STATE OF COLORADO

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 721
Denver, Colorado 80203
Phone: (303) 866-3441
Fax: (303) 866-4474
www.cwcb.state.co.us

TO: Colorado Water Conservation Board Members

FROM: Linda Bassi and Jeff Baessler,
Stream & Lake Protection Section

DATE: June 30, 2011

SUBJECT: Agenda Item 14, July 12-13, 2011 Board Meeting
Stream & Lake Protection Section –
New ISF Appropriation Recommendations in Water Division 5

Summary and Staff Recommendation

Staff has received final recommendations for new instream flow (ISF) appropriations on the Colorado River between Kremmling and Dotsero from the Upper Colorado Wild and Scenic Stakeholder Group. The recommendations are a key component of a Management Plan Alternative to potential federal determinations that certain Colorado River segments are "suitable" for designation under the Wild and Scenic River Act to protect a number of outstanding remarkable values associated with the river.

This memo provides an overview of: 1) the technical analyses that were performed by the Stakeholder Group and CWCB staff to provide the Board with sufficient information to declare its intent to appropriate in accordance with the Instream Flow Rules; 2) a discussion of why the Stakeholder Group's final consensus recommendations can be considered to be the minimum amounts necessary to preserve the natural environment to a reasonable degree on this portion of the Colorado River; 3) an overview of the Colorado Division of Wildlife's recommendation and its conditional support of the Stakeholder Group recommendation 4) a discussion of how the recommended flows will not deprive the people of the State of Colorado of the ability to fully develop compact entitlements; and 5) terms and conditions developed by the Stakeholder Group, in cooperation with CWCB staff.

Staff recommends that, pursuant to Rule 5d., the Board declare its intent to appropriate an ISF water right on each stream segment listed on the attached Tabulation of Instream Flow Recommendations, include the proposed terms and conditions described in this memo, and direct staff to publicly notice the Board's declaration of its intent to appropriate.

Further, staff recommends that the Board declare its intent to appropriate these ISF water rights as recommended by the Stakeholder Group due to: (1) the importance of these ISF water rights to the viability of the Management Plan; and (2) the diversity of the stakeholders and the painstaking negotiation process that resulted in this recommendation.

Background

The CWCB Staff has been working with a diverse group of stakeholders ("The Upper Colorado Stakeholder Group" or "Stakeholder Group") to develop resource protection methods that could serve as alternatives to potential federal determinations by the U.S. Bureau of Land Management (BLM) or U.S. Forest Service (USFS) that certain Colorado River segments are "suitable" for designation under the Wild and Scenic River Act. In February 2011, the Stakeholder Group submitted a Wild and Scenic Management Plan Alternative (Management Plan Alternative), which was supported unanimously by the individual staff members and representatives of the stakeholders. A copy of the transmittal letter and the Management Plan Alternative was provided to the Board at the March 2011 Board meeting, wherein the Board voted unanimously to endorse the plan as follows:

> "The Board endorses the Upper Colorado Stakeholder Group Wild and Scenic Management Plan Alternative. By this endorsement, the CWCB is not determining whether to appropriate an instream flow water right on the Colorado River or whether to commit funds to this Management Plan. This endorsement is contingent on the endorsement of the management plan, which is in substantial compliance with the February 28, 2011 Upper Colorado Wild and Scenic Stakeholder Management plan, also recognizing this alternative to the wild and scenic cannot go forward without the support and endorsement of the stakeholders."

A key part of this plan relies upon the CWCB appropriating and filing an application for instream flow water rights for the Colorado River for segments between Kremmling and Dotsero prior to December 31, 2011. The Stakeholder Group members have worked diligently among themselves and with Staff from the CWCB, Attorney General's Office and the Colorado Division of Wildlife (CDOW) to develop an agreed-upon ISF recommendation and address the statutory findings the Board must make, as well as a number of issues related to a potential instream flow water right on the Colorado River. The Stakeholder Group and staff have been meeting regularly since the March Board meeting and have recently come to agreement on proposed ISF recommendations for three segments of the Colorado River. (See attached final recommendation letter).

Technical Investigations

Staff's executive summary and technical analysis of the proposed reaches are attached to this memo.

Natural Environment Studies

1. Determination of the existence of a natural environment

Based upon 2008 - 2010 fish sampling studies completed by the CDOW, the natural environment on the Colorado River in the reach of stream between Kremmling and Dotsero is indicated by the presence of a high number of different fish species, including rainbow and brown trout, flannelmouth and bluehead suckers, and mountain whitefish.

2. Determination of the minimum amount of water necessary to preserve the natural environment to a reasonable degree

The CWCB hired Miller Ecological Consultants to conduct River 2-D modeling work to provide additional biological information to the Stakeholder Group regarding the habitat needs of certain fish species within the proposed ISF reaches on the Colorado River. The resulting Miller Report was provided to the Board at the May 2011 meeting.

The objective of the Miller Report was to determine the current amount of physical hydraulic habitat available for fish species of interest in the proposed reaches, and estimate the expected changes to physical hydraulic habitat that would occur as a result of both man-made and natural hydrologic changes. The results of the hydraulic habitat modeling, which are displayed for each of the species' life stages as the amount of weighted useable area available at each specific modeled discharge, could then be used to determine times when flows may be limiting to a particular species' life stage, and to identify the preferred flow regime based on the range of hydrologic conditions needed for ecological function and fish habitat.

It is important to note that the Miller Report did not specifically quantify the minimum amount of water necessary to preserve the natural environment to a reasonable degree based upon the species of interest being used to indicate the presence of a natural environment. Rather, the report allowed room for interpretation of the minimum amounts that the Stakeholder Group could recommend to the CWCB for an instream flow water right that would be reasonable, taking into account the CWCB's need to balance reasonable preservation of the existing aquatic natural environment with the needs of mankind.

To arrive at its recommendation of the minimum amount that is reasonable for preservation of the natural environment, the Stakeholder Group utilized all of the available scientific data; various expert biological opinions on the interpretation of that data; information on historical and simulated future hydrologic conditions; and a collaborative consensus-building process.

In formulating its ISF recommendations, the Stakeholder Group incorporated the following specific relationships, analyses and/or considerations:

- Physical habitat – flow relationships from the Miller Report primarily for adult trout life stages, which provide a basis to support the recreational fishing ORV, and also for native fish.
- An analysis of potential water availability constraints.
- An emphasis on total habitat availability for adult nonnative brown trout and rainbow trout, which provide the majority of the recreational value identified by the BLM.
- An effort to recommend ISF amounts that would provide adequate habitat for all life stages of native species as well as some consideration of flows necessary to provide habitat for the non-native mountain whitefish.

The Stakeholder Group's ISF recommendations are based on PHABSIM relationships documented in the Miller Report and on an evaluation of total weighted usable habitat and the relative quality of habitat available for all species and life stages modeled. Based upon the considerations listed above, the recommended ISF amounts are the minimum flow amounts that will provide habitat for all of the fish species of interest and their life stages in the proposed ISF reaches, thereby protecting the fish-related ORVs identified by the BLM.

Water Availability

In its analysis of the amount of water available for an instream flow recommendation, the Stakeholder Group evaluated both historical and future simulated flow conditions at three points of reference along the Upper Colorado River, from Kremmling downstream to Dotsero. The Kremmling gage (09058000) provided the upstream reference point for the Blue River to Piney River Segment, the Kremmling gage plus the Piney gage (09059500) provided a reference point for the Piney River to Cabin Creek Segment, and lastly – the Dotsero gage (0907050) minus the Eagle gage (09070000) provided a downstream reference point for the Cabin Creek to Eagle River Segment. The data sets that were developed for each of these points were statistically analyzed in order to determine the geometric mean value and the upper and lower 95% confidence intervals for each day of the year. The geometric mean analysis is used to

characterize the central tendency of flows on a daily basis for the chosen period of record without the distorting effects of rare high magnitude flood events.

Since all of the recommended flow amounts fall below the historic geometric mean or within the 95% confidence intervals at all three reference points, CWCB staff considers water to be available for appropriation. Although staff only uses historic flow conditions to determine whether water is available for any given flow recommendation, staff understands that the future simulated flows were utilized by the Stakeholder Group in the development of a consensus recommendation. Nevertheless, it should be mentioned that the use of the future simulated flows resulted in some recommended flows that are significantly below the historic geometric mean and the lower 95% confidence interval, and in some cases the recommendations are below the 25 percentile value of daily flows. This is atypical of most ISF recommendations, which normally fall within the 95% geometric mean confidence bands. However, the Management Plan provides for voluntary measures to provide additional flows during these dry periods, which is not generally part of a typical ISF recommendation.

Colorado Division of Wildlife Recommendation

CWCB staff relies upon the CDOW biological experts to both make ISF recommendations and to evaluate and opine on the natural environment studies and quantification models provided in recommendations submitted by other entities. Further, CDOW has its own statutory and policy mandates which require it to protect, preserve and maintain fisheries and associated aquatic ecosystems. As a result, CDOW independently reviewed and analyzed all of the data and modeling efforts utilized by the SG and developed an independent recommendation for the minimum amount of water that it believes is necessary to preserve the natural environment to a reasonable degree in the subject reach of the Colorado River. (CDOW's recommendation is attached).

The CDOW analyses resulted in higher recommended flows and differences in timing of those flows when compared with the SG recommendation. The primary reason for this difference is that the SG considered future water availability constraints in the development of its consensus recommendation. Staff and CDOW only consider existing conditions when recommending minimum flow amounts which are necessary to preserve the natural environment to a reasonable degree.

However, CDOW supports the SG's proposed instream flow recommendations in lieu of its own recommendation, assuming that the Management Plan Alternative is adopted by the BLM. CDOW believes that the Management Plan Alternative, which incorporates long-term protection measures, cooperative measures, funding mechanisms, and a monitoring plan to assist in protection of the Outstandingly Remarkable Values identified by the BLM, will be sufficient to preserve the natural environment to a reasonable degree. Accordingly, CDOW conditions its endorsement of the plan on the conditions set forth below:

1. The CWCB's determination that the Stakeholder Group's instream flow recommendation meets its statutory standards is premised on implementation of the Stakeholder Group's Alternative Management Plan. While withdrawal of the Plan would not affect the validity of a decreed ISF water right, the CWCB retains the ability to revisit its findings through a subsequent public process relating to its determination of the amount of water necessary to preserve the natural environment to a reasonable degree if the Upper Colorado River Management Plan developed by the Stakeholder Group is ever withdrawn for any reason;

2. The CWCB's determination regarding the amount of water necessary to preserve the natural environment to a reasonable degree will in no way limit the CDOW's ability to perform its statutory responsibilities and duties under Title 33 Wildlife and Parks and Outdoor Recreation of

the Colorado Revised Statues and under section 37-60-122.2 regarding fish and wildlife resource mitigation plans;

3. Nothing in the Upper Colorado River Management Plan shall preclude or limit the CDOW's use of any data regardless of whether such data has been used in the negotiation of the proposed Outstanding Remarkable Value (ORV) Indicators or Resource Guides; and

4. Participation in the Upper Colorado River Management Plan as a stakeholder is not intended to serve as project mitigation nor as a means to demonstrate that a project does not unreasonably diminish the ORVs (except as may be agreed between the project proponent and the CDOW).

The CDOW would also recommend that the CDOW's preliminary instream flow recommendations serve as a guide for future water acquisitions by the CWCB to preserve and improve the natural environment and as a goal for future UCRSG's Voluntary Cooperative Measures.

Proposed terms and conditions for the ISF water right

As outlined in its May 13, 2011 letter, the Stakeholder Group's recommendation for and support of these ISFs is conditioned upon the inclusion of the following terms and conditions within the CWCB's declaration of intent to appropriate, water court application, and proposed decree:

1) This ISF is a unique ISF appropriation in that it is recommended by the consensus of a diverse stakeholder group under a local management plan designed to help protect resources of "outstanding remarkable value" that have been identified by the Bureau of Land Management and the United States Forest Service. This ISF is also unique because it involves the mainstem of the Colorado River, the relative size of that river, the current level of water supply development, the level of use for recreational fishing purposes, and the river's overall importance to the State of Colorado. The terms of this appropriation are part of a compromise and settlement and are unique circumstances that shall not establish any precedent and shall not be construed as a commitment to include any specific findings of fact, conclusions of law or administrative practices in future appropriations.
2) Pursuant to section 37-92-102(3)(b), C.R.S. (2010), this instream flow appropriation shall be subject to the present uses or exchanges of water being made by other water users, pursuant to appropriation or practices in existence on the date of this appropriation. The CWCB will apply this provision if the proponent provides adequate documentation and verification of present uses and exchanges.
3) During any period identified by the Upper Colorado River Commission in a finding issued pursuant to Article VIII(d)(8) of the Upper Colorado River Basin Compact of 1948 for curtailment of Colorado River basin water uses within Colorado, which the State of Colorado has agreed to implement in a manner that impacts water diversions within Water Division 5, the CWCB agrees that this ISF water right will be administered in accordance with compact curtailment rules adopted by the State of Colorado that are then in effect, if any. If no such compact curtailment rules are then in effect, it is the intent of the CWCB that this instream flow right will not be administered during the period of any such compact curtailment.
4) The CWCB agrees not to file a statement of opposition to adjudications of water rights made after the date of this filing that: (1) result in depletions that do not exceed 100 acre feet; or (2) are for changes of water rights that do not seek to change more than 2500 acre feet, provided such changes of water rights do not involve an exchange through the subject ISF reaches; and (3) do not exceed a *total* 1% depletive effect on the instream flow right decreed herein in accordance with the *de minimis* Rule 8e of the Rules Concerning the Instream Flow and Natural Lake Level Program. This term and condition does not preclude the CWCB from enforcing this ISF appropriation in accordance with the priority system. The CWCB may also evaluate any water court applications made after the date of this filing to determine whether

they are appropriate for application of the Injury with Mitigation Rule 8i.(3) of the Rules Concerning the Instream Flow and Natural Lake Level Program.

5) It is the intent of the CWCB that this ISF provide protection of the natural environment only to the extent authorized by state statute as against adjudications of water rights made after the date of this filing. The CWCB intends that the ISF water right decreed herein is not appropriate for consideration as a streamflow standard in other administrative or regulatory permitting contexts.

Additionally, in response to Board questions about the timing of the BLM and USFS approval of the Management Plan Alternative, the Stakeholder Group is recommending an approach to filing a water court application for this ISF water right that will comply with negotiated Plan deadlines and preserve the Board's ability to decide on a course of action that is responsive to the BLM and USFS Plan approval process. The Stakeholder Group requests that the Board adopt the following, to be incorporated as part of the record of Board deliberations. Board adoption of this approach is not necessary at this Board meeting, but would be part of the Board's final action on this ISF appropriation.

> The CWCB directs the filing in 2011 of an application for this right. The CWCB will seek to defer the prosecution of the filed application until formal federal approval of the SG Plan without material change. If the water court declines to defer prosecution of the CWCB application, then the State will consult with the SG and seek a recommendation from the SG on a further course of action. Following consultation, the CWCB will take one of the following actions: (1) prosecution of the ISF application seeking a decree upon agency approval of the SG Plan; (2) withdrawal of the ISF application; or (3) any other action unanimously agreed upon by the SG and the CWCB. If the CWCB withdraws the application but the SG Plan is subsequently adopted by the federal agencies, then the CWCB will promptly file a new ISF application for the same amounts and subject to the same conditions. Nothing herein is intended to limit the discretion of the CWCB to make or respond to other ISF filings.

Finally, while not discussed at the May 2011 CWCB meeting, the Stakeholder Group has discussed the relationship between this potential ISF water court filing and potential water rights filings in connection with the proposed Colorado River Cooperative Agreement between Denver Water and certain west slope entities. The Stakeholder Group developed the following consensus approach, which it requests be adopted and reflected in the record of Board deliberations:

A. The CWCB direct its staff and counsel to file the ISF application in 2011.
B. In order for any Colorado River Cooperative Agreement (CRCA) application made in 2011 to be senior in priority to the ISF filing, the CWCB will claim an appropriation date within 2011 for the ISF that is junior to the appropriation date claimed in any CRCA application made in 2011. The CWCB is willing to make this accommodation because the contemplated CRCA application(s) is/are intended to provide environmental benefits within the Colorado River basin.
C. The CWCB direct its staff and counsel to work cooperatively with the SG and the parties to the CRCA to address material conflicts, if any, that may arise between the ISF and CRCA applications if the CRCA application(s) cannot reasonably be filed in 2011.

No Deprivation of Compact Entitlements

Several factors support the conclusion that this ISF water right will not "deprive the people of the state of Colorado of the beneficial use of those waters available by law and interstate compact." Section 37-92-102(2), C.R.S. (2011).

- To a large extent, in several months of the year, the proposed ISF reach of the Colorado River is controlled by downstream senior calls (Cameo and Shoshone) for amounts larger than the proposed ISF water right.
- Because most of the recommended ISF amounts fall significantly below the historical geometric mean and the lower 95% confidence interval, with this ISF water right in place, water users will be able to develop additional water rights on the Colorado River upstream, within and downstream of this proposed ISF water right, clearly at the peak of the hydrograph, but also at other times of the year.
- The mainstem of the Colorado River, within and immediately upstream of this proposed ISF reach, is not the only source of water for developing Colorado River Compact entitlements. Water is available for development on numerous other rivers and tributaries in the Colorado River basin. Also, additional water development in the Colorado River basin can occur downstream of this proposed ISF water right.
- The Stakeholder Group and CWCB staff have recommended including a term and condition (set forth above under "Proposed Terms and Conditions for the ISF Water Right") that specifically addresses how the ISF water right would be administered in times of a compact curtailment situation, which will protect Colorado's ability to fully use its compact entitlements, and allows Colorado to manage Colorado's water effectively during dry periods.

Instream Flow Rule 5d.

Rule 5d. provides that the Board may declare its intent to appropriate ISF water rights after reviewing Staff's recommendations for the proposed appropriations. Rule 5d. also sets forth the activities that take place after the Board declares its intent that initiate the public notice and comment procedure for the ISF appropriations. Specifically,

5d. Board's Intent to Appropriate. Notice of the Board's potential action to declare its intent to appropriate shall be given in the January Board meeting agenda and the Board will take public comment regarding its intent to appropriate at the January meeting.

(1) After reviewing Staff's ISF recommendations for proposed ISF appropriations, the Board may declare its intent to appropriate specific ISF water rights. At that time, the Board shall direct the Staff to publicly notice the Board's declaration of its intent to appropriate.

(2) After the Board declares its intent to appropriate, notice shall be published in a mailing to the ISF Subscription Mailing Lists for the relevant water divisions and shall include:

  (a) A description of the appropriation (e.g. stream reach, lake location, amounts, etc.);
  (b) Availability (time and place) for review of Summary Reports and Investigations Files for each recommendation; and,
  (c) Summary identification of any data, exhibits, testimony or other information in addition to the Summary Reports and Investigations Files supporting the appropriation.

(3) Published notice shall also contain the following information:

(a) The Board may change flow amounts of contested ISF appropriations based on information received during the public notice and comment period.

(b) Staff will maintain, pursuant to Rule 5e.(3), an ISF Subscription Mailing List for each water division composed of the names of all persons who have sent notice to the Board Office that they wish to be included on such list for a particular water division. Any person desiring to be on the ISF Subscription Mailing List(s) must send notice to the Board Office.

(c) Any meetings held between Staff and members of the public will be open to the public. Staff may provide Proper Notice prior to any such meetings and may provide notice to persons on the ISF Subscription Mailing List(s).

(d) Any Notice to Contest must be received at the Board office no later than March 31st, or the first business day thereafter. All Notices of Party status and Contested Hearing Participant status must be received at the Board office no later than April 30th, or the first business day thereafter.

(e) Staff will announce its Final Staff ISF Recommendation concerning contested appropriations at the September Board meeting and will send notice of the Final Staff Recommendation to all persons on the Contested Hearing Mailing List.

(f) The Board may take final action on any uncontested ISF appropriations at the May Board meeting.

(4) After the Board declares its intent to appropriate, notice of the Board's action shall be mailed within five working days to the County Commissioners of the county(ies) in which the proposed reach or lake is located.

Staff Recommendation

Staff recommends that, pursuant to Rule 5d., the Board declare its intent to appropriate an ISF water right on each stream segment listed on the attached Tabulation of Instream Flow Recommendations, include the proposed terms and conditions described above, and direct Staff to publicly notice the Board's declaration of its intent to appropriate.

Further, staff recommends that the Board declare its intent to appropriate these ISF water rights as recommended by the Stakeholder Group due to: (1) the importance of these ISF water rights to the viability of the Management Plan; and (2) the diversity of the stakeholders and the painstaking negotiation process that resulted in this recommendation.

Attachments

Colorado Water Conservation Board

Instream Flow Tabulation - Streams

Water Division 5

Case Number	Stream	Watershed	County	Upper Terminus	Lower Terminus	Length (miles)	USGS QUADS	Amount(dates) (CFS)	Approp Date
10/5/A-001	Colorado River	Colorado headwaters	Grand Eagle	confl Blue River at lat 40 02 33N long 106 23 53W	confl Piney River at lat 39 51 19N long 106 38 31W	23.70	Kremmling McCoy Radium Sheephorn Mountain State Bridge	600 (5/15 - 7/31) 750 (8/1 - 9/15) 500 (9/16 - 5/14)	
10/5/A-002	Colorado River	Colorado headwaters	Eagle	confl Piney River at lat 39 51 19N long 106 38 31W	confl Cabin Creek at lat 39 52 29N long 106 53 36W	20.80	Blue Hill Burns North Burns South McCoy State Bridge	650 (5/15 - 7/31) 800 (8/1 - 9/15) 525 (9/16 - 5/14)	
10/5/A-003	Colorado River	Colorado headwaters	Eagle	confl Cabin Creek at lat 39 52 29N long 106 53 36W	pt immed u/s of confl Eagle River at lat 39 38 48N long 107 03 30W	25.00	Burns South Dotsero Sugarloaf Mountain	900 (5/15 - 6/15) 800 (6/16 - 9/15) 650 (9/16 - 5/14)	

Totals for Water Division 5

Total # of Stream Miles = 69.5

Total # of Appropriations = 3

(Totals do not include donated/acquired water rights)

Report Totals

Total # of Stream Miles = 69.5

Total # of Appropriations = 3

(Totals do not include donated/acquired water rights)

Stream: Colorado River

Executive Summary

Water Division: 5
Water District: 100
CDOW#: 21262, 19637
CWCB ID: 10/5/A-001, 10//A-002, 10/5/A-003

Segment: Confluence with Blue River to Confluence with Piney River

Upper Terminus: CONFLUENCE WITH BLUE RIVER
(Latitude 40° 02' 33.25"N) (Longitude 106° 23' 53.24"W)

Lower Terminus: CONFLUENCE WITH PINEY RIVER
(Latitude 39° 51' 18.59"N) (Longitude 106° 38' 30.5"W)

Watershed: Colorado headwaters (HUC#: 14010001**)**
Counties: Grand & Eagle
Length: 23.7 miles
USGS Quad(s): Kremmling, Sheephorn Mountain, Radium, McCoy, State Bridge
Flow Recommendation: 500 cfs (September 16 – May 14)
600 cfs (May 15 – July 31)
750 cfs (August 1 –September 15)

Segment: Confluence with Piney River to Confluence with Cabin Creek

Upper Terminus: CONFLUENCE WITH PINEY RIVER
(Latitude 39° 51' 18.59"N) (Longitude 106° 38' 30.5"W)

Lower Terminus: CONFLUENCE WITH CABIN CREEK
(Latitude 39° 52' 28.61"N) (Longitude 106° 53' 35.85"W)

Watershed: Colorado headwaters (HUC#: 14010001**)**
Counties: Eagle
Length: 20.8 miles
USGS Quad(s): State Bridge, McCoy, Blue Hill, Burns North, Burns South
Flow Recommendation: 525 cfs (September 16 – May 14)
650 cfs (May 15 – July 31)
800 cfs (August 1 –September 15)

<u>Segment</u>: Confluence with Cabin Creek to Point Immediately Upstream of Confluence with Eagle River

Upper Terminus: CONFLUENCE WITH CABIN CREEK
(Latitude 39° 52’ 28.61”N) (Longitude 106° 53’ 35.85”W)

Lower Terminus: POINT IMMEDIATELY UPSTREAM OF CONFLUENCE WITH EAGLE RIVER
(Latitude 39° 38’ 48.33”N) (Longitude 107° 03’ 30.05”W)

Watershed: Colorado headwaters (HUC#: 14010001**)**
Counties: Eagle
Length: 25.0 miles
USGS Quad(s): Burns South, Sugarloaf Mountain, Dotsero
Flow Recommendation: 650 cfs (September 16 – May 14)
900 cfs (May 15 – June 15)
800 cfs (June 16 –September 15)

Staff Analysis and Recommendation

Summary

The information contained in this report and the associated instream flow file folder forms the basis for staff's instream flow recommendation to be considered by the Board. It is staff's opinion that the information contained in this report is sufficient to support the findings required in Rule 5.40.

Colorado's Instream Flow Program was created in 1973 when the Colorado State Legislature recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment" (see 37-92-102 (3) C.R.S.). The statute vests the CWCB with the exclusive authority to appropriate and acquire instream flow and natural lake level water rights. In order to encourage other entities to participate in Colorado's Instream Flow Program, the statute directs the CWCB to request instream flow recommendations from other state and federal agencies. The Upper Colorado River Wild and Scenic Stakeholder Group (SG) recommended these three segments of the Colorado River to the CWCB for inclusion into the Instream Flow Program. These segments of the Colorado River are being considered for inclusion into the Instream Flow Program because there is a natural environment that can be preserved to a reasonable degree with an instream flow water right.

The Colorado River originates in Rocky Mountain National Park at an elevation of 11,200 feet and travels 282 miles before it exits Colorado at the Utah border at an elevation of 4,350 feet. The total length of the Upper Colorado River that is considered for this ISF appropriation is 69.5 miles long. The reach begins at the confluence with the Blue River, near the town of Kremmling, at an elevation of approximately 7,300 feet and ends at a point immediately upstream of the confluence of the Eagle River at an elevation of approximately 6,100 feet. Given the different biological and hydrological characteristics along the length of this Upper Colorado River reach, the SG has divided this reach into three segments 1) Blue River to Piney River Segment, 2) Piney River to Cabin Creek Segment, and 3) Cabin Creek to Eagle River Segment (lower termini immediately upstream of the confluence with the Eagle River). Portions of the Blue River to Piney River Segment are located in both Grand and Eagle counties, while the entire Piney River to Cabin Creek and Cabin Creek to Eagle River segments are located in Eagle County. The Blue River to Piney River Segment represents 23.7 river miles; the Piney River to Cabin Creek Segment represents 20.8 river miles and the Cabin Creek to Eagle River Segment represents 25.0 river miles.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Confluence w/ Blue River	Confluence w/ Piney River	23.7	24%	76%

93% of the public lands are managed by the Bureau of Land Management (BLM) and the remaining 7% is part of the Radium State Wildlife Area (SWA).

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Confluence w/ Piney River	Confluence w/ Cabin Creek	20.8	33%	67%

90% of the public lands are managed by the BLM and the remaining 10% is owned by the State Land Board (SLB).

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Confluence w/ Cabin Creek	Point Immediately upstream of the Confluence w/ Eagle River	25.0	61%	39%

100% of the public lands are managed by the BLM.

Biological Data

Brown trout

Brown trout (*Salmo trutta*) are native to Europe and western Asia (Scott and Crossman 1973). This species was brought to Colorado and other Rocky Mountain states in the late 1880s (Belica 2007); the introduced fish were a mix of stocks from England, Scotland, and Germany (Behnke 2002). Brown trout are often the dominant trout species in lower elevation mountain streams (Belica 2007), but large streams characterized by variable habitat can allow rainbow trout to coexist with brown trout (Behnke 2002). Although they can tolerate sluggish flows, brown trout do not require slow water velocities (Scott and Crossman 1973). This species spawns in October and November, when water temperatures reach approximately 7°C (Scott and Crossman 1973; Behnke 2002). Like other trout species, brown trout bury their eggs in redds in shallow, gravel-bottomed streams (Scott and Crossman 1973; Behnke 2002). Brown trout typically reach adult lengths of 16 inches (Scott and Crossman 1973), but in smaller, relatively unproductive streams, they usually do not exceed 10 inches (Behnke 2002). Brown trout are carnivorous, but their diet changes in response to food availability. They consume large amounts of stream invertebrates, but they also eat frogs, fish, and rodents (Scott and Crossman 1973; Behnke 2002; Belica 2007). Brown trout begin to transition to a piscivorous diet at approximately 6 inches in length; at a length of 12 inches, brown trout are almost entirely piscivorous if sufficient prey fish are present (Scott and Crossman 1973; Belica 2007). Piscivorous brown trout tend to be larger and longer-lived than those that eat mostly invertebrates (Behnke 2002).

Rainbow trout

The native range of the rainbow trout (*Oncorhynchus mykiss*) is the eastern Pacific Ocean and streams west of the Rocky Mountains; this range stretches from Baja California north to the Kuskokwim River in Alaska (Scott and Crossman 1973). However, rainbow trout have been introduced worldwide and are common in Colorado (Bernstein and Montgomery 2008). Rainbow trout inhabit small to moderately large streams with gravel substrates and riffle-pool

morphology. They also inhabit lakes, but require streams for successful reproduction (Scott and Crossman 1973, Bernstein and Montgomery 2008). Rainbow trout spawn when water temperatures exceed 6-7°C, so timing is variable; in coastal areas, spawning occurs in January or February, but in colder regions, it occurs as late as June (Behnke 2002). Fertilized eggs are buried in redds, or nests excavated by the female (Scott and Crossman 1973; Bernstein and Montgomery 2008). Female rainbow trout reach sexual maturity between 2 and 6 years of age, and an average adult length for resident stream rainbow trout is 12-18 inches (Behnke 2002; Bernstein and Montgomery 2008). Rainbow trout mainly consume drifting invertebrates, but larger individuals will also eat small fish, eggs, and an occasional rodent (Scott and Crossman 1973; Bernstein and Montgomery 2008).

Mountain whitefish

The mountain whitefish (*Prosopium williamsoni*) is native to western North America; its range stretches from the Lahontan Basin in the south through British Columbia in the north (Scott and Crossman 1973). In Colorado, mountain whitefish are not native south of the Green River Drainage of the Colorado River Basin (Behnke 2002), but they have been successfully introduced outside of their natural range. Mountain whitefish prefer large rivers, and are most commonly associated with open channel habitat and deeper water (Behnke 2002), but they can also utilize pool habitats in smaller, turbid streams (Scott and Crossman 1973). Mountain whitefish can tolerate higher turbidity and temperatures than many other trout species (Behnke 2002). Mountain whitefish typically grow to a maximum length of 8-12 inches and reach sexual maturity between ages 3 and 6. Spawning occurs in winter and can extend into January or February in large systems where temperatures are more stable (Scott and Crossman 1973, Behnke 2002). Mountain whitefish are broadcast spawners that do not build nests (Scott and Crossman 1973). The diet of the mountain whitefish is predominantly benthic invertebrates (Scott and Crossman 1973), but the species is also opportunistic and will feed on fish eggs, fish, and invertebrates on the water's surface (Scott and Crossman 1973, Behnke 2002).

Flannelmouth sucker

Historically, the flannelmouth sucker (*Catostomus latipinnis*) was commonly found in most, if not all, medium to large, lower elevation rivers of the Upper Colorado River drainage (upstream of Glen Canyon Dam). Within the State of Colorado, flannelmouth sucker are present in the Colorado River and numerous tributaries including the Gunnison River up to the Aspinall Unit reservoirs (Bezzerides and Bestgen 2002), the Uncompahgre River (Sigler and Miller 1963) and the Dolores River. Flannelmouth suckers are typically found in slower, warmer rivers in plateau regions of the Colorado River drainage (Deacon and Mize 1997). They usually inhabit the mainstem of moderate to large rivers but are occasionally found in small streams. This species frequents pools and deep runs but can also be found in the mouths of tributaries, riffles, and backwaters. Flannelmouth sucker typically spawn in the Upper Colorado River basin between April and June (McAda 1977, McAda and Wydoski 1980, Snyder and Muth 1990, Tyus and Karp 1990).

Bluehead sucker

This bluehead sucker (*Catostomus discobolus*) is found in a large variety of river systems ranging from large rivers with discharges of several thousand cfs to small creeks with less 11 than a couple of cfs (Smith 1966). Adult bluehead suckers exhibit a strong preference for specific

habitat types (Holden and Stalnaker 1975). This species has been reported to typically be found in runs or riffles with rock or gravel substrate (Vanicek 1967, Holden and Stalnaker 1975, Carlson et al. 1979, Sublette et al. 1990). The bluehead sucker is known to feed on invertebrates, which have their highest densities in riffles. Although the species generally inhabits streams with cool temperatures, bluehead suckers have been found inhabiting small creeks with water temperatures as high as 82.4° F (Smith 1966).

Roundtail chub

Historically, roundtail chub (*Gila robusta*) were known to commonly occur in most medium to large tributaries of the Upper Colorado River Basin (Vanicek 1967, Holden and Stalnaker 1975, Joseph et al. 1977). Roundtail chub historically occurred in lower elevation (below 7,546 ft.) streams, including the Colorado, Dolores, Duchesne, Escalante, Green, Gunnison, Price, San Juan, San Rafael, White, and Yampa rivers (Bezzerides and Bestgen 2002). Roundtail chub are often found in stream reaches that have a complexity of pool and riffle habitats (Bezzerides and Bestgen 2002). Adults are found in eddies and pools adjacent to strong current and use instream boulders as cover (Sigler and Sigler 1996, Brouder et al., 2000). Roundtail chub begin spawning when water temperatures reach about 65°F (Vanicek and Kramer 1969, Joseph et al. 1977). In most Colorado River tributaries this increase in temperature coincides with a decrease in discharge after peak runoff (Bezzerides and Bestgen 2002).

Field Survey Data

The Upper Colorado River from Kremmling, Colorado downstream to Dotsero, Colorado is known to provide habitat for 14 fish species, with brown trout, rainbow trout, mountain whitefish and flannelmouth sucker being the key species of interest for the Physical Habitat Simulation (PHABSIM) modeling (MEC 2011) as selected by the Colorado Division of Wildlife (CDOW). The change in fish habitat in response to changes in flow was modeled for these species and some of their life stages at three locations in the Upper Colorado River: Pumphouse Site, Rancho del Rio Site, and Lyons Gulch Site. The Pumphouse and Rancho del Rio sites are located on the Colorado River between the Blue River and Piney River and the Lyons Gulch Site is located on the Colorado River between Cabin Creek and the Eagle River.

The nonnative brown trout and rainbow trout provide the majority of the recreational fishing opportunities in the Upper Colorado River reach from Kremmling downstream to Dotsero. At a site sampled in 2008 near Radium (Blue River to Piney Segment), brown trout and rainbow trout comprised 45% and 2% of the fish sampled, respectively. At a site sampled in 2008 from Cottonwood to Lyons Gulch (Cabin Creek to Eagle River Segment), brown trout and rainbow trout comprised 19% and <1% of the fish sampled. Brown trout reproduce naturally in the Colorado River and its tributaries, while the rainbow trout population has been supplemented by stocking since the onset of whirling disease greatly reduced their populations. Beginning in 2008 and continuing in 2009, a whirling disease resistant strain of rainbow trout was stocked throughout the Colorado River mainstem with the intent to increase survival and reproduction of these fish in the future.

Mountain whitefish, which are native in Colorado only to the Yampa River and White River drainages (Schisler 2010), comprised 8% and 12% of the fish sampled at the Radium and

Cottonwood to Lyons Gulch sites sampled in 2008, respectively. Speckled dace are native fish to the Colorado River drainage, and comprised 2% and 10% of the fish sampled at the Radium and Cottonwood to Lyons Gulch sites sampled in 2008, respectively. Flannelmouth suckers comprised <1% and 3% of the fish sampled at the Radium and Cottonwood to Lyons Gulch sites sampled in 2008, respectively. Similarly, the bluehead sucker comprised <1% of the fish sampled from both the Radium Site and from Cottonwood to Lyons Gulch.

Biological Flow Recommendation

These instream flow recommendations are the result of a review of the physical habitat – flow relationships, hydrological conditions, and a compromise among the SG entities on the recommended minimum instream flow necessary to preserve the natural environment to a reasonable degree. The instream flow recommendations consider the physical habitat – flow relationships, primarily for the adult trout life stage as presented in the MEC Instream Flow Report (2011) provided to the CWCB, although other native fish data were considered, in addition to water availability constraints. These flows are a component of the SG Plan to support the recreational fishing Outstandingly Remarkable Value identified by the Bureau of Land Management (BLM). The instream flow levels are within the range of flow from 500 cfs to 1,500 cfs that provide abundant habitat for most species and lifestages (MEC 2011).

Recommendations for minimum flows are based on PHABSIM relationships as reported by MEC (2011) and an evaluation of total weighted usable habitat and the relative quality of habitat available for all species and life stages modeled. Emphasis is placed on total habitat availability for the adult nonnative brown trout and rainbow trout, which provide the majority of the recreational value, although fry and juvenile trout life stages were also weighted more heavily than other species. Mountain whitefish and flannelmouth sucker were also considered in this evaluation. An effort was made to establish minimum instream flow recommendations that would provide adequate habitat for all life stages of these native species. The PHABSIM relationship between habitat and flow at specific sites for each species can be found in the attached SG recommendation.

Segment 1: Blue River to Piney River

The Blue River to Piney River Segment is represented by the MEC (2011) Pumphouse and Rancho del Rio sites, which are evaluated together given the similarity in habitat and fish composition. As discussed by MEC (2011), total habitat quantity is abundant for most species and lifestages between 500 and 1,500 cfs based on PHABSIM habitat versus flow relationships. This essentially means that the maximum habitat, or the peak of the habitat – flow relationship, for each species life stage occurs somewhere along this continuum of flow. The maximum flow within this range reduces the amount of habitat for the majority of species life stages, especially the brown trout juvenile and fry life stages that provide the foundation for a robust trout fishery. A minimum flow between 500 and 750 cfs balances an adequate amount of habitat for all species and lifestages.

A minimum flow of 500 cfs established during the winter period from September 16th to May 14th will maintain sufficient levels of habitat for all life stages of brown trout and rainbow trout at both the Pumphouse and Rancho del Rio sites. When placed in the context of water

availability, 500 cfs will provide sufficient levels of habitat during the base flow period that represents a bottleneck for adult trout in terms of metabolic constraints and survival. Based on the PHABSIM modeling, a minimum flow of 500 cfs will result in approximately 90% and 82% of the maximum total weighted usable habitat for adult brown trout and adult rainbow trout, respectively in the Blue River to Piney River Segment.

A minimum flow of 600 cfs during the spring/early summer period from May 15th to July 31st will provide less than the maximum amount of total weighted usable habitat. When the 600 cfs ISF level is placed in the context of both the brown trout and rainbow trout habitat – flow relationships, approximately 91% and 88% of the maximum total weighted usable area will be available to the trout fishery, respectively. An ISF of 600 cfs during the summer provides adequate habitat for juvenile brown trout, and juvenile rainbow trout. Based on the habitat – flow relationships for adult brown trout, the maximum total weighted usable area occurs at approximately 750 cfs at both the Pumphouse and Rancho del Rio sites. The SG recommendation also includes an ISF level that maximizes brown trout habitat for a six week period during late summer from August 1st to September 15th, which represents a key time of the year in terms of aquatic life stress.

The SG's recommended flows seek to balance the habitat among the three trout life stages – adult, fry and juvenile. Stream flows greater than a 750 cfs, which maximizes adult brown trout habitat, would also begin to decrease the amount of fry and juvenile habitat. Thus, it is important to consider the multiple trout life stages, because the recruitment of young fish into the adult population is important in maintaining a healthy fishery.

When the 600 cfs and 750 cfs levels are placed in the context of the optimum adult mountain whitefish habitat range, 500 cfs to 1,100 cfs, these flows will provide a sufficient amount of habitat for all of the life stages at the Pumphouse Site. Similarly, a 600 cfs and 750 cfs flow at the Rancho del Rio Site will provide a suitable amount of habitat for juveniles and fry, but less than the optimal range of habitat for adult mountain whitefish which occurs from approximately 1,500 cfs to 3,000 cfs. At the Rancho del Rio Site, the physical habitat available to adult mountain whitefish is considerably different than the habitat at the Pumphouse Site; however increasing an ISF level to achieve a greater amount of habitat for adult mountain whitefish at the Rancho del Rio Site would decrease the available habitat for other species and their life stages.

Flannelmouth sucker habitat was modeled at the Rancho del Rio Site, despite only comprising <1% of the fish sampled at the Radium Site, in 2008. This reach of the Colorado River is near the upstream extent of the flannelmouth sucker, as the current distribution is documented to extend upstream to near Glenwood Springs, CO (Bezzerides and Bestgen 2002). The amount of available habitat at flows between 500 and 750 cfs is sufficient to maintain the current population of flannelmouth suckers which is near the upstream extent of its distribution.

Segment 2: Piney River to Cabin Creek

The Piney River to Cabin Creek Segment represents a slight change in the hydrological conditions of the Colorado River given the additional inflows from the Piney River. Typically, the Piney River contributes about an additional 10% of flow above what is measured in the

Colorado River at the Kremmling gage, approximately 24 miles upstream. This additional flow is relatively constant on a seasonal basis and does not appreciably change the shape of the hydrograph. For example, the timing of spring runoff and the timing of the peak flows do not appreciably change in the Colorado River with the addition of Piney River flow. This is generally not the case with the proposed third ISF segment – Cabin Creek to Eagle River. Hydrological inputs from Cabin Creek and other tributaries downstream to the confluence with the Eagle River increase the flows in the Colorado River by approximately 25%. The additional flows in the most downstream segment also change the timing of runoff, such that runoff occurs slightly earlier in the calendar year. The change in hydrological and hydraulic conditions in the Colorado River from State Bridge downstream to Dotsero was one of the primary reasons for creating two ISF segments in this reach. The Piney River to Cabin Creek Segment also represents a transition zone for the recreational fishing ORV. The Bureau of Land Management (BLM) recognizes that the recreational fishing ORV extends downstream to Red Dirt Creek, near McCoy, approximately 7 miles downstream of the confluence with the Piney River.

To evaluate the biological instream flow needs, this segment was represented by the Rancho del Rio River2D site (MEC 2011). The Rancho Del Rio site is approximately 4 miles upstream of the confluence with the Piney River. Given the Rancho Del Rio information was considered in the development of the instream flow for the Blue River to Piney River Segment, the SG believes that the upstream ISF values provided a starting point for the Piney River to Cabin Creek ISF Segment but should be increased given the additional flow contributions to the river.

A minimum flow of 525 cfs during the winter period from September 16th to May 14th will maintain sufficient levels of available habitat for all life stages of brown trout and rainbow trout at the Rancho del Rio Site. Based on the PHABSIM modeling, a minimum flow of 525 cfs will result in approximately 87% and 78% of the maximum total weighted usable habitat for adult brown trout and adult rainbow trout, respectively in the Piney River to Cabin Creek Segment.

A minimum flow of 650 cfs during the summer period from May 15th to July 31st will provide approximately 88% of the maximum amount of habitat available to brown trout at the Rancho Del Rio Site. A flow of 650 cfs in this reach will also provide 86% of the maximum amount of habitat available to rainbow trout at the Rancho Del Rio Site. A minimum flow of 800 cfs during the late summer period from August 1st to September 15th will provide approximately 91% of the maximum amount of habitat available to brown trout at the Rancho Del Rio Site. A flow of 800 cfs will also provide 94% of the maximum amount of habitat available to rainbow trout at the Rancho Del Rio Site.

When the recommended ISF levels for the Piney River to Cabin Creek Segment are placed in the context of the Rancho Del Rio Site mountain whitefish habitat-flow relationships, a suitable amount of habitat will be available for juveniles and fry, but less than the optimal range will be available for the adult mountain whitefish. Similarly, for the flannelmouth sucker, flows between 525 cfs and 800 cfs will be sufficient to maintain the current population of flannelmouth suckers which is near the upstream extent of its distribution.

Segment 3: Cabin Creek to Point Immediately Upstream of Eagle River

The Cabin Creek to Eagle River Segment is represented by the Lyon's Gulch PHABSIM modeling site (MEC 2011). As discussed by MEC (2011), total habitat quantity is abundant for most species and lifestages between 500 and 1,500 cfs based on PHABSIM habitat versus flow relationships for this segment.

A minimum flow of 650 cfs during the winter period, September 16th to May 14th, will provide adequate amounts of habitat for all species and life stages during this base flow period. A 650 cfs flow during the winter period will provide approximately 89% and 94%, of the maximum total weighted usable habitat for adult brown trout and adult rainbow trout, respectively. A 650 cfs flow will also provide an adequate amount of habitat for fry and juvenile of each trout species. Again the adult brown trout and adult rainbow trout life stages were the primary species and life stage considered for this lower segment, although the mountain whitefish, speckled dace, and sucker species, including the flannelmouth sucker, were also considered. These other species comprised a larger component of the fish assemblage as compared to the upstream reach (CDOW 2010). However, as discussed above, the winter period is the most critical period for adult trout in terms of metabolic constraints and survival; thus, a 650 cfs flow should be protective of the adult trout during the winter period.

A minimum flow of 900 cfs established during the spring runoff and early summer period, May 15th to June 15th, will provide approximately 99% of the maximum total weighted usable habitat for both the adult brown trout and adult rainbow trout at the Lyon's Gulch Site. This flow level also provides an abundant amount of habitat for the adult mountain whitefish and adult flannelmouth sucker.

A minimum flow of 800 cfs during the mid to late summer period will provide approximately 97% and 98% of the maximum total weighted usable habitat, for adult brown trout and adult rainbow trout, respectively . This flow level balances the trout life stages during the summer months, a time when growth and development occurs for the younger life stages and adults.

Hydrologic Data and Analysis

During the development of the alternative management plan, the SG relied upon two hydrological data sets to establish flow-based resource guides. The SG evaluated both historical and future simulated flow conditions at three points of reference along the Upper Colorado River, from Kremmling downstream to Dotsero. The Kremmling gage (09058000) provided the upstream reference point for the Blue River to Piney River Segment, the Kremmling gage plus the Piney gage (09059500) provided a reference point for the Piney River to Cabin Creek Segment, and lastly – the Dotsero gage (0907050) minus the Eagle gage (09070000) provided a downstream reference point for the Cabin Creek to Eagle River Segment. The period of record from April 1st 1983 to March 31st 2006, 24 years, was selected to characterize the historical flow conditions for all three points of reference along the Upper Colorado River.

Using each data set (historic and future), the geometric mean value and the upper and lower 95% confidence intervals were calculated for each day of the year. These figures characterize the

central tendency of flows on a daily basis for the entire period of record without the distorting effects of rare high magnitude flood events.

Although staff typically only uses historic flow conditions to determine whether water is available for an instream flow recommendation, staff understands that the future simulated flows were utilized by the SG in the development of a consensus recommendation. Since all of the recommended flow amounts fall below the historic geometric mean or within the 95% confidence intervals at all three reference points, CWCB staff considers water to be available for appropriation. (See figures 1-3 below).

The SG also evaluated simulated flows to characterize possible future flow scenarios at all three points of reference along the Upper Colorado River. Briefly, future water demands of the East Slope, Grand and Eagle counties were imposed on the undepleted flows of the Upper Colorado River to construct a future hydrological scenario. The undepleted flows used in the model represented the period of record from April 1st 1947 to March 31st 1991, 44 years.

The SG also identified dry year conditions as occurring 25% of the time over the period of record for the Kremmling gage, based on the cumulative annual flow that passes the gage. This evaluation resulted in 6 years being characterized as dry year conditions for the historical period (e.g. 1992, 1994, 2001 through 2004), and 11 years for the simulated future flows. As such, these dry year conditions provide a reference for low flow levels in the Upper Colorado River at the Kremmling gage.

This subset of dry year conditions was also evaluated using the geometric mean. These hydrographs are noticeably different from the entire period of record hydrographs in that peak flows do not occur until late summer given the absence of snowpack driven runoff that is typically observed in early June. It is also apparent that modeled future dry conditions may be very similar to historical dry periods based on the similar shape of the hydrographs. During the historical winter base flow conditions, the lower 95% confidence interval ranged from approximately 300 cfs to 450 cfs, and the modeled future flows show a similar range.

It should be mentioned that the use of the future simulated flows discussed above resulted in some recommended flows which are significantly below the historic geometric mean and the lower 95% confidence interval, and in some cases the recommendations are below the 25 percentile value of daily flows. This is atypical of most ISF recommendations, which normally fall within the 95% geometric mean confidence bands. However, the Management Plan provides for voluntary measures to provide additional flows during these dry periods, which is not generally part of a typical ISF recommendation.

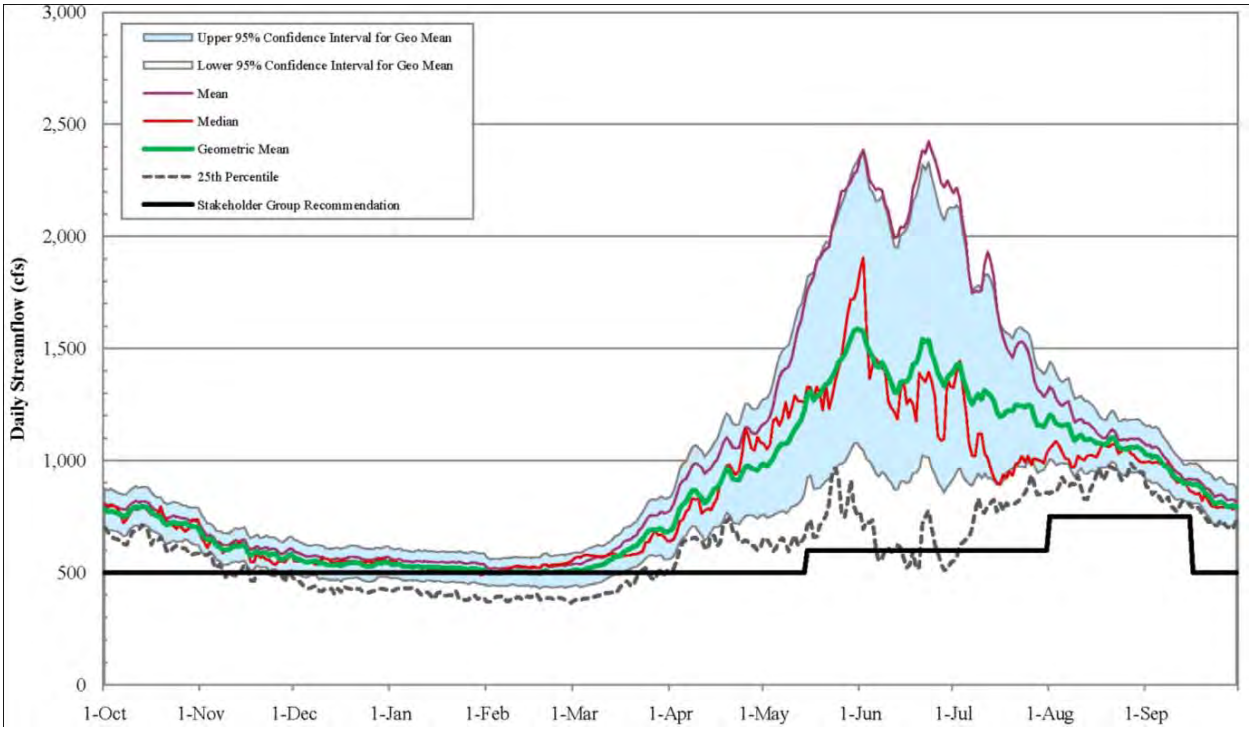


Figure 1 - Blue River to Piney River ISF summary; hydrograph based on the Kremmling gage (09058000).

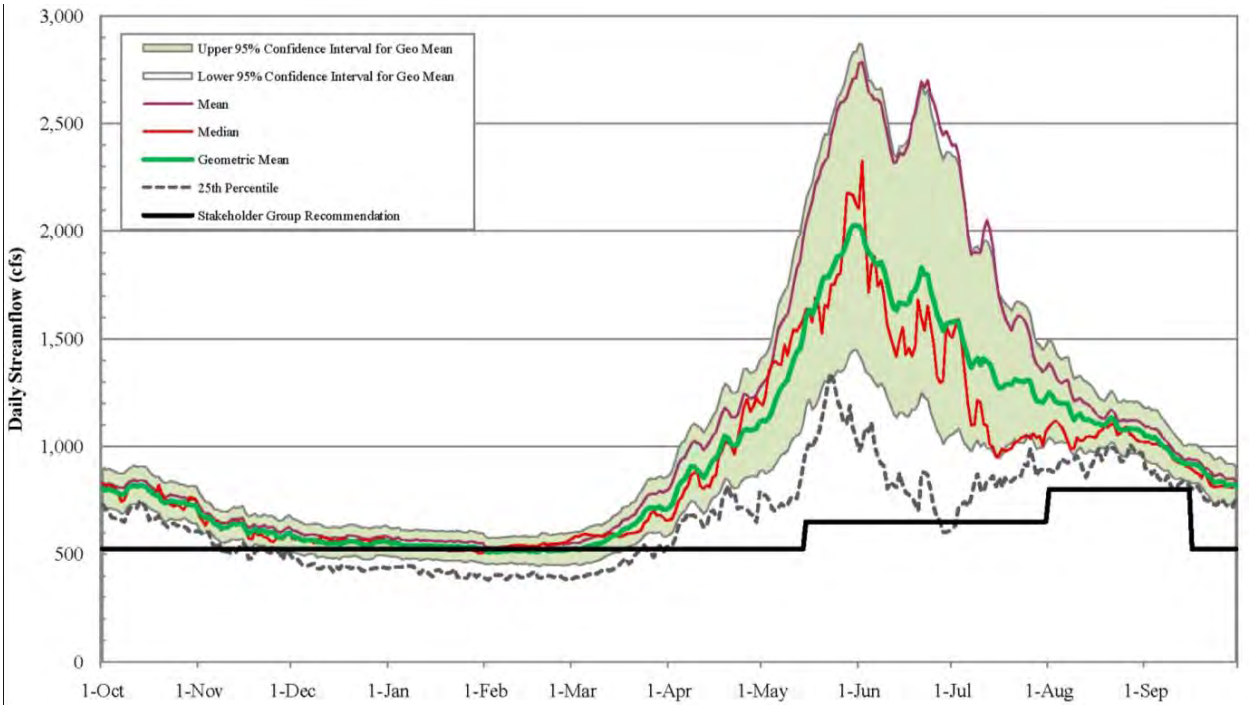


Figure 2 - Piney River to Cabin Creek ISF summary; hydrograph based on the Kremmling gage (09058000) plus the Piney River gage (09059500).

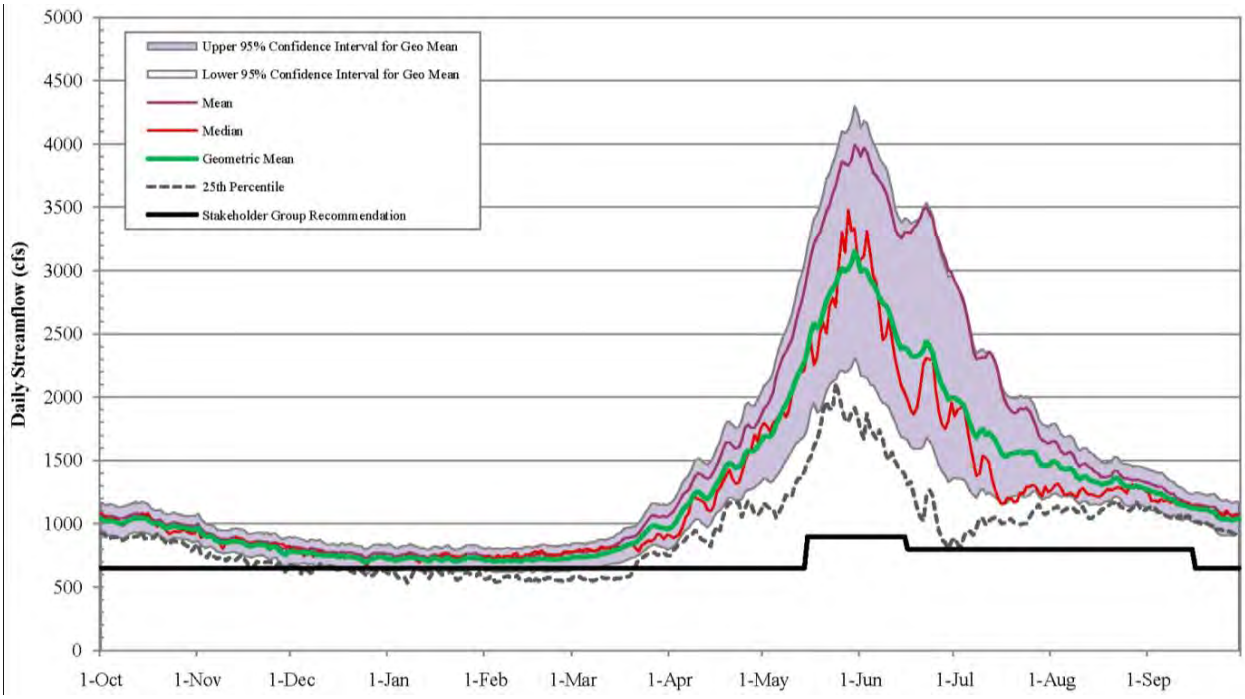


Figure 3 - Cabin Creek to Eagle River ISF summary; hydrograph based on the Dotsero gage (09070500) minus the Eagle River gage (09070000).

CWCB Staff's Instream Flow Recommendation

Staff recommends the Board form its intent to appropriate on the following stream reaches:

Segment: Confluence with Blue River to Confluence with Piney River

Upper Terminus: CONFLUENCE WITH BLUE RIVER
(Latitude 40° 02' 33.25"N) (Longitude 106° 23' 53.24"W)
UTM North: 4433418.29 UTM East: 380728.87
PLSS: NW NE S19 T1N R80W 6th PM
360' South of the North Section Line, 2100' West of the East Section Line

Lower Terminus: CONFLUENCE WITH PINEY RIVER
(Latitude 39° 51' 18.59"N) (Longitude 106° 38' 30.5"W)
UTM North: 44129714.89 UTM East: 359556.85
PLSS: NW NW S25 T2S R83W 6th PM
1307' South of the North Section Line, 1226 East of the West Section Line

Watershed: Colorado headwaters (HUC#: 14010001**)**
Counties: Grand & Eagle
Length: 23.7 miles
USGS Quad(s): Kremmling, Sheephorn Mountain, Radium, McCoy, State Bridge
Flow Recommendation: 500 cfs (September 16 – May 14)
600 cfs (May 15 – July 31)
750 cfs (August 1 –September 15)

Segment: Confluence with Piney River to Confluence with Cabin Creek

Upper Terminus: CONFLUENCE WITH PINEY RIVER
(Latitude 39° 51' 18.59"N) (Longitude 106° 38' 30.5"W)
UTM North: 44129714.89 UTM East: 359556.85
PLSS: NW NW S25 T2S R83W 6th PM
1307' South of the North Section Line, 1226 East of the West Section Line

Lower Terminus: CONFLUENCE WITH CABIN CREEK
(Latitude 39° 52' 28.61"N) (Longitude 106° 53' 35.85"W)
UTM North: 4415556.15 UTM East: 338088.78
PLSS: SE SE S15 T2S R85W 6th PM
444' North of the South Section Line, 737' West of the East Section Line

Watershed: Colorado headwaters (HUC#: 14010001**)**
Counties: Eagle
Length: 20.8 miles
USGS Quad(s): State Bridge, McCoy, Blue Hill, Burns North, Burns South
Flow Recommendation: 525 cfs (September 16 – May 14)
650 cfs (May 15 – July 31)
800 cfs (August 1 –September 15)

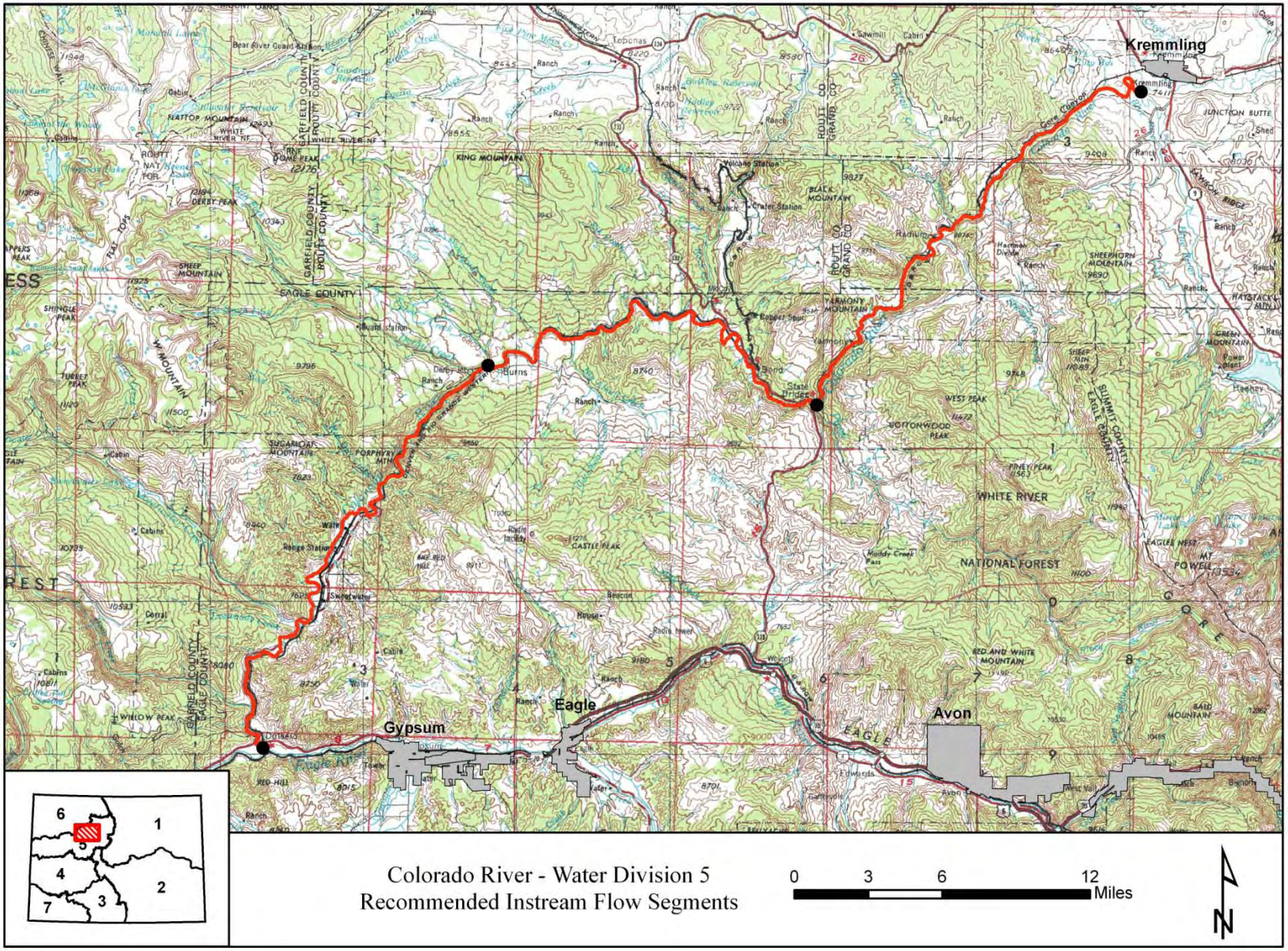
Segment: Confluence with Cabin Creek to Point Immediately Upstream of Confluence with Eagle River

Upper Terminus: CONFLUENCE WITH CABIN CREEK
(Latitude 39° 52' 28.61"N) (Longitude 106° 53' 35.85"W)
UTM North: 4415556.15 UTM East: 338088.78
PLSS: SE SE S15 T2S R85W 6th PM
444' North of the South Section Line, 737' West of the East Section Line

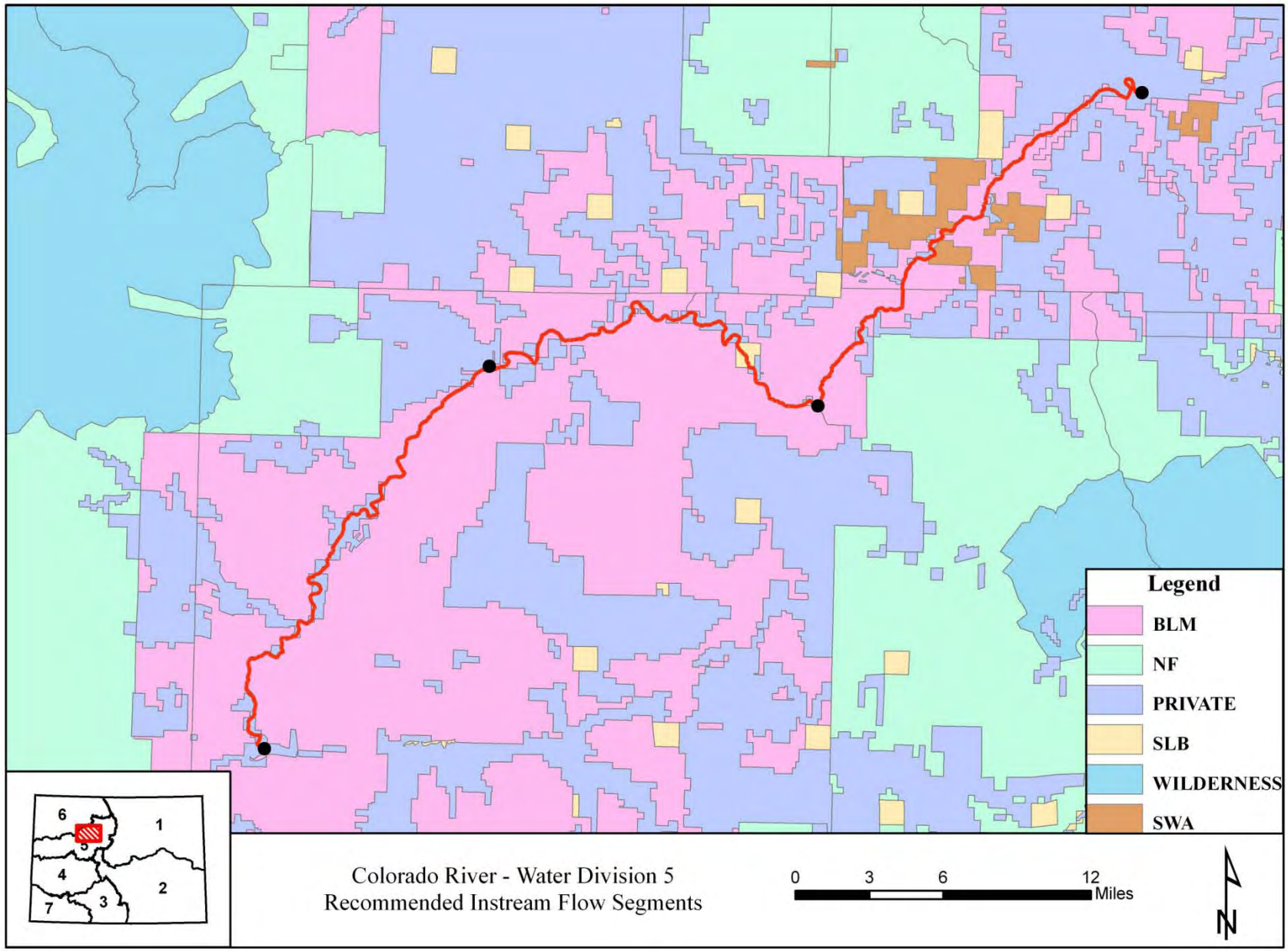
Lower Terminus: POINT IMMEDIATELY UPSTREAM OF CONFLUENCE WITH EAGLE RIVER
(Latitude 39° 38' 48.33"N) (Longitude 107° 03' 30.05"W)
UTM North: 4390576.79 UTM East: 323390.88
PLSS: SW NE S5 T5S R86W 6th PM
2319' South of the North Section Line, 2186 West of the East Section Line

Watershed: Colorado headwaters (HUC#: 14010001**)**
Counties: Eagle
Length: 25.0 miles
USGS Quad(s): Burns South, Sugarloaf Mountain, Dotsero
Flow Recommendation: 650 cfs (September 16 – May 14)
900 cfs (May 15 – June 15)
800 cfs (June 16 –September 15)

Vicinity Map



Land Use Map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Colorado River - Water Division 5
Recommended Instream Flow Segments
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June 30, 2011

Ms. Jennifer Gimbel, Director
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Re: Supplemental Information to Stakeholder Group's May 13 Recommendation on Upper Colorado River Wild and Scenic Alternative Management Plan Instream Flow

Dear Ms. Gimbel,

By letter dated May 13, 2011, the Stakeholder Group for the Upper Colorado River Wild and Scenic Alternative Management Plan (SG Plan) submitted a consensus recommendation for instream flow right appropriations in the Colorado River between Kremmling and Dotsero. The Stakeholder Group (SG) recommendation was presented to the Board as an informational item during its May 2011 meeting in Durango and elicited questions from the Board members. This letter confirms the SG recommendation as conveyed in its May 13 submittal (Attachment A hereto), provides a more detailed explanation of the SG's recommendation and technical rationale (Attachment B), and provides written feedback in response to questions raised by the Board.

Board members asked questions regarding the relationship between the recommended instream flow rights filing and adoption by the BLM and U.S. Forest Service of the SG Plan as an alternative to a determination on suitability under the Wild and Scenic Rivers Act. The SG recommended approach set forth below attempts to honor deadlines that were negotiated under the SG Plan, while at the same time preserving the Board's ability to decide on a course of action that is responsive to the BLM and U.S. Forest Service's approval process. The SG requests the Board adopt the following, to be incorporated as part of the record of Board deliberations:

> "The CWCB directs the filing in 2011 of an application for this right. The CWCB will seek to defer the prosecution of the filed application until formal federal approval of the SG Plan without material change. If the water court declines to defer prosecution of the CWCB application, then the State will consult with the SG and seek a recommendation from the SG on a further course of action. Following consultation, the CWCB will take one of the following actions: (1) prosecution of the ISF application seeking a decree upon agency approval of the SG Plan; (2) withdrawal of the ISF application; or (3) any other action unanimously agreed upon by the SG and the CWCB. If the CWCB withdraws the application but the SG Plan is subsequently adopted by the federal agencies, then the CWCB will promptly file a new ISF application for the same amounts and subject to the same conditions. Nothing herein is intended to limit the discretion of the CWCB to make or respond to other ISF filings."

Finally, while not discussed during the Board's May 2011 meeting, a question has arisen within the SG regarding the relationship between the instream flow filings and potential water rights filings in connection with the proposed Colorado River Cooperative Agreement between Denver Water and certain west slope entities. The SG has arrived at the following consensus approach, which the SG requests be adopted and reflected in the record of Board deliberations:

a. The CWCB direct its staff and counsel to file the ISF application in 2011.
b. In order for any Colorado River Cooperative Agreement (CRCA) application made in 2011 to be senior in priority to the ISF filing, the CWCB will claim an appropriation date within 2011 for the ISF that is junior to the appropriation date claimed in any CRCA application made in 2011. The CWCB is willing to make this accommodation because the contemplated CRCA application(s) is/are intended to provide environmental benefits within the Colorado River basin.
c. The CWCB direct its staff and counsel to work cooperatively with the SG and the parties to the CRCA to address material conflicts, if any, that may arise between the ISF and CRCA applications if the CRCA application(s) cannot reasonably be filed in 2011.

Thank you for your continued support of the SG activities. If you have any questions regarding the supplemental information in this letter, please contact Rob Buirgy at (970) 690-4655 or rbuirgy@gmail.com.

Sincerely,

Rob R. Buirgy, Project Manager

462 Blue Lake Trail
Lafayette, CO 80026
(970) 690-4655

Two Enclosures: Stakeholder Group's May 13, 2011 Recommendation Letter
Upper Colorado River Wild and Scenic Instream Flow Summary Recommendation

cc: Ted Kowalski
Linda Bassi
Jeff Baessler
Susan Schneider

May 13, 2011

Ms. Jennifer Gimbel, Director
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Dear Ms. Gimbel,

The Stakeholder Group for the Upper Colorado River Wild and Scenic Alternative Management Plan (Plan) is submitting this revised letter to transmit the Stakeholder Group (SG) recommendation for instream flows for the Colorado River. This letter supersedes our letter dated May 5, 2011, and incorporates the most current agreement among the stakeholders. This recommendation for instream flows addresses segments of the mainstem of the Upper Colorado River between Kremmling and Dotsero. These stream reaches were included in a U.S. Bureau of Land Management Wild and Scenic Rivers Act study conducted as part of the federal Land Management Plan revision process. It is that process which prompted formation of the SG and development of the Alternative Management Plan that is proposed in lieu of potential designation under the Wild and Scenic Rivers Act. One of the Plan's four primary long-term resource protection measures is a consensus recommendation from the SG to the CWCB for appropriation of instream flows (ISFs) pursuant to C.R.S. 37-92-102.

This recommendation is the product of a substantial effort by diverse SG interests to develop a consensus ISF recommendation for minimum flows that, when combined with other aspects of the Plan, the SG believes will preserve the natural environment to a reasonable degree while accommodating the needs of the various SG interests. This recommendation is supported by the individual staff members and representatives of the Plan's stakeholders but has yet to be approved by the governing boards of all stakeholder entities.

The SG consensus ISF recommendation is as follows:

<u>Blue River confluence to Piney River confluence</u>

Sept 16 -May 14	500 cfs
May 15 -July 31	600 cfs
Aug 1 -Sept 15	750 cfs

<u>Piney River confluence to Cabin Creek confluence</u>

Sept 16 -May 14	525 cfs
May 15 -July 31	650 cfs
Aug 1 -Sept 15	800 cfs

<u>Cabin Creek confluence to a point immediately upstream of the Eagle River confluence</u>

Sept 16 -May 14	650 cfs
May 15 -Jun 15	900 cfs
Jun 16 -Sept 15	800 cfs

The SG's recommendation for and support of this ISF is conditioned upon inclusion of the concepts set forth below within the CWCB's Declaration of Intent to Appropriate, water court application(s), and proposed decree(s):

1) This ISF is a unique ISF appropriation in that it is recommended by the consensus of a diverse stakeholder group under a local management plan designed to help protect resources of "outstanding remarkable value" that have been identified by the Bureau of Land Management and the United States Forest Service. This ISF is also unique because it involves the mainstem of the Colorado River, the relative size of that river, the current level of water supply development, the level of use for recreational fishing purposes, and the river's overall importance to the State of Colorado. The terms of this appropriation are part of a compromise and settlement and are unique circumstances that shall not establish any precedent and shall not be construed as a commitment to include any specific findings of fact, conclusions of law or administrative practices in future appropriations.

2) Pursuant to section 37-92-102(3)(b), C.R.S. (2010), this instream flow appropriation shall be subject to the present uses or exchanges of water being made by other water users, pursuant to appropriation or practices in existence on the date of this appropriation. The CWCB will apply this provision if the proponent provides adequate documentation and verification of present uses and exchanges.

3) During any period identified by the Upper Colorado River Commission in a finding issued pursuant to Article VIII(d)(8) of the Upper Colorado River Basin Compact of 1948 for curtailment of Colorado River basin water uses within Colorado, which the State of Colorado has agreed to implement in a manner that impacts water diversions within Water Division 5, the CWCB agrees that this ISF water right will be administered in accordance with compact curtailment rules adopted by the State of Colorado that are then in effect, if any. If no such compact curtailment rules are then in effect, it is the intent of the CWCB that this instream flow right will not be administered during the period of any such compact curtailment.

4) The CWCB agrees not to file a statement of opposition to adjudications of water rights made after the date of this filing that: (1) result in depletions that do not exceed 100 acre feet; or (2) are for changes of water rights that do not seek to change more than 2,500 acre feet, provided such changes of water rights do not involve an exchange through the subject ISF reaches; and (3) do not exceed a 1% depletive effect on the instream flow right decreed herein in accordance with the *de minimis* Rule 8e of the Rules Concerning the Instream Flow and Natural Lake Level Program. This term and condition does not preclude the CWCB from enforcing this ISF appropriation in accordance with the priority system. The CWCB may also evaluate applications for water rights made after the date of this filing to determine whether they are appropriate for application of the Injury with Mitigation Rule 8i.(3) of the Rules Concerning the Instream Flow and Natural Lake Level Program.

5) It is the intent of the CWCB that this ISF provide protection of the natural environment only to the extent authorized by state statute as against adjudications of water rights made after the date of this filing. The CWCB intends that the ISF water right decreed herein is not appropriate for consideration as a streamflow standard in other administrative or regulatory permitting contexts.

In addition, the SG consensus recommendation recognizes the ability of the CWCB to revisit its findings related to its determination of the amount of water necessary to preserve the natural environment to a reasonable degree if the Plan is no longer in effect.

If you have any questions regarding this recommendation, please contact Rob Buirgy at (970) 690-4655 or rbuirgy@gmail.com.

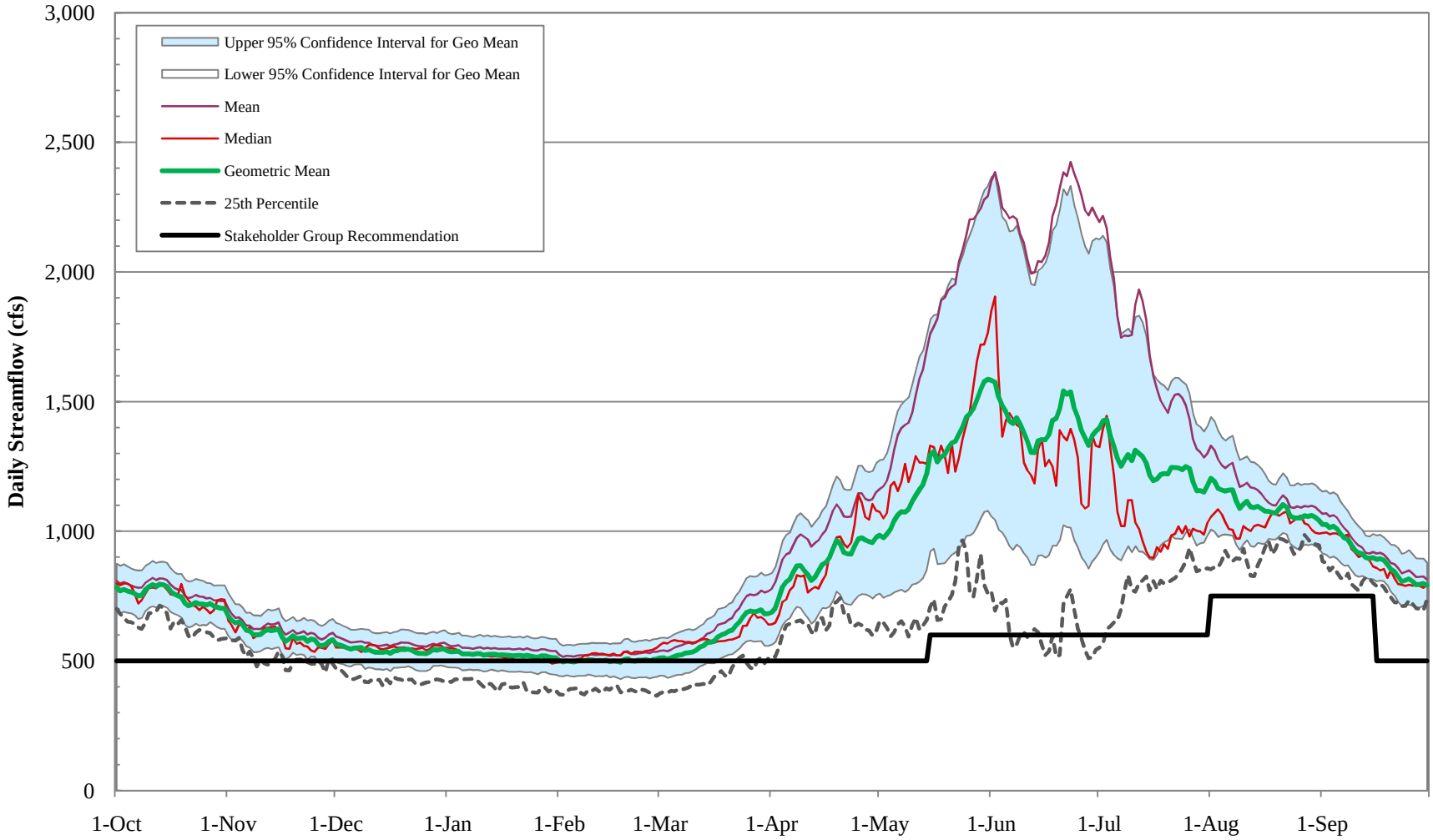
Sincerely,

Rob R. Buirgy, Project Manager

Enclosures (3)

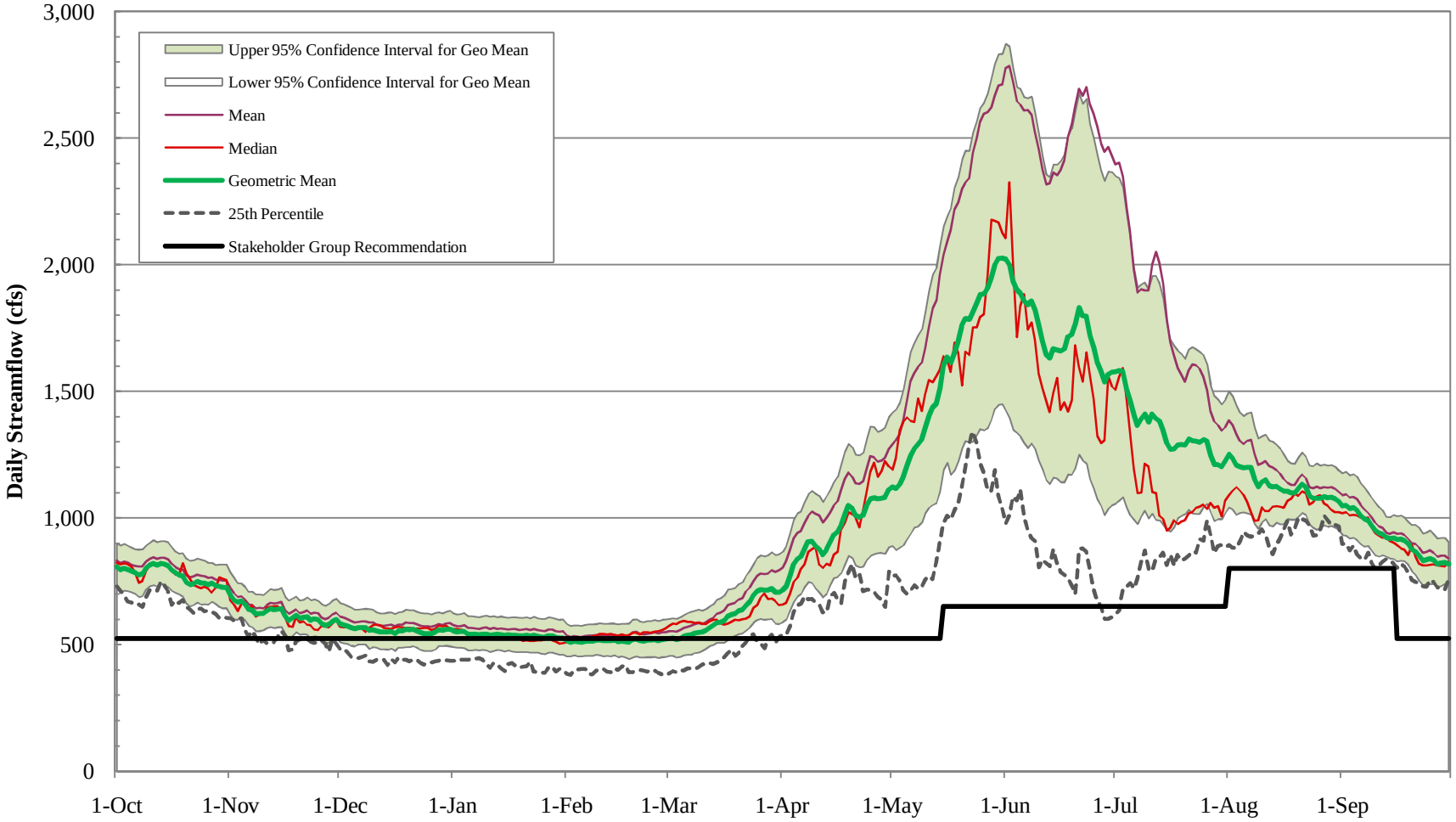
cc: Ted Kowalski
Linda Bassi
Jeff Baessler
Susan Schneider

Figure 1
Daily Streamflow Statistics and Stakeholder Group ISF Recommendation
Colorado River near Kremmling (USGS 09058000)



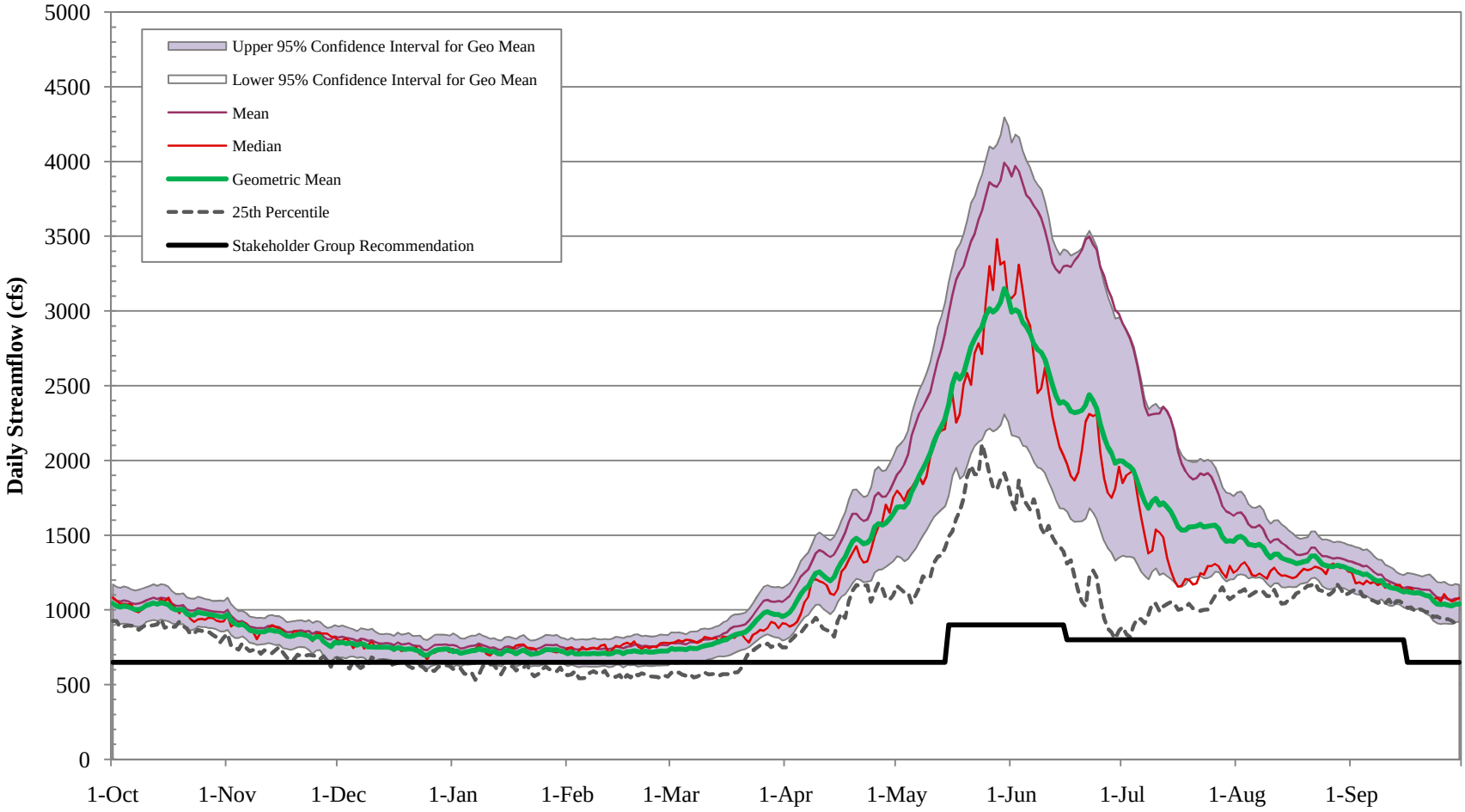
Note:
The Upper Colorado River Wild & Scenic Alternative Management Plan Stakeholder Group recommendation applies to the stream reach from the confluence of the Colorado River and the Blue River to the confluence with the Colorado River and the Piney River.

Figure 2
Daily Streamflow Statistics and Stakeholder Group ISF Recommendation
Colorado River near Kremmling (USGS 09058000) + Piney River near State Bridge (USGS 09059500)



Note:
The Upper Colorado River Wild & Scenic Alternative Management Plan Stakeholder Group recommendation applies to the stream reach from the confluence of the Colorado River and the Piney River to the confluence with the Colorado River and Cabin Creek.

Figure 3
Daily Streamflow Statistics and Stakeholder Group ISF Recommendation
Colorado River near Dotsero (USGS 09070500) - Eagle River below Gypsum (USGS 09070000)



Note:
The Upper Colorado River Wild & Scenic Alternative Management Plan Stakeholder Group recommendation applies to the stream reach from the confluence of the Colorado River and Cabin Creek to a point immediately upstream of the confluence with the Colorado River and the Eagle River.

Stream: Colorado River

Executive Summary

Water Division: 5
Water District: 100
CDOW#: 21262 & 19637

Segment: Blue River to Piney River

Upper Terminus: Blue River
Latitude: 40º 02’ 33.2”N Longitude: 106º 23’ 52.1"
WNW NE S19 T1N R80W 6PM

Lower Terminus: Piney River
Latitude: 39º 51’ 17.9”N Longitude: 106º 38’ 31.6"W
SW NW S25 T2S R83W 6PM

Counties: Grand and Eagle
Length: 23.7 miles

ISF Appropriation Amounts:

500 cfs	September 16th to May 14th
600 cfs	May 15th to July 31st
750 cfs	August 1st to September 15th

Segment: Piney River to Cabin Creek

Upper Terminus: Piney River
Latitude: 39º 51’ 17.9”N Longitude: 106º 38’ 31.6"W
SW NW S25 T2S R83W 6PM

Lower Terminus: Cabin Creek
Latitude: 39º 52’ 29.2”N Longitude: 106º 53’ 37.1"W
SE SE S15 T2S R85W 6PM

County: Eagle
Length: 20.8 miles

ISF Appropriation Amounts:

525 cfs	September 16th to May 14th
650 cfs	May 15th to July 31st
800 cfs	August 1st to September 15th

Segment: Cabin Creek to a point Immediately upstream of the Confluence with the Eagle River

Upper Terminus: Cabin Creek

Latitude: 39º 52’ 29.2”N Longitude: 106º 53’ 37.1"W
SE SE S15 T2S R85W 6PM

Lower Terminus: Eagle River

Latitude: 39º 38’ 46.5”N Longitude: 107º 03’ 28.8"W
SW NE S5 T5S R86W 6PM

County: Eagle
Length: 25.0 miles

ISF Appropriation Amounts:

650 cfs	September 16th to May 14th
900 cfs	May 15th to June 15th
800 cfs	June 16th to September 15th

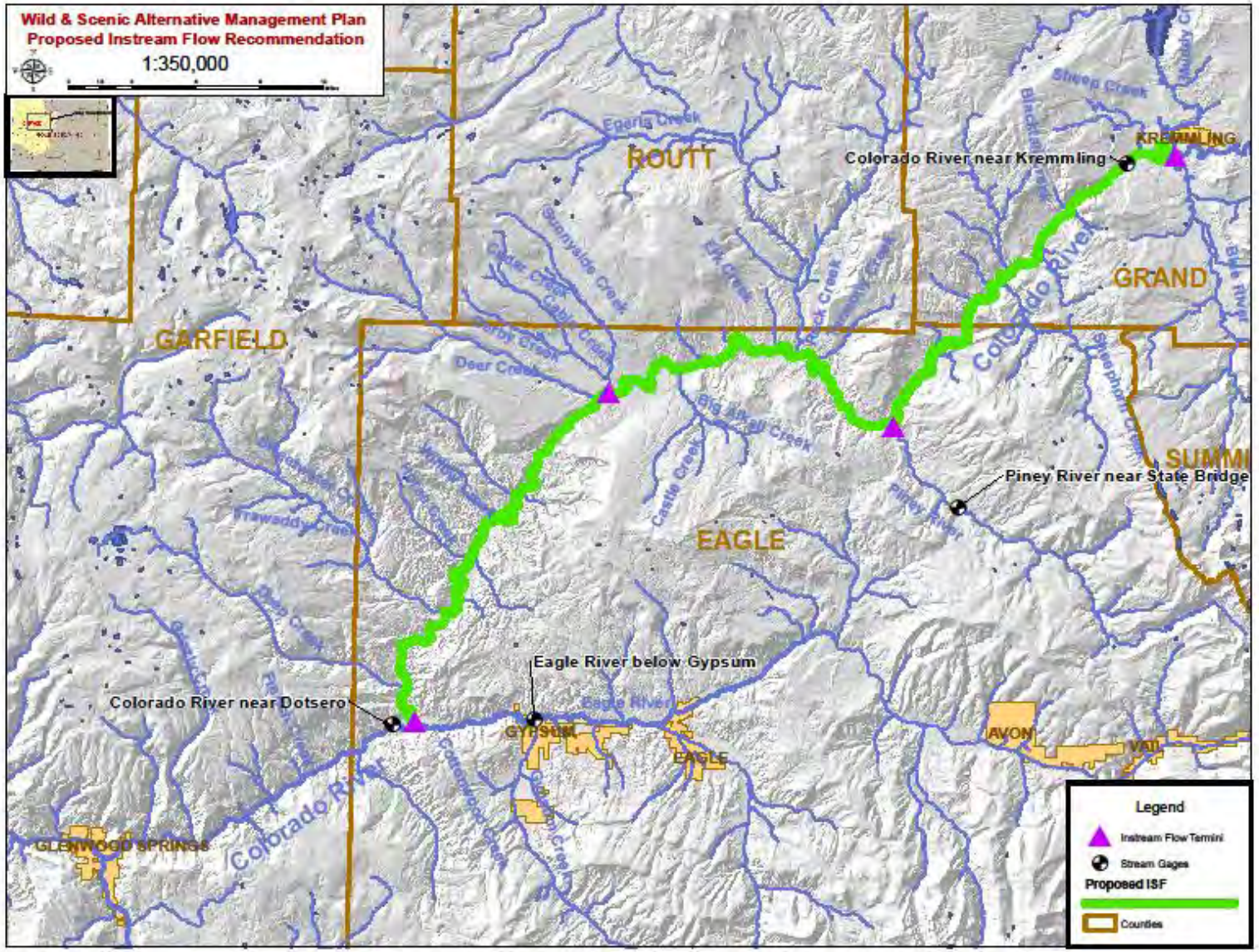


Figure 1: Map of the Colorado River from the confluence of the Blue River to the confluence of the Eagle River, with relevant streamflow gages.

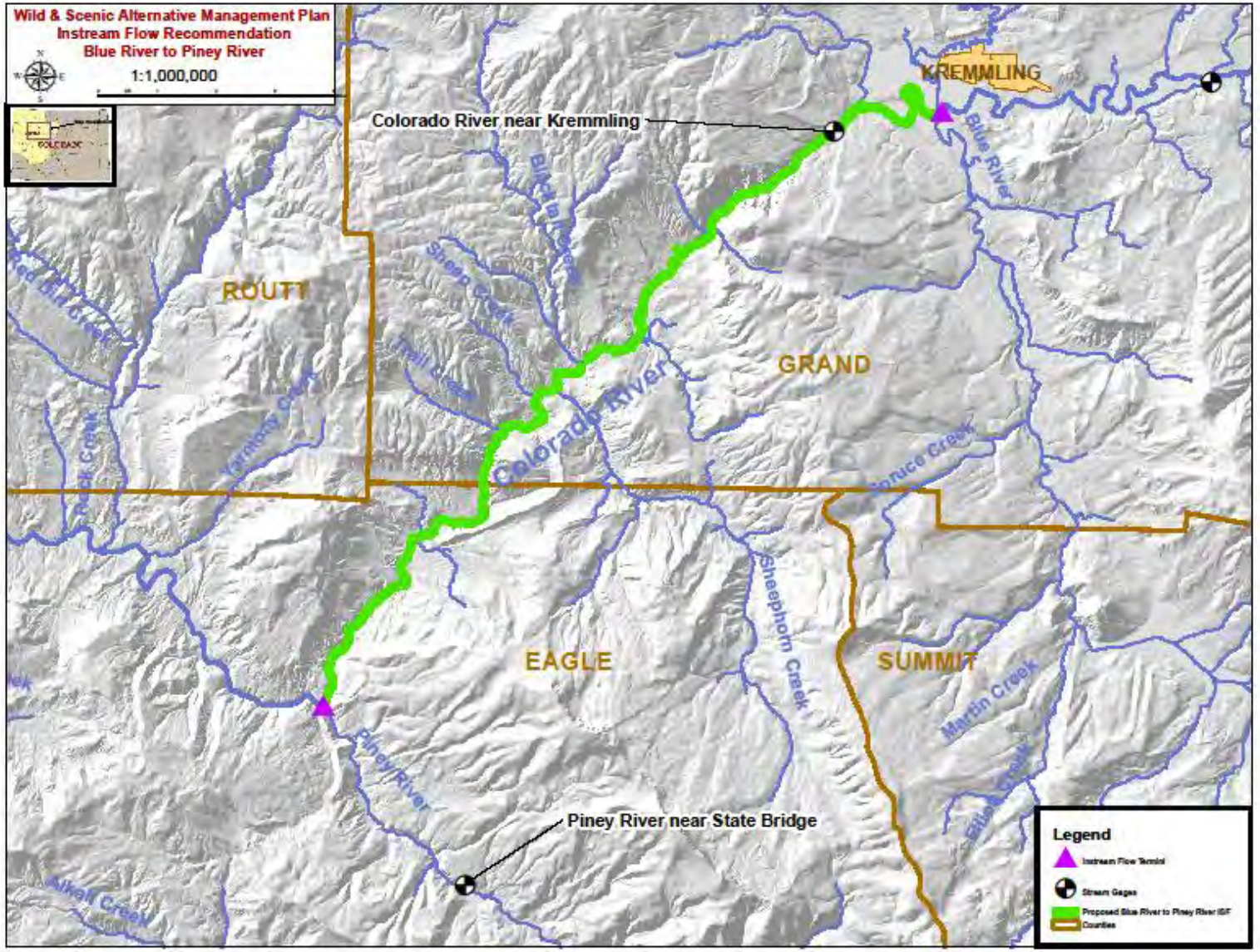


Figure 2: Map of the Colorado River ISF segment from the confluence with the Blue River to the confluence with the Piney River.

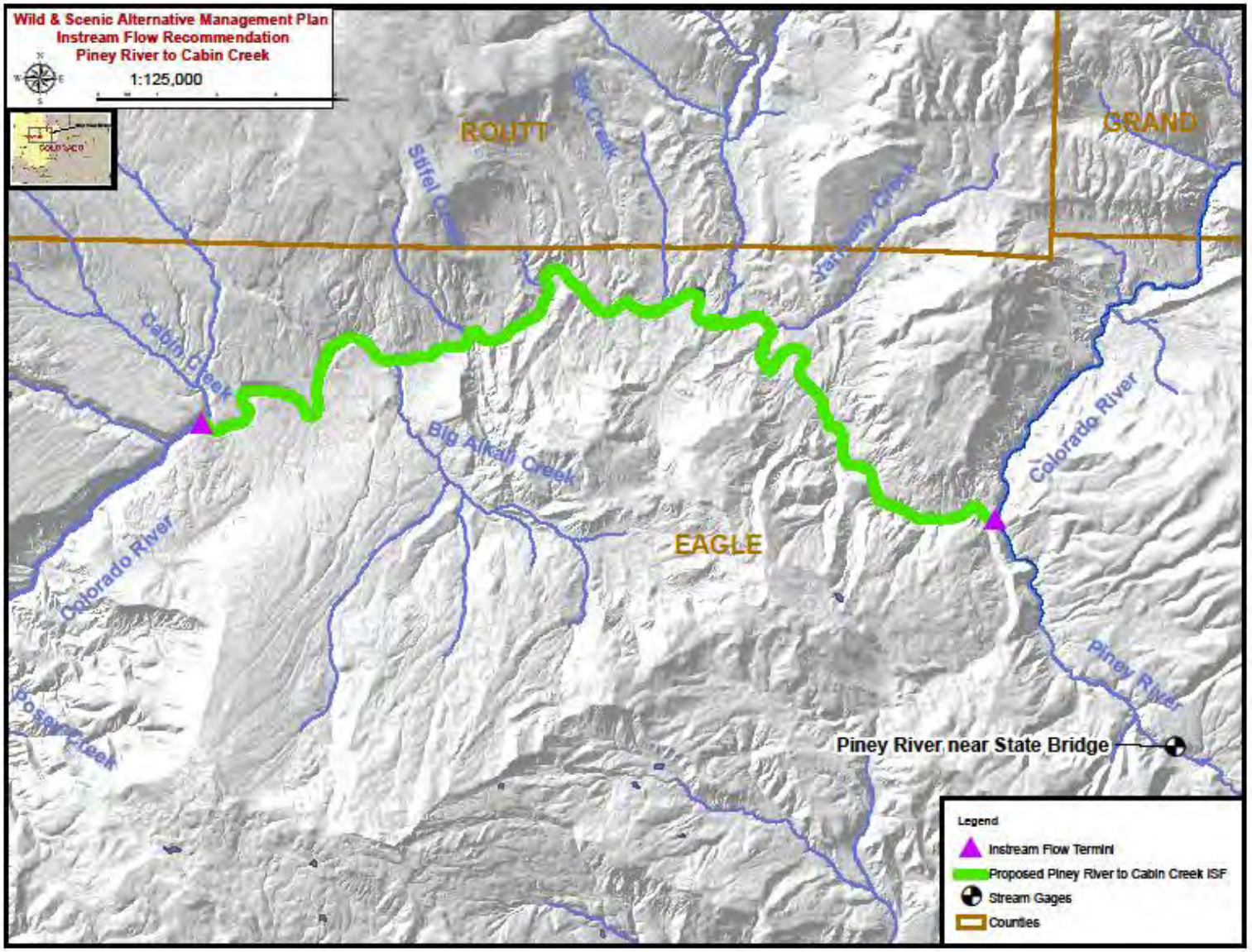


Figure 3: Map of the Colorado River ISF segment from the confluence with the Piney River to the confluence with Cabin Creek.

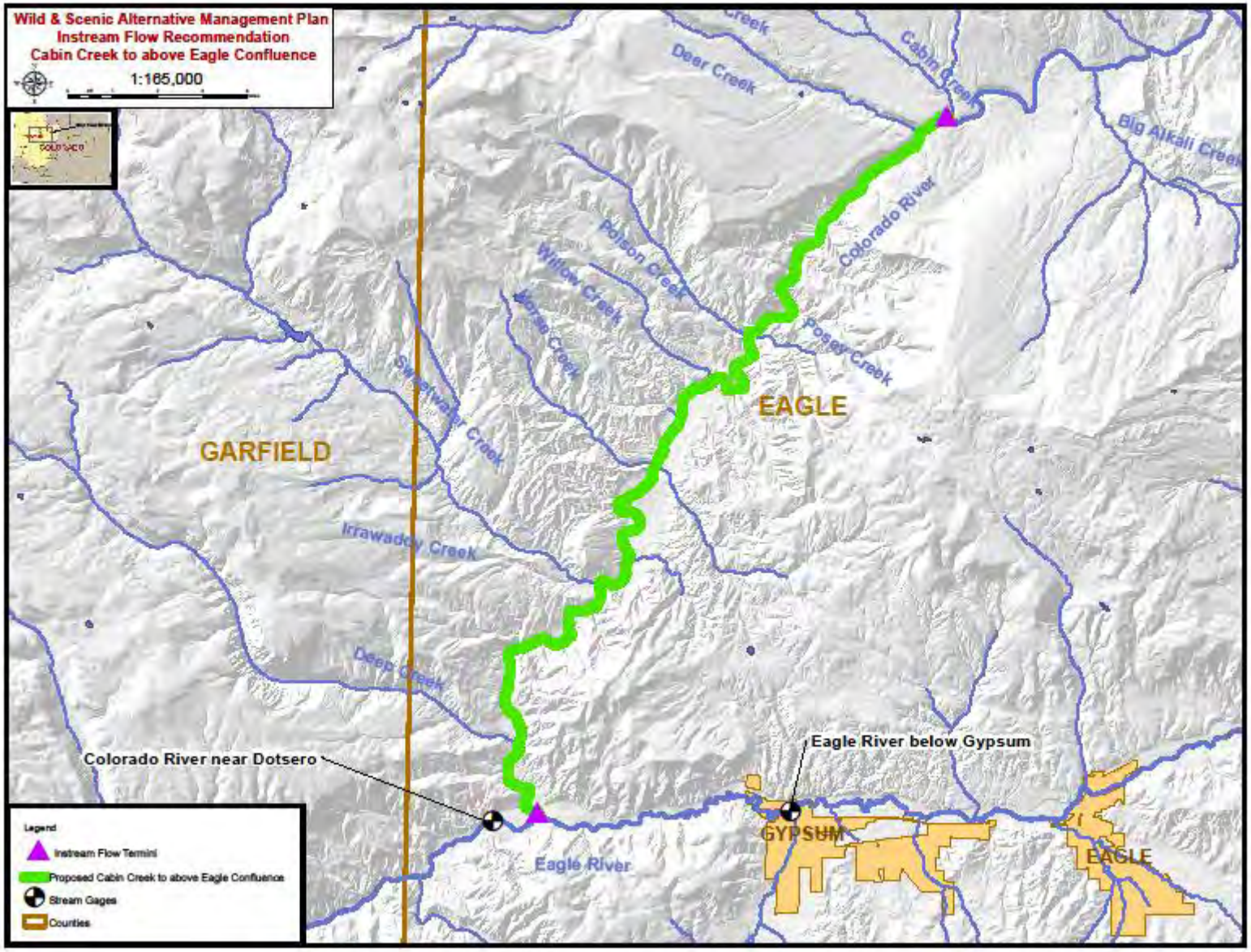


Figure 4: Map of the Colorado River ISF segment from the confluence with Cabin Creek to the confluence with the Eagle River.

Enclosure 1

Background Information

The Upper Colorado River Wild and Scenic Stakeholder Group (SG) represents a diverse range of interests who have worked together since 2008 to develop a management plan to protect the outstandingly remarkable values (ORVs) in the Colorado River from Kremmling downstream to the forest service boundary east of Glenwood Springs. The management plan includes long term protective measures and voluntary cooperative measures to protect the fishery and the recreational fishing ORV in the Upper Colorado River from Kremmling downstream to Dotsero.

The information presented in this summary forms the basis for the instream flow (ISF) recommendation to be considered by the Colorado Water Conservation Board (CWCB). It is the SG's opinion that the information contained in this report is sufficient to support the findings required by CWCB Rule 5(i). The SG recommends three segments of the Upper Colorado River for inclusion into the State of Colorado's Instream Flow Program.

The total reach of the Upper Colorado River that is considered for this ISF appropriation is 69.5 miles long (Figure 1). The reach begins at the confluence with the Blue River, near the town of Kremmling, at an elevation of approximately 7,300 feet and ends at a point immediately upstream of the confluence of the Eagle River at an elevation of approximately 6,100 feet. Given the different biological and hydrological characteristics along the length of this Upper Colorado River reach, the SG has divided this reach into three segments 1) Blue River to Piney River Segment, 2) Piney River to Cabin Creek Segment, and 3) Cabin Creek to Eagle River Segment (lower termini immediately upstream of the confluence with the Eagle River). Portions of the Blue River to Piney River Segment are located in both Grand and Eagle counties (Figure 2), while the entire Piney River to Cabin Creek and Cabin Creek to Eagle River segments are located in Eagle County (Figures 3 and 4). The Blue River to Piney River Segment represents 23.7 river miles; the Piney River to Cabin Creek Segment represents 20.8 river miles and the Cabin Creek to Eagle River Segment represents 25.0 river miles.

Fish Species of Interest, Sensitive Species and Species of Special Concern

The Upper Colorado River from Kremmling, Colorado downstream to Dotsero, Colorado is known to provide habitat for 14 fish species, with brown trout, rainbow trout, mountain whitefish and flannelmouth sucker being the key species of interest for the Physical Habitat Simulation (PHABSIM) modeling (MEC 2011) as selected by the Colorado Division of Wildlife (CDOW). The change in fish habitat in response to changes in flow was modeled for these species and some of their life stages at three locations in the Upper Colorado River: Pumphouse Site, Rancho del Rio Site, and Lyons Gulch Site. The Pumphouse and Rancho

del Rio sites are located on the Colorado River between the Blue River and Piney River and the Lyons Gulch Site is located on the Colorado River between Cabin Creek and the Eagle River.

The nonnative brown trout and rainbow trout provide the majority of the recreational fishing opportunities in the Upper Colorado River reach from Kremmling downstream to Dotsero. At a site sampled in 2008 near Radium (Blue River to Piney Segment), brown trout and rainbow trout comprised 45% and 2% of the fish sampled, respectively (Table 1, CDOW 2010). At a site sampled in 2008 from Cottonwood to Lyons Gulch (Cabin Creek to Eagle River Segment), brown trout and rainbow trout comprised 19% and <1% of the fish sampled (Table 1, CDOW 2010). Brown trout reproduce naturally in the Colorado River and its tributaries, while the rainbow trout population has been supplemented by stocking since the onset of whirling disease greatly reduced their populations. Beginning in 2008 and continuing in 2009, a whirling disease resistant strain of rainbow trout was stocked throughout the Colorado River mainstem with the intent to increase survival and reproduction of these fish in the future.

Table 1: Percent catch and total number of fish collected at two sites in the study area, sampled in 2008 (CDOW 2010).

Species / Hybrid Names	Radium Station	Cottonwood to Lyon's Gulch
Colorado River cutthroat trout	<1	--
Colorado River rainbow trout	--	<1
cutthroat x rainbow trout hybrid	<1	--
brown trout	45	19
rainbow trout	2	<1
brook trout	--	--
mountain whitefish	8	12
mottled sculpin	<1	<1
roundtail chub	--	<1
speckled dace	2	10
bluehead sucker	<1	<1
flannelmouth sucker	<1	3
longnose sucker	10	23
white sucker	32	33
white x flannelmouth sucker hybrid	<1	<1
white x longnose sucker hybrid	<1	<1
northern pike	<1	--
Total # Collected	1,782	1,347

Mountain whitefish, which are native in Colorado only to the Yampa River and White River drainages (Schisler 2010), comprised 8% and 12% of the fish sampled at the Radium and Cottonwood to Lyons Gulch sites sampled in 2008, respectively (Table 1, CDOW 2010). Speckled dace are native fish to the Colorado River drainage, and comprised 2% and 10% of the fish sampled at the Radium and Cottonwood to Lyons Gulch sites sampled in 2008, respectively (Table 1, CDOW 2010). Flannelmouth suckers comprised <1% and 3% of the fish sampled at the Radium and Cottonwood to Lyons Gulch sites sampled in 2008, respectively (Table 1, CDOW 2010). Similarly, the bluehead sucker comprised <1% of the fish sampled from both the Radium Site and from Cottonwood to Lyons Gulch. A brief life history discussion is provided for selected species in the Upper Colorado River ISF segments.

Brown trout

Brown trout (*Salmo trutta*) are native to Europe and western Asia (Scott and Crossman 1973). This species was brought to Colorado and other Rocky Mountain states in the late 1880s (Belica 2007); the introduced fish were a mix of stocks from England, Scotland, and Germany (Behnke 2002). Brown trout are often the dominant trout species in lower elevation mountain streams (Belica 2007), but large streams characterized by variable habitat can allow rainbow trout to coexist with brown trout (Behnke 2002). Although they can tolerate sluggish flows, brown trout do not require slow water velocities (Scott and Crossman 1973). This species spawns in October and November, when water temperatures reach approximately 7°C (Scott and Crossman 1973; Behnke 2002). Like other trout species, brown trout bury their eggs in redds in shallow, gravel-bottomed streams (Scott and Crossman 1973; Behnke 2002). Brown trout typically reach adult lengths of 16 inches (Scott and Crossman 1973), but in smaller, relatively unproductive streams, they usually do not exceed 10 inches (Behnke 2002). Brown trout are carnivorous, but their diet changes in response to food availability. They consume large amounts of stream invertebrates, but they also eat frogs, fish, and rodents (Scott and Crossman 1973; Behnke 2002; Belica 2007). Brown trout begin to transition to a piscivorous diet at approximately 6 inches in length; at a length of 12 inches, brown trout are almost entirely piscivorous if sufficient prey fish are present (Scott and Crossman 1973; Belica 2007). Piscivorous brown trout tend to be larger and longer-lived than those that eat mostly invertebrates (Behnke 2002).

Rainbow trout

The native range of the rainbow trout (*Oncorhynchus mykiss*) is the eastern Pacific Ocean and streams west of the Rocky Mountains; this range stretches from Baja California north to the Kuskokwim River in Alaska (Scott and Crossman 1973). However, rainbow trout have been introduced worldwide and are common in Colorado (Bernstein and Montgomery 2008). Rainbow trout inhabit small to moderately large streams with gravel substrates and riffle-pool morphology. They also inhabit lakes, but require streams for successful reproduction (Scott and Crossman 1973, Bernstein and Montgomery 2008). Rainbow trout spawn when water temperatures exceed 6-7°C, so timing is variable; in coastal areas, spawning occurs in

January or February, but in colder regions, it occurs as late as June (Behnke 2002). Fertilized eggs are buried in redds, or nests excavated by the female (Scott and Crossman 1973; Bernstein and Montgomery 2008). Female rainbow trout reach sexual maturity between 2 and 6 years of age, and an average adult length for resident stream rainbow trout is 12-18 inches (Behnke 2002; Bernstein and Montgomery 2008). Rainbow trout mainly consume drifting invertebrates, but larger individuals will also eat small fish, eggs, and an occasional rodent (Scott and Crossman 1973; Bernstein and Montgomery 2008).

Mountain whitefish

Mountain whitefish (*Prosopium williamsoni*) is native to western North America; its range stretches from the Lahontan Basin in the south through British Columbia in the north (Scott and Crossman 1973). In Colorado, mountain whitefish are not native south of the Green River Drainage of the Colorado River Basin (Behnke 2002), but they have been successfully introduced outside of their natural range. Mountain whitefish prefer large rivers, and are most commonly associated with open channel habitat and deeper water (Behnke 2002), but they can also utilize pool habitats in smaller, turbid streams (Scott and Crossman 1973). Mountain whitefish can tolerate higher turbidity and temperatures than many other trout species (Behnke 2002). Mountain whitefish typically grow to a maximum length of 8-12 inches and reach sexual maturity between ages 3 and 6. Spawning occurs in winter and can extend into January or February in large systems where temperatures are more stable (Scott and Crossman 1973, Behnke 2002). Mountain whitefish are broadcast spawners that do not build nests (Scott and Crossman 1973). The diet of the mountain whitefish is predominantly benthic invertebrates (Scott and Crossman 1973), but the species is also opportunistic and will feed on fish eggs, fish, and invertebrates on the water's surface (Scott and Crossman 1973, Behnke 2002).

Flannelmouth sucker

Historically, the flannelmouth sucker (*Catostomus latipinnis*) was commonly found in most, if not all, medium to large, lower elevation rivers of the Upper Colorado River drainage (upstream of Glen Canyon Dam). Within the State of Colorado, flannelmouth sucker are present in the Colorado River and numerous tributaries including the Gunnison River up to the Aspinall Unit reservoirs (Bezzerides and Bestgen 2002), the Uncompahgre River (Sigler and Miller 1963) and the Dolores River. Flannelmouth suckers are typically found in slower, warmer rivers in plateau regions of the Colorado River drainage (Deacon and Mize 1997). They usually inhabit the mainstem of moderate to large rivers but are occasionally found in small streams. This species frequents pools and deep runs but can also be found in the mouths of tributaries, riffles, and backwaters. Flannelmouth sucker typically spawn in the Upper Colorado River basin between April and June (McAda 1977, McAda and Wydoski 1980, Snyder and Muth 1990, Tyus and Karp 1990).

Bluehead sucker

This bluehead sucker (*Catostomus discobolus*) is found in a large variety of river systems ranging from large rivers with discharges of several thousand cfs to small creeks with less

than a couple of cfs (Smith 1966). Adult bluehead suckers exhibit a strong preference for specific habitat types (Holden and Stalnaker 1975). This species has been reported to typically be found in runs or riffles with rock or gravel substrate (Vanicek 1967, Holden and Stalnaker 1975, Carlson et al. 1979, Sublette et al. 1990). The bluehead sucker is known to feed on invertebrates, which have their highest densities in riffles. Although the species generally inhabits streams with cool temperatures, bluehead suckers have been found inhabiting small creeks with water temperatures as high as 82.4° F (Smith 1966).

Roundtail chub

Historically, roundtail chub (*Gila robusta*) were known to commonly occur in most medium to large tributaries of the Upper Colorado River Basin (Vanicek 1967, Holden and Stalnaker 1975, Joseph et al. 1977). Roundtail chub historically occurred in lower elevation (below 7,546 ft.) streams, including the Colorado, Dolores, Duchesne, Escalante, Green, Gunnison, Price, San Juan, San Rafael, White, and Yampa rivers (Bezzerides and Bestgen 2002). Roundtail chub are often found in stream reaches that have a complexity of pool and riffle habitats (Bezzerides and Bestgen 2002). Adults are found in eddies and pools adjacent to strong current and use instream boulders as cover (Sigler and Sigler 1996, Brouder et al., 2000). Roundtail chub begin spawning when water temperatures reach about 65°F (Vanicek and Kramer 1969, Joseph et al. 1977). In most Colorado River tributaries this increase in temperature coincides with a decrease in discharge after peak runoff (Bezzerides and Bestgen 2002).

Instream Flow Recommendations

The SG recommends an instream flow of 600 cfs from May 15th to July 31st (spring/summer), 750 cfs from August 1st to September 15th (late summer), and 500 cfs from September 16th to May 14th (fall/winter) for the Blue River to Piney River Segment. For the Piney River to Cabin Creek Segment, the SG recommends an instream flow of 650 cfs from May 15th to July 31st (spring/summer), 800 cfs from August 1st to September 15th (late summer), and 525 cfs from September 16th to May 14th (fall/winter). For the Cabin Creek to Eagle River Segment, the SG recommends an instream flow of 900 cfs from May 15th to June 15th (spring/early summer), 800 cfs from June 16th to September 15th (summer), and 650 cfs from September 16th to May 14th (fall/winter).

These instream flow recommendations are the result of a review of the physical habitat – flow relationships, hydrological conditions, and a compromise among the SG entities on the recommended minimum instream flow necessary to preserve the natural environment to a reasonable degree. The above instream flow recommendations consider the physical habitat – flow relationships, primarily for the adult trout life stage as presented in the MEC Instream Flow Report (2011) provided to the CWCB, although other native fish data were considered, in addition to water availability constraints. These flows are a component of the SG Plan to support the recreational fishing ORV. The instream flow levels are within the range of flow from 500 cfs to 1,500 cfs that provide abundant habitat for most species and lifestages (MEC 2011).

Recommendations for minimum flows are based on PHABSIM relationships as reported by MEC (2011) and an evaluation of total weighted usable habitat and the relative quality of habitat available for all species and life stages modeled. Emphasis is placed on total habitat availability for the adult nonnative brown trout and rainbow trout, which provide the majority of the recreational value, although fry and juvenile trout life stages were also weighted more heavily than other species. Mountain whitefish and flannelmouth sucker were also considered in this evaluation. An effort was made to establish minimum instream flow recommendations that would provide adequate habitat for all life stages of these native species.

Blue River to Piney River Segment

The Blue River to Piney River Segment is represented by the MEC (2011) Pumphouse and Rancho del Rio sites, which are evaluated together given the similarity in habitat and fish composition. As discussed by MEC (2011), total habitat quantity is abundant for most species and lifestages between 500 and 1,500 cfs based on PHABSIM habitat versus flow relationships. This essentially means that the maximum habitat, or the peak of the habitat – flow relationship, for each species life stage occurs somewhere along this continuum of flow. The maximum flow within this range reduces the amount of habitat for the majority of species life stages, especially the brown trout juvenile and fry life stages that provide the foundation for a robust trout fishery. A minimum flow between 500 and 750 cfs balances an adequate amount of habitat for all species and lifestages.

A minimum flow of 500 cfs established during the winter period from September 16th to May 14th will maintain sufficient levels of habitat for all life stages of brown trout and rainbow trout at both the Pumphouse and Rancho del Rio sites. When placed in the context of water availability, 500 cfs will provide sufficient levels of habitat during the base flow period that represents a bottleneck for adult trout in terms of metabolic constraints and survival. Based on the PHABSIM modeling, a minimum flow of 500 cfs will result in approximately 90% and 82% of the maximum total weighted usable habitat for adult brown trout and adult rainbow trout, respectively in the Blue River to Piney River Segment (Figures 5 – 8).

A minimum flow of 600 cfs during the spring/early summer period from May 15th to July 31st will provide less than the maximum amount of total weighted usable habitat (Figure 5 and Figure 6). When the 600 cfs ISF level is placed in the context of both the brown trout and rainbow trout habitat – flow relationships (Figures 5 – 8), approximately 91% and 88% of the maximum total weighted usable area will be available to the trout fishery, respectively. An ISF of 600 cfs during the summer provides adequate habitat for juvenile brown trout (Figure 5 and Figure 6), and juvenile rainbow trout (Figure 7 and Figure 8). Based on the habitat – flow relationships for adult brown trout (Figure 5 and Figure 6), the maximum total weighted usable area occurs at approximately 750 cfs at both the Pumphouse and Rancho del Rio sites. The SG recommendation also includes an ISF level that maximizes brown trout

habitat for a six week period during late summer from August 1st to September 15th, which represents a key time of the year in terms of aquatic life stress.

The SG's recommended flows seek to balance the habitat among the three trout life stages – adult, fry and juvenile. Stream flows greater than a 750 cfs, which maximizes adult brown trout habitat, would also begin to decrease the amount of fry and juvenile habitat. Thus, it is important to consider the multiple trout life stages, because the recruitment of young fish into the adult population is important in maintaining a healthy fishery.

When the 600 cfs and 750 cfs levels are placed in the context of the optimum adult mountain whitefish habitat range, 500 cfs to 1,100 cfs, these flows will provide a sufficient amount of habitat for all of the life stages at the Pumphouse Site (Figure 9). Similarly, a 600 cfs and 750 cfs flow at the Rancho del Rio Site will provide a suitable amount of habitat for juveniles and fry, but less than the optimal range of habitat for adult mountain whitefish which occurs from approximately 1,500 cfs to 3,000 cfs (Figure 10). At the Rancho del Rio Site, the physical habitat available to adult mountain whitefish is considerably different than the habitat at the Pumphouse Site; however increasing an ISF level to achieve a greater amount of habitat for adult mountain whitefish at the Rancho del Rio Site would decrease the available habitat for other species and their life stages.

Flannelmouth sucker habitat was modeled at the Rancho del Rio Site, despite only comprising <1% of the fish sampled at the Radium Site, in 2008. This reach of the Colorado River is near the upstream extent of the flannelmouth sucker, as the current distribution is documented to extend upstream to near Glenwood Springs, CO (Bezzerides and Bestgen 2002). The amount of available habitat at flows between 500 and 750 cfs is sufficient to maintain the current population of flannelmouth suckers which is near the upstream extent of its distribution.

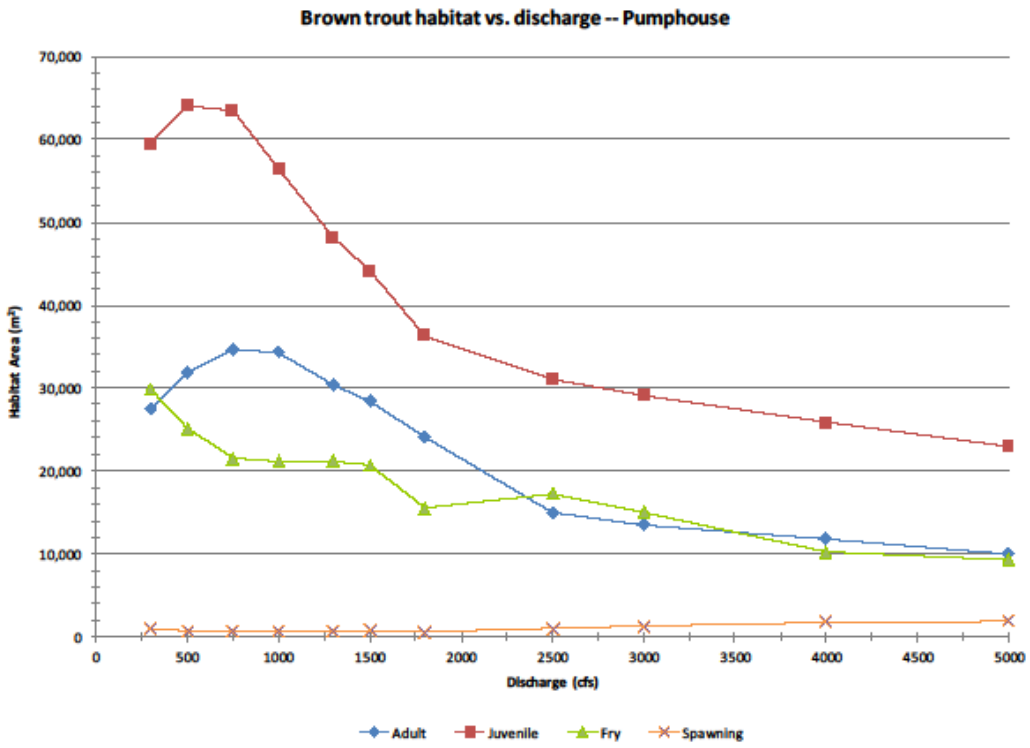


Figure 5: Brown trout habitat versus discharge at the Pumphouse Site (MEC 2011).

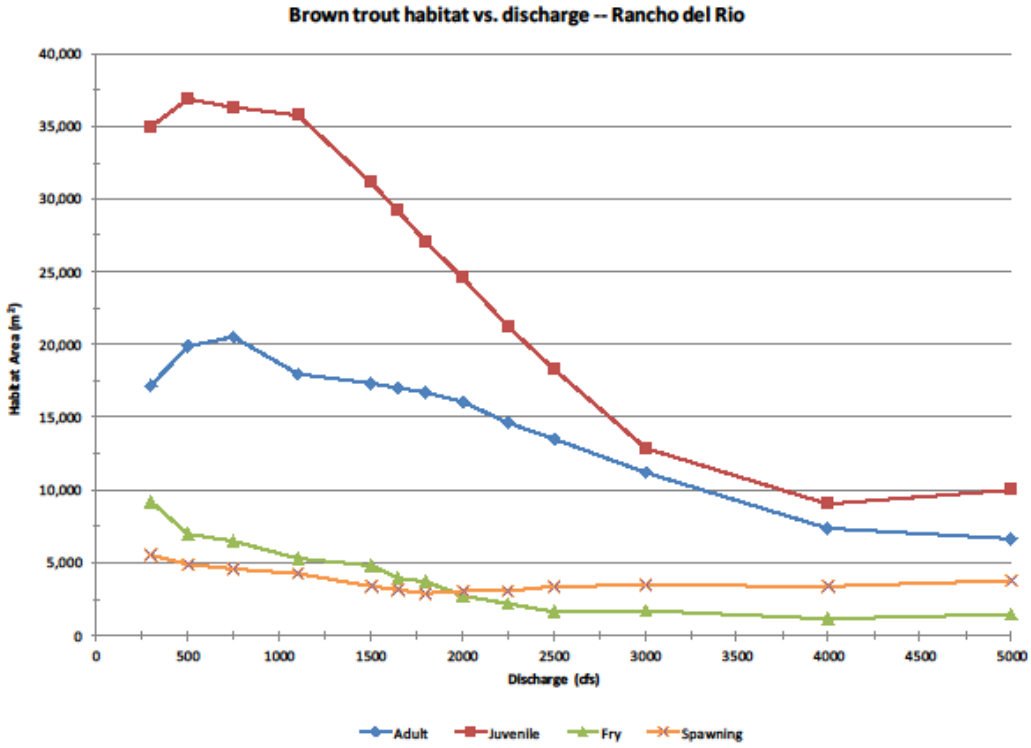


Figure 6: Brown trout habitat versus discharge at the Ranch del Rio Site (MEC 2011).

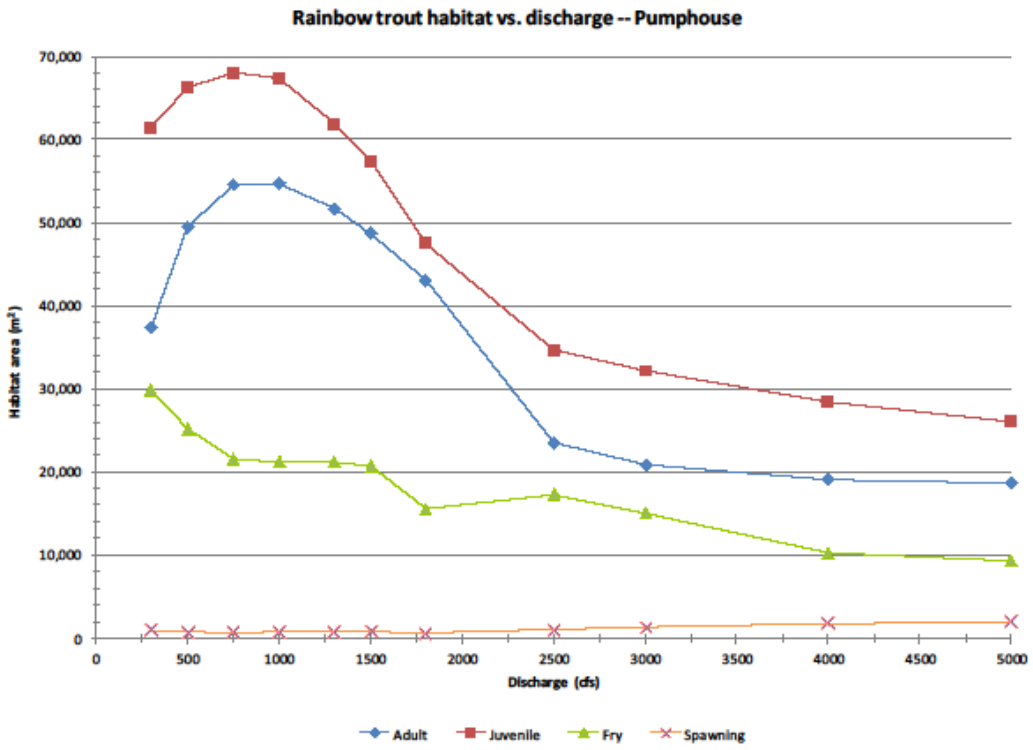


Figure 7: Rainbow trout habitat versus discharge at the Pumphouse Site (MEC 2011).

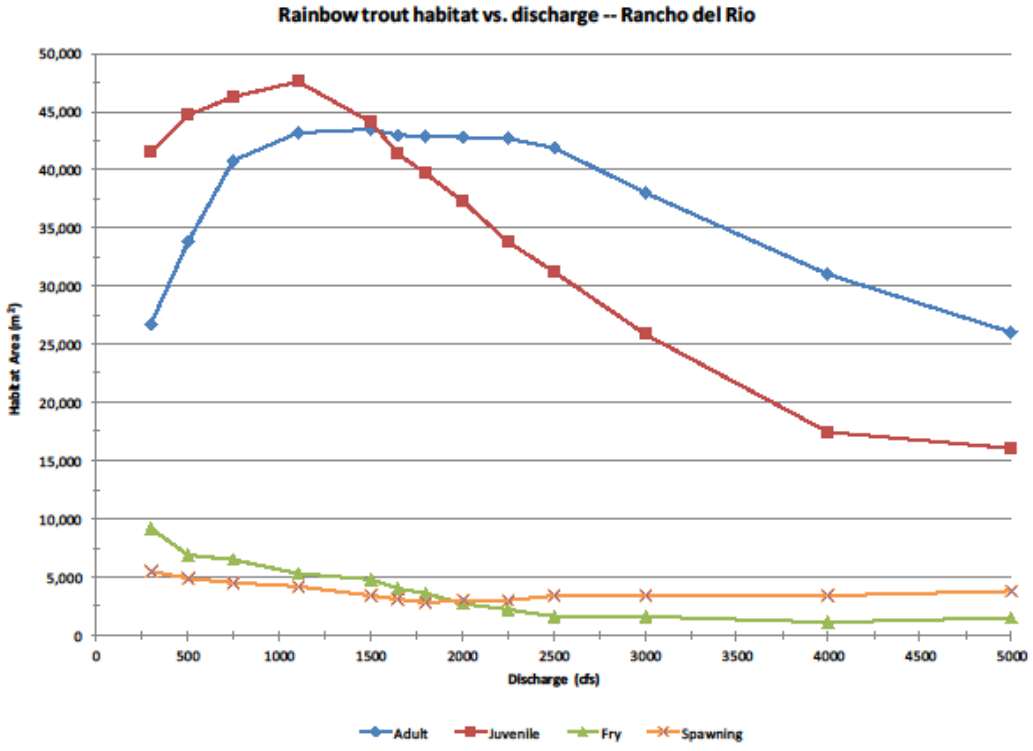


Figure 8: Rainbow trout habitat versus discharge at the Rancho del Rio Site (MEC 2011).

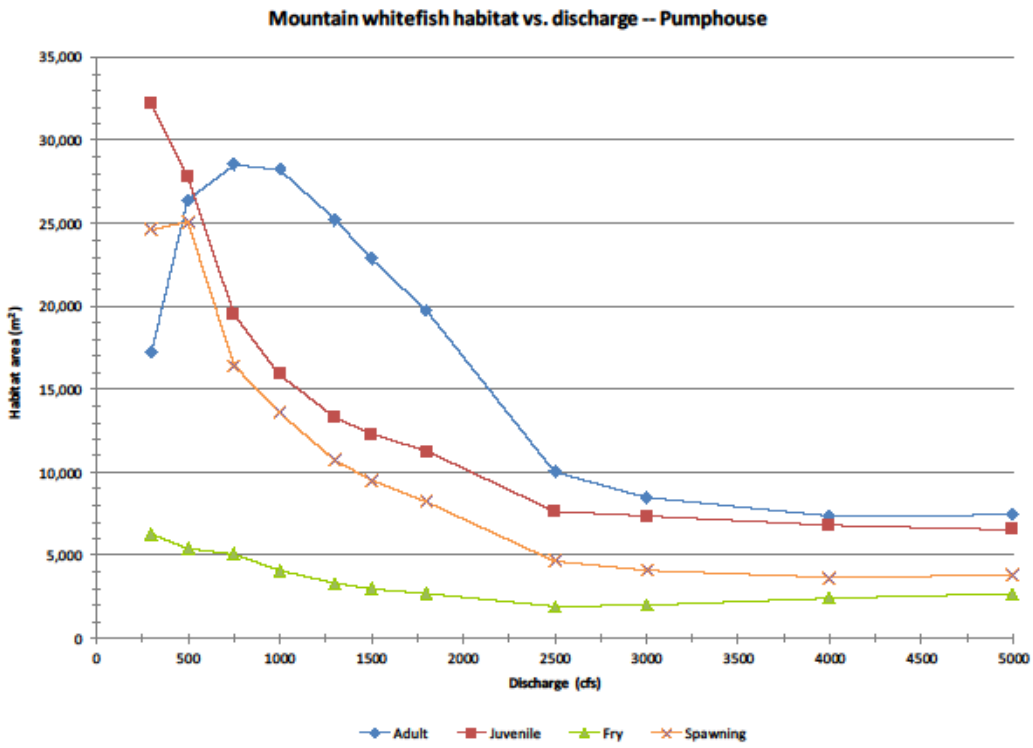


Figure 9: Mountain whitefish habitat versus discharge at the Pumphouse Site (MEC 2011).

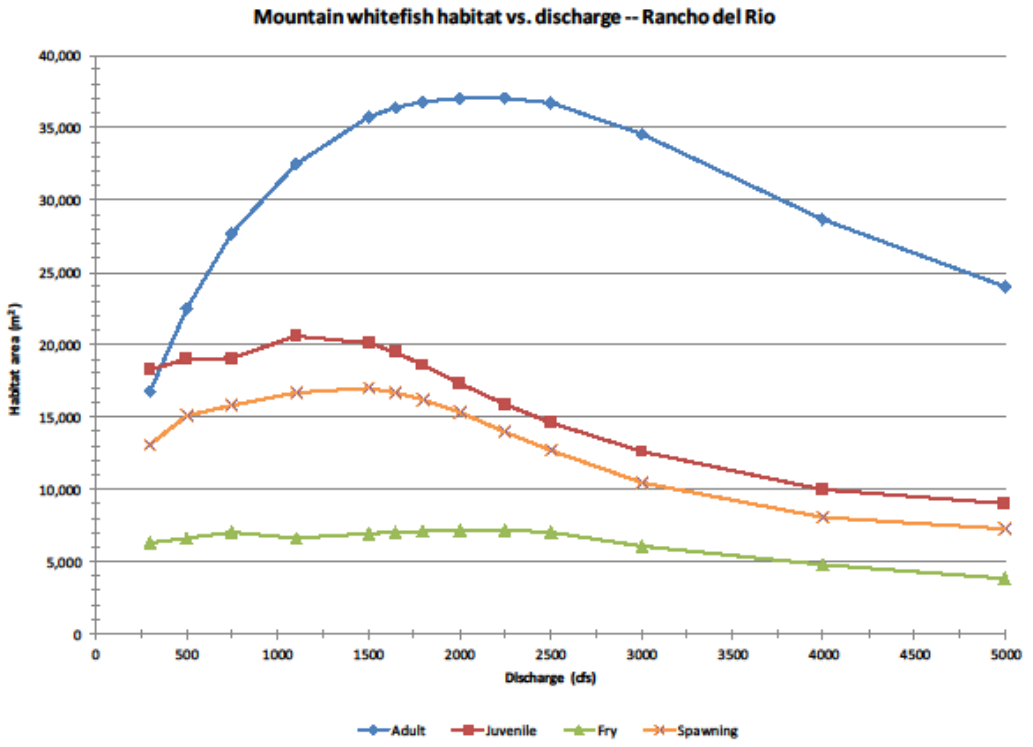


Figure 10: Mountain whitefish habitat versus discharge at the Rancho del Rio Site (MEC 2011).

Piney River to Cabin Creek Segment

The Piney River to Cabin Creek Segment represents a slight change in the hydrological conditions of the Colorado River given the additional inflows from the Piney River. Typically, the Piney River contributes about an additional 10% of flow above what is measured in the Colorado River at the Kremmling gage, approximately 24 miles upstream. This additional flow is relatively constant on a seasonal basis and does not appreciably change the shape of the hydrograph. For example, the timing of spring runoff and the timing of the peak flows do not appreciably change in the Colorado River with the addition of Piney River flow. This is generally not the case with the proposed third ISF segment – Cabin Creek to Eagle River. Hydrological inputs from Cabin Creek and other tributaries downstream to the confluence with the Eagle River increase the flows in the Colorado River by approximately 25%. The additional flows in the most downstream segment also change the timing of runoff, such that runoff occurs slightly earlier in the calendar year. The change in hydrological and hydraulic conditions in the Colorado River from State Bridge downstream to Dotsero was one of the primary reasons for creating two ISF segments in this reach. The Piney River to Cabin Creek Segment also represents a transition zone for the recreational fishing ORV. The Bureau of Land Management (BLM) recognizes that the recreational fishing ORV extends downstream to Red Dirt Creek, near McCoy, approximately 7 miles downstream of the confluence with the Piney River.

A River2D site was not established within the segment boundaries to evaluate fish habitat relationships. However, to evaluate the biological instream flow needs this segment is best represented by the Rancho del Rio River2D site (MEC 2011). The Rancho Del Rio site is approximately 4 miles upstream of the confluence with the Piney River. Given the Rancho Del Rio information was considered in the development of the instream flow for the Blue River to Piney River Segment, the SG believes that the upstream ISF values provided a starting point for the Piney River to Cabin Creek ISF Segment but should be increased given the additional flow contributions to the river.

A minimum flow of 525 cfs during the winter period from September 16th to May 14th will maintain sufficient levels of available habitat for all life stages of brown trout and rainbow trout at the Rancho del Rio Site. Based on the PHABSIM modeling, a minimum flow of 525 cfs will result in approximately 87% and 78% of the maximum total weighted usable habitat for adult brown trout and adult rainbow trout, respectively in the Piney River to Cabin Creek Segment.

A minimum flow of 650 cfs during the summer period from May 15th to July 31st will provide approximately 88% of the maximum amount of habitat available to brown trout at the Rancho Del Rio Site. A flow of 650 cfs in this reach will also provide 86% of the maximum amount of habitat available to rainbow trout at the Rancho Del Rio Site.

A minimum flow of 800 cfs during the late summer period from August 1st to September 15th will provide approximately 91% of the maximum amount of habitat available to brown trout at the Rancho Del Rio Site. A flow of 800 cfs will also provide 94% of the maximum amount of habitat available to rainbow trout at the Rancho Del Rio Site.

When the recommended ISF levels for the Piney River to Cabin Creek Segment are placed in the context of the Rancho Del Rio Site mountain whitefish habitat-flow relationships, a suitable amount of habitat will be available for juveniles and fry, but less than the optimal range will be available for the adult mountain whitefish. Similarly, for the flannelmouth sucker, flows between 525 cfs and 800 cfs will be sufficient to maintain the current population of flannelmouth suckers which is near the upstream extent of its distribution.

Cabin Creek to a Point Immediately Upstream of the Confluence with the Eagle River Segment

The Cabin Creek to Eagle River Segment is represented by the Lyon's Gulch PHABSIM modeling site (MEC 2011). As discussed by MEC (2011), total habitat quantity is abundant for most species and lifestages between 500 and 1,500 cfs based on PHABSIM habitat versus flow relationships for this segment.

A minimum flow of 650 cfs during the winter period, September 16th to May 14th, will provide adequate amounts of habitat for all species and life stages during this base flow period. A 650 cfs flow during the winter period will provide approximately 89% and 94%, of the maximum total weighted usable habitat for adult brown trout and adult rainbow trout, respectively (Figure 11 and Figure 12). A 650 cfs flow will also provide an adequate amount habitat for fry and juvenile of each trout species. Again the adult brown trout and adult rainbow trout life stages were the primary species and life stage considered for this lower segment, although the mountain whitefish, speckled dace, and sucker species, including the flannelmouth sucker, were also considered. These other species comprised a larger component of the fish assemblage as compared to the upstream reach (CDOW 2010). However, as discussed above the winter period is the most critical period for adult trout in terms of metabolic constraints and survival, thus a 650 cfs flow should be protective of the adult trout during the winter period.

A minimum flow of 900 cfs established during the spring runoff and early summer period, May 15th to June 15th, will provide approximately 99% of the maximum total weighted usable habitat for both the adult brown trout and adult rainbow trout at the Lyon's Gulch Site. This flow level also provides an abundant amount of habitat for the adult mountain whitefish and adult flannelmouth sucker (Figure 13 and Figure 14).

A minimum flow of 800 cfs during the mid to late summer period will provide approximately 97% and 98% of the maximum total weighted usable habitat, for adult brown trout and adult rainbow trout, respectively (Figure 11 and Figure 12). This flow level balances the trout life stages during the summer months, a time when growth and development occurs for the younger life stages and adults.

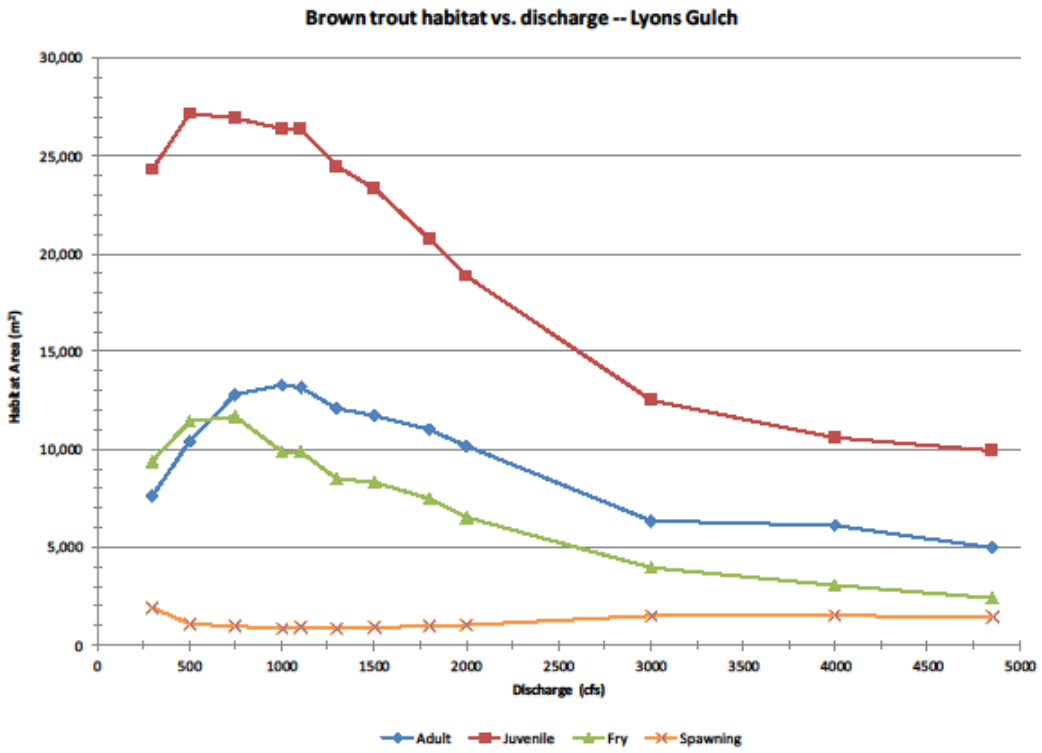


Figure 11: Brown trout habitat versus discharge at the Lyon's Gulch Site, Piney River to Eagle River Segment (MEC 2011).

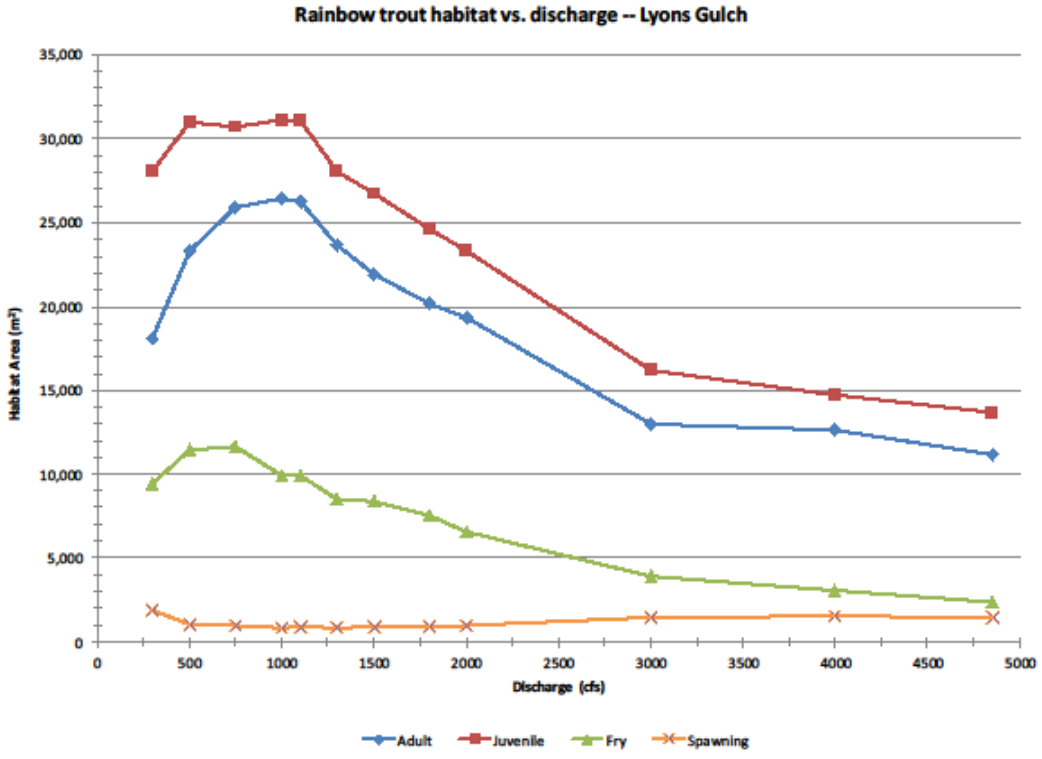


Figure 12: Rainbow trout habitat versus discharge at the Lyon's Gulch Site, Piney River to Eagle River Segment (MEC 2011).

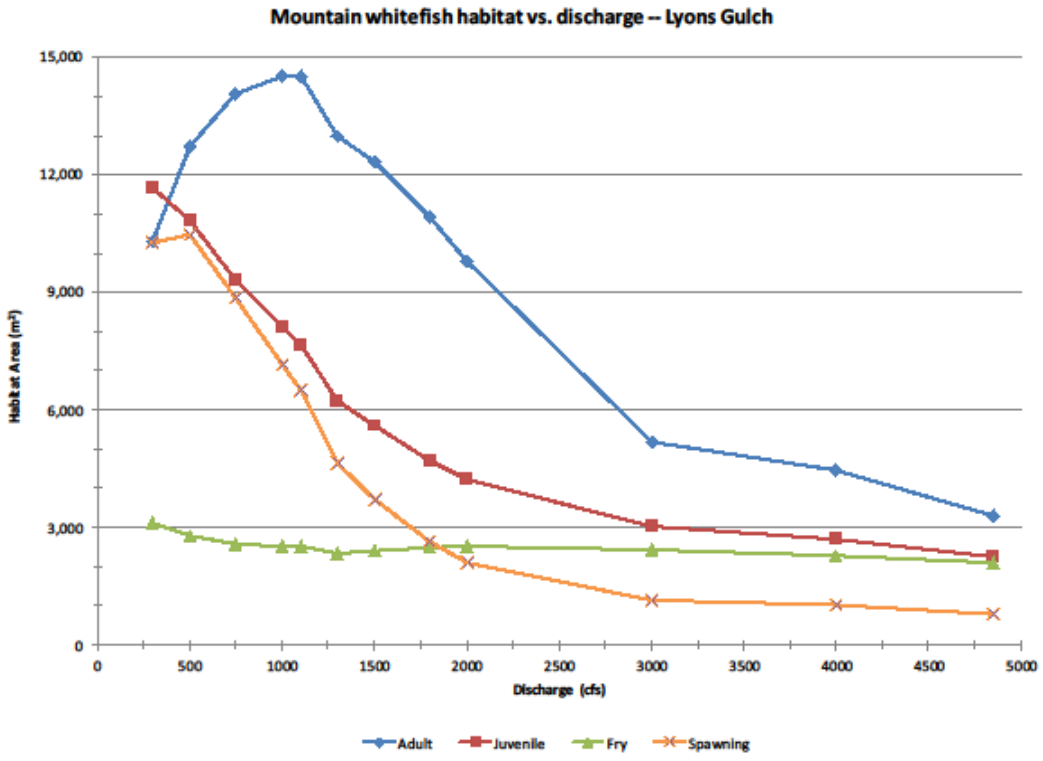


Figure 13: Mountain whitefish habitat versus discharge at the Lyon's Gulch Site, Piney River to Eagle River Segment (MEC 2011).

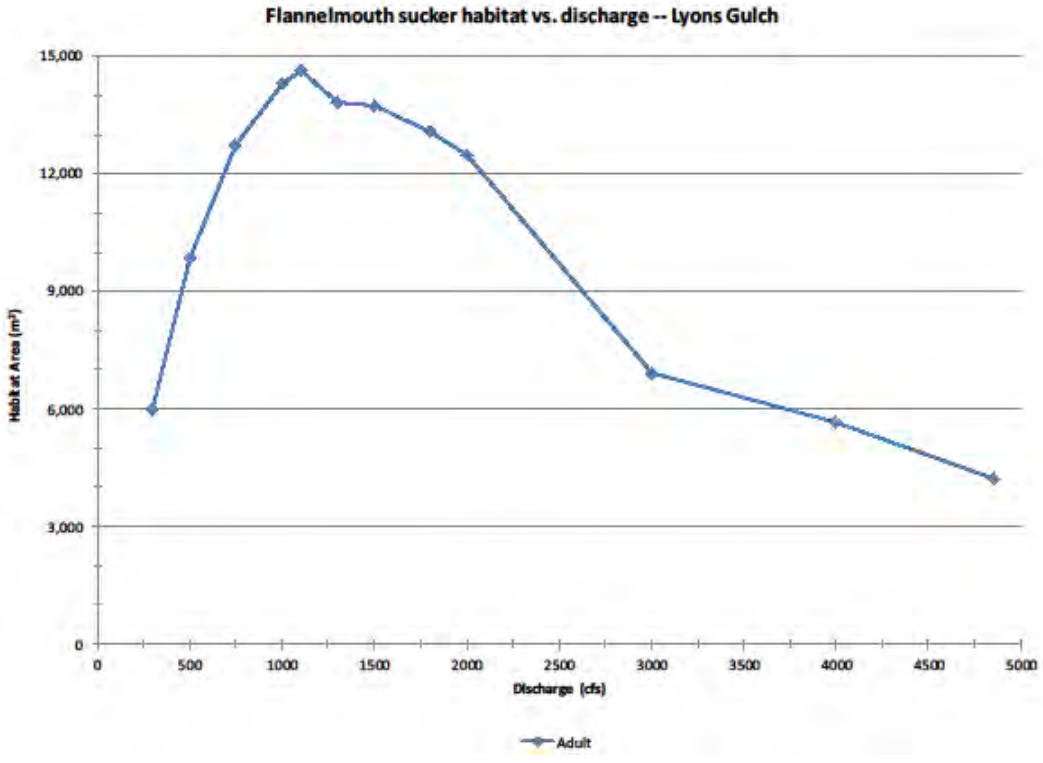


Figure 14: Flannelmouth sucker habitat versus discharge at the Lyon's Gulch Site, Piney River to Eagle River Segment (MEC 2011).

Hydrological Characteristics

During the development of the alternative management plan, the SG relied upon two hydrological data sets to establish flow-based resource guides. The SG evaluated both historical and future simulated flow conditions at three points of reference along the Upper Colorado River, from Kremmling downstream to Dotsero. The use of both historical and simulated future flow data was important for the SG to reach a consensus on the ISF recommendations. The Kremmling gage (09058000) provided the upstream reference point for the Blue River to Piney River Segment, the Kremmling gage plus the Piney gage (09059500) provided a reference point for the Piney River to Cabin Creek Segment, and lastly – the Dotsero gage (0907050) minus the Eagle gage (09070000) provided a downstream reference point for the Cabin Creek to Eagle River Segment. The period of record from April 1st 1983 to March 31st 2006, 24 years, was selected to characterize the historical flow conditions for all three points of reference along the Upper Colorado River.

The SG also evaluated simulated flows to characterize possible future flow scenarios at all three points of reference along the Upper Colorado River. Briefly, future water demands of the East Slope, Grand and Eagle counties were imposed on the undepleted flows of the Upper Colorado River to construct a future hydrological scenario. The undepleted flows used in the model represented the period of record from April 1st 1947 to March 31st 1991, 44 years.

Using each data set, the geometric mean value and the upper and lower 95% confidence intervals was calculated for each day of the year (Figures 15 - 20). These figures characterize the central tendency of flows on a daily basis for the entire period of record. The SG also identified dry year conditions as occurring 25% of the time over the period of record for the Kremmling gage, based on the cumulative annual flow that passes the gage. This evaluation resulted in 6 years being characterized as dry year conditions for the historical period (e.g. 1992, 1994, 2001 through 2004), and 11 years for the simulated future flows. As such, these dry year conditions provide a reference for low flow levels in the Upper Colorado River at the Kremmling gage.

This subset of dry year conditions was also evaluated using the geometric mean (Figure 21 and Figure 22). These hydrographs are noticeably different from the entire period of record hydrographs in that peak flows do not occur until late summer given the absence of snowpack driven runoff that is typically observed in early June. It is also apparent that modeled future dry conditions may be very similar to historical dry periods based on the similar shape of the hydrographs. During the historical winter base flow conditions, the lower 95% confidence interval ranged from approximately 300 cfs to 450 cfs, and the modeled future flows show a similar range.

The geometric mean analyses for the daily hydrographs were considered, in part, by the SG entities in developing the consensus ISF appropriations for the Upper Colorado River – Blue River to Piney River Segment, the Piney River to Cabin Creek Segment, and the Cabin Creek to Eagle River Segment.

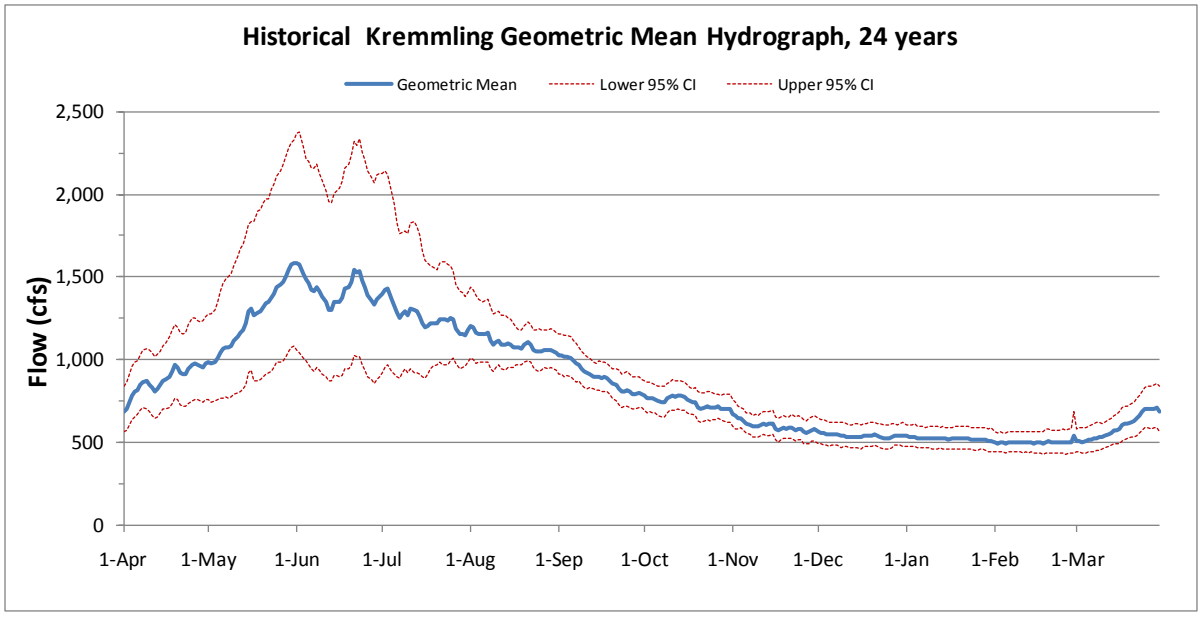


Figure 15: Daily historical Kremmling gage geometric mean hydrograph using the 1983 to 2006 period of record.

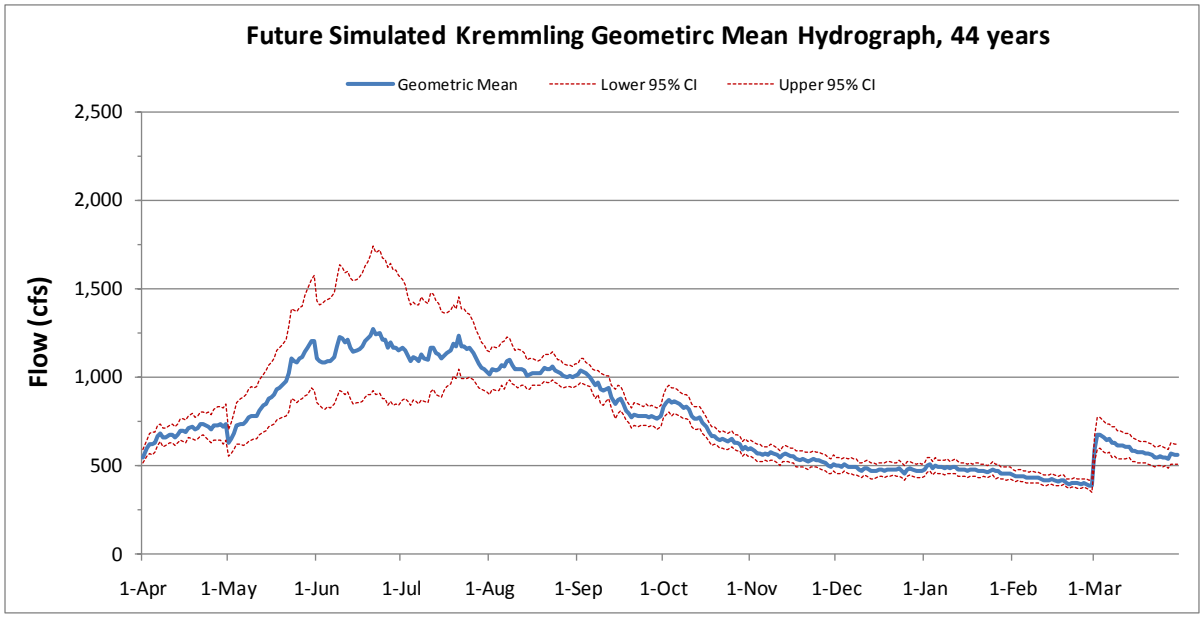


Figure 16: Daily simulated Kremmling gage geometric mean hydrograph using the 1947 to 1991 period of record to estimate a future flow scenario.

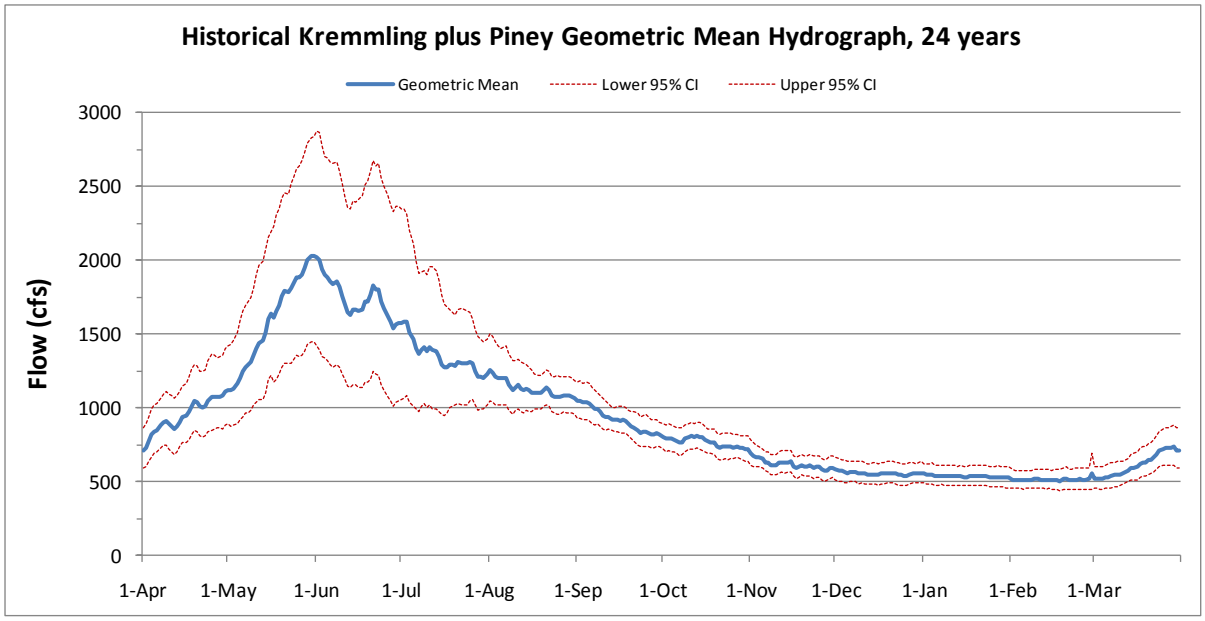


Figure 17: Daily historical Kremmling gage plus Piney gage geometric mean hydrograph using the 1983 to 2006 period of record.

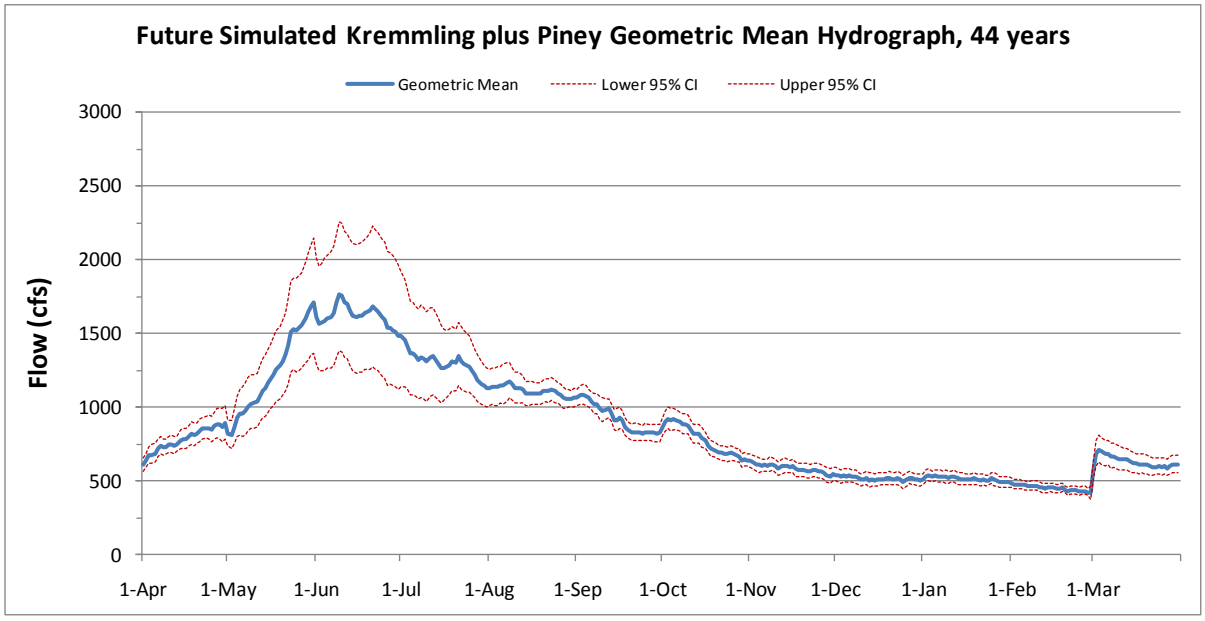


Figure 18: Daily simulated Kremmling gage plus Piney gage geometric mean hydrograph using the 1947 to 1991 period of record to estimate a future flow scenario.

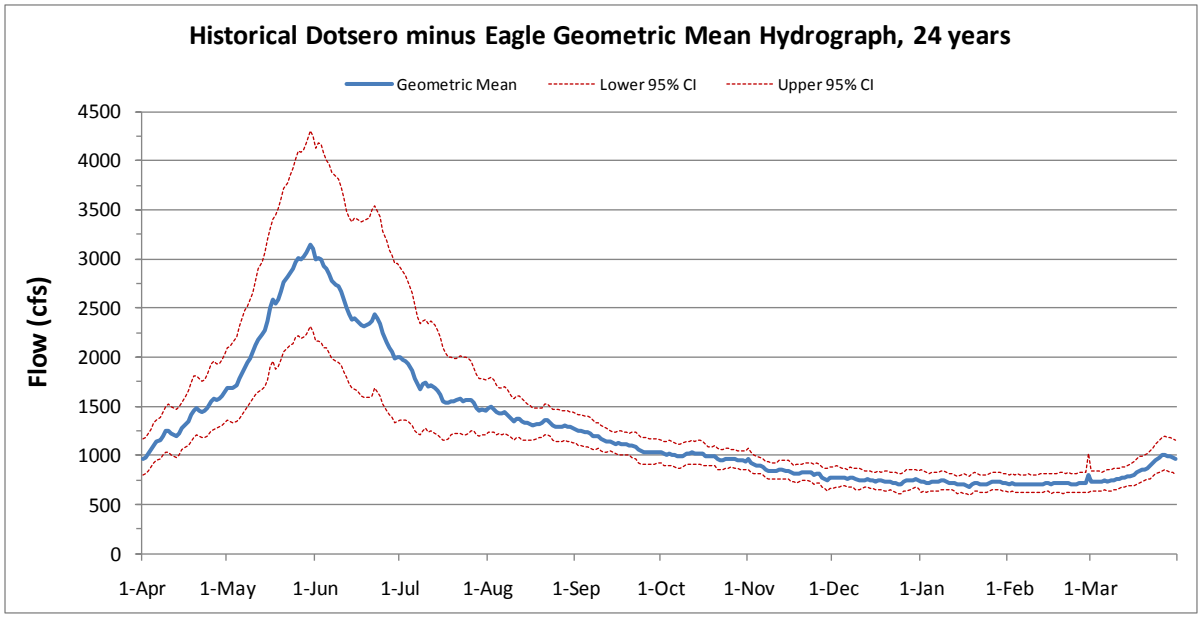


Figure 19: Calculated daily historical geometric mean hydrograph using the Dotsero gage minus the Eagle gage for the 1983 to 2006 period of record.

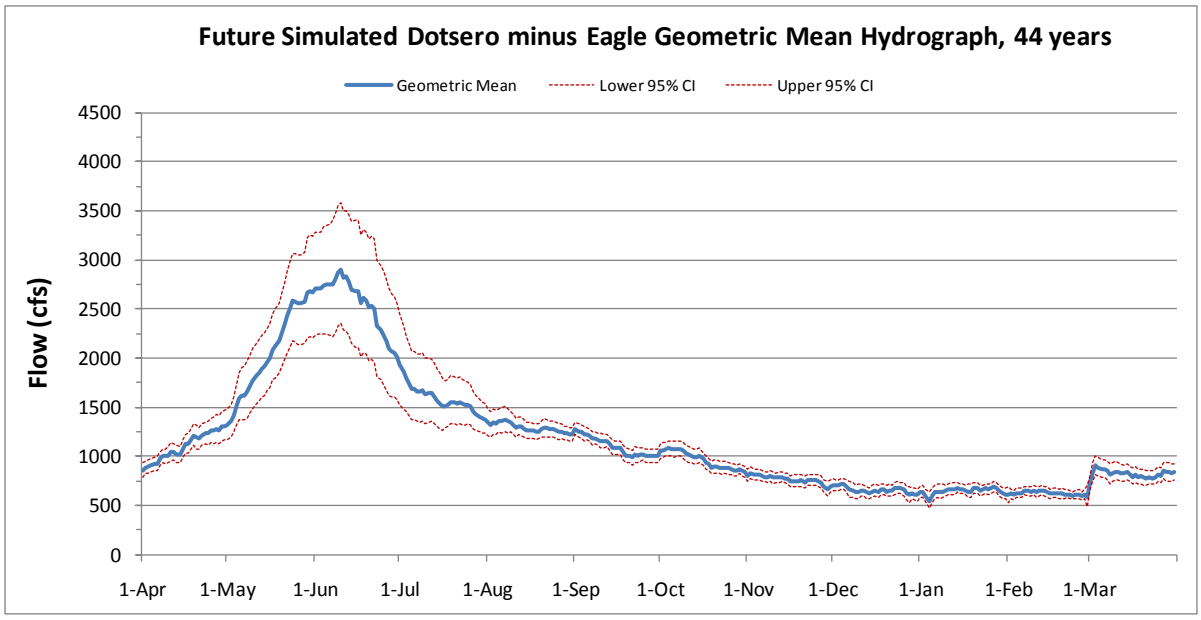


Figure 20: Daily simulated Dotsero gage minus the Eagle gage geometric mean hydrograph using the 1947 to 1991 period of record to estimate a future flow scenario.

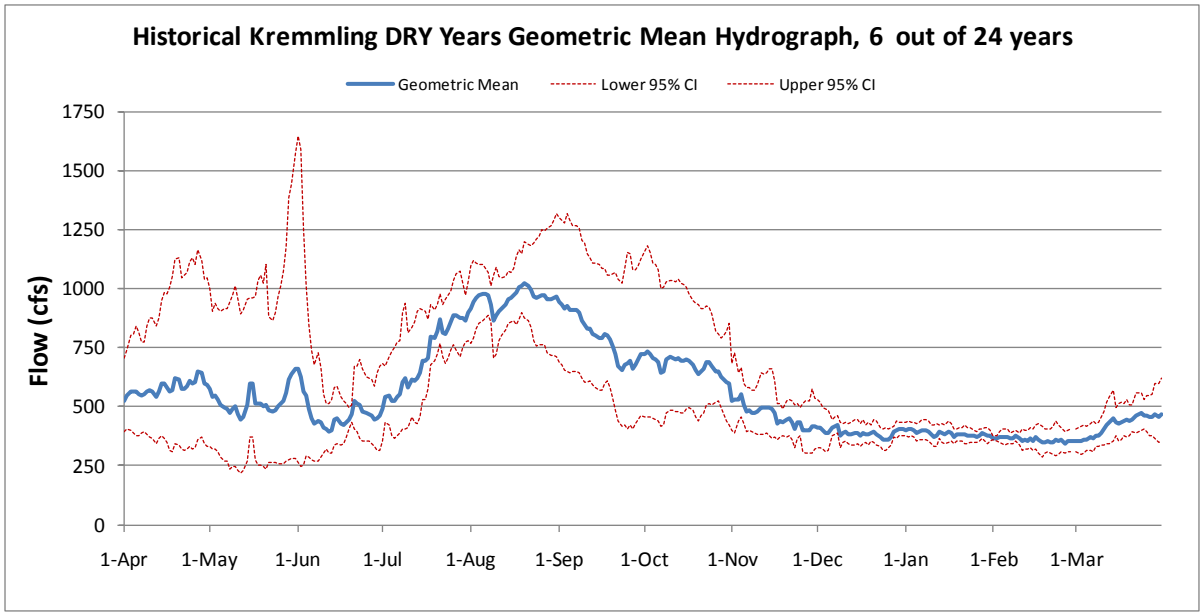


Figure 21: Daily historical Kremmling gage geometric mean hydrograph using six driest years in the 1983 to 2006 period of record.

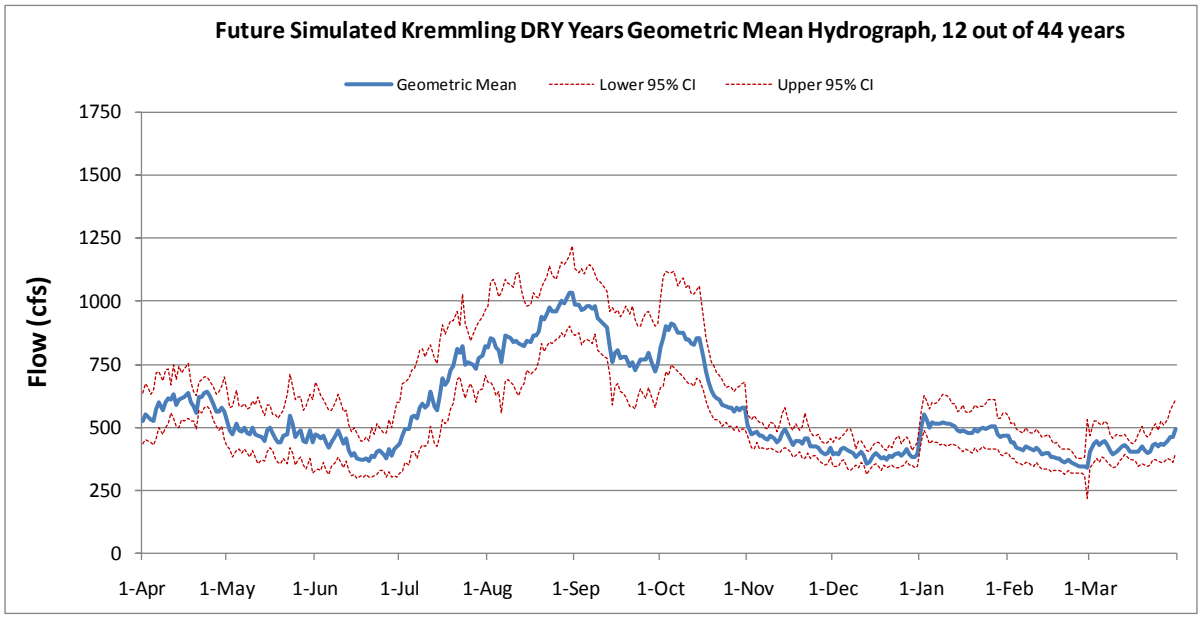


Figure 22: Daily simulated Kremmling gage geometric mean hydrograph using 12 driest years in the 1947 to 1991 period of record to estimate a future flow scenario.

Instream Flow Summary

The SG recommended ISF levels are placed in the context of the Historical flow conditions for each segment (Figures 23 – 25). The hydrographs illustrate the typical water year as observed from October 1st to September 31st rather than the SG water year April 1st to March 31th as presented above. The figures also present some of the daily flow summary statistics that the SG considered during the development of the management plan as well as the minimum instream flows.

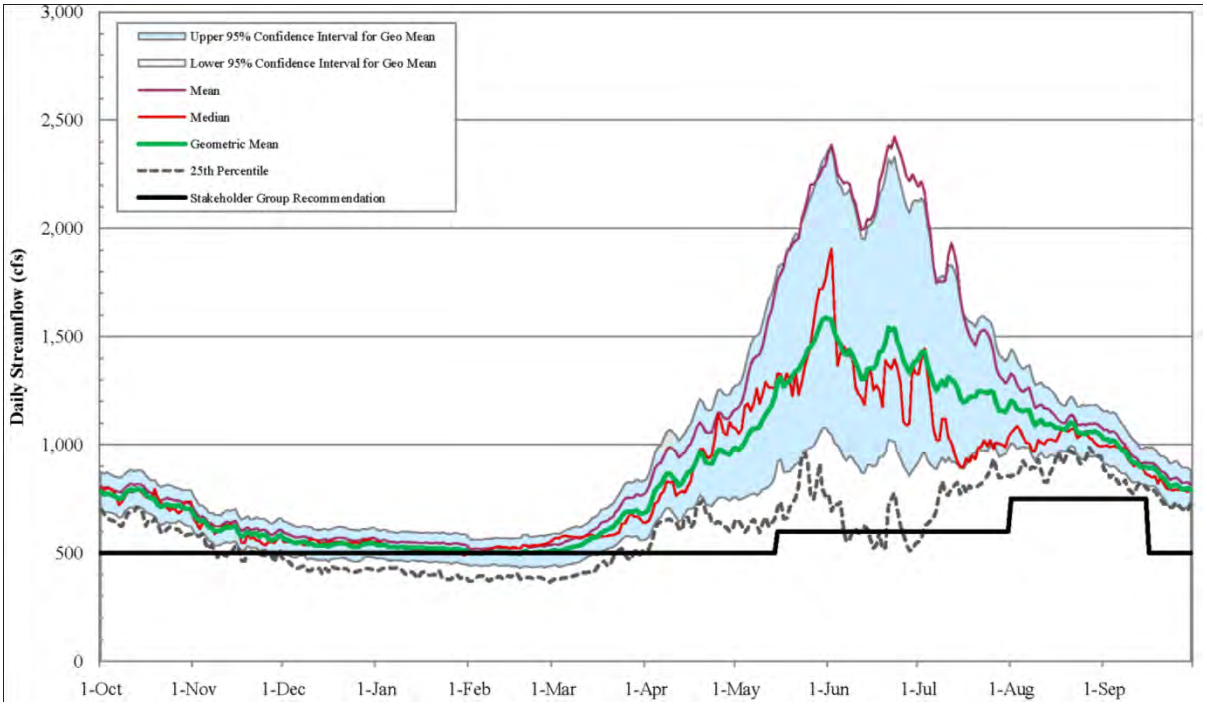


Figure 23: Blue River to Piney River ISF summary; hydrograph based on the Kremmling gage (09058000).

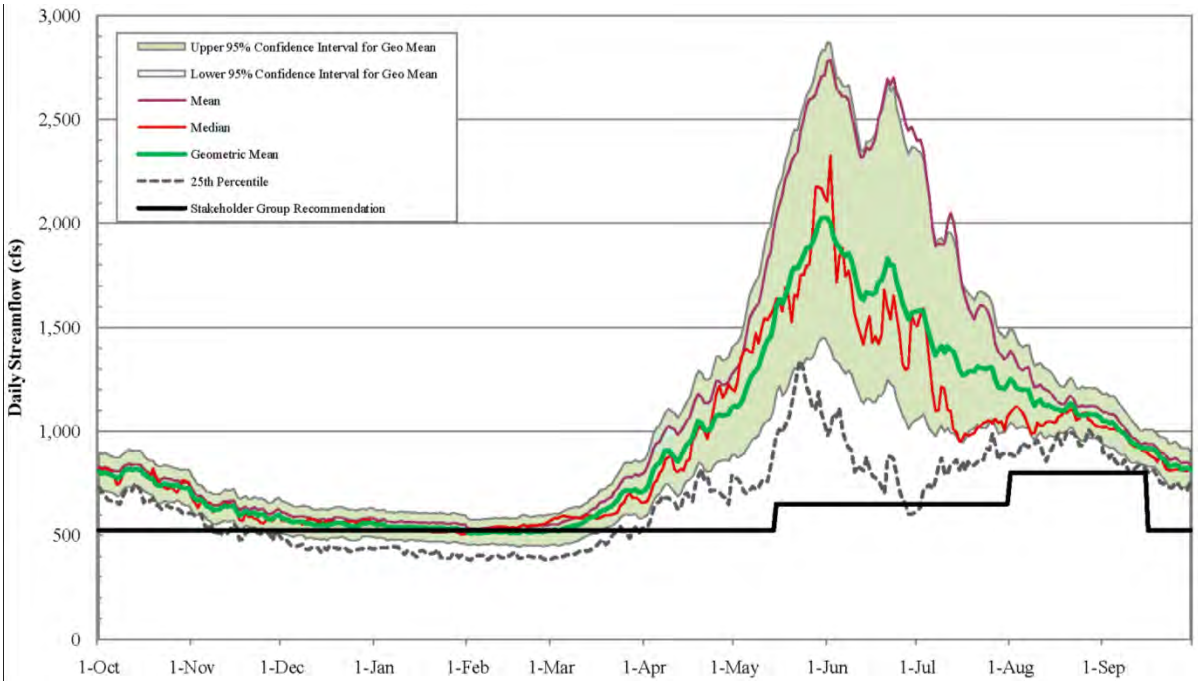


Figure 24: Piney River to Cabin Creek ISF summary; hydrograph based on the Kremmling gage (09058000) plus the Piney River gage (09059500).

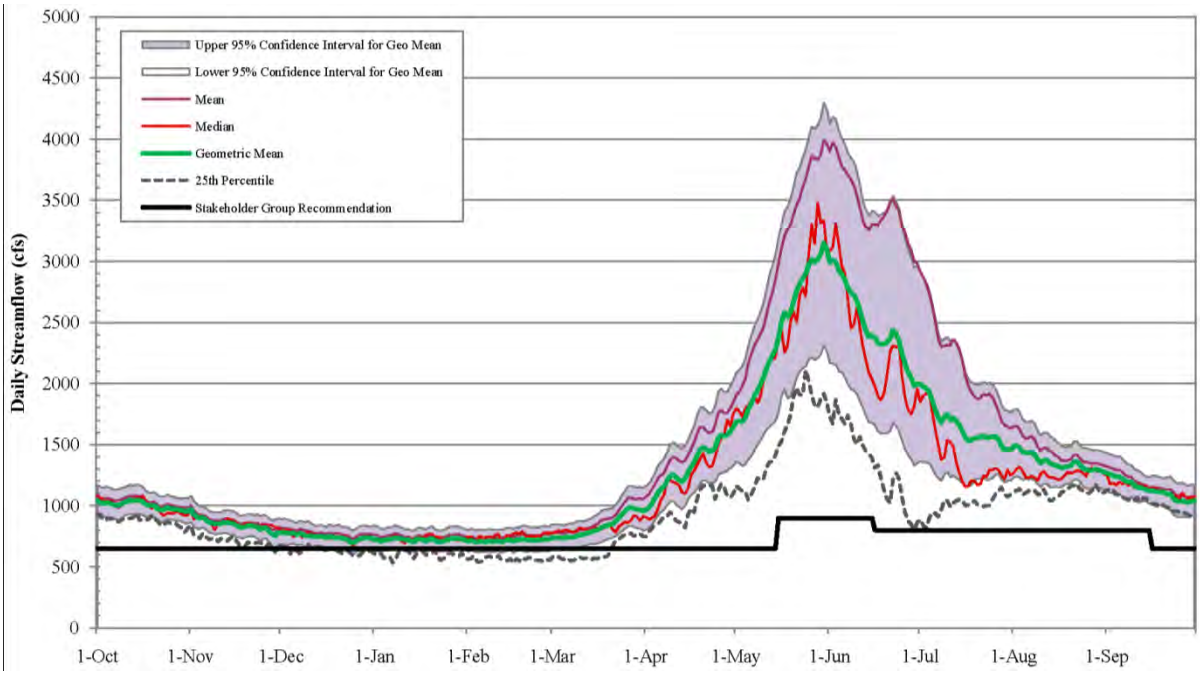


Figure 25: Cabin Creek to Eagle River ISF summary; hydrograph based on the Dotsero gage (09070500) minus the Eagle River gage (09070000).

STATE OF COLORADO

John W. Hickenlooper, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER

Thomas E. Remington, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192
wildlife.state.co.us

For Wildlife-
For People

June 30, 2011

Ms. Linda Bassi
Colorado Water Conservation Board
Stream and Lake Protection Section
1313 Sherman Street, Room 723
Denver, Colorado 80203

Re: Colorado Division of Wildlife Preliminary Instream Flow Recommendations for the Colorado River.

Dear Linda,

The purpose of this letter is to formally transmit the Colorado Division of Wildlife's (CDOW) Instream Flow Recommendation for the Colorado River to the Colorado Water Conservation Board (CWCB). The CDOW has been a cooperating agency in the Upper Colorado River Stakeholder Group (UCRSG) process to develop resource protection methods that could serve as alternatives to federal determinations by the U.S. Bureau of Land Management (BLM) or U.S. Forest Service (USFS) that certain Colorado River segments are "suitable" for designation under the Wild and Scenic River Act. A key part of this plan relies upon the CWCB appropriating instream flow water rights on the Colorado River from the confluence of the Blue River downstream to the confluence with the Eagle River and filing a water court application prior to December 31, 2011.

As you know, the UCRSG has been working for several years to develop a local management plan which includes a Monitoring Plan, Long-Term Protection Measures ,Voluntary Cooperative Measures, Outstanding Remarkable Value (ORV) Indicators and Resource Guides designed to help protect resources of an "outstandingly remarkable value". It is the UCRSG's intention that this "Management Plan" along with their proposed instream flow recommendations, considered a Long-Term Protection Measure, would serve as an alternative to a "suitable" designation under the Wild and Scenic River Act. The UCRSG proposed instream flow recommendations are:

Table 1: UCRSG Proposed Instream Flow Recommendations.

Stream	Upper Terminus	Lower Terminus	County	Length	Flow (cfs)
Colorado River	Confluence Blue River	Confluence Piney River	Grand, Eagle	23.74	750 (8/1 – 9/15) 500 (9/16 – 5/14) 600 (5/14 – 7/31)
	Confluence Piney River	Confluence Cabin Creek	Eagle	20.81	800 (8/1 – 9/15) 525 (9/16 – 5/14) 650 (5/15 – 7/31)
	Confluence Cabin Creek	Confluence Eagle River	Eagle	25.00	900 (5/15 – 6/15) 800 (6/16 – 9/15) 650 (9/16 – 5/14)

The UCRSG instream flow recommendations are the result of a review of the physical habitat-flow relationships, hydrological conditions, and a compromise among the UCRSG entities on the recommended minimum instream flow necessary to preserve the natural environment to a reasonable degree. The UCRSG instream flow recommendations differ from the CDOW's proposed instream flow recommendations, which were based on the physical and biological data collected to date and did not incorporate any future water availability constraints.

The CDOW believes the information provided to the CWCB by the UCRSG including their July 2011 cover letter, May 13 CWCB letter, instream flow recommendation executive summary report, proposed alternative management plan, Instream Flow Report for the Colorado River from Kremmling, Colorado downstream to Dotsero, Colorado (Miller & Swaim 2011 - "The Miller Report"), and associated instream flow file folder forms the basis for the instream flow recommendations to be considered by the CWCB.

The State of Colorado's Instream Flow Program (ISFP) was created in 1973 when the Colorado State Legislature recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment" (see 37-92-102 (3) C.R.S.). The statute vests the CWCB with the exclusive authority to appropriate and acquire instream flow and natural lake level water rights. In order to encourage other entities to participate in Colorado's ISFP, the statute directs the CWCB to request instream flow recommendations from other state and federal agencies. The CDOW is recommending these segments of the Colorado River to the CWCB for inclusion into the ISFP. The Colorado River should be considered for inclusion into the ISFP because it has a natural environment that can be preserved to a reasonable degree with an instream flow water right.

The CDOW is forwarding this stream flow recommendation to the CWCB to meet Colorado's policy "… that the wildlife and their environment are to be protected, preserved, enhanced, and managed for the use, benefit, and enjoyment of the people of this state and its visitors … and that, to carry out such program and policy, there shall be a continuous operation of planning, acquisition, and development of wildlife habitats and facilities for wildlife-related opportunities" (See §33-1-101 (1) C.R.S.). The CDOW Strategic Plan states "[h]ealthy aquatic environments are essential to maintain healthy and viable fisheries, and critical for self-sustaining populations. The [CDOW] desires to protect and enhance the quality and quantity of aquatic habitats."

General background information and information relating to the fish species of interest is provided in the UCRSG's Instream Flow Recommendation Executive Summary. The Board staff relies upon the biological expertise of the CDOW to interpret output from the physical and biological data collected to develop the initial biologic instream flow recommendation. This initial recommendation is designed to address the unique biologic requirements of each stream without regard to water availability concerns. Prior to making the CDOW's instream flow recommendations, the CDOW reviewed: (1) CDOW fish survey data; (2) the results of the River2D Study; (3) the Miller Report; (4) the fish species of interest and their habitat requirements; (5) the amount of habitat available and the quality of habitat available at

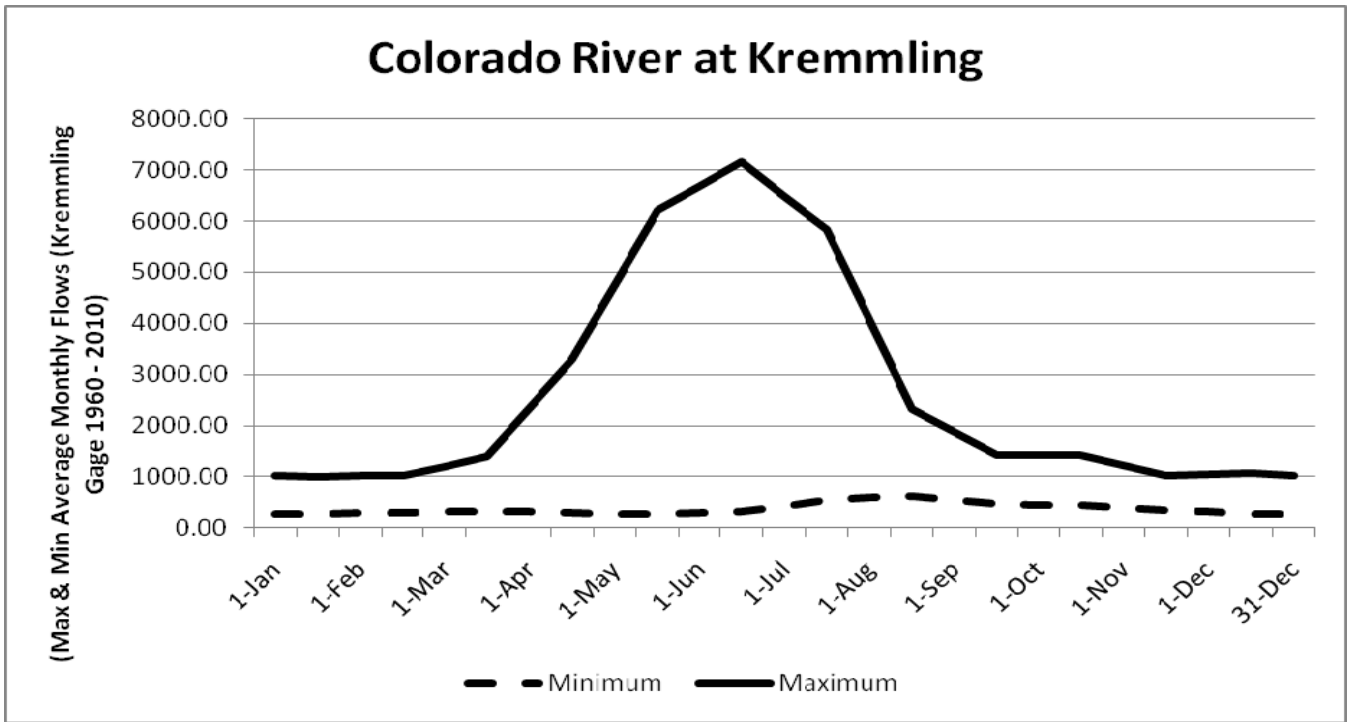
specific modeled flows; (6) the existing hydrology of the subject reaches; and (7) geomorphology of the segments of the Colorado River under consideration.

Existing Natural Environment

A review of the recorded gage data for the 1960 – 2010 time period (50 Years) for the Colorado River at Kremmling gage shows the existing "Natural Environment" of this segment of the Colorado River (Blue River to Eagle River confluences) has experienced and is the result of a wide range of flows. At the Kremmling Gage, near the upper end of the reach, the highest average monthly flow during June was 7,160 cfs (1984) and the lowest average monthly flow during June was 328 cfs (2004), a difference of over 6,800 cfs. The average (mean) monthly flow at the Kremmling Gage is 2,070 cfs for June. Estimating flows for the Colorado River upstream of the confluence with the Eagle River (near the lower end of the reach – [Dotsero minus Gypsum stream gage data]) shows that the highest average monthly flow during June was 9,306 cfs (1984) and the lowest average monthly flow during June was 623 cfs (2002), a difference of over 8,600 cfs. The average (mean) monthly flow upstream of the Eagle River is estimated to be 3,656 cfs for June.

Figure 1 below shows the range of flows that created the natural environment found in the Colorado River near Kremmling. The upper solid line represents the maximum average monthly flow and the lower dashed line represents the minimum average monthly flow. This relationship between the maximum and minimum average monthly flows is not unique to the Colorado River and can be found on all streams and rivers in the State of Colorado. Over the years, the CWCB has heard arguments for appropriating both ends of the spectrum.

Figure 1: Maximum and Minimum Average Monthly flows at the Kremmling Gage.



The CDOW reviewed all of the physical and biological information available and completed its own independent analysis of that information and believes that without the UCRSG Management Plan, the following instream flow recommendations would be necessary to preserve the natural environment to a reasonable degree:

Table 2: CDOW Instream Flow Recommendations.

Stream	Upper Terminus	Lower Terminus	County	Length	Flow (cfs)
Colorado River	Confluence Blue River	Confluence Piney River	Grand, Eagle	23.74	750 (5/1 – 9/30) 650 (10/1 – 10/31) 500 (11/1 – 3/31) 650 (4/1 – 4/30)
	Confluence Piney River	Confluence Cabin Creek	Eagle	20.81	1000 (5/1 – 8/15) 850 (8/16 – 9/30) 650 (10/1 – 10/31) 525 (11/1 – 3/31) 700 (4/1 – 4/30)
	Confluence Cabin Creek	Confluence Eagle River	Eagle	25.00	1000 (5/1 – 9/15) 850 (9/16 – 10/31) 675 (11/1 – 3/31) 850 (4/1 – 4/30)

Figure 2: CDOW Blue River to Piney River ISF Recommendation Hydrograph.

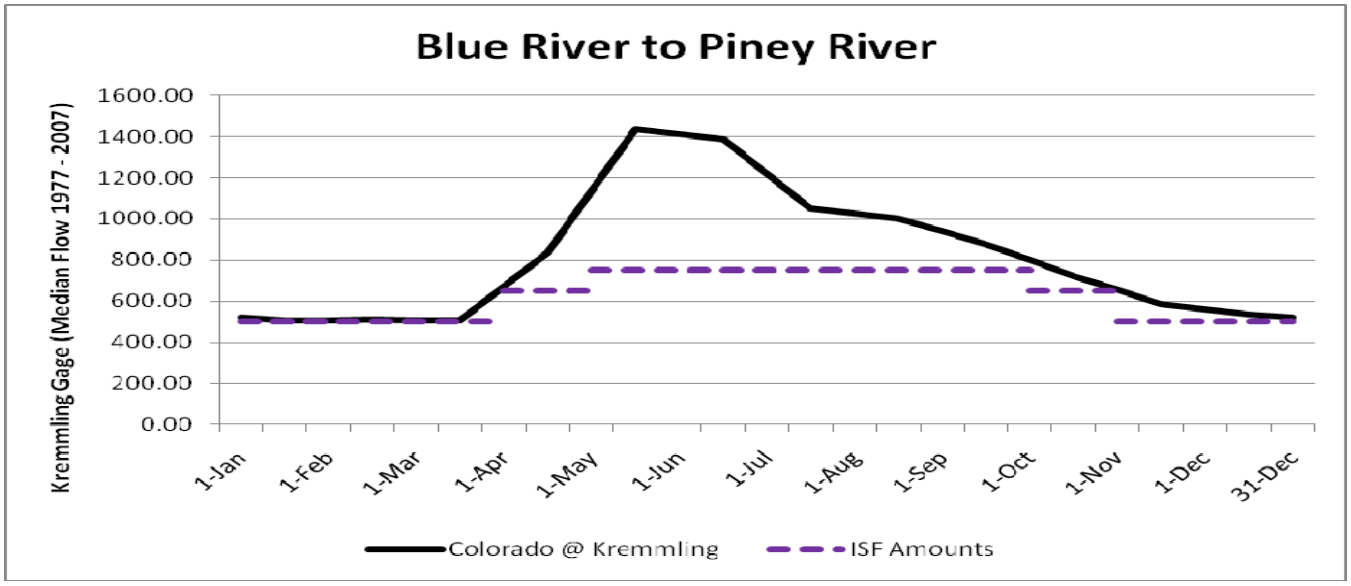


Figure 3: CDOW Piney River to Cabin Creek ISF Recommendation Hydrograph.

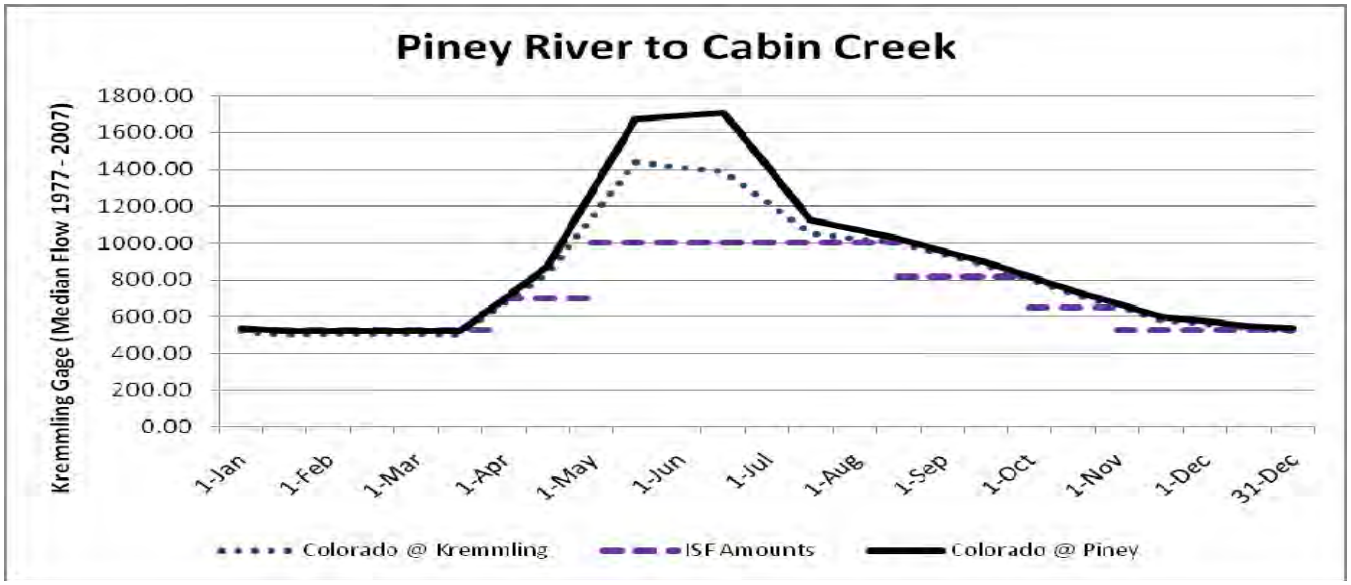
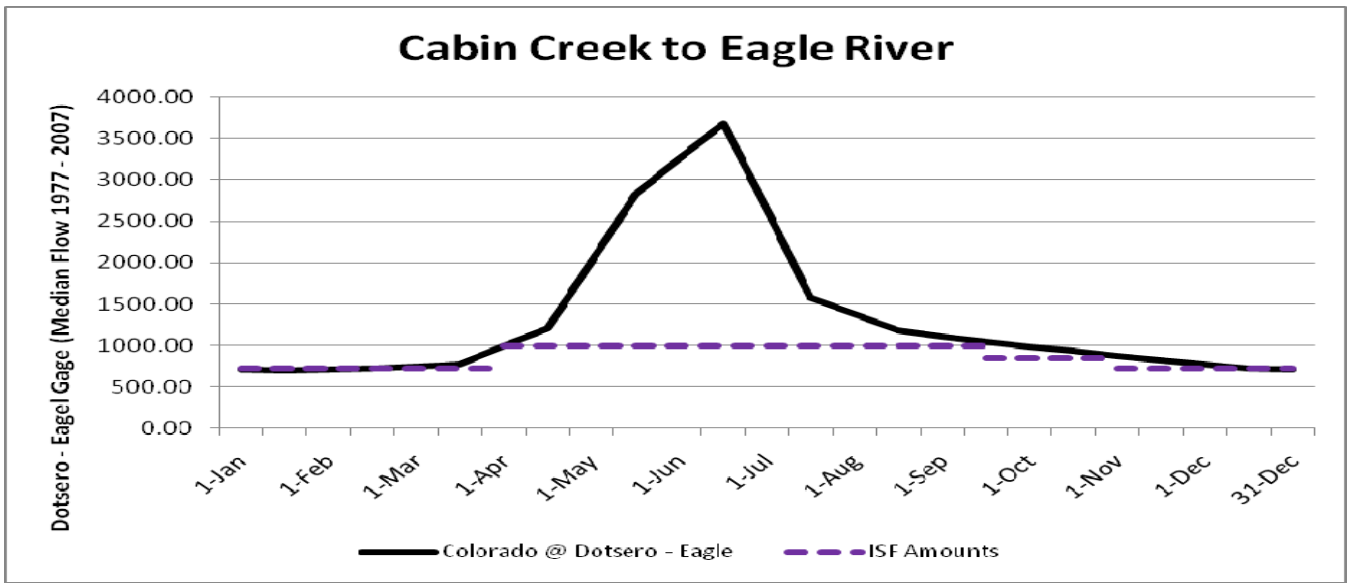


Figure 4: CDOW Cabin Creek to Eagle River ISF Recommendation Hydrograph.



However, because this is a unique ISF appropriation in that it is recommended by the consensus of a diverse stakeholder group after several years of negotiations, and is part of an on-going larger local Management Plan which includes a Monitoring Plan, Long-Term Protection Measures and Voluntary Cooperative Measures designed to help protect resources of an "outstanding remarkable value" and because of the high level of water supply development within and upstream of this reach of the Colorado River, the CDOW supports the UCRSG's Management Plan and proposed instream flow recommendations.

Justification for UCRSG Instream Flow Recommendations

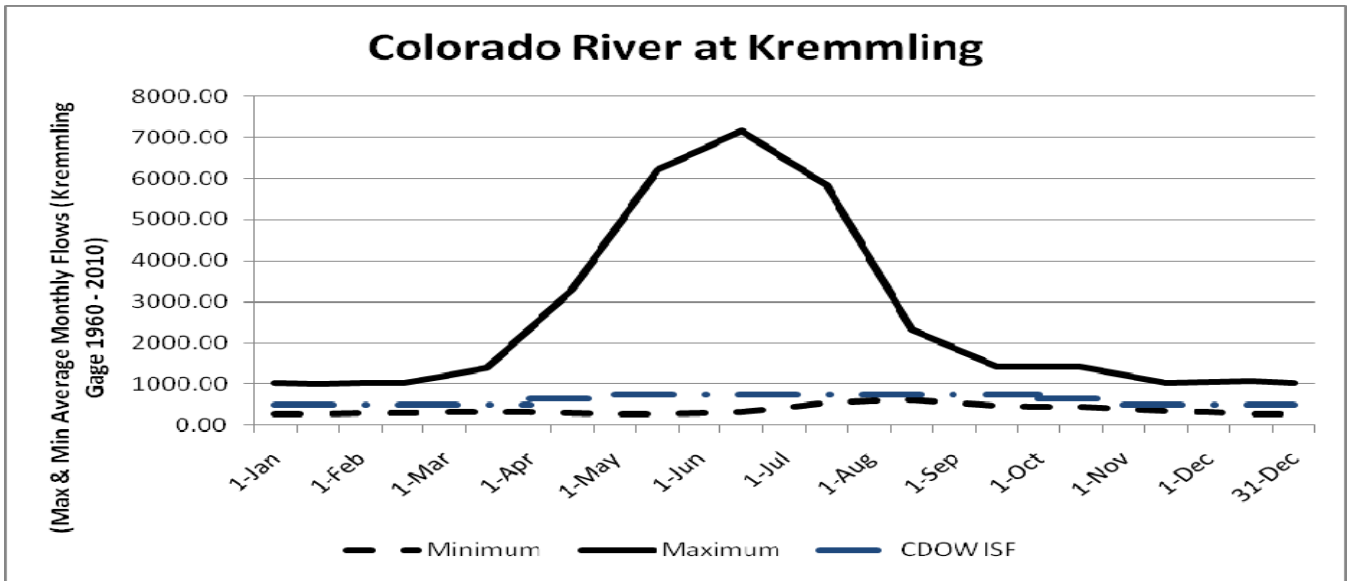
The UCRSG instream flow recommendations differ from the CDOW's proposed instream flow recommendations. The CDOW's recommendations were based on (1) CDOW fish survey data; (2) the results of the River2D Study; (3) the Miller Report (MEC 2011); (4) the fish species of interest and their habitat requirements; (5) the amount of habitat available and the quality of habitat available at specific modeled flows; (6) the existing hydrology of the subject reaches; and (7) geomorphology of the segments of the Colorado River under consideration. The CDOW's instream flow water availability analysis only considered existing hydrologic conditions and did not incorporate any future water availability constraints. The UCRSG instream flow recommendations are the result of a review of the physical habitat-flow relationships, existing and future hydrological conditions, and a compromise among the UCRSG entities on the recommended minimum instream flow necessary to preserve the natural environment to a reasonable degree.

There has been some concern expressed regarding the size of instream flow recommendations (CDOW has recommended 750 cfs in the upper reach and 1000 cfs in the lower two reaches) and the amount of fish habitat protected (expressed as weighted useable area. Some people are concerned that the recommended instream flows that are required to protect a significant portion of the total useable area available to fish, as determined by the Miller Study, may not be the minimum flow necessary to preserve the natural environment to a reasonable degree. However, as the Instream Flow Council (IFC) has pointed out "Instream flow is not just about fish habitat; it is transdisciplinary." (Annear, et all 2004).

To address these concerns, one must first compare the flows that created the outstandingly remarkable natural environment of the Colorado River to the recommended instream flows to maintain **optimum** fish habitat. As shown in Figure 1 above, the natural hydrograph and the resulting natural environment of the Colorado River is subject to wide swings in the quantity of water available. Figure 5 below displays how the CDOW's proposed Blue River to Piney River instream flow recommendation falls in

relationship to the maximum and minimum average monthly flows that have produced the existing natural environment. According to the Miller Report, "Bankfull flows occur at approximately 2,500 cfs and approximately 4,000 cfs in the upper and lower river, respectively. Peak flows are most important for habitat creation and maintenance. Peak flows of bankfull and higher are required at regular frequency for proper ecosystem functions." The proposed instream flow recommendations do not specifically address habitat maintenance issues but the UCRSG's Management Plan provides for Voluntary Cooperative Measures which can provide a mechanism to do so.

Figure 5: CDOW Blue River to Piney River ISF Recommendation and Maximum and Minimum Average Monthly Flows.



As you can see, the flows recommended by the CDOW, which are slightly higher than those recommended by the UCRSG, are much closer to the minimum average monthly flow values than the maximum average monthly flow values. In addition, Figures 2, 3 and 4 above show how the recommended instream flow values compare to the median flows or 50% exceedance flows of the last 30 years of record (1977 – 2007). These figures show that the recommended instream flows are less than the mean (average) and median (50% exceedence) flows in the river.

The goal of the proposed instream flow water right is to provide the minimum flow necessary to preserve the natural environment to a reasonable degree. Since 1973, the CWCB and CDOW have used the presence of a fishery as an indicator that a natural environment is present. The CDOW has based most, if not all, of its minimum instream flow recommendations on the flow required to preserve the existing or potential fishery of a recommended reach.

The Instream Flow Council (IFC) has identified more than 34 instream flow assessment tools. The IFC reviewed each tool and identified the strengths and weaknesses of using each method. The CDOW and CWCB have relied on only a small number of these tools over the years, the Tennant Method, R2CROSS, PHABSIM/IFIM and River2D. R2CROSS is the most common methodology used by the CDOW to develop instream flow recommendations and the most familiar to the CWCB. The R2CROSS Methodology uses three instream flow hydraulic parameters (average depth, percent wetted perimeter, and average velocity) to develop biologic instream flow recommendations. The CDOW has determined that maintaining these three hydraulic parameters at adequate levels across riffle habitat types also maintains aquatic habitat in pools and runs for most life stages of fish and aquatic invertebrates (Nehring 1979; Espegren 1996). The CDOW believes that for cold water fisheries on small and medium size streams, instream flow recommendations from a correctly performed R2CROSS study compare favorably to instream flow recommendations from more expensive and time consuming PHABSIM studies. The goal of each of these studies is to protect the available fish habitat. The CDOW's intent

and basis for all its instream flow recommendations is the belief that preserving and protecting the entire fishery is the minimum requirement if your intent is to protect and preserve the entire natural environment of a segment to a reasonable degree.

PHABSIM and River2D Models provide more in-depth knowledge of the amount of potential fish habitat available than does the R2CROSS model because their results incorporate the use of Habitat Suitability Curves (HSC). These HSC add specific species' biological components to the hydraulic simulation models and allow the models to predict the amount of weighted useable area available at each modeled flow. The River2D Model used in the Colorado River Analysis is the state-of-art two-dimensional model used in instream flow studies for stream habitat modeling. The two-dimensional hydraulic modeling requires channel geometry data, multiple water-surface elevation data sets and multiple velocity data sets. The results of this modeling effort provided the most accurate estimate of the physical habitat available for each modeled fish species. The CDOW used the results from this modeling effort to make its instream flow recommendations.

Figures 6, 7 and 8 display some of the information the CDOW used to determine its recommended instream flow amounts. Each figure displays the amount of poor, fair and good habitat available at a modeled flow and a pie chart representing the relative abundance of each modeled species found within each proposed stream reach. Figure 6 is representative of the Blue River to Piney River segment, Figure 7 is representative of the Piney River to Cabin Creek segment and Figure 8 is representative of the Cabin Creek to Eagle River segment.

Figure 6: Blue River to Piney River Segment

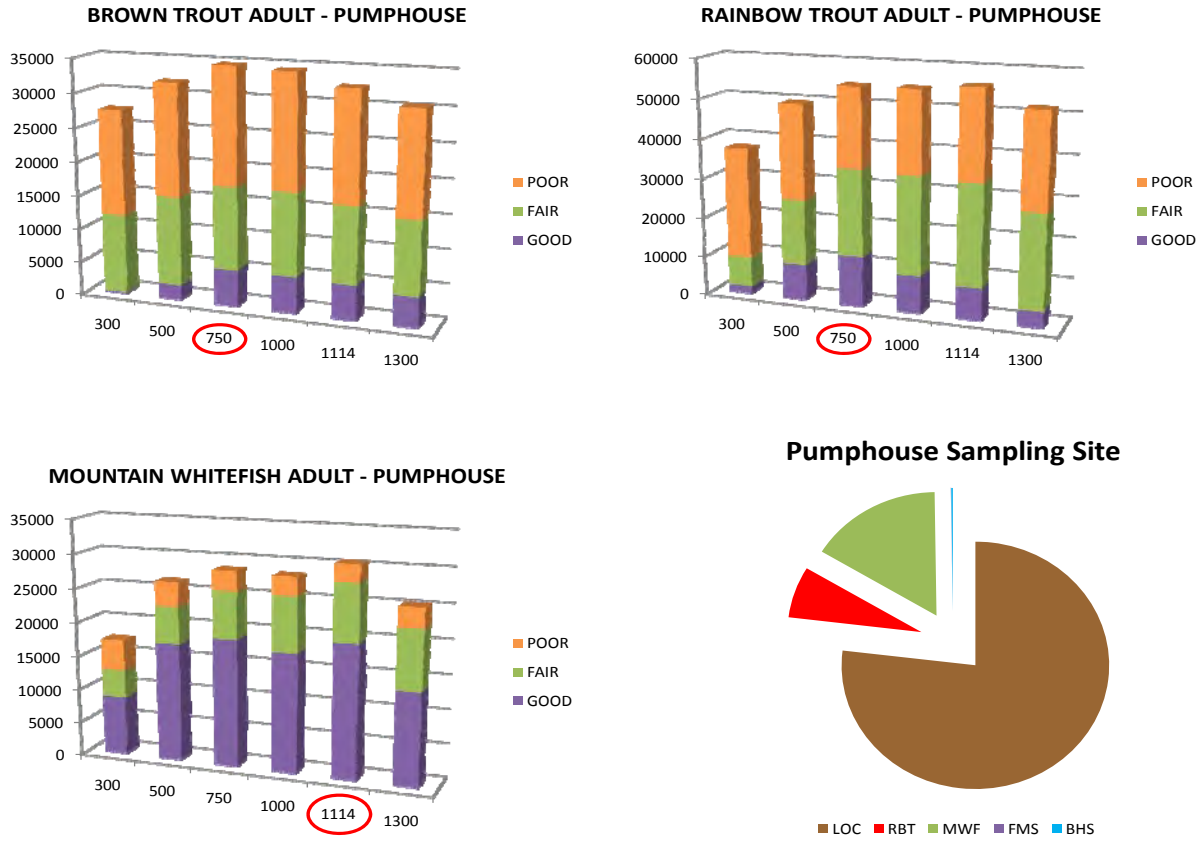
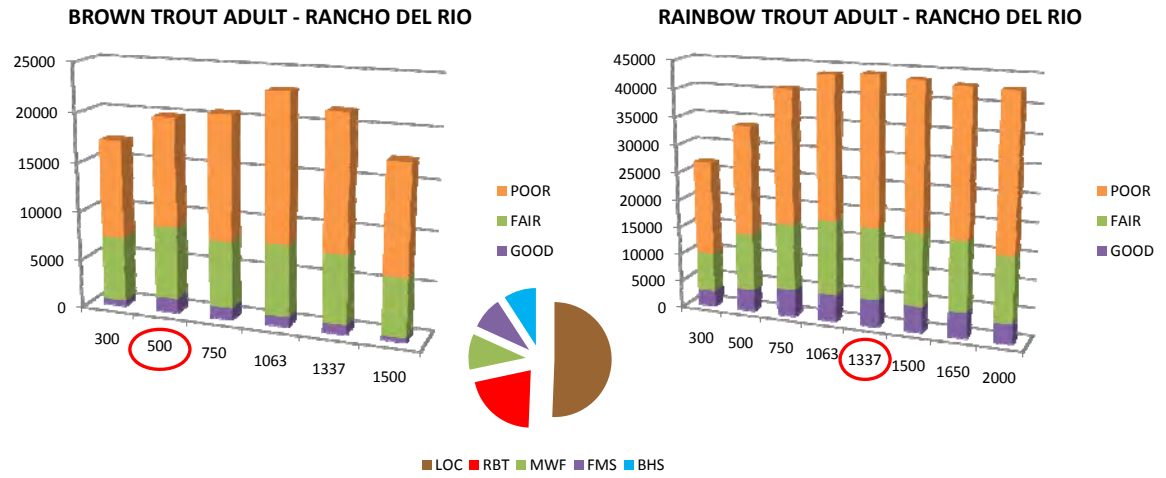


Figure 7: Piney River to Cabin Creek Segment



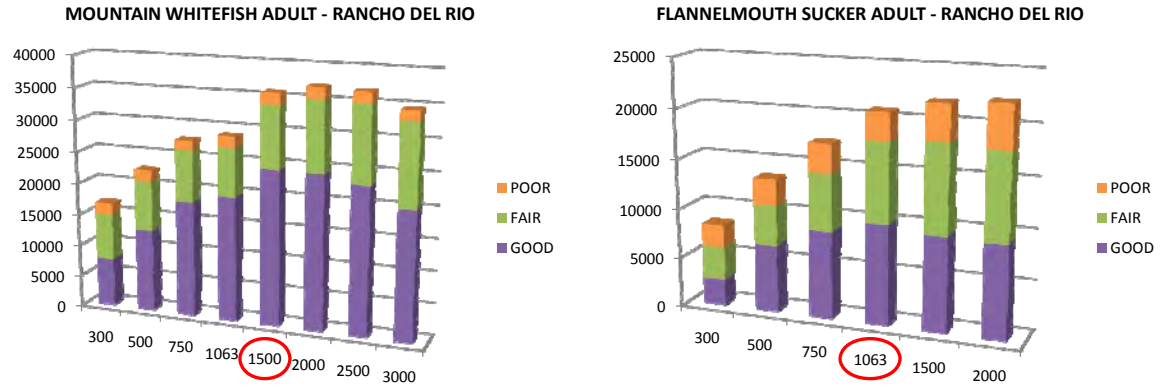
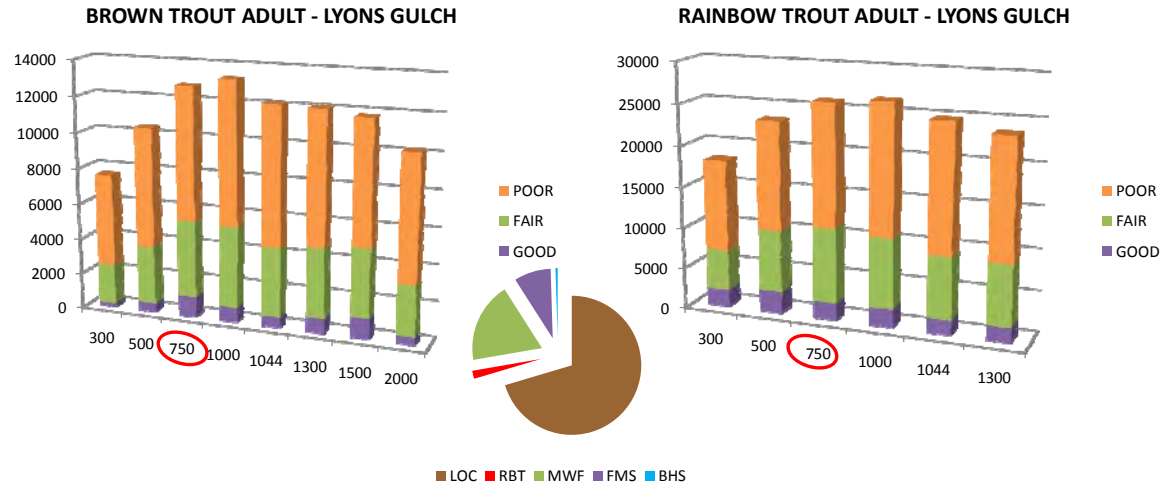
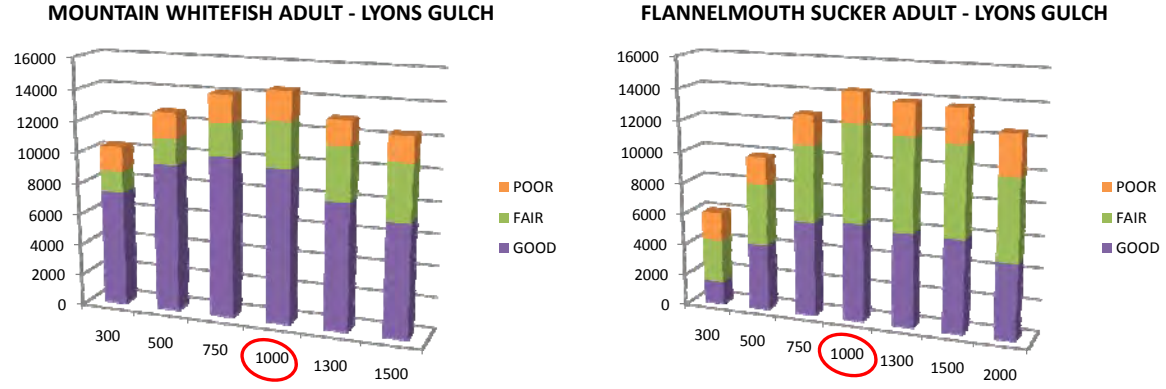


Figure 8: Cabin Creek to Eagle River Segment





CDOW Recommendation

The CDOW is recommending that the CWCB appropriate the flows recommended by the stakeholder group conditioned on the following:

1. The CWCB's determination that the UCRSG's instream flow recommendation meets its statutory standards is premised on implementation of the UCRSG Alternative Management Plan. While withdrawal of the Plan would not affect the validity of a decreed ISF water right, the CWCB retains the ability to revisit its findings through a subsequent public process relating to its determination of the amount of water necessary to preserve the natural environment to a reasonable degree if the Upper Colorado River Management Plan developed by the Stakeholder Group is ever withdrawn for any reason;

2. The CWCB's determination regarding the amount of water necessary to preserve the natural environment to a reasonable degree will in no way limit the CDOW's ability to perform its statutory responsibilities and duties under Title 33 Wildlife and Parks and Outdoor Recreation of the Colorado Revised Statues and under section 37-60-122.2 regarding fish and wildlife resource mitigation plans;

3. Nothing in the Upper Colorado River Management Plan shall preclude or limit the CDOW's use of any data regardless of whether such data has been used in the negotiation of the proposed Outstanding Remarkable Value (ORV) Indicators or Resource Guides; and

4. Participation in the Upper Colorado River Management Plan as a stakeholder is not intended to serve as project mitigation nor as a means to demonstrate that a project does not unreasonably diminish the ORVs (except as may be agreed between the project proponent and the CDOW).

The CDOW would also recommend that the CDOW's preliminary instream flow recommendations serve as a guide for future water acquisitions by the CWCB to preserve and improve the natural environment and as a goal for future UCRSG's Voluntary Cooperative Measures.

If you have any questions regarding the attached information or the instream flow recommendations, please contact me at (303)-291-7267.

Sincerely,

Mark Uppendahl

Mark Uppendahl
Colorado Division of Wildlife
Instream Flow Program Coordinator

Cc: Grady McNeill, CDOW Resource Support Section Manager – w/o attachments
Jay Skinner, CDOW Water Unit Program Manager – w/o attachments
Dave Graf, CDOW Water Resource Specialist – w/o attachments
Sherman Hebein, CDOW Senior Fish Biologist – w/o attachments
Jon Ewert, CDOW Fish Biologist – w/o attachments
Kendall Backich, CDOW Fish Biologist – w/o attachments