United States Department of Agriculture | **Forest Service** | **Grand Mesa, Uncompahgre and Gunnison National Forests** | **2250 Highway 50**
Delta, CO 81416
Voice: 970-874-6600
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File Code: 2540/2670
Date: February 27, 2014

Jeff Baessler
Deputy Section Chief
Colorado Water Conservation Board
1313 Sherman Street, Room 723
Denver, CO 80203

Dear Mr. Baessler:

Enclosed you will find instream flow recommendations for two streams on the Grand Mesa, Uncompahgre and Gunnison National Forests. These recommendations were prepared by our fisheries and hydrology specialists. The two streams, Kelso Creek and Schaefer Creek, support self-sustaining populations of native Cutthroat Trout. Kelso Creek is being used by Colorado Parks and Wildlife as a brood source for native Cutthroat Trout introductions in western Colorado.

Please do not hesitate to contact the Forest Fisheries Biologist, Matthew Dare, at 970-874-6651 or the Forest Hydrologist, Gary Shellhorn, at 970-874-6666 if you have questions about these recommendations.

Sincerely,

/s/ Scott G. Armentrout
SCOTT G. ARMENTROUT
Forest Supervisor

Enclosures

Kelso Creek

Executive Summary
Water Division: 4
Water District: 42
CPW water code:
CWCB ID:

Segment: Confluence with Escalante Creek upstream to headwaters.
Upper terminus UTM: 12S, 708541.48 E, 4267933.97 N
Lower terminus UTM: 12S, 726148.95 E, 4277508.12 N

Watershed:
County(s): Mesa
Length: 14.2 miles
USGS Quad(s): Kelso Point, Snipe Mountain
Flow recommendation: TBD

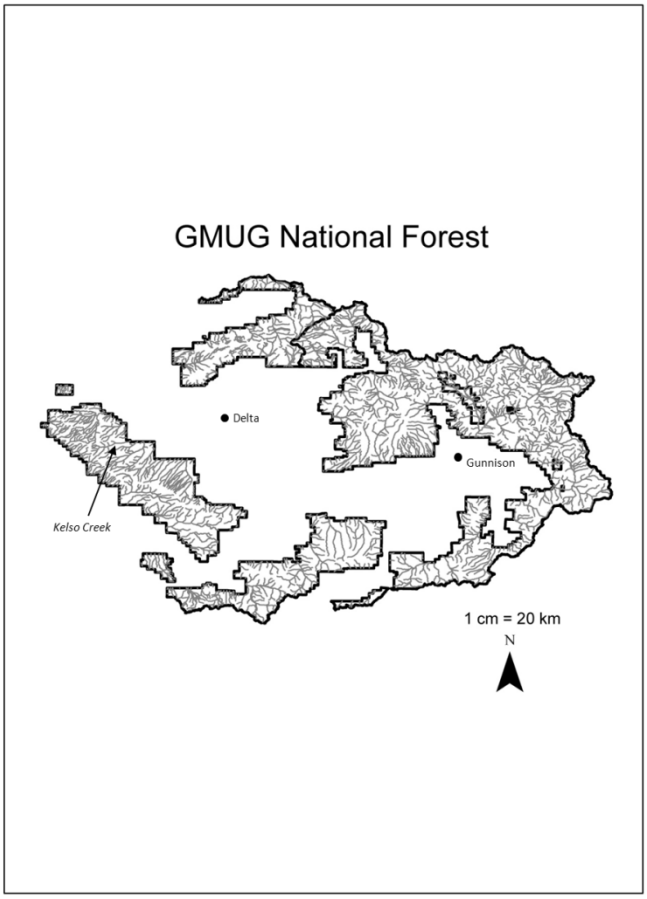

Figure 1. Kelso Creek, on the Uncompahgre Plateau, west of Delta, Colorado.

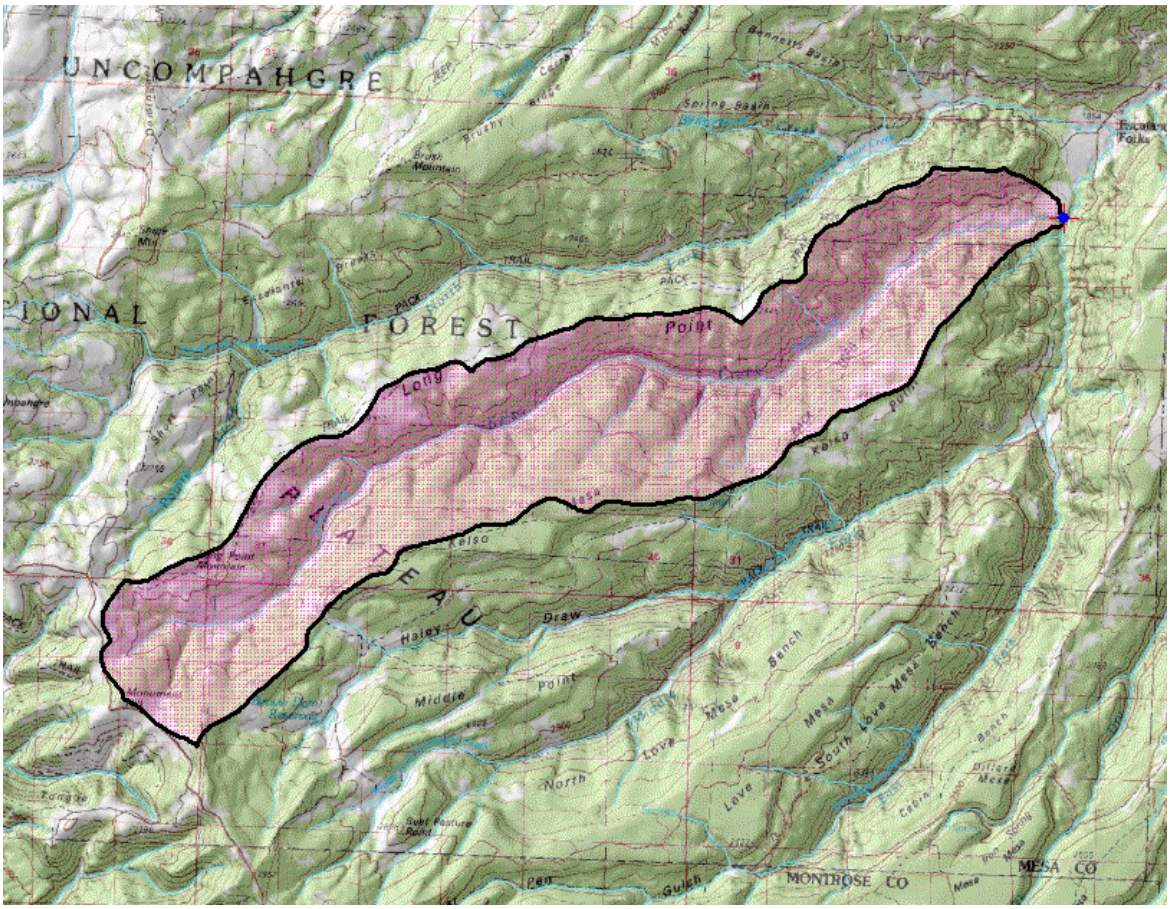

Figure 2. StreamStats map of the Kelso Creek watershed. The instream flow recommendation contained in this report includes all of Kelso Creek, from the headwaters to its confluence with Escalante Creek.

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.

Kelso Creek is located on the east side of the Uncompahgre Plateau, to the east of Delta, Colorado. From its confluence with Escalante Creek to its headwaters, Kelso Creek is 14.2 miles. Total watershed area is 15,249 acres, of which 3 percent is private land. Private parcels are located at the downstream and upstream ends of the watershed (Figure 3).

Land Status Review

The Kelso Creek watershed is 15,249 acres. There are four parcels of private land within the watershed, comprising 430.7 acres (Figure 3). Public lands within the watershed are owned and managed by the USBLM and USFS. The majority of public lands in the watershed are owned and managed by the USFS (Figure 3).

Existing Water Right Information

A search revealed no record of existing water rights upstream of the USFS boundary. There are two diversions located between the USFS boundary and the confluence of Kelso Creek and Escalante Creek.

Biological Data

<u>Fish Population Survey Data</u>

Kelso Creek supports a genetically pure population of greenback- or GB-lineage Colorado River Cutthroat Trout. The population was discovered in 2011 and since that time it has been studied intensively because of the size of the population and its genetic purity. In 2012 CRCT from Kelso Creek were used to stock Woods Lake, near Telluride. In 2013 USFS personnel assisted CPW in collecting spawning adults in Kelso Creek. Eggs collected from Kelso Creek were reared in a hatchery and stocked into Woods Lake in the October 2013. In 2012 CPW, USFS, and BLM personnel agreed Kelso Creek would serve as the source population for all future CRCT restoration projects in western Colorado.

USFS personnel performed a population estimate in Kelso Creek on September 21, 2011. Eighty-seven fish were collected in two passes through a 275-foot section of Kelso Creek. Fish ranged in size from 45mm to 215 mm. The sample included fish from at least 3 age classes and the population estimate was greater than 800 fish per mile. Cutthroat trout are the only fish species present in Kelso Creek.

Genetic data

The genetic composition of the Cutthroat Trout population was evaluated at three locations in the watershed in 2011 and 2012. Ninety-one fish were collected in three sampling efforts: September 23, 2011, May 25, 2012, and August 8, 2012. The results of the genetic analysis revealed the population to be genetically pure greenback, or GB-lineage Cutthroat Trout. This variety of Cutthroat Trout is believed to be aboriginal to western Colorado. At this time GB-lineage Cutthroat Trout are protected as a Threatened Species under provisions of the U.S. Endangered Species Act.

The intensity of genetic analysis conducted for the population in Kelso Creek was necessary because CPW, USBLM, and USFS biologists agreed the Kelso Creek population would serve as the source population for future translocation efforts in Western Colorado. In 2012 and 2013 fish from Kelso Creek were stocked in Woods Lake, near Telluride, CO. Stocking followed two years of intensive reclamation efforts to remove non-native Brook Trout from the watershed. The Kelso Creek population will serve as the source for fish stocked in Big Dominguez Creek, following a watershed-scale chemical reclamation planned for 2016 and 2017.

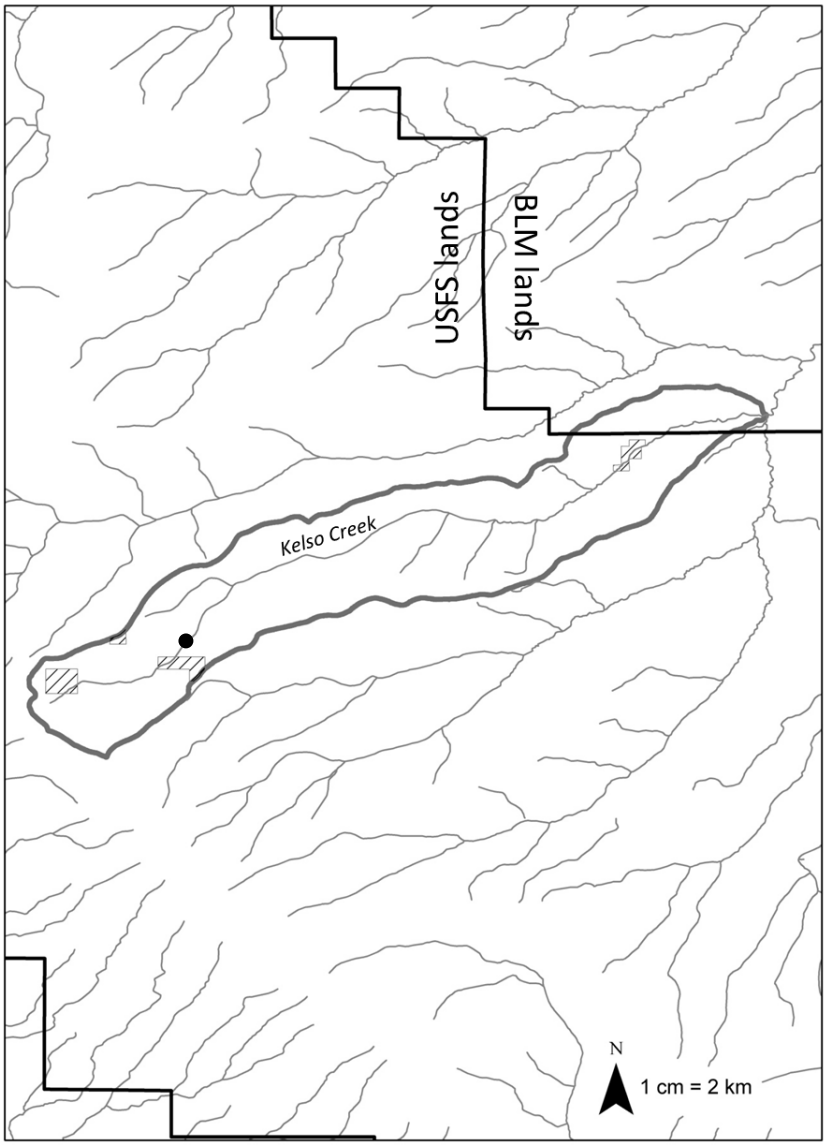

Figure 3. Kelso Creek watershed. Private land delineated with cross hatching. Location of R2Cross transect performed on September 23, 2013 shown with closed circle.

Field Survey Data

USFS personnel used the R2Cross method to quantify the amount of water required to preserve the natural environment to a reasonable degree. The R2Cross method requires that stream discharge and channel profile data be collected in a riffle stream habitat type. Riffles are most easily visualized as the stream habitat types that would dry up first should streamflow cease. This type of hydraulic data collection consists of setting up a transect, surveying the stream channel geometry, and measuring the stream discharge.

Hydrologic Data and Analysis

Biological Flow Recommendation

The CWCB staff relied upon the biological expertise of the cooperating agencies to interpret output from the R2Cross model to develop the initial, biological instream flow recommendation. This initial recommendation is designed to address the unique biological requirements of each stream without regard to water availability. Three instream flow hydraulic parameters, average depth, percent wetted perimeter, and average velocity are used to develop biological instream flow recommendations. CPW has determined that maintaining these three hydraulic parameters at adequate levels across riffle habitat types will also maintain aquatic habitat in pools and runs for most life stages of fish and aquatic invertebrates (Nehring 1979; Espegren 1996).

For this stream, one data set was collected with the results shown in Table 1.

Table 1. Stream flow and R2Cross output from one cross section located on Kelso Creek.

Party	Date	Q	40% - 250%	Summer (3/3)	Winter (2/3)
U.S. Forest Service	September 23, 2013	0.45	0.2-1.1	Out of range*	0.34

*Estimate out of range due to velocity parameter. Maximum predicted velocity in R2Cross was 0.39 ft/sec.

In addition to R2Cross, USFS personnel used the USGS program, StreamStats, to estimate an annual hydrograph for Kelso Creek. Kelso Creek is an ungauged stream; therefore, the estimated hydrograph was based on watershed size and stream gauge data from nearby watersheds. The annual average discharge is an estimated 5.45 cfs, with a prediction error of 32 percent (Table 2). Predictions for monthly average discharge were most precise during baseflow periods and the least precise predictions were for the summer months, June through August (Table 2). Large prediction errors for the summer months reflect the fact streams on the Uncompahgre Plateau are flashy with large changes in discharges possible following weather events.

Table 2. Annual and monthly average streamflow estimates derived using the USGS StreamStats program. Estimates were derived using the "area-averaged" approach. Discharge is reported in CFS; prediction error is reported as percentage of each estimate.

Period	Discharge (prediction error)
January	1.31 (57)
February	1.47 (34)
March	1.96 (23)
April	3.79 (28)
May	9.49 (37)
June	8.08 (130)
July	5.35 (270)
August	3.41 (130)
September	0.93 (130)
October	2.07 (100)
November	1.79 (61)
December	1.53 (53)
Annual mean	5.45 (32)

USFS Instream Flow Recommendation

The USFS believes the conservation significance of the Cutthroat Trout population in Kelso Creek warrants protection of instream flows beyond standard CWCB practices. The absence of water development upstream of the USFS boundary means there is an opportunity to secure an instream flow at or near 100% of base flow discharge. Therefore, we recommend the Board consider a summer instream flow of 0.45 cfs (measured base flow in September), a winter instream flow of 0.34 cfs (meeting 2/3 hydraulic criteria), and a spring instream flow of 1.38 cfs (modeled bankfull discharge). Alternatively, the Board may consider allocating all available flow to the instream flow filing.

There is parcel of USBLM land between the USFS boundary and the confluence with Escalante Creek. Based on our consultation with the USBLM, the instream flow recommendation would apply to Kelso Creek from its confluence with Escalante Creek to the headwaters.

CWCB Instream Flow Recommendation

TBD