



**COLORADO**

**Colorado Water  
Conservation Board**

Department of Natural Resources

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Denver, CO 80203

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Jared Polis, Governor

Dan Gibbs, DNR Executive Director

Rebecca Mitchell, CWCB Director

**TO:** Colorado Water Conservation Board Members

**FROM:** Linda Bassi, Chief  
Kaylea White, Senior Water Resource Specialist  
Stream and Lake Protection Section

**DATE:** November 18-19, 2020 Board Meeting

**AGENDA ITEM:** 22. Lease of Ruedi Reservoir Water for Instream Flow Use on the Fryingpan River and 15-Mile Reach of the Colorado River (Water Division 5)

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**Staff recommends that the Board:**

1. Conclude that the proposed acquisition of an interest in 3,500 acre-feet of water by lease from the Colorado River Water Conservation District is appropriate and determine that the acquired interest in water would be best utilized by:
  - a. From January 1 - March 31, 2021, using it to preserve the natural environment of the Fryingpan River at rates up to the existing decreed ISF water right in that reach; and to improve the natural environment in that reach by protecting flows above the decreed ISF rates at rates not to exceed 70 cfs;
  - b. From July 1 - September 30, 2021, using it to preserve the natural environment by supplementing existing ISF water rights in the 15-Mile Reach of the Colorado River; and to improve the natural environment by providing water above the decreed ISF rates to help meet or reduce shortfalls to the USFWS flow recommendations for the endangered fish critical habitat; and
  - c. For the time periods of April 1 - June 30 and October 1 - December 31, 2021, using it to preserve the natural environment in the 15-Mile Reach by providing an incremental amount of water to help meet or reduce shortfalls to the USFWS flow recommendations;
2. Condition its approval of the use of the leased water in the 15-Mile Reach from April 1 - December 31, 2021 on the following:
  - a. Releases of Ruedi water under the Water Lease Agreement shall not cause the releases out of Ruedi Reservoir to exceed 300 cfs and shall not cause flows in the Fryingpan River below Ruedi Reservoir to exceed 350 cfs. Staff and the U.S. Fish and Wildlife Service shall coordinate with the Bureau of Reclamation to ensure that these conditions are met.
  - b. CWCB staff shall consult and coordinate weekly with Colorado Parks and Wildlife staff on proposed releases to minimize impacts to the fishery on the Fryingpan River below Ruedi Reservoir;



3. Approve the expenditure of \$239,750 from the Construction Fund for the lease; and
4. Authorize the Director to execute a Water Lease Agreement with the Colorado River Water Conservation District.

## Introduction

The Colorado River Water Conservation District, acting through its Colorado River Water Projects Enterprise (“District”), has offered the Colorado Water Conservation Board (“CWCB”) another opportunity to enter into a one-year short-term lease of a portion of water that the District holds in Ruedi Reservoir for instream flow (“ISF”) use. This would be the second of such leases with the District. In 2018, the Board approved a lease from the District for 3,500 acre-feet of water for ISF use that the District holds in Ruedi Reservoir. In 2019, Ruedi Reservoir releases made pursuant to that lease increased flows in the Fryingpan River below Ruedi Reservoir during the winter, and also supplemented flows in the 15-Mile Reach of the Colorado River to help reduce shortfalls to the USFWS flow recommendations for the endangered fish critical habitat in that reach. This year, the District has offered to repeat the lease of 3,500 acre-feet from Ruedi Reservoir.

The objective of the proposed lease is to help maintain Fryingpan River flows at a rate of 70 cfs to prevent the formation of anchor ice at times when temperatures and low flows could otherwise combine to create anchor ice during the time period of January 1 - March 31. The CWCB would use the leased water to supplement its existing decreed ISF water right to preserve, and to increase flows to improve the natural environment to a reasonable degree on the Fryingpan River. Subsequent to this time period, starting on April 1, any remaining leased water would be delivered to the 15-Mile Reach as needed to help meet or reduce shortfalls to USFWS flow recommendations for the endangered fish critical habitat in that reach. See Vicinity Map at **Attachment 1** and River District Offer Letter at **Attachment 2**.

## 1. The Board’s Water Acquisition Procedures

ISF Rule 6. governs the Board’s procedures for acquiring water for ISF use. Section 37-92-102(3), C.R.S. provides 120 days for the Board to determine what terms and conditions it will accept in an acquisition agreement for water, water rights, or interests in water to preserve or improve the natural environment. ISF Rule 6. requires a minimum of two Board meetings to allow for public input prior to taking final action on a proposed acquisition. ISF Rule 6m.(4) provides that within twenty days of the first Board meeting, any person may request the Board to hold a hearing on the proposed acquisition. Because no requests for hearing were filed, the Board may take final action on this proposal at this Board meeting. ISF Rule 6e. requires the Board to evaluate the appropriateness of the acquisition and to determine how best to utilize the acquired water to preserve or improve the natural environment. ISF Rule 6. lists several factors the Board may consider in its evaluation of the acquisition that are addressed in this memo.

As required by statute, CWCB staff requested recommendations from the Colorado Division of Parks and Wildlife (“CPW”), the U.S. Department of Agriculture, and the U.S. Department of Interior. Pursuant to ISF Rule 6m.(1), CWCB staff provided notice of the proposed acquisition



to all persons on the appropriate ISF Subscription Mailing Lists, and provided notice to the State Engineer's Substitute Supply Plan Notification List for Water Division 5.

## 2. Background

In 2018, the District worked with the Roaring Fork Conservancy ("RFC") to evaluate needs and potential available supply to enhance instream flows in the Fryingpan River below Ruedi Reservoir during the winter months under certain conditions. Studies have shown that winter flows of 70 cfs, 31 cfs above the decreed ISF rate of 39 cfs (November 1 -April 30), would benefit the natural environment by preventing anchor ice, which adversely impacts aquatic macroinvertebrates and trout fry. Based upon those studies and a recommendation from Colorado Parks and Wildlife ("CPW"), the District and CWCB entered into a one-year lease agreement in 2018. Operation of that lease in 2019 provided up to 26 cfs of additional flows from January 1 - March 7, 2019 by releasing 3,201 acre-feet, and proved to be very beneficial toward maintaining Fryingpan River flows at a minimum of 70 cfs when temperatures and low flows could have otherwise combined to create anchor ice. The balance of the leased water remaining after March 31, 2019 in the amount of 299 acre-feet was released in late September 2019 for use in the 15-Mile Reach of the Colorado River. This year, the District has offered to lease 3,500 acre-feet of water available to it under two different Ruedi Reservoir Round II Water Sales Contracts with the Bureau of Reclamation ("USBR").

## 3. Water Proposed for Leased Acquisition

The water rights proposed for the lease are up to 3,500 acre-feet of water available to the District in Ruedi Reservoir pursuant to its Ruedi Reservoir Round II Water Sales Contract No. 079D6C0106 that could be delivered to the Fryingpan River in Pitkin and Eagle Counties ("Leased Water"). The contract expressly provides that the water may be used "...to supplement winter instream flows in the Fryingpan River." After March 31, 2021, any remaining Leased Water could be delivered pursuant to the River District's Ruedi Reservoir Round II Water Sales Contract No. 139D6C0101 ("Remaining Leased Water"). That contract authorizes municipal uses in the Colorado River Basin; the contract's definition of "municipal uses" includes "use of water by . . . piscatorial users, including delivery of water to supplement streamflow . . ." Ruedi Reservoir is decreed for irrigation, domestic, municipal, generation of electrical energy, stockwatering, industrial, piscatorial, recreation, and other beneficial uses.

## 4. Reach of Stream Proposed for Use of the Leased Rights

The reach of stream proposed for use of the Leased Water is the Fryingpan River from its confluence with Rocky Fork Creek, adjacent to the outlet of Ruedi Reservoir, down to its confluence with the Roaring Fork River in Pitkin and Eagle Counties. The Remaining Leased Water would be used on the 15-Mile Reach of the Colorado River. The reaches are described below and shown on the attached Vicinity Map.



## 5. Existing ISF Water Rights

The CWCB currently holds ISF water rights on the following reaches of the Fryingpan and Colorado Rivers on which it would use the Leased Water and Remaining Leased Water, respectively:

Case No.	Stream	Segment	Length (miles)	Amount CFS Rates (Dates)	Appropriation Date
W-1945 (1973)	Fryingpan River	confl Rocky Fork Creek to confl Roaring Fork River		39 cfs (11/1 - 4/30) 110 cfs (5/1 - 10/31)	07/12/1973
5-92CW286	Colorado River (15 mile reach)	Tailrace of Grand Valley Pumping Plant to confl Gunnison River	Approx. 15 miles	581cfs (7/1-9/30)	3/5/1992
5-94CW330	Colorado River (15 mile reach)	27.5 Road Gage to confl Gunnison River	Approx. 2 miles	300 cfs (7/1-9/30)	11/4/1994

## 6. Natural Flow Regimes

The Fryingpan River originates in the central Rocky Mountains of Colorado northeast of Aspen in Pitkin County. The headwaters of the Fryingpan River are at the Continental Divide in the Hunter Fryingpan Wilderness at an elevation of about 12,000 feet. Streamflow in the Fryingpan River is primarily from snowmelt and local precipitation. The hydrology of the basin is influenced by reservoir operations and transmountain diversions. The largest storage facility in the basin is Ruedi Reservoir, located in the lower portion of the watershed approximately 11 miles above the point at which the Fryingpan River flows in to the Roaring Fork River near the town of Basalt. Peak flows typically occur in May, June, and early July and diminish down to base flows July through September; streamflows are characteristically low and steady November through March of most years. The Fryingpan River below Ruedi Reservoir flows in a westerly direction through a confined canyon fed by only a few small tributary streams. The streamflow of the Fryingpan River in this canyon is almost entirely made up of Ruedi Reservoir releases, especially during the winter months. The thermal effects of the reservoir create open water conditions virtually year round, making the river a very popular fishery for both local residents and visitors to the area.

The Colorado River originates in the southern Rocky Mountains of Colorado over 2 miles above sea level, flows past Glenwood Springs and Grand Junction, running parallel to I-70, and flows west out of Colorado into Utah. The 15-Mile Reach includes the portion of the river from the Grand Valley Diversion (River Mile 185.1) to the confluence with the Gunnison River in Grand Junction. Streamflow is primarily from snowmelt and local precipitation. Peak flows typically occur in May and June, and drop off quickly in July-September most years. Tributaries include the Blue, Eagle, and Roaring Fork Rivers.



## 7. Existing Natural Environments

The Fryingpan River is a Gold Medal trout fishery renowned for its abundant quality-sized trout, specifically a robust brown trout population and a burgeoning rainbow trout population recovering from the impacts of whirling disease. Mottled sculpin and aquatic invertebrates are the foundation of the diet that supports the Gold Medal fishery. The anglers drawn to this fishing opportunity provide a significant economic driver for local communities and the quality fishery is pivotal to the high quality of life for residents and visitors. Winter flow conditions below the reservoir and the thermal effects of the reservoir have, over time, created fairly predictable conditions for anchor ice formation when stream flows are below 70 cfs and air temperatures are in the single digits. Extensive anchor ice deposits can have dramatic impacts on aquatic macroinvertebrate numbers and can disrupt their life cycles. Impacts on trout fry in the interstitial spaces in the substrate can also occur with the formation and accumulation of anchor ice deposits.

The 15-Mile Reach of the Colorado River provides critical habitat for two species of endangered fish: the Colorado pikeminnow and razorback sucker. This reach is sensitive to water depletions because of its location downstream of several large diversions. It provides spawning habitat for these endangered fish species as well as high-quality habitat for adult fish. Due to development on the Colorado River, this reach has experienced declining flows and significant dewatering during the late summer months, and at times, there are shortages in the springtime. As a result, the U.S. Fish and Wildlife Service (“USFWS”) has issued flow recommendations for the 15-Mile Reach since 1989 to protect instream habitat for the endangered fish.

## 8. Proposed Method of Acquisition

Under this proposal, the CWCB would lease 3,500 acre-feet of Ruedi Reservoir water from the District. The District and the CWCB will update the lease agreement from 2018 and work through each agency’s respective contracting processes. The final lease agreement will become effective after approval by both the CWCB and District’s boards of directors. Issues that the lease will address include: (1) the lease term; (2) amount of water to be leased; (3) timing of and coordination on releases; (4) payments to District for the leased water; (5) any other provisions deemed necessary by the parties. The use of the water under the lease is authorized by the Ruedi Reservoir decrees, the District contract with USBR, and CWCB Board findings and acceptance of the acquired water.

## 9. Proposed Use of the Acquired Water

From **January 1 - March 31, 2021**, the Leased Water would be used to supplement the existing 39 cfs ISF water right in the Fryingpan River to preserve the natural environment, and used at rates up to 70 cfs to meet the RFC and CPW flow recommendations to improve the natural environment to a reasonable degree. The decreed winter instream flow rate of 39 cfs is from November 1 - April 30. The objective of the lease would be to maintain Fryingpan River flows at a rate of 70 cfs to prevent the formation of anchor ice at times when



temperatures and low flows could otherwise combine to create anchor ice. See RFC memo at **Attachment 3**.

The RFC estimates that eight weeks, or fifty-six days, is the maximum length of time that the use of Leased Water would be necessary during any given winter season. That time period would translate to approximately 3,500 AF ( $31 \text{ cfs} = 61.487 \text{ af/day} \times 56 \text{ days} = 3,443 \text{ af}$ ). Based upon its river monitoring system and analysis of weather conditions, the RFC will inform the CWCB when conditions are conducive to the formation of anchor ice. The CWCB, CRWCD, RFC, and USBR will coordinate on the timing and amount of releases of Ruedi water, requesting such releases, and recording and accounting for the releases.

Additionally, CPW has observed that increased flows on the Fryingpan River during the winter months improve fish habitat, increase spawning success and fry emergence for brown trout, promote a more robust macroinvertebrate food base for fish, and most importantly, address issues related to anchor ice formation and accumulation. See CPW's written recommendation at **Attachment 4**.

From **April 1 - June 30** and **October 1 - December 31**, any Remaining Leased Water would be used on the 15-Mile Reach of the Colorado River to provide an incremental amount of water to preserve the natural environment by helping meet or reduce shortfalls to the USFWS flow recommendations.

From **July 1 - September 30**, any Remaining Leased Water would be used to supplement existing ISF water rights in the 15-Mile Reach to preserve the natural environment, and to provide water to help meet or reduce shortfalls to the USFWS flow recommendations for the endangered fish critical habitat. The CWCB's use of the Remaining Leased Water above the decreed ISF rates to meet the USFWS flow recommendations will improve the natural environment to a reasonable degree.

CPW has confirmed that the USFWS flow recommendations and related biological studies, developed in 1989, refined in 1995, and incorporated into the 1999 Programmatic Biological Opinion ("PBO") for the Upper Colorado River above its confluence with the Gunnison River, formed the basis for the ISF water rights held by the Board on the 15-Mile Reach of the Colorado River. Based upon the numerous actions of the State over the years supporting the Upper Colorado River Recovery Program and the PBO, and the ongoing need for water in the 15-Mile Reach, CPW recommends moving forward with this proposal.

## 10. Historical Use and Historical Return Flows

Because this is a release of stored water and does not involve a change of water right, or other mechanism through which return flows would be owed, the Board does not need to consider this factor.



### 11. Location of Other Water Rights

There are many other water rights located on the Fryingpan River and Colorado River; however, they will not be affected by this release of stored water for ISF use on the Fryingpan River and delivery to and use on the 15-Mile Reach.

### 12. Material Injury to Existing Rights

There will be no injury to existing rights. Under this lease, water previously stored in priority under the Ruedi Reservoir water rights would be released during times when temperature and flow conditions are conducive to the formation of anchor ice in the winter months, and when needed to supplement flows in the 15-Mile Reach.

### 13. Stacking Evaluation

When the Leased Water is available under this lease for ISF use on the Fryingpan River or Remaining Leased Water is available for ISF use on the 15-Mile Reach, it can be used to supplement the Board's decreed ISF water rights and may be combined, or stacked, with the existing ISF water rights and any other acquired water to achieve a greater level of protection for the natural environment and to help meet the USFWS flow targets for the endangered fish on the 15-Mile Reach.

### 14. Effect of Proposed Acquisition on Any Relevant Interstate Compact Issue

The proposed lease does not negatively affect any interstate compact.

### 15. Effect on Maximum Utilization of Waters of the State

This proposed lease will promote maximum utilization of waters of the State by generating hydropower at the Ruedi power plant, supporting the recovery of endangered fish within the Upper Colorado River Basin, and making water available to downstream users.

### 16. Availability for Downstream Use

Remaining Leased Water would be available for use downstream of the 15-Mile Reach of the Colorado River.

### 17. Administrability

Discussions with the Division 5 Division Engineer indicate that the release and delivery of the Leased Water and Remaining Leased Water from Ruedi Reservoir to and through the Fryingpan River and the 15-Mile Reach pursuant to a lease agreement between the District and the CWCB will be administrable.

### 18. Potential Benefits of This Proposed Lease

When Leased Water is needed and available for ISF use, such water will be protected through the subject reach of the Fryingpan River down to the confluence with the Roaring Fork River. The proposed acquisition would increase stream flows in the Fryingpan River and provide benefits to fish and macroinvertebrate species that live in this reach. After March 31, any Remaining Leased Water will be used in the Colorado River and be protected through the 15-



Mile Reach, down to the confluence with the Gunnison River. The proposed acquisition would increase streamflows in the Colorado River and provide benefits to the two species of endangered fish that live in this reach.

## 19. Cost to Complete Transaction

The District's Water Marketing Policy, updated on January 21, 2020, established the price for project year 2021 at \$68.50/AF for Ruedi Reservoir water used in-channel, which, for 3,500 AF, would total \$239,750.00. At its September 1, 2020 meeting, the District's Board waived the \$400 non-reimbursable application fee for the lease. The CWCB would pay for the lease with funds authorized by section 37-60-123.7, C.R.S. (2020) for acquisitions of water for ISF use to preserve or improve the natural environment.

## 20. Policy 19 Funding Request

Because staff is requesting the Board to approve an expenditure of funds authorized by section 37-60-123.7, information required by CWCB's Financial Policy 19, which governs such expenditures, is set forth below.

### Financial Aspects of the Proposal

The price for this lease is based upon the CRWCD's Water Marketing Policy, described above in #19. Costs related to negotiating and finalizing the lease agreement can be absorbed as part of the ordinary course of business of the CWCB staff. Consequently, staff will recommend that the Board authorize an expenditure of up to \$239,750.00 for this lease.

### Required Information from Colorado Parks and Wildlife

CPW has provided the following information required by Section 2 of Policy 19 for acquisitions that will be used to improve the natural environment to a reasonable degree:

a. The degree to which the acquired water will add useable habitat to riffles, pools and runs within the subject ISF reach; and b. the amount of additional useable area for fish and macroinvertebrates that the acquired water will provide:

**Fryingpan River:** Releases of Leased Water will increase winter flows in the Fryingpan River up to 70 cfs, which will reduce anchor ice formation. Anchor ice is detrimental to aquatic invertebrates and to incubating fish eggs because it limits aquatic habitat availability. Anchor ice has been shown to be reduced at flows in the range of 70 to 100 cfs with such reduction providing additional useable habitat for brown trout adults and more favorable conditions for egg incubation over the winter period. Increased macroinvertebrate diversity is also correlated with aquatic habitat conditions associated with flows greater than 70 cfs.

**15-Mile Reach:** Any Remaining Leased Water above the decreed ISF flow rates will improve the natural environment in July through September by helping meet the USFWS flow recommendations. USFWS flow recommendations are based on PHABSIM/IFIM modeling, which assesses preferred habitat for the endangered fish species - Colorado pikeminnow and



razorback sucker. These flow recommendations seek to maximize weighted useable area (or preferred habitat), and vary depending on hydrologic year type; hence, the exact amount of additional useable area can't be predicted, but increases in preferred habitat are anticipated for any Remaining Leased Water added to the 15-Mile Reach.

c. Where applicable, the amount of protection from high temperatures and low oxygen levels in hot summer months that the acquired water will provide:

**Fryingpan River:** Because Leased Water will be used in the Fryingpan River only in the winter, CPW concluded that this information is not relevant to this acquisition.

**15-Mile Reach:** Because Remaining Leased Water will be used for warm-water fish species, CPW concluded that this information is not relevant to this acquisition.

d. An analysis of the degree to which the additional water resulting from the acquisition: (1) benefits the natural environment, and (2) does not result in hydraulic conditions that are detrimental to the aspects of the natural environment intended to be benefited by the acquired water, such as habitat requirements for a particular life stage of a fish species:

**Fryingpan River:** Flows up to 70 cfs resulting from releases of Leased Water will benefit brown trout adults and egg incubation over the winter, and will not result in detrimental hydraulic conditions. IFIM/PHABSIM studies show that flows up to 100 cfs provide benefits for brown trout adults and egg incubation. Flows up to 250 cfs provide benefits for multiple life stages of rainbow trout.

**15-Mile Reach:** Any Remaining Leased Water above the decreed ISF flow rates will improve the natural environment in July through September by helping meet the USFWS flow recommendations. USFWS flow recommendations are based on PHABSIM/IFIM studies, which model the relationship between flow and preferred habitat, specifically showing where habitat is increasing and/or declining for adult Colorado pikeminnow and razorback sucker. USFWS flow recommendations vary by hydrologic year type, but seek to maximize preferred habitat without detrimental hydraulic conditions for the endangered fish.

e. Where applicable, an estimate of the degree to which the acquired water will increase moisture levels in the alluvial aquifer to support the riparian vegetation in the subject stream reach:

**Fryingpan River:** Because Leased Water will be used in the Fryingpan River only in the winter, CPW concluded that this information is not relevant to this acquisition.

**15-Mile Reach:** Because Remaining Leased Water will be used for warm-water fish species, CPW concluded that this information is not relevant to this acquisition.

See CPW's recommendation letter at **Attachment 4**.



## ATTACHMENTS

**Attachment 1:** Vicinity Map

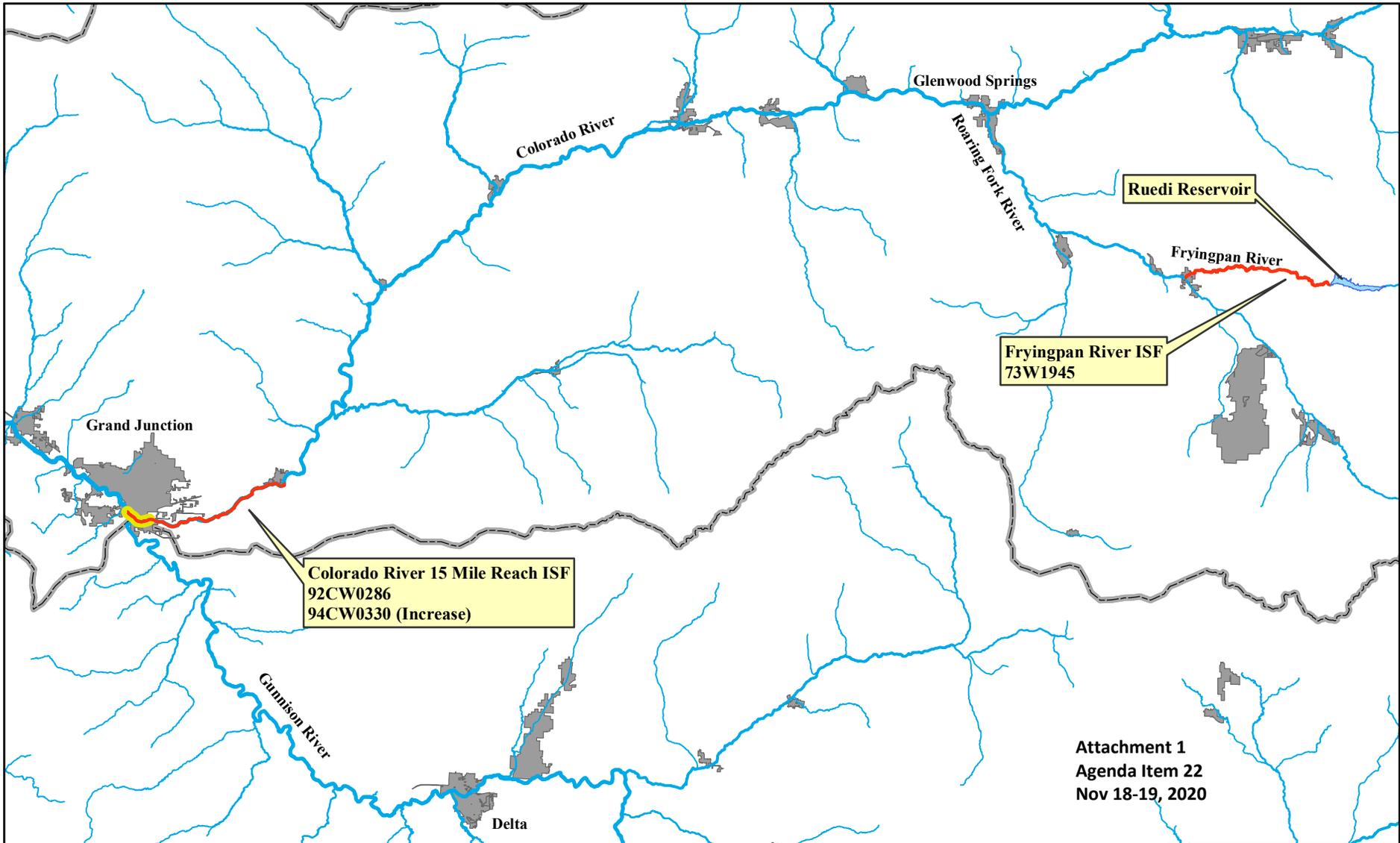
**Attachment 2:** District's Offer Letter

**Attachment 3:** Roaring Fork Conservancy's Memo

**Attachment 4:** Colorado Parks and Wildlife Recommendation Letter

**Attachment 5:** Support Letter from Ruedi Water and Power Authority





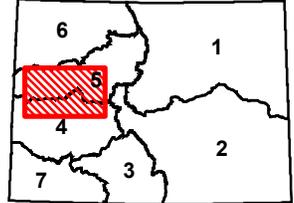
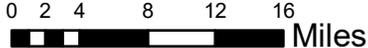
Attachment 1  
 Agenda Item 22  
 Nov 18-19, 2020



**COLORADO**  
 Colorado Water Conservation Board

Department of Natural Resources

November 18-19, 2020 CWCB Board Meeting  
 Agenda Item 22: Lease of Ruedi Reservoir Water for Instream Flow Use on the Fryingpan River and 15-Mile Reach of the Colorado River (Water Division 5)





# COLORADO RIVER DISTRICT

PROTECTING WESTERN COLORADO WATER SINCE 1937

Linda J. Bassi  
Chief, Stream and Lake Protection Section  
Colorado Water Conservation Board  
1313 Sherman St., Rm. 721  
Denver, CO 80203

September 1, 2020

**Re: Lease of Ruedi Reservoir Water for Frying Pan River Winter Instream Flow Enhancement**

Dear Linda:

By this letter the Colorado River Water Conservation District (River District) acting through its Colorado River Water Projects Enterprise (“Enterprise”), expresses its willingness to lease 3,500 acre-feet (AF) of Ruedi Reservoir water to the CWCB for Frying Pan River winter instream flow enhancement during the 2021 calendar year.

**Background – 2018 Lease with the CWCB**

In 2018 the CWCB, in collaboration with Roaring Fork Conservancy, entered into a contract with the River District for 3,500 AF of Ruedi Reservoir water for the primary purpose of enhancing the instream flow in the Frying Pan below Ruedi Reservoir between January 1 and March 31, 2019 to prevent anchor ice formation. 3,200 AF was delivered between January 1 and March 7, increasing Fryingpan flows approximately 25 cubic feet per second (cfs) above the 39 cfs decreed instream flow. The 300 AF balance was used later in the 2019 calendar year to enhance flows in the 15 Mile Reach of the Colorado River for endangered fish recovery purposes.

The need for this enhanced winter flow is outlined in more detail in the companion letter provided by the Roaring Fork Conservancy.

**Colorado River District Applicable Ruedi Contracts**

The River District’s Enterprise maintains five perpetual Ruedi contracts with the Bureau of Reclamation. The requested 3,500 AF lease volume will be credited to two River District contracts.

Water delivered to supplement winter instream flows from January 1 – March 31, 2021 will be delivered pursuant to the River District’s Ruedi Reservoir Round II Water Sales Contract No. 079D6C0106 with the Bureau of Reclamation. This contract at ¶6. b. explicitly provides that leased water may be used “...to supplement winter instream flows in the Fryingpan River.”



**Lease of Ruedi Reservoir Water for Frying Pan River Winter Instream Flow Enhancement**

In the event only a portion of the 3,500 AF is delivered to supplement winter instream flows the balance may be delivered to the 15 Mile Reach between April 1 and December 31, 2021. The balance will be delivered pursuant to the River District's Ruedi Reservoir Round II Water Sales Contract No. 139D6C0101 with the Bureau of Reclamation

**Contract Term and Pricing**

The River District proposes to enter into a lease with the CWCB essentially identical to the 2018 lease. Key terms include:

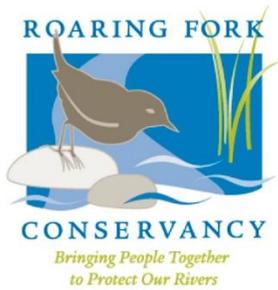
1. The contract will be for the 2021 calendar year (January 1 – December 31).
2. The cost for a contract for year 2021 be \$68.50/AF as set forth in the River District's Water Marketing Policy. Note that the price is slightly higher than the \$65.25/AF paid for the 2018 lease. The higher price is consistent with the Water Marketing Policy which provides for annual price increases not to exceed the sum of the Consumer Price Index plus the New Growth Index. Similar to the 2018 contract with the CWCB, the River District Board of Directors has graciously agreed to waive the standard \$400 contract application fee.

The River District is pleased to have this opportunity to work with the CWCB on a lease that would benefit winter stream flows in Fryingpan River below Ruedi Reservoir. We look forward to working with you to complete this transaction. Please let us know if we can provide any additional information to assist in CWCB's consideration of this proposal.

Respectfully,

John M. Currier, P.E.  
Chief Engineer  
Colorado River District

Cc: Heather Tattersall Lewin, Roaring Fork Conservancy  
April Long, Ruedi Water and Power Authority



## MEMORANDUM

TO: CWCB Board and Staff  
FROM: Heather Lewin, Roaring Fork Conservancy  
RE: Lease of Water in Ruedi Reservoir for Winter Release  
Date: August 31, 2020

The Colorado River Water Conservation District (“District”) has been in discussions with Roaring Fork Conservancy (“RFC”) regarding the possibility of leasing water currently held under contract by the District for release from Ruedi Reservoir during the winter months under certain conditions. We would like to propose that this lease be held and funded by the CWCB using funds from the Board’s Construction Fund as allowed under section 37-60-123.7, C.R.S..

The parameters of the lease would be as follows:

1. The District currently holds contracts with the US Bureau of Reclamation for a total of 11,413.5 af of water in Ruedi Reservoir, of which 3500 af is available to supplement instream flows on the Fryingpan River.
2. RFC has provided information showing the potential environmental impacts of low winter flows on the Fryingpan River and the benefits of augmenting those flows as detailed below. The objective of the lease would be to maintain Fryingpan River flows at a between 60 and 70 cfs or up to 31 cfs above the current minimum flow of 39 cfs when temperatures and low flows combine to create anchor ice.
3. A combination of flow levels and temperature creates icing conditions, so it is difficult to predict with certainty when, or in what amount releases would be necessary. For instance, extremely low temperatures could create anchor ice even when flows are already above the minimum of 39 cfs, while high temperatures could lead to ice-free conditions even when flows are at 39 cfs or below. It is reasonable to assume that eight weeks, or fifty-six days, is the maximum length of time that augmentation would be necessary during any given winter season.
4. The mechanics of the lease would work as follows: RFC, through their river monitoring system and analysis of weather conditions, will call for additional releases when conditions are conducive to the formation of anchor ice. Additional releases would be limited to the amount necessary to bring Fryingpan flows at Ruedi Dam between 60 and 70 cfs. Releases would continue until anchor ice conditions abated, at which time RFC will notify the Bureau of Reclamation to halt additional releases. RFC will keep the District informed of

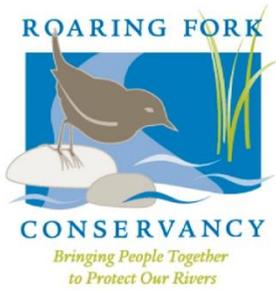
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**Attachment 3  
Agenda Item 22  
Nov 18-19, 2020**

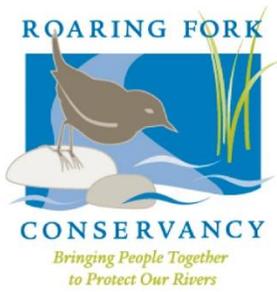


the timing and amount of all releases with total releases between December and April not to exceed 3,500 af.

5. The CWCB will contract with the District pursuant to the District's current water marketing policy.
6. Releases may be suspended by Bureau of Reclamation when those releases preclude the Bureau from managing Ruedi Reservoir consistent with the Bureau's legal and regulatory obligations. Any such suspension will be accompanied by written communications to RFC, the CWCB and the District detailing the reason(s) for that suspension.
7. The term of the lease will be for one year beginning January 1, 2021. An extension or renewal of the lease may be negotiated between the parties at their discretion.
8. The following summarizes the findings of previous studies of anchor ice and its impact on the Fryingspan River fishery:

**From Summary Report: A Study of Macroinvertebrate Community Response to Winter Flows on the Fryingspan River - August 11, 2004 (Bill Miller):**

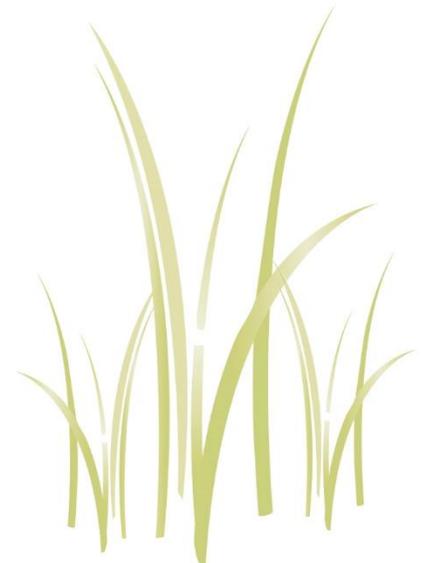
- *Aquatic macroinvertebrate communities were evaluated as a means to elucidate the relationships between winter base flows, anchor ice and macroinvertebrates community structure. The magnitude of discharge may be the most important factor that influences macroinvertebrates during the winter months. (p16)*
- *The formation and frequency of occurrence of anchor ice at FPR-TC appears to be a contributing influence on macroinvertebrate community structure and function. Recent data suggests that two or more concurrent winters with higher flows may be necessary to achieve an optimum balance in the macroinvertebrate community.(p18)*
- *Results of this study suggest that magnitude of discharge and air temperature work together to influence anchor ice formation. The lower discharge at site FPR-TC in 2002-2003 was much more conducive to the formation of anchor ice than the higher flows during the following winter.(p.22)*
- *The available data suggest that anchor ice was at least partially responsible for the degraded condition of the macroinvertebrate*



*community at FPR-TC during the spring of 2003. To alleviate anchor ice related stress to the macroinvertebrate community, an effort should be made to avoid low wintertime releases out of Ruedi Reservoir.(p.23)*

**From Summary Report: A Study of Macroinvertebrate Community Response to Winter Flows on the Fryingpan River - September 10, 2006 (Bill Miller):**

- *Results of this study suggest that magnitude of discharge and air temperature work together to influence anchor ice formation.(p.17)*
  - *It appears that macroinvertebrate diversity and evenness recover in one to two years after severe anchor ice formation if winter flows remain greater than 70 cfs. • Flows greater than 70 cfs seem to result in less anchor ice in the upper half of the river than flows of approximately 40 cfs. (p. 22)*
9. Agreement from the U.S. Bureau of Reclamation that these releases will not interfere with or compromise their ability to manage the reservoir under most circumstances.
  10. Agreement from Colorado Parks and Wildlife that these releases will not degrade or compromise habitat, biomass or other environmental conditions in and adjacent to the Fryingpan River.





# COLORADO

## Parks and Wildlife

Department of Natural Resources

Water Resources Section - Aquatic,  
Terrestrial, and Natural Resources Branch

November 5, 2020

Ms. Linda Bassi  
Ms. Kaylea White  
Colorado Water Conservation Board  
Stream and Lake Protection Section  
1313 Sherman Street, 7th Floor  
Denver, CO 80203

SUBJECT: Potential Contractual Interest in Water from Ruedi Reservoir for the Benefit of Instream Flows in the Fryingpan River and 15-Mile Reach of the Colorado River

Linda and Kaylea:

This letter is in response to your letter dated September 11, 2020 requesting recommendations from Colorado Parks and Wildlife (CPW) on the proposed acquisition of a contractual interest in water from the Colorado River Water Conservation District (CRWCD). The proposal is for a one-year renewable lease of up to 3,500 acre-feet of Ruedi Reservoir water the CRWCD holds. This lease proposal was presented to the CWCB at their September 2020 regular meeting as part of a two meeting process to obtain Board approval. The CRWCD, in collaboration with Roaring Fork Conservancy (RFC), identified this leasing arrangement in 2018 to increase winter flows in the Fryingpan River. The lease was operated in the winter of 2018/19, and remaining leased water at the end of the winter period was delivered to the 15-Mile Reach of the Colorado River. The proposed 2020 lease would operate similarly. First, leased water would be used for wintertime releases to the Fryingpan River to increase winter flows and prevent anchor ice formation. Any remaining leased water at the end of the winter period will be used to supplement flows in the 15-Mile Reach to help reduce shortfalls to the U.S. Fish and Wildlife Service (USFWS) flow recommendations for the endangered species or to meet existing decreed instream flow rates. The following represents CPW's final opinions and recommendations on the proposal.

### Fryingpan River Wintertime Releases

The Fryingpan River is a highly regarded fishery resource with a designation as a Gold Medal Fishery. It has a widespread reputation as a premier trophy brown and rainbow trout fishery with high use among the angling public. The Fryingpan River has an existing 1973 instream flow water right for 39 cfs (November through April) and 110 cfs (May through October). This is one of the first instream flow water rights that the CWCB Board appropriated following the original passage of legislation creating the instream flow program. Per the statute, the CWCB followed the recommendation of the Division of Wildlife and made the determination that these flows were "necessary to preserve the natural environment to a reasonable degree."

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The CWCB also has the authority to acquire water, water rights, or interests in water to “preserve or improve the natural environment to a reasonable degree.” The stated goal of this acquisition is to boost flows from 39 cfs to approximately 70 cfs. While 39 cfs meets the criteria to be the “minimum amount necessary to preserve the natural environment to a reasonable degree,” various studies have determined that more flow during the winter months improves fish habitat, increasing spawning success and fry emergence for brown trout, promotes a more robust macroinvertebrate food base for fish, and most importantly, addresses issues related to anchor ice formation and accumulation.

Anchor ice is a problem that can occasionally occur downstream of reservoirs where a combination of air and water temperatures can cause ice to become anchored to the bottom of the river channel, as opposed to on top of the water column. Anchor ice formation is, in general, detrimental to aquatic invertebrates and to incubating fish eggs. Anchor ice in the Fryingpan River has been observed to be less prevalent at flows greater than approximately 70 cfs than at flows near 40 cfs (see *Summary Report of Macroinvertebrate Community Response to Winter Flows of the Fryingpan River* conducted by Bill Miller in 2006). Miller also noticed that macroinvertebrate diversity recovers after severe anchor ice formation within one to two years if flows remain greater than 70 cfs.

Observational data collected by CDOW and CPW staff have confirmed this opinion by Miller, putting a preference on flows between 70 cfs and 100 cfs in the winter, noting that flows in excess of 70 cfs minimize anchor ice formation. CPW is supportive of using this leased water to supplement flows in the Fryingpan River up to 70 cfs during the period of January 1 through March 31, 2021.

#### 15-Mile Reach Releases

This lease proposal seeks to use the remainder of the 3,500 AF of leased water, if any, from Ruedi Reservoir for deliveries to incrementally meet the USFWS flow recommendations for endangered fish habitat in the 15-Mile Reach from April 1 to December 31, and to help meet existing decreed instream flow water rights on the 15-Mile Reach from July 1 through September 30, 2021.

Flow recommendations for the 15-Mile Reach have been quantified by the USFWS; these flow recommendations are well documented in several reports prepared by Osmundson and others (1989, 1991, 1995). Osmundson’s 1995 study developed relationships between flow and habitat for the Colorado pikeminnow and razorback sucker in the 15-Mile Reach. The study recommends monthly flow targets which vary by hydrological year type and quantifies minimum occurrences of these flows that are critical to recovery of these two species in the 15-Mile Reach. These flow recommendations were included in the Final Programmatic Biological Opinion for the 15-Mile Reach and are used to inform annual 10,825 releases and other coordinated reservoir operations in the basin above the critical habitat.

The USFWS reports confirm that there is a demonstrated need for supplemental releases should additional leased water exist in the 3,500 AF pool. Typically, 10,825 releases are focused on supplementing flows in the late-irrigation season. The USFWS has increasingly seen an additional need in April because of a low flow condition referred to as the “April Hole.” Particularly in years following a dry year, storage levels in the Colorado River basin are below average and diversions to storage in April are more significant, exacerbated by opening of major Grand Valley canals upstream of the 15-Mile Reach, causing low flow conditions in the 15-Mile Reach. Low flows in the month of April have proven to be problematic- resulting in decreased habitat availability, increased vulnerability to avian and terrestrial predation, and increased sun damage - particularly during the spring when native fish are looking for flow-cues to move toward spawning habitats. Below average flows in April also decrease riverine productivity and can cause declining abundance of macroinvertebrates in the 15-Mile Reach.

The CWCB has existing instream flow water rights for the 15-Mile Reach in amounts that vary from 581 cfs to 881 cfs from July through September. The leased Ruedi water would be used to supplement the CWCB's instream flow water rights to preserve the natural environment, and when possible, meet the USFWS flow recommendations for razorback sucker and Colorado pikeminnow. The USFWS flow recommendations for the 15-Mile Reach range from 810 cfs to 15,660 cfs for April through December depending on the month and hydrologic year type. The remaining leased water from Ruedi Reservoir would be used to meet both the CWCB's water rights and, when possible, to meet the USFWS flow recommendations on a more frequent basis.

CPW is of the opinion that should there be a remaining balance from the CRWCD pool of water in Ruedi Reservoir, this water could best be used to preserve and/or improve the natural environment in the 15-Mile Reach starting in April. Specifically:

- From April 1 to June 30, the leased water would incrementally contribute towards preserving the natural environment by helping meet or reduce shortfalls to the published USFWS flow recommendations.
- From July 1 to September 30, the water could be used to supplement the CWCB's decreed instream flow water right in the 15-Mile Reach to preserve the natural environment and contribute to meeting or reducing shortfalls to the published USFWS flow recommendations to improve the natural environment to a reasonable degree.
- From October 1 to December 31, the leased water would incrementally contribute towards preserving the natural environment by helping meet or reduce shortfalls to the published USFWS flow recommendations.

CPW is appreciative of the ongoing consultation on releases from Ruedi Reservoir to the 15-Mile Reach. We are supportive of this water acquisition proposal so long as continued coordination occurs between CPW aquatic biologists and CWCB staff prior to and during releases of leased water for instream flow uses in the 15-Mile Reach, particularly as it relates to appropriate ramping rates during the winter period.

#### CWCB Policy 19 Considerations

Since this proposal will be funded with monies authorized by 37-60-123.7 to acquire water to improve the natural environment to a reasonable degree, CWCB Policy 19 must be followed. Specifically, Policy 19 asks CPW to provide data and information to the Board that addresses the following:

- a. The degree to which the acquired water will add useable habitat to riffles, pools and runs within the subject ISF reach;
- b. The amount of additional useable area for fish and macroinvertebrates that the acquired water will provide;
- c. Where applicable, the amount of protection from high temperatures and low oxygen levels in hot summer months that the acquired water will provide;
- d. An analysis of the degree to which the additional water resulting from the acquisition: (1) benefits the natural environment, and (2) does not result in hydraulic conditions that are detrimental to the aspects of the natural environment intended to be benefited by the acquired water, such as habitat requirements for a particular life stage of a fish species; and
- e. Where applicable, an estimate of the degree to which the acquired water will increase moisture levels in the alluvial aquifer to support the riparian vegetation in the subject stream reach.

### Fryingpan River

Since this proposal is to provide water for the winter season, CPW believes that c. and e. do not apply in this case. In addition to the benefits of reduced anchor ice formation, there are a number of sources of information that exist to address a, b, and d.

- Policy 19, criteria a, b and d(1): During the 1980s and 1990s, CDOW researcher R. Barry Nehring conducted long-term research projects that included the reach of the Fryingpan River below Ruedi. These investigations included IFIM/PHABSIM studies where Nehring concluded, among other things, that wintertime flows in the Fryingpan River of up to 100 cfs are optimum for brown trout adults and for egg incubation. Optimum flows for various life stages of rainbow trout are also between 100 and 250 cfs.
- Policy 19, criteria a, and b: Research conducted by Bill Miller and observationally confirmed by CPW indicate anchor ice is less prevalent at flows in the range of 70 to 100 cfs. Reduction in anchor ice provides additional useable habitat for brown trout adults and more favorable conditions for egg incubation. Increased macroinvertebrate diversity is also correlated with reduced anchor ice associated with flows greater than 70 cfs.
- Policy 19, criteria a, b and d(1): The Ruedi Round II Water Marketing Program Final Supplemental EIS (1989) contains additional IFIM/PHABSIM data curves that also show brown and rainbow trout habitat improving as flows increase up to 100 cfs.
- Policy 19, criterion d(2): The Ruedi Round II Water Marketing Program Final Supplemental EIS also shows that for nearly all trout life stages, flows have to exceed 100 cfs before there is any reduction in overall habitat.

### 15-Mile Reach of the Colorado River

Since this proposal may provide supplemental water for the warm-water endangered fish species in the 15-Mile reach from July through September, CPW believes that c. and e. do not apply in this case. There are a number of sources of information that exist to address Policy 19 considerations and quantify the benefits of this proposal to the Colorado pikeminnow and razorback sucker specifically:

- Policy 19, criterion a: USFWS flow recommendations are based in part on a 1989 Kaeding and Osmundson report which uses PHABSIM modeling to relate flows to preferred habitat for adult Colorado pikeminnow. Flow recommendations in July through September maximize weighted useable area for Colorado pikeminnow, and vary depending on hydrologic year type. Note, summer use of the 15-Mile Reach is considered most valuable for adult Colorado pikeminnow habitat. The 15-Mile Reach is regarded primarily as important habitat for adult Colorado pikeminnow throughout the year and for razorback sucker during spring runoff with July considered a transitional month between runoff and baseflow. The lease proposal will result in increases in preferred habitat for Colorado pikeminnow and/or razorback sucker depending on the hydrologic year type.
- Policy 19, criteria a., b. and d.(1): USFWS flow recommendations are also based on research conducted by Osmundson and Kaeding using PHABSIM and mesohabitat modeling to assess flows that maximize preferred habitat of eddies, pools, and deep backwaters. Osmundson and Kaeding research also indicated slow and fast runs were preferred at low flow levels, so flow recommendations in below average hydrologic

year types maximize preferred low flow habitat of runs. The lease proposal will result in increases in preferred habitat for Colorado pikeminnow and/or razorback sucker depending on the hydrologic year type.

- Policy 19, criterion d(2): USFWS flow recommendations based on PHABSIM/IFIM studies, which model the relationship between flow and preferred habitat, specifically showing where habitat is increasing and/or declining for adult Colorado pikeminnow and razorback sucker. USFWS flow recommendations vary by hydrologic year type, but seek to maximize preferred habitat without detrimental hydraulic conditions for the endangered fish.

### Conclusions and Recommendations

CPW is of the opinion that the proposed acquisition of water from Ruedi Reservoir will result in benefits to the fishery in the Fryingpan River. This conclusion is based on the reduction of anchor ice formation and an overall increase in habitat for several life stages of both rainbow and brown trout. Additionally, should there be remaining leased water starting in April, the proposed lease will benefit the Colorado pikeminnow and razorback sucker in the 15-Mile Reach. Benefits will also be provided to the sympatric 3-species in the 15-Mile Reach, the roundtail chub, flannelmouth sucker, and bluehead sucker. Additionally, releases are likely to provide temperature benefits for the cold-water trout in the Fryingpan, Roaring Fork, and Middle Colorado Rivers on its way downstream to the critical habitat.

CPW therefore believes that CWCB should proceed with this acquisition while continuing to coordinate with USFWS and CPW throughout the lease period, particularly on appropriate ramping rates during both the winter and summer periods. CPW looks forward to working with the Board's staff, RFC, USFWS, CRWCD, and others as this lease is implemented.

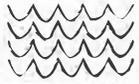
As always, CPW staff will be available at the November 2020 CWCB meeting to answer any questions that the Board might have relating to this agenda item. Thank you for the opportunity to assist in this matter.

Sincerely,



Katie Birch  
Instream Flow Program Specialist

cc: Bakich, Logan, Felt, Martin, Crockett, Graf, Harris, DeWalt, Romatzke



# RUEDI WATER & POWER AUTHORITY

0238 Fawn Drive  
Carbondale, Co 81623  
970.963.4959  
www.rwapa.org

Celene Hawkins, Chair  
Colorado Water Conservation Board  
1313 Sherman Street  
Room 718  
Denver, CO 80203

Dear Ms. Hawkins,

I am writing to express Ruedi Water and Power Authority's (RWAPA) strong support for the lease of Ruedi Reservoir water for winter instream flow use on the Fryingpan River and 15-Mile Reach of the Colorado River.

RWAPA is a regional water agency in the Roaring Fork Watershed, directed by a Board with an elected official from each local government within the watershed – Aspen, Snowmass Village, Basalt, Carbondale, Glenwood Springs, Pitkin and Eagle Counties. Our mission is to mobilize resources and influence to protect and enhance the waters and communities of the Roaring Fork Watershed.

The Fryingpan River is an extremely valuable resource for our communities because of its natural beauty, rich environment, and recreational opportunities. In 1979, the lower Fryingpan River became the first recognized "Gold Medal" trout stream in the state and in 2015 it was determined to generate nearly \$4 million in local economic value annually. Water released from Ruedi Reservoir influences the quality of the instream and riparian habitat of this river. Low flows, especially in winter, can contribute to the formation of anchor ice and compromise the quality of trout habitat, resulting in environmental and economic impacts to the area.

In 2018 the CWCB, in collaboration with Roaring Fork Conservancy, entered into a contract with the Colorado River District for 3,500 AF of Ruedi Reservoir water for the primary purpose of enhancing the instream flow in the Fryingpan below Ruedi Reservoir between January 1 and March 31, 2019 to prevent anchor ice formation. 3,200 AF was delivered between January 1 and March 7, increasing Fryingpan flows approximately 25 cubic feet per second (cfs) above the 39 cfs decreed instream flow. Anecdotally, anchor ice formed in December of 2018 in the lower Fryingpan and nearby in the Roaring Fork River. When the additional releases began in January 2019, the anchor ice in the Fryingpan slowly melted and no other formation or damage was observed. However, anchor ice nearby in the Roaring Fork River, regularly broke apart, ripped river bottom, and reformed throughout that winter, potentially damaging the macroinvertebrate populations of the riverbed.

RWAPA greatly appreciated the efforts and expenses of the state in 2018-2019. And, upon seeing the success of this operation achieved and preparing for another low base flow in the Fryingpan this winter, RWAPA encourages the CWCB to support this lease to enhance flows and protect the environment of the Fryingpan River again this year.

Sincerely,

April Long, Executive Director  
Ruedi Water and Power Authority

Attachment 5  
Agenda Item 22  
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