

## **Stream: North Fork Wallace Creek**

### **Executive Summary**

Water Division: 5

Water District: 45

CDOW#: 28212

CWCB ID: 07/6/A-004

**Segment:** Headwaters to the Confluence with Wallace Creek

**Upper Terminus:** HEADWATERS IN THE VICINITY OF  
(Latitude 39° 21' 29.18"N) (Longitude 107° 57' 1.62"W)

**Lower Terminus:** CONFLUENCE WITH WALLACE CREEK  
(Latitude 39° 21' 9.57"N) (Longitude 108° 1' 43.52"W)

**Watershed:** Colorado headwaters-Plateau (HUC#:14010005)

**Counties:** Garfield, Mesa

**Length:** 4.78 miles

**USGS Quad(s):** Hawxhurst Creek, Housetop Mountain

**Flow Recommendation:** 2.8 cfs (April 1 - July 15)  
1.1 cfs (July 16 - March 31)



## **Staff Analysis and Recommendation**

### **Summary**

The information contained in this report and the associated instream flow appendices (see CD entitled 2008 Instream Flow Recommendations) 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. The Bureau of Land Management (BLM) recommended this segment of North Fork Wallace Creek to the CWCB for inclusion into the Instream Flow Program. North Fork Wallace Creek is being considered for inclusion into the Instream Flow Program because it has a natural environment that can be preserved to a reasonable degree with an instream flow water right.

North Fork Wallace Creek is approximately 4.78 miles long. It begins on the west flank of Battlement Mesa on the Grand Mesa National Forest at an elevation of approximately 10280 feet and terminates at the confluence with Wallace Creek at an elevation of approximately 6640 feet. Approximately 50% of the land on the 4.78 mile segment addressed by this report is publicly owned. North Fork Wallace Creek is located within Mesa County. The total drainage area of the creek is approximately 5.64 square miles. Willow Creek generally flows in a westerly direction.

The subject of this report is a segment of North Fork Wallace Creek beginning at the Headwaters and extending downstream to the confluence of Wallace Creek. The proposed segment is located approximately 10 miles east of Debeque. The staff has received only one recommendation for this segment, from the BLM. The recommendation for this segment is discussed below.

### **Instream Flow Recommendation(s)**

BLM recommended 2.8 cfs, summer, and 1.1 cfs, winter, based on its data collection efforts. The modeling results from this survey effort are within the confidence interval produced by the R2Cross model.

### **Land Status Review**

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Headwaters	Confluence with Wallace Creek	4.78	50%	50%

56% of the public lands are owned by the BLM and the U.S. Forest Service owns 44% of the public lands.

## Biological Data

The BLM has conducted field surveys of the fishery resources on this stream and have found a natural environment that can be preserved. As reported in the letter from BLM to the CWCB “North Fork Wallace Creek is a high gradient stream, with moderate substrate size. The creek is often confined by a narrow canyon, and it has cut down to bedrock in numerous locations. The riparian community is very vigorous in these confined locations and provides substantial shading and nutrient supply for the creek. The creek provides a good pool habitat, but riffles for spawning are a limiting factor for the fish population. Fishery surveys indicate a self-sustaining population of Colorado River Cutthroat Trout and brook trout. BLM may take actions in the future to reduce the brook trout population, because brook trout are known to outcompete Colorado River Cutthroat Trout. The Colorado River Cutthroat Trout may be of high genetic quality. This location is good for managing for Colorado River Cutthroat Trout because the stream reach is isolated, physical barriers are present downstream that prevent the migration of other fish into the reach, and the creek has reliable flows”.

## Field Survey Data & Biological Flow Quantification

BLM staff used the R2Cross methodology 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.

The CWCB staff relied upon the biological expertise of the cooperating agencies to interpret output from the R2Cross data collected to develop the initial, biologic instream flow recommendation. This initial recommendation is designed to address the unique biologic 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 biologic instream flow recommendations. The CDOW has determined that maintaining these three hydraulic parameters at adequate levels across riffle habitat types, aquatic habitat in pools and runs will also be maintained for most life stages of fish and aquatic invertebrates (Nehring 1979; Espegren 1996).

For this segment of stream, two data sets were collected with the results shown in Table 1 below. Table 1 shows who collected the data (Party), the date the data was collected (Date), the measured discharge at the time of the survey (Q), the accuracy range of the predicted flows based on Manning’s Equation (240% and 40% of Q), the summer flow recommendation based on meeting 3 of 3 hydraulic criteria and the winter flow recommendation based upon 2 of 3 hydraulic criteria.

**Table 1: North Fork Wallace Creek R2Cross Summary**

			Confidence Intervals	Recommended Flows (cfs)	
Party	Date	Q (cfs)	250%-40%	Summer (3/3)	Winter (2/3)
BLM	06/09/2006	5.49	13.7 – 2.2	2.84	(1)
BLM	09/29/2006	0.54	1.4 – 0.2	(1)	1.08

BLM = Bureau of Land Management

(1) Predicted flow outside of the accuracy range of Manning’s Equation.

The summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 2.8 cfs. The winter flow recommendation, which meets 2 of 3 criteria and is within the accuracy range of the R2Cross model is 1.1 cfs. These recommendations were derived by averaging the results of the two data sets. It is our belief that recommendations that fall outside of the accuracy range of the model, over 250% of the measured discharge or under 40% of the measured discharge may not give an accurate estimate of the necessary instream flow required.

## Hydrologic Data and Analysis

After receiving the cooperating agency's biologic recommendation, the CWCB staff conducted an evaluation of the stream hydrology to determine if water was physically available for an instream flow appropriation. This evaluation was done through a computation that is, in essence, a "water balance". In concept a "water balance" computation can be viewed as an accounting exercise. When done in its most rigorous form, the water balance parses precipitation into all the avenues water pursues after it is deposited as rain, snow, or ice. In other words, given a specified amount of water deposition (input), the balance tries to account for all water depletions (losses) until a selected end point is reached. Water losses include depletions due to evaporation and transpiration, deliveries into ground water storage, temporary surface storage, incorporations into plant and animal tissue and so forth. These losses are individually or collectively subtracted from the input to reveal the net amount of stream runoff as represented by the discharge measured by stream gages. Of course, the measured stream flow need not be the end point of interest; indeed, when looking at issues of water use to extinction stream flow measurements may only describe intermediate steps in the complex accounting process that is a water balance carried out to a net value of zero.

In its analysis, CWCB staff has attempted to use this idea of balancing inputs and losses to determine if water is available for the recommended Instream Flow Appropriation. Of course, this analysis must be a practical exercise rather than a lengthy, and costly, scientific investigation. As a result, staff has simplified the process by lumping some variables and employing certain rational and scientifically supportable assumptions. The process may be described through the following description of the steps used to complete the evaluation for this particular stream.

The first step required in determining water availability is a determination of the hydrologic regime at the Lower Terminus (LT) of the recommended ISF reach. In the best case this means looking at the data from a gage at the LT. Further, this data, in the best case, has been collected for a long period of time (the longer the better) including wet and dry periods. In the case of **North Fork Wallace Creek** no such gage is available at the LT. In fact, there is no gage on North Fork Wallace Creek. It is thus necessary to describe the normal flow regime at the North Fork Wallace Creek LT through a "representative" gage station. The gage station selected for this was BATTLEMENT CREEK NEAR PARACHUTE, CO (USGS 09092600), a gage with a 9 year period of record (POR) collected between 1956 and 1965. The gage is at an elevation of 6,630 ft above mean sea level (amsl) and has a drainage area of 10.5 mi<sup>2</sup>. The hydrograph (plot of discharge over time) produced by this gage includes virtually no upstream consumption through diversions. While this lack of significant upstream diversion and use make this gage attractive for our purposes, the gage does have one drawback; namely, it has a short POR.

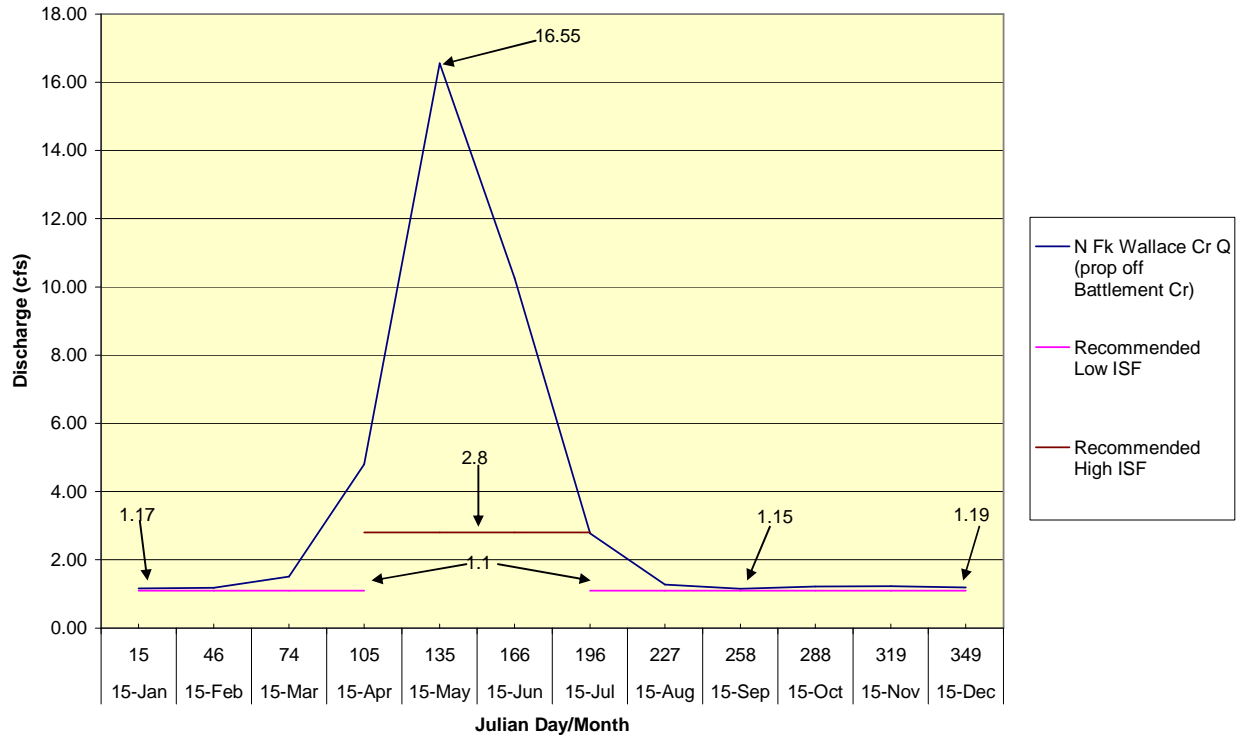
To keep the positive values of the Battlement Creek gage while reducing the limitation of its short POR, a statistical procedure called linear regression was employed. The procedure gives us the means to relate characteristics of a limited (short) data set to those of a larger (longer) data set and, if the two data sets are similar enough, to predict the data values “missing” from the short data set. The outcome is a “predicted” (called “Y – Hat” or  $\hat{Y}$ ) set of data that augments the short data set; creating, in effect, a longer POR that is reflective of climate variation (i.e., it includes more wet-dry cycles.) The gage that was selected to provide the longer POR was WEST DIVIDE CREEK NEAR RAVEN, CO (USGS 09089500), a gage with a 50 year POR collected between 1955 and 2005. The West Divide Creek gage is at an elevation of 7050 ft amsl and has a drainage area of 64.6 mi<sup>2</sup>.

Before performing the linear regression described above, the measured hydrographs of both gages must be adjusted to remove the effects of water consumption by upstream irrigation diversion. As mentioned above, the hydrograph of the Battlement Creek gage includes virtually no upstream consumption through diversions. West Divide Creek, however, does have a small number of upstream diversions as well as a trans-basin source of increased discharge. Thus, before performing the linear regression, the West Divide data record must be increased by the amount of consumptive loss due to upstream diversions; it must also be decreased by the amount of trans-basin additions. When the data sets are adjusted in the manner described, then the two gages can be regressed one against the other to produce a “predicted” hydrograph for Battlement Creek that displays the important attributes of a gage that is located nearby, is un-impacted (by irrigation consumption or “foreign water”), and exhibits a long-term POR.

With a satisfactory hydrograph for the “representative” gage station created, the next step is to use that hydrograph on North Fork Wallace Creek by multiplying the adjusted Battlement Creek discharge values (hydrograph) by the ratio of North Fork Wallace Creek basin area (5.64 mi<sup>2</sup> above the LT) to Battlement Creek basin area (10.5 mi<sup>2</sup>). With no significant upstream consumption or addition of “foreign water” in North Fork Wallace Cr., the resulting proportioned hydrograph thus represents a distribution of flow over time reflective of existing conditions.

The following hydrograph depicts the mean monthly discharge of North Fork Wallace Creek (proportioned off Battlement Creek near Parachute). Included in the hydrograph are the recommended ISF values. The data used in the creation of this hydrograph are displayed in Table #2.

**Fig 1 - North Fork Wallace Creek Discharge (proportioned off Battlement Cr) & ISFs**



**Table 2 – Mean Monthly Discharge and Recommended Instream Flows – North Fork Wallace Cr.**

		N Fk Wallace (cfs)	Recommended ISFs
15-Jan	15	1.17	1.1
15-Feb	46	1.17	1.1
15-Mar	74	1.51	1.1
31-Mar	90	1.51	1.1
1-Apr	91	4.80	2.8
15-Apr	105	4.80	2.8
15-May	135	16.55	2.8
15-Jun	166	10.26	2.8
15-Jul	196	2.77	2.8
16-Jul	197	2.77	1.1
15-Aug	227	1.26	1.1
15-Sep	258	1.15	1.1
15-Oct	288	1.22	1.1
15-Nov	319	1.23	1.1
15-Dec	349	1.19	1.1

## Existing Water Right Information

Staff has analyzed the water rights tabulation to identify any potential water availability problems. There are no historical diversions or water rights located within this stream reach. Based on this analysis staff has determined that water is available for appropriation on North Fork Wallace Creek, from the headwaters to the confluence with Wallace Creek, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid existing water rights.

### CWCB Staff's Instream Flow Recommendation

Staff recommends the Board form its intent to appropriate on the following stream reach:

### **Segment:** Headwaters to the Confluence with Wallace Creek

#### **Upper Terminus:** HEADWATERS IN THE VICINITY OF

(Latitude 39° 21' 29.18"N) (Longitude 107° 57' 1.62"W)

UTM = 4360670.1 N UTM = 245785.9 E

SW SW S13 T8S 95W 6PM

700' East of the West Section Line; 670' North of the South Section Line

#### **Lower Terminus:** CONFLUENCE WITH WALLACE CREEK

(Latitude 39° 21' 9.57"N) (Longitude 108° 1' 43.52"W)

UTM = 4360288.9 N UTM = 239017.6 E

NE NE S19 T8S R95W 6PM

410' West of the East Section Line; 1270' South of the North Section Line

**Watershed:** Colorado headwaters-Plateau (HUC#:14010005)

**Counties:** Garfield, Mesa

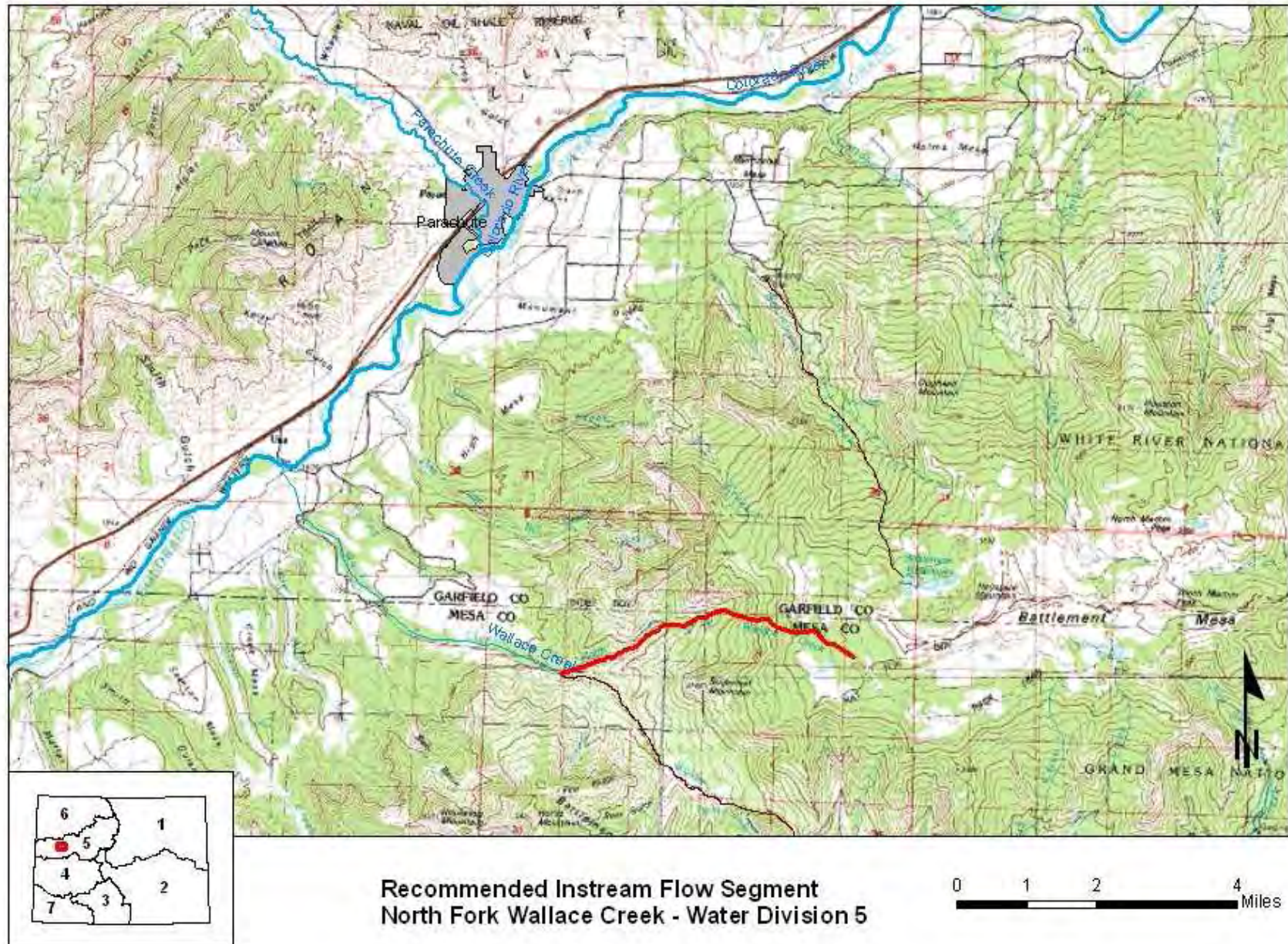
**Length:** 4.78 miles

**USGS Quad(s):** Hawxhurst Creek, Housetop Mountain

**Flow Recommendation:** 2.8 cfs (April 1 - July 15)  
1.1 cfs (July 16 - March 31)

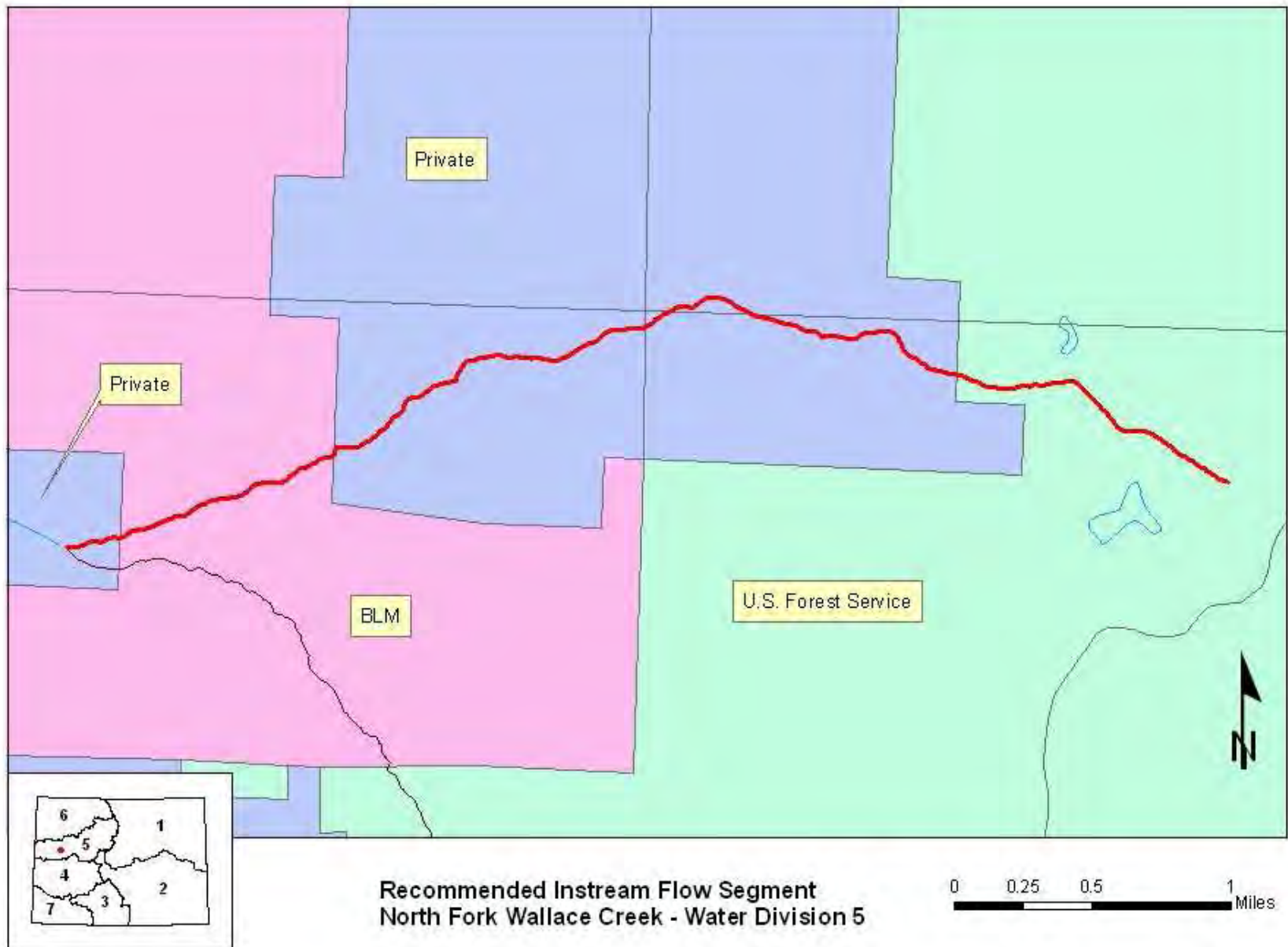


# Vicinity Map

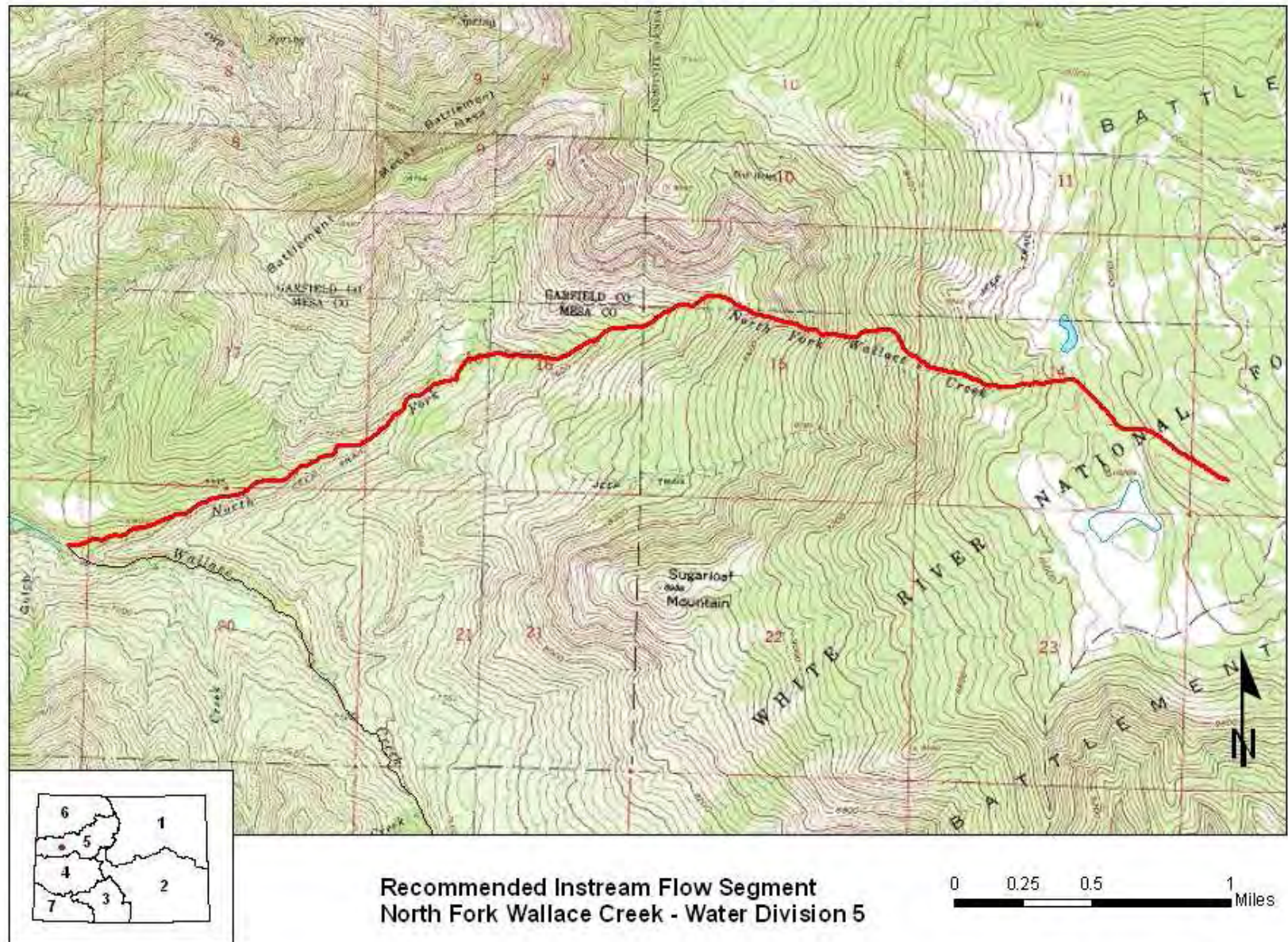




# Land Use Map



# Topographic & Water Rights Map





**UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
COLORADO STATE OFFICE  
2850 YOUNGFIELD STREET  
LAKEWOOD, COLORADO 80215-7093**

In Reply Refer To:  
7250 (CO-932)

**DEC 26 2007**

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 instream flow recommendation for North Fork Wallace Creek, located in Water Division 5.

**Location and Land Status.** North Fork Wallace Creek is tributary to Wallace Creek approximately 10 miles east of Debeque, Colorado. The creek is located within the lower Colorado River watershed. This recommendation covers the stream reach beginning at the headwaters and extends downstream to the confluence with Wallace Creek. Approximately 50 percent of the 4.5-mile reach is located on federal lands, while the remaining 50 percent is located on private lands. U.S. Forest Service lands are located at the top of the reach, private lands are located in the middle of the reach, and BLM lands are located in the lower part of the reach. The private lands are owned by Chevron Corporation and by Roger and Sandra Knox.

**Biological Summary.** North Fork Wallace Creek is a high gradient stream, with moderate substrate size. The creek is often confined by a narrow canyon, and it has cut down to bedrock in numerous locations. The riparian community is very vigorous in these confined locations and provides substantial shading and nutrient supply for the creek. The creek provides good pool habitat, but riffles for spawning are a limiting factor for the fish population. Fishery surveys indicate a self-sustaining population of Colorado River Cutthroat Trout and Brook Trout. BLM may take actions in the future to reduce the brook trout population, because Brook Trout are known to outcompete Colorado River Cutthroat Trout. The Colorado River Cutthroat Trout may be of high genetic quality. This location is good for managing for Colorado River Cutthroat Trout because the stream reach is isolated, physical barriers are present downstream that prevent the migration of other fish into the reach, and the creek has reliable base flows.

**R2Cross Analysis.** BLM's data analysis, coordinated with the Division of Wildlife, indicates that the following flows are needed to protect the fishery and natural environment to a reasonable degree:

- 2.8 cubic feet per second is recommended during the high temperature period from April 1 through July 15. This recommendation is driven by the average depth criteria, which is to be expected in a high gradient, confined stream. It is very important to protect a flow rate that provides adequate usable habitat, because the creek is small, and there are some sections that are too steep to provide habitat for fish.
- 1.1 cubic feet second is recommended for the base flow period from July 16 through March 31. This recommendation is driven by water availability. This flow rate provides good habitat in pools and provides sufficient water for passage between pools. This base flow rate should also maintain sufficient water exchange in pools to prevent complete icing during the winter, because North Fork Wallace Creek has a northwest aspect and is susceptible to icing.

**Water Availability.** There are no historical diversions or water rights located within this stream reach. BLM is not aware of any historical gage information for this stream reach, but there are other gages in the vicinity. BLM recommends using the Battlement Creek gage (U.S. Geological Survey (USGS) 09092600) located approximately 10 miles to the east. Battlement Creek has a similar watershed, aspect, and snowmelt runoff pattern to North Fork Wallace Creek.

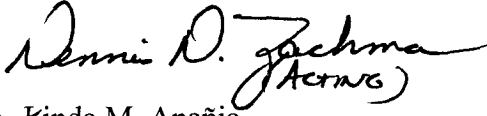
**Relationship to Management Plans.** BLM's management of this stream reach may change in the future. BLM believes that the Colorado River Cutthroat Trout in this reach may be of high genetic quality. Colorado Division of Wildlife has sent genetic samples to laboratories for analysis, but BLM has not yet received results of the analysis. If the trout are of high genetic quality, BLM will move this creek from a monitoring and maintenance category to an active management category. Possible actions BLM could take under active management may be to eliminate the brook trout portion of the fish population and to identify downstream barriers that could be enhanced to maintain separation between fish communities. BLM's efforts to maintain riparian and fisheries health will be supplemented by an instream flow appropriation.

The BLM requests that the Board recognize that this recommendation is based only upon the minimum flows necessary to support cold-water and cool-water fishery values. BLM may wish to work with the Board and/or through the Colorado water rights system to appropriate flows to optimally protect fish values and to protect other water-dependent values specified in BLM resource management plans. Data sheets, R2Cross output, fishery survey information, and photographs of the cross section were included with BLM's draft recommendation in February 2007.



We thank both the Division of Wildlife and the Water Conservation Board for their cooperation in this effort. If you have any questions regarding our instream flow recommendation, please contact Roy Smith, Water Rights Specialist, at 303-239-3940.

Sincerely,

  
for Linda M. Anañia  
Deputy State Director  
Resources and Fire

cc: Jamie Connell, Grand Junction FO  
Tom Fresques, Glenwood Springs FO



# FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER  
CONSERVATION BOARD

## LOCATION INFORMATION

STREAM NAME: N. Fk. Wallace Creek		CROSS-SECTION NO.:	
CROSS-SECTION LOCATION: Approx. 200 yds upstream from confluence w/ Wallace Creek			
DATE: 6.9.06	OBSERVERS: M. Smith, T. Finances		
LEGAL DESCRIPTION:	1/4 SECTION: NW	SECTION: 20	TOWNSHIP: 8 N/S
			RANGE: 95 E/W PM: with
COUNTY: Mesa	WATERSHED: Colorado	WATER DIVISION: 5	DOW WATER CODE: 28212
MAP(S):	USGS: House top Mtn. 7.5' 12 S 0756258		
	USFS: 4360195		

## SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES/NO	METER TYPE: Marsh-McBirney			
METER NUMBER:	DATE RATED:	CALIB/SPIN: sec	TAPE WEIGHT: lbs/foot	TAPE TENSION: lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to 4" cobble		PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: 3	

## CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	surveyed
⊗ Tape @ Stake RB	0.0	surveyed
① WS @ Tape LB/RB	0.0	5.42 5.30
② WS Upstream	20.0'	4.88
③ WS Downstream	33.5'	6.19
SLOPE	1.31/33.5' = 0.039	

SKETCH

LEGEND:

Stake ⊗

Station ①

Photo ◇

Direction of Flow →

## AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	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:																	
mayfly, caddisfly, stonefly																	

## COMMENTS

PH: 8.4
TDS: 330
Temp: 15.5°C

### DISCHARGE/CROSS SECTION NOTES

[illegible]



COLORADO WATER  
CONSERVATION BOARD

# FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



## LOCATION INFORMATION

STREAM NAME: <u>North Wallace Creek</u>		CROSS-SECTION NO.: <u>1</u>
CROSS-SECTION LOCATION: <u>Approx. 200 yds. upstream from confluence w/ Wallace Creek</u>		
DATE: <u>7-27-06</u>	OBSERVERS: <u>K. Smith, J. Thompson, T. Fresquez</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>NW</u>	SECTION: <u>20</u>
	TOWNSHIP: <u>8 N(S)</u>	RANGE: <u>9S E(W)</u> PM: <u>6th</u>
COUNTY: <u>Mesa</u>	WATERSHED: <u>Colorado</u>	WATER DIVISION: <u>5</u>
		DOW WATER CODE: <u>28212</u>
MAP(S):	USGS: <u>Housetop Mtn. 7.5'</u>	<u>12 S 07S 6258</u>
	USFS:	<u>436 0198</u>

## SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES/NO	METER TYPE: <u>Marsh-Murray</u>			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: _____ lbs/foot	TAPE TENSION: _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>small to medium cobbles</u>	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: <u>3</u>		

## CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(X) Tape @ Stake LB	0.0	<u>surveyed</u>
(X) Tape @ Stake RB	0.0	<u>surveyed</u>
(1) WS @ Tape LB/RB	0.0	<u>2.60 2.67</u>
(2) WS Upstream	<u>15.0'</u>	<u>5.34</u>
(3) WS Downstream	<u>10.0'</u>	<u>6.12</u>
SLOPE	<u>0.58/30.0'</u>	

SKETCH

**LEGEND:**  
Stake (X)  
Station (1)  
Photo (1) →  
Direction of Flow →

## AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	DISTANCE ELECTROFISHED: <u>25</u> 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
<u>mayfly - 3</u>																	
<u>dobsonfly - 1</u>																	
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	
<u>mayfly, dobsonfly, caddisfly</u>																	

## COMMENTS

<u>Ph. 21</u>
<u>OS: 410</u>
<u>Temp: 25.5</u>



### DISCHARGE/CROSS SECTION NOTES

[illegible]

COLORADO WATER CONSERVATION BOARD  
INSTREAM FLOW / NATURAL LAKE LEVEL PROGRAM  
STREAM CROSS-SECTION AND FLOW ANALYSIS

LOCATION INFORMATION

STREAM NAME: North Wallace Creek  
XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
XS NUMBER: 1  
  
DATE: 29-Sep-06  
OBSERVERS: R. Smith, J. Thompson, T. Fresques  
  
1/4 SEC: NW  
SECTION: 20  
TWP: 8S  
RANGE: 95W  
PM: 6th  
  
COUNTY: Mesa  
WATERSHED: Colorado  
DIVISION: 5  
DOW CODE: 28212  
  
USGS MAP: Housetop Mtn. 7.5'  
USFS MAP: 0

SUPPLEMENTAL DATA

\*\*\* NOTE \*\*\*

Leave TAPE WT and TENSION  
at defaults for data collected  
with a survey level and rod

TAPE WT: 0.0106  
TENSION: 99999

CHANNEL PROFILE DATA

SLOPE: 0.01933333

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: .....DATE.....

STREAM NAME: North Wallace Creek  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

# DATA POINTS= 24

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
S	0.00	4.94		
1 G	1.30	5.15		
W	3.00	5.60		0.00
	3.30	5.68	0.10	0.40
	3.60	5.79	0.20	0.61
	3.90	5.91	0.30	0.75
	4.20	5.85	0.25	0.79
	4.50	5.86	0.25	0.80
	4.80	5.86	0.25	0.95
	5.10	5.84	0.25	1.02
	5.40	5.80	0.20	0.76
	5.70	5.74	0.15	0.81
	6.00	5.78	0.20	0.32
	6.30	5.81	0.20	0.51
	6.60	5.69	0.10	0.44
	6.90	5.70	0.10	0.34
	7.50	5.72	0.10	0.00
	8.50	5.65	0.05	0.00
	9.00	5.68	0.10	0.00
	9.50	5.69	0.10	0.00
	10.00	5.71	0.10	
W	10.50	5.62		
1 G	12.20	5.24		
S	12.20	5.24		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.31	0.10	0.03	0.01	2.2%
0.32	0.20	0.06	0.04	6.7%
0.32	0.30	0.09	0.07	12.4%
0.31	0.25	0.08	0.06	10.9%
0.30	0.25	0.08	0.06	11.0%
0.30	0.25	0.08	0.07	13.1%
0.30	0.25	0.08	0.08	14.1%
0.30	0.20	0.06	0.05	8.4%
0.31	0.15	0.05	0.04	6.7%
0.30	0.20	0.06	0.02	3.5%
0.30	0.20	0.06	0.03	5.6%
0.32	0.10	0.03	0.01	2.4%
0.30	0.10	0.05	0.02	2.8%
0.60	0.10	0.08	0.00	0.0%
1.00	0.05	0.04	0.00	0.0%
0.50	0.10	0.05	0.00	0.0%
0.50	0.10	0.05	0.00	0.0%
0.50	0.10	0.05	0.00	0.0%
0.51		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

7.61 0.3 1.05 0.54 100.0%  
 (Max.)

Manning's n = 0.1062  
 Hydraulic Radius = 0.137681547

STREAM NAME: North Wallace Creek  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.05	0.97	-7.2%
5.36	1.05	3.11	196.6%
5.38	1.05	2.92	178.5%
5.40	1.05	2.73	160.7%
5.42	1.05	2.55	143.2%
5.44	1.05	2.37	126.0%
5.46	1.05	2.19	109.1%
5.48	1.05	2.02	92.6%
5.50	1.05	1.85	76.4%
5.52	1.05	1.68	60.5%
5.54	1.05	1.52	44.9%
5.56	1.05	1.36	29.6%
5.57	1.05	1.28	22.1%
5.58	1.05	1.20	14.6%
5.59	1.05	1.12	7.3%
5.60	1.05	1.05	0.0%
5.61	1.05	0.97	-7.2%
5.62	1.05	0.90	-14.3%
5.63	1.05	0.82	-21.4%
5.64	1.05	0.75	-28.3%
5.65	1.05	0.68	-35.2%
5.66	1.05	0.61	-41.8%
5.68	1.05	0.48	-53.9%
5.70	1.05	0.38	-63.9%
5.72	1.05	0.30	-70.9%
5.74	1.05	0.24	-76.8%
5.76	1.05	0.19	-82.2%
5.78	1.05	0.14	-86.9%
5.80	1.05	0.10	-90.9%
5.82	1.05	0.06	-94.2%
5.84	1.05	0.03	-97.0%
5.86	1.05	0.01	-99.1%

WATERLINE AT ZERO  
 AREA ERROR = 5.600



STREAM NAME: North Wallace Creek  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

Constant Manning's n

\*GL\* = lowest Grassline elevation corrected for sag

STAGING TABLE

\*WL\* = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
*GL*	5.24	10.56	0.41	0.67	4.31	10.76	100.0%	0.40	4.57	1.06
	5.25	10.48	0.40	0.66	4.21	10.67	99.2%	0.39	4.40	1.05
	5.30	10.07	0.37	0.61	3.70	10.25	95.3%	0.36	3.64	0.99
	5.35	9.65	0.33	0.56	3.20	9.82	91.3%	0.33	2.95	0.92
	5.40	9.24	0.30	0.51	2.73	9.40	87.4%	0.29	2.33	0.85
	5.45	8.83	0.26	0.46	2.28	8.97	83.4%	0.25	1.78	0.78
	5.50	8.41	0.22	0.41	1.85	8.55	79.5%	0.22	1.29	0.70
	5.55	8.00	0.18	0.36	1.44	8.12	75.5%	0.18	0.88	0.61
*WL*	5.60	7.59	0.14	0.31	1.05	7.70	71.6%	0.14	0.54	0.51
	5.65	7.15	0.09	0.26	0.68	7.25	67.4%	0.09	0.27	0.40
	5.70	4.41	0.09	0.21	0.38	4.49	41.8%	0.08	0.14	0.37
	5.75	2.83	0.08	0.16	0.21	2.89	26.9%	0.07	0.07	0.34
	5.80	1.90	0.05	0.11	0.10	1.93	18.0%	0.05	0.02	0.26
	5.85	1.20	0.02	0.06	0.02	1.22	11.3%	0.02	0.00	0.12
	5.90	0.08	0.01	0.01	0.00	0.08	0.7%	0.00	0.00	0.06

STREAM NAME: North Wallace Creek  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

# SUMMARY SHEET

MEASURED FLOW (Qm)=	0.54 cfs
CALCULATED FLOW (Qc)=	0.54 cfs
(Qm-Qc)/Qm * 100 =	0.8 %
MEASURED WATERLINE (WLm)=	5.61 ft
CALCULATED WATERLINE (WLc)=	5.60 ft
(WLm-WLc)/WLm * 100 =	0.2 %
MAX MEASURED DEPTH (Dm)=	0.30 ft
MAX CALCULATED DEPTH (Dc)=	0.31 ft
(Dm-Dc)/Dm * 100	-3.3 %
MEAN VELOCITY=	0.51 ft/sec
MANNING'S N=	0.106
SLOPE=	0.01933333 ft/ft
.4 * Qm =	0.2 cfs
2.5 * Qm=	1.4 cfs

## RECOMMENDED INSTREAM FLOW:

=====

FLOW (CFS)

PERIOD

=====

=====

## RATIONALE FOR RECOMMENDATION:

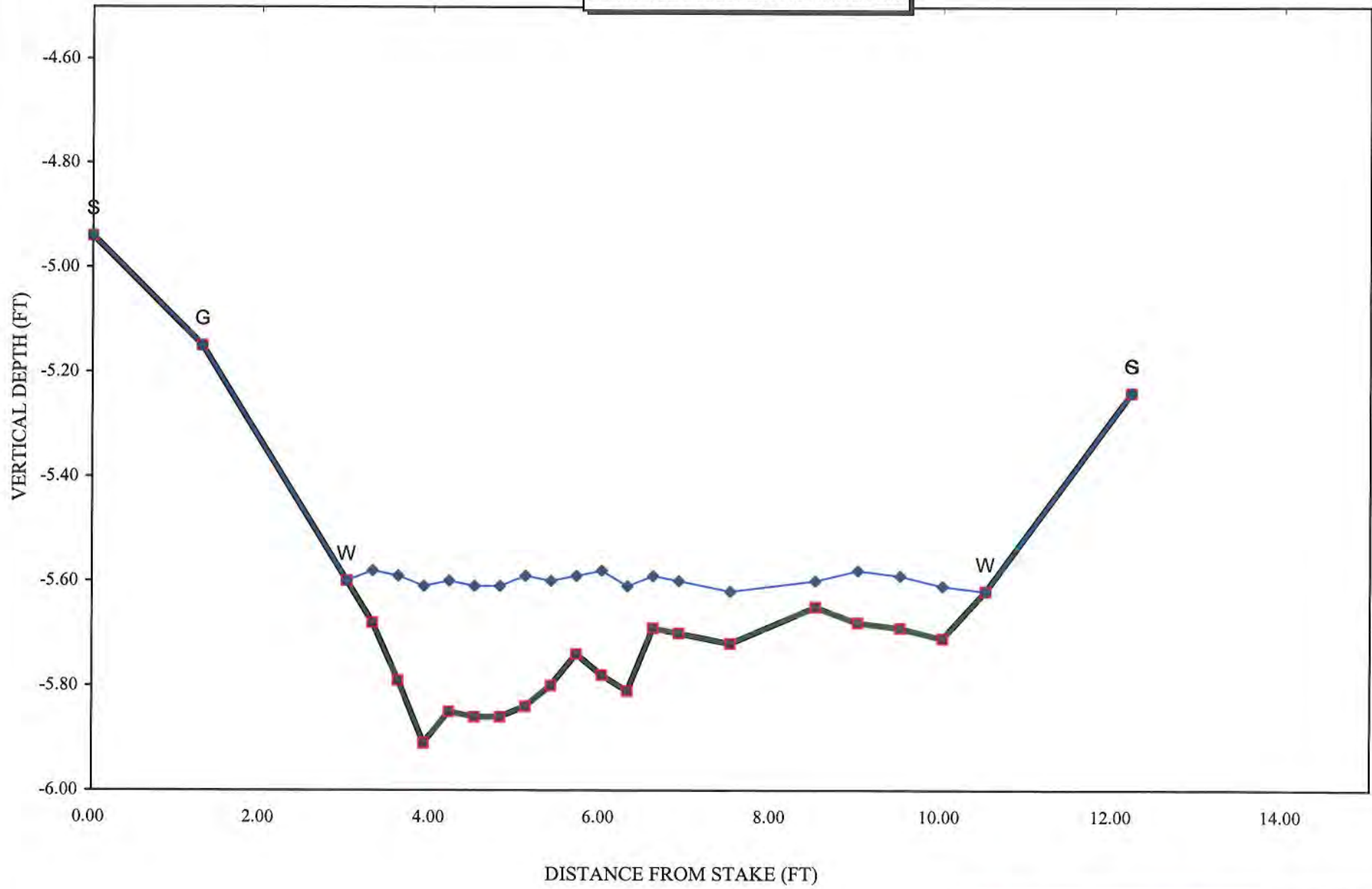
=====

RECOMMENDATION BY: ..... AGENCY..... DATE:.....

CWCB REVIEW BY: ..... DATE:.....

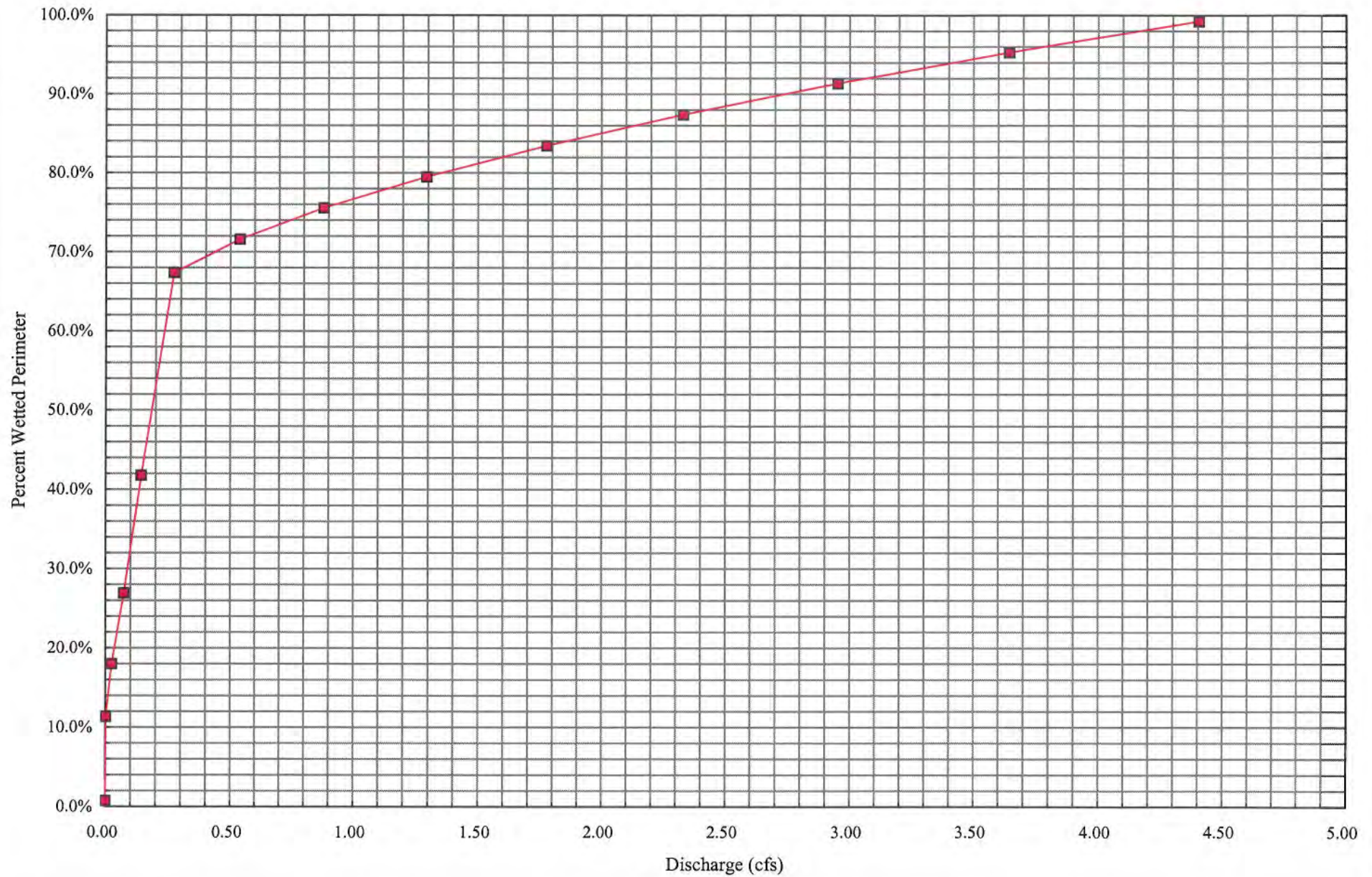
# North Wallace Creek

## CROSS SECTION DATA ANALYSIS



Channel Bottom Computed Water Line

Percent Wetted Perimeter vs. Discharge





COLORADO WATER CONSERVATION BOARD  
INSTREAM FLOW / NATURAL LAKE LEVEL PROGRAM  
STREAM CROSS-SECTION AND FLOW ANALYSIS

LOCATION INFORMATION

STREAM NAME: North Fork Wallace Creek XS1  
XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
XS NUMBER: 1

DATE: 9-Jun-06  
OBSERVERS: R. Smith, T. Fresques

1/4 SEC: NW  
SECTION: 20  
TWP: 8 S  
RANGE: 95 W  
PM: 6th

COUNTY: Mesa  
WATERSHED: Colorado  
DIVISION: 5  
DOW CODE: 28212

USGS MAP: Housetop Mtn. 7.5'  
USFS MAP: 0

SUPPLEMENTAL DATA

\*\*\* NOTE \*\*\*

Leave TAPE WT and TENSION  
at defaults for data collected  
with a survey level and rod

TAPE WT: 0.0106  
TENSION: 99999

CHANNEL PROFILE DATA

SLOPE: 0.039

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: .....DATE.....

STREAM NAME: North Fork Wallace Creek XS1  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

# DATA POINTS= 27

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
1 S & G	0.00	5.16		
	1.00	5.17		
W	1.90	5.36		
	2.00	5.59	0.20	0.11
	2.50	5.58	0.20	0.68
	3.00	5.58	0.20	0.76
	3.50	5.60	0.20	0.97
	4.00	5.68	0.30	1.59
	4.50	5.69	0.30	1.82
	5.00	5.61	0.20	1.34
	5.50	5.62	0.20	1.19
	6.00	5.62	0.20	1.64
	6.50	5.66	0.30	1.67
	7.00	5.77	0.40	2.05
	7.50	5.65	0.30	2.51
	8.00	5.74	0.40	2.51
	8.50	5.89	0.50	2.64
	9.00	5.86	0.50	2.45
	9.50	5.78	0.40	2.36
	10.00	5.88	0.50	1.94
	10.50	5.72	0.30	2.24
	11.00	5.71	0.30	1.25
	11.50	5.46	0.05	0.00
	12.00	5.51	0.10	0.45
W	12.60	5.42		
	13.30	5.32		
1 S & G	14.50	5.23		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.25	0.20	0.06	0.01	0.1%
0.50	0.20	0.10	0.07	1.2%
0.50	0.20	0.10	0.08	1.4%
0.50	0.20	0.10	0.10	1.8%
0.51	0.30	0.15	0.24	4.3%
0.50	0.30	0.15	0.27	5.0%
0.51	0.20	0.10	0.13	2.4%
0.50	0.20	0.10	0.12	2.2%
0.50	0.20	0.10	0.16	3.0%
0.50	0.30	0.15	0.25	4.6%
0.51	0.40	0.20	0.41	7.5%
0.51	0.30	0.15	0.38	6.9%
0.51	0.40	0.20	0.50	9.1%
0.52	0.50	0.25	0.66	12.0%
0.50	0.50	0.25	0.61	11.2%
0.51	0.40	0.20	0.47	8.6%
0.51	0.50	0.25	0.49	8.8%
0.52	0.30	0.15	0.34	6.1%
0.50	0.30	0.15	0.19	3.4%
0.56	0.05	0.03	0.00	0.0%
0.50	0.10	0.06	0.02	0.5%
0.61		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

11.03 0.5 2.99 5.49 100.0%  
 (Max.)

Manning's n = 0.0669  
 Hydraulic Radius= 0.271017906

STREAM NAME: North Fork Wallace Creek XS1  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.99	2.98	-0.3%
5.14	2.99	6.11	104.5%
5.16	2.99	5.82	94.8%
5.18	2.99	5.55	85.6%
5.20	2.99	5.28	76.6%
5.22	2.99	5.01	67.7%
5.24	2.99	4.75	58.9%
5.26	2.99	4.49	50.3%
5.28	2.99	4.24	42.0%
5.30	2.99	4.00	33.8%
5.32	2.99	3.77	26.0%
5.34	2.99	3.54	18.3%
5.35	2.99	3.42	14.5%
5.36	2.99	3.31	10.8%
5.37	2.99	3.20	7.1%
5.38	2.99	3.09	3.4%
5.39	2.99	2.98	-0.3%
5.40	2.99	2.87	-3.9%
5.41	2.99	2.77	-7.5%
5.42	2.99	2.66	-11.1%
5.43	2.99	2.55	-14.7%
5.44	2.99	2.45	-18.2%
5.46	2.99	2.24	-25.2%
5.48	2.99	2.03	-32.0%
5.50	2.99	1.84	-38.6%
5.52	2.99	1.65	-44.9%
5.54	2.99	1.46	-51.2%
5.56	2.99	1.27	-57.4%
5.58	2.99	1.09	-63.6%
5.60	2.99	0.92	-69.1%
5.62	2.99	0.77	-74.1%
5.64	2.99	0.65	-78.3%

WATERLINE AT ZERO  
 AREA ERROR = 5.389

STREAM NAME: North Fork Wallace Creek XS1  
 XS LOCATION: Approx. 200 yds. Upstream from confluence w/ Wallace Creek  
 XS NUMBER: 1

Constant Manning's n

\*GL\* = lowest Grassline elevation corrected for sag

STAGING TABLE

\*WL\* = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
*GL*	5.23	13.22	0.37	0.66	4.88	13.57	100.0%	0.36	10.83	2.22
	5.24	13.05	0.36	0.65	4.76	13.40	98.8%	0.36	10.47	2.20
	5.29	12.15	0.34	0.60	4.13	12.49	92.0%	0.33	8.67	2.10
	5.34	11.36	0.31	0.55	3.55	11.70	86.2%	0.30	7.01	1.98
*WL*	5.39	10.90	0.27	0.50	2.99	11.22	82.7%	0.27	5.43	1.82
	5.44	10.54	0.23	0.45	2.45	10.82	79.7%	0.23	4.00	1.63
	5.49	9.83	0.20	0.40	1.94	10.07	74.2%	0.19	2.84	1.46
	5.54	9.36	0.16	0.35	1.47	9.55	70.4%	0.15	1.84	1.26
	5.59	8.01	0.13	0.30	1.01	8.15	60.1%	0.12	1.10	1.09
	5.64	5.97	0.11	0.25	0.65	6.10	44.9%	0.11	0.65	0.99
	5.69	4.03	0.10	0.20	0.40	4.12	30.3%	0.10	0.36	0.92
	5.74	2.71	0.08	0.15	0.23	2.78	20.5%	0.08	0.19	0.82
	5.79	2.02	0.05	0.10	0.11	2.06	15.2%	0.05	0.07	0.62
	5.84	1.13	0.03	0.05	0.03	1.15	8.5%	0.03	0.01	0.39
	5.89	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

1

## SUMMARY SHEET

---

---

---

---

---

---

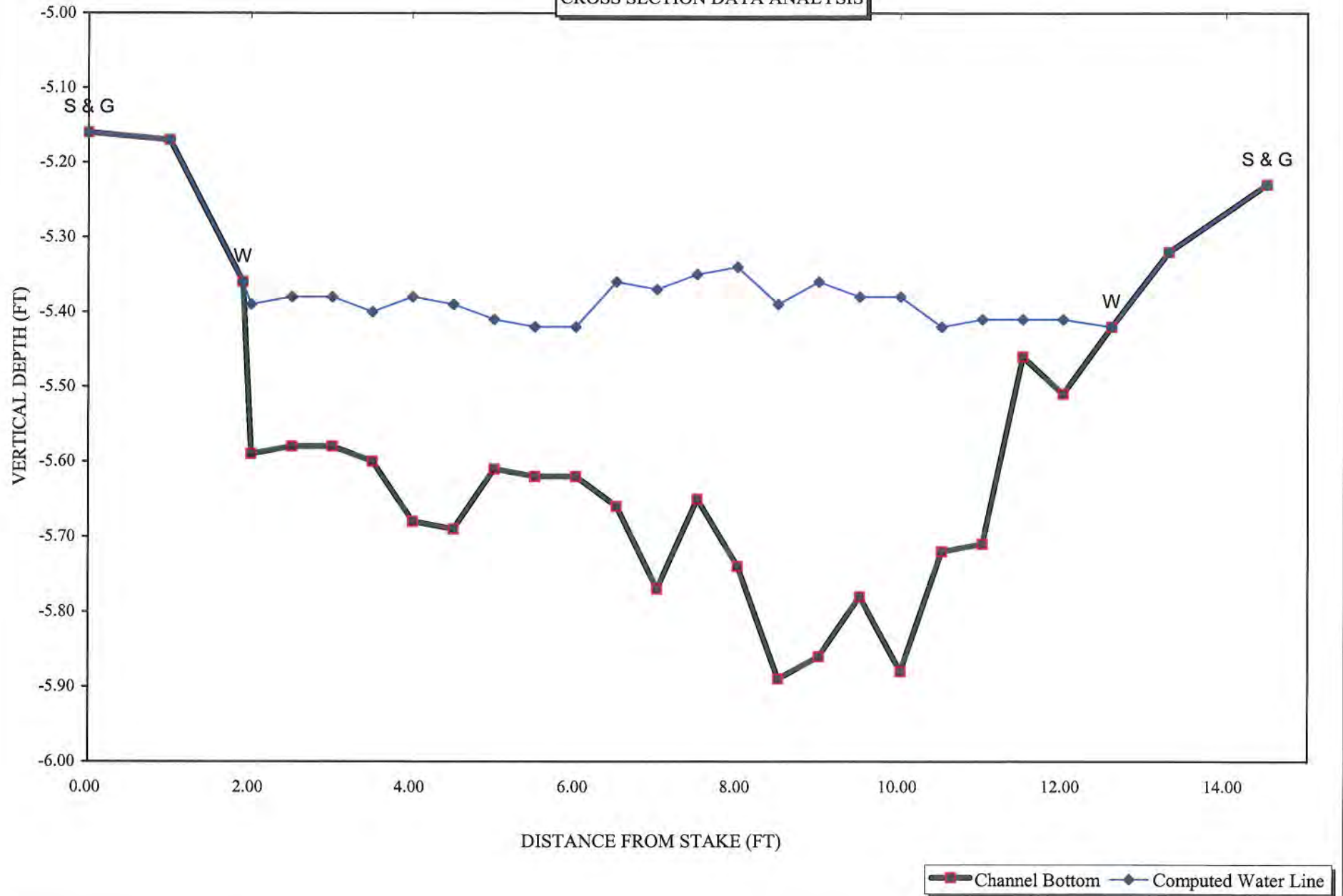
[illegible]

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

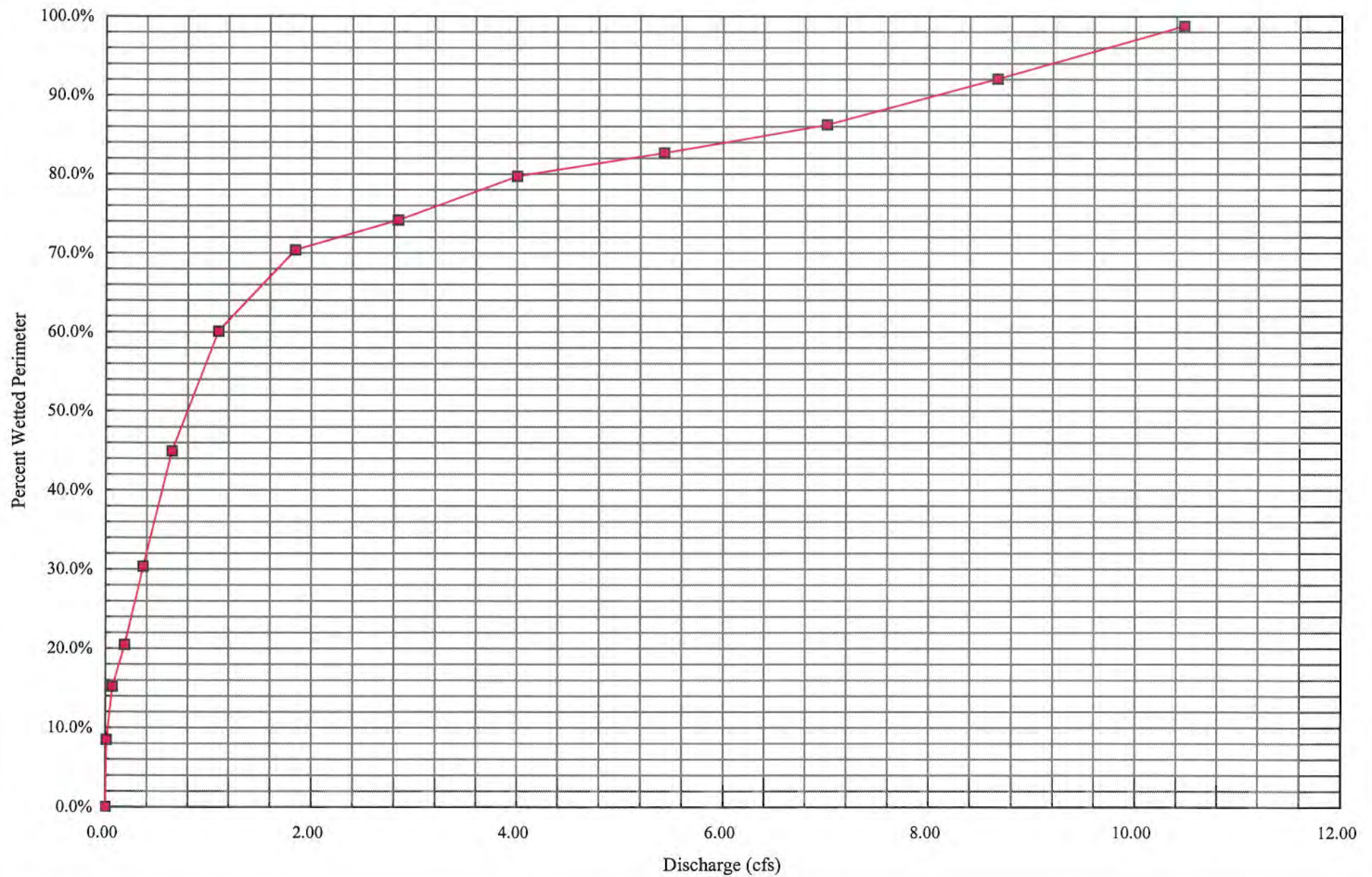


# North Fork Wallace Creek XS1

CROSS SECTION DATA ANALYSIS



Percent Wetted Perimeter vs. Discharge





# **Glenwood Springs Field Office Stream Surveys**

## **September 2006**

**North Fork Wallace Creek** - Water Code #28212

North Fork Wallace Creek, located south of Parachute, CO and located on BLM lands managed by the Glenwood Springs Field Office was sampled on September 29, 2006. North Fork Wallace Creek is tributary to Wallace Creek which enters the Colorado River. Presence/absence sampling was done in support of the Colorado BLM in-stream flow program. Sampling was conducted via backpack electro-shocker and approximately 30 feet of stream was sampled. Personnel present were Tom Fresques, BLM West Slope Fisheries Biologist, Roy Smith CSO Water Rights Program Lead, and Jay Thompson CSO Fisheries and Riparian Lead.

A total of 17 fish were collected. 12 Colorado River cutthroat trout, and 5 brook trout. Cutthroat ranged in size from 62mm to 220mm. Brook trout ranged from 77mm to 235mm.



Colorado River cutthroat trout





Brook trout

