

Ms. Linda Bassi
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an instream flow water right on Deep Creek, located in Water Division 6.

Location and Land Status. Deep Creek originates on the southwest flank of Hahn's Peak, and flows into Steamboat Lake. This recommendation addresses the portion of Deep Creek that starts at the headwaters and extends downstream to the confluence with Steamboat Lake, a distance of approximately 2.5 miles. The BLM manages approximately 0.1 miles of this reach, the U.S. Forest Service manages 1.5 miles, Steamboat Lake State Park manages 0.65 miles, and 0.25 miles are in private ownership.

Biological Summary. Deep Creek is a cold water, high gradient stream. It begins in a narrow, densely forested valley, and then emerges into a wide meadow area that surrounds Steamboat Lake. Substrate is generally from small to medium in size, ranging from gravels to six-inch cobbles. A low quantity of pool habitat is a limiting factor for the fish population. The limited amount of pool habitat is augmented by deeper stream habitat that forms around root wads and by beaver ponds close to Steamboat Lake.

Water quality is excellent for supporting cold water species. Fish surveys have documented a self-supporting population of what appear visually to be cutthroat trout x rainbow trout hybrids. Spot surveys have revealed abundant populations of stonefly, caddisfly, and mayfly.

Deep Creek supports a healthy riparian community comprised of spruce, willow, and alder. Bank stability appears to be good, except in areas of high livestock usage.

R2Cross Analysis. The BLM collected the following R2Cross data from Deep Creek:

Cross Section Date	Discharge Rate	Top Width	Winter Flow Recommendation (meets 2 of 3 hydraulic criteria)	Summer Flow Recommendation (meets 3 of 3 hydraulic criteria)
6/9/2020 #1	2.90 cfs	14.70 feet	1.35 cfs	3.46 cfs
6/9/2020 #2	2.29 cfs	9.44 feet	1.51 cfs	1.54 cfs
Averages:			1.43 cfs	2.50 cfs

BLM's analysis of this data indicates that the following flows are needed to protect the natural environment to a reasonable degree.

2.50 cubic feet per second is recommended during the snowmelt runoff period and summer, from May 1 through July 31. This recommendation is driven by the average depth criteria. This flow rate will ensure that the riffle habitat can be fully

utilized during the spring and summer period, when fish are spawning and moving actively between pools.

1.4 cubic feet per second is recommended during late summer and fall from August 1 through September 15. This recommendation is driven by the average velocity and wetted perimeter criteria. This flow rate should provide adequate physical habitat for the fish population to complete important parts of its life cycle before cold temperatures arrive.

0.3 cubic feet per second is recommended during the cold weather period from September 16 through April 30. This recommendation is driven by naturally limited water availability. This flow rate should maintain full and sufficiently cool pools during fall, and it should prevent pools from completely icing during winter, allowing the fish population to successfully overwinter.

Water Availability. BLM recommends using a variety of data sources to confirm water availability, because BLM is not aware of any historical gage data on this creek. Use of Streamstats can provide an estimate of natural hydrology. One nearby gage may provide an estimate of the seasonality of flows, because it is located on a watershed with similar characteristics. USGS Gage 09240800, on South Fork Elk River near Clark, is located on a larger watershed but appears to be relatively unaffected by diversion and storage operations.

BLM is aware of only one water right on Deep Creek:

Button Ditch No. 1 – 1 cfs, 1991 priority

The official diversion record for Button Ditch shows no diversions since 2003.

Relationship to Land Management Plans. BLM's management plan calls for actions to maintain and enhance habitat that supports fish species. Specifically, the BLM plan calls for making instream flow recommendations to the Colorado Water Conservation Board to meet minimum instream flow requirements to maintain fisheries. Finally, the plan calls for maintaining and improving the function of riparian areas to achieve advanced ecological stage for the riparian community, and it also calls for protecting riparian and wetland systems from activities that could degrade those habitats. Establishing an instream flow water right would assist in meeting these objectives.

Data sheets, R2Cross output, fishery survey information, and photographs of the cross section were included with BLM's draft recommendation in February 2021. BLM thanks both Colorado Parks and Wildlife and the Colorado Water Conservation Board for their cooperation in this effort.

If you have any questions regarding our instream flow recommendation, please contact Roy Smith at 303-239-3940.

Sincerely,

Deputy State Director
Resources

Cc: Bruce Sillitoe, Little Snake Field Office
Eric Scherff, Little Snake Field Office
Elijah Waters, Northwest District Manager

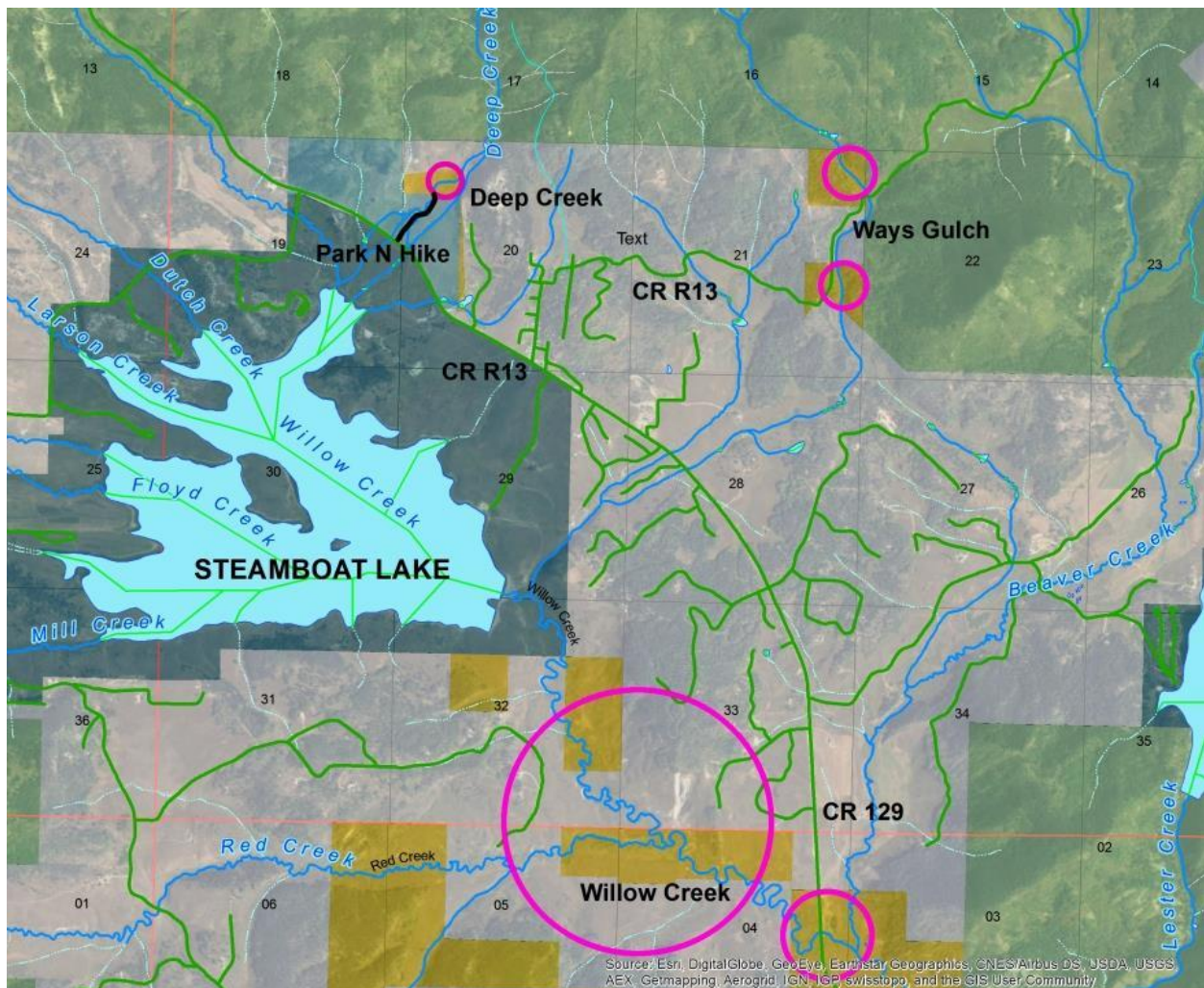
Little Snake Field Office

Stream Sampling July 2016

Deep Creek - Water Code: 21349

Introduction:

Deep Creek, located North of Clark, Colorado, near Steamboat Lake State Park on BLM lands managed by the Little Snake Field Office was sampled on July 20, 2016. Deep Creek is tributary to Steamboat Lake. Sampling was conducted to determine fishery status, species composition, and obtain a two-pass removal population estimate. One shocker was used to sample a 360 foot reach of stream. What appeared visually to be a mix of Rainbow Trout and Cutthroat Trout (RXN's) were the only species seen or collected (see photos). Personnel present included: Tom Fresques, Shawn Wiser, Kristen Doyle, and Nate Higginson, BLM, and Brian Hodge, Trout Unlimited.





Deep Creek - representative habitat



RXN hybrid – this fish appears more Cutthroat - note the distribution and fewer spots



RXN hybrid – this one appears more Rainbow - note number and distribution of spots

Discussion:

Deep Creek at the sample site supports a small population of what appeared to be rainbow x cutthroat trout hybrids. A total of 9 fish were collected and all appeared healthy. Age-class diversity was limited as only two were noted. Based on the sampling the population estimate for the stream at the site is **6 fish ($\geq 140\text{mm}$) + or – 2 fish at the 95% confidence interval, and 88 fish ($\geq 140\text{mm}$) + or – 22 fish per stream mile at the 95% confidence interval.**

Riparian vegetation was extremely dense and was comprised primarily of willow, with some alder, cow parsnip, monkshood, timothy, and larkspur. The stream was very well shaded and covered and was difficult to access. Stream habitats were comprised of a mix of riffles, small runs and small pools. Quality pool habitat was limited and is likely a limiting factor in this stream reach. Substrate was comprised of gravel with some cobble and rock. Root wads provided some habitat as well. Beaver ponds habitat was noted below the BLM reach on State Property.

This stream is small and has limited flow, but otherwise provides good habitat. Limited flow and lack of larger pool/holding habitat are likely the primary limiting factors on this stream. Water temperature at the time of sampling was 59.4°F and does not appear to be a limiting factor although a temperature probe would better inform temperature ranges and seasonal variations.

Recommendations:

- Investigate fish distribution up on Forest
- Look for barriers to fish movement
- Consider placement of a temperature probe



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>Deep Creek</u>		CROSS-SECTION NO: <u>1</u>
CROSS-SECTION LOCATION: <u>At State Land Board - BLN boundary</u>		
DATE: <u>6-9-20</u>	OBSERVERS: <u>R. Smith, A. Huff</u>	
LEGAL DESCRIPTION:	% SECTION: <u>NW</u>	SECTION: <u>20</u>
TOWNSHIP: <u>10N/8</u>	RANGE: <u>85E(W)</u>	PM: <u>6H</u>
COUNTY: <u>Rowlett</u>	WATERSHED: <u>Elk River</u>	WATER DIVISION: <u>6</u>
DOW WATER CODE: <u>21349</u>		
MAP(S):	USGS: <u>20K 13N</u>	<u>335242</u>
	USFS: <u>4520171</u>	

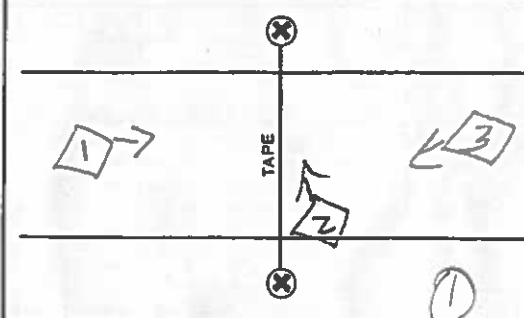
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: <u>YES/NO</u>	METER TYPE: <u>M-M</u>
METER NUMBER:	DATE RATED:
CALIB/SPIN: _____ sec	TAPE WEIGHT: <u>5.11</u> lbs/foot
TAPE TENSION: <u>5.11</u> lbs	
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 6" cobble</u>	PHOTOGRAPHS TAKEN: <u>YES/NO</u>
NUMBER OF PHOTOGRAPHS: <u>3</u>	

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	<u>surveyed</u>
⊗ Tape @ Stake RB	0.0	<u>surveyed</u>
① WS @ Tape LB/RB	0.0	<u>6.90/6.90</u>
② WS Upstream	<u>6.0</u>	<u>6.75</u>
③ WS Downstream	<u>11.0</u>	<u>7.20</u>
SLOPE	<u>0.45 / 17.0 = 0.026</u>	

SKETCH



LEGEND:
Stake ⊗
Station ①
Photo ①
Direction of Flow →

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO <u>NO</u>	DISTANCE ELECTROFISHED: _____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO														
LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)																	
SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	
<u>mayfly, stonefly, caddisfly - abundant</u>																	

COMMENTS

Water Quality Data Readings:			
Temp.	Conductivity	pH	Salinity
<u>7.5°C</u>	<u>154</u>	<u>7.0</u>	<u>0.11 ppt</u>

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:

Neen Creek

CROSS-SECTION NO.:

DATE:

DATE: 6-10-20

SHEET ____ OF ____

BEGINNING OF MEASUREMENT

**EDGE OF WATER LOOKING DOWNSTREAM:
(0.0 AT STAKE)**

LEFT / RIGHT

Gage Reading: _____ft

TIME: Noon

[illegible]

DISCHARGE/CROSS SECTION NOTES

[illegible]

STREAM NAME: Deep Creek
XS LOCATION: UTM Zone 13N 335342 4520171
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	2.90 cfs
CALCULATED FLOW (Qc)=	2.90 cfs
(Qm-Qc)/Qm * 100 =	0.0 %

MEASURED WATERLINE (WLm)=	6.90 ft
CALCULATED WATERLINE (WLc)=	6.90 ft
(WLm-WLc)/WLm * 100 =	0.0 %

MAX MEASURED DEPTH (Dm)=	0.45 ft
MAX CALCULATED DEPTH (Dc)=	0.45 ft
(Dm-Dc)/Dm * 100	0.0 %

MEAN VELOCITY= 1.42 ft/sec
MANNING'S N= 0.054
SLOPE= 0.026 ft/ft

.4 * Qm = 1.2 cfs
2.5 * Qm = 7.3 cfs

RECOMMENDED INSTREAM FLOW:

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FLOW (CFS)

PERIOD

=====

=====

RATIONALE FOR RECOMMENDATION:

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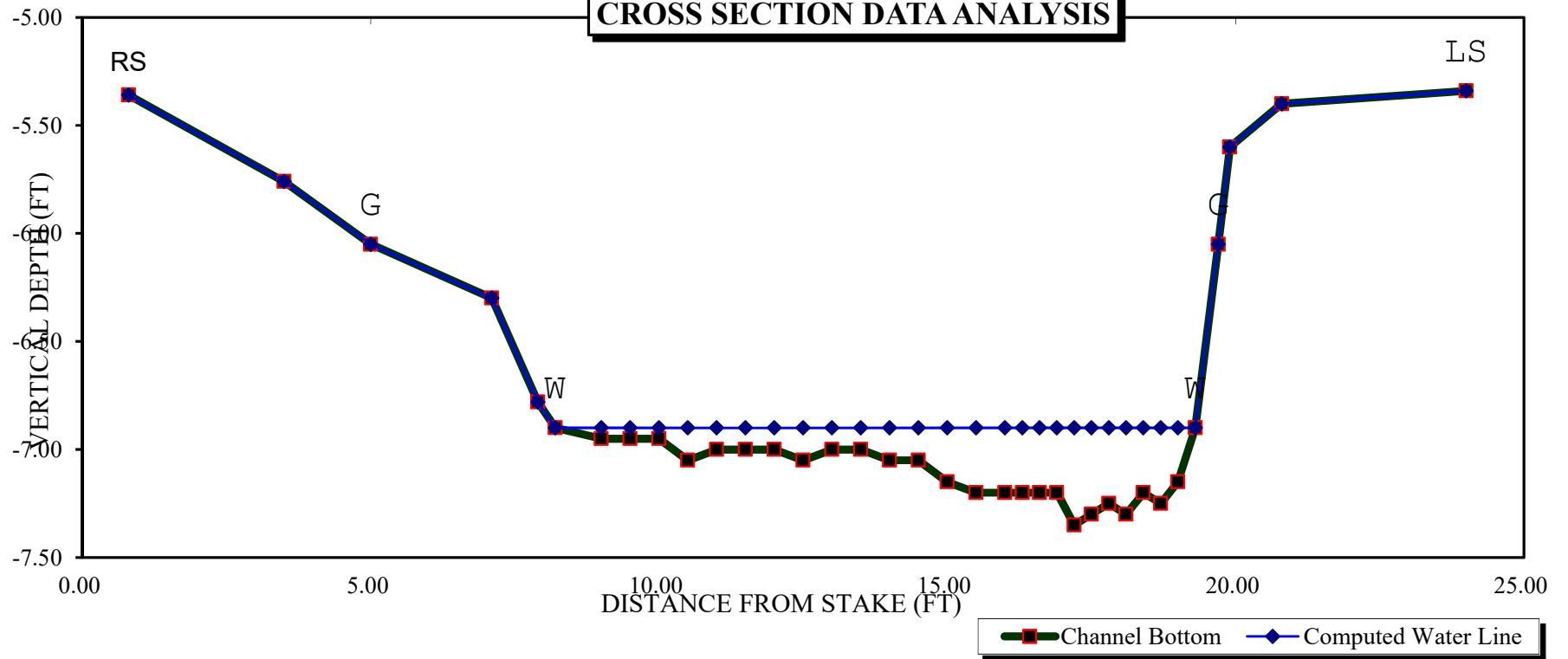
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RECOMMENDATION BY: AGENCY DATE:

CWCB REVIEW BY: DATE:

Deen Creek

CROSS SECTION DATA ANALYSIS



STREAM NAME: Deep Creek
XS LOCATION: UTM Zone 13 335303 4520130
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 2.29 cfs
CALCULATED FLOW (Qc)= 2.29 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 6.30 ft
CALCULATED WATERLINE (WLc)= 6.30 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.45 ft
MAX CALCULATED DEPTH (Dc)= 0.45 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 1.16 ft/sec
MANNING'S N= 0.055
SLOPE= 0.012 ft/ft

.4 * Qm = 0.9 cfs
2.5 * Qm= 5.7 cfs

RECOMMENDED INSTREAM FLOW:	
=====	
FLOW (CFS)	PERIOD
=====	=====
_____	_____
_____	_____
_____	_____
_____	_____

RATIONALE FOR RECOMMENDATION:
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RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

Deen Creek

CROSS SECTION DATA ANALYSIS

