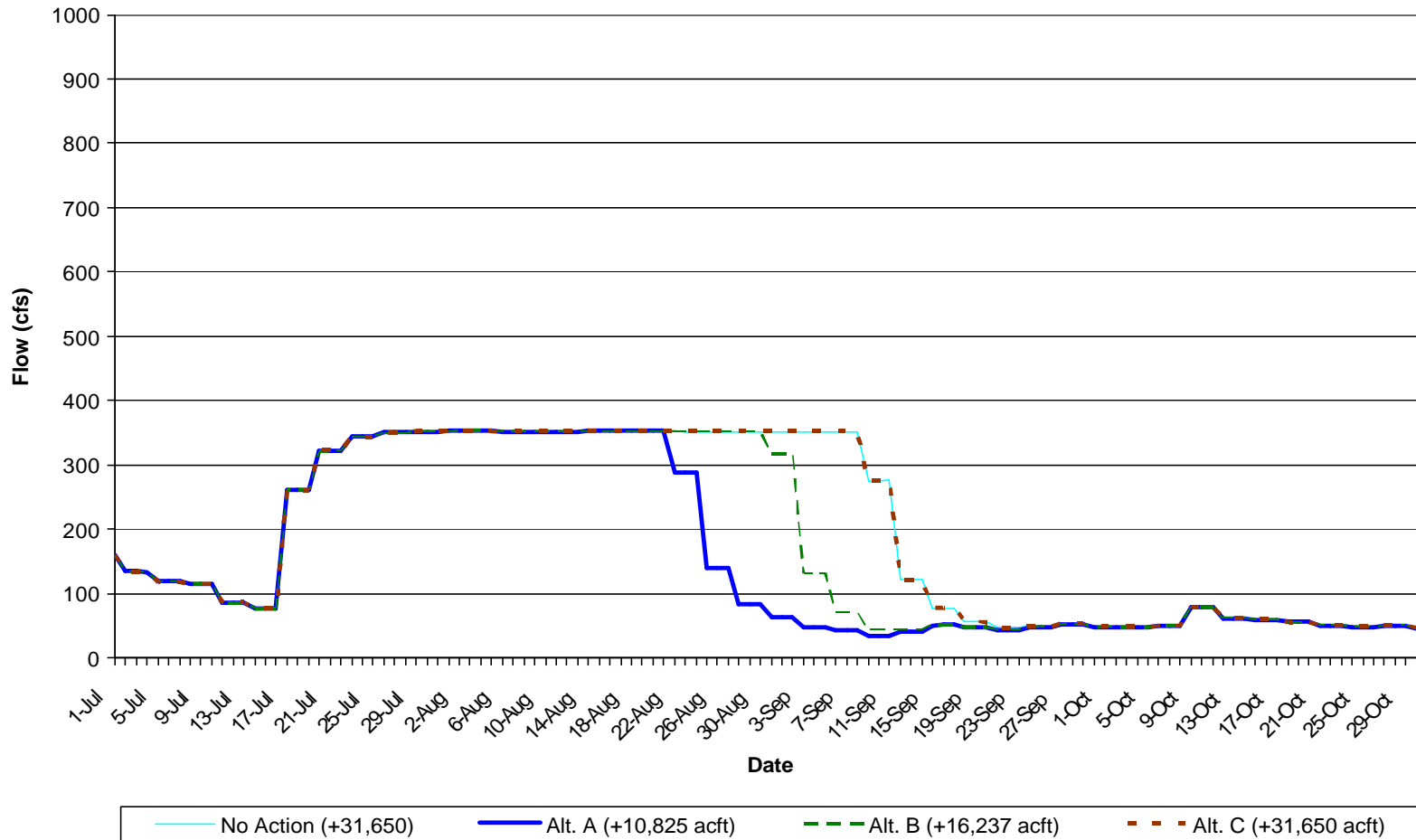


Figure 4.8. Moderate Year (1988) Simulated Flows In The Fryingpan River Below Ruedi Reservoir. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryingpan River Target.

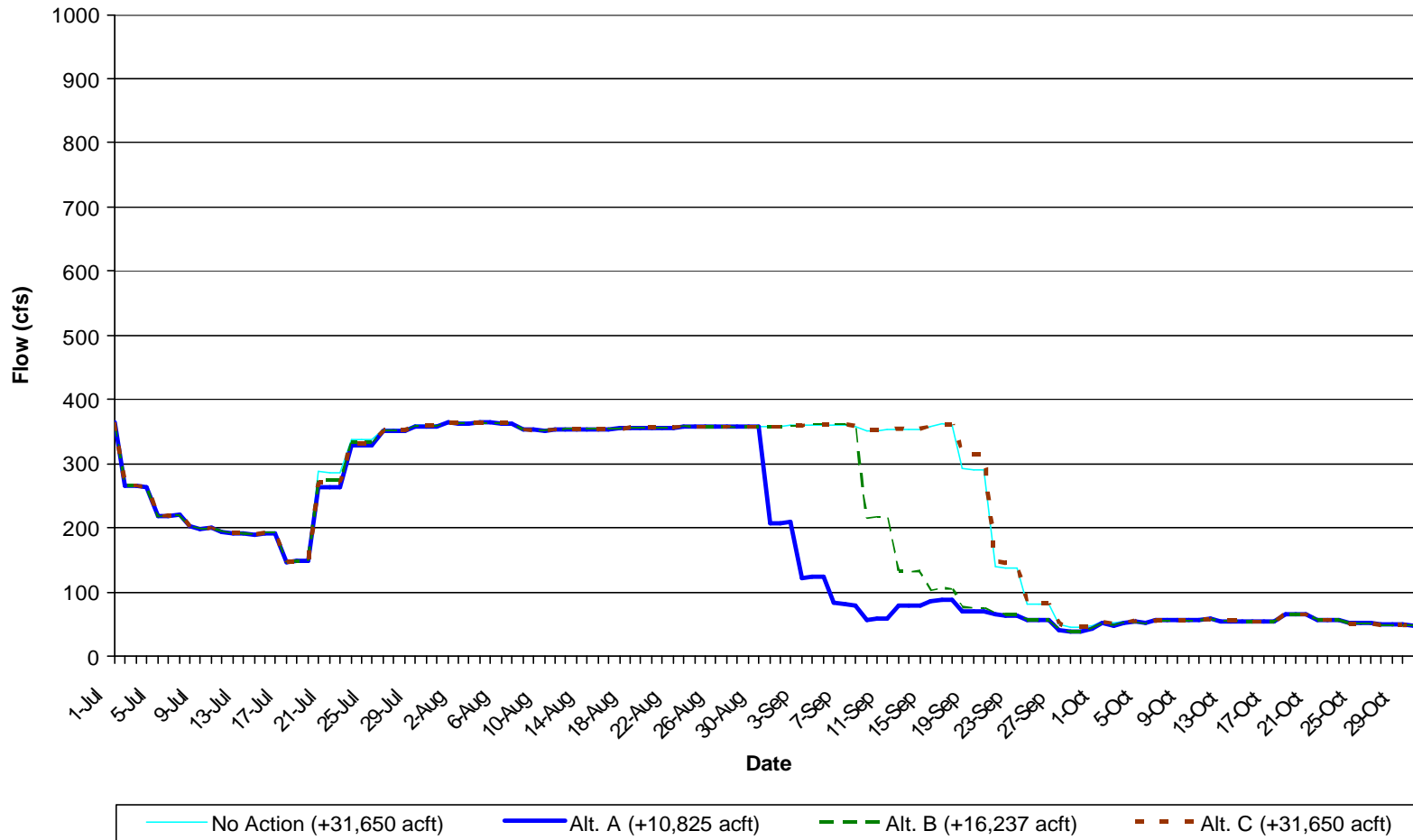
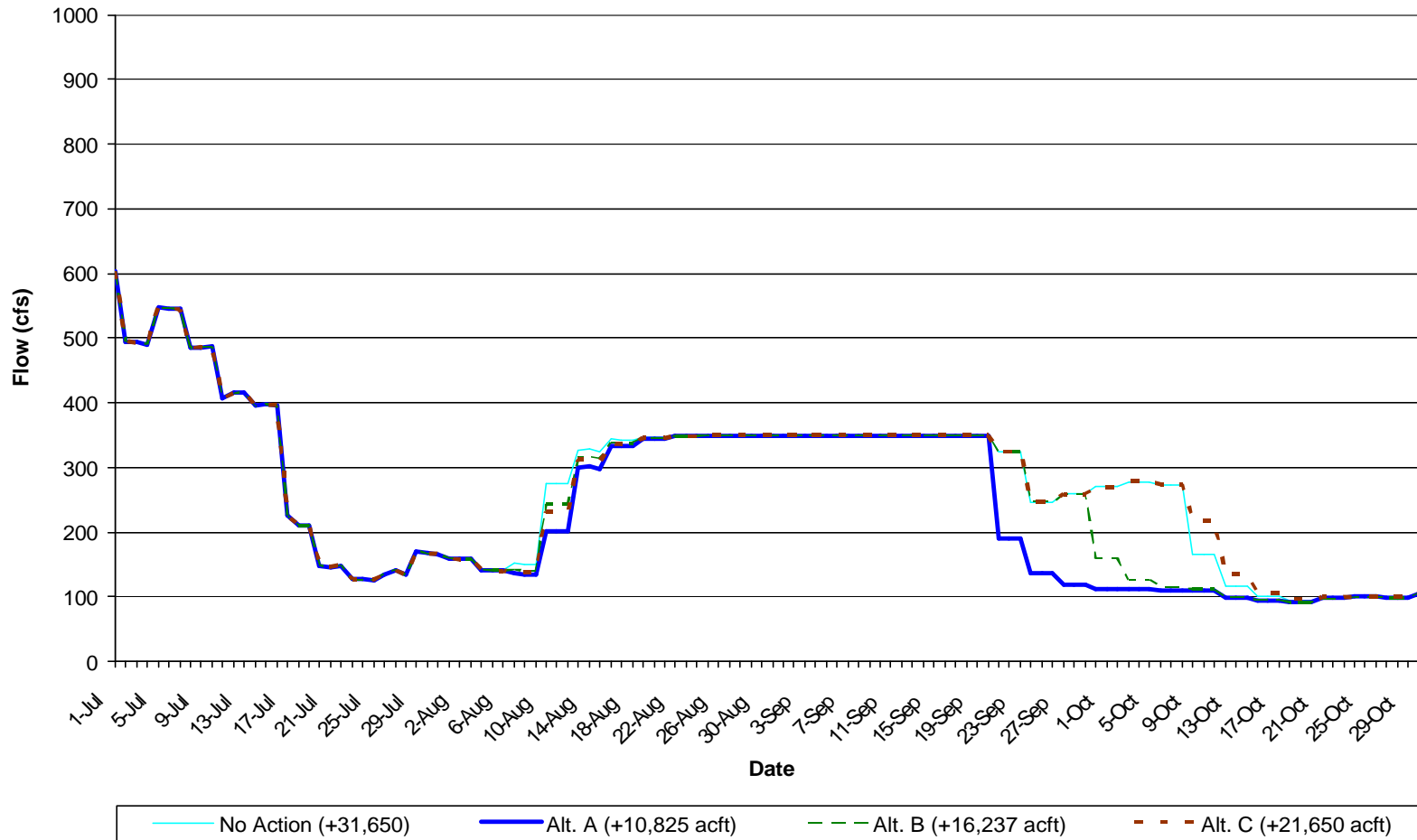


Figure 4.9. Wet Year (1988) Simulated Flows In The Fryingspan River Below Ruedi Reservoir. Modeling Includes Existing 1,500 af Of Water Contract Demand, 5,000+5,000 af Endangered Fish Contract, and 350 cfs Fryingspan River Target.



Potential impacts to fishing, in this case, would stem from either impacts to the fishery or impacts to fishing experience (flow, accessibility, etc.) No substantial impacts to the fishery of the Fryingpan River are anticipated as a result of any of the alternatives (see Section 4.2.2). Consequently, impacts on the economy, as a result of impacts to the fishery, are not anticipated.

Looking at fishing experience along the Fryingpan River, there are notable differences between the alternatives depending on the precipitation year types. In general, flows in excess of 250 cfs are considered to be the primary impact on fishing experience because it limits wadeability and access of the Fryingpan River. In wet years, the hydrologic modeling (see Section 4.2.3, Figure 4.9) indicates that Fryingpan River flows are expected to be equal to or above 250 cfs for 55 days under Alternative A, 61 days under Alternative B, when delivered, 70 days under Alternative C, and 73 days under the No Action Alternative. In wet years impacts to the Roaring Fork Valley would be expected to be the least under Alternative A, followed by Alternative B. Alternative C and the No Action Alternative will have the most number of days equal to or above 250 cfs.

Moderate precipitation year hydrologic modeling indicates that flows in the Fryingpan River would be equal to or above 250 cfs for 46 days under Alternative A, 55 days under Alternative B in years when additional water is delivered, and 67 days for Alternative C and the No Action Alternative. Accordingly, impacts to the Roaring Fork Valley would be expected to be the least under Alternative A and Alternative B for years when additional water is not delivered, and the greatest under Alternative C and the No Action Alternative.

For dry years, the hydrologic modeling suggests that Fryingpan River flows would be at or greater than 250 cfs for 39 days under Alternative A, 48 days for Alternative B in years when water is delivered, and 57 days for Alternative C and the No Action Alternative. Again, impacts to the Roaring Fork Valley are expected to be the least under Alternative A and Alternative B for years when additional water is not delivered, and the greatest under Alternative C and the No Action Alternative.

The availability of suitable augmentation water to supply demands in the growing Roaring Fork Valley also can potentially play a role in local economies. If the demand for augmentation water on the west slope exceeds the available supply from Ruedi Reservoir during the term of the agreement, the alternatives could potentially have differing levels of effect on future development. No Action could potentially affect future development opportunities on the west slope because no additional water for contracting would be available from Ruedi. This could, in part, be minimized by the availability of water from Wolford Reservoir to meet these demands. However, Wolford Reservoir cannot meet contracting demands on the Fryingpan and Roaring Fork Rivers unless the demands on these rivers are generated by calls on the Colorado River downstream of the Roaring Fork. Any augmentation water that is necessary to meet calls on the Fryingpan and Roaring Fork Rivers can only be met by Ruedi Reservoir or conversion of other rights to augmentation. However, based on current requests and the availability of Wolford Reservoir to meet at least some of the demand, Reclamation does not believe that any of the alternatives, including no action, will result in lost development opportunities on the west slope.

Alternative Effects: When compared to No Action, Alternatives A and B have the least effect on flows in the Fryingpan River. When compared to No Action, Alternatives A and B have potential beneficial effects on the economy in moderate and dry years, and equal impacts during

wet years. Alternative C is not expected to result in either negative or beneficial impacts on the Roaring Fork Valley economy when compared to the No Action Alternative.

4.2.5 Hydropower Production

Through a program administered by FERC, the Town of Aspen was licensed to construct a hydropower facility at the base of Ruedi Dam. Aspen's FERC license allows Aspen to make use of operational releases from Ruedi Reservoir to generate energy. A Memorandum of Agreement between Reclamation and Aspen for operation of the hydropower facility states that Reclamation has sole discretion concerning release rates from Ruedi Reservoir. Under the alternatives set forth in this document Aspen will continue to be able to use releases at their discretion.

Because Aspen's FERC license affords them the opportunity to use any releases made from Ruedi, any releases within the capacity of the power plant are considered a benefit to Aspen. Increased flows due to releases for endangered fish up to 250 cfs are an opportunity for increased power production, which benefits Aspen, if used. Releases in excess of the hydropower facility capacity are not considered an adverse effect on energy production. Consequently, each of the alternatives will have varying degrees of benefit to Aspen.

Releases above 250 cfs in the summer and fall may also result in less fall/winter season releases and thus less generation during this timeframe. A key consideration in winter power generation is the power plant's ability to utilize low flows. The power plant can effectively only use flows at or above 40 cfs and must cease operation below this level. As Table 4.4 indicates mean monthly winter releases have not dropped below 40 cfs during the last 13 years of endangered fish releases. The lowest mean monthly releases occurred in January 2002 as a result of unusually low snowpack, yet average monthly releases from Ruedi were maintained at or above 40 cfs. This suggests that none of the Alternatives would likely cause mean monthly winter flows to drop below 40 cfs.

Alternative Effects: The varying degrees of bypass of the power plant due to flows exceeding 250 cfs will produce varying degrees of benefit to the Aspen power plant under the different alternatives. Alternative A would result in the least number of estimated bypass days with 39 days in dry years, 46 days in moderate years, and 55 days in wet years. Alternative B (when delivered) would result in a slightly higher number of bypass days with an estimated 48 days in dry years, 55 days in moderate years, and 61 days in wet years. The most bypass days would occur under the No Action Alternative and Alternative C. Flows would be bypassed an estimated 57 days in dry years and 67 days in moderate years. In wet years, bypasses are expected to occur 73 and 70 days respectively.

As explained in Section 2.2.2., it is not appropriate to analyze an alternative limiting flows to 250 cfs for the benefit of the Aspen power plant. Also, given the nature of the FERC program whereby the degree of benefit to Aspen may not determine Ruedi's releases but Aspen may benefit from Ruedi's releases, releases under all the alternatives are considered to benefit Aspen.

4.2.6 Cultural Resources

The No Action Alternative and Alternatives A, B and C, as described, would not result in new surface disturbances since the delivery system for endangered species releases consists of existing stream courses, and no new facilities will need to be constructed. Water levels and shoreline areas subjected to wave action within Ruedi Reservoir would not change substantially with any of the alternatives. The water levels for the alternatives in a representative dry year,

(Figure 4.4) a representative moderate year, (Figure 4.5) and a representative wet year (Figure 4.6) are listed in Table 4.5 as follows:

Table 4.5. Mean High and Low Water Levels at Ruedi Reservoir

	Water Year Type					
	DRY		MODERATE		WET	
	High	Low	High	Low	High	Low
No Action	7750	7706	7766	7730	7766	7738
Alternative A	7750	7723	7766	7743	7766	7745
Alternative B	7750	7715	7766	7736	7766	7742
Alternative C	7750	7706	7766	7730	7766	7739

These indicate the reservoir water levels for all alternatives range from a high of 7766 feet to a low of 7706. Water levels for Alternatives A and B have the same high elevations as the No Action Alternative, since the reservoir starts with the same amount of water in each of the representative years. However, low water levels are slightly higher for Alternatives A and B in each of the representative years than under the No Action Alternative.

All of the alternatives have water fluctuation ranges equal to or less than the No Action Alternative, indicating that wave action from implementation of any of the alternatives will not be worse than the No Action Alternative.

The cultural resource survey for the reservoir, conducted by Arnold Withers in 1964 (Withers, 1964) indicates no archaeological sites between the 7700 and 7800 elevation contours. In addition, the steep sides of Ruedi Reservoir have been subjected to wave action for the past 34 years, and any cultural resources not identified by Withers in 1964 would have already been impacted.

Finally, there would be no significant changes to the streambed downstream as a result of any of the alternatives (See 4.1, Erosion and Scour), and thus there would be no effect on cultural resources below the Reservoir.

Alternative Effects: The No Action Alternative and Alternatives A, B, and C are not the type of undertakings that have potential to affect cultural resources.

4.2.7 Indian Trust Assets and Environmental Justice

There are no anticipated effects to either Indian Trust Assets, or minority or low-income populations and communities as a result of any of the alternatives.

4.3 Summary of Environmental Effects

Table 4.6 provides a summary of the environmental effects described in the Environmental Consequences section of this document.

Table 4.6. Summary of Environmental Effects.

	<u>No Action</u>	<u>Alternative A</u>	<u>Alternative B (when delivered)</u>	<u>Alternative C</u>
<p>Hydrology</p> <ul style="list-style-type: none"> • Erosion and Scour • Water Contracting 	<p>Releases are not expected to affect either bank erosion or streambed scour</p> <p>Round II contracting restricted to 6,135 af</p>	<p>Same as no action</p> <p>Round II Contracting expanded to 17,000 af with potential to contract for 10,825 af if demand materializes</p>	<p>Same as no action</p> <p>Round II Contracting expanded to 17,000 af with potential to contract additional 10,825 af if demand materializes. When delivered, 5,412 af would be provided thru a temporary one-year service contract</p>	<p>Same as no action</p> <p>Round II Contracting expanded to 17,000 af</p>
<p>Aquatic Wildlife</p> <ul style="list-style-type: none"> • Sport Fishery • Threatened & Endangered Species 	<p>Releases not anticipated to have any impact on sport fishery</p> <p>Short-term (one-year) agreements would provide up to 21,650 af for endangered fish habitat and recovery; short-term agreements less desirable than long-term</p>	<p>Same as no action</p> <p>10,825 af per year through 2012 to improve endangered fish habitat and recovery</p>	<p>Same as no action</p> <p>10,825 af per year through 2012 to improve endangered fish habitat and recovery</p> <p>Provide portion of the west slope water users commitment an estimated 10% of time (1 in 10 years), should circumstances interrupt their augmentation water for endangered fish recovery</p>	<p>Same as no action</p> <p>10,825 af per year through 2012 to improve endangered fish habitat and recovery</p> <p>Make an additional 10,825 af available for endangered fish recovery</p>

Table 4.6 (cont.)	<u>No Action</u>	<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>
Recreation <ul style="list-style-type: none"> • Ruedi Reservoir • Fryingpan Fishing • Roaring Fork Fishing 	<p>In dry years, Aspen and Dearhamer boat ramps would only be usable until early July. In moderate years, Aspen and Dearhamer would be usable until late August/early Sept. In wet years, all boat ramps would be usable through the season.</p> <p>Estimated 57 days = 250 cfs in Fryingpan River for dry years, 67 for moderate years, and 73 for wet years</p> <p>Releases benefit Roaring Fork fishing opportunities</p>	<p>Same as no action</p> <p>Estimated 39 days = 250 cfs in Fryingpan River for dry years, 46 for moderate years, and 55 for wet years</p> <p>Smaller releases would provide less benefit to Roaring Fork fishing opportunities than no action</p>	<p>Same as no action</p> <p>Estimated 48 days = 250 cfs in Fryingpan River for dry years, 55 for moderate years, and 61 for wet years</p> <p>Smaller releases would provide less benefit to Roaring Fork fishing opportunities than no action</p>	<p>Same as no action</p> <p>Estimated 57 days = 250 cfs in Fryingpan River for dry years, 67 for moderate years, and 70 for wet years</p> <p>Same as no action</p>
Economic/Social Environment	Potential for largest number of days over 250 cfs, which could translate to greatest economic impact	Reduced number of days over 250 cfs, potential for less economic impact than no action	Reduced number of days over 250 cfs, potential for less economic impact than no action	Same as no action
Hydropower Production	Estimate of 57 days when flows would be bypassed in dry years, 67 for moderate years, and 73 for wet years	Estimate of 39 days when flows would be bypassed in dry years, 46 in moderate years, and 55 in wet years	Estimate of 48 days when flows would be bypassed in dry years, 55 in moderate years, and 61 in wet years.	Estimate of 57 days when flows would be bypassed in dry years, 67 in moderate years, and 70 in wet years
Cultural Resources	Not the type of undertaking that has potential to affect cultural resources	Same as no action	Same as no action	Same as no action
Indian Trust Assets and Environmental Justice	No effects are anticipated	Same as no action	Same as no action	Same as no action

CHAPTER 5 – CONSULTATION AND COORDINATION

5.1 Public Involvement

In March 2000, the Bureau of Reclamation opened a public scoping process to identify significant issues and concerns associated with the proposed action for Ruedi Reservoir deliveries. A scoping document outlining the background and need for the proposed action was issued to beneficiaries and stakeholders. News releases were also issued to announce the opening of the scoping process and a public meeting.

A public meeting was held on May 10, 2000, at the Basalt Middle School. The purpose of the meeting was to introduce the proposed action, identify additional issues and concerns, and answer questions. The meeting was divided into three sections: an introduction to the Upper Colorado River Endangered Species Recovery Program, Background on Ruedi Reservoir and its Recovery Program Role, and a Summary of the Scoping Process. Questions and comments from the meeting were considered in the development of the Draft EA. Participants in the scoping process and in the public meeting were added to the distribution list for the Draft EA and have had the opportunity to comment on it.

Comments received at the meeting and in response to scoping are summarized in Table 5.1.

Table 5.1. Comment Summary from Public Meeting and Disposition.

COMMENT	DISPOSITION
<p>1. a) Flows from Ruedi Reservoir releases made under the proposed agreement will destroy fisheries in the Fryingpan River.</p> <p>b) Flows from Ruedi Reservoir releases made under the proposed agreement will negatively impact brown trout redds and the natural reproduction of the species.</p> <p>c) Flows from Ruedi Reservoir releases made under the proposed agreement may cause low flow releases from the reservoir during the winter, negatively affecting over wintering habitat for fish.</p>	<p>a) Address in environmental assessment.</p> <p>b) Address in environmental assessment.</p> <p>c) Address in environmental assessment.</p>
<p>2. Flows from Ruedi Reservoir releases made under the proposed agreement will negatively impact economies of the Fryingpan and Roaring Fork valleys.</p>	<p>Address in environmental assessment.</p>
<p>3. a) Flows greater than 250 cfs from Ruedi Reservoir releases made under the proposed agreement negatively impact recreation in the Fryingpan and Roaring Fork valleys.</p> <p>b) Flows from Ruedi Reservoir releases made under the proposed agreement may reduce water levels and negatively impact recreation at the reservoir.</p>	<p>a) Address in environmental assessment.</p> <p>b) Address in environmental assessment.</p>
<p>4. Flows from Ruedi Reservoir releases made under the proposed agreement will cause physical damage to the stream banks of the Fryingpan River.</p>	<p>Address in environmental assessment.</p>
<p>5. Fluctuating flows from Ruedi Reservoir releases made under the proposed agreement will negatively impact macro invertebrate production.</p>	<p>Address in environmental assessment.</p>
<p>6. Concern exists that the west slope water users' commitment to provide 5,412.5 af/year from Wolford Mountain Reservoir may not be achievable some years due to extraordinary operation and maintenance circumstances, yet there may be unused contracted water available in Ruedi Reservoir. Shortages such as this can occur due to events beyond human control and may be as frequent as 1 out of every 10 years.</p>	<p>Address in environmental assessment.</p>
<p>7. Interest has been expressed in using 10,825 af of Ruedi Reservoir's uncommitted yield to enhance 15 Mile Reach flows and/or fulfill water users' obligations. (This request to make 10,825 af of the uncommitted yield available would be in addition to the 10,825 af made available through the proposed long-term agreement.)</p>	<p>Address in environmental assessment.</p>
<p>8. There is concern that there are growing demands on Ruedi Reservoir and no current environmental studies.</p>	<p>Outside the scope of the Proposed Action.</p>
<p>9. Ruedi has been overburdened with the responsibility for endangered species flows.</p>	<p>Outside the scope of the Proposed Action.</p>
<p>10. Put a cap on Ruedi Reservoir's commitment to support flows in the 15 Mile Reach.</p>	<p>Outside the scope of the Proposed Action.</p>
<p>11. Manage Ruedi Reservoir to maintain existing uses and economies.</p>	<p>Outside the scope of the Proposed Action.</p>
<p>12. Reassess Ruedi Reservoir's role as a regional water supply.</p>	<p>Outside the scope of the Proposed Action.</p>
<p>13. Ruedi Reservoir should be operated so that there is 95,000 af available on September 1 and 85,000 af available on October 1 to enhance recreation.</p>	<p>Outside the scope of the Proposed Action.</p>
<p>14. The maximum Fryingpan flow should be 200 cfs and the minimum should be 150 cfs.</p>	<p>Not supported by scientific evidence.</p>
<p>15. Preservation of endangered species in the Colorado River was not one of the enacted goals and purposes of Ruedi Reservoir.</p>	<p>Inaccurate -already decided by law.</p>
<p>16. The Proposed Action will negatively affect the hydropower plant at Ruedi Reservoir.</p>	<p>Address in environmental assessment.</p>
<p>17. Establish a priority for releases from Ruedi Reservoir – fish recovery flow releases should be subordinate to all others.</p>	<p>Outside the scope of the Proposed Action.</p>

The scoping period ended with the finalization of the EA. Meetings and consultations with concerned parties, stakeholders, and beneficiaries were held as needed. A public meeting presenting the Draft EA and inviting public comment on the draft was held in Carbondale on April 8th. Comments from the public were accepted from March 14th thru April 29th, 2002.

5.2 Consultation and Coordination with Other Agencies

During 2001, several technical meetings were held between Reclamation, the Colorado River Water Conservation District, Roaring Fork Conservancy and other interested parties to discuss the hydrologic modeling. These meetings aided in establishing direction for and clarifying key modeling elements. Limited discussion on the preparation of the EA and alternative development also occurred at these meetings.

A number of agencies/entities have been involved with development of Round II water marketing since its inception in the early 1980's. Each of these has been important in shaping the events leading to development of this draft EA. The following list is those agencies/entities, which were contacted during preparation of this specific draft EA and/or were included in review of the document.

- U.S. Fish and Wildlife Service
- Upper Colorado River Endangered Fish Recovery Program
- Roaring Fork Conservancy
- Town of Basalt
- U.S. Forest Service
- Colorado Division of Wildlife
- Colorado Water Conservation Board
- Ruedi Water and Power Authority
- Colorado River Water Conservation District

5.3 Public Response to Ruedi 2012 Agreement Draft EA

Table 5.2 is an itemization of all the comments received and how they were addressed in the letters. The 26 letters resulted in 181 comments. In Table 5.2 the first number is the number of the letter, and the second number is the number of the comment within the letter. Letters are numbered in the order they were received but are organized in Table 5.2 by groups. For instance all of the letters received from private individuals are grouped together. To determine how your comment was addressed, find the number of your letter below then proceed to the table. For instance the 23rd comment from the Colorado Water Conservation Board may be found on the 3rd page of Table 5.2 under comment number **26-23**. How each comment was dealt with is explained in Table 5.2. In some cases the comment resulted in changes to the EA. Where these changes can be found in the EA is explained in the right most column of the table. In many cases several letters made similar or the same comment. Rather than repeating the comment that appeared in several letters, it is discussed the first time it appears in the table and the other letters are listed. For instance, Starwood Water District (letter #21) commented that they support the Colorado River Endangered Fish Recovery Program. This same comment was repeated by the Town of Basalt (#16), the Basalt Water Conservancy District (#22), and the Colorado River Water Conservation District (#23). Therefore, the comment is listed only the first time on page 5

of the table under Irrigation Districts, letter #21, with the other letters also listed at this point. Copies of the letters can be obtained by contacting Mr. Will Tully at (970) 962-4368.

1. Christopher Lewis – Basalt
2. Walt Geister – Aspen
3. Robert Karp – Snowmass
4. Ken Call – Glenwood Springs
5. R.L. Sherwood – Eagle
6. Robert Dunn – Basalt
7. Steve Custenborder – Basalt
8. Bruce Gabow – Basalt
9. Patrick Dearmin – Golden
10. JA Simpson – Aspen
11. Barbara Forrest – Carbondale
12. Tim Heng – Taylor Creek Fly Shop – Basalt
13. Cari Potter – Carbondale
14. Timothy Snowden – Penrose
15. Doug Davis – Carbondale
16. Town of Basalt
17. City of Rifle, Town of New Castle, Mid Valley Metropolitan District
18. Ernest Bradley - Ferdinand Hayden Chapter of Trout Unlimited
19. David Nickum - Colorado Trout Unlimited
20. Roaring Fork Conservancy
21. Starwood Water District
22. Basalt Water Conservancy District, Battlement Mesa Metropolitan District, Exxon Mobil and American Soda, LLLP
23. Colorado River Water Conservation District
24. Ruedi Water and Power Authority
25. Southeastern Colorado Water Conservancy District
26. Colorado Water Conservation Board

Table 5.2 Public Comments to Ruedi 2012 Draft EA and Responses

Colorado State Government Comments (letter #26)		
#	Comments	Responses
26	Reclamation should address how CWCB issues identified in several previous contracts are addressed in the EA.	
X	1. Assurances of no loss of Fry-Ark Project yield.	Section 2.1.1 of the EA has been revised to indicate that none of the alternatives considered in detail will affect Fryingpan Arkansas Project yield.
X	2. Assurance of no increased repayment costs to Fry-Ark Project water contractors	Reclamation has agreed to absorb the annual capital costs (plus interest) of the water provided pursuant to the 2012 agreement. The Recovery Program will pay the annual Operation and Maintenance (O&M) costs associated with the water. These measures assure the cost of Ruedi reservoir water to contractors will not increase as a result of the proposed agreement.
X	3. Reclamation should cover O&M costs to assure no increase costs to Ruedi contractors.	It has been agreed that O&M costs associated with water provided pursuant to the 2012 Agreement, will be paid for by the Recovery Program.
X	4. Operating guidelines concerning release rates and reservoir elevations should be clarified.	Operations are guided by the Fryingpan-Arkansas Project Operating Principles referred to in the EA. Operational measures common to all alternatives are described in Section 2.1.2. The measures address release rates and cumulative flows in the Fryingpan River. Reservoir elevations respond primarily to the type of hydrologic year (wet, dry, or moderate). See figures 4.4 through 4.6. Operational measure 3 in Section 2.1.2 (addresses cumulative flows in the Fryingpan River), will tend to stretch the releases for endangered fish throughout the augmentation season for the 15 Mile Reach. This moderates reservoir elevation decreases during the recreation season.
X	5. How do Ruedi releases fit in the overall strategy for managing flows in the 15 MR.	Figure 2.1 depicts how Ruedi releases fit in the overall management strategy.
X	6. Expand on the process used to balance the needs of recreation, water contractors, and endangered fish in developing the annual operating plan.	Annual operations are determined by factors such as hydrology and demands for releases for the multiple Project purposes consistent with the Operating Principles. Operational decisions are made on an on going basis in response to those factors, including recreation, water contracts, fish and wildlife, and endangered fish commitments.

26-1	X	Section 2.1, table in text identified as 2.1, should be 1.2 (26-1)	Correction made
26-2	X	Section 1.2, The purpose and need should be limited to execution of the contract and use of water may be anytime during the year but is expected to be predominantly from July to October. (26-2)	Reclamation believes the need for the proposed agreement is related to the PBO and Reclamation's need to contract the remainder of water available for contracting in Ruedi. The purpose and need statement (Section 1.2) was edited to include a statement that the proposed agreement will meet the requirement of the PBO and will permit Reclamation to continue contracting water in Ruedi. Section 2.1.3 has also been edited to include a statement of when the water is likely to be used.
26-3, 23-5	X	The description of the FWS pool in Wolford is incorrectly described. The amount of water available to the FWS is based upon annual storable inflow and how conservatively the pool was operated the previous year. While there's a high likelihood of carry-over from year to year, the FWS has not operated their pool on the basis of using carryover; rather they've assumed other parties will operate conservatively and have carryover. (23-5, 26-3)	Section 2.1.1 has been revised to more accurately describe the FWS pool in Wolford.
26-4	X	Pg. 2-2, change there to their (26-4)	Correction made
26-5	X	Clarify whether or not figures 2.2 through 2.4 include actions common to all alternatives discussed for enhancing July-October flows or not. Not sure whether or not Wolford, Williams Fork and Green Mountain water are included as noted in the pie charts. (26-5)	Figures 2.2 through 2.4 have been revised to include three corrections. 1) the model was re-run based on a revised No Action Alternative that does not include endangered fish releases of 5,412 af from Wolford or Williams Fork Reservoirs. 2) all graphs were re-run as an error was found in the way the contribution from Green Mountain Reservoir was modeled. 3) all graphs now include water contributions from Ruedi, Wolford, Williams Fork and Green Mountain reservoirs.
26-6	X	At the end of chapter 2, insert additional text to accompany the graphs of simulated reservoir content and flows from the modeling efforts or move the graphs to chapter 4. Most of the explanatory text is in Chapter 4 and the remaining graphs in Attachment A. (26-6)	Figures 2.2 through 2.4 reflect what would happen if Reclamation released only the 5,000 + 5,000 af and the currently estimated contract demand, and did not enter into the proposed agreement. This is not an alternative considered in detail because it does not meet the purpose and need, nor is it appropriate or accurate as explained in section 2.2.1. We developed limited information on the effects to meet a local interest. Chapter 4 analyzes only those alternatives considered in detail. This information remains in Chapter 2.
26-7	X	Section 3.1 2 nd paragraph after table 3.1. Change to Geologic features....control... (26-7)	Correction made

26-8	X	Section 3.1, pg. 3-3. Clarify the role of the operating principles vs. the CWCB instream flows in the discussion about minimum releases. The statement in section 4.2.2 in the paragraph preceding Table 4-4 is clear. Section 3.1 should be in greater detail but just as clear. (26-8)	Section 3.1 has been expanded to clarify the difference between the operating principles and CWCB's instream flow program.
26-9	X	Section 3.1.1: expand to include more details about the spring Coordinated Reservoir Operations and the late summer augmentation using surplus from the Green Mountain HUP pool as per the Orchard Mesa Check settlement, Grand Valley Water Management, etc. (26-9)	Section 3.1.1 has been expanded to include a discussion of the late summer augmentation from the Green Mountain HUP. Coordinated Reservoir Operations do not affect whether or not Ruedi fills and do not affect releases from Ruedi for endangered fish purposes.
26-10	X	Section 3.2.1, 2 nd paragraph, 1 st sentence: Change increasing to increased (26-10)	Suggested change not made; the text is correct.
26-11	X	Table 3.5, Distribution of outfitters/guide days per year. Is any data available for 1996 - present? (26-11)	Table 3.5 has been expanded to include data through the year 2000.
26-11a	X	Section 3.4. Rewrite the first paragraph to be clear if the visitor estimate refers to river users only. (26-15)	Section 3.4 has been revised based on information recently available from the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002).
26-12	X	Section 3.4: Clarify whether it is 20,000 visits or 20,000 visitors. Are people who fished multiple times counted once or every trip to the river? (26-12)	Section 3.4 has been revised and expanded to include information recently available from the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002). The sentence referred to in this comment was updated with the study's findings.
26-13	X	Section 4.1, pg. 4-3, 2 paragraphs before section 4.2. If Ruedi returns to providing 21,650 af, would the east and west slope water users need to provide their 10, 825 af? CWCB says likely not. (26-13)	The No Action Alternative has been revised to recognize that if Reclamation goes back to providing 21,650 from Ruedi, the east and west slope water users would not likely provide 5,412 each, as there is no benefit to the east or west slope for that action. This outcome has been explicitly indicated by the Colorado River Water Conservation District, and though it is not a decision delegated to Reclamation, is predicted to be true for east slope water users as well. The model was re-run and all graphs and text reflect this revision.
26-14	X	Section 4.2.1, need to emphasize that between now and 2012, that uses of contract water are not anticipated to exceed the 1500 af of historic use. It is important to remind the reader that we are looking at uses over the period of a 25 or 40-year contract and thus it is not necessary to show full development and use of contract water that some would expect. (26-14)	Section 4.2.1 has been revised
26-16	X	Section 4.2.1, middle of 2 nd paragraph. "In August 1998...sediments that had were deposited..." delete "had" (26-16)	Correction made

26-17	X	Section 4.2.1, Erosion and scour, 2 nd paragraph. Explain reason for flows exceeding 650 cfs to help reader understand the likely frequency of flows at this magnitude. (26-17)	This statement has been removed from the text, as flows of this magnitude could not be found in the 2001 Fryingpan record.
26-18	X	The Table 4.4 on pg. 4-9 would be more useful if the low flow events were included. (20-11) Table 4-4, pg. 4-9. Add a “monthly average” as far right column and “winter average” for each year. (26-18)	Table 4.4 has been revised to include monthly lows, monthly averages, and winter averages in the Fryingpan River and inflows to Ruedi Reservoir.
26-19	X	Figures 4-1 through 4-3. Add a small symbol to one of the lines for Alt. A or Flows w/o Fish Releases in order to make distinction. (26-19)	Figures 4-1 through 4-3 have been revised to distinguish among alternatives.
26-20	X	Section 4.2.3 There is a good discussion about the difference between modeled releases and probably reservoir operation. The section describes how modeling larger releases earlier in the season overstates the impacts to reservoir recreation due to larger than probable decreases in reservoir elevation during the recreation season. A similar discussion in the following Fishing section would be helpful. The model may overstate the simulated number of days flows would exceed 250 cfs. (26-20)	Section 4.2.3 <i>Fishing</i> has been revised to include discussion of the tendency of the model to overstate the flows that could be expected in the Fryingpan. The modeling is driven by mathematical algorithms. The model pushes releases to the maximum of the ‘Fryingpan River Modeling Constraint’ (350 cfs). In reality, the releases are more guided by the operations group’s Wednesday conference calls and the decisions made there. Historically, the FWS has been more sensitive to the concerns of exceeding 250 cfs in the Fryingpan and has worked to increase releases from other reservoirs to satisfy 15 Mile Reach targets or has allowed flows in the 15 Mile Reach to remain below target. Similar management responses could be expected in the future.
26-21	X	Section 4.2.4 – Economic/Social Environment, Alternative effects and Section 4.2.5 – Hydropower Production, alternative Effects should read “Alternatives A and B...” (26-21)	Correction made
26-22, 23-15	X	Table 4.6 – Check accuracy of “Beneficial Effects” to Recreation on the Fryingpan (26-22) and likewise determinations under Economic\Social environment. (26-22, 23-15)	Table 4.6 has been revised to reflect overall effects of the Alternatives.
26-23	X	Is there a need to add a section on mitigation measures to emphasize that there are no proposed mitigation measures necessary or required? Because this is an action taken to implement measures deemed necessary to help the recovery of endangered Colorado River fish. (26-23)	Even though the 2012 Agreement is necessary to implement endangered species recovery measures, environmental and socioeconomic effects of each alternative must be analyzed in comparison with the No Action Alternative. In the 2012 Agreement Alternatives A, B, and C either have the same or beneficial effects in all variables when compared to the No Action Alternative; for that reason mitigation measures are not applicable to the 2012 Agreement.

26-24	X	Attachment A, General Model operations, 2 nd bullet. Questions: Exactly how is the classification of years done? Classified based on quartiles of exceedance probability of runoff, or some other method? What data is used? Runoff in the Fryingpan and Roaring Fork? Or the entire Colorado basin streamflow down to the 15 Mile Reach? Or something else? (26-24)	The description of years has been modified in Attachment A to indicate the basis of classification in the model.
<u>Irrigation Districts (21, 22, 23, 24, 25)</u>			
21-1 , 16-2, 22-2, 23-1	X	Supports Colorado River Endangered Fish Recovery Program (16-2, 21-1, 22-2, 23-1)	Comment noted
21-2 , 5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 22-2, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
21-2a	X	Fully support the comments of Leavenworth and Karp (use 22-3)	Comment noted
21-3 , 17-1, 22-4, 23-11	X	Believe the hypothesized 1500 af of contract deliveries is optimistically low (17-1, 21-3, 22-4, 23-11)	Section 4.2.1 Hydrology has been revised to explain the appropriateness of using 1500 af in the simulation models.
21-4 , 17-9, 22-5	X	The EA does not specifically address priorities for fish releases, contract clients and other municipal suppliers and water users. The issue has been raised but not addressed. This issue is of concern to contract users. (17-9, 21-4, 22-5)	Priorities of water released from Ruedi involve how shortages are managed. Shortage provisions will be negotiated during the contract negotiations. Negotiation sessions are open to the public and all interested parties are urged to attend the negotiating sessions and provide input.
21-5 , 17-10, 22-6	X	Reclamation should specifically state that the long-term repayment contracts of our clients and other similar entities would be delivered in preference to the 2012 water. This would be in compliance with subparagraph 7.B of our clients' contracts and because the 2012 is temporary. (17-10, 21-5, 22-6)	Section 7.b. of the Ruedi Round II contracts provides that when there is a shortage, temporary and short-term contracts are reduced first. Reclamation does not consider the Ruedi 2012 contract to be temporary or short-term. It is referred to in the PBO as a long-term contract and we are considering it as such.
21-6 , 17-12, 22-7	X	Reclamation should pursue legislative relief from further increases in the costs of water. To not suspend the increase in the price of that water during the term of this contract would render the water useless as future marketable yield. (17-12, 21-6, 22-7)	See response to comment 26-item 2.
21-7 , 17-11, 22-8, 23-19	X	Another concern is that the execution of the 2012 contract will result in increased costs for clients' water. Reclamation needs to insure that those costs will not be shifted to our clients upon expiration of their contracts. (17-11, 21-7, 22-8, 23-19)	As a result of the efforts mentioned in the response to comment 21-6, Reclamation has determined the cost of Ruedi reservoir water to contractors will not increase as a result of the 2012 Agreement any more than it would have without the Agreement.
22-1	X	Clients support delivery of 10,825 af from Ruedi to support recovery of endangered fish and PBO	Comment noted

22-2, 21-2, 5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
22-3, 17-7, 21-8, 23-8	X	Object to any consideration of Alternative C. There is no assurance that this water will not be needed for legitimate contracting purposes. (17-7, 21-8, 22-3, 23-8)	Reclamation must consider a full range of alternatives and the FWS has requested we consider use of an additional 10,000 af of water from Ruedi to further enhance flows in the 15 MR.
22-4, 17-1, 21-3, 23-11	X	Believe the hypothesized 1500 af of contract deliveries is optimistically low (17-1, 21-3, 22-4, 23-11)	See response to comment 21-3.
22-5, 17-9, 21-4,	X	The EA does not specifically address priorities for fish releases, contract clients and other municipal suppliers and water users. The issue has been raised but not addressed. This issue is of concern to contract users. (17-9, 21-4, 22-5)	See response to comment 21-4.
22-6, 17-10, 21-5,	X	Reclamation should specifically state that the long-term repayment contracts of our clients and other similar entities would be delivered in preference to the 2012 water. This would be in compliance with subparagraph 7.B of our clients' contracts and because the 2012 is temporary. (17-10, 21-5, 22-6)	See response to comment 21-5.
22-7, 17-12, 21-6,	X	Reclamation should pursue legislative relief from further increases in the costs of water. To not suspend the increase in the price of that water during the term of this contract would render the water useless as future marketable yield. (17-12, 21-6, 22-7)	See response to comment 21-6.
22-8, 17-11, 21-7, 23-19	X	Another concern is that the execution of the 2012 contract will result in increased costs for clients' water. Reclamation needs to insure that those costs will not be shifted to our clients upon expiration of their contracts. (17-11, 21-7, 22-8, 23-19)	See response to comment 21-7.
23-1, 16-2, 21-1, 22-2,	X	Supports Colorado River Endangered Fish Recovery Program (16-2, 21-1, 22-2, 23-1)	Comment noted
23-2	X	Page 1-3, 1 st partial paragraph: The EA understates the goal of the Colorado River Endangered Fish Recovery Program. The PBO deals with the Colorado River above the confluence with the Gunnison, but the entire Recovery Program deals with the CO River and its tributaries above Lake Powell (23-2)	This paragraph has been revised to clarify the overall goal of the recovery program.
23-3	X	Pg 1-4, section 1.3 Clarified that "5,000 af 4 out of 5 years" is interpreted to mean 5,000 af will be delivered every year until the marketing pool is fully contracted. (23-3)	Section 1.3 has been revised to explain how the 5,000 af plus 5,000 af in 4 of 5 years is managed and made available.
23-4	X	Pg 1-4, 3 rd line from the bottom, should be "Colorado River Water Conservation District", not Conservancy District (23-4)	Correction made

23-5, 26-3,	X	Page 2-1: The description of the FWS pool in Wolford is incorrectly described. The amount of water available to the FWS is based upon annual storable inflow and how conservatively the pool was operated the previous year. While there's a high likelihood of carry-over from year to year, the FWS has not operated their pool on the basis of using carryover; rather they've assumed other parties will operate conservatively and have carryover. (23-5, 26-3)	See response to comment 26-3.
23-6	X	Page 2-2, Section 2.1.2, No Action Alternative: Wolford releases would be limited to a maximum of 6,000 af if the No Action Alternative were selected; there is no benefit to the Colorado River Water Conservation District or the West Slope of continuing to provide 6,000 plus 5,412 from Wolford. (23-6)	Section 2.1.3 (Section in Final EA that discusses No Action Alternative) of the EA and other pertinent sections have been revised to indicate that if Reclamation reverts to providing 21,650 to enhance flows in the 15 MR it is unlikely that the water users would continue to provide their 10,825 af, as there is no benefit to either the east or west slope to continue to do so.
23-7	X	Page 2-2, Section 2.1.4: The action contemplated in this alternative (pg 2-2, section 2.1.4, alternative B) in which the West Slope 5,412.5 af commitment is made from Ruedi, should be portrayed as 10% likelihood, not "1 in every 10 years". (23-7)	Section 2.1.5 has been revised to state: "West slope water users estimate this need will arise 1 out of every 10 years, or 10% of the time."
23-8, 17-7, 21-8, 22-3,	X	Page 2-2, Section 2.1.5: Object to any consideration of Alternative C. There is no assurance that this water will not be needed for legitimate contracting purposes. (17-7, 21-8, 22-3, 23-8)	See response to comment 22-3.
23-9	X	Pg 3-3, 2 nd paragraph, line 5: The date should be October 31, not October 30. (23-9)	Correction made
23-10	X	Pg 4-1 to 4-3, discussion of the No Action Alternative: Reclamation should disclose that the No Action Alternative would likely result in the removal of the Wolford Mountain 5,412 commitment, making that water available to Round II Contractees if Reclamation chose to impose the financial and mitigation costs of Section 7. Reclamation should also disclose the impacts of not receiving repayment for this Federal project. (23-10)	The modeling, graphs, and discussion have been revised to show that the No Action Alternative would not include 5,412 af contributions from Wolford or Williams Fork reservoirs. The scope of the No Action Alternative includes actions and effects that are reasonably anticipated to occur as a result of not implementing the proposed action. Reclamation believes additional actions to be too speculative to include in this document.
23-11, 17-1, 21-3, 22-4,	X	Section 4.2.1, 3 rd paragraph: Believe the hypothesized 1500 af of contract deliveries is optimistically low (17-1, 21-3, 22-4, 23-11)	See response to comment 22-4.
23-12, 15-1, 17-14	X	Section 4.2.3 Recreation: EA should address potential cost of extending boat ramps at Dearhamer and Aspen Yacht Club. (15-1, 17-14, 21-8, 22-3, 23-12)	Reclamation does not believe the effects of the alternatives warrant extending these ramps. In response to issues raised during the public scoping process, Reclamation will work with USFS to make the Ruedi Marina boat ramp usable by all boats including sail boats.

<p>23-13, 18-4a, 8-2, 12-2, 16-4, 20-4, 24-11</p>	<p>X</p>	<p>Section 4.2.4, Economic/Social Environment: The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)</p>	<p>Results of the <i>Fryingpan Valley Economic Study (Roaring Fork Conservancy, 2002)</i> have been incorporated throughout the document, specifically in sections 3.3.1, 3.3.2, 3.4, and 4.2.4.</p>
<p>23-14</p>	<p>X</p>	<p>Table 4.6: Aquatic Wildlife – T/E species. No reason for Adverse Effect for No Action and beneficial effect for Alternative C. Reclamation supposedly will provide the same amount of water for each alternative. (23-14)</p>	<p>It is true that initially the same amount of water will be provided to the 15 Mile Reach under both alternatives. However, the No Action Alternative would constitute a lack of sufficient progress in fulfilling Reclamation’s commitment to the Recovery Program, and consequently the terms and conditions of the 1999 Programmatic Biological Opinion. Reclamation would revert to the guidance of the 1995 Biological Opinion as amended, and enter into short-term agreements subject to annual approval and reinitiation of section 7 consultation. We would attempt to develop a Reasonable and Prudent Alternative (RPA) that would allow Reclamation to contract for more than 6,135 af of Round II water. Alternatives A, B, and C would have a beneficial effect because they establish a firm water supply for T/E species through 2012. The actions of the remaining parties involved are not entirely predictable (See Section 4.2.2, Endangered Species, <i>Alternative Effects</i>).</p>
<p>23-15, 26-22</p>	<p>X</p>	<p>Table 4.6 -- Check accuracy of “Beneficial Effects” to Recreation on the Fryingpan and likewise determinations under Economic/Social environment. (26-22, 23-15)</p>	<p>See response to comment 26-22.</p>
<p>23-16</p>	<p>X</p>	<p>Table 4.6: Appears that the only reason for beneficial effect for hydropower production is the existence of Ruedi creates a hydropower benefit. This may be true, but the EA should differentiate between the No action alternative and potential actions, not between ‘no reservoir’ and the potential actions. (23-16)</p>	<p>Sections 2.2.2, 3.5, and 4.2.5 have been revised to describe the relationship between the FERC licensed hydropower facility and Ruedi operations.</p>
<p>23-17, 5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 24-9</p>	<p>X</p>	<p>Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)</p>	<p>Comment noted</p>
<p>23-18, 24-8</p>	<p>X</p>	<p>Restructure Ruedi’s debt in a way that keeps the water affordable and available as originally envisioned. Alternative: acknowledge the value of the water provided to FWS as though it were provided under a private contract (23-18, 24-8)</p>	<p>See responses to comments 21-6 and 21-7.</p>

23-19, 17-11, 21-7, 22-8,	X	Another concern is that the execution of the 2012 contract will result in increased costs for clients' water. Reclamation needs to insure that those costs will not be shifted to our clients upon expiration of their contracts. (17-11, 21-7, 22-8, 23-19)	See response to comment 21-7.
23-20, 24-6	X	EA should address the development opportunities that might be lost permanently by reducing the amount of augmentation water available on the western slope as a result of the proposed action (23-20, 24-6)	The effects section of Paragraph 4.2.4 has been revised to discuss possible lost development opportunities. Reclamation does not believe there will be any lost development opportunities during the term of the 2012 Agreement.
23-21	X	EA should address long-term impact of dedicating significant proportion of sales pool to endangered species rather than supporting development as envisioned by legislative authority of Fry-Ark project (23-21)	See responses to comments 23-20 and 4-1. The proposed agreement is only through the year 2012. Reclamation does not believe the proposed contract will inhibit development on the western slope in the near nor long term.
24-1, 18-2,	X	Doesn't appear that economic and environmental impacts have been appropriately determined (18-2, 24-1)	Several sections of the draft EA, including 3.31, 3.32, 3.4, and 4.2.4, were rewritten to more accurately portray the known effects based on recent information from the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002).
24-2	X	The EA does not provide direct comparisons between release patterns and river productivity when river was at its peak (1980s) compared to productivity when endangered fish releases began. This comparison would be most illustrative to show the relationship, if any (24-2)	Section 3.2.1 has been revised. The period of record has been expanded to include CDOW fish population data from 1977 (before endangered fish releases) through 2001.
24-3, 12-6, 20-1,	X	There is not sufficient evidence in the EA to conclude that the proposed action will have no effect on Fryingpan fishery. (12-6, 20-1, 24-3)	Based upon the information available (section 4.2.3), we believe there will be no significant effect to fisheries. As discussed in section 2.1.2, Reclamation will evaluate the final results of the Roaring Fork Conservancy fishery study being conducted by Miller Ecological Consultants, Inc. Reclamation will coordinate with the Colorado Division of Wildlife (CDOW) to assess recommendations in the study and work toward implementing those appropriate measures and monitoring techniques that are feasible and consistent with the multiple Project purposes.
24-4	X	Bureau should acknowledge that the Roaring Fork Conservancy study is underway and a willingness to revisit some of the EA's findings and day-to-day management policies once the final results are available. (24-4)	See response to comment 24-3.

24-5	X	Propose stronger mitigation measures that limit releases from Ruedi of >250 cfs, especially during daylight hours. (24-5)	Section 2.1.2(Operational Measures Common to All Alternatives) discusses that Reclamation, in an effort to address concerns of decreased wadeability of the Fryingpan River when flows exceed 250 cfs, will make efforts to limit cumulative flows to 250 cfs or less when consistent with the multiple Project purposes and reasonable to do so, and so long as future fishery research does not indicate that flows in excess of 250 cfs are important for Fryingpan or Roaring Fork river fishery maintenance or enhancement.
24-6, 23-20,	X	EA should address the development opportunities that might be lost permanently by reducing the amount of augmentation water available on the western slope as a result of the proposed action (23-20, 24-6)	See response to comment 23-20.
24-7	X	The EA does not acknowledge that in the long run, the water provided for T/E species in the 15-mile reach is effectively removed from Colorado's allocation under the Colorado River Compact. (24-7)	Water provided to T/E species pursuant to the 2012 contract is effectively removed from beneficial consumptive use under the Upper Colorado River Compact upstream of the 15 Mile Reach during the term of the contract. However, use of 2012 contract water for beneficial consumptive use is still possible downstream of the Gunnison confluence if a need exists. Furthermore, following the termination of the 2012 contract, such water may again be available for beneficial consumptive use.
24-8, 23-18,	X	Restructure Ruedi's debt in a way that keeps the water affordable and available as originally envisioned. Alternative: acknowledge the value of the water provided to FWS as though it were provided under a private contract (23-18, 24-8)	See responses to comments 21-6 and 21-7.
24-9, 5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17,	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
24-10	X	The Bureau should provide assurances that new sources of water for T/E species will be managed to the greatest possible extent, to reduce the need for high flows in the Fryingpan, especially during the height of the fishing season. (24-10)	See response to comment 24-5.
24-11, 18-4a, 8-2, 12-2, 16-4, 20-4, 23-13,	X	The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)	See response to comment 23-13.

25-1	X	The draft EA understates the environmental consequences of the No action alternative in section 4.1. Draft fails to recognize that the PBO also serves to satisfy the Bureau’s ESA Section 7 requirements for other Bureau projects: Fry-Ark and C-BT. The potential adverse effects of the no action alternative should be disclosed in the EA. (25-1)	Section 4.1 has been revised and expanded to better explain the effects of the No Action Alternative.
25-2	X	Draft EA on pg 3-2 inaccurately states that the maximum volume of the replacement pools 28,000 af. This contrary to the operating principles of Ruedi that says the replacement capacity is the portion of the total reservoir capacity required to permit the project diversions. (25-2)	The text on page 3-1 and the footnote in Table 3.1 have been revised to address this comment.
25-3	X	The BOR should recognize the uncertainty with substitute supply plan approvals. Check out CO Supreme Court decision: Empire Lodge Homeowners’ Association v. Moyer. It is the discretion of the state engineer to issue substitute supply plans. The Court ruled that there is no authority for the state engineer to issue a substitute supply plan not specifically authorized by statute (25-3).	The water provided under the 2012 Agreement will not be provided under a substitute supply plan. It will be released by Reclamation and protected and delivered to and through the 15 Mile Reach by the CWCB.
<u>Conservation Organizations (18, 19, 20)</u>			
18-1, 5-1, 12-1, 16-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
18-2, 24-1	X	Economic and environmental impacts have not been appropriately determined (18-2, 24-1)	See response to comment 24-1.
18-3, 1-1,	X	From own experience & other persons, low winter release rate having a negative impact on aquatic life on Fryingpan River (1-1, 18-3)	According to the Colorado Division of Wildlife (CDOW), brown trout are increasing, rainbow trout are decreasing due to whirling disease and brook trout are decreasing due to competition from brown. As discussed in section 2.1.2, final results and recommendations provided by the Roaring Fork Conservancy fishery study will be evaluated by Reclamation and the CDOW
18-4	X	Minimum winter flow of 39 cfs should be reevaluated (18-4)	Section 2.1.2 includes an operational measure, common to all alternatives, to evaluate the final results of the Roaring Fork Conservancy fishery study and coordinate with the Colorado Division of Wildlife to assess recommendations in the study and work toward implementing those appropriate measures and monitoring techniques that are feasible and consistent with the multiple Project purposes. Reevaluation of the 39 cfs minimum for winter flows held by CWCB would be an appropriate task for the CWCB. Reclamation would cooperate with the reevaluation.

18-4a , 8-2, 12-2, 16-4, 20-4, 23-13, 24-11	X	The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)	See response to comment 24-11.
18-5	X	Future and recent studies from recognized sources, like DOW should be incorporated (18-5)	See responses to comments 24-3 and 18-7.
18-6	X	Operating criteria should limit the release rate change to no more than 25% and that change should be limited during trout early development (18-6)	<p>A review of past endangered fish releases on the Fryingpan River indicates changes in flows greater than 25 percent have occurred an average of 1-2 days per year. Future endangered fish releases are not anticipated to differ appreciably from past releases.</p> <p>Reclamation will continue to attempt to make release adjustments of no more than 50 cfs increments when feasible and consistent with multiple project purposes. This operational measure is discussed in section 2.1.2, and strives to minimize the probability of rapidly changing flows and the subsequent impacts on aquatic biota, rescue activities, recreation interests, and stream bank stability, while providing Reclamation the operational flexibility to comply with Colorado water law.</p>
18-7	X	EA's discussion of trout populations on pages 3-5 to 3-7 do not include information for low winter flows during extended periods of time. Trout populations by year should be shown in the EA (18-7).	Section 3.2.1, has been revised to include fish population data from the CDOW. Table 4.4 has been revised to show the average and low releases for each winter month from 1988 to 2001. There have been no extended periods of low winter flow during this period of time on the Fryingpan River.
19-1 , 5-1, 12-1, 16-1, 18-1, 20-17, 21-2, 22-2, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
19-2 , 20-11	X	DOW study does not claim that flows are unimportant, but flow fluctuations were not the cause of observed declines in rainbows, but rather whirling disease was the cause. (19-2, 20-11)	Comment noted
19-3	X	Cannot agree with statement (p. 4-9), "fluctuations in stream flows are not a significant causal agent of species loss". Flows are among the most significant factors and they underlie recovery program. (19-3)	Comment noted
19-4	X	Reclamation set the 39 cfs minimum based upon CWCB recommendations. Should use the Roaring Fork Conservancy study results to re-examine minimum flow needs. (19-4)	Sections 3.1 and 4.2.2 have been revised to clarify the relationship between the Operating Principles and CWCB's instream flows. Regarding the re-examination of minimum flow needs, see response to comment 24-3.

19-5	X	Statements about rare times when flows drop below 40 cfs don't offer comfort to those who are concerned about low winter flows. Should mention specific mitigation commitments to increase the minimum winter release or add to operating criteria to limit the conditions under which releases would be reduced to the current minimum. (19-5)	The CWCB establishes minimum instream flows to protect the natural environment to a reasonable degree. Data in table 4.4 and fish population data in section 3.2 do not indicate that management of Ruedi Reservoir is adversely affecting fish populations on the Fryingpan River and the proposed action is not expected to significantly change flows in the Fryingpan River during the term of the contract. No specific mitigation commitments have been included to increase the minimum winter release; however Reclamation will consult with the Colorado Division of Wildlife (CDOW) to assess recommendations in the final results of the Roaring Fork Conservancy fishery study conducted by Miller Ecological Consultants, Inc. Reclamation will work towards implementing those appropriate measures and monitoring techniques that are consistent with multiple purposes of the Project. This operational measure has been included in section 2.1.2.
19-6	X	BOR makes no commitment for ramping rates as releases are adjusted. BOR should establish ramping rates using Arkansas rates or preferably developing appropriate ramping rates specific to the Fryingpan and add these as mitigation measures in the final EA. (19-6)	See response to comment 18-6.
20-1, 12-6, 24-3	X	There is not sufficient evidence in the EA to conclude that the proposed action will have no effect on Fryingpan fishery. (12-6, 20-1, 24-3)	See response to comment 24-3.
20-2	X	Bureau should define appropriate mitigation measures related to operational procedures in its final decision on T/E fish releases. Should include timing and magnitude of flow releases, targeted cap on flow levels, staging of the releases and operations under drought conditions. (20-2)	As previously stated, Reclamation will not impose a cap on releases from Ruedi. However, as we have done in the past, we will continue to try to manage the reservoir to minimize flows in excess of 250 cfs. This has been included as an operational measure common to all alternatives in section 2.1.2.
20-3	X	Monitor and evaluate operating procedure on an annual basis in conjunction with the best scientific data available. (20-3)	See response to comment 24-3.
20-4, 18-4a, 8-2, 12-2, 16-4, 23-13, 24-11	X	The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)	See response to comment 23-13.
20-5, 16-9,	X	Consider Roaring Fork Conservancy erosion/scour and sport fishery information prior to finalizing Sections 4.2.1 and 4.2.2 and Table 4.6 of Final EA (16-9, 20-5)	See response to comment 24-3.

20-6	X	According to preliminary economic study results, predominant activity on Ruedi Reservoir is watercraft activities: 70%. (20-6)	Section 3.3.1 has been revised to include data from the <i>Fryingpan Valley Economic Study</i>; specifically the finding that 72% of the visitors to the reservoir participate in some form of watercraft activity.
20-7	X	Few corrections on page 3-9 about Forest Service campgrounds and day-use areas. (20-7)	Section 3.3.1 has been revised to address corrections concerning Forest Service campgrounds and day-use areas.
20-8	X	There is additional information about the Aspen Yacht Club available. (20-8)	Section 3.3.1 has been revised to update information about the Aspen Yacht Club.
20-9	X	There are some initial findings from Roaring Fork Conservancy economic study (20-9)	Sections 3.3.1, 3.3.2, 3.4, and 4.2.4 have been revised to include findings from the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002)
20-10	X	The draft EA relies upon documents that are not specific to the Fryingpan River to reach conclusions regarding impact from the reservoir releases. (20-10)	See response to comment 24-3.
20-11, 19-2	X	DOW study does not claim that flows are unimportant, but flow fluctuations were not the cause of observed declines in rainbows, but rather whirling disease was the cause. (19-2, 20-11)	Comment noted.
20-12	X	The Roaring Fork Conservancy fishery study will address flow regimes and fish populations. Results indicate that the late summer high releases could be impacting recruitment, especially for rainbow trout. (20-12)	See response to comment 24-3.
20-13	X	In the second paragraph of section 4.2.4, many of the assertions are factually incorrect. Assume there wasn't enough data to make assumptions. (20-13)	Section 4.2.4 has been revised.
20-14, 1-2, 12-7, 16-3,	X	Basalt prides itself on possessing and sustaining an economy that is not directly dependent on the ski industry. Outdoor recreation is the key to the quality of life enjoyed by the community's residents and represents an important draw for tourists. (1-2, 12-7, 16-3, 20-14)	Section 3.4 has been revised to include most recent recreation data provided by the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002).
20-15, 12-3	X	There have been over 1500 service days available for commercial trips on the lower Fryingpan since 1990 and the cap is almost always reached. BOR should review and check the information used to generate Table 4.10 for accuracy. (20-15)	Table 4.10 was deleted from the final EA. Table 3.5 has been updated to include information from 1997 through 2000. Distribution of the use is not available for these latter years. Data in Table 3.5 is based on reports submitted to the USFS by outfitter/guides.
20-16	X	Conclusions drawn in section 4.2.4 are shaky. The reference to "more detailed study" can be accomplished with the Roaring Fork Conservancy Economics Study. (20-16)	Section 4.2.4 has been revised to include findings from the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002).
20-17, 19-1, 5-1, 12-1, 16-1, 18-1, 21-2, 22-2, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
<u>Municipalities (16,17)</u>			

16-1 , 20-17, 19-1, 5-1, 12-1, 18-1, 21-2, 22-2, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
16-3 , 1-2, 20-14, 12-7,	X	Basalt prides itself on possessing and sustaining an economy that is not directly dependent on the ski industry. Outdoor recreation is the key to the quality of life enjoyed by the community's residents and represents an important draw for tourists. (1-2, 12-7, 16-3, 20-14)	Section 3.4 has been revised to include the findings of the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002).
16-4 , 18-4a, 8-2, 12-2, 20-4, 23-13, 24-11	X	The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)	See response to comment 23-13.
16-5	X	Minimize occurrence and duration of rates >250 cfs during sport fish spawning between Labor Day and mid-October (16-5)	See response to comment 24-5.
16-6	X	Operate Ruedi to prevent ice-over and minimize anchor ice buildup in the Fryingpan channel downstream from the dam to protect river ecology and sport fishery (16-6)	See response to comment 24-3.
16-7	X	Operate Ruedi to minimize rapid stream flow fluctuations in the reach of Fryingpan downstream from the dam (16-7)	See response to comment 18-6.
16-8	X	Incorporate hydrologic, river ecology, fishery information from Roaring Fork Conservancy into sections 3.1 and 3.2 into final EA (16-8)	See response to comment 24-3.
16-9 , 20-5,	X	Consider Roaring Fork Conservancy erosion/scour and sport fishery information prior to finalizing Sections 4.2.1 and 4.2.2 and Table 4.6 of Final EA (16-9, 20-5)	See response to comment 24-3.
16-10 , 12-8, 17-8, 21-8, 22-3	X	Create a new section in Chapter 4 that requires an EIS at the expiration of the 2012 agreement, but prior to continued releases from Ruedi for 15 mile reach program and evaluate if continued releases benefit endangered fish (12-8, 16-10, 17-8, 21-8, 22-3)	The disposition after the year 2012, of the water committed through the year 2012, is beyond the scope of this analysis. In determining the use of this water in the future, Reclamation will comply with federal law, including NEPA, in effect at that time.
16-11	X	Incorporate new paragraph into Section 4.2.4 that states that the releases will count towards repayment of the debt burden on Ruedi at the current per acre-foot price for Round II contract water (16-11)	See responses to comments 21-6 and 21-7.
17-1 , 21-3, 22-4, 23-11	X	Believe the hypothesized 1500 af of contract deliveries is optimistically low (17-1, 21-3, 22-4, 23-11)	See Response to comment 21-3.

17-3, 21-8, 22-3	X	Discuss the fact that Round II Contracts are “Category I” depletions under the PBO and those depletions would be subject to re-consultation after Category 2 depletion projects have been re-consulted. These contracts are not subject to Section 7 consultations. Discussion should be modified to properly characterize the context of the 2012 agreement action in the PBO and its implications in that broader context for the 5 Reclamation projects and Category 1 and 2 projects. (17-3, 21-8, 22-3)	Section 4.1 <i>No Action Alternative</i> has been revised to clarify the environmental consequences, specifically the processes of re-consultation under two scenarios (1. under the PBO; 2. absent the PBO but under the BO). Additionally, discussion of the implications to the Colorado-Big Thompson, Fryingpan-Arkansas, Collbran, Grand Valley, and Silt Projects, as well as Category 1 and 2 depletions have been incorporated.
17-4, 25-1	X	The discussion about potential re-consultations should present a balanced discussion about the potential ramifications of the no action alternative, including re-consultation on the Fryingpan-Arkansas Project’s transmountain diversions. (17-4, 25-1)	See response to comment 25-1.
17-5, 21-8, 22-3	X	The non-jeopardy nature of the PBO is not mentioned in the EA and should be. (17-5, 21-8, 22-3)	Section 1.1 has been edited to note that the PBO was a non-jeopardy opinion.
17-6, 22-3	X	The discussion about effects on the fish should not be narrowly focused on Round II contracts. The 2012 is part of a package of mitigation actions on which the Service based its non-jeopardy findings. The discussion page 4-10 should be either generalized in reference to all of the water depletions addressed in the PBO or expanded to be fully and fairly accurate. (17-6, 22-3)	Section 4.2.2 has been revised to state, “The Service has determined that all four species of endangered fish and their critical habitat are adversely affected by upstream water depletions; one of which is Round II water marketing.”
17-7, 21-8, 22-3, 23-8	X	Object to any consideration of Alternative C. There is no assurance that this water will not be needed for legitimate contracting purposes. (17-7, 21-8, 22-3, 23-8)	See response to comment 22-3.
17-8, 12-8, 16-10, 21-8, 22-3	X	Create a new section in Chapter 4 that requires an EIS at the expiration of the 2012 agreement, but prior to continued releases from Ruedi for 15 mile reach program and evaluate if continued releases benefit endangered fish (12-8, 16-10, 17-8, 21-8, 22-3)	See response to comment 16-10.
17-9, 21-4, 22-5	X	The EA does not specifically address priorities for fish releases, contract clients and other municipal suppliers and water users. The issue has been raised but not addressed. This issue is of concern to contract users. (17-9, 21-4, 22-5)	See response to comment 21-4.
17-10, 21-5, 22-6	X	Reclamation should specifically state that the long-term repayment contracts of our clients and other similar entities would be delivered in preference to the 2012 water. This would be in compliance with subparagraph 7.B of our clients’ contracts and because the 2012 is temporary. (17-10, 21-5, 22-6)	See response to comment 21-5.
17-11, 21-7, 22-8, 23-19	X	Another concern is that the execution of the 2012 contract will result in increased costs for clients’ water. Reclamation needs to insure that those costs will not be shifted to our clients upon expiration of their contracts. (17-11, 21-7, 22-8, 23-19)	See response to comment 21-7.

17-12, 21-6, 22-7	X	Reclamation should pursue legislative relief from further increases in the costs of water. To not suspend the increase in the price of that water during the term of this contract would render the water useless as future marketable yield. (17-12, 21-6, 22-7)	See response to comment 21-6.
17-13	X	The EA should note that the statement (footnote to Table 3.1- up to 28,000 af is available on a preferred basis) is the position of the Southeast Colorado Water Conservancy District and Western Slope users have disputed this in the past. (17-13)	Table 3.1 and the text immediately preceding the table, have been revised to describe the origin of the volumes displayed in the table.
17-14, 15-1, 23-12	X	EA should address potential cost of extending boat ramps at Dearhamer and Aspen Yacht Club. (15-1, 17-14, 21-8, 22-3, 23-12)	See response to 23-12.
17-15	X	Section 4.2.1 Include a discussion in EA that given the probability that contract deliveries will exceed the assumed amount at some point during the period through 2012 that substantial increases in contract deliveries above 1500 af would not alter the conclusions in the EA (17-15)	Section 4.2.1 has been revised.
<u>Individuals (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)</u>			
1-1, 18-3	X	How many studies have been done on the Fryingspan River at winter flows less than 50 cfs? (1-1, 18-3)	To our knowledge there have been no studies conducted on the Fryingspan River at flows less than 50 cfs. The study being conducted by Miller Ecological Consultants for the Roaring Fork Conservancy, and others, identify habitat available for various life stages at flows down to about 40 cfs. Reclamation will evaluate the results of this study to determine whether or not to adopt recommendations and work towards implementing those appropriate measures and monitoring techniques that are consistent with multiple project purposes. This operational measure is discussed in section 2.1.2.
1-2, 20-14, 12-7, 16-3,	X	Basalt prides itself on possessing and sustaining an economy that is not directly dependent on the ski industry. Outdoor recreation is the key to the quality of life enjoyed by the community's residents and represents an important draw for tourists. (1-2, 12-7, 16-3, 20-14)	Section 3.4 has been revised to include the findings of the <i>Fryingspan Valley Economic Study</i> (Roaring Fork Conservancy, 2002).
1-3	X	Sales tax revenue 2 nd from fly fishing (1-3)	According to the town of Basalt (Gustine, pers comm. 2002), the top five contributors in sales tax revenue are: 1) City Market, 2) Valley Lumber, 3) Clark's Market, 4) George T. Sander's, and 5) Big O Tires
1-4	X	Don't endanger upstream fish and their habitat (1-4)	Comment noted.
2-1	X	Adopt DOW recommendations, 63 min cfs – winter and 250 max cfs – summer (2-1)	See responses to comments 18-4 and 24-5.

3 -1, 6-1, 7-2, 8-1	X	Reconsider the flow rates because proposed rates have excessive summer flows and low winter flows (3-1, 6-1, 7-2, 8-1)	See responses to comments 18-4 and 24-5.
4 -1, 13-1	X	Recreational interests in Frying-Pan should be placed ahead of T/E species (4-1, 13-1)	As a federal agency, Reclamation has a legal responsibility to comply with the Endangered Species Act (ESA) and meet the multipurpose requirement of the Fryingpan Arkansas Project. Reclamation attempts to operate the project to meet all project purposes including water supply, recreation, and fish and wildlife purposes of the project.
5-1,	X	Support the Ruedi 2012 agreement	Comment noted
6-1, 3 -1, 7-2, 8-1	X	Reconsider the flow rates because proposed rates have excessive summer flows and low winter flows (3-1, 6-1, 7-2, 8-1)	See Response to Comment 3-1
6 -2	X	Wading is difficult in excess of 250 cfs (6-2)	See response to comment 24-5.
6-3	X	Ruedi Reservoir is too low (because of drought) to provide adequate flows for next year's fishery (6-3)	Beginning in November of each year, Reclamation establishes a winter target flow that will at minimum, sustain the established instream flow on the Fryingpan based on precipitation predictions for that winter. In Mid-winter this flow may be changed in accordance with real time data. This past winter flows were maintained at 39 cfs despite drought conditions. Snowpack conditions allow us to believe adequate flows will be available for next year's fishery.
6-4, 9-3	X	Manage the flow schedule for the benefit of the fishery and the town of Basalt (6-4, 9-3)	Reclamation must operate Ruedi Reservoir to meet irrigation, municipal and industrial, recreation, and fish and wildlife needs for which the Fryingpan Arkansas Project was authorized. The reservoir cannot be managed for the sole benefit of one category of user. As a federal agency, Reclamation has a legal responsibility to comply with the Endangered Species Act (ESA).
6 -5	X	Keep the flows near 90 cfs in the winter and 175-200 cfs in the late summer/fall (6-5)	See response to comment 2-1.

7-1	X	Fish populations dropped in past decade (7-1).	We do not believe this is an accurate statement. Figures 3.3 and 3.3a have been added to section 3.2.1 of the final EA to show population trends of rainbow and brown trout in the Fryingpan River between 1977 and 2001. The figures are based on sampling done by the Colorado Division of Wildlife and indicate relatively stable populations of rainbow and brown trout since 1992. The combined populations of rainbow and brown trout have been relatively stable since 1986.
7-2	X	Insect populations dropped since high summer flows started (7-2)	See response to comment 24-3.
7-3	X	Low winter flows will negatively affect fish and insect populations (7-3)	Refer to section 4.2.2. The CWCB established minimum instream flow for the Fryingpan River is 39 cfs from 11/1 to 4/30. Additionally, the modeling for the EA assumes no less than 39 cfs flows. Reclamation does not believe these flows represent risk to macroinvertebrates. During the term of the 2012 Agreement, flows in the Fryingpan River are not expected to change significantly from the past 14 years.
7-4	X	39 cfs is way too low to maintain fishery health in the winter; 175-200 maximum for late summer/fall (7-4)	See response to comment 2-1.
8-2, 18-4a, 12-2, 16-4, 20-4, 23-13, 24-11	X	The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)	See response to comment 23-13.
8-3	X	Incorporate DOW fish count into EA (8-3)	The Colorado Division of Wildlife population data has been incorporated in section 3.2.1 of the final EA.
9-1	X	Use the following flow recommendations: 90 cfs – winter, 175-200 cfs – summer/fall (9-1)	See response to comment 2-1.
9-3, 6-4	X	Manage the flow schedule for the benefit of the fishery and the town of Basalt (6-4, 9-3)	See response to comment 6-4.
10-1	X	Save the 2012 water (10,825 af) as a reserve for fire fighting (10-1)	This comment is outside the scope of the EA. However, if there were a need for firefighting water in the Fryingpan Valley, Reclamation would make water available for that emergency need.
11-1, 15-8	X	Release of water for the 15 mile reach endangers recreational use on the Fryingpan and Roaring Fork Rivers (11-1, 15-8)	Comment noted. We believe this issue is adequately addressed in Section 4.2.3 of the EA.

11-2	X	Release of water for the 15 mile reach endangers rescue activities (11-2, 15-7)	Ruedi water has been made available for the 15 Mile Reach every year since 1989. Additionally, the Preferred Alternative makes a smaller quantity of water available than the No Action Alternative, reducing the potential occurrence and duration of flows in excess of 250 cfs. Operational measures have been incorporated in section 2.1.2 that address this concern.
12-1, 5-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9	X	Alternative A is the preferred choice (5-1, 12-1, 16-1, 18-1, 19-1, 20-17, 21-2, 22-2, 23-17, 24-9)	Comment noted
12-2, 18-4a, 8-2, 16-4, 20-4, 23-13, 24-11	X	The final EA should incorporate Roaring Fork Conservancy economic studies in sections 3.2.1, 3.3.1, 3.3.2, 3.4, 4.2.4 (8-2, 12-2, 16-4, 18-4, 20-4, 23-13, 24-11)	See response to comment 23-13.
12-3, 20-15	X	USFS data on number of Outfitter/Guide Service days was distorted; figure is closer to 1500 for that time period (12-3)	See response to comment 20-15.
12-4	X	Information on fishery status should not come from a layperson (Trout Unlimited), but a biological study. (12-4)	Figures 3.3 and 3.3a have been added to section 3.2.1, using data from the Colorado Division of Wildlife, to show population trends of rainbow and brown trout on the Fryingpan River between 1977 and 2001.
12-5	X	No significant impact on fisheries is misleading. Impact from low winter releases, create ice dams that impact fisheries (12-5)	Based upon the information available, we believe that there will be no significant effect to fisheries, as explained in section 4.2.2. See response to comment 24-3.
12-5a	X	Studies show that fish biomass was greater 13 years ago than now	See response to comment 7-1.
12-6, 20-1, 24-3	X	There is not sufficient evidence in the EA to conclude that the proposed action will have no effect on Fryingpan fishery. (12-6, 20-1, 24-3)	See response to comment 24-3.
12-7, 20-14, 1-2, 16-3,	X	Basalt's economy is not primarily affected by winter alpine recreation (1-2, 12-7, 16-3, 20-14)	See response to comment 1-2.
12-8, 16-10, 17-8, 21-8, 22-3	X	Create a new section in Chapter 4 that requires an EIS at the expiration of the 2012 agreement, but prior to continued releases from Ruedi for 15 mile reach program and evaluate if continued releases benefit endangered fish (12-8, 16-10, 17-8, 21-8, 22-3)	See response to comment 16-10.
13-1, 4-1,	X	Recreational interests in Frying-Pan should be placed ahead of T/E species (4-1, 13-1)	See response to comment 6-4.
13-2	X	We need the Ruedi water for trout and recreational use (13-2)	See response to comment 6-4.
14-1	X	What effects do the number of high flow days (>250 cfs) have on aquatic biota? (14-1)	In section 4.2.2, the effect of Ruedi releases on fisheries and macroinvertebrates is discussed.

14-2	X	Will there be any accumulated effects of unseasonably high flows on whirling disease parasite's spores, their distribution and their effects on fish? (14-2)	According to the CDOW, flow fluctuations do not seem to have an effect on whirling disease. See Sections 3.2.1 and 4.2.2.
14-3	X	Is there any correlation between large rainbow trout numbers declining in a year after high flow year and this effect being more pronounced in rainbow trout populations? (14-3)	According to the CDOW, the decline in rainbow trout populations is primarily associated with increased incidence of whirling disease.
14-4	X	While sculpin spawn in the spring, will the flows have any effect on young of the year sculpins or their survival rates? (14-4)	CDOW does not currently have population or life history data for sculpins in the Fryingpan or Roaring Fork Rivers. General information provided by the CDOW, indicates that sculpins prefer cool, clear, swift, freshwater streams and rivers as well as a rock and cobble substrate where interstitial spaces are free from silt and mud; feeding on macroinvertebrates. Temperatures, turbidity, velocity, substrate, and macroinvertebrate populations are not expected to change significantly as a result of the 2012 Agreement. Reclamation does not believe flows will affect sculpins or their survival rates.
14-5	X	What losses will be incurred to the local fishery economy? (14-5)	If there are losses, Reclamation believes they will be minimal and unquantifiable. Section 3.4 has been revised to include findings of the <i>Fryingpan Valley Economic Study</i> (Roaring Fork Conservancy, 2002), and discusses the importance of the Fryingpan River fishery to today's economy. Water for endangered fish has been provided for more than 10 years, and fish economy has grown in that time.
15-1, 17-14, 23-12	X	EA should address potential cost of extending boat ramps at Dearhamer and Aspen Yacht Club. (15-1, 17-14, 21-8, 22-3, 23-12)	See response to comment 23-12.
15-2	X	Below 7747 ft, Aspen Yacht Club is unable to use the 50 ft mast tower facility (15-2)	This circumstance is not an effect of the proposed action, but an effect of ongoing operations at Ruedi Reservoir. To enhance recreation opportunities at Ruedi Reservoir we will cooperate with the Forest Service in constructing a mast tower facility at the Ruedi Marina boat ramp.
15-3	X	Below 7755 ft, the mooring facilities are unusable (15-3)	Comment noted
15-4	X	Yacht club members denied use of facilities in summer/fall 2001 for ½ the sailing season due to low Ruedi levels (15-4)	Comment noted

15-5	X	Unmarked, uncharted hazards which exist at low water become a significant hazard to navigation (15-5)	Reclamation will work with the USFS to address concerns about low water hazards at Ruedi Reservoir. This action is not a measure to mitigate effects of the 2012 Agreement, but a measure to address a current issue that arose during the NEPA process.
15-6	X	Draft EA states Ruedi Marina boat ramp has a toe elevation of 7704 ft, but not necessarily usable at higher elevations. At 7720 ft., boat ramp is inundated with muck and debris so that it is not safe or practical to use the ramp (15-6)	Reclamation will work with the USFS to attempt to keep Ruedi Marina boat ramp clear when water levels are low. This action is not a measure to mitigate effects of the 2012 Agreement, but a measure to address a current issue that arose during the NEPA process.
15-7	X	Lowered reservoir levels would inhibit the Basalt Fire Dept. from obtaining a dock in the future from the Aspen Yacht Club for their rescue boat (15-7)	Comment noted
15-8, 11-2,	X	Release of water for the 15 mile reach endangers rescue activities (11-1, 15-8)	See Response to Comment 11-2.
15-9	X	The FWS has offered no definitive proof that maintaining target flows in the 15 mile Reach is actually helping the fish (15-9)	There is extensive published data from the FWS that documents the need for additional flows in the 15 MR of the Colorado River. The target flow recommendations are based upon research findings that indicate water levels maximize the amount of habitat used by these fish.
15-10	X	Is it possible that upstream dams and reservoirs, combined with inadequate food supplies and unhealthy rivers are the reason for the declines in adult pikeminnow and humpback chub? The FWS seems to think that more habitats are the solution to providing more food sources. How could these fish have survived with normal low flows in late summer and fall? These fish survived intact during years with low flows during some drought periods...flows lower than what has been seen in the 15 mile reach in recent history (15-10)	See response to comment 15-9.
15-11	X	Trying to save endangered native fish is a noble effort, but I'm skeptical regarding the progress increased flows in the late summer/fall will induce. I'm willing to forego fishing if I knew that this would save endangered fish. (15-11)	FWS and others have done extensive research on what is limiting populations of razorback sucker and Colorado pikeminnow. The recovery program focuses on these limiting factors, which include a lack of flows in the 15-Mile Reach of the Colorado River.

ATTACHMENT A

Ruedi Reservoir Operations Model for Evaluation of Streamflow Impacts for Colorado River Endangered Fish Recovery ¹

January 7, 2001
Bureau of Reclamation

General Model Operations -

- < Model simulates daily operations for up to 24 years using assumption that the 1975 - 1998 climatological conditions will repeat into future. A simulation year begins November 1 and ends October 31.
- < Each simulation year is pre-classified on a scale of 1 to 4 based on quartiles of historic Colorado River Basin runoff volumes (1 = high, 4 = low).
- < Inflow bypass is set to 39 cfs for Nov. 1 - Apr. 30, and 110 cfs for May 1 - Oct 31.
- < Ruedi daily contract releases are the sum of those releases that are required due to Cameo call, and those releases that are independent of any call. When Ruedi is in or out of priority is based on historic records. Contract releases in model are:

Call dependent contracts - municipal monthly distribution = 1,850 af.

Call dependent contracts - industrial monthly distribution = 6,000 af.

Call independent contracts = 0 af.

Monthly Contract Distribution Percent:

	J	F	M	A	M	J	J	A	S	O	N	D
Municipal	1	1	1	2	3	20	27	24	16	3	1	1
Industrial	7	7	7	7	9	10	12	10	9	8	7	7

Note: The model has been adjusted to reflect historic releases for contracts. Records indicate that only a portion of the entire contracted quantity is being used, averaging only 1,500 af per year. This amount is used for simulations.

- < For the period Nov 1 - Apr 15, model simulates release of water to meet storage drawdown target, which is picked by the model based on each year's runoff level (i.e. 1 = 40Kaf, 2 = 50 Kaf, 3 = 60Kaf, 4 = 70 Kaf). During this period, model calculates uniform daily release rate based on inflow and storage volume to be evacuated during this period. To provide a slightly more realistic simulation of actual operations, the drawdown period is broken into two forecasting periods:

¹ This model was provided to Reclamation by the Colorado River Conservation District (River District). The original model was developed for the River District by EnarTech, Inc.

- < November 1 - January 31 and February 1 - April 15. This allows for some fluctuation of wintertime releases, rather than one uniform value over the entire period.
- < From April 15 to July 15, model calculates a release rate that targets filling the conservation pool around July 15. This is an attempt to mimic management decisions during the spring reservoir filling period to control releases based on available storage space, forecasted inflows and snowpack runoff, and anticipated release demands. The model computes a new release every half-month period during April 15 thru July 15. The release is calculated as:

$$\frac{[(\text{inflow} - \text{releases}) - (\text{maximum conservation storage} - \text{present storage})] / \text{number days in period}}{\text{factor}}$$

where :

inflow is total inflow from start of period to July 15

releases are total Fry-Ark replacement releases, west slope contract, and estimated inflow bypass discharge from start of period to July 15

factor is an adjustment factor for progressively increasing the influence of the forecasted inflows as follows:

April 15 - July 15,	factor = 0.3
May 1 - July 15,	factor = 0.4
May 15 - July 15,	factor = 0.5
June 1 - July 15,	factor = 0.6
June 15 - July 15,	factor = 0.8
July 1 - July 15,	factor = 1.0

- < From July 15 to Oct. 31, the model simulates releases for west slope contract demands, USFWS requested release for 15-mile reach, Fryingpan River fisheries release, bypass for river administration, bypass for minimum streamflow requirements, and spills if necessary.
- < The USFWS daily recommended flows in 15-mile reach are based on each years level-of-runoff scale (1 - 4). The recommended flows for July in original model were replaced with August recommended values, since in practice, the late summer targets are used when augmentation is commenced.
- < Total releases to meet USFWS recommendations begin July 15 and are based on flow shortages determined using: 1) if simulation year is 1991 or greater, gauged flow on Colorado near Palisade. 2) if simulation year less than 1991, then use sum of gauged flow on Colorado River above Cameo and Plateau Creek and Orchard Mesa Irrigation District return flows, minus Government Highline and Grand Valley Irrigation Company canal diversions. Total release is increased by 10 percent for transit losses to 15-mile reach.

< The USFWS 15-mile reach demands are to be met by shared releases from Ruedi, Wolford Mountain, Williams Fork, and Green Mountain Reservoirs. Each reservoir is assigned an annual starting storage account for meeting the USFWS demands. Ruedi, Wolford Mountain, and Williams Fork USFWS accounts become available on July 15. Green Mountain’s account does not become available until August 15.

Ruedi’s annual account can vary depending on the alternative being evaluated. Williams Fork’s account is set to 5,412 acre-feet each year.

Green Mountain’s account is adjusted by a percentage according to the runoff volume level for the year (i.e. 1 to 4) being simulated:

<u>Runoff Level</u>	<u>Green Mtn. Available</u>
1	100% of 30,000 acre-feet
2	66% of 30,000 acre-feet
3	33% of 30,000 acre-feet
4	10 % of 30,000 acre-feet

Wolford Mtn. Reservoir’s account is set each year based on the following table:

<u>Year</u>	<u>Annual Available Water in Fish Pool (af)</u>
1975	6,000
1976	3,600
1977	1,200
1978	6,000
1979	6,000
1980	6,000
1981	1,200
1982	6,000
1983	6,000
1984	6,000
1985	6,000
1986	6,000
1987	3,400
1988	5,000
1989	3,400
1990	1,800
1991	4,200
1992	1,800
1993	5,000
1994	3,100
1995	6,000
1996	6,000
1997	6,000
1998	6,000

- < The amount released from each reservoir is based on the ratio of the previous days remaining available storage in account in each reservoir to the total available from all reservoirs. The ratio is then applied to the potential USFWS demand to get each reservoir's proportional release contribution.
- < Once proportional release rates are calculated, any individual release limits are then applied. Ruedi is limited to 350 cfs based on past endangered fish release practices. Williams Fork releases are limited to a maximum of 480 cfs per information from Denver Water Board. Wolford Reservoir releases are limited to 200 cfs. Since limits are applied after proportional release rates are calculated, the total release rate, in addition to other flows, may not be sufficient to meet the USFWS recommended flow rate, even though there is water available in all reservoirs.
- < Releases are calculated in a 3-day stepped average in an attempt to demonstrate how actual management decisions may affect releases as a desire to refrain from rapid transitions in release rates. The 3-day stepped average release values are further used in the model for calculating power generation and simulating flow in Fryingpan River below Ruedi.

ATTACHMENT B

Bibliography

- Baker, Tom. 2001. Phone conversations. Town Manager, Town of Basalt, Colorado.
- BRW, Inc. 1999. *Roaring Fork and Fryingpan Rivers Multi-Objective Planning Project*. Prepared for the Colorado Water Conservation Board.
- Crandall, Kristine. 2002. *Fryingpan Valley Economic Study*. Colorado: Roaring Fork Conservancy
- Czenkusch, Alan. 2001. Phone conversations. Aquatic Biologist, Area 8, Glenwood Springs Office, Colorado Division of Wildlife.
- Czenkusch, Alan. 2000. Phone conversations. Aquatic Biologist, Area 8, Glenwood Springs Office, Colorado Division of Wildlife.
- Colorado Department of Local Affairs. State of Colorado. 2001. *Population Estimates for Colorado*. <http://www.dola.state.co.us/demog/>
- Colorado Division of Wildlife Fish Research Section. 2001. Nehring R. Barry, et al. *Impact Assessment of Some Physical and Biological Factors in the Whirling Disease Epizootic Among Wild Trout in Colorado*. Special Report No. 76. A contribution of Federal Aid in Fish and Wildlife Restoration Project F237R. DOW-R-S-76-01. ISSN 0084-8875. March.
- Colorado River Outfitters Association, 2001. "Commercial River Use in Colorado, 1988-2001." Online: www.croa.org/2001-rafting-report-2.htm
- Harris, Phil. 2001. Phone conversations. Operations Manager, High Country Engineering, Colorado.
- Keneally, Mike. 2001. Phone conversations. Developed Recreation Specialist, Sopris Ranger District, White River National Forest, USDA Forest Service.
- Nehring, R. Barry and Richard M. Anderson. 1993. "Determination of Population-limiting Critical Salmonid Habitats in Colorado Streams Using the Physical Habitat Simulation System". *Rivers* Volume 4. Number 1. Pages 1-19.
- Nehring, R. Barry. 1991. "Effect of Reservoir Escapement of Mysids on Two Colorado Tailrace Trout Fisheries." American Fisheries Society Symposium 9 Paper *Mysids in Fisheries: Hard Lessons from Headlong Introductions*.

Nelson, Mark S. and Richard A. Roline. 1996. *Distribution of Aquatic Macroinvertebrates in Relation to Stream Flow Characteristics in the Arkansas River*. No. 8220-96-19. Denver: USDI Bureau of Reclamation Technical Service Center.

Roline, Richard A. 2001. Phone conversations. Research Biologist, Technical Service Center, USDI Bureau of Reclamation.

Smith, Roy E. and Linda M. Hill, eds. 2000. *Arkansas River Water Needs Assessment*. No. BLM/RS/ST-00/002+7200. Denver: USDI Bureau of Land Management.

Strange, Elizabeth M. 1998. "Flow Regime Limitations of Colorado Trout Populations: Perspectives for Watershed Management." Boulder: Trout Unlimited.

U.S. Department of the Interior. 1989. *Ruedi Reservoir, Colorado Round II Water Marketing Program Final Supplement to the Environmental Statement*. Fryingpan-Arkansas Project, Colorado. Colorado: Bureau of Reclamation.

U.S. Department of the Interior. 1999. *Final Programmatic Biological Opinion for the Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Action in the Upper Colorado River Above the Confluence with the Gunnison River*. Denver: Fish and Wildlife Service.

Withers, Arnold. 1964. *Archaeological Survey of Ruedi Reservoir, Colorado*. University of Denver; Department of Anthropology. Denver: National Parks Service.

ATTACHMENT C

List of Preparers

Bob Burton, Archaeologist with the Bureau of Reclamation, provided cultural resources expertise and archaeological survey history for Ruedi Reservoir.

Doug Epperly, Environmental Specialist with the Bureau of Reclamation, provided resource analysis, and coordination and production of the document.

Terry Gomoll, Repayment Specialist with the Bureau of Reclamation, provided information on water contracting and review of water contract related documentation.

Alice Johns, Resources Division Chief with the Bureau of Reclamation, provided resource analysis, background information and document review.

Kara Lamb, Public Information Specialist with the Bureau of Reclamation, prepared press releases and provided direction for public involvement activities.

Tara Moberg, Environmental Specialist with the Bureau of Reclamation, provided resource analysis, and coordination and production of the document.

Mark Phillips, Geologist with the Bureau of Reclamation, provided primary development of the hydrologic model.

Lynnette Smith, Repayment Specialist with the Bureau of Reclamation, provided information on water contracting and review of water contract related documentation.

Will Tully, Environmental Specialist with the Bureau of Reclamation, provided project direction, resource analysis, background information, document review, and model development.

Malcolm Wilson, Hydraulic Engineer with the Bureau of Reclamation, provided development of model simulations and document review.