COLORADO
Parks and Wildlife
Department of Natural Resources

Water Resources Section
6060 Broadway
Denver, CO 80216

November 1, 2024

Mr. Rob Viehl, Section Chief
Colorado Water Conservation Board
Stream and Lake Protection Section
1313 Sherman Street, 7th Floor
Denver, CO 80203

Subject: Instream Flow Recommendation for East Fork Dry Creek in Water Division 4, Ouray County to be presented at the January 2025 CWCB Meeting

Dear Mr. Viehl:

The information contained within and referred to in this letter forms the scientific and biological basis for an instream flow (ISF) recommendation on East Fork Creek in Water Division 4. Field investigations relating to this ISF recommendation were initiated by CPW staff in 2019. In 2022, Colorado Parks and Wildlife (CPW) and Colorado Water Conservation Board (CWCB) staff completed data collection. East Fork Dry Creek is a first order stream that supports native Colorado River cutthroat trout. This ISF recommendation was first presented to interested parties at the ISF Workshop in January 2020. CPW and CWCB staff conducted outreach to the Ouray County Commissioners in 2024. It is CPW staff's opinion that the information contained in this letter is sufficient for the CWCB's staff to recommend an ISF appropriation to the Board on East Fork Dry Creek as it specifically addresses the findings required in Rule 5(i) of the Instream Flow Program Rules.

CPW participates in the ISF Program and develops ISF recommendations for the Board's consideration in an effort to address CPW's legislative directives "… 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" [§33-1-101 (1) C.R.S.], and "… that the natural, scenic, scientific, and outdoor recreation areas … 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 acquisition, development, and management of … lands, waters, and facilities." [§33-10-101 (1) C.R.S.].

In addition to these broad statutory guidelines, CPW's strategic planning document (CPW Strategic Plan, 2015) explains the agency's current goals to, "[c]onserve wildlife and habitat to ensure healthy sustainable populations and ecosystems" in order to, "protect and enhance water resources for fish and wildlife populations," by pursuing, "partnerships and agreements to enhance instream flows,

protect reservoir levels, and influence water management activities," and to, "[a]dvocate for water quality and quantities to conserve aquatic resources." In addition to the CPW Strategic Plan, the agency's fish and wildlife conservation activities are also informed by the State Wildlife Action Plan (2002, Revised 2015). The aforementioned documents direct CPW to advocate for the preservation of the state's fish and wildlife resources and natural environment, and therefore link CPW's mission to the goals and priorities of CWCB's Instream Flow and Natural Lake Level Program.

Recommended Segments & Land Status

CPW is proposing an ISF recommendation on East Fork Dry Creek from the headwaters (located at UTM 12S 225416.86 4245723.89) to the confluence with Beaver Dams Creek (located at UTM 12S 229778.94 4246758.01). The reach is approximately 3.1 miles in length. The upper portion of the proposed reach is on public land managed under the Uncompahgre National Forest. There are approximately 1.7 miles of East Fork Dry Creek under private land ownership toward the lower terminus of the proposed ISF reach.

Colorado Cutthroat Trout Conservation Goals

In 2001, CPW entered into a multi-state and multi-agency conservation agreement and strategy concerning Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*). Colorado's partners in this plan and agreement include the natural resource management agencies from Utah and Wyoming, a number of federal agencies including the USFS, USFWS, BLM and NPS, and the Ute Indian Tribe of the Uintah and Ouray Reservation. The purpose of the strategy is to provide a framework for the long-term conservation of the Colorado River cutthroat trout (CRCT), and to reduce or eliminate the threats that warrant its status as a sensitive species or species of concern by federal resource agencies. Essentially, the parties agreed that in order to prevent listing of the subspecies, and to reach desired recovery goals without hindering further development of our state resources, continued implementation of the conservation strategy was necessary.

The objectives of the strategy are to identify and characterize all CRCT core and conservation populations, secure and enhance conservation populations, restore populations, secure and enhance watershed conditions, public outreach, data sharing, and coordination. CPW believes that flow protection can be achieved by establishing an ISF water right, and this step is a conservation action that will "secure and enhance watershed conditions" and will support the core conservation populations of CRCT which are resident to the East Fork Dry Creek basin. Information about the species and CPW's conservation strategy can be found here: CPW Cutthroat Trout Research. CPW believes that securing ISF water rights for core conservation populations of CRCT is a critical step in the overall preservation of these important native trout.

Natural Environment and Biological Summary

East Fork Dry Creek is a tributary of the Uncompahgre River which flows easterly off the Uncompahgre Plateau towards the town of Montrose. East Fork Dry Creek is a first order headwater stream that is snow-melt dominated and influenced by late-summer monsoonal events. The mean basin elevation is approximately 9,200 feet. The basin receives approximately 27 inches of precipitation a year. The drainage basin contributing to the ISF reach is approximately 5.7 square miles. It is forested with dense stands of pine and some interspersed aspen stands. The creek supports a healthy riparian community. Willows and skunk cabbage were observed in the field.

East Fork Dry Creek is a relatively high-gradient channel with substrate that ranges from small cobble to gravel and sand. Fish habitat in East Fork Dry Creek is complex and includes significant large woody debris in the channel creating deep pools. Log-jams are plentiful throughout the ISF reach which create both pools and long runs. These refuge habitats support fish when flows are periodically low following runoff. Ample overhead shading provides cover and temperature buffering. The creek also supports a healthy riparian area and a diverse macroinvertebrate community. Macroinvertebrates observed in the field include stonefly, case-making caddisfly, midge, and water beetle.

East Fork Dry Creek supports a self-sustaining population of Colorado River cutthroat trout of the Gunnison Basin lineage. CRCT are state species of special concern and considered federally sensitive species (State Wildlife Action Plan, 2015). Length-frequency data indicates multiple age classes surveyed by CPW in 2017 (see attached), which reinforces that the cutthroat trout in East Fork Dry Creek are a self-sustaining population. Multiple cutthroat trout were observed during 2020 and 2022 site visits.

R2Cross Background

Initial biological instream flow recommendations were developed using the R2Cross methodology (Espegren, 1996[1]). R2Cross uses field data that has been collected in a riffle habitat type. Riffles are often the limiting habitat features in streams during low flow events, so maintaining specific hydraulic conditions across riffle habitat types will also maintain aquatic habitat in pools and runs for most life stages of fish and macroinvertebrates (Nehring, 1979[2]). The R2Cross model uses field data, including a survey of cross-sectional channel geometry, a longitudinal slope of the water surface, and a flow measurement, as input to a single transect hydraulic model. R2Cross uses Ferguson's Variable-Power Equation (Ferguson, 2007[3]) to model a stage-discharge relationship and compute corresponding hydraulic parameters of average depth, average velocity, and percent wetted perimeter over modeled stages. Maintaining these three hydraulic parameters at specified levels should ensure conditions that allow movement of fish longitudinally across riffles and adequate depths, velocities, and oxygenation for production of macroinvertebrates and development of trout eggs. Baseflow recommendations are typically developed based on the flows that meet two of three hydraulic criteria and summer flow recommendations are based on hydraulic criteria that meet three of three hydraulic criteria (as described in Nehring 1979 and Espergren 1996).

In 2020 and 2022, CPW and CWCB staff conducted site visits and collected R2Cross datasets on EF Dry Creek. Two cross-sectional datasets from 2020 were not included in preliminary flow recommendations because it was an extremely dry year and streamflow was too low for an accurate flow measurement. The preliminary results of the R2Cross analysis are summarized below using one cross-section from 2022.

[1]Espegren, G.D., 1996, Development of Instream Flow Recommendations in Colorado Using R2CROSS, Colorado Water Conservation Board.

[2]Nehring, B.R., 1979, Evaluation of Instream Flow Methods and Determination of Water Quantity Needs for Streams in the State of Colorado, Colorado Division of Wildlife.

[3] Ferguson, R.I., 2007. Flow resistance equations for gravel- and boulder-bed streams. Water Resources Research 43. https://doi.org/10.1029/2006WR005422

	Bankfull Top Width	Date Measured	Flow Measured	Flow Meeting Two Criteria	Flow Meeting Three Criteria
3	14.48 ft	5/26/2022	1.49 cfs	1.8 cfs	2.5 cfs
Recommended Flow Rates:				**1.8 cfs**	**2.5 cfs**

The biological flow recommendation during the baseflow period is 1.8 cfs. This rate will be protective by maintaining an average depth of 0.2 and 50 percent wetted perimeter. The biological flow recommendation in the summer is 2.5 cfs, which will also maintain suitable depth and wetted perimeter, as well as a velocity of 1 foot per second (fps) on average.

In order to make a preliminary determination whether water is available for the R2Cross-based flow recommendations and to determine the appropriate seasonal transition dates, CPW examined basic hydrologic data and water rights information for East Fork Dry Creek. East Fork Dry Creek does not have any gage data, and because it is high-elevation and undeveloped, CWCB staff relied upon regression equations for monthly flow estimates to determine the seasonality of the flow recommendations. CPW is not aware of the any active water rights within the ISF reach.

Water Availability

CPW's analysis indicates that the following flows are needed to protect the natural environment to a reasonable degree. Based on the hydrology from CSUFlow18 (Eurich et al., 2021[4]), there appears to be water availability limitations during the fall and winter periods. Therefore, CPW's adjusted flow recommendations are the following:

- Early Spring Flow Recommendation (March 1 through March 31): **1.5 cfs**
    - Earlier spring snowmelt may be a reality in a changing climate. This flow recommendation will support sufficient wetted perimeter and depth as fish transition to more metabolic activity as they come out of overwintering conditions with warming spring temperatures.
- Spring and Summer Flow Recommendation (April 1 through July 31): **2.5 cfs**
    - Maintains adequate depth, velocity, and wetted perimeter from the start of spring snowmelt through its recession and into late-summer flow conditions. This flow rate will support fish when they are most active and will provide refuge areas when stream temperatures are high following spring runoff. This higher flow rate also supports beneficial spawning conditions for cutthroat trout who spawn in the spring to early summer. It will also allow for streamflow conditions which support feeding and growth.
- Late Summer and Fall Flow Recommendation (August 1 through October 31): **1.2 cfs**
    - This flow recommendation has been reduced due to water availability constraints but will provide sufficient wetted perimeter and habitat availability in pools and glides and may allow fish movement between most riffles.
- Baseflow Recommendation (November 1 through February 28): **0.6 cfs**

[4] Eurich, A., Kampf, S.K., Hammond, J.C., Ross, M., Willi, K., Vorster, A.G. and Pulver, B., 2021, Predicting mean annual and mean monthly streamflow in Colorado ungauged basins, River Research and Applications, 37(4), 569-578.

- This flow recommendation has been reduced due to water availability constraints but will provide sufficient wetted perimeter and refuge habitat is deep pools and glides, especially those holding habitats created from large woody debris in the channel.

The purpose of this letter is to formally transmit this ISF recommendation to CWCB for their Board's consideration. Based on CPW's opinion that there is a flow-dependent natural environment in East Fork Dry Creek Creek that can be preserved to a reasonable degree with an ISF water right in the recommended rates. Please refer to attachments which include; R2Cross field forms, R2Cross output, fish survey information, and photographs at each cross section location.

CPW personnel will be available at the January 2025 CWCB meeting to answer any questions that the Board might have regarding these flow recommendations. We appreciate your consideration.

Sincerely,

Katie Birch
CPW Instream Flow Program Coordinator
Attachments (as stated)