Greg Espegren
Aquatics Specialist
Colorado Water Project
1320 Pearl Street, Suite 320
Boulder, CO 80302
303.440.2937

January 4, 2010

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

Dear Ms. Bassi and Mr. Baessler,

Trout Unlimited in conjunction with the Colorado Division of Wildlife (CDOW) is submitting this final instream flow recommendation for Black Hollow Creek, located in Larimer County, Water Division 1.

Location and Land Status. Black Hollow Creek originates at the base of Crown Point at an elevation of approximately 10,000 feet. Over the next 4.5 miles it flows generally northward through the Roosevelt National Forest and Comanche Peak Wilderness as it drops to its confluence with the Poudre River at an elevation of 7500 feet. The proposed ISF reach covers this entire 4.5 mile segment and over 90% of the reach is located entirely on Forest Service Land (Fig. 1).

Biological Summary and R2CROSS Analysis. In October 2008, TU collected stream cross sectional data, natural environment data, and other data needed to quantify instream flow needs. Previous survey data collected by CDOW indicates that the stream supports healthy populations of Greenback cutthroat trout.

Stream cross sectional data were analyzed using the R2CROSS program, and the output was evaluated using the methods described in Nehring (1979) and Espegren (1996). The R2CROSS models how average depth, percent wetted perimeter and average velocity vary with discharge. According to the criteria established by Nehring (1979), the relevant minimum requirements are an average depth of 0.2 feet, a wetted perimeter of 50%, and an average velocity of 1.0 ft/sec. Protecting salmonids during the summer season is accomplished by insuring all three criteria are met while during the winter protection can be accomplished by protecting 2 of three criteria. Thus, the fishery of Black Hollow Creek can be protected with minimum summer flows of 2.2 cfs and minimum winter flows of 1.4 cfs. However, because spring and fall water availability is often insufficient for meeting this requirement, we recommend adjusting the ISF requirement to

reflect water availability. Therefore, TU recommends that the CWCB appropriate the following flow amounts to preserve the natural environment of Black Hollow Creek to a reasonable degree:

- From **May 1 through September 30** a flow appropriation of **2.2 cfs** is recommended to maintain the three principal criteria of average depth, average velocity, and percent wetted perimeter;

- From **October 1 through November 15** a flow appropriation of **1.4 cfs** is recommended to maintain the average depth and wetter perimeter criteria;

- From **November 16 through April 30**, a flow appropriation of **0.75 cfs** is recommended based on water availability limitations;

Water Availability. The preliminary instream flow recommendation we submitted in February 2009 was based on two preliminary water availability analyses. One was an aerial apportionment of USGS gage 06748530 on Little Beaver Creek at Rustic, CO and the other was based on StreamStats. Subsequent to those preliminary analyses, the CWCB provided us with a geometric mean analysis of daily flows at Black Hollow Creek. We used the CWCB's water availability analysis to adjust the seasonality and quantities of the instream flow recommendation so that the estimated daily flow through Black Hollow Creek typically exceeds the recommended instream flow. These seasonal adjustments are reflected in the final instream flow recommendation above.

Relationship to Existing State Policy. TU is forwarding this stream flow recommendation to the CWCB to meet the State of Colorado's policy "that the wildlife and their environment are to be protected, preserved, enhanced, and managed for the use, benefit, and enjoyment of the people of this state and its visitors … and that, to carry out such program and policy, there shall be a continuous operation of planning, acquisition, and development of wildlife habitats and facilities for wildlife-related opportunities." C.R.S. 33-1-101(1). Further, the CDOW Strategic Plan states "Healthy aquatic environments are essential to maintain healthy and viable fisheries, and critical for self-sustaining populations. The Division desires to protect and enhance the quality and quantity of aquatic habitats." TU recommends that Black Hollow Creek be considered for inclusion in the Instream Flow Program because doing so would help meet these stated policies. Specifically, establishing minimum flows through this reach would preserve the natural environment of the stream to a reasonable degree.

Attached, please find copies of the field data sheets, the R2CROSS modeling runs, and stream photographs. If you have any questions regarding the attached information or the instream flow recommendations, please feel free to contact me at (303) 440-2937.

Trout Unlimited thanks the Colorado Division of Wildlife and the Colorado Water Conservation Board Staff for their support in preparing this recommendation.

Sincerely,

Greg Espegren
Trout Unlimited
Aquatic Specialist

Cc: Jay Skinner, CDOW Water Unit Program Manager – w/o attachments
Mark Uppendahl, CDOW Instream Flow Program Coordinator

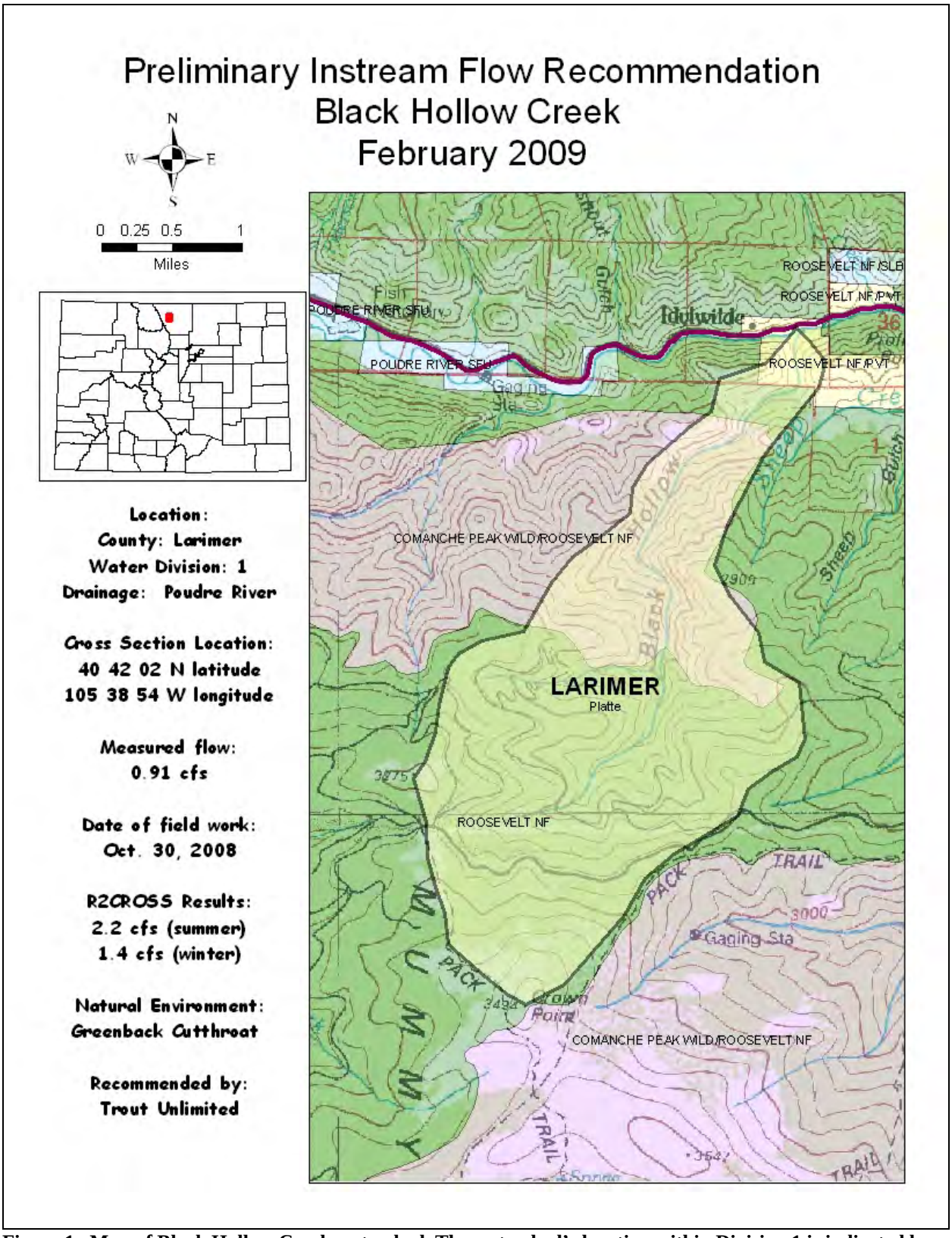

Figure 1.. Map of Black Hollow Creek watershed. The watershed's location within Division 1 is indicated by the red box on the inset map of Colorado

Greg Espegren
Aquatics Specialist
Colorado Water Project
1320 Pearl Street, Suite 320
Boulder, CO 80302
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February 24, 2009

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

Dear Ms. Bassi and Mr. Baessler,

Trout Unlimited in conjunction with the Colorado Division of Wildlife (CDOW) is submitting this instream flow recommendation for Black Hollow Creek, located in Larimer County, Water Division 1.

Location and Land Status. Black Hollow Creek originates at the base of Crown Point at an elevation of approximately 10,000 feet. Over the next 4.5 miles it flows generally northward through the Roosevelt National Forest and Comanche Peak Wilderness as it drops to its confluence with the Poudre River at an elevation of 7500 feet. The proposed ISF reach covers this entire 4.5 mile segment and over 90% of the reach is located entirely on Forest Service Land (Fig. 1).

Biological Summary and R2CROSS Analysis. In October 2008, TU collected stream cross sectional data, natural environment data, and other data needed to quantify instream flow needs. Previous survey data collected by CDOW indicates that the stream supports healthy populations of Greenback cutthroat trout.

Stream cross sectional data were analyzed using the R2CROSS program, and the output was evaluated using the methods described in Nehring (1979) and Espegren (1996). The R2CROSS models how average depth, percent wetted perimeter and average velocity vary with discharge. According to the criteria established by Nehring (1979), the relevant minimum requirements are an average depth of 0.2 feet, a wetted perimeter of 50%, and an average velocity of 1.0 ft/sec. Protecting salmonids during the summer season is accomplished by insuring all three criteria are met while during the winter protection can be accomplished by protecting 2 of three criteria. Thus, the fishery of Black Hollow Creek can be protected with minimum summer flows of 2.2 cfs and minimum winter flows of 1.4 cfs. However, because spring and fall water availability is often insufficient for meeting this requirement, we recommend adjusting the ISF requirement to

reflect water availability. Therefore, TU recommends that the CWCB appropriate the following flow amounts to preserve the natural environment of Black Hollow Creek to a reasonable degree:

- From **April 16 through August 15** a flow appropriation of **2.2 cfs** is recommended to maintain the three principal criteria of average depth, average velocity, and percent wetted perimeter;

- From **August 16 through October 15** a flow appropriation of **1.4 cfs** is recommended to maintain the average depth and wetter perimeter criteria;

- From **October 16 through November 15**, a flow appropriation of **1.0 cfs** is recommended based on water availability limitations;

- From **November 16 to April 15** a flow appropriation of **0.5 cfs** is recommended based on water availability limitations;

Water Availability. The USGS maintained a gage (USGS gage 06748530) on Little Beaver Creek (Little Beaver Creek at Rustic, CO) between October, 1960 and October, 1973. This watershed is due south of Black Hollow Creek and thus experiences similar climatic conditions. The gaged portion of Little Beaver Creek's watershed (12.3 mi^2) is slightly less than twice the size of the Black Hollow Creek watershed (6.65 mi^2) and therefore provides a good representation of flows within the Black Hollow Creek watershed. The Colorado State Engineer's CDSS Diversion Structures, Division 1, Database (version 20080701) indicates that there are no diversion structures located within the Little Beaver Creek watershed above the gaging station. Therefore, no adjustments were necessary to determine native flows at the gage.

We used an aerial apportionment approach to estimate the discharge passing through the proposed ISF reach on Black Hollow Creek. In short, we assumed that the average water contributed to daily stream flows per square mile of Black Hollow's watershed was the same as that contributed per square of Little Beaver Creek's watershed. This allowed us to estimate how much water would have flowed through Black Hollow Creek in the absence of any diversions. Once again, CDSS indicated that there are no known diversion structures within the Black Hollow Creek watershed and thus no adjustments to the modeled flows through Black Hollow Creek were needed.

We also used the USGS StreamStats program to estimate flows on Black Hollow Creek at the Poudre River confluence.

These two water availability analyses were used to adjust the recommended ISF so that our estimate of average monthly flows through Black Hollow Creek typically exceeded the recommended flows (Fig. 2).

Relationship to Existing State Policy. TU is forwarding this stream flow recommendation to the CWCB to meet the State of Colorado's policy "that the wildlife and their environment are to be protected, preserved, enhanced, and managed for the use, benefit, and enjoyment of the people of this state and its visitors … and that, to carry out such program and policy, there shall

be a continuous operation of planning, acquisition, and development of wildlife habitats and facilities for wildlife-related opportunities." C.R.S. 33-1-101(1). Further, the CDOW Strategic Plan states "Healthy aquatic environments are essential to maintain healthy and viable fisheries, and critical for self-sustaining populations. The Division desires to protect and enhance the quality and quantity of aquatic habitats." TU recommends that Black Hollow Creek be considered for inclusion in the Instream Flow Program because doing so would help meet these stated policies. Specifically, establishing minimum flows through this reach would preserve the natural environment of the stream to a reasonable degree.

Attached in Appendix A, please find copies of the field data sheets, the R2CROSS modeling runs, and stream photographs. If you have any questions regarding the attached information or the instream flow recommendations, please feel free to contact me at (303) 440-2937.

Trout Unlimited thanks the Colorado Division of Wildlife and the Colorado Water Conservation Board Staff for their support in preparing this recommendation.

Sincerely,

Greg Espegren
Trout Unlimited
Aquatic Specialist

Cc: Jay Skinner, CDOW Water Unit Program Manager – w/o attachments
Mark Uppendahl, CDOW Instream Flow Program Coordinator

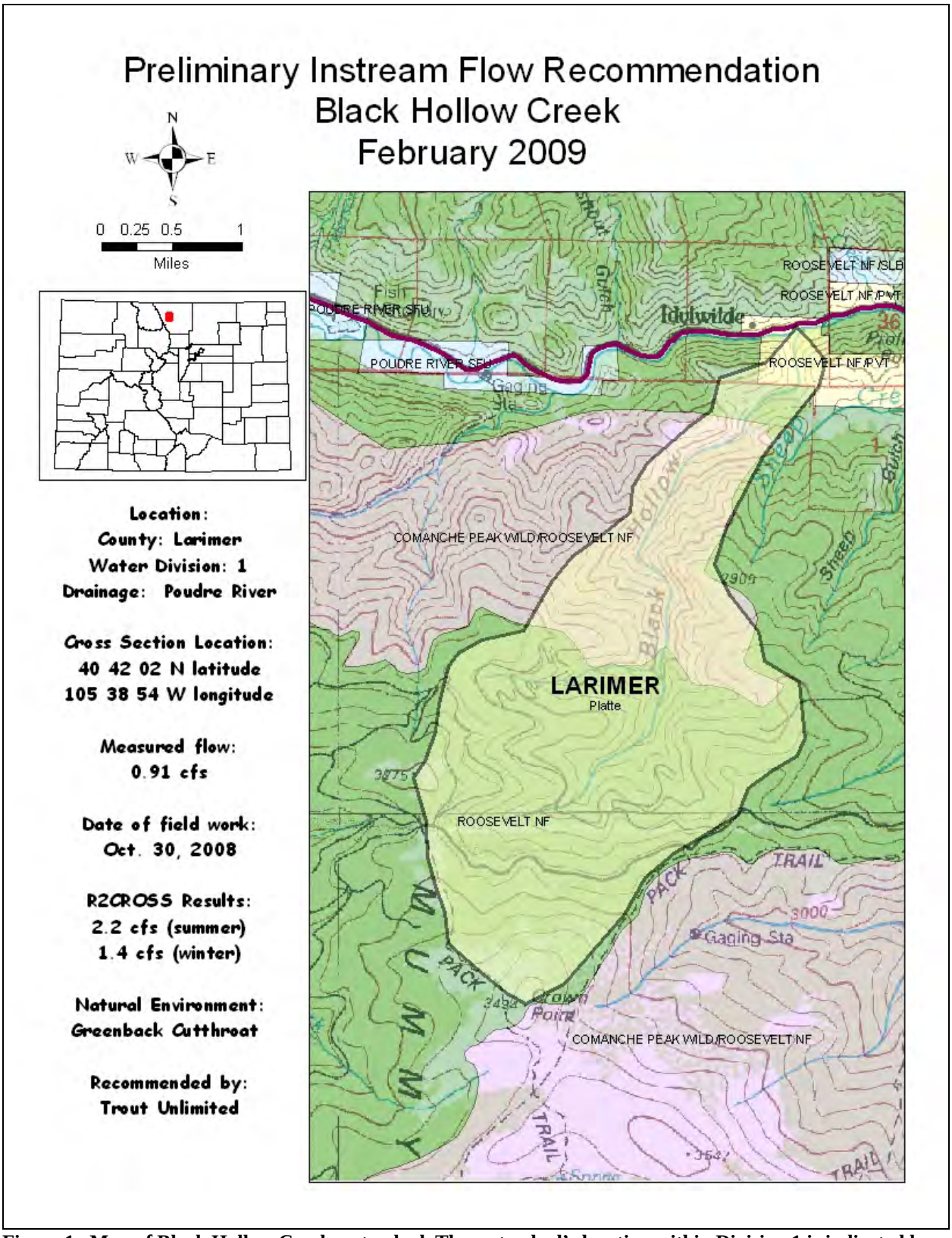


Figure 1.. Map of Black Hollow Creek watershed. The watershed's location within Division 1 is indicated by the red box on the inset map of Colorado

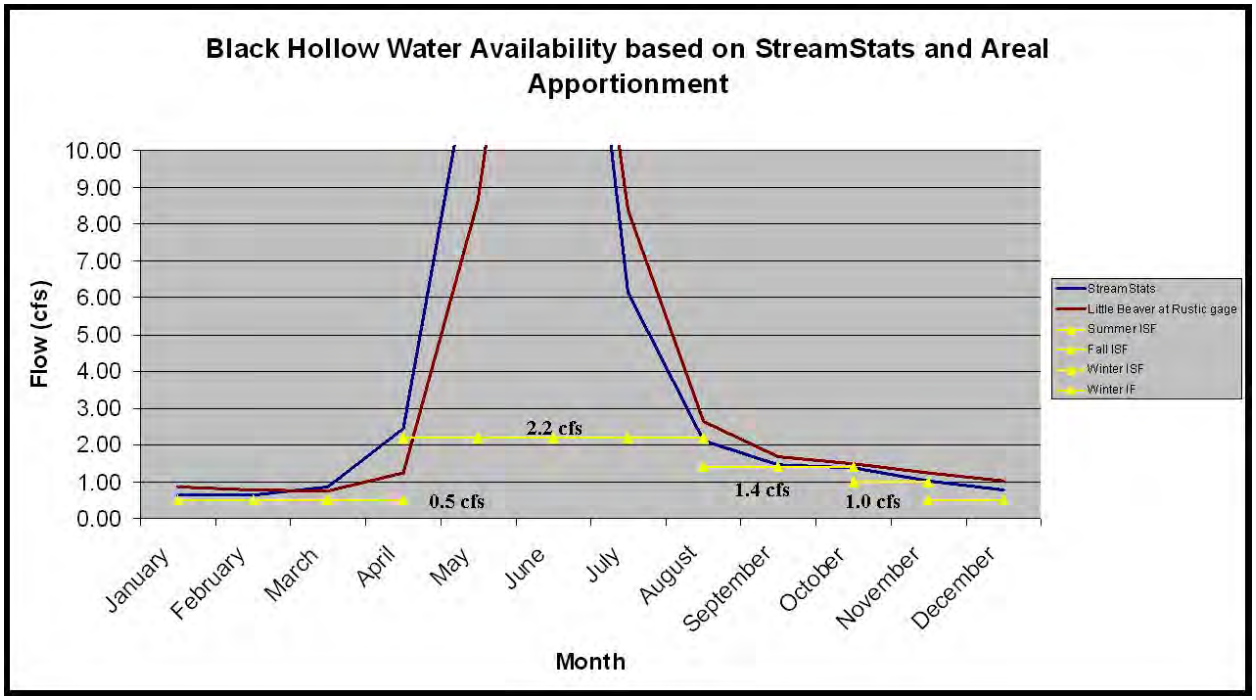


Figure 2. Recommended instream flow appropriations (yellow lines) as compared to estimated average monthly discharge at Lower Terminus of proposed ISF reach on Black Hollow Creek.

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Black Hollow					CROSS-SECTION NO.:
CROSS-SECTION LOCATION: @ LOIS' HOUSE (PHILLIPS) 40° 42' 02.6" N 105° 38' 54.3" W					
DATE:	OBSERVERS:				
LEGAL DESCRIPTION	¼ SECTION:	SECTION:	TOWNSHIP: N/S	RANGE: E/W	PM:
COUNTY:	WATERSHED:	WATER DIVISION:	DOW WATER CODE:		
MAP(S): USGS:					
USFS:					

SUPPLEMENTAL DATA

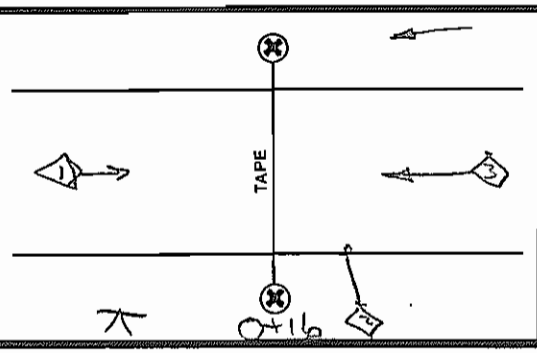
SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE:			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: _____ lbs/foot	TAPE TENSION: _____ lbs
CHANNEL BED MATERIAL SIZE RANGE:	PHOTOGRAPHS TAKEN: YES NO	NUMBER OF PHOTOGRAPHS: 3		

CHANNEL PROFILE DATA

0+01.5

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	
② WS Upstream	55	7' 4 1/2"
③ WS Downstream	90	7' 9 1/4"
SLOPE	.40 / 14.5 = .0273	

SKETCH



LEGEND:
Stake ⊗
Station ①
Photo ①
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:

COMMENTS

FORM #ISF ED 1-86

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Black Hallow	CROSS-SECTION NO.: 1	DATE: 10/30/08	SHEET 1 OF 1
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: ____ ft	TIME: 2:47 pm

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft^2)	Discharge (cfs)
S	1.5		4' 1 1/4								
G	4.5		6' 4 3/4								
W	5.6		7' 7 1/4								
	5.9		7' 11 3/4	0.3				0.01			
	6.2		8' 0"	0.3				0.01			
	6.5		7' 11 1/4	0.3				0.30			
	6.8		8' 1 1/2	0.5				0.63			
	7.2		8' 0 7/8	0.4				0.48			
Begin No Flow	7.5		7' 11 5/8	0.4				0.35			
	7.8		7' 11 1/4	0.3				0.51			
	8.1		7' 11 1/4	0.3				1.48			
	8.4		7' 11"	0.3				1.40			
	8.7		7' 9 5/8	0.2				1.39			
	9.0		7' 10"	0.2				1.36			
	9.3		7' 9 5/8	0.2				2.01			
	9.6		7' 9 1/4	0.2				1.48			
W	9.8		7' 7 1/2								
G	13.5		6' 6"								
S	16.0		4' 6 3/4								
TOTALS:											

End of Measurement	Time: 3:20 pm	Gage Reading: ____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

Data Input & Proofing

STREAM NAME:	Black Hollow Creek
XS LOCATION:	At Lois Phillips' house
XS NUMBER:	1
DATE:	10/30/2008
OBSERVERS:	Espegren
1/4 SEC:	
SECTION:	
TWP:	
RANGE:	
PM:	
COUNTY:	Larimer
WATERSHED:	Poudre
DIVISION:	1
DOW CODE:	
USGS MAP:	
USFS MAP:	
TAPE WT:	0.0106 lbs / ft (Level and Rod Survey)
TENSION:	99999 lbs
SLOPE:	0.0273 ft / ft

CHECKED BY:.....DATE.....

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

Total Data Points = 19

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	S	1.50	4.52			0.00	0.00	0.00
1	G	4.50	6.40			0.00	0.00	0.00
	W	5.60	7.60	0.00	0.00	0.00	0.00	0.00
		5.90	7.98	0.30	0.01	0.09	0.00	7.68
		6.20	8.00	0.30	0.01	0.09	0.00	7.70
		6.50	7.94	0.30	0.30	0.09	0.03	7.64
		6.80	8.13	0.50	0.63	0.18	0.11	7.63
		7.20	8.07	0.40	0.48	0.14	0.07	7.67
		7.50	7.97	0.40	0.35	0.12	0.04	7.57
		7.80	7.94	0.30	0.51	0.09	0.05	7.64
		8.10	7.94	0.30	1.48	0.09	0.13	7.64
		8.40	7.92	0.30	1.40	0.09	0.13	7.62
		8.70	7.80	0.20	1.39	0.06	0.08	7.60
		9.00	7.83	0.20	1.36	0.06	0.08	7.63
		9.30	7.80	0.20	2.01	0.06	0.12	7.60
		9.60	7.77	0.20	1.48	0.05	0.07	7.57
	W	9.80	7.63	0.00		0.00	0.00	0.00
1	G	13.50	6.50			0.00	0.00	0.00
	S	16.00	4.56			0.00	0.00	0.00
	Totals					1.21	0.91	

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

LOCATION INFORMATION

STREAM NAME:	Black Hollow Creek
XS LOCATION:	At Lois Phillips' house
XS NUMBER:	1
DATE:	30-Oct-08
OBSERVERS:	Espegren
1/4 SEC:	0
SECTION:	0
TWP:	0
RANGE:	0
PM:	0
COUNTY:	Larimer
WATERSHED:	Poudre
DIVISION:	1
DOW CODE:	0
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE: 0.0273

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

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

STREAM NAME: Black Hollow Creek
XS LOCATION: At Lois Phillips' house
XS NUMBER: 1

DATA POINTS= 19

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	S	1.50	4.52			0.00		0.00	0.00	0.0%
1	G	4.50	6.40			0.00		0.00	0.00	0.0%
	W	5.60	7.60	0.00	0.00	0.00		0.00	0.00	0.0%
		5.90	7.98	0.30	0.01	0.48	0.30	0.09	0.00	0.1%
		6.20	8.00	0.30	0.01	0.30	0.30	0.09	0.00	0.1%
		6.50	7.94	0.30	0.30	0.31	0.30	0.09	0.03	3.0%
		6.80	8.13	0.50	0.63	0.36	0.50	0.18	0.11	12.1%
		7.20	8.07	0.40	0.48	0.40	0.40	0.14	0.07	7.4%
		7.50	7.97	0.40	0.35	0.32	0.40	0.12	0.04	4.6%
		7.80	7.94	0.30	0.51	0.30	0.30	0.09	0.05	5.0%
		8.10	7.94	0.30	1.48	0.30	0.30	0.09	0.13	14.6%
		8.40	7.92	0.30	1.40	0.30	0.30	0.09	0.13	13.8%
		8.70	7.80	0.20	1.39	0.32	0.20	0.06	0.08	9.1%
		9.00	7.83	0.20	1.36	0.30	0.20	0.06	0.08	8.9%
		9.30	7.80	0.20	2.01	0.30	0.20	0.06	0.12	13.2%
		9.60	7.77	0.20	1.48	0.30	0.20	0.05	0.07	8.1%
	W	9.80	7.63	0.00		0.24		0.00	0.00	0.0%
1	G	13.50	6.50			0.00		0.00	0.00	0.0%
	S	16.00	4.56			0.00		0.00	0.00	0.0%
	TOTALS ----------					4.54	0.5 (Max.)	1.21	0.91	100.0%

Manning's n = 0.1338
Hydraulic Radius= 0.265391835

STREAM NAME: Black Hollow Creek
XS LOCATION: At Lois Phillips' house
XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.21	1.27	5.3%
7.37	1.21	2.46	104.0%
7.39	1.21	2.35	95.3%
7.41	1.21	2.25	86.8%
7.43	1.21	2.15	78.4%
7.45	1.21	2.05	70.1%
7.47	1.21	1.95	61.9%
7.49	1.21	1.85	53.9%
7.51	1.21	1.76	46.1%
7.53	1.21	1.67	38.4%
7.55	1.21	1.58	30.8%
7.57	1.21	1.49	23.3%
7.58	1.21	1.44	19.6%
7.59	1.21	1.40	16.0%
7.60	1.21	1.35	12.4%
7.61	1.21	1.31	8.8%
7.62	1.21	1.27	5.3%
7.63	1.21	1.23	1.8%
7.64	1.21	1.19	-1.7%
7.65	1.21	1.14	-5.1%
7.66	1.21	1.10	-8.5%
7.67	1.21	1.06	-11.9%
7.69	1.21	0.98	-18.7%
7.71	1.21	0.90	-25.4%
7.73	1.21	0.82	-32.0%
7.75	1.21	0.74	-38.6%
7.77	1.21	0.66	-45.0%
7.79	1.21	0.59	-51.4%
7.81	1.21	0.51	-57.3%
7.83	1.21	0.45	-62.6%
7.85	1.21	0.39	-67.3%
7.87	1.21	0.34	-71.9%

WATERLINE AT ZERO
AREA ERROR = 7.630

STREAM NAME: Black Hollow Creek
XS LOCATION: At Lois Phillips' house
XS NUMBER: 1

Constant Manning's n

STAGING TABLE

"GL" = lowest Grasslina elevation corrected for sag
"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"	6.50	8.91	0.97	1.63	8.60	9.90	100.0%	0.87	14.35	1.67	
	6.63	8.36	0.89	1.50	7.47	9.28	93.7%	0.81	11.87	1.59	
	6.68	8.15	0.87	1.45	7.06	9.04	91.3%	0.78	10.98	1.56	
	6.73	7.94	0.84	1.40	6.66	8.80	88.9%	0.76	10.14	1.52	
	6.78	7.73	0.81	1.35	6.26	8.56	86.5%	0.73	9.33	1.49	
	6.83	7.52	0.78	1.30	5.88	8.32	84.1%	0.71	8.57	1.46	
	6.88	7.31	0.75	1.25	5.51	8.08	81.6%	0.68	7.84	1.42	
	6.93	7.11	0.73	1.20	5.15	7.84	79.2%	0.68	7.14	1.39	
	6.98	6.90	0.70	1.15	4.80	7.61	76.8%	0.63	6.48	1.35	
	7.03	6.69	0.67	1.10	4.46	7.37	74.4%	0.61	5.86	1.31	
	7.08	6.48	0.64	1.05	4.13	7.13	72.0%	0.58	5.27	1.28	
	7.13	6.27	0.61	1.00	3.81	6.89	69.6%	0.55	4.72	1.24	
	7.18	6.06	0.58	0.95	3.51	6.65	67.2%	0.53	4.20	1.20	
	7.23	5.85	0.55	0.90	3.21	6.41	64.7%	0.50	3.71	1.16	
	7.28	5.64	0.52	0.85	2.92	6.17	62.3%	0.47	3.26	1.11	
	7.33	5.43	0.49	0.80	2.65	5.93	59.9%	0.45	2.83	1.07	
	7.38	5.22	0.46	0.75	2.38	5.69	57.5%	0.42	2.44	1.03	2.2
	7.43	5.01	0.42	0.70	2.12	5.45	55.1%	0.39	2.08	0.98	
	7.48	4.80	0.39	0.65	1.88	5.22	52.7%	0.36	1.74	0.93	
	7.53	4.59	0.36	0.60	1.64	4.98	50.3%	0.33	1.44	0.88	1.4
	7.58	4.38	0.32	0.55	1.42	4.74	47.8%	0.30	1.17	0.82	
"WL"	7.63	4.18	0.29	0.50	1.20	4.50	45.5%	0.27	0.92	0.76	
	7.68	4.06	0.25	0.45	1.00	4.35	43.9%	0.23	0.69	0.69	
	7.73	3.95	0.20	0.40	0.80	4.20	42.4%	0.19	0.48	0.61	0.5
	7.78	3.76	0.16	0.35	0.60	3.96	40.0%	0.15	0.32	0.52	
	7.83	2.84	0.15	0.30	0.44	3.02	30.5%	0.14	0.22	0.50	
	7.88	2.68	0.11	0.25	0.30	2.82	28.5%	0.11	0.12	0.41	
	7.93	2.39	0.07	0.20	0.17	2.49	25.2%	0.07	0.05	0.30	
	7.98	1.30	0.06	0.15	0.08	1.37	13.8%	0.06	0.02	0.28	
	8.03	0.68	0.06	0.10	0.04	0.72	7.2%	0.05	0.01	0.26	
	8.08	0.41	0.02	0.05	0.01	0.43	4.3%	0.02	0.00	0.15	

STREAM NAME: Black Hollow Creek
XS LOCATION: At Lois Phillips' house
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	0.91	cfs
CALCULATED FLOW (Qc)=	0.92	cfs
(Qm-Qc)/Qm * 100 =	-0.6	%
MEASURED WATERLINE (WLm)=	7.62	ft
CALCULATED WATERLINE (WLc)=	7.63	ft
(WLm-WLc)/WLm * 100 =	-0.2	%
MAX MEASURED DEPTH (Dm)=	0.50	ft
MAX CALCULATED DEPTH (Dc)=	0.50	ft
(Dm-Dc)/Dm * 100	0.0	%
MEAN VELOCITY=	0.76	ft/sec
MANNING'S N=	0.134	
SLOPE=	0.0273	ft/ft
.4 * Qm =	0.4	cfs
2.5 * Qm=	2.3	cfs

RECOMMENDED INSTREAM FLOW:

FLOW (CFS)	PERIOD

RATIONALE FOR RECOMMENDATION:

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

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