United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7093
www.blm.gov/co

TAKE PRIDE IN AMERICA

RECEIVED
JAN 05 2009
Colorado Water Conservation Board

In Reply Refer To:
7250 (CO-932)

DEC 30 2008

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 Troublesome Creek, located in Water Division 5.

Location and Land Status: Troublesome Creek is tributary to the Colorado River approximately four miles east of Kremmling, Colorado. The creek is located within the upper Colorado River watershed in Grand County. This recommendation addresses two reaches located in the upper portions of the Troublesome Creek watershed. The first reach starts at the confluence with Glomerate Creek and extends downstream to the confluence with Rabbit Ears Creek. The second reach covers the stream reach beginning at the confluence with Rabbit Ears Creek and extending downstream to the headgate of the Pickering Ditch. In the two-mile upper reach, all of the land along the creek is owned and managed by the BLM. In the three-mile lower reach, approximately 42 percent of the reach is managed by BLM, and 58 percent is privately owned by an association that manages the land for recreational values with a limited number of summer residences.

Biological Summary: Troublesome Creek is a moderate gradient stream with moderate to small substrate size. The creek meanders through the bottom of a mountain valley. The willow riparian community associated with the creek often occupies the entire valley floor. The riparian community also provides substantial nutrients to the creek system and abundant bank overhangs for fish habitat. However, the riparian community does not provide substantial shading of fish habitat because the creek channel is wide. Fishery surveys indicate that the creek supports a large and self-sustaining population of brown trout with a wide variety of age classes. The creek also supports small numbers of brook trout and mottled sculpin.

R2Cross Analysis: The 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.

Upper Reach – Confluence with Glomerate Creek to Confluence With Rabbit Ears Creek

- 5.1 cubic feet per second (cfs) is recommended during the high temperature period from April 1 through October 31. This recommendation is driven by the average velocity and wetted perimeter criteria. Because the creek channel is large, meeting the wetted perimeter criteria is especially important for providing sufficient physical habitat during the time of year when fish are putting on weight for overwintering and also during October, when brown trout are spawning.

- 2.8 cfs is recommended for the cold temperature period from November 1 through March 31. This recommendation is driven by the depth criteria. This flow should allow fish passage between pools during the winter, and should prevent complete icing of the water column at this high elevation location.

Lower Reach –Confluence With Rabbit Ears Creek to Headgate of Pickering Ditch

- 9.3 cfs is recommended during the high temperature period from April 1 through October 31. This recommendation is driven by the average depth criteria. The creek in this reach has a wide channel in response to large flows associated with snowmelt runoff. Without sufficient flow, only the thalweg of the creek is wetted, which does not provide sufficient habitat for the large brown trout population.

- 5.9 cubic feet per second is recommended for the cold temperature period from November 1 through March 31. As would be expected in a wide channel, this recommendation is driven by the wetted perimeter criteria. This flow should allow passage between pools during the winter, and should prevent complete icing of the water column at this high elevation.

Water Availability: Matheson Reservoir is located just above the upper terminus of the proposed instream flow reach. The reservoir is decreed for 475.83 acre feet, conditional, and 1,073.6 acre feet, absolute. The BLM's understanding is that reservoir releases water for diversion by the Pickering Ditch, which is suggested as the lower terminus of this reach, and to Missouri Ditch, located further downstream.

For calculating water availability, the BLM recommends using USGS Gage 09039000, Troublesome Creek near Pearmont, CO. This gage is located above all of the ditches in the lower watershed, with the exception of Pickering Ditch, which is decreed for 9.5 cfs. The BLM recommends examining the historic diversion records for Pickering Ditch and adding those volumes back into the gage record to get an estimate of raw water availability for the watershed. For the upper reach, a basin apportionment calculation can be performed on the gage data. For the lower reach, the adjusted gage data can be used without further modification, because the

lower terminus of the lower instream flow reach is located only ¾ miles upstream from this gage.

Relationship to Management Plans: Troublesome Creek is managed for several types of uses. The upper reach forms the southeast boundary of the Troublesome Wilderness Study Area. In this location, mountainous terrain rises up steeply from the creek. The creek corridor in this location has been historically grazed and grazing will continue under an updated allotment management plan that emphasizes improvement and maintenance of riparian habitat. The lower Rabbit Ears Creek forms the southeastern boundary of the BLM's Troublesome Wilderness Study Area. Recreation and livestock grazing are the management emphasis for the lower reach, again with an emphasis on maintaining and improving riparian conditions. A protected flow regime will assist the BLM in meeting its management objectives for this stream corridor.

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. The 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 to support this recommendation were provided with the BLM's draft recommendation in February 2008. 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 at 303-239-3940.

Sincerely,

for Linda Anania
Deputy State Director, Resources and Fire

cc:
David Stout, Kremmling FO
Paula Belcher, Kremmling FO
Tom Fresques, Glenwood Springs FO

DRAFT INSTREAM FLOW RECOMMENDATION

Mr. Dan Merriman
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Mr. Merriman:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its instream flow recommendation for Troublesome Creek, located in Water Division 5.

Location and Land Status. Troublesome Creek is tributary to the Colorado River approximately four miles east of Kremmling, Colorado. The creek is located within the upper Colorado River watershed in Grand County. This recommendation addresses two reaches located in the upper portions of the Troublesome Creek watershed. The first reach starts at the outlet of Matheson Reservoir and extends downstream to the confluence with Rabbit Ears Creek. The second reach covers the stream reach beginning at the confluence with Rabbit Ears Creek and extending downstream to the headgate of the Pickering Ditch. In the 3.0-mile upper reach, all of the land along the creek is owned and managed by the BLM. In the 3.0-mile lower reach, approximately 42% of the reach is managed by BLM, and 58% is privately owned by an association that manages the land for recreational values with a limited number of summer residences.

Biological Summary. Troublesome Creek is a moderate gradient stream with moderate to small substrate size. The creek meanders through the bottom of a mountain valley. The willow riparian community associated with the creek often occupies the entire valley floor. The riparian community also provides substantial nutrients to the creek system and abundant bank overhangs for fish habitat. However, the riparian does not provide substantial shading of fish habitat because the creek channel is wide. Fishery surveys indicate that the creek supports a large and self-sustaining population of brown trout with a wide variety of age classes. The creek also supports small numbers of brook trout and mottled sculpin.

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.

Upper Reach –
Outlet of Matheson Reservoir to Confluence With Rabbit Ears Creek

5.1 cubic feet per second is recommended during the high temperature period from April 1 through October 31. This recommendation is driven by the average velocity and wetted perimeter criteria. Because the creek channel is large, meeting the wetted perimeter criteria is especially important for providing sufficient physical habitat during the time of year when fish are putting on weight for overwintering and also during October, when brown trout are spawning.

2.8 cubic feet per second is recommended for the cold temperature period from November 1 through March 31. This recommendation is driven by the depth criteria. This flow should allow fish passage between pools during the winter, and should prevent complete icing of the water column at this high elevation location.

Lower Reach –
Confluence With Rabbit Ears Creek to Headgate of Pickering Ditch

9.3 cubic feet per second is recommended during the high temperature period from April 1 through October 31. This recommendation is driven by the average depth criteria. The creek in this reach has a wide channel in response to large flows associated with snowmelt runoff. Without sufficient flow, only the thalweg of the creek is wetted, which does not provide sufficient habitat for the large brown trout population.

5.9 cubic feet per second is recommended for the cold temperature period from November 1 through March 31. As would be expected in a wide channel, this recommendation is driven by the wetted perimeter criteria. This flow should allow passage between pools during the winter, and should prevent complete icing of the water column at this high elevation.

Water Availability. Matheson Reservoir is located just above the upper terminus of the proposed instream flow reach. The reservoir is decreed for 475.83 acre feet, conditional, and 1,073.6 acre feet, absolute. BLM's understanding is that reservoir releases water for diversion by the Pickering Ditch, which is suggested as the lower terminus of this reach, and to Missouri Ditch, located further downstream.

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Relationship to Management Plans. Troublesome Creek is managed for several types of uses. The upper reach forms the southeast boundary of the Troublesome Wilderness Study Area. In this location, mountainous terrain rises up steeply from the creek. The creek corridor in this location has been historically grazed and grazing will continue under an updated allotment management plan that emphasizes improvement and maintenance of riparian habitat The lower Rabbit Ears Creek forms the southeastern boundary of BLM's Troublesome Wilderness Study Area. Recreation and livestock grazing are the management emphasis for the lower reach, again with an emphasis on maintaining and improving riparian conditions. A protected flow regime

will assist BLM in meeting its management objectives for this stream corridor.

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 are enclosed to support this recommendation. 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 at 303-239-3940.

Sincerely,

Linda Anania
Deputy State Director
Resources and Fire

4 Enclosures

cc: Peter McFadden, Kremmling FO
Paula Belcher, Kremmling FO
Tom Freques, Glenwood Springs FO

Appendix - B

Field Data

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: Troublesome Creek [illegible]			CROSS-SECTION NO.: 1
CROSS-SECTION LOCATION: approx. [illegible] [illegible] Rabbit Ears [illegible]			
DATE: 10-13-06	OBSERVERS: R. Smith, R. Belcher		
LEGAL DESCRIPTION — ¼ SECTION: SE	SECTION: 35	TOWNSHIP: 4 (N)/S	RANGE: 80 E/(W) — PM: 6th
COUNTY: Grand	WATERSHED: [illegible]	WATER DIVISION: 5	DOW WATER CODE: 23521
MAP(S): USGS: Hyannis Peak 7.5'	Zone 13 0387929 [illegible]		
USFS:	[illegible]		

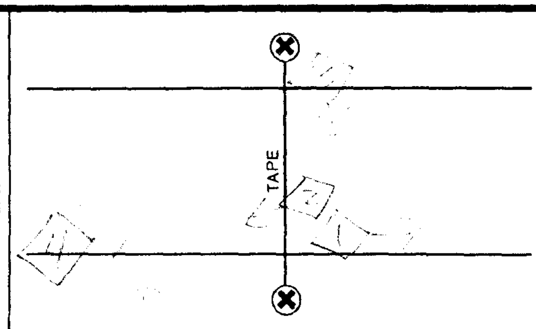
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: (YES)/NO	METER TYPE: Marsh McBirney			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: [illegible] cobbles to [illegible] boulders		PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: 4	

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	6.50/6.50
(2) WS Upstream	26.0	6.34
(3) WS Downstream	40.0	6.92
SLOPE	0.58/66.0 = 0.0087	

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
see attached survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:

[illegible], [illegible], caddisfly

COMMENTS

TDS: 050
pH: 6.5
[illegible]: 46°

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:	CROSS-SECTION NO.: 1	DATE:	SHEET ___ OF ___

BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: 0.6 ft	TIME: 2:30 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)
RS	0.0		4.72								
G	2.0		5.50								
W	2.2		6.50	ϕ				ϕ			
	3.0		6.72	0.10				3.1			
	4.0		6.9	0.13				0.2			
	5.0		6.75	0.10				1.3			
	6.0		6.66	0.15				0.28			
	7.0		6.79	0.12				0.4			
	8.0		7.05	0.15				0.5			
	9.0		7.02	0.12				0.7			
	10.0		6.16	0.10				0.2			
	11.0		6.92	0.12				2.16			
	12.0		7.01	0.12				0.46			
	13.0		6.81	0.30				1.91			
	14.0		6.86	0.35				1.04			
	15.0		6.80	0.30				0.75			
	16.0		6.63	0.15				1.34			
	17.0		6.71	0.20				0.58			
	18.0		6.74	0.25				0.19			
	19.0		6.64	0.15				0.07			
	20.0		6.56	0.05				0			
W	25.0		6.50	ϕ				ϕ			
	26.8		6.09								
	32.1		5.68								
G	37.6		5.60								
LS	40.0		3.1								
TOTALS:											

End of Measurement	Time: 2:50	Gage Reading: 0.6 ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Troublesome [illegible]					CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: [illegible] 17 [illegible]					
[illegible]					
DATE: [illegible]	OBSERVERS: [illegible] C. Belcher				
LEGAL DESCRIPTION	¼ SECTION: SE	SECTION: 35	TOWNSHIP: 4 (N)/S	RANGE: 80 E/(W)	PM: [illegible]
COUNTY: [illegible]	WATERSHED: [illegible]	WATER DIVISION:	DOW WATER CODE: 23521		
MAP(S):	USGS: Hyannis Peak 7.5'				
	USFS:				

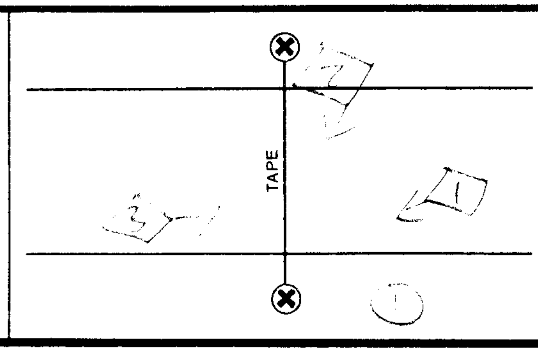
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: [illegible]			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ______ sec	TAPE WEIGHT: surveyed lbs/foot	TAPE TENSION: surveyed lbs
CHANNEL BED MATERIAL SIZE RANGE: [illegible]	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	[illegible].85 [illegible]
(2) WS Upstream	20.0	5.75
(3) WS Downstream	[illegible]1.0	6.71
SLOPE	0.96/67.0 = 0.0143	

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
see attached																	
survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:

mayfly, stonefly, caddisfly

COMMENTS

[illegible] 6.5
[illegible]
Tem[illegible]

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Troublesome Creek	CROSS-SECTION NO.:	DATE:	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: 0.6 ft	TIME:

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)
LS	0.0		4.66								
G	5.1		[illegible]								
W	6.8		5.86								
	7.0		5.90	0.05				7			
	8.0		5.90	0.05				8			
	9.0		6.05	0.20				0.36			
	10.0		6.21	0.35				0.75			
	11.0		6.26	0.40				0.79			
	12.0		6.14	0.30				1.30			
	13.0		6.35	0.50				1.17			
	[illegible]		6.39	[illegible]				1.67			
	[illegible]		6.40	0.55				1.67			
	[illegible]		6.48	[illegible]				1.19			
	[illegible]		6.39	0.55				1.10			
	[illegible]		6.27	0.40				1.37			
	[illegible]		6.42	0.55				1.19			
	20.0		6.37	0.50				1.19			
	21.0		6.38	[illegible]				1.38			
	22.0		6.32	[illegible]				[illegible]			
	23.0		6.36	0.50				1.12			
	24.0		6.27	0.40				2.19			
	[illegible]		6.15	0.30				1.13			
	[illegible]		5.91	[illegible]				[illegible]			
	27.0		5.92	0.05				[illegible]			
W	27.6		5.85								
	31.0		5.27								
G	45.1		4.74								
LS	52.3		2.96								
TOTALS:											

End of Measurement	Time: [illegible]	Gage Reading: 0.6 ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: Troublesome Creek - above Rabbit Ears						CROSS-SECTION NO.: 1
CROSS-SECTION LOCATION: Approx. 600 ft. upstream from confluence with Rabbit Ears Creek						
DATE: 10-13-04	OBSERVERS: P Belcher, R. Smith					
LEGAL DESCRIPTION	¼ SECTION: SE	SECTION: 35	TOWNSHIP: 4 (N)/S	RANGE: 80 E/(W)	PM: 6th	
COUNTY: Grand	WATERSHED: Colorado	WATER DIVISION: 5	DOW WATER CODE: 23521			
MAP(S): USGS: Hyannis Peak 7.5'	Zone 13 0388004	8490 A				
USFS:	4457962					

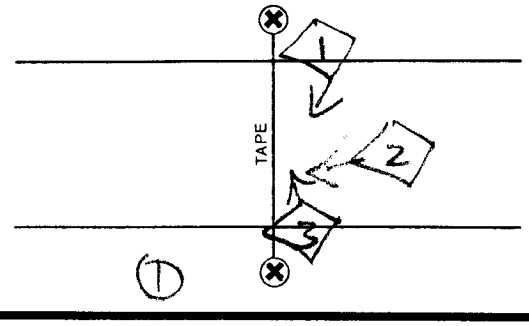
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: (YES) NO	METER TYPE: Marsh-McBirney			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: surveyed _____ lbs/foot	TAPE TENSION: surveyed _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: 2" to 8" cobbles	PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: 3		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(X) Tape @ Stake LB	0.0	surveyed
(X) Tape @ Stake RB	0.0	surveyed
(1) WS @ Tape LB/RB	0.0	6.52/6.52
(2) WS Upstream	47.5	6.23
(3) WS Downstream	26.5	6.65
SLOPE	0.42/64.0 = 0.0065	

SKETCH



LEGEND:
Stake (X)
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
see attached survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:
mayfly, caddisfly, stonefly

COMMENTS

TDS = 100
Ph = 6.4
Temp = 48°

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Troublesome Creek	CROSS-SECTION NO.: 1	DATE: 10-13-06	SHEET 1 OF 1
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: 0.3 ft	TIME: 1:15

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)
L.S.	0.0		4.38								
G	2.0		5.61								
W	2.4		6.52	ϕ				ϕ			
	3.0		6.65	0.15				0.27			
	4.0		6.70	0.20				0.44			
	5.0		6.64	0.15				0.30			
	6.0		6.64	0.15				ϕ			
	7.0		6.66	0.15				ϕ			
	8.0		6.67	0.15				0.41			
	9.0	< 9.5	6.72 ~ 6.72	0.20	< 0.20			0.88	< 0.95		
	10.0	< 10.5	6.80	0.30	< 0.35			1.48	< 0.83		
	11.0		6.88 ~ 6.88	0.35				1.21			
	12.0		6.89	0.35				1.94			
	13.0		6.83	0.30				0.72			
	14.0		6.72	0.20				0.42			
	15.0		6.71	0.20				0.75			
	16.0		6.66	0.15				0.29			
	17.0		6.63	0.10				0.70			
	18.0		6.66	0.15				0.81			
W	19.0		6.52	ϕ				ϕ			
G	21.3		5.69								
R.S.	26.8		4.68								
TOTALS:											

End of Measurement	Time: 1:35	Gage Reading: 0.3 ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Troublesome - above Rabbit Ears					CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: approx. 700' upstream from confluence with Rabbit Ears Creek					
DATE: 10-13-06	OBSERVERS: R Smith, P. Belcher				
LEGAL DESCRIPTION	¼ SECTION: SE	SECTION: 35	TOWNSHIP: 4 (N) S	RANGE: 80 E (W)	PM: 6th
COUNTY: Grand	WATERSHED: Colorado	WATER DIVISION: 5	DOW WATER CODE: 23521		
MAP(S): USGS: Hyannis Peak 7.5'	USFS:				

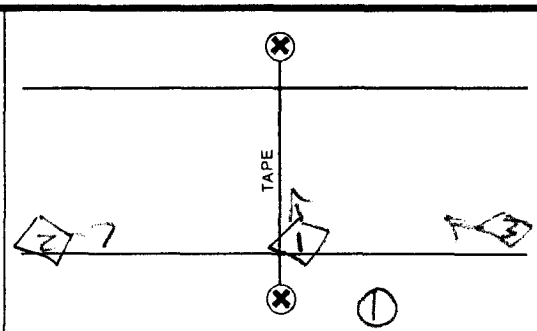
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: Marsh-McBirney			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: 2" to 6" cobbles	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	6.37 / 6.37
② WS Upstream	21.0	6.23
③ WS Downstream	43.0	6.65
SLOPE	0.42 / 64.0 = 0.0065	

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
see attached survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:
caddis, mayfly, stonefly

COMMENTS

Temp = 48°
Ph = 6.4
TDS = 100

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Troublesome Creek | CROSS-SECTION NO.: 2 | DATE: 10-13-06 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: 0.4 ft | TIME: 1;40

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)
LS/G	0.0		4.48								
	2.0		5.50								
	6.2		5.76								
	9.3		5.83								
W	13.9		6.37	Ø				Ø			
	14.5		6.44	0.05				Ø			
	15.0		6.43	0.05				Ø			
	15.5		6.51	0.15				0.48			
	16.0		6.56	0.20				0.81			
	16.5		6.60	0.25				0.88			
	17.0		6.57	0.20				0.64			
	17.5		6.61	0.25				1.48			
	18.0		6.69	0.35				1.47			
	18.5		6.66	0.30				1.11			
	19.0		6.75	0.40				1.96			
	19.5		6.67	0.30				1.28			
	20.0		6.61	0.25				1.52			
	20.5		6.72	0.35				0.89			
	21.0		6.67	0.30				0.81			
	21.5		6.52	0.15				0.99			
	22.0		6.68	0.30				0.68			
	22.5		6.69	0.30				0.94			
W	23.0		6.37	Ø				Ø			
RS+G	25.7		4.51								
TOTALS:											

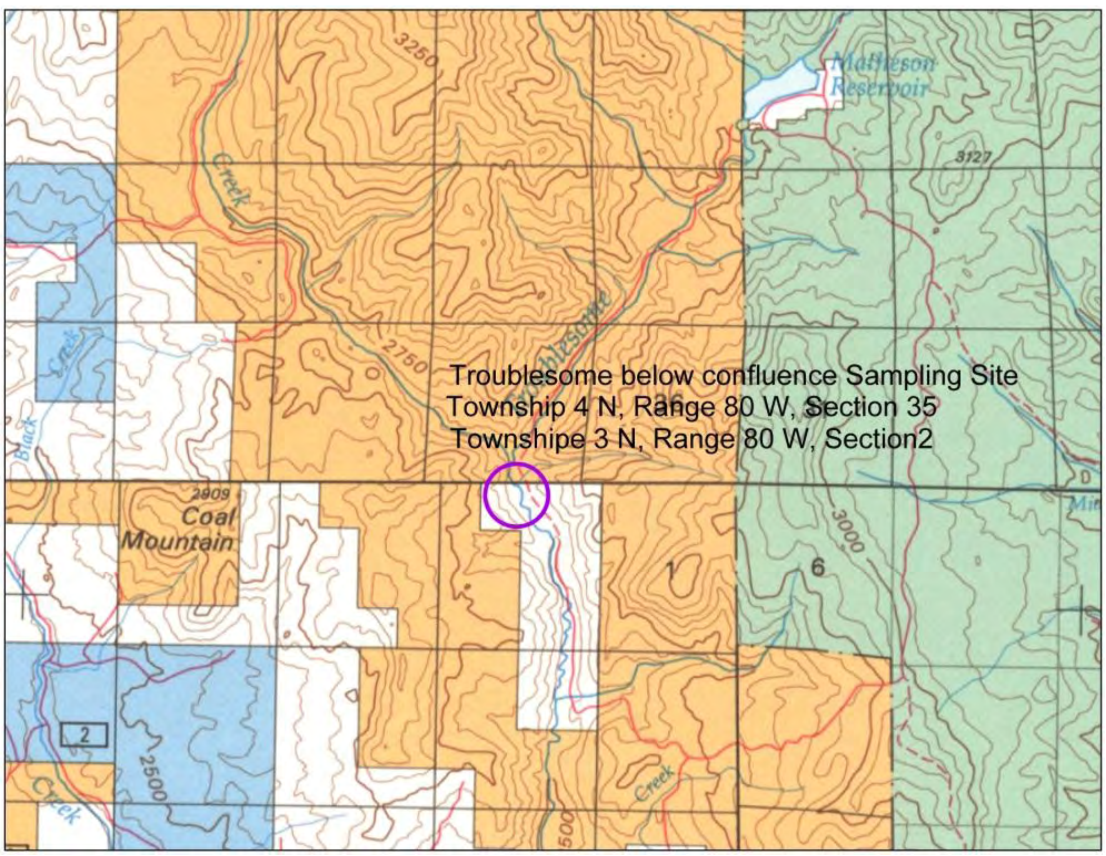
End of Measurement | Time: 0.4 | Gage Reading: 2.00 ft | CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY:

Kremmling Field Office Stream Surveys
October 2006

Troublesome Creek Below Confluence with Rabbit Ears Creek - Water Code #23521

Troublesome Creek, located north of Kremmling, CO and located on BLM lands managed by the Kremmling Field Office was sampled on October 13, 2006. Troublesome Creek is tributary to 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 275 feet of stream was sampled. Personnel present were Paula Belcher, KRFO, Hydrologist, Roy Smith, CSO Water Rights Program Lead, Paul a private land owner along Troublesome Creek, Tom Fresques, BLM West Slope Fisheries Biologist, and Malia Boyum, Biological Technician, GSFO.

A total of 66 fish were collected including 60 brown trout, 3 brook trout, and 3 sculpin. No lengths were taken for this section. See the data sheet below for more information.


Troublesome below confluence Sampling Site
Township 4 N, Range 80 W, Section 35
Townshipe 3 N, Range 80 W, Section2
2909
Coal
Mountain
3250
3127
2750
3000
2500
Creek
Creek
Creek
Black
1
6
2

FISH SAMPLING FORM

WATER Troublesome Creek (below confluence) CODE____ DATE 10-13-06
GEAR backpack shocker EFFORT 275 ft STATION #____ PASS #_____

species	length	weight	mark		species	length	weigh t	mark
Individuals were not measured, only counted								
200 ft effort:								
BRN	28 individuals		(one measured 13.5")					
BRK	1 individual							
MOSC	3 individuals							
75 ft effort:								
BRN	32 individuals							
BRK	2 individuals							

GPS Location:

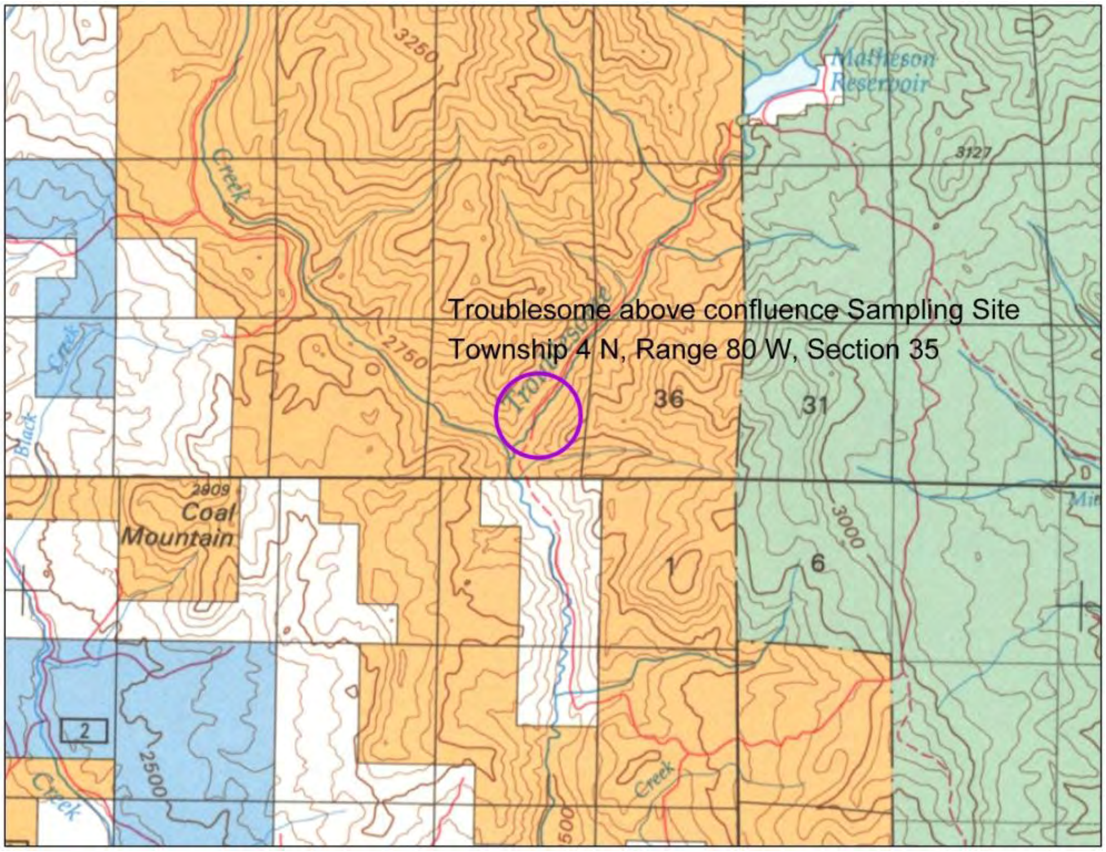
Notes (water temp, etc.):
Over 275 ft effort, 66 total fish were captured: 60 brown trout (*Salmo trutta* morpha *fario*); 3 brook trout (*Salvelinus fontinalis*); 3 mottled sculpin (*Cottus bairdi)*

Kremmling Field Office Stream Surveys
October 2006

Troublesome Creek Above Confluence with Rabbit Ears Creek - Water Code #23521

Troublesome Creek, located north of Kremmling, CO and located on BLM lands managed by the Kremmling Field Office was sampled on October 13, 2006. Troublesome Creek is tributary to 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 175 feet of stream was sampled. Personnel present were Paula Belcher, KRFO, Hydrologist, Roy Smith, CSO Water Rights Program Lead, Paul Wirthrich a private land owner along Troublesome Creek, Tom Fresques, BLM West Slope Fisheries Biologist, and Malia Boyum, Biological Technician, GSFO.

A total of 29 fish were collected including 26 brown trout, 1 brook trout, and 2 sculpin. See the data sheet below for size distributions.


Troublesome above confluence Sampling Site
Township 4 N, Range 80 W, Section 35
Matheson Reservoir
3250
3127
Creek
2750
36
31
2909
Coal Mountain
1
6
3000
2
2500
Creek
Creek
Black

FISH SAMPLING FORM

WATER Troublesome Creek (above confluence) CODE 23521 DATE 10-13-06

GEAR backpack shocker EFFORT 175 ft STATION #___ PASS #__

species	length (mm)	weight	mark		species	length (mm)	weight	mark
BRN	328				BRN	82		
BRN	232				BRN	74		
BRN	286				BRK	173		
BRN	282				MOSC	108		
BRN	250				MOSC	95		
BRN	164							
BRN	160							
BRN	223							
BRN	235							
BRN	225							
BRN	172							
BRN	208							
BRN	207							
BRN	87							
BRN	86							
BRN	78							
BRN	82							
BRN	150	← injured eye						
BRN	88							
BRN	82							
BRN	83							
BRN	78							
BRN	90							
BRN	93							

GPS Location:

Notes (water temp, etc.):

29 total fish: 26 brown trout (*Salmo trutta* morpha *fario*); 1 brook trout (*Salvelinus fontinalis*); 2 mottled sculpin (*Cottus bairdi*)