

Rincon La Vaca Creek Executive Summary



CWCB STAFF INSTREAM FLOW RECOMMENDATION January 25-26, 2021

UPPER TERMINUS: headwaters
UTM North: 4170340.18 UTM East: 288830.29

LOWER TERMINUS: confluence Los Pinos River
UTM North: 4171003.14 UTM East: 294776.30

WATER DIVISION: 7

WATER DISTRICT: 31

COUNTY: Hinsdale

WATERSHED: Upper San Juan

CWCB ID: 18/7/A-002

RECOMMENDER: Colorado Parks and Wildlife (CPW)

LENGTH: 4.47 miles

FLOW RECOMMENDATION: 1.2 cfs (11/01 - 04/30)
2.8 cfs (05/01 - 10/31)



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Conservation Board**

Department of Natural Resources

Introduction

Colorado's General Assembly created the Instream Flow and Natural Lake Level Program in 1973, recognizing "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 Colorado Water Conservation Board (CWCB or Board) with the exclusive authority to appropriate and acquire instream flow (ISF) and natural lake level water rights (NLL). Before initiating a water right filing, the Board must determine that: 1) there is a natural environment that can be preserved to a reasonable degree with the Board's water right if granted, 2) the natural environment will be preserved to a reasonable degree by the water available for the appropriation to be made, and 3) such environment can exist without material injury to water rights.

Colorado Parks and Wildlife (CPW) recommended that the CWCB appropriate an ISF water right on a reach of Rincon La Vaca Creek because it has a natural environment that can be preserved to a reasonable degree. The proposed reach extends from Rincon La Vaca Creek's headwaters downstream to the confluence with the Los Pinos River. Rincon La Vaca Creek is located within Hinsdale County (See Vicinity Map), and originates at an elevation of approximately 12,440 feet. It flows in an easterly direction for 4.47 miles before it joins Los Pinos Creek at an elevation of 10,555 feet. One hundred percent of the land on the 4.47 mile proposed reach is part of the Weminuche Wilderness Area managed by the U.S. Forest Service (See Land Ownership Map).

The information contained in this Executive Summary and the associated supporting data and analyses form the basis for staff's ISF recommendation to be considered by the Board. This Executive Summary provides sufficient information to support the CWCB findings required by ISF Rule 5i on natural environment, water availability, and material injury. Additional supporting information is located at: <https://cwcb.colorado.gov/2021-isf-recommendations>.

Natural Environment

CWCB staff relies on the recommending entity to provide information about the natural environment. In addition, staff reviews information and conducts site visits for each recommended ISF appropriation. This information is used to provide the Board with a basis for determining that a natural environment exists.

Rincon La Vaca is a cold-water stream that runs through an alpine forest and meadow in the northern Weminuche Wilderness of the San Juan National Forest. The average elevation of the basin is 12,000 feet. Rincon La Vaca is a first order, headwater mountain stream. Flowing down from the mountains toward the valley meadow, the upper portion of the stream is high gradient, gradually decreasing in steepness as it heads towards the confluence with Los Pinos River. The channel is defined in the upper portion of the reach by boulders and woody debris forming pools with cobble to boulder sized substrate. Sinuosity of the channel increases as it enters the alpine meadow and substrate changes to predominantly sand. The watershed drains approximately six square miles of high elevation mountains, hydrologically driven by snowmelt from the snowpack of the local peaks. The riparian community is robust and healthy with a vast diversity of forest and meadow species of the San Juan Mountain Range. CWCB staff observed evidence of diverse wildlife, including moose and a variety of birds.

The USFS has documented a trout population in Rincon La Vaca Creek that is self-sustaining and contains individuals of multiple age classes. CPW has sampled this population and identified them as Colorado River cutthroat trout with genetic testing pending. Populations of macroinvertebrates were also observed to include caddisfly, mayfly and stonefly.

Table 1. List of species identified in Rincon La Vaca Creek.

Species Name	Scientific Name	Protection Status
Colorado River cutthroat trout* ¹	<i>Oncorhynchus clarkii pleuriticus</i> ¹	State - Species of Greatest Conservation Need & Species of Special Concern
caddisfly*	<i>Trichoptera</i>	None
mayfly*	<i>Ephemeroptera</i>	None
stonefly*	<i>Plecoptera</i>	None

¹Genetic testing pending

*Indicates native species

ISF Quantification

CWCB staff relies upon the biological expertise of the recommending entity to quantify the amount of water required to preserve the natural environment to a reasonable degree. CWCB staff performs a thorough review of the quantification analyses completed by the recommending entity to ensure consistency with accepted standards.

Quantification Methodology

CPW staff used the R2Cross methodology to develop the initial ISF recommendation. The R2Cross method is based on a hydraulic model and uses field data collected in a stream riffle (Espgren, 1996). Riffles are a stream habitat type that are most easily visualized as sections of the stream that would dry up first should streamflow cease. The data collected consists of a streamflow measurement, survey of channel geometry and features at a single transect, and survey of the longitudinal slope of the water surface.

The field data is used to model three hydraulic parameters: average depth, average velocity, and percent wetted perimeter. Maintaining these hydraulic parameters at adequate levels across riffle habitat types also will maintain aquatic habitat in pools and runs for most life stages of fish and aquatic macroinvertebrates (Nehring, 1979). CPW staff interprets the model results to develop an initial recommendation for summer and winter flows. The summer flow recommendation is based on meeting 3 of 3 hydraulic criteria. The winter flow recommendation is based on meeting 2 of 3 hydraulic criteria. The model's suggested accuracy range is 40% to 250% of the streamflow measured in the field. Recommendations that fall outside of the accuracy range may not give an accurate estimate of the hydraulic parameters necessary to determine an ISF rate.

The R2Cross methodology provides the biological amount of water needed for summer and winter periods. The recommending entity uses the R2Cross results and its biological expertise to develop an initial ISF recommendation. CWCB staff then evaluates water availability for the reach typically based on median hydrology (see the Water Availability section below for more details). The water availability analysis may indicate less water is available than the initial recommendation. In that case, the recommending entity either modifies the magnitude and/or

duration of the recommended ISF rates if the available flows will preserve the natural environment to a reasonable degree, or withdraws the recommendation.

Data Analysis

R2Cross data was collected at seven transects for this proposed ISF reach by USFS and CPW (Table 2). Results obtained at more than one transect are averaged to determine the R2Cross flow rate for the reach of stream. The R2Cross model results in a winter flow of 1.15 cfs, which meets 2 of 3 criteria and is within the accuracy range of the R2Cross model. The R2Cross model results in a summer flow of 2.75 cfs, which meets 3 of 3 criteria and is within the accuracy range of the R2Cross model. R2Cross field data and model results can be found in the appendix to this report.

Table 2. Summary of R2Cross transect measurements and results for Rincon La Vaca Creek.

Date, Xsec #	Entity	Top Width (feet)	Streamflow (cfs)	Accuracy Range (cfs)	Winter Rate (cfs)	Summer Rate (cfs)
09/11/2014, 1	USFS	10.45	3.62	1.45 - 9.05	Out of range	4.22 ¹
09/11/2014, 2	USFS	8.70	3.91	1.56 - 9.78	Out of range	2.10
09/11/2014, 3	USFS	10.39	3.90	1.56 - 9.75	Out of range	2.36
10/06/2016, 1	CPW	12.32	6.97	2.79 - 17.43	Out of range	Out of range
10/06/2016, 2	CPW	11.85	7.29	2.92 - 18.23	Out of range	Out of range
09/29/2020, 1	CPW	14.62	2.75	1.10 - 6.88	1.15	2.73
09/29/2020, 2	CPW	13.50	3.43	1.37 - 8.58	Out of range	3.79
				Mean	1.15	2.75

¹ The USFS did not include results from their XS 1 in their analysis because bankfull indicators were not well defined, and the riffle was higher gradient and shorter than their XS 2 and 3. Deferring to USFS expertise, USFS XS 1 results were not included in the flow recommendation.

ISF Recommendation

The CPW recommends the following flows based on R2Cross modeling analyses, biological expertise, and staff's water availability analysis.

2.8 cfs is recommended from May 1st to October 31st. This flow rate will maintain an average velocity of 1 ft/s, average depth of at least 0.2 feet, and at least 50 percent wetted perimeter of the stream channel on average over the measured cross sections.

1.2 cfs is recommended from November 1st to April 30th. This flow rate will maintain depths of 0.2 feet on average and over 50 percent wetted perimeter.

Water Availability

CWCB staff conducts hydrologic analyses for each recommended ISF appropriation to provide the Board with a basis for making the determination that water is available.

Methodology

Each recommended ISF reach has a unique flow regime that depends on variables such as the timing, magnitude, and location of water inputs (such as rain, snow, and snowmelt) and water losses (such as diversions, reservoirs, evaporation and transpiration, groundwater recharge, etc). Although extensive and time-consuming investigations of all variables may be possible, staff takes a pragmatic and cost-effective approach to analyzing water availability. This approach focuses on streamflows and the influence of flow alterations, such as diversions, to understand how much water is physically available in the recommended reach.

Staff's hydrologic analysis is data-driven, meaning that staff gathers and evaluates the best available data and uses the best available analysis method for that data. Whenever possible, long-term stream gage data (period of record 20 or more years) will be used to evaluate streamflow. Other streamflow information such as short-term gages, temporary gages, spot streamflow measurements, diversion records, and StreamStats will be used when long-term gage data is not available. StreamStats, a statistical hydrologic program, uses regression equations developed by the USGS (Capesius and Stephens, 2009) to estimate mean flows for each month based on drainage basin area and average drainage basin precipitation. Diversion records will also be used to evaluate the effect of surface water diversions when necessary. Interviews with water commissioners, landowners, and ditch or reservoir operators can provide additional information. A range of analytical techniques may be employed to extend gage records, estimate streamflow in ungaged locations, and estimate the effects of diversions. The goal is to obtain the most detailed and reliable estimate of hydrology using the most efficient analysis technique.

The final product of the hydrologic analysis used to determine water availability is a hydrograph, which shows streamflow and the proposed ISF rate over the course of one year. The hydrograph will show median daily values when daily data is available; otherwise, it will present mean-monthly streamflow values. Staff will calculate 95% confidence intervals for the median streamflow if there is sufficient data. Statistically, there is 95% confidence that the true value of the median streamflow is located within the confidence interval.

Basin Characteristics

The drainage basin of the proposed ISF on Rincon La Vaca Creek is 5.9 square miles, with an average elevation of 11,827 feet and average annual precipitation of 40.2 inches (See the Hydrologic Features Map).

There is one diversion on the proposed ISF reach, Weminuche Pass Ditch (WDID 3104637, appropriation date 1934, 1935, 1950 with net decreed rate of 40 cfs). Weminuche Pass Ditch is operated by CPW and located approximately 0.5 miles upstream from the proposed lower terminus. The ditch is a transbasin diversion that exports water from Rincon La Vaca Creek in Division 7 across the basin divide to the headwaters of Weminuche Creek, a tributary to the Rio Grande River in Division 3. CPW stores diversions from this water right in the Rio Grande Reservoir and makes releases to supplement irrigation on historically irrigated lands below the reservoir in exchange for wildlife benefits and youth hunting opportunities. Due to surface water diversions and transbasin exports, hydrology in this drainage basin does not represent natural flow conditions.

Available Information and Data Analysis

Weminuche Pass Ditch Diversion and CPW bypass

The Weminuche Pass Ditch is decreed for a total of 40 cfs, but embankment failures have limited diversions in recent years. Weminuche Pass Ditch diversions occur primarily during spring runoff season, typically from the beginning of June to mid-July. Later in the season, diversions are subject to call by senior water rights located downstream in Division 7.

In most years, the Weminuche Pass Ditch has the legal ability to dewater the lower 0.5 miles of Rincon La Vaca Creek. In the interest of sustaining the fishery, CPW has agreed to bypass 2.8 cfs to help preserve the natural environment to a reasonable degree. It is anticipated that outside of the season of use for the Ditch, the Ditch will bypass all of the native flow in the creek. This practice will be memorialized through CPW's special use permit authorization with the USFS and bypass flows will be protected by this proposed ISF water right.

StreamStats

The USGS StreamStats tools was used to estimate monthly streamflow. StreamStats based estimates do not account for the Weminuche Pass Ditch diversions.

Site Visits

Staff visited the site in September 2020 to collect additional R2Cross data. No other site visits were made by CWCB staff to collect additional flow data.

Water Availability Summary

The hydrograph (See Complete Hydrograph) shows StreamStats results for mean-monthly streamflow. Staff has concluded that water is available based on StreamStats estimates and the commitment by CPW to bypass the ISF flow rates.

Material Injury

Because the proposed ISF on Rincon La Vaca Creek is a new junior water right, the ISF can exist without material injury to other water rights. Under the provisions of section 37-92-102(3)(b), C.R.S. (2020), the CWCB will recognize any uses or exchanges of water in existence on the date this ISF water right is appropriated.

Citations

Capesius, J.P. and V.C. Stephens, 2009, Regional regression equations for estimation of natural streamflow statistics in Colorado, Scientific Investigations Report 2009-5136.

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

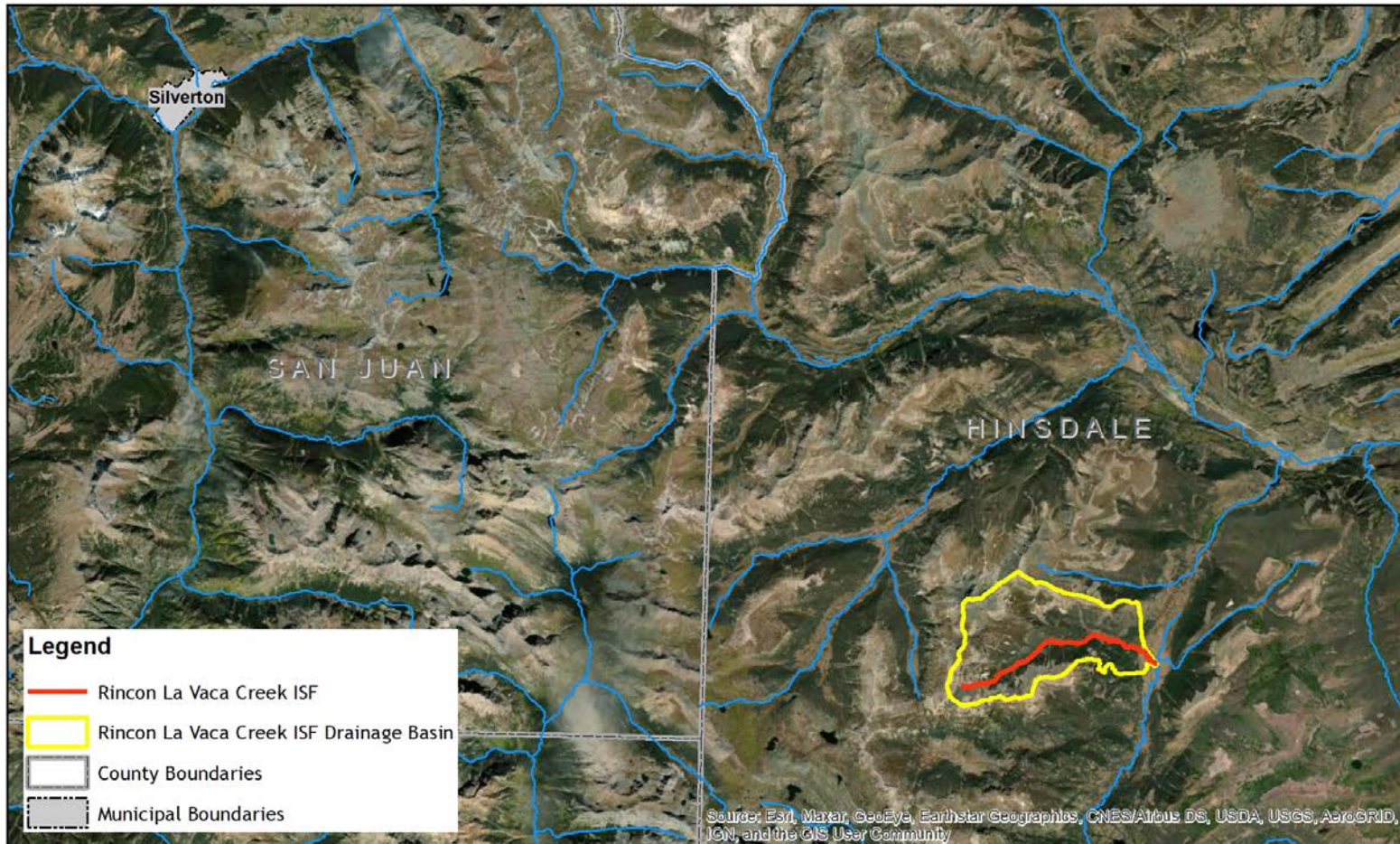
Nehring, B.R., 1979, Evaluation of Instream Flow Methods and Determination of Water Quantity Needs for Streams in the State of Colorado, Colorado Division of Wildlife.

Metadata Descriptions

The UTM locations for the upstream and downstream termini were derived from CWCB GIS using the National Hydrography Dataset (NHD).

Projected Coordinate System: NAD 1983 UTM Zone 13N.

VICINITY MAP



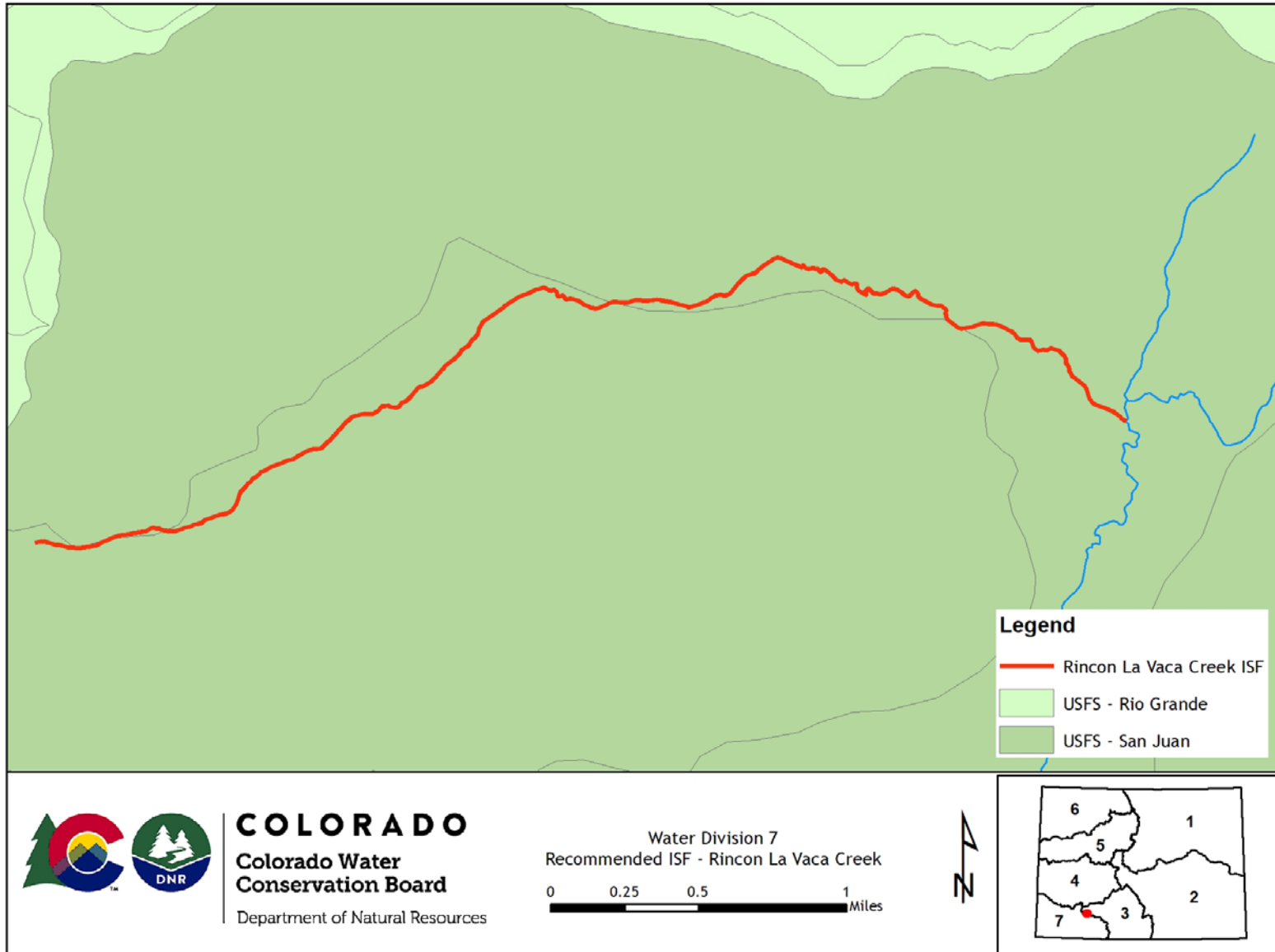
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Water Division 7
Recommended ISF - Rincon La Vaca Creek

0 1.5 3 6 Miles



LAND OWNERSHIP MAP



HYDROLOGIC FEATURES MAP

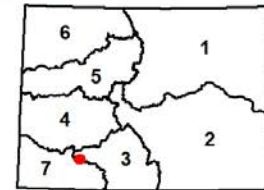


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COMPLETE HYDROGRAPH

