



# United States Department of the Interior



## BUREAU OF RECLAMATION

Eastern Colorado Area Office  
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Loveland, Colorado 80537-9711

IN REPLY  
REFER TO:

EC-1340 (WTully)

To: Interested Parties  
(See Enclosed Distribution List)

Subject: Finding of No Significant Impact and Environmental Assessment (Assessment) for  
Agreements to Offset HUP Shortages in Green Mountain Reservoir.

Enclosed for your information is a copy of the Finding of No Significant Impact (FONSI) and Environmental Assessment (Assessment) for agreements between the Bureau of Reclamation (Reclamation), the Northern Colorado Water Conservancy District, and the Colorado River Water Conservation District to release and manage up to 10,000 acre-feet of water from Ruedi Reservoir to supplement water that is in Green Mountain Reservoir but unavailable because of a drawdown limitation on Green Mountain. The water will be used primarily by farmers in the Grand Valley. This FONSI is based on the assessment, prepared by Reclamation, which evaluated the effects of the proposed project and mitigation measures that will be implemented. The environmental commitments and mitigation outlined in the FONSI and the Assessment will minimize the environmental effects of the proposal to the point that Reclamation believes there will be no significant impact on the human environment beyond what is expected to occur from the No Action alternative. The FONSI and Assessment are being distributed to those listed on the enclosed distribution list, which includes libraries in Basalt and Carbondale.

Additionally, the FONSI and Assessment are available as an Adobe Acrobat document (.pdf file) by visiting the Great Plains Region web site at "[www.gp.usbr.gov/nepa/nepa.html](http://www.gp.usbr.gov/nepa/nepa.html)", or they can also be accessed by going to "[www.gp.usbr.gov](http://www.gp.usbr.gov)", clicking on "Current Activities", and clicking on "Environmental Activities". The Assessment will be under the Environmental Assessment heading.

If you have any questions, have any problems with the above links, or would like a copy of the Assessment, please contact Kara Lamb at 970-962-4326 or Will Tully at 970-962-4368 or send an email to [klamb@gp.usbr.gov](mailto:klamb@gp.usbr.gov) or to [wtully@gp.usbr.gov](mailto:wtully@gp.usbr.gov).

Sincerely,

*for* Brian Person  
Area Manager

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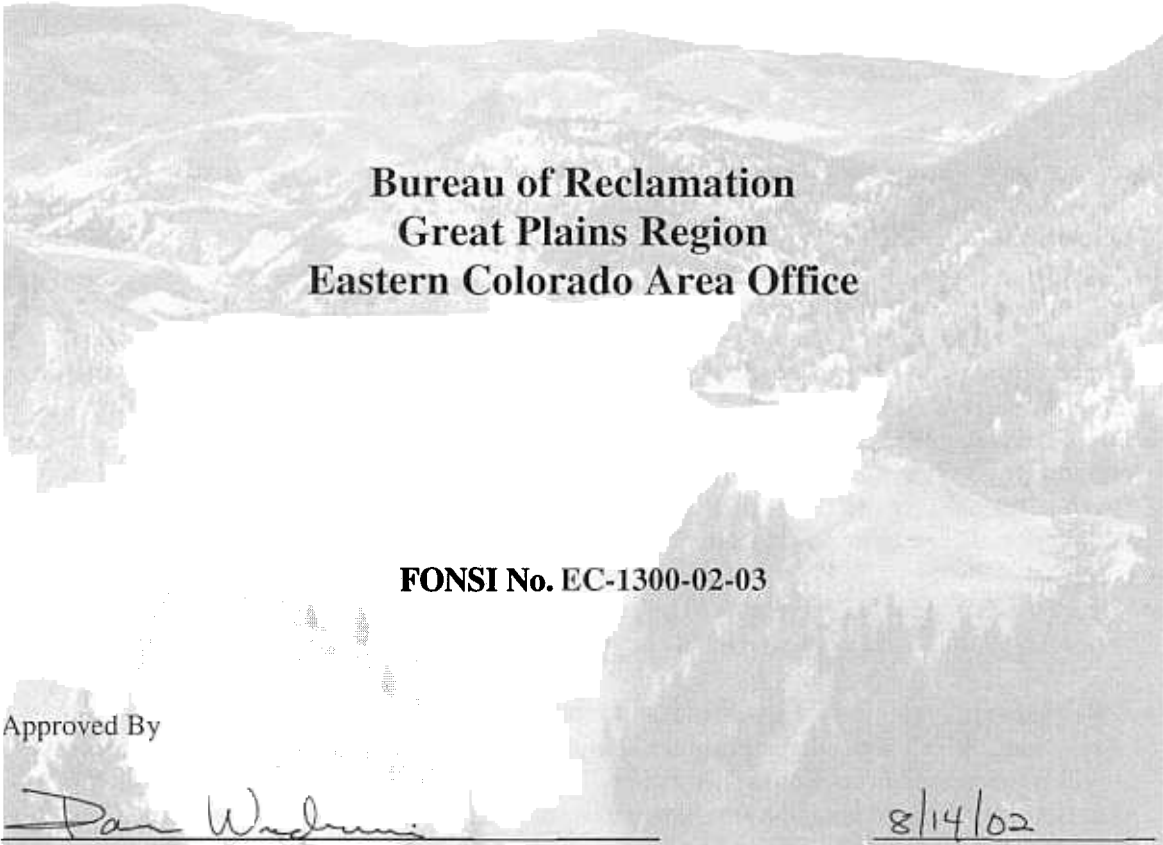


## Finding of No Significant Impact

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### *Ruedi Reservoir Agreements to Offset HUP Shortages at Green Mountain Reservoir*

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A grayscale background image showing a wide view of a reservoir surrounded by forested mountains.

Bureau of Reclamation  
Great Plains Region  
Eastern Colorado Area Office

**FONSI No. EC-1300-02-03**

Approved By

*Dan Wadman*

Area Manager

Eastern Colorado Area Office

*8/14/02*

Date

## INTRODUCTION

This FONSI (Finding of No Significant Impact) describes the U.S. Bureau of Reclamation's environmental conclusions regarding a proposal to enter into two agreements that would make up to 10,000 AF (acre-feet) of water from Ruedi Reservoir available to partially offset a shortage in the HUP (historic users pool) of Green Mountain Reservoir. Environmental effects of the Proposed Action and the No Action Alternative were evaluated in accordance with the provisions of NEPA (National Environmental Policy Act), and are documented in an EA (Environmental Assessment).

The purpose for the Proposed Action is to make available, if needed, up to 10,000 AF of water from Ruedi Reservoir to partially offset Green Mountain water that is unavailable to HUP beneficiaries. Green Mountain is operating under a drawdown limitation imposed to prevent aggravating a landslide condition along the reservoir that could impact homes and businesses in the vicinity. This operating limitation, combined with a continuing drought in the Green Mountain watershed, has reduced the water available to the 66,000 acre-feet HUP by about 20,000 AF. HUP beneficiaries primarily use Green Mountain water for irrigation in the Grand Valley between late spring and early fall.

During the environmental review process, potential effects from the Proposed Action 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 Proposed Action.

## PREFERRED ALTERNATIVE

Reclamation evaluated the effects of two alternatives—the No Action Alternative and the Proposed Action (HUP releases). Reclamation has selected the Proposed Action as the Preferred Alternative.

The Proposed Action includes entering into two temporary (less than a year) agreements to release water from Ruedi Reservoir to help offset shortages to the HUP due to Green Mountain Reservoir limitations on drawdown. The first agreement, between Reclamation and the Northern Colorado Water Conservancy District, would establish payment to the federal government for the costs of the water released from Ruedi. The second agreement would be among Reclamation, the Colorado River Water Conservation District, and the Northern Colorado Water Conservancy District to release up to 10,000 AF of water from Ruedi Reservoir for use by the HUP beneficiaries. Releases under this agreement would be made in the following manner:

- To the extent possible, releases will be at a steady rate beginning August 1, 2002, or as soon as releases can legally and practically begin;
- Releases under this contract will end on October 15 to minimize impacts on brown trout spawning, which generally begins in mid-October. At the end of the release period, flows will be decreased in such a manner as to minimize the stranding of fish in pools due to decreasing water levels. The rate of decreasing flows will be coordinated with the Colorado Division of Wildlife;

- Efforts will be made to limit cumulative Fryingpan River flows below Rocky Fork Creek to 300 cfs (cubic-feet/second) or less for the duration of the agreements to minimize impacts on recreation;
- Efforts will be made to minimize changes in flows during the time water is being released.

### FINDING

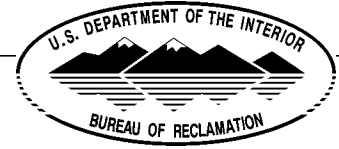
Having evaluated potential significant impacts associated with the Proposed Action, Reclamation has determined that no significant impacts are anticipated to occur. Furthermore, Reclamation makes the following specific findings:

- No significant adverse impacts to recreation opportunities and experience are expected as a result of the Proposed Action, based on the following:
  1. Drought conditions analyzed under the No Action Alternative are expected to degrade recreation experience at Ruedi Reservoir. Implementing the Proposed Action will not significantly further impact the degraded recreation experience;
  2. Flows in the Fryingpan River as a result of the Proposed Action are not expected to appreciably impact access or fishing experience because of the minor amount of flow above 250 cfs that is expected;
- Effects of the proposed action on endangered species are addressed in the *Final Programmatic Biological Opinion for Bureau of Reclamation's Operation and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions in the Upper Colorado River Above the Confluence with the Gunnison River*;
- Only minor adverse impacts to socioeconomic resources in the Basalt/Roaring Fork Valley would be expected to occur as a result of impacts on recreation and would be offset, from a state-wide perspective, by socioeconomic benefits realized in the Grand Valley due to improved agricultural conditions;

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

*R U E D I   R E S E R V O I R*  
**Colorado**

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*Environmental Assessment*

Agreements to Offset HUP Shortages  
at Green Mountain Reservoir

**EA No. EC-1300-02-03**

U. S. Bureau of Reclamation  
Eastern Colorado Area Office  
Loveland, Colorado

AUGUST 2002

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# *Purpose and Need*

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## CHAPTER 1

The U. S. Bureau of Reclamation proposes to make up to 10,000 AF (acre-feet) of water available for release from Ruedi Reservoir from August 1 to October 15, 2002, to partially offset a shortage in the HUP (Historic User Pool) of Green Mountain Reservoir. The water would be available for use by beneficiaries of the HUP as needed. Water otherwise available from Green Mountain Reservoir for HUP beneficiaries is unavailable due to landslide concerns.

Reclamation, an agency of the Department of the Interior, was established to protect, develop, and manage water resources in the 17 western states. The agency operates the Fryingpan-Arkansas Project, of which Ruedi Reservoir is part, and the Colorado-Big Thompson Project, of which Green Mountain Reservoir is part (see Location Map).

This EA (environmental assessment), was prepared in compliance with the National Environmental Policy Act. In the chapters to follow, background on the matter is provided (Chapter 1), alternative plans outlined (Chapter 2), and affected environment discussed and effects of the alternatives analyzed (both in Chapter 3). The EA concludes with consultation and coordination done during the study (Chapter 4).

The analysis in the EA presumes that inflow to Ruedi in 2003 will be similar to 2002.

### **PURPOSE**

To make available, as needed, up to 10,000 AF of water from Ruedi Reservoir to HUP beneficiaries to partially offset water that is in Green Mountain Reservoir but unavailable for use due to operating limitations on the reservoir.

### **NEED**

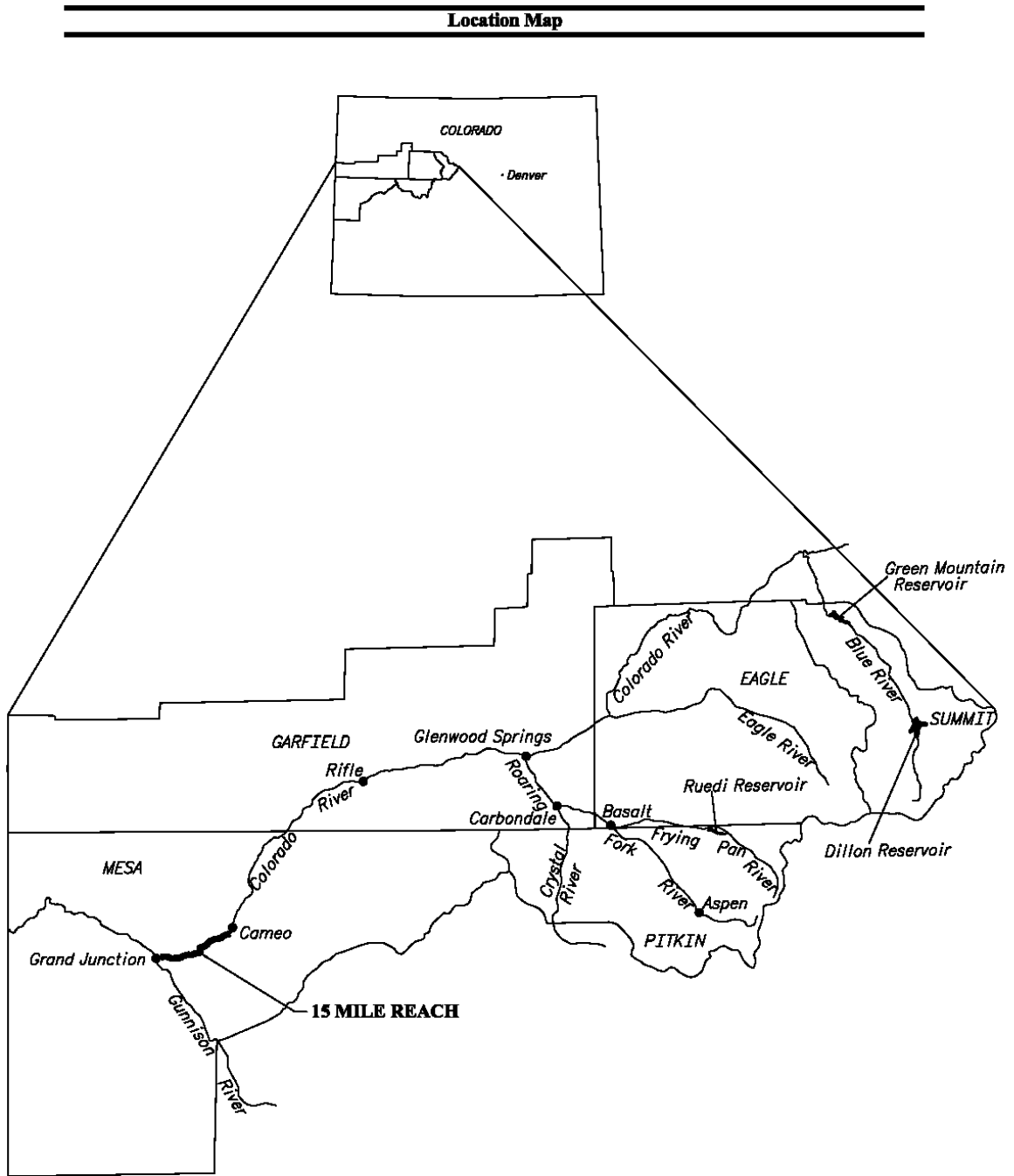
In an average year, water at Green Mountain Reservoir is allocated as follows (in order of priority):

- 52,000 AF—Replacement for out-of-priority depletions by the Colorado-Big Thompson Project West Slope Collection System
- 5,000 AF—Augmentation of out-of-priority Silt Project depletions
- 66,000 AF—Augmentation and direct delivery to HUP beneficiaries
- 20,000 AF—Delivery to water service contractors

The Green Mountain Reservoir watershed is in a continuing drought. In 2002, the volume of water stored for the purposes above was about 124,000 AF. This would have satisfied the first three allocations but resulted in a 100% shortage—or no water—for water service contracts. An operating limitation on drawdown of the reservoir was imposed to prevent aggravating a landslide condition along the reservoir that could damage homes and businesses in Heeney, Colorado, on the west shore. This limitation has reduced water available to the 66,000 HUP by about 20,000 AF.



Location Map



The largest use of HUP water is for irrigation in the Grand Valley during spring, summer and early fall months. Irrigating generally ceases in late October or early November.

## **BACKGROUND**

### ***Ruedi Reservoir***

Ruedi Reservoir is part of Reclamation's Fryingpan-Arkansas Project in central Colorado. Water from the Fryingpan River (and other tributaries of the Roaring Fork River) on the west slope of the Rockies is diverted through the project to the Arkansas River on the east slope. Project purposes are irrigation, power generation, municipal and industrial water supplies, recreation, and fish and wildlife. Ruedi stores water for replacement of out-of-priority diversions by the Fryingpan-Arkansas Project West Slope Collection System and for West Slope uses and benefits (compensatory storage). The reservoir, located 15 miles east of the town of Basalt, was constructed in 1968. It has a total capacity of 102,373 AF.

The compensatory storage in Ruedi was intended for the west slope. Reclamation instituted *Round I* and then *Round II* water sales in the 1980s to market water to west slope users. About 12,319 AF are currently under contract through these water sales.

### ***Green Mountain Reservoir***

Green Mountain Reservoir is part of Reclamation's Colorado-Big Thompson Project in central Colorado. Water from the Colorado River on the west slope of the Rockies is diverted through project facilities for use on the east slope. Project purposes are irrigation, power generation, municipal and industrial water supplies, and other uses. Green Mountain Reservoir, about 13 miles southeast of the town of Kremmling, was completed in 1943. It has a total capacity of 154,600 AF.

To serve the priority users from the reservoir this year, Reclamation planned to use all the available 124,000 AF in the active conservation pool. This would have drawn the reservoir down to a point it last reached in 1963. Plans for the drawdown revealed that reports in 1963 (as well as later studies) found evidence of landslide risk if the reservoir were drawn below elevation 7880 feet, endangering homes, businesses, and other improvements on the west side of the reservoir. For this reason, Reclamation decided to limit water available from the reservoir, shorting the HUP beneficiaries this year. Reclamation had already declared a 100% shortage to water service contractors earlier this year because water was unavailable due to the drought.

## **ISSUES**

Reclamation's Eastern Colorado Area Office in Loveland, Colorado, released the draft *Ruedi Reservoir 2012 Agreement EA* for comment in March 2002. From the mailing list developed for that EA, on July 19, 2002, Reclamation solicited comments from interested parties on the proposed action (summarized in Chapter 4). Those who commented included the Service, Colorado River Water Conservation District, Town of Basalt, Roaring Fork Conservancy, and Ruedi Water and Power Authority.



# *Alternatives*

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## **CHAPTER 2**

Chapter 2 presents the two alternative plans analyzed in this EA: the *Proposed Action*—in which up to 10,000 AF would be released from Ruedi Reservoir this summer for use by HUP beneficiaries—and the *No Action Alternative*--in which these releases would not be made. The chapter concludes with a summary table of the potential impacts of these alternatives.

### **PROPOSED ACTION**

In the Proposed Action, Reclamation would enter into two temporary (less than a year) agreements involving Ruedi Reservoir to help offset shortages to the HUP from limitations on Green Mountain Reservoir drawdown.

The first agreement between Reclamation and the NCWCD (Northern Colorado Water Conservancy District) would establish payment to the federal government for costs of contract water releases from Ruedi.

The second agreement, among Reclamation, the Colorado River Water Conservation District, and the NCWCD, would be for the release of up to 10,000 AF from Ruedi water for use by HUP beneficiaries. The agreement would specify:

- To the extent possible, releases would be at a steady rate from August 1, 2002, or as soon as releases could legally and practically begin;
- Releases under this agreement would end on October 15, 2002, to minimize effects on brown trout spawning which generally begins in mid-October. At the end of the release period, flows would be decreased so as to minimize the stranding of fish in pools due to dropping water levels. The release rate would be coordinated with the Colorado Division of Wildlife;
- Efforts would be made to limit cumulative flows in the Fryingpan River below Rocky Fork Creek to 300 cfs or less for the duration of the agreement to minimize effects on recreation;
- Efforts would be made to minimize changes in flows in the Fryingpan while releases were being made.

### **NO ACTION ALTERNATIVE**

In this alternative, releases from Ruedi would not be made this summer to offset water shortages to HUP beneficiaries from the limitation placed on Green Mountain Reservoir.

## SUMMARY OF IMPACTS

Table 2.1 summarizes potential environmental impacts of the alternatives. These impacts are detailed in the next chapter.

<b>Table 2.1 Summary of Potential Impacts.</b>		
	<b><u>No Action</u></b>	<b><u>Proposed Action</u></b>
<b>Hydrology</b> <ul style="list-style-type: none"> <li>• <b>Erosion and Scour</b></li> <li>• <b>Water Contracting</b></li> </ul>	<p>Projected flows not expected to cause erosion or scour downstream of Ruedi.</p> <p>There is sufficient water to meet 2002 contract demands and if 2003 inflow is similar to 2002 inflow, there will be sufficient water to meet 2003 contract demands.</p>	<p>Projected flows not expected to cause erosion or scour downstream of Ruedi.</p> <p>There is sufficient water to meet 2002 contract demands and if 2003 inflow is similar to 2002 inflow, there will be sufficient water to meet 2003 contract demands.</p>
<b>Aquatic Wildlife</b> <ul style="list-style-type: none"> <li>• <b>Sport Fishery</b></li> <li>• <b>Threatened &amp; Endangered Species</b></li> </ul>	<p>End of October drop in flows could potentially impact brown trout spawning and incubation. This is expected to be minimal.</p> <p>All contract obligations for endangered fish releases from Ruedi are expected to be met in 2002 and 2003. The 4 out of 5 years 5,000 AF Ruedi water for endangered fish was not available in 2002 and is not expected to be available 2003 if 2003 inflows are equal to or less than 2002 inflow.</p>	<p>Releases of up to 10,000 AF for HUP beneficiaries would be completed before spawning begins—no impacts beyond those expected under No Action.</p> <p>All contract obligations for endangered fish releases from Ruedi are expected to be met in 2002 and 2003. The 4 out of 5 years 5,000 AF Ruedi water for endangered fish is not expected to be available in 2002 or 2003. Additional irrigation return flows in the Grand Valley would accrue to the 15 Mile Reach.</p>
<b>Recreation</b> <ul style="list-style-type: none"> <li>• <b>Ruedi Reservoir</b></li> <li>• <b>Fryingpan Fishing</b></li> </ul>	<p>In 2002, Dearhamer and Aspen Yacht Club boat ramps not useable; Ruedi Marina boat ramp available until mid Sept. If 2003 inflow is similar to 2002 inflow, Dearhamer and Aspen Yacht Club boat ramps not useable in 2003; Ruedi Marina boat ramp available for 30-45 days.</p> <p>Degraded recreation experience due to low water levels in 2002 and 2003.</p> <p>No impact—flows at or below 250 cfs.</p>	<p>In 2002, Dearhamer and Aspen Yacht Club boat ramps not useable; Ruedi Marina boat ramp available until about September 1. If 2003 inflow is similar to 2002 inflow, Dearhamer, Aspen Yacht Club, and Ruedi Marina boat ramps would not be useable in 2003.</p> <p>Degraded recreation experience due to low water levels in 2002 and 2003.</p> <p>Potential for minor impacts on fishing. Flows expected to be over 250 cfs, but less than 300 cfs.</p>

<ul style="list-style-type: none"> <li>• <b>Roaring Fork Fishing</b></li> </ul>	<p>Flows/fishing conditions degrading as summer progresses.</p>	<p>Additional flow could potentially improve fishing experience.</p>
<p><b>Social and Economic Environment</b></p> <ul style="list-style-type: none"> <li>• <b>HUP Beneficiaries</b></li> <li>• <b>Town of Basalt/Roaring Fork Valley</b></li> </ul>	<p>Negative impact to agriculture in the Grand Valley from shortage of irrigation water.</p> <p>No impacts anticipated. Reservoir visitation and visitor spending down in 2003 due to low reservoir levels and brief availability of boat ramps.</p>	<p>Beneficial impact on agriculture in the Grand Valley as shortages are partially offset by 10,000 AF releases.</p> <p>Flows above 250 cfs would have potential to cause minor impacts on fishing and visitor spending. In 2003, reservoir visitation and visitor spending down due to low reservoir levels and lack of boat ramp facilities.</p>
<p><b>Hydropower Production</b></p>	<p>All releases from Ruedi (200-220 cfs) could be used for hydropower production.</p>	<p>Flows above 250 cfs would be bypassed around power plant — estimated to be 0-50 cfs bypassed.</p>
<p><b>Cultural Resources</b></p>	<p>This action has no potential to cause effects to historic properties.</p>	<p>This action has no potential to cause effects to historic properties.</p>



# *Affected Environment and Environmental Consequences*

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## CHAPTER 3

Chapter 3 describes hydrology (water volume), aquatic life (including threatened and endangered fish), threatened and endangered wildlife, recreation, economic and social environment, hydropower production, and cultural resources of the Ruedi Reservoir area. These are the resources that could be affected by the Proposed Action. This description is followed by an analysis of the effects of the alternatives (explained in Chapter 2). Effects of the No Action Alternative are presented first, followed by effects of the Proposed Action.

Scoping determined that Indian trust assets (legal interests in property and rights held in trust by the U.S. for Indian tribes or individuals), environmental justice (adverse effects to a particular social-economic group, including low-income or minority populations), wetlands, floodplains, or migratory birds wouldn't be affected by either of the alternatives in this EA.

### HYDROLOGY

#### *Affected Environment*

The primary source of streamflow in the Upper Colorado River basin above the Gunnison River is the spring melting of accumulated winter snowpack. The annual hydrographs of rivers in the area show highest streamflows occurring during the late spring and early summer. Streamflow is at its lowest during the winter. Streamflows in the Fryingpan River are stored in Ruedi Reservoir during peak runoff, and then released for users later in the year.

Ruedi Dam is a major structural feature of the Fryingpan-Arkansas Project. The reservoir has an active conservation capacity of 102,373 AF at elevation 7,766.0 feet. Replacement capacity of the reservoir is used to replace water diverted out of priority from the Western to the Eastern Slope by the project; Ruedi's regulatory capacity provides for other uses on the Western Slope (Table 3.1 displays pool allocations and volumes).

The Fryingpan River below Ruedi Reservoir is a cobble-boulder bed channel typical of high mountain streams in the Rocky Mountains. Geologic features of the Fryingpan Valley, especially steep canyon walls and erosion resistant sandstone, shape the general form of the Fryingpan River, essentially restricting lateral and vertical movement of the channel (BRW, Inc 1999; USDI, 1989). Because of these factors and the large size of the bed and bank materials that form the Fryingpan River, the channel is considered relatively stable (BRW, Inc 1999; USDI, 1989). Through most of its length to the town of Basalt, the channel is adequate to contain approximately 1,000 cfs (USDI, 1989).

The *Ruedi Reservoir, Colorado, Round II Water Marketing Program Final Supplement to the Environmental Statement* (USDI, 1989) characterizes the Roaring Fork River in the following manner:

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 (p. 3.5).

**Table 3.1. Ruedi Reservoir Allocations.**

ALLOCATIONS	VOLUME (AF)	TOTALS (AF)
<b>Replacement Capacity*</b>	up to 28,000	28,000
<b>Regulatory Capacity</b>		
<b>A. Marketable Yield</b>		
Round I Contracts	7,850	
Round II Contracts		
Currently Available (4,469 AF Contracted)	6,135	
Available w/Long-Term Agreement	<u>10,865</u>	
<i>Subtotal</i>	17,000	
Round II Mitigation	**5,000	
Uncommitted		
End. Fish (Temporary 1 Year Agreement in 2002)	10,825	
Remaining Uncommitted*** (available to contract)	<u>10,825</u>	
<i>Subtotal</i>	21,650	
<i>Total</i>		51,500
<b>B. Pool Removed from Marketable Yield During Round II NEPA to Enhance Reservoir Recreation</b>	21,778	21,778
<b>C. Inactive Storage</b>	1,032	1,032
<b>D. Dead Storage</b>	63	63
<b><i>Total Storage Capacity</i></b>		102,373
<p><i>*The Operating Principles describe replacement capacity as that part of total reservoir capacity required to permit project diversions when diversions could not otherwise be made because of simultaneous demands of senior diversions in western Colorado at the time these principles were adopted. An estimated 28,000 AF is available on a preferred basis to the extent actually needed for replacement purposes. In 2002, 625 AF was released, the record to date for replacement water.</i></p> <p><i>**An additional 5,000 AF of water is available from Ruedi Reservoir in 4 years out of 5 through re-regulation of the reservoir.</i></p> <p><i>***The proposed agreement would use water from this allocation.</i></p>		

Operating Principles of the Fryingpan-Arkansas Project define minimum releases (hereafter referred to as “minimum releases”) from the reservoir:

For the protection of recreational values, including fishing, on the Fryingpan River below Ruedi Reservoir, releases of water from said reservoir, not to exceed the stream inflow, shall be made so that the streamflow immediately below the junction of the Fryingpan River and Rocky Fork shall not be reduced below 39 cfs from November 1 to April 30, and 110 cfs from May 1 to October 30, or as actual experience or court decree hereafter dictate (p. 4).

Reclamation typically operates Ruedi to release 39 cfs, or more, from November 1 through April 30 irrespective of inflow. Flows and storage estimates in this EA are based on releasing 39 cfs through the winter of 2002-2003.

Past Ruedi releases of approximately 500 cfs have occurred with no reported scouring or erosion of the Fryingpan River streambed or banks.

The *Colorado River Endangered Fish Recovery Program* has established target flows for the 15 Mile Reach (see Location Map), which their research indicates are necessary to achieve adequate habitat for recovery of endangered fish. A range of target flows was established to respond 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 year.

### ***No Action Alternative***

Flows in the Fryingpan are anticipated to be approximately 200-220 cfs during August, September, and October this year, a combination of releases for endangered fish, water service contracts, reservoir operation requirements, and inflows from Rocky Fork. Based on past information, this rate of flow is not expected to generate either scour or erosion problems in the Fryingpan River.

Ruedi releases are expected to exceed inflows during the summer and fall while endangered fish and contract releases continue, resulting in a drop in reservoir content. Projected approximate reservoir storage volumes and elevations are presented in Table 3.2.

**Table 3.2. Approximate Storage Volume and Elevation of Ruedi Reservoir by Month Under No Action.**

<b>DATE</b>	<b>STORAGE (AF)</b>	<b>ELEVATION (ft)</b>
August 1	68,400	7727
September 1	62,600	7720
October 1	53,100	7706
November 1	45,600	7694

Winter releases from Ruedi meet minimum releases. The reservoir is low, so it will be operated to replenish storage, meaning any inflows above minimum releases will be stored.

Flows in the Roaring Fork are expected to continue to decline through the late summer and fall following the typical hydrograph pattern for the river.

Flows in the 15 Mile Reach are expected to be impacted by the ongoing drought in Colorado. Ruedi will continue to make endangered fish releases in accordance with agreements negotiated with the Service and the Colorado Water Conservation Board.

In 2003, beginning water year (April) storage at Ruedi would be approximately 40,500 AF, low in comparison to the average water year beginning storage of approximately 60,000 AF. For this reason,

Ruedi would continue to be operated to store water and limit releases during 2003. If 2003 inflow to Ruedi is similar to 2002 inflow, Ruedi would be expected to be above 51,800 AF for a part of the summer but would be in all likelihood under this volume for a substantial part of the summer season. Flow in the Fryingpan River would be expected to be lower than average, and at times would only be at the minimum releases especially during early summer months. In late summer 2003, endangered fish releases would be expected to increase flows in the Fryingpan River, but would most likely be below 250 cfs.

***Proposed Action (HUP Releases)***

This alternative would increase flows in the Fryingpan River by an estimated 66 cfs if released at a constant rate from August 1 through October 15. This would result in Fryingpan River flows of approximately 250-300 cfs during the term of the agreements. The flow would be a combination of releases expected under No Action along with releases made for the HUP under the agreement. Based on past information, this rate of flow is not expected to generate either scour or erosion problems in the Fryingpan River.

Ruedi releases are expected to exceed inflows during the term of the agreements, causing a drop in Ruedi content. Projected approximate reservoir storage volumes and elevations are shown in Table 3.3.

**Table 3.3. Approximate Storage Volume and Elevation of Ruedi Reservoir by Month Under the Proposed Action.**

<b>DATE</b>	<b>STORAGE (AF)</b>	<b>ELEVATION (ft)</b>
August 1	68,400	7727
September 1	57,000	7712
October 1	43,700	7691
November 1	35,900	7677

Similar to No Action , winter releases are anticipated to be the minimum required release of 39 cfs or inflows to the reservoir, whichever is less. The reservoir is low, so the reservoir will be operated to replenish storage; any flows above 39 cfs will be stored.

Flows in the Roaring Fork would be expected to continue to decline during the term of the agreement but the HUP releases would be expected to increase overall flow.

Under this alternative, Reclamation would continue to make endangered fish releases in accordance with agreements that support the Recovery Program. The Grand Valley irrigation systems are expected to continue to operate with as much efficiency as possible, reducing administrative spills and return flows to the Colorado River. When the irrigators are able to divert their full water supply, total return flows to the Colorado River can reach up to 300 cfs. Lewis Wash, the only drain to enter the 15 Mile Reach, typically varies from 2-30 cfs during the irrigation season. The Proposed Action would contribute to greater return flows and administrative spills to Lewis Wash and thus to the 15 Mile Reach than would occur under the No Action Alternative.

At the start of fill in April 2003, storage in Ruedi under this alternative would be approximately 30,800 AF, low in comparison to the average water year beginning storage of approximately 60,000 AF. For this

reason, Ruedi would continue to operate to store water and limit releases during 2003. If 2003 inflow is similar to 2002 inflow, Ruedi would be expected to be below 51,800 AF for all of the summer season. Boats that require a boat ramp to launch would be unable to use the reservoir during 2003. Flow in the Fryingpan River would be expected to be lower than average and at times would only be the minimum releases especially during early summer. In late summer 2003, endangered fish releases would be expected to increase flows in the Fryingpan River but would most likely be below 250 cfs.

### *Net Effects*

Fryingpan River flow would be higher for the rest of the summer and into early fall under the Proposed Action. Ruedi storage content would drop faster and remain lower through the winter when compared to No Action. Flows in the 15 Mile Reach are likely to be minimally improved through greater return flows and possibly administrative spills. Contents in Ruedi Reservoir during Water Year 2003 would be approximately 10,000 acre-feet less than under No Action. Beyond 2003, contents and the rate of releases are likely to be driven more by natural hydrology than the Proposed Action.

## **AQUATIC WILDLIFE**

This section includes both sport fish and threatened and endangered fish species in the reservoir and in the rivers below Ruedi Reservoir.

### *Affected Environment*

Sport Fish. The Fryingpan River between Ruedi Dam and the Roaring Fork River is designated *Gold Medal Water* by the Colorado Division of Wildlife where anglers have the best chance of catching trophy trout. Brown and rainbow trout are distributed throughout this part 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 remained fairly steady with a slight increase through the 1990's (Colorado Division of Wildlife, 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 on this hypothesis but indications are that brown trout predation on the young is part of the explanation for population drops of other trout species (Colorado Division of Wildlife, 2000). Other factors such as the undesirable river temperatures during the spring rainbow trout egg incubation may also have an impact. 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 (Colorado Division of Wildlife, 2000). Rainbow trout stocking slowed in the late 1980's, and, since 1992, has occurred only once (in 1998).

Even without stocking, the Fryingpan River supports some of the highest fish populations in Colorado. Brown trout populations have been fairly constant at about 1,500 fish/ha (fish per hectare) since 1992, and rainbow trout populations averaged about 300 fish/ha from 1992 to 1996 (Strange, 1998). Whirling disease has been detected in the Fryingpan River since 1995; however, effects have only been observed in rainbow trout populations. The disease is most prevalent in lower reaches of the river, where the source has been identified in private ponds that spill into the Fryingpan (Colorado Division of Wildlife, 2000).

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—has enhanced both the biomass and numbers of both brown and rainbow trout, especially for the first few miles just below the dam (Colorado Division of Wildlife, 2000; Nehring, 1991). 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). Releases of opossum shrimp have clearly altered the diet of brown and rainbow trout in the reach immediately below the dam (Nehring, 1991).

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 Frypan River Below Ruedi Dam.**

<b>SPECIES</b>	<b>ADULT SPAWNING</b>	<b>EGG INCUBATION</b>	<b>EGG HATCHING</b>	<b>FRY EMERGENCE</b>
Brown trout	October 15- November 15	October 15-May1	April 1-June 1	May 15-June 15
Rainbow trout	April 1-May 1	April 1-June 15	June 1-July 1	June 15-July 15

(Nehring and Anderson, 1993)

Threatened and Endangered Fish. 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 to reproduce, feed, and grow. In recent times, multiple factors have contributed to the loss of habitat and decline of these native species. One factor, 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 Gunnison River are estimated at approximately 1 million AF/year (USDI, 1999)

There are currently two contracts that make water from Ruedi Reservoir available for the 15 Mile Reach to benefit endangered fish. The first, executed in 1990, is a forty-year contract with the CWCB (Colorado Water Conservation Board) for 10,000 AF for the 15 Mile Reach. The contract stipulates that 5,000 AF be made available annually, with an additional 5,000 AF to be made available at least 4 out of 5 years through re-regulation. The second contract is a short-term (one-year) agreement with CWCB and the Service to make 10,825 AF available for the 15 Mile Reach. This short-term agreement will be replaced by the 2012 agreement currently being negotiated with the CWCB and Service. (The 2012 agreement is not part of the Proposed Action.)

Several other contracts and agreements are associated with other reservoirs that directly and indirectly enhance endangered fish habitat in the 15 Mile Reach: the *Municipal Recreation Agreement* between Reclamation and the municipalities of Grand Junction, Palisade, and Fruita; and the *West and East Slope*

*Interim Water Users' Agreements* to make 10,825 AF available for the 15 Mile Reach. These contracts make water available from a variety of sources including Green Mountain, Wolford Mountain, and Williams Fork Reservoirs.

### ***No Action Alternative***

Sport Fisheries. Releases from Ruedi for operations and contract obligations primarily occur outside of spawning and critical early development life stages for brown and rainbow trout in the Fryingpan River as shown in Table 3.4. The first two weeks of spawning and egg incubation would occur before releases are expected to drop to the winter release level of the lesser of 39 cfs or inflows. Releases would be gradually reduced so that fish would be able to migrate to the larger, year-round pools. Winter flows of the lesser of 39 cfs or inflows are believed to have potential to impact brown trout incubation by limiting access to redds, limiting movement for incubation, and exposing eggs to de-watering and freezing.

Smith and Hill (2000) believe that flow changes greater than 25% can have a negative impact on trout fisheries. No dramatic changes in flows (that is, changes in flow greater than 25%) are anticipated during releases from August 1, 2002 to November 1, 2002. In general, changes in flow would reflect past release practices which have been kept well below 25% of current flow. Changes in flow greater than 25% are generally “ramped” over multiple days to minimize impacts. In addition, a 2001 CDOW (Colorado Division of Wildlife) study investigating 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 (pp.73-74).

Macroinvertebrates represent a significant food source for trout species; 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. Flow fluctuations seen below Ruedi Dam under No Action are expected to be less than 50 cfs per day, which would not have a negative effect on macroinvertebrates. This variation is typical for a high mountain environment like the Fryingpan, 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 winter (November 1-April 30) minimum instream flow established for the Fryingpan between Ruedi and the Roaring Fork is 39 cfs established by the CWCB subsequent to amendment of the Fryingpan-Arkansas Operating Principles to protect the stream biology of the Fryingpan. The *Operating Principles*, as amended, stipulate that Ruedi Reservoir winter releases are to be the lesser of 39 cfs or inflows to the reservoir. Under No Action, winter release rates are anticipated to be at 39 cfs or inflows, whichever is less, in accordance with the principles. Reclamation typically operates Ruedi to release 39 cfs, or more, from November 1 through April 30

irrespective of inflow. Flows and storage estimates in this EA are based on releasing 39 cfs through the winter of 2002-2003. Releases of 39 cfs may be marginal in terms of providing suitable macroinvertebrate habitat, and could have some negative effects on their ability to successfully overwinter. If inflows drop significantly below 39 cfs, habitat and overwintering success would be further degraded.

Threatened and Endangered Species. The 15 Mile Reach is affected more than other Colorado River reaches because it is downstream of several large diversions and upstream of the Gunnison River. Low water conditions in the 15 Mile Reach during late summer and early fall especially limit habitat. Late summer target flows established by the Service for maintaining endangered fish habitat in the 15 Mile Reach are not expected to be met under No Action. Flows in the 15 Mile Reach are expected to be 90 cfs, as compared to the dry year target flow of 810 cfs. In addition, sufficient storage exists in Ruedi to meet Reclamation's obligations for endangered fish releases of 15,825 AF in 2003.

A forty-year contract between Reclamation and the CWCB provides 10,000 AF of water for the 15 Mile Reach, as mentioned previously (5,000 AF annually, and another 5,000 AF 4 out of 5 years through re-regulation). Reclamation determined that drought conditions do not allow re-regulation that would provide the second 5,000 AF in 2002. (This water has been supplied every year since the agreement was executed in 1990 except this year.) Reclamation also anticipates that under No Action there is a high probability that second 5,000 AF release would not be made in 2003.

#### ***Proposed Action (HUP Releases)***

Sport Fisheries. As with No Action, Ruedi releases for operations and contract obligations primarily occur outside of spawning and critical early development life stages for brown and rainbow trout in the Fryingpan River (Table 3.4). The first two weeks of spawning and egg incubation for brown trout would occur before releases are expected drop to the winter minimum releases. Releases under the Proposed Action would be gradually decreased and would end before the mid-October beginning of brown trout spawning and incubation, as under No Action. Winter flows are also expected to meet minimum releases creating potential to impact brown trout incubation by limiting access to redds, limiting movement for incubation, and exposing eggs to de-watering and freezing.

Smith and Hill (2000) state that flow changes greater than 25% can have a negative impact on trout fisheries. No dramatic changes in flows (changes in flow greater than 25%) are anticipated during releases associated with the Proposed Action; the alternative also includes measures to gradually decrease flows over multiple days.

Fluctuations in flows below Ruedi under this alternative, which will be less than 50 cfs per day, would not be expected to have a negative effect on macroinvertebrates, a significant food source for trout species, as mentioned. Variations of this magnitude and less are 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).

Under this alternative, winter flows are expected to be similar to No Action: 39 cfs or reservoir inflows, whichever is less. Releases of 39 cfs may be marginal in terms of providing suitable macroinvertebrate overwintering habitat and could have some negative effects their ability to successfully overwinter. If inflows dropped significantly below 39 cfs, habitat and overwintering success would be further degraded. Reclamation typically operates the reservoir to release 39 cfs to the Fryingpan River irrespective of inflow. Estimates in this EA are based on releasing 39 cfs to the Fryingpan River from November 1, 2002 through April 30, 2003.

CDOW has indicated there are potential benefits for both the Roaring Fork and Fryingpan fisheries from some supplemental Ruedi 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-off. Supplemental flow aids in maintaining better environmental conditions for the fishery, thereby reducing potential die-off. In addition, CDOW indicated flows  $\geq 250$  cfs 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).

Threatened and Endangered Species. Flows in the 15 Mile Reach may be improved by the Proposed Action. Releases made under the agreement would be diverted by HUP beneficiaries at the head of the 15 Mile Reach. Lewis Wash is the only return flow point within the 15 Mile Reach. Flows are generally minor from this return flow point, in the range of 2-30 cfs when full irrigation is underway. Currently, Grand Valley irrigators are only diverting part of the water they would typically divert when not in drought conditions (approximately 1,800-2,000 cfs at present in comparison to 2,260 cfs typically). Releases under the Proposed Action represent only a small part of the total that would be diverted. It is anticipated that the Proposed Action would result in minor, increased administrative spills and return flows that would reach the 15 Mile Reach.

Under this alternative, sufficient storage is expected to be available in Ruedi to meet Reclamation's obligations for endangered fish releases in 2003. Just as in No Action, however, the probability is high that the second 5,000 AF (4 out of 5 years) would not be made available in 2003.

Consequently, Reclamation has determined that there would be a minor beneficial effect to Colorado River endangered fish as a result of the Proposed Action.

Releases like the Proposed Action and resultant impacts on Colorado River endangered fish are addressed in the *Programmatic Biological Opinion* developed by Reclamation, the Service, water users, and environmental interests in 1999. The PBO calls for a number of measures to help recover endangered fish while allowing new depletions from activities like those associated with the Proposed Action to proceed. Although coordination with the Service continues on Reclamation operations, no further formal consultation is required for actions covered by the PBO, such as the Proposed Action.

### *Net Effects*

No Action and the Proposed Action are expected to have similar impacts on the sport fishery in the Fryingpan River: potential disruption of some brown trout spawning and incubation, and potential for overwinter impacts to macroinvertebrates. The Proposed Action is not anticipated to create any impacts on spawning activities beyond those anticipated under No Action. Delivery of water under the Proposed Action is planned to end by October 15, before the onset of brown trout spawning activities. Both alternatives would result in meeting minimum releases in the Fryingpan River during the winter of 2002-2003.

The Proposed Action alternative would likely have a minor beneficial effect on endangered fish species.



## RECREATION

### *Affected Environment*

Ruedi Reservoir. Ruedi Reservoir is a developed recreation attraction on the western slope, offering a wide variety of recreational opportunities. Camping is by far the most popular activity followed by fishing and then boating (USDI, 1989; Keneally, 2001). The general season of use at Ruedi is Memorial Day through the weekend after Labor Day, with heaviest use occurring from July 4th to Labor Day. Use of the area decreases after Labor Day as 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 include camping (associated with hunting), fishing, and, when available, ice fishing (Keneally, 2001). Preliminary data from the Roaring Fork Conservancy indicate that over 70% of respondents participated in watercraft associated activities, the predominant activity on Ruedi Reservoir. Thirty-two percent of those activities were motorboating, while 20% were sailing, 10% were jet skiing, 7% were kayaking or canoeing, and 5% were sail boarding. Fifty percent of respondents camped and 32% fished from shore (Crandall, 2002).

The U.S. Forest Service manages the water surface and lands around Ruedi Reservoir under agreement with Reclamation. They operate four campgrounds, two day-use areas, and the Ruedi Marina, as shown in Figure 3.1. Three of the campgrounds—the Mollie B, Little Maud, and Little Mattie—are located next to Ruedi Marina, while the Dearhamer Campground is located at the east end of the reservoir. Picnicking and beach facilities are available at the Freeman Mesa day-use area located at the middle of the north shore.

There is one privately owned facility on the reservoir, the Aspen Yacht Club (Club). The 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 (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 summer.

There are a total of three boat ramps located at the reservoir: Ruedi Marina, Dearhamer, and Aspen 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 Aspen 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.

Fishing. Reservoir operations have moderated natural flows along the part of the Fryingpan River between the dam and the Roaring Fork River. Moderation of the stream flow has improved the sport fishery, especially for brown trout (Strange, 1998).

The Fryingpan River between Ruedi Dam and the Roaring Fork River has been designated by the CDOW as Gold Medal Water, as mentioned, indicating a greater than average potential to catch trophy trout. This part 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.

The Forest Service currently permits four outfitter-guides along the public land parts of the Fryingpan River from Ruedi Dam to Basalt. Outfitter-guide operations generally run from the beginning of May through the end of October, an estimated 75% of the user trips are between July 1 and September 30 (Table 3.5).

Several segments of the Roaring Fork River are also Gold Medal Waters and have catch and release requirements. The Forest Service permits six outfitter/guides along the public land parts of the Roaring Fork.

**Table 3.5. Distribution Of Total Outfitter/Guide Days In Percent By Year.**

YEAR	MAY 1-SEPT. 30	JULY 1-SEPT. 30
1987	93%	84%
1988	91%	74%
1989	94%	90%
1990	90%	78%
1991	91%	70%
1992	93%	69%
1993	93%	69%
1994	93%	75%
1995	93%	75%

***No Action Alternative***

Ruedi Reservoir. Currently, the Dearhammer and Aspen Yacht Club boat ramps are not useable at Ruedi Reservoir and are anticipated to remain unavailable through 2003. The Ruedi Marina boat ramp is expected to be useable through mid-September but will then become unavailable and remain so until next spring. The boat ramp will most likely be available for only part of the 2003 summer season due to the expected low storage content of the reservoir going into the spring runoff season.

Due to a lack of water in the reservoir, camping and other activities at the reservoir would most likely be degraded for the remainder of this summer season and could well be degraded for most of the 2003 summer season as well. The anticipated low reservoir content would be expected to impact the aesthetics, access to recreation, and proximity to camping at Ruedi.

Fishing. Flows between August 1 and October 31 are expected to be between approximately 200-220 cfs. These flows would not be expected to impact fishing along the Fryingspan River.

Fishing experience along the Roaring Fork would continue to deteriorate throughout this period as flows decline.

In 2003, flows along the Fryingspan River are expected to be unusually low at times. Fishermen have indicated that flows less than 150 cfs can impact fishing along the Fryingspan. Early in the summer recreation season, flows could be as low as 110 cfs, the minimum allowed by Ruedi's Operating Principles during this time of year. Flows are expected to increase as contract demand, endangered fish releases, and other releases occur later in the summer. Consequently, there is potential for the fishing experience along the Fryingspan to be impacted by low flows early in the summer season. No appreciable impacts to Roaring Fork fishing experience are anticipated because early summer flows are affected much more by other tributaries than by the Fryingspan River.

### ***Proposed Action (HUP Releases)***

Ruedi Reservoir. If 2003 inflow is similar to 2002 inflow, the Dearhamer and Aspen Yacht Club boat ramps would not be available for use in 2003 under the Proposed Action. In 2002 the Ruedi Marina boat ramp is expected to be useable through September 1 but would become unavailable shortly thereafter and remain unusable in 2003 if inflow is similar to 2002 inflow.

Camping and other recreational activities at the reservoir would most likely be degraded for the remainder of this summer season, as with No Action, and could well be degraded for most of the 2003 summer season. The anticipated low reservoir content would be expected to impact the aesthetics, access to recreation, and proximity to camping at Ruedi.

Fishing. Flows between August 1 and October 31 are expected to be between approximately 250-300 cfs. These flows have the potential to impact fishing along the Fryingpan River. Although the impacts would not be as substantive as higher flows, they would begin to limit river access and wading opportunities.

Fishing experience along the Roaring Fork would decline throughout the period of the agreement as flows declined but could be expected to be slightly improved by additional releases made under this alternative. This may only serve to extend the fishing season by a brief period.

In 2003, flows along the Fryingpan River are expected to be unusually low at times. Early in the summer, flows could be as low as the minimum allowed by the Operating Principles during this time. Fishermen have indicated that flows less than 150 cfs can impact fishing in the Fryingpan. Flows are expected to increase as contract demand, endangered fish releases, and other releases occur later in the summer. Consequently, there is potential for the fishing experience along the Fryingpan to be impacted by low flows early in the summer, longer than under No Action. No appreciable impacts to Roaring Fork fishing experience are anticipated because most early summer season flows are derived from tributaries other than Fryingpan River.

### ***Net Effects***

Under the Proposed Action, the Ruedi Marina boat ramp in 2002 is expected to become unusable up to three weeks earlier than under No Action. If 2003 inflow is similar to 2002 inflow, the Ruedi Marina boat ramp would probably not be unusable for any portion of 2003. Under the No Action alternative the Ruedi Marina boat ramp would be usable for approximately 30-45 days during the early part of the 2003 recreation season.

Ruedi releases under the Proposed Action are expected to cause some impacts to fishing access and wading, whereas no impacts are anticipated under No Action. Similarly, low flows in the Fryingpan River are expected to occur during the 2003 summer season under both alternatives but could be anticipated to last longer under the Proposed Action.

## **SOCIAL AND ECONOMIC ENVIRONMENT**

### ***Affected Environment***

Grand Valley. HUP beneficiaries include domestic, municipal, and agricultural users in the Colorado River basin above the Gunnison River. The largest group of HUP beneficiaries is a collection of farm and ranch interests in Mesa County near Grand Junction, Colorado. Agriculture has been an important

industry in the county from the time irrigated farming began in Colorado in the 1880's. The long frost-free period of about 191 days gives farmers a selection from a large variety of cash and forage crops. Principal cash crops have been fruit (apples, peaches, pears, apricots, and cherries), sugar beets, corn, malting barley, and small grains. Alfalfa and corn for silage are the main forage crops grown for livestock feed.

HUP beneficiaries primarily use late summer and early fall water to irrigate row, orchard, and vineyard crops. Irrigation is used to complete the growing of late season row crops maturing at that time of year. In addition, water during this time is used to flood orchard and vineyard stands so that they overwinter successfully.

Roaring Fork Valley. Recreation activities associated with Ruedi Reservoir, the Fryingpan River, and the Roaring Fork River benefit the valley economy and the towns of Basalt and Carbondale, where visitors purchase goods and services. Surveys indicate that from November 2000 to October 2001 over 20,000 visits were made to the Fryingpan River Valley between Ruedi and Basalt (Crandall, 2002). Most of these visitors indicated they were anglers.

The Fryingpan and Roaring Fork Rivers are located in west central Colorado in Pitkin, Eagle, and Garfield counties (Location Map). Basalt, with a population of 2,681, is the major community along the Fryingpan, being situated at the confluence of the Fryingpan and the Roaring Fork Rivers. Upstream along the Fryingpan from Basalt are numerous multi-acre, private parcels, most of which have been developed as single-family dwellings.

In large part, concerns about impacts to the local economy expressed by the public have been focused on Basalt and, to a lesser extent, the Roaring Fork Valley. Basalt's economy does bear some similarity with the Valley's economic situation: for purposes of this analysis, therefore, the discussion of Basalt's economy that follows can be applied broadly to the Roaring Fork Valley.

Basalt's economy is closely tied to outdoor recreation. It is an important draw for tourists, and it is the key to the quality of life for area residents. During the winter, the major recreational activity is alpine skiing, while during other seasons fishing remains the key attraction to Basalt and surrounding area. For the most part, only a few businesses constitute Basalt's economy, and these businesses are mostly directly related to recreation activities associated with Ruedi Reservoir, the Fryingpan River below Ruedi Dam, and the Roaring Fork River. Examples are fishing and camping retail stores. There is a much larger economic influence associated with travel cost expenditures of visitors (gas, lodging, dining, groceries, etc.). Thus, contributions directly to the economy may not be particularly significant; when coupled with traveler's expenditures, however, these contributions represent a more important element within the community's economy.

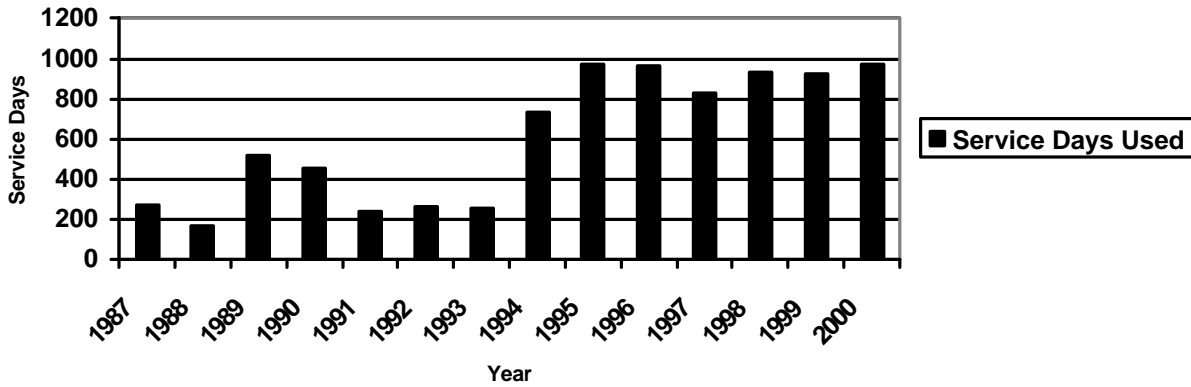
Basalt's population went from 529 in 1980, to 1,210 in 1990 (+129%), to 2,681 in 2000 (+122%). Carbondale went from 2,084 in 1980, to 3,004 in 1990 (+44%), to 5,196 in 2000 (+73%). Glenwood Springs went from 4,637 in 1980, to 6,561 in 1990 (+41%), to 7,736 in 2000 (+18%), while Aspen's population went from 3,678 in 1980, to 5,049 in 1990 (+37%), and to 5,940 in 2000 (+18%). These data were provided by the State of Colorado (2001). Thus, it can be seen the area is growing in population.

Estimates indicate that sales tax receipts for the two fishing stores in Basalt have increased by up to 35% over the past four years, although sales tax receipts were down (approximately 30%) in one year, 1999 (Baker, 2001). (That year endangered fish releases were higher than in any other year, totaling 27,401 AF, although Ruedi Reservoir was at or above 100,000 AF through the end of August.)

Based on information reported to the U.S. Forest Service by permitted guides, outfitter/guide trips (service days) provided during endangered fish releases (July-October) over the past thirteen years have

increased over 260% as shown in Figure 3.2. There are approximately 34,000 annual visitor-use days for the lower Fryingpan River.

**Figure 3.2. Outfitter/Guide Service Days Used on the Fryingpan River from 1987 through 2000.**



In large part, information is lacking to determine how dependent local economies are on recreation at Ruedi Reservoir and the Fryingpan River. To supply information on effects of recreation on local economies, the Roaring Fork Conservancy, in cooperation with the Colorado River Water Conservation District and the Ruedi Water and Power Authority, is conducting a multi-year study of the types, distribution, and effects of recreational activities in the Fryingpan River Valley between the reservoir and Basalt. Results of this study are expected in late 2002.

Available information, however, suggests that past endangered fish releases have not significantly affected either the Basalt economy, the outfitter/guide industry in the area, or long-term user preferences for this area. In addition, the information suggests that local economies are composed of, and driven by, more significant factors than those associated with localized recreation activities, and this segment of the economy may have less influence in comparison to other economic forces in the Roaring Fork Valley, such as real estate. At this time, given past trends, there are no indications that the above conclusions are unreasonable.

***No Action Alternative***

Grand Valley. HUP beneficiaries would probably not be able to provide late season irrigation for row crops this year. Flood irrigating to overwinter orchards and vineyards would be limited, at best. HUP beneficiaries would potentially lose substantial amounts of row crops for 2002, and could potentially lose orchard and vineyard stands in addition. Orchard and vineyard losses, in most cases, would represent years of care for these stands while they grew to fruit-bearing maturity.

Roaring Fork Valley. The Fryingpan River, due to flow regulation of Ruedi Reservoir, should provide a high quality, consistent fishing experience through October. No impacts to fishing experience would be expected because flows are anticipated to be less than 250 cfs. Consequently, no impacts on the area economy are expected as a result of No Action during 2002, other than those effects associated with low reservoir levels. If 2003 inflows are similar to 2002 inflows, continuing low reservoir levels and the limited availability (30-45 days) of boat ramp access at Ruedi would be expected to continue to negatively impact visitation and visitor spending in the Roaring Fork Valley in 2003.

### ***Proposed Action (HUP Releases)***

Grand Valley. Releases made through the proposed agreement would supply needed irrigation to complete growing late season row crops and provide irrigation to overwinter orchards and vineyards. Because the HUP is still anticipated to be short several thousand acre-feet of water this year, some crop losses would still be expected, but the impacts would be considerably less under this alternative than under No Action.

Roaring Fork Valley. Some impacts to the Basalt area economy would be anticipated due to both the degraded recreation experience at Ruedi Reservoir and the above 250 cfs flows in the Fryingpan River. The 250-300 cfs flows in the Fryingpan may limit or degrade fishing, although this may not be substantial given the relatively small increment over 250 cfs that is anticipated. Nevertheless, the Proposed Action may result in losses of recreation visitors and revenues derived from visitors' purchases. However, effects of low water levels at Ruedi Reservoir are expected to be only slightly more than under the No Action alternative.

### ***Net Effects***

The Proposed Action would provide needed water to sustain irrigated crops in Mesa County but may also have a minor negative impact on the Basalt area economy, beyond that anticipated under No Action, due to impacts on recreation.

## **HYDROPOWER PRODUCTION**

### ***Affected Environment***

The City of Aspen is licensed by FERC (Federal Energy Regulatory Commission) to operate a hydropower facility at Ruedi Dam and Reservoir. The FERC license recognizes that Aspen's hydropower production objectives are subordinate to other uses but allows Aspen to generate electricity with any flows resulting from operation of the reservoir.

Aspen's facility has a maximum design capacity of approximately 300 cfs. However, based on information from High Country Engineering who operates the plant, equipment limitations make it undesirable to operate the plant at flows in excess of 250 cfs. Releases above 250 cfs bypass the facility. Similarly, the power plant is not able to operate with flows less than 40 cfs (High Country Engineering., 2001)

### ***No Action Alternative***

Ruedi releases are expected to be less than 250 cfs though the late summer and early fall months. Consequently, releases would not exceed the hydropower plants capacity, so Aspen would be able to make full use of the releases.

Because winter flows are anticipated to be the lesser of 39 cfs or reservoir inflows, the plant is not anticipated to be able to operate during the months of November to March.

### ***Proposed Action (HUP Releases)***

Releases from Ruedi would be expected to consistently exceed 250 cfs by only a small margin. Aspen would be able to make use of the increased flows and generate increased power but approximately 0-60 cfs would consistently be bypassed throughout the term of the agreement.

Under this alternative, winter flows are also expected to be the lesser of 39 cfs or reservoir inflows. The plant would not be able to generate power during the winter months.

### ***Net Effects***

During the August to October term of the agreements, there would be an opportunity for slightly more power generation under the Proposed Action than under No Action. In addition, a few cfs of water would probably have to be bypassed around the power plant each day because total releases would be expected to exceed the power plant's functional limit of 250 cfs.

## **CULTURAL RESOURCES**

### ***Affected Environment***

The area of potential effect is Ruedi Reservoir and the stream channels below Ruedi. There are no known cultural resource sites at Ruedi Reservoir. A 1964 survey of the reservoir between elevations 7700 and 7800 feet conducted by Arnold Withers (*Archaeological Survey of the Ruedi Reservoir, Colorado, 1964*) did not identify any sites. Wave action has affected all reservoir shorelines. Low angle surfaces, where sites are typically protected from wave action, are protected by siltation from further erosion.

### ***No Action Alternative***

Low reservoir content would expose shoreline already subject to wave action but not typically exposed at the reservoir. This would subject any sites, if present, to potential damage from wave action and looting or vandalism. The threat from wave action may be limited due to the steep shoreline of the reservoir. The threat from vandalism may be low because of the relatively steep shoreline surrounding most of the reservoir, boating access would not be available at these lower reservoir levels, and the lowest reservoir levels would not occur until after the recreation season. In addition, the period between site exposure and accumulation of snow would be relatively short and would also limit potential damage from looting or vandalism.

Flows downstream of Ruedi Reservoir would be approximately 200-220 cfs through November 1. Flows at this rate are not expected to create any scour or erosion to the stream channels downstream of Ruedi (see "Hydrology" in this chapter). Therefore, no effects on cultural resources below the Reservoir are anticipated.

### ***Proposed Action (HUP Releases)***

This alternative would expose approximately 18 more feet of shoreline at the reservoir in comparison to No Action; shoreline that would not typically be exposed. Similar to No Action, this area would be subject to slightly increased impacts due to wave action and looting or vandalism. These impacts would be relatively low risk for the same reasons as explained under No Action. Reclamation would conduct a reconnaissance of the shoreline during the low water period to determine if landforms likely to contain cultural resource sites were visible. Reclamation would consult with the State Historic Preservation Office on the findings from this survey, and on the need for any further actions.

No new surface disturbance is proposed under this alternative—the delivery system for releases consist of existing stream courses and existing canals on agricultural lands. Flows downstream of Ruedi Reservoir would be approximately 250-300 cfs during releases for the Proposed Action. Flows at this rate are not expected to create any scour or erosion to the stream channels downstream of Ruedi (see “Hydrology”). Therefore, no effects on cultural resources below the reservoir are anticipated.

### ***Net Effects***

The Proposed Action would result in a slight increase in potential impacts to cultural resources at Ruedi Reservoir due to the additional 18 feet of exposed shoreline. Because the survey found no sites and the reservoir shoreline has been subjected to previous wave action, no potential to cause effects to historic properties exists.

No impacts downstream of Ruedi are anticipated under either alternative.





# *Consultation and Coordination*

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## CHAPTER 4

### COMMENTS

From the mailing list developed for the draft *Ruedi Reservoir 2012 Agreement EA* released by the Eastern Colorado Area Office in Loveland, Colorado, Reclamation solicited comments on the proposed action from 40 interested parties. This was done by means of an email distribution describing the proposed action and requesting comments. Nine comments were received. These comments, summarized below, are analyzed in Chapter 3:

- Flows in the Fryingpan River below Reudi above 300 cfs (cubic-feet/second) could affect brown trout by scouring habitat;
- Flows in the Fryingpan above 300 cfs could present a hazard to wading anglers;
- Flows in the Fryingpan from 250-400 cfs damages trout habitat;
- Importance of the Fryingpan River corridor to the economy of Basalt;
- Flows in the Fryingpan shouldn't be greatly increased in October during brown trout spawning;
- Effects to the Fryingpan fishery would be more serious if flows dropped in November from a higher flow in October (flatter flows over a longer period are better);
- Flows in the Fryingpan up to 250 cfs don't present a problem to anglers and guides;
- 250 cfs flows continually during the period without spikes later in the irrigation season would be ideal under the circumstances (with flows up to 275 cfs probably acceptable);
- Proposed Reudi releases could limit the ability next year (and years following) to meet the 5,000 AF of water required every 4 years of 5 releases;
- Proposed releases would benefit the Roaring Fork River and the Colorado River above Palisade, and irrigation return flows might benefit the lower end of the 15 Mile Reach;
- Coordinating Reudi releases with other releases from Wolford Mountain and Williams Fork reservoirs might maintain fishing in the Fryingpan throughout the summer.

These comments were used in the analysis in Chapter 3.

### CONSULTATION

In additions to those who provided comments, others were consulted about providing information for the EA. They are:

George Smith, U.S. Fish and Wildlife Service, Colorado River Endangered Fish Recovery Program, who provided information on the 15 Mile Reach and the PBO;

Brent Uilenberg, U.S. Bureau of Reclamation, Western Colorado Area Office, who provided information on the HUP diversions and agriculture.

Bill Miller, Miller Ecological Consultants, who provided information on brown trout spawning.

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