Italian Creek Executive Summary

CWCB STAFF INSTREAM FLOW RECOMMENDATION
January 24-25, 2022

UPPER TERMINUS:	confluence South Italian Creek at: UTM North: 4312733.91 UTM East: 355602.65
LOWER TERMINUS:	confluence Taylor River at: UTM North: 4312702.92 UTM East: 358831.67
WATER DIVISION:	4
WATER DISTRICT:	59
COUNTY:	Gunnison
WATERSHED:	East-Taylor
CWCB ID:	22/4/A-003
RECOMMENDER:	High Country Conservation Advocates (HCCA)
LENGTH:	2.42 miles
EXISTING INSTREAM FLOW:	84CW355, 2.5 cfs (1/1 – 12/31)
FLOW RECOMMENDATION:	0.7 cfs (04/01 - 10/31) - increase

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

BACKGROUND

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.

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/2022-isf-recommendations.

RECOMMENDED ISF REACH

HCCA recommended that the CWCB appropriate an increase to the existing ISF water right on a reach of Italian Creek. Italian Creek is located within Gunnison County approximately eight miles north from Taylor Park Reservoir (See Vicinity Map). Italian Creek originates on the north side of Italian Mountain and flows east until it reaches the confluence with the Taylor River. The existing ISF water right on Italian Creek was appropriated in 1984 for 2.5 cfs.

The proposed reach extends from the confluence with South Italian Creek downstream to the confluence with the Taylor River for a total of 2.42 miles. Ninety-nine percent of the land on the proposed reach is public land managed by the United States Forest Service (USFS) and 1% is privately owned (See Land Ownership Map). HCCA is interested in protecting this stream because it has a self-sustaining population of Colorado River Cutthroat Trout, a species of greatest conservation need and special concern. HCCA's mission is to protect the health and natural beauty of the land, rivers, and willife in and around Gunnison County.

OUTREACH

Stakeholder input is a valued part of the CWCB staff's analysis of ISF recommendations. Currently more than 1,100 people are subscribed to the ISF mailing list. Notice of the potential appropriation of an ISF water right on Italian Creek was sent to the mailing list in March and November of 2021. Staff sent notice letters to identified landowners adjacent to Italian Creek based on information available in the county assessors website. A public notice about this recommendation was also published in the Crested Butte News on October 28, 2021.

Staff presented information about the ISF program and this recommendation to the Gunnison County Board of County Commissioners on October 25, 2021. In addition, staff spoke with Bob Hurford, Division 4 Engineer, on November 3, 2021 regarding water availability on Italian Creek.

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.

Italian Creek is a cold-water, high-gradient stream with a slope that decreases near the confluence with the Taylor River. The channel is composed of mostly cobble-sized substrate with some boulders and ample woody debris.

The stream flows from alpine headwaters through robust riparian environments composed primarily of willow communities. There are both active and abandoned beaver ponds on and off-channel, including a complex forming a large wetland area near the confluence with the Taylor River.

Colorado Parks and Wildlife (CPW) identified four trout species, including a species of greatest conservation need and special concern. These populations are believed to be self-sustaining because Italian Creek is not stocked. HCCA staff observed several small trout and macroinvertebrates while completing R2Cross assessments in 2020.

Table 1. List of species identified in Italian Creek.

Species Name	Scientific Name	Protection Status
Colorado River Cutthroat Trout	*Oncorhynchus clarkii pleuriticus*	State - Species of Greatest Conservation Need State - Species of Special Concern
Brook Trout	*Salvelinus fontinalis*	None
Brown Trout	*Salmo trutta*	None
Rainbow Trout	*Oncorhynchus mykiss*	None
macroinvertebrates	various	None
beaver	*Castor canadensis*	None
willow	*Salix spp.*	None

ISF QUANTIFICATION

CWCB staff relies on 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

HCCA 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 (Espegren, 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 macro-invertebrates (Nehring, 1979). HCCA 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 three transects for this proposed ISF reach by HCCA (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 summer flow of 3.18 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 Italian Creek.

Date, XS #	Top Width (feet)	Streamflow (cfs)	Accuracy Range (cfs)	Winter Rate (cfs)	Summer Rate (cfs)
06/25/2020, 1	15.00	5.53	2.21 - 13.83	N/A	2.58
07/06/2020, 2	17.10	6.38	2.55 - 15.95	N/A	3.77
09/25/2020, 3	18.40	2.45	0.98 - 6.13	N/A	Out of range
			Mean		3.18

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

An increase of 0.7 cfs is recommended from April 1 through October 31 to bring the total ISF protection to 3.2 cfs. This increase is warranted because R2Cross modeling shows that the existing 2.5 cfs ISF water right does not fully protect habitat in the variety of riffle habitats on Italian Creek. Depending on the geomorphology of individual riffles, the existing ISF flow rate of 2.5 cfs does not fully meet the average velocity criteria.

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.

Water Availability 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 streamflow 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 Italian Creek is 16.80 square miles, with an average elevation of 11,108 feet and average annual precipitation of 28.40 inches (See the Hydrologic Features Map). There are no active surface water diversions in the proposed reach. There is one pipeline near the headwaters of Italian Creek. Due to the lack of surface water diversions, hydrology in the basin represents natural flow conditions.

Data Analysis

There are no current or historic streamflow gages on Italian Creek and no nearby representative gages were identified. StreamStats provides the best available estimate of streamflow on Italian Creek. CWCB staff visited Italian Creek but was unable to measure the flow due to inclement weather.

Water Availability Summary

The hydrograph (See Complete Hydrograph) shows StreamStats results for mean-monthly streamflow. Staff has concluded that water is available for appropriation.

MATERIAL INJURY

Because the proposed ISF on Italian 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. (2021), the CWCB will recognize any uses or exchanges of water in existence on the date this ISF water right is appropriated.

ADDITIONAL INFORMATION

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.

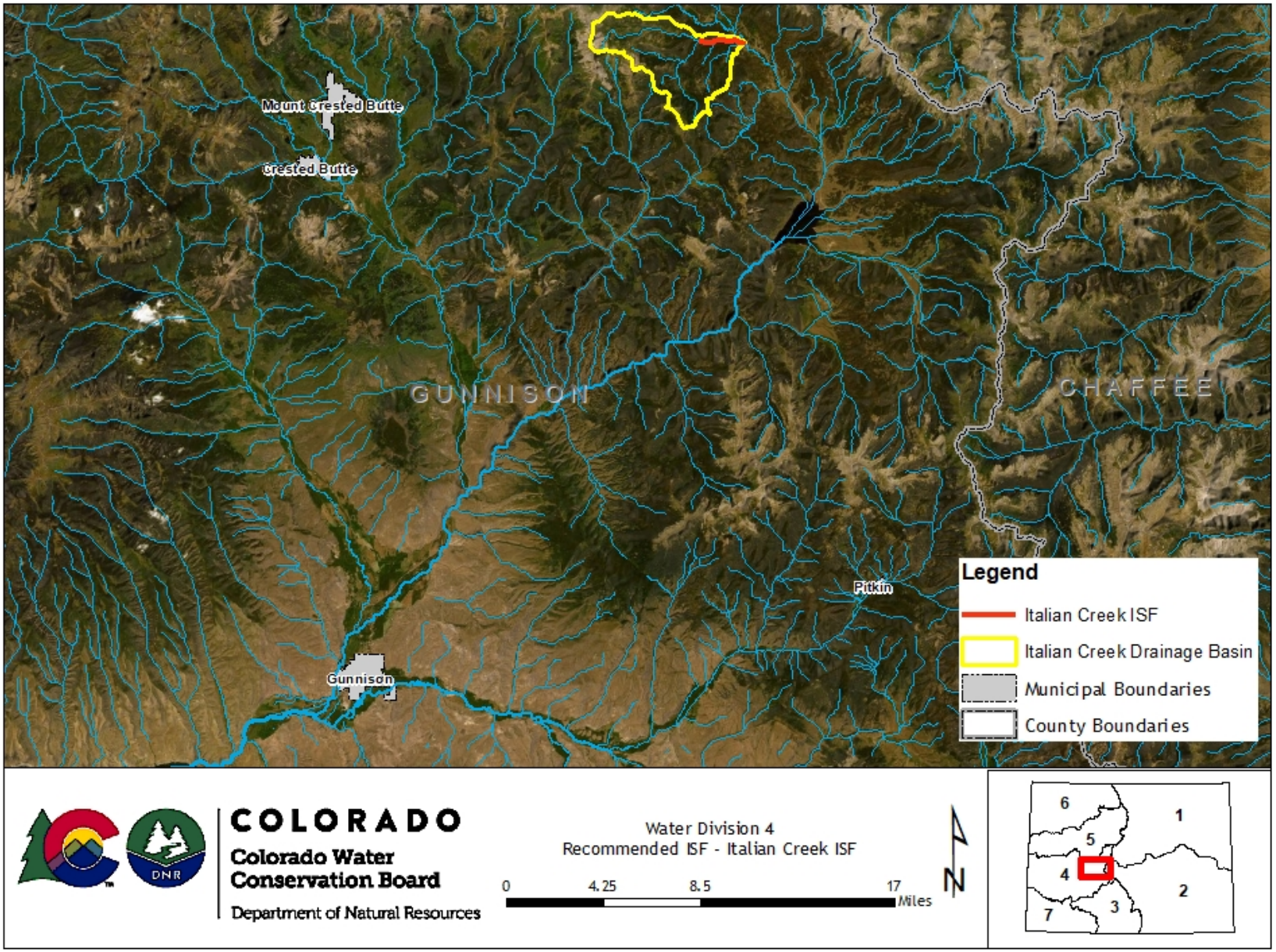
Nehring, B.R., 1979, Evaluation of Instream Flow Methods and Determination of Water Quantity Needs for Streams in the State of Colorado, Colorado Division of Wildlife.

Metadata Descriptions

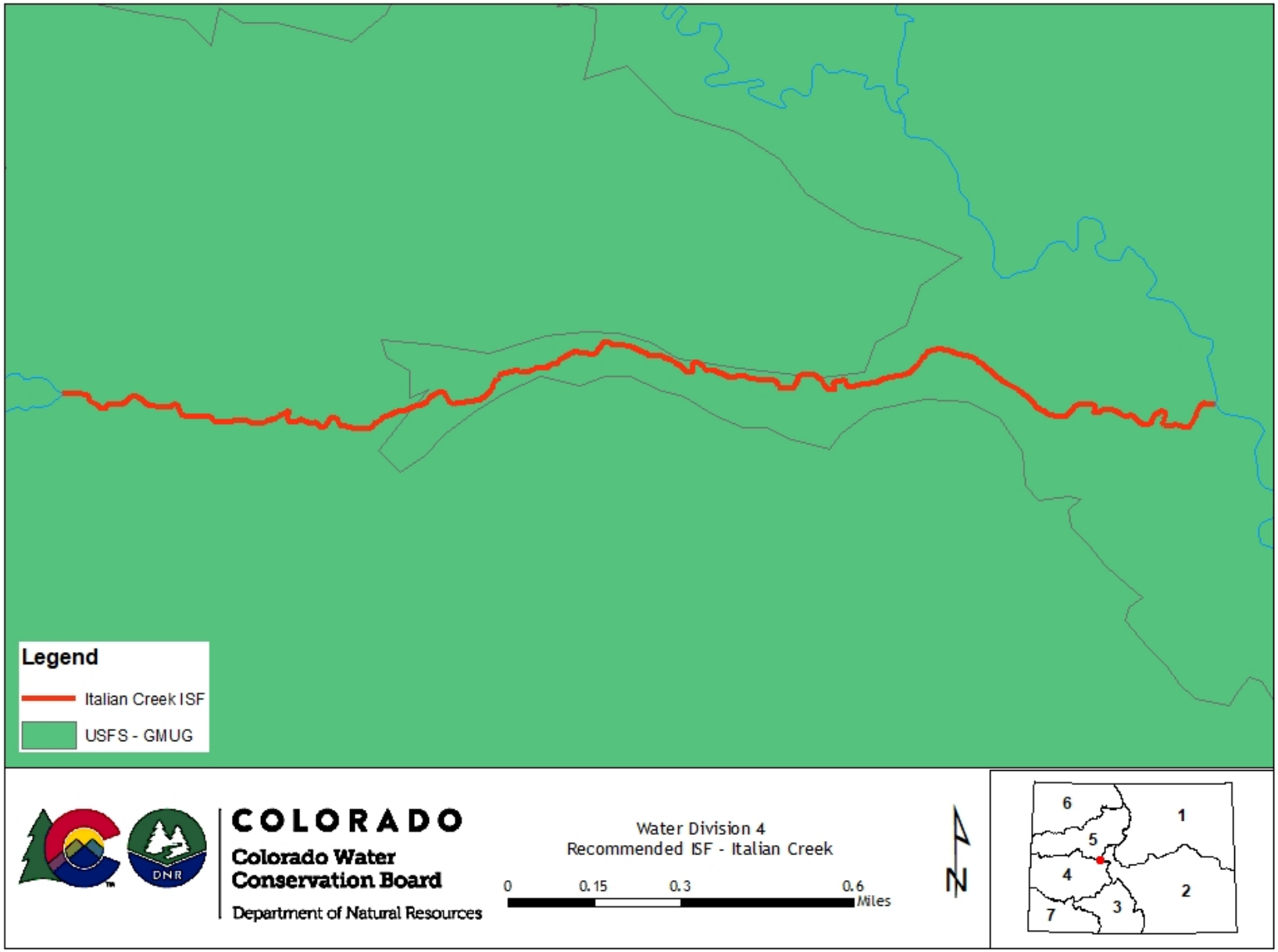
The UTM locations for the upstream and downstream termini were derived from CWCB GIS using the National Hydrography Dataset (NHD).

Projected Coordinate System: NAD 1983 UTM Zone 13N.

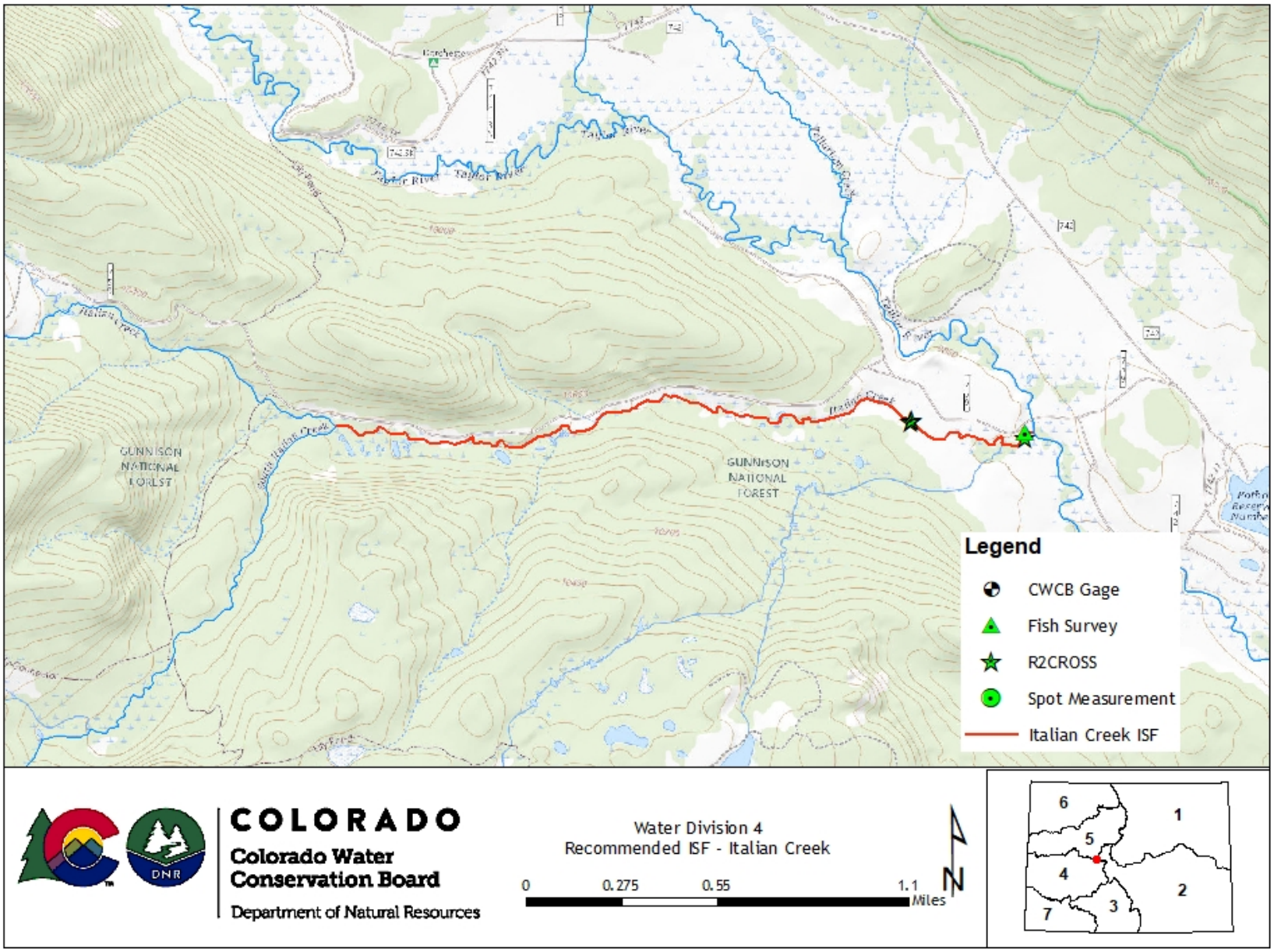
VICINITY MAP



LAND OWNERSHIP MAP



HYDROLOGIC FEATURES MAP



COMPLETE HYDROGRAPH