

1313 Sherman Street, Room 718 Denver, CO 80203

P (303) 866-3441 F (303) 866-4474 Jared Polis, Governor

Dan Gibbs, DNR Executive Director

Rebecca Mitchell, CWCB Director

TO: Colorado Water Conservation Board Members

FROM: Robert Viehl, Water Resource Specialist

Stream and Lake Protection Section

DATE: November 18-19, 2020

AGENDA ITEM: 21. Final Action on Contested ISF Appropriations:

Trout Creek (Water Division 6)

Staff recommendation

Staff recommends that the Board make the following determinations and take the following actions on the Trout Creek instream flow (ISF) appropriation described in Attachment 1, based on the information contained in this memo, associated attachments, and the information presented by staff both in writing and orally at the January 29, 2019 Board meeting:

- (1) Determine, pursuant to section 37-92-102(3), C.R.S. (2020), that for the ISF appropriation on Trout Creek at the flow rates of 1.1 cfs (11/01-03/31), 5.7 cfs (04/01-06/30), and 5.0 cfs (07/01-10/31):
 - (a) There is a natural environment that can be preserved to a reasonable degree with the recommended water rights, if granted;
 - (b) The natural environment will be preserved to a reasonable degree by the water available for the recommended appropriations; and
 - (c) Such natural environment can exist without material injury to water rights.
- (2) Pursuant to ISF Rule 5f., establish January 29, 2019 as the appropriation date for this water right.
- (3) Accept the terms and conditions in the Stipulation and Agreement with Knott Land and Livestock Company, Inc. (KLL) (Attachment 2), and with Twentymile Coal, LLC (Twentymile) (Attachment 3).
- (4) Direct staff to request the Attorney General's Office to file the necessary water right application for this ISF appropriation and to include the terms and conditions agreed upon with Twentymile in the water court application and resulting decree.



Background:

The CWCB appropriated an ISF water right on Trout Creek recommended by Colorado Parks and Wildlife (CPW) and decreed in Case No. 77W1338 with a flow rate of 5 cfs (1/1-12/31) and appropriation date of 9/23/1977.

In 2018, the Bureau of Land Management (BLM) recommended a sub-section of the original appropriation for an increased flow rate and inclusion into the CWCB's Instream Flow and Natural Lake Level Program:

Waterbody	Watershed	County	Upper Terminus	Lower Terminus	Length (miles)
Trout Creek	Upper Yampa	Routt	confluence unnamed tributary	Koll Ditch headgate	6.64

On January 29, 2019, the CWCB formed its intent to appropriate an ISF water right on a segment of Trout Creek in Water Division 6.

On March 29, 2019, KLL filed a Notice to Contest this ISF appropriation.

On April 29, 2019, Twentymile filed a Notice of Party Status.

No other party filed a Notice to Contest or Notice of Party Status and the hearing was set to be held in conjunction with the CWCB's September 17-19, 2019 meeting.

On October 17, 2019, the Parties agreed to continue the hearing until November 2020. As part of this agreement, CWCB Staff and the BLM agreed to take additional measurements on Trout Creek in 2020 on lands owned by KLL.

On July 9, 2020, CWCB Staff, CPW Staff, BLM, and representatives from KLL and Twentymile mutually selected three cross-sections for R2Cross analysis on lands owned by KLL. R2Cross field measurements were completed with all parties in attendance.

On July 23, 2020, CPW conducted a fish survey in the lower end of the recommended reach on Trout Creek.

On August 25, 2020, CWCB Staff, BLM, and Tyler Knott collected a second R2Cross data set at the same three cross-sections measured on July 8, 2020.

On October 19, 2020, CWCB staff executed stipulations with KLL and Twentymile containing terms and conditions to resolve issues related to the proposed ISF on Trout Creek. Upon final action by the CWCB on this appropriation that includes this stipulated language, KLL and Twentymile will not further oppose the Trout Creek ISF in these administrative proceedings. In the event the CWCB declines to adopt CWCB staff's recommendation to include these terms and conditions in its final action on the Trout Creek ISF, the stipulation will be void and the KLL Notice to Contest and the Twentymile Notice of Party Status shall remain in full force and effect. The parties shall also seek to reschedule the hearing and the associated deadlines for prehearing statements and a prehearing conference.

Technical Investigations

The Board was provided detailed information regarding all originally collected field data, studies, and analyses for this stream segment at its January 29, 2019 Board meeting. A summary of this data as well as the additional R2Cross and fish survey data collected in 2020 is included below.

Natural Environment Studies

BLM conducted field surveys on this stream and found a natural environment that can be preserved to a reasonable degree. The BLM based its original description of the Trout Creek fishery on fish surveys completed in 1993 and 2007 as documented in CPW's database. The July 23, 2020 fish survey confirmed that the Trout Creek fishery consists of native species (mottled sculpin, speckled dace, and mountain sucker), as well as brown trout and brook trout. Fisheries biologists observed young of the year brook and brown trout and multiple age classes, which indicates self-sustaining trout populations.

To evaluate instream flow requirements, BLM collected hydraulic data, and the CWCB staff reviewed and analyzed this data. The additional R2Cross data collected in 2020 was analyzed and results were averaged with the data used to formulate the original recommendation. The final R2Cross analysis resulted in reduced flow rates. All parties agreed to reduce the recommended flow rates of the Trout Creek ISF and to change the dates for two of the flow rate periods.

Water Availability Studies

The CWCB staff conducted a water availability analysis for the recommended segment of Trout Creek. To determine the amount of water physically available for the Board's appropriations, staff analyzed available streamgage records, flow measurements, and diversion records using appropriate standard methods to develop a hydrograph for this recommendation. Based upon its analysis, staff has determined that water is available for appropriation on Trout Creek to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of existing water rights.

Relevant Instream Flow Rules

- 5f. <u>Date of Appropriation.</u> The Board may select an appropriation date that may be no earlier than the date the Board declares its intent to appropriate. The Board may declare its intent to appropriate when it concludes that it has received sufficient information that reasonably supports the findings required in Rule 5i.
- 5h. <u>Final Board Action on an ISF Recommendation.</u> The Board may take final action on any uncontested Staff Recommendation(s) at the May Board meeting or any Board meeting thereafter. If a Notice to Contest has been filed, the Board shall proceed under Rule 5j-5q.
- 5i. <u>Required Findings.</u> Before initiating a water right filing to confirm its appropriation, the Board must make the following determinations:
 - (1) <u>Natural Environment</u>. That there is a natural environment that can be preserved to a reasonable degree with the Board's water right if granted.
 - (2) <u>Water Availability.</u> That the natural environment will be preserved to a reasonable degree by the water available for the appropriation to be made.

(3) <u>Material Injury.</u> That such environment can exist without material injury to water rights.

These determinations shall be subject to judicial review in the water court application and decree proceedings initiated by the Board, based on the Board's administrative record and utilizing the criteria of section 24-4-106(6) and (7), C.R.S. (2020).

Attachments

Attachment 1) Tabulation of Trout Creek ISF Appropriation

Attachment 2) Knott Land and Livestock Company, Inc. Stipulation and Agreement

Attachment 3) Twentymile Coal, LLC Stipulation and Agreement

Attachment 4) R2Cross summary table and field sheets output for data collected in 2020



Colorado Water Conservation Board Instream Flow Tabulation - Streams Water Division 6



Water

Court Div.	Case Number	Stream	Watershed	County	Upper Terminus (UTM)	Lower Terminus (UTM)	Length (miles)	Amount(dates) (CFS)	Approp Date
6	(increase)	Trout Creek	Upper Yampa	Routt	confl unnamed tributary at E: 323578.92 N: 4457645.23	Koll Ditch hdgt at E: 329133.88 N: 4464276.41	6.64	1.1(11/01 - 03/31) 5.7 (04/01 - 06/30) 5.0 (07/01 - 10/31)	01/29/2019

Totals for Water Division 6

Total # Appropriations = 1
Total # Appropriation Stream Miles = 6.6

BEFORE THE COLORADO WATER CONSERVATION BOARD STATE OF COLORADO

IN THE MATTER OF PROPOSED INSTREAM FLOW APPROPRIATION IN WATER DIVISION NO. 6:

TROUT CREEK (Increase)

ROUTT COUNTY, COLORADO

STIPULATION AND AGREEMENT BETWEEN THE STAFF OF THE COLORADO WATER CONSERVATION BOARD AND KNOTT LAND AND LIVESTOCK COMPANY

Staff for the Colorado Water Conservation Board ("Staff") and Knott Land and Livestock Company, Inc., ("KLL"), by and through their respective counsel, hereby stipulate and agree as follows:

- 1. In 2019, Staff recommended an instream flow water right appropriation for Trout Creek ("Trout Creek ISF"), which is an increase to the existing instream flow water right on Trout Creek decreed in Case No. 77W1338, in the amounts of 2.0 cfs (11/01 03/31), 8.0 cfs (04/01 07/31), and 7.0 cfs (08/01 10/31) with an upper terminus located at the confluence with an unnamed tributary at UTM North: 4457645.23, UTM East: 323578.92 and with a lower terminus at the Koll Ditch headgate, at UTM North: 4464276. 41, UTM East: 329133.88.
- 2. The Colorado Water Conservation Board ("CWCB") declared its intent to appropriate the Trout Creek ISF at its meeting in January 2019.
- 3. KLL filed a Notice to Contest the ISF appropriation, and Twentymile Coal Company, LLC filed a Notice of Party Status.
- 4. KLL owns a total of 2,394 acres in Routt County, Colorado, located approximately 10 miles south and west of Oak Creek, Colorado. KLL possesses a number of water rights including rights associated with the following structures: Male Moore and Company Ditch, David M. Chapman Ditch, David M. Chapman Ditch, David M. Chapman Ditch, No. 2, Knott Ditch, Knott Ponds 1 4, Knott Springs 1 6, Slough Ditch, Knott Wastewater Ditch, Orno Ditch, and Alex Ditch.
- 5. Both the United States Bureau of Land Management ("BLM"), who recommended the Trout Creek ISF, and Staff agree to reduce the recommended flow rates of the Trout Creek ISF and to change the dates for two of the flow rate periods. All published notices for the Trout Creek ISF reflect appropriation of the flow rates stated in paragraph 1, above, however BLM and Staff

now agree to the following reduced flow rates and flow rate periods: 1.1 cfs (11/01 - 03/31), 5.7 cfs (04/01 - 06/30), and 5.0 cfs (07/01 - 10/31).

- 6. Staff hereby agrees to include in its recommendation to the CWCB for final action on the Trout Creek ISF at the November 2020 CWCB meeting, that the final action include the flow rates and flow rate periods described in paragraph 5, above, the terms and conditions set forth in Exhibit A to this Stipulation and Agreement, and the terms and conditions set forth in paragraphs 7-10, below.
- 7. The CWCB will not install any measurement structures for the administration of the instream flow water right, or any other purpose, on property owned by KLL or any of its successors absent permission by KLL its successors, or assigns.
- 8. The CWCB shall install, operate, and maintain such measuring devices and keep such records as the Division Engineer may require for administration of the Trout Creek ISF.
- 9. Any calls placed by the CWCB for the Trout Creek ISF will be based on measurements by a stream gage or other physical/mechanical measurement consistent with the Division Engineer's practices that demonstrates that the flow of the stream within the decreed instream flow reach has fallen below the instream flow rates confirmed in any decree for the Trout Creek ISF.
- 10. Any releases from Sheriff Reservoir in Trout Creek at the point of measurement for the Trout Creek ISF shall be included in the streamflow for determination of whether the streamflow has fallen below the flow rates confirmed in any decree for the Trout Creek ISF.
- 11. In consideration of the mutual promises contained herein, KLL agrees not to further oppose the Trout Creek ISF in these proceedings or in any Water Court proceeding to adjudicate the Trout Creek ISF. Provided, however, KLL reserves the right to file a statement of opposition in any such Water Court adjudication for the sole purpose of ensuring that any decree entered is consistent with the terms of this Stipulation and Agreement.
- In the event the CWCB Board declines to adopt Staff's recommendation to adopt the terms and conditions of this Stipulation and Agreement, this Stipulation and Agreement is void and KLL's Notice to Contest shall remain in full force and effect. If the Board declines to adopt Staff's recommendations at its November 2020 meeting, the parties shall also seek to reschedule the hearing and the associated deadlines for prehearing statements and a prehearing conference.
- 13. This Stipulation and Agreement shall be binding upon and inure to the benefit of the parties and their successors and assigns.
- 14. The parties shall each bear their own costs and attorneys' fees associated with this matter.

- 15. This stipulation is entered into by way of compromise and settlement of this matter. Any agreements or terms and conditions herein are due solely to the unique circumstances of this case and the resulting stipulation. This stipulation shall not establish any precedent or be used in any other administrative or legal proceeding except as explicitly provided herein.
- 16. This Stipulation and Agreement may be executed in counterparts, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same agreement.
- 17. Nothing in this Stipulation and Agreement affects or changes the timing or flow rates of the instream flow water right on Trout Creek decreed in Case No. 77W1338.

Stipulated and agreed to this 19th day of October, 2020.

OFFICE OF THE COLORADO ATTORNEY GENERAL

Counsel for Staff of the Colorado Water Conservation Board

Jennifer Mele (#30720) Andy Nicewicz (#44903) 1300 Broadway, 7th Floor

Denver, CO 80203

(720) 508-6282; (720) 508-6259

jennifer.mele@coag.gov; andy.nicewicz@coag.gov HOLSINGER LAW, LLC

Counsel for Knott Land and Livestock Company

>1/Kulu

David Kueter (#26136)

1800 Glenarm Place, Suite 500

Denver, CO 80202

dkueter@holsingerlaw.com

EXHIBIT A to STIPULATION

1. Previously decreed Knott Land and Livestock water rights. CWCB will acknowledge that the following Trout Creek water rights are senior to the 2020 Trout Creek instream flow water right and not subject to a call by the 2020 ISF:

Water Structure / Water Feature	Amount	Priority	Adjudication	Appropriation	Source	Case No.
		Number	Date	Date		(if applicable)
Male Moore and Company Ditch	4.83 cfs	87AA	6/19/1914	10/7/1909	Trout Creek	6/19/1914
	2.08 cfs	189	7/12/1948	6/1/1930	Trout Creek	7/12/1948
David M. Chapman Ditch	1.83 cfs	28	9/22/1892	5/11/1888	Trout Creek	W1223-77
	2.66 cfs	56	9/15/1902	6/1/1891	Trout Creek	9/15/1902
	0.58 cfs	83B	6/19/1914	6/17/1908	Trout Creek	W1223-77
	2.66 cfs	190	7/12/1948	5/1/1936	Trout Creek	7/12/1948
	4.00 cfs		12/31/1995	6/1/1944	Purington Draw	95CW0065
David M. Chapman Ditch 2	1.83 cfs	28	9/22/1892	5/11/1888	Trout Creek	W1223-77
	0.58 cfs	83B	6/19/1914	6/17/1908	Trout Creek	W1223-77
	0.66 cfs	88	7/2/1912	5/1/1910	Trout Creek	CA3463
						95CW0065
	1.28 cfs	186	7/12/1948	5/5/1910	Trout Creek	95CW0065
	1.50 cfs	A-9	11/15/1962	6/1/1932	Trout Creek	CA3081
						95CW0065
Knott Ditch	2.00 cfs		12/31/1979	8/1/1938	Trout Creek	79CW0148
Knott Pond 1	1.44 AF		12/31/1979	10/11/1979	Trout Creek	79CW0148
Knott Pond 2	1.75 AF		12/31/1979	10/11/1979	Trout Creek	79CW0148
Knott Pond 3	2.2 AF		12/31/1979	10/11/1979	Trout Creek	79CW0148
Knott Pond 4	5.13 AF		12/31/1979	10/11/1979	Trout Creek	79CW0148
Knott Spring 1	0.06 cfs		12/31/1979	10/11/1979	Yampa River	W-506-77
Knott Spring 2	0.10 cfs		12/31/1973	7/1/1940	Yampa River	W-506-77
						82CW0027
Knott Spring 3	0.20 cfs		12/31/1973	6/1/1932	Yampa River	W-506-77
Knott Spring 4	0.10 cfs		12/31/1973	8/1/1948	Yampa River	W-506-77
						82CW0027
Knott Spring 5	0.30 cfs		12/31/1973	7/15/1952	Yampa River	W-506-77
Knott Spring 6	0.10 cfs		12/31/1973	7/1/1940	Yampa River	W-506-77
						82CW0027
Slough Ditch	1.28 cfs	89	6/19/1914	5/5/1910	Trout Creek /	6/19/1914
					Purington Draw	
	1.28 cfs	186	7/12/1948	5/5/1910	Trout Creek /	7/12/1948
					Purington Draw	
Knott Wastewater Ditch	8.00 cfs	96CW14	8/26/1996	6/1/1944	Trout Creek	96CW0014
Orno Ditch	1.83 cfs	28	9/22/1892	5/11/1888	Trout Creek	09/22/1892
	0.58 cfs	83B	6/19/1914	6/17/1908	Trout Creek	6/19/1914
	3.6 cfs	A-13	11/15/1962	5/5/1946	Trout Creek	CA3081
	2.30 cfs	95CW64	12/31/1995	1/1/1944	Trout Creek	95CW0064
Alex Ditch	1.28 cfs	186	7/12/1948	5/5/1910	Trout Creek	95CW0065

- 2. Knott Land and Livestock 2020 application for change of water rights. If filed in 2020, CWCB agrees not to object to KLL's anticipated application for the following changes to the senior priority of the Slough Ditch on the basis of injury to the 2020 ISF:
 - a. Change of point of diversion to the Orno Ditch headgate
 - b. Alternate point of diversion at the David M. Chapman Ditch 2 headgate
 - c. Alternate point of diversion at the Alex Ditch
 - d. Change in place of use to include alternate KLL lands for irrigation
 - e. Change in type of use to include livestock watering

CWCB reserves the right to object to the change application for the protection of the 1977 Trout Creek ISF.

KLL reserves the right to argue that the proposed change is a pre-existing practice to which the 1977 ISF is subject pursuant to C.R.S. 37-92-102(3)(b).

- 3. KLL uses and practices entitled to protection under C.R.S. 37-92-102(3)(b). CWCB acknowledges that it is the historical practice of KLL to move water between its decreed points of diversion for certain ditches referenced in the above table. CWCB agrees that the instream flow water right decreed herein is subject to the uses made pursuant to this historical practice, described and limited as follows:
 - a. Diversions under this provision to which the CWCB's 2020 Trout Creek ISF water right is subject under C.R.S. 37-92-102(3)(b) shall be limited to the maximum flow rate limits for the following structures as follows:
 - i. Male Moore and Company Ditch: 8.12 c.f.s.
 - ii. David M. Chapman Ditch: 9.17 c.f.s.
 - iii. David M. Chapman Ditch Purington Draw: 4.11 c.f.s.
 - iv. Knott Ditch: 2.50 c.f.s.
 - v. Knott Wastewater Ditch: 10.60 c.f.s
 - vi. Orno Ditch: 9.14 c.f.s.
 - vii. Alex Ditch: 3.50 c.f.s.
 - b. Total diversions to which the CWCB's 2020 Trout Creek ISF water right is subject under C.R.S. 37-92-102(3)(b) at the structures listed in subparagraph a. shall be limited to the cumulative total decreed to said structures of 38.23 c.f.s., however, diversion rates at each structure shall not exceed the rates set forth in subparagraph a.

These claims are supported by the affidavit of Bernard C. Knott, attached hereto as Appendix 1, and the affidavit of Tyler L. Knott, attached hereto as Appendix 2.

CWCB further agrees that for purposes of administration under C.R.S. 37-92-502(2)(c), said practices were in existence on the date of appropriation of the 2020 ISF.

AFFIDAVIT OF BERNARD C. KNOTT

- I, Bernard C. Knott, being first duly sworn, depose and state under oath, as follows:
 - 1. I am over the age of eighteen years and have personal knowledge of the matters set forth in this affidavit.
 - 2. Knott Land and Livestock Company, Inc. (hereinafter "Knott") was established in August 1973 as a business entity for Dan Knott, Doris Knott, and myself, Bernard Knott, whom previously conducted business and their ranching operations under their personal names located at 18300 CR 29, Oak Creek, Colorado 80467 since 1936, located on Trout Creek, a tributary to the Yampa River, in Routt and Rio Blanco Counties.
 - 3. I have resided at this location since 1947 and have had intimate knowledge of said operations since. I am a current shareholder, director, and officer of Knott.
 - 4. Knott is the owner and operator of numerous water rights located in the Trout Creek drainage, including those for irrigation, fish propagation, domestic, and livestock watering.
 - 5. Knott controls, by ownership and/or lease, a significant portion of decreed direct flow water rights in the upper Trout Creek valley (upstream of the Koll Ditch) as shown on the attached table.
 - 6. Knott manages their ranching operations and water use for the benefit of the whole operation, including but not limited to livestock production, hay and forage production, wildlife habitat, ecosystem services, etc.
 - 7. Through this management system, Knott uses physically and legally available water to sustainably maximize its operations. This includes diverting and using water at various points and locations in varying amounts throughout the year. For example, Knott may reduce or discontinue diverting and irrigating with the Male Moore and Company Ditch to reallocate that physically available water to the David M Chapman Ditches, in any given year, and especially during drought and low flow conditions.
 - 8. Knott manages the limited resource of water available to it, which flows down Trout Creek, as it deems to provide the most beneficial use.
 - 9. It is the current practice and has been the historical practice of Knott since prior to the date of appropriation of the increased instream flow water right on Trout Creek to move water between its decreed points of diversion, with the following maximum flow rates for the following ditches:
 - i. Male Moore and Company Ditch: 8.12 c.f.s.
 - ii. David M. Chapman Ditch: 9.17 c.f.s.
 - iii. David M. Chapman Ditch Purington Draw: 4.11 c.f.s.

Knott Ditch: 2.50 c.f.s.

iv.

v. Knott Wastewater vi. Orno Ditch: 9.14 c vii. Alex Ditch: 3.50 c	.f.s.
	n paragraph 9 have historically been limited to the ructures of 38.23 c.f.s. and the rates set forth in
11. Any downstream administration of w Resources, affects the flexibility an available water.	vater rights through the Colorado Division of Water d overall beneficial use to Knott of the limitedly
I, Bernard C. Knott, hereby certify that the knowledge, information, and belief.	foregoing is true and complete to the best of my
Executed in Oak Creek (town o	or city), Colorado on Ctober 14th, 2020.
	Bernard C. Knott Bernard C. Knott
STATE OF COLORADO COUNTY OF Coutt)) ss.)
The foregoing instrument was subscribe , 2020, by Bernard C. Knott	d and sworn to before me this $\frac{1}{2}$ day of
AMBER NICHOLE TEXTER NOTARY PUBLIC STATE OF COLORADO NOTARY ID #20184039966	Witness my hand and official seal. Notary Public My commission expires: 10.10.2022

AFFIDAVIT OF TYLER L. KNOTT

- I, Tyler L. Knott, being first duly sworn, depose and state under oath, as follows:
 - 1. I am over the age of eighteen years and have personal knowledge of the matters set forth in this affidavit.
 - 2. Knott Land and Livestock Company, Inc. (hereinafter "Knott") was established in August 1973 as a business entity for Dan Knott, Doris Knott, and Bernard Knott, whom previously conducted business and their ranching operations under their personal names located at 18300 CR 29, Oak Creek, Colorado 80467 since 1936, located on Trout Creek, a tributary to the Yampa River, in Routt and Rio Blanco Counties.
 - 3. I am a direct heir of the initial shareholders of Knott.
 - 4. I have resided at this location since 1983 and have had intimate knowledge of said operations since. I am a current shareholder, director, and officer of Knott.
 - 5. Knott is the owner and operator of numerous water rights located in the Trout Creek drainage, including those for irrigation, fish propagation, domestic, and livestock watering.
 - 6. Knott controls, by ownership and/or lease, a significant portion of decreed direct flow water rights in the upper Trout Creek valley (upstream of the Koll Ditch) as shown on the attached table.
 - 7. Knott manages their ranching operations and water use for the benefit of the whole operation, including but not limited to livestock production, hay and forage production, wildlife habitat, ecosystem services, etc.
 - 8. Through this management system, Knott uses physically and legally available water to sustainably maximize its operations. This includes diverting and using water at various points and locations in varying amounts throughout the year. For example, Knott may reduce or discontinue diverting and irrigating with the Male Moore and Company Ditch to reallocate that physically available water to the David M Chapman Ditches, in any given year, and especially during drought and low flow conditions.
 - Knott manages the limited resource of water available to it, which flows down Trout Creek, as it deems to provide the most beneficial use.
 - 10. It is the current practice and has been the historical practice of Knott since prior to the date of appropriation of the increased instream flow water right on Trout Creek to move water between its decreed points of diversion, with the following maximum flow rates for the following ditches:
 - i. Male Moore and Company Ditch: 8.12 c.f.s.

	ii. iii. iv. v. vi. vii.	David M. Chapm Knott Ditch: 2.50	r Ditch: 10.60 c.f.s c.f.s.
11. Diversions cumulative paragraph	e total	structures listed in decreed to said s	n paragraph 10 have historically been limited to the structures of 38.23 c.f.s. and the rates set forth in
12. Any down Resources, available v	affects	administration of the flexibility a	water rights through the Colorado Division of Water nd overall beneficial use to Knott of the limitedly
I, Tyler L. Knott knowledge, inform	, hereby	y certify that the and belief.	foregoing is true and complete to the best of my
Executed in	k C	(CUL_(town	or city), Colorado on Ctober 14th, 2020.
			Tyler L. Knott
STATE OF COLO)) ss.)
The foregoing in	nstrume 2020, b	nt was subscrib y Bernard C. Kno	ed and sworn to before me this Way of tt.
AMBER NIC NOTAR STATE OF NOTARY ID My Commission E	RYPUBL F COLOR 1#201840	TEXTER IC ADO 039966	Witness my hand and official seal. Notary Public My commission expires: 10 10 2022

BEFORE THE COLORADO WATER CONSERVATION BOARD STATE OF COLORADO

IN THE MATTER OF PROPOSED INSTREAM FLOW APPROPRIATION IN WATER DIVISION NO. 6:

TROUT CREEK (Increase)

ROUTT COUNTY, COLORADO

STIPULATION AND AGREEMENT BETWEEN THE STAFF OF THE COLORADO WATER CONSERVATION BOARD AND TWENTYMILE COAL COMPANY

Staff for the Colorado Water Conservation Board ("Staff") and Twentymile Coal, LLC ("Twentymile"), by and through their respective counsel, hereby stipulate and agree as follows:

- 1. In 2019, Staff recommended an instream flow water right appropriation for Trout Creek ("Trout Creek ISF"), which is an increase to the existing instream flow water right on Trout Creek decreed in Case No. 77CW1338, in the amounts of 2.0 cfs (11/01 03/31), 8.0 cfs (04/01 07/31), and 7.0 cfs (08/01 10/31) with an upper terminus located at the confluence with an unnamed tributary at UTM North: 4457645.23, UTM East: 323578.92 and with a lower terminus at the Koll Ditch headgate, at UTM North: 4464276. 41, UTM East: 329133.88.
- 2. The CWCB declared its intent to appropriate the Trout Creek ISF at its meeting in January 2019.
- 3. Knott Land and Livestock Company, Inc., filed a Notice to Contest the ISF appropriation, and Twentymile filed a Notice of Party Status.
- 4. Twentymile owns and operates the Foidel Creek Mine, which is located in the Trout Creek watershed, and owns a number of water rights that are decreed for diversion from Trout Creek and its tributaries. Twentymile's water rights include underground water rights, direct flow surface rights and water storage rights, as well as appropriative rights of exchange. Additionally, Twentymile has a plan for augmentation that was decreed in Case No. W-1502-78 and amended in Case No. 90CW99.
- 5. Both the United States Bureau of Land Management ("BLM"), who recommended the Trout Creek ISF, and Staff agree to reduce the recommended flow rates for the Trout Creek ISF and to change the dates for two of the flow rate periods. All published notices for the Trout Creek ISF reflect appropriation of the flow rates stated in paragraph 1, above, however BLM and Staff now agree to the following reduced flow rates and flow rate periods: 1.1 cfs (11/01 03/31), 5.7 cfs (04/01 06/30), and 5.0 cfs (07/01 10/31).

- 6. Staff hereby agrees to include in its recommendation to the CWCB for final action on the Trout Creek ISF at the November 2020 CWCB meeting, that the final action include the flow rates and flow rate periods described in paragraph 5, above, the terms and conditions described in paragraph 7-9, below, and that any decree entered by the water court for the Trout Creek ISF include the following terms and conditions:
 - A. The CWCB acknowledges that the following water rights are senior to the 2020 Trout Creek Instream Flow Water Right and not subject to a call by the 2020 Instream Flow Water Right:

Water Structure/Water	Amount	Twentymile	Adjudication	Appropriation	Source	Case No.
Feature		Amount	Date	Date		
Last Chance Ditch	4.5 cfs	1.5 cfs	6/9/1913	8/7/1906	Trout	1777
					Creek	
Last Chance Ditch	9.0 cfs	1.0 cfs	11/15/1962	10/1/1954	Trout	W-3081
Enlargement					Creek	

- B. The CWCB acknowledges that, pursuant to Twentymile's decree in Case No. W-1502-78, as amended in Case No. 90CW99, Water Division 6, Twentymile's Last Chance Ditch water rights may be used for irrigation, or may be converted for use for mining, reclamation, irrigation, electric generation, fish propagation, and all other beneficial uses, either directly, or by exchange and/or after storage. The CWCB agrees that the instream flow water right decreed herein is subject to the uses made or authorized pursuant to these decrees.
- 7. The CWCB shall install, operate, and maintain such measuring devices and keep such records as the Division Engineer may require for administration of the Trout Creek ISF.
- 8. Any calls placed by the CWCB for the Trout Creek ISF will be based on measurements by a stream gage or other physical/mechanical measurement consistent with the Division Engineer's practices that demonstrates that the flow of the stream within the decreed instream flow reach has fallen below the instream flow rates confirmed in any decree for the Trout Creek ISF.
- 9. Any releases from Sheriff Reservoir in Trout Creek at the point of measurement for the Trout Creek ISF shall be included in the streamflow for determination of whether the streamflow has fallen below the flow rates confirmed in any decree for the Trout Creek ISF.
- 10. In consideration of the mutual promises contained herein, Twentymile agrees not to further oppose the Trout Creek ISF in these proceedings or in any Water Court proceeding to adjudicate the Trout Creek ISF. Provided, however, Twentymile reserves the right to file a statement of opposition in any such Water Court adjudication for the sole purpose of ensuring that any decree entered is consistent with the terms of this Stipulation and Agreement.

- 11. In the event the CWCB Board declines to adopt Staff's recommendation to include the terms and conditions referenced above in paragraph 6 in its final action on the Trout Creek ISF, this Stipulation is void and Twentymile's party status shall remain in full force and effect. If the Board declines to adopt Staff's recommendation at its November 2020 meeting, the parties shall also seek to reschedule the hearing and the associated deadlines for prehearing statements and a prehearing conference.
- 12. This Stipulation and Agreement shall be binding upon and inure to the benefit of the parties and their successors and assigns.
- 13. The parties shall each bear their own costs and attorneys' fees associated with this matter.
- 14. This Stipulation and Agreement may be executed in counterparts, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same agreement.
- 15. Nothing in this Stipulation and Agreement affects or changes the timing or flow rates of the instream flow water right on Trout Creek decreed in Case No. 77CW1338.

Stipulated and agreed to this 2 day of October, 2020.

OFFICE OF THE COLORADO ATTORNEY GENERAL Counsel for Staff of the Colorado Water

Counsel for Staff of the Colorado Wate Conservation Board

Jennifer Mele (#30720) Andy Nicewicz (#44903)

1300 Broadway, 7th Floor

Denver, CO 80203

(720) 508-6282; (720) 508-6259

jennifer.mele@coag.gov; andy.nicewicz@coag.gov HOLLAND & HART LLP Counsel for Twentymile Coal, LLC

el C' Q 10.19.20

William H. Caile (#32223)

Mark E. Hamilton (#24585)

555 17th Street, Suite 3200

PO Box 8749

Denver, CO 80201

whcaile@hollandhart.com; mehamilton@hollandhart.com

Summary of R2Cross transect measurements and results for Trout Creek.

Date, Xsec #	Top Width (feet)	Streamflow (cfs)	Accuracy Range (cfs)	Winter Rate (cfs)	Summer Rate (cfs)
07/09/2020, 1	29.48	4.14	1.66 - 10.35	3.94	
08/25/2020, 1	29.44	12.84	5.14 - 32.10		8.18
			Xsec Average	3.94	8.18
07/09/2020, 2	39.30	7.34	2.94 - 18.35	8.32	14.19
08/25/2020, 2	39.00	11.93	4.77 - 29.83	6.31	16.48
			Xsec Average	7.32	15.34
07/09/2020, 3	27.39	6.92	2.77 - 17.30	5.70	6.19
08/25/2020, 3	27.38	12.26	4.90 - 30.65		6.32
			Xsec Average	5.70	6.26
08/12/2017, 1	39.42	9.43	3.77 - 23.58	9.27	13.28
08/12/2017, 2	35.17	8.58	3.43 - 21.45	5.79	12.80
			Xsec Average	7.53	13.04
			Overall Average	6.12	10.70

R2Cross data from 2020 was collected at 3 locations, with each location surveyed twice and the two measurements averaged together to get the cross-section average. The BLM cross-sections collected in 2017 were collected in close proximity at a fourth location near the lower terminus, this data was averaged together to evenly weight the results. The average cross-section results from all 4 locations were averaged together to obtain the overall average.



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NA	ME:	trout ca	2 <i>€€</i> ≮						oss-section no.: 7_
CROSS-SECT	TION LOC	CATION: UPP	er end	of REACI	r l				
GP5	: 4		107,0						
DATE: 7/5	7/2020	OBSERVERS: K	POY SMITH,	K. BIRCH,		A -JOHNAGE		La.	
LEGAL DESCRIPTIO	N	% SECTION:	SECTION:	5 100	/NSHIP:	3 (N/S	RANGE:	SCEKW P	() Th
COUNTY:	ROUT	τ	WATERSHED: Ya	mpa Riv	rer wate	R DIVISION:		DOW WATER CO	ODE: 23535
MAP(S):	USGS:								· · · · · · · · · · · · · · · · · · ·
wire (O).	USFS:								

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION:	YES# NO	METER TYPE:	Marsh.	McBirne			
METER NUMBER:	DATE F	RATED:	CALIB/SPIN:	sec	Y SUVE	bs/foot	TAPE TENSION: lbs
CHANNEL BED MATERIAL SIZE RA GRAVEC TO LARGE		3		PHOTOGRAPHS TAK	EN YES NO	NUMBER OF P	HOTOGRAPHS:

CHANNEL PROFILE DATA

STATION	DISTANCE (ft)	ROD READING (ft)	Γ	®	LEGEND:
X Tape @ Stake LB	0.0	5,55			Stake 🕱
★ Tape @ Stake RB	0.0	4.62	s K		Station (1)
WS @ Tape LB/RB	0.0	6.5/6.5	E T C	₩ ¥ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩	Photo (1)
2 WS Upstream	44,75	5,68	H		
3 WS Downstream	22,75	6,84		⊼ 🔅 🕏	Direction of Flow
SLOPE \.\\\\\	W.S = 0.017			// @ ~	

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES NO	DISTANCE	DISTANCE ELECTROFISHED:ft				FISH CAUGHT: YES/NO					WATER CHEMISTRY SAMPLED YES NO							
	LENGTH	- FREC	DUENC	DISTR	IBUTIO	ON BY	ONE-IN	CH SIZ	E GRO	UPS (1.	0-1.9, 2	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> </u>	<u> </u>	<u> </u>				
								<u> </u>				L	L	<u> </u>		ļ		
	·····						ļ	L	L					<u> </u>	_	ļ		
										<u> </u>	<u> </u>					<u> </u>		
AQUATIC INSECTS IN STREAM SECTION B	Y COMMON	OR SCI	ENTIFIC	OADE	R NAM	E:												

COMMENTS

RH 7.97	TEMP 19.5°C,	CONDUCTIVITY	253 SALINITY	O.I PPT
				,

BENCH MARK ROCK 6.20 6.20

DISCHARAELERPSSISECTION NOTES DATE: 7/8/2020 SHEET / OF 2 CROSS-SECTION NO. STREAM NAME: TROUT CREEK 1 TIME: 12:45 PM/ 1:50 PM EDGE OF WATER LOOKING DOWNSTREAM: LEFT/RIGHT Gage Reading: **BEGINNING OF MEASUREMENT** (0.0 AT STAKE) Velocity (ft/sec) Total Water Depth Revolutions Distance Width Stake Discharge Vertical Depth (ft) Grassline (G) Depth From Obser-Mean in Initial Point Time (cfs) Waterline (W) Tape/Inst vation **Point** Vertical Rock (sec) (R) (ft) (ft) (ft) BF 5,55 0 5,76 5,79 5,86 4.0 4.4 6,00 4,6 6.Z2 W(R) 5,0 6.50 0.2 0,0 6.7 (a,O 0.35 6.9 0.4 7.0 7.5 6.9 0.15 0.4 0.3 0,79 8.0 6.8 0.45 8.5 6.95 0,25 9.0 6,75 0.40 9.5 0,30 400 10.0 0.30 7.35 10.5 1, 14 0.40 11.0 ルノヲ 11.5 0,30 1.54 12,0 0,40 1.05 6.95 0.45 12.5 0,93 0.25 13.0 6.75 /3,5 6.65 0.15 0.51 14.0 6.9 0,40 0.16 0.11 14,5 7.05 0.55 0,28 15,0 0.50 7.0 0.62 15,5 7.0 0.50 6,95 16,0 0,45 0.60 6.85 0.35 0,59 16.5 6.95 0.45 1.18 17,0 7.0 and 27.9 SEE SHEET 2 FOR INFO BETWEEN Ø WLU 27,9 6.50 0 6.26 28.8 29,4 6,02 29.5 5,42 BF 5.06 29,9 4.81 30.2 30.7 4.62 STAKE ے TOTALS: CALCULATIONS CHECKED BY: **CALCULATIONS PERFORMED BY:** End of Measurement Time: Gage Reading:

DISCHARARGERPS SECTION NOTES

STREAM NAME:	7200	it cee	EK		7 (((()))		CROS	S-SECTION	I NO.:	DATE:7/9/	ZDZ SHEE	7Z of Z
BEGINNING OF N	MEASUREME	NT EDGE OF	WATER LOOKING AKE)	DOWNSTREAM	LEFT RIC	Ga Ga	ge Re	ading:	ft	TIME:		
Stake (S)	Distance	Width	Total	Water	Depth	Revoluti	ons		Veloc	ity (ft/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)		(ft)	Vertical Depth From Tape/Inst (ft)	Depth (ft)	of Obser- vation (ft)			Time (sec)	At Point	Mean in Vertical	Area (ft ²)	Discharge (cfs)
CONTI	NED	FROM	SHEET :	7								ļ
						ļ					ļ	
	17.5	ļ	6.85	0.35					0.98			
<u> </u>	18.0		6.85	0.35					0.24			
	18.5		6,90	0,40					0.56			
	19.0								0,53			
<u></u>	19.5	<u> </u>		0.40				L	0.72		 	
	20.0		7,0	0.5					0.54			
	20.5	 	6.85	0,35					0.88			
	21.0	 	6.90	0,40					0.12			
<u></u>	21.5			0,40					0.49			
<u></u>	22.0	-	7.0	0.50					0.54			-
<u> </u>	23.0			0.15					0.11			
	24.0			0.15					-			
	25.0		4.60	0.1								
	<u> </u>											
<u> </u>												
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<u> </u>												
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	ļ	<u> </u>									 	<u> </u>
<u> </u>						<u> </u>						
			4.									
		8		*								
TOTALS:												
End of Measur	rement T	ime:	Gage Readin	g:ft	CALCULAT	IONS PERF	ORME	D BY:		CALCULATIONS	CHECKED BY:	



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NA	ME: -	TROUT CE	266K -	MIDDLE	CROSS -SECTION	J	CROS	SS-SECTION NO.:
CROSS-SECT	TION LOC	ATION: GPS:	40,2707	14 107.6	25762 W			
DATE: 7/9	12020	OBSERVERS: R	SMITH, E.	BIRCH, L.F	ifcos-Soumb, B.	Logen, J.	μ,	
LEGAL DESCRIPTION	N	% SECTION:	SECTION:		ISHIP: IN/S		COE/W PM	(eth
COUNTY:	DUTT		WATERSHED:	River	WATER DIVISION:		DOW WATER CODE	
MAP(S):	USGS:				•			4
WAT 10).	USFS:							

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS YES NO DISCHARGE SECTION:	METER TYPE:	Harsh-	McBiri	ney		,
METER NUMBER:	DATE RATED:	CALIB/SPIN:	sec	TAPE WEIGHT:	SULVEYED IDS/1001	TAPE TENSION: Ibs
CHANNEL BED MATERIAL SIZE RANGE: GRAVIC TO LARGE	Cobble		PHOTOGRAPHS TAK	(EN: YES/NO		HOTOGRAPHS:

CHANNEL PROFILE DATA

STATION	DISTANCE (ft)	ROD READING (ft)	COTTONUOU LEFT®	LEGEND:
* Tape @ Stake LB	0.0	7.2	WILLOW /ALDERS	Stake 🕱
Tape @ Stake RB	0.0	6,36	s x	Station (1)
1 WS @ Tape LB/RB	0.0	8.2/8.2	T S S S S S S S S S S S S S S S S S S S	Photo (1)
2 WS Upstream	31.3	7.62]"	<u> </u>
③ WS Downstream	24,2	8,54	GRASS RIGHT &	Direction of Flow
SLOPE	0.94 / 55.5	, = 0.01695		

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES NO	DISTANCE	DISTANCE ELECTROFISHED:it					FISH CAUGHT: YES/NO					WATER CHEMISTRY SAMPLED TESYNO						
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 TOTA															TOTAL			
1 2 3 4																		
												<u> </u>		<u> </u>	<u></u>			
											-			<u> </u>				
AQUATIC INSECTS IN STREAM SECTION BY	COMMON	OR SCI	ENTIFIC	ORDE	R NAM	E :												

COMMENTS

PH	8.4.	Water Temp	21,200,	CONDUCTIONY	284	SALINITY	O.I PPT
			<u>.</u>	•			

DISCHARGEMERTION NOTES

STREAM NAME:	TROU	t cree	K				CROS	s-section	I NO.:	DATE: 7/9/	2020shee	T L OF Z
BEGINNING OF	MEASUREMEI	EDGE OF V	WATER LOOKING IKE)	DOWNSTREAM	LEFT /RIGH	Ga	ge Re	ading:	tt	TIME: 2/50		
o Stake (S)	Distance	Width	Total	Water	Depth	Revoluti	ons		Veloci	ty (ft/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)	From Initial Point (ft)	(H)	Vertical Depth From Tape/Inst (ft)	Depth (ft)	of Obser- vation (ft)			Time (sec)	At Point	Mean in Vertical	Area (ft ²)	Discharge (cfs)
STAKELE	0.0		6.36									
	1.0		6.60									ļ
BF	1.3		7,20									
	2.0		7.66			~						
	2.8		7.92									
	3,5		8.06									
R WS	4.7		2.20	0					0			
	6.0		73.30	01					0,6			
	7.0		8.25	0.05					0.0			
	8,0		3.40	0.20					0.03			
	9,0		8,35	0,15					0.64			
	10.0		8,30	0.10					0,79			
	11.0		8.40	0.70					0,20			
	12.0		8,45	0,25					0.20			
	13.0		8,55	0.35					1.13			
,	13.5		8.50	0,30					0.94			
,	14.0		8.50	0.30					1.05			
	14.5		8.65	0,45					0.56			
	15.0		8.50	0.30		~			0.57			
	15.5		3.65	0,45					1,00			
	16.0		8,70	0.50					1,20			
	16,50		8.70	6,36					1.42			
	17.0		8.65	0,45					2,26			
	17.5		3.70	0.50					1,26			
	18.0		8.75	0,55					1,59			
	18,5		8.85	0.65					1,40			
	190		8.70	C,50					2,29			
	19.5		8.75	0, 55					1,32			
	20,0		8,65	0,15					1.39			
	20.5		5,60	0.10					0.68			
	21.0		8,65	0,45					0.61			
	21.5		8,55	0,35					1.49			
	22,0		8.55	0.35					1.10			
See sh	567 Z	FOR H	EASUREN		BETWEE	v 22	_ a	400	32,5			
Lus	32.5		8,20	0					0			
	33.2		8.08									
	34.2		7.78							-		
	35,4		7.78		-							<u> </u>
	36,2		7,77	1								<u> </u>
	37.3		7,42									1
 -	393		7.30	-								<u> </u>
BF/STAKE	406		7.20									
TOTALS:								. DV	- T	ALCIU ATIONS	יוובטערס מיי	
End of Measur	ement Ti	me:3:32	Gage Reading	g:n	CALCULATIO	JNS PERFO	JHMEC	BY:		CALCULATIONS C	neuken BY:	

DISCHARGE COMPAGE SECTION NOTES

STREAM NAME:	TROU	it cree	K			ľ	ROSS-SECTIO	ON NO.:	DATE: 7/9/2	OZO SHE	12 of 2
BEGINNING OF A	MEASUREMEN	EDGE OF V	WATER LOOKING IKE)	DOWNSTREAM	f: LEFT/RIG	GHT Gag	e Reading:	ft	тіме: <i>2 2</i>		
Stake (S)	Distance From	Width (ft)	Total Vertical	Water Depth	Depth of	Revolution	ns	Veloc	ity (ft/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)	Initial Point (ft)	(1.0)	Depth From Tape/inst (ft)	(ft)	Obser- vation (ft)		Time (sec)	At Point	Mean in Vertical	Area (It ²)	Discharge (cfs)
CONTIN	UED F	POM .	HEET I							<u> </u>	
	22.5		8-6	0.4				1.12			
	23,0		3.45 8.45 3.5	0,25 0,25 0,35				1.24			
	24.0		8.45	0,25							
	25,0		3,5	0.3				0.59			
	26.0		8,55	়. 35				0.01			
	27.0		8.5	0,3				1.35			
	28:0		8,5	0,3				0.13			
	29,0		B, 25 B, 35	0.05				0.0			
	30,0		8,35	0,15				0.35			
	31,0		3.40	0.2				0,58			
										 	
						*					
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										-	
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	-		1.						 		
		-									
		- 3		-							
							+				
TOTALS:											
End of Measurer	nent Tim	e; 3:37	Gage Reading:	fi	CALCULATIO	ONS PERFORM	IED BY:	C/	ALCULATIONS C	HECKED BY:	
		0.00	Gage neading.		L						



FIETO DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NA	ME: -	TROUT C	REEK	<						CR	OSS-SECTION NO.:
CROSS-SECT	TION LOC	COW	ER	CROSS -	1°EC7	100					
		GPS	; 4	40. Z89	29	N	103	7.043	48 W		
DATE: 7/9	12020	OBSERVERS: S	MITH.	, K. BIRCH	, L. f	IECDI-JON	1M2)	L. LOGAN		MIRANIDA	TYLER KNOTT
LEGAL DESCRIPTION	N	W SECTION:	SE	SECTION:	28	TOWNSHIP:		4 (NVS	RANGE:	% E(W) "	" 6th
COUNTY:			WATERSI	Yan	pa	<i>P.</i>	WATER C	DIVISION:)	DOW WATER CO	0E: 83535
MAP(S):	USGS:										
	USFS:										

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS YES NO	METER TYPE: MAR.	5H - M	CBIRNE		1	l
METER NUMBER:	DATE RATED:	CALIB/SPIN	:sec	SUYVE Y	PO ibs/loot	SURVEYED TAPE TENSION: Ibs
CHANNEL BED MATERIAL SIZE RANGE: GRAVECS TO MED O) && <@2		PHOTOGRAPHS TAK	KEN YES/NO	NUMBER OF PI	HOTOGRAPHS: 5

CHANNEL PROFILE DATA

STATION	DISTANCE (ft)	ROD READING (ft)	ALDERS AND S	LEGEND:
X Tape @ Stake LB	0.0	2,28		Stake 🕱
X Tape @ Stake RB	0.0	2,49		Station (1)
① WS @ Tape LB/RB	0.0	4.01 /4.0.		Photo (1)-
2 WS Upstream	50,3	3,30	H	
3 WS Downstream	7,0	4,09	CONSI CARLES & ALOCA + WILLIAM	Direction of Flow
SLOPE 0.7	7/57.3 = 0.	0138		

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES	EAM ELECTROFISHED: NA It						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
					L													
AQUATIC INSECTS IN STREAM SECTION BY	COMMON O	R SCI	ENTIFIC	ORDE	R NAM	E :												

COMMENTS

PH	8,33		TEMP	21,5	SALINITY O.1 PPT
CONDU	CTIVITY	292		٠	

DISCHARARIGRASSISECTION NOTES

STREAM NAME	TROU	T CLE	EK			C	ROSS-SEC	TION	NO.:	7/9/zc	SHEE	r OF
BEGINNING OF	MEASUREMEN	EDGE OF V	WATER LOOKING IKE)	DOWNSTREAM	EFF/R	IGHT Gag	e Reading	g:		TME: 4/15	·)	
Stake (S)	Distance	Width	Total	Water	Depth	Revolutio	ns		Velocity	/ (ft/sec)		
Grassline (G) Waterline (W) Rock (R)	From Initial	(ft)	Vertical Depth From Tape/Inst (ft)	Depth (ft)	of Obser- vation (ft)		1 .	me ec)	At Point	Mean in Vertical	Area (ft ²)	Discharge (cfs)
R STAKE	29,5		2,28							ļ		
	28.7		2.60							<u> </u>		
R BF	28.2		2.88	ļ								
	28.0		3,40 3,87									
	27.3			 			_		······································		ļ	<u> </u>
0			3.92			 			Ø			
R WS	24.5		4.0	Ø						1000		
* SEE	SHEET	2 F0	1	UREME	WT3	BETWE		27	5 and	2015		
	20,5		4.35	0.35		-	 		1.31	 		
	20.0		4.30	0.30					1.56			
	/9.5		4,50	0.50		 			0.63			<u> </u>
	19.0		4.35	0.35		<u> </u>			1.40			
	18.5		4,35	0,35					1.94	-		ļ
	18.0		4.30	0.30		1			1.50		· · · · · · · · · · · · · · · · · · ·	
	17.5		4.25	0.25		ļ			1.64			
	17.0		4,25			ļ			1.18	<u> </u>		<u> </u>
, , , , , , , , , , , , , , , , , , ,	16.5		4.70	0,20					1,33	<u> </u>		
	16.0		4.40	0.40					1.33			
	15.5		4.40	0.40		-			0.20			_
	15.0		4,45	0.45					1.97			-
	14.5		4.50	0.50				-	1.88			
	14.0		4.45	0,45					1.85			
	13.5		4.35						1,59			
	13.0		4.45	0.45					1,96			
	12.5		4.35						1.73			
	12.0		4.45						1.44			
	11.5		4.45						0,90			
	11.0			0.50					0.45			
	10.5		4.35	0.35					1,26			
	10.0		4.25						1.15			
	9.0		4.25	0.25					0.59			
	8.0		4,35			-	_		0.80			
	7.0		4.25	0,25					0.04	 		
	6. O 5, O		4.30	0.30		 			<u>0,58</u> 0,23			
	4,0		4.35	0,10		 	_	-+	0.24			
	3.0		4.05	0,05					0,0			
Lws	2.9		4.01	0				1	0			
	2.1		3.62			†						
	1.5	,	3.34	1			_					
L BF	0.8	<u> </u>	287	£				1				
STAKE	0.0		2.49			1						
TOTALS:												
	rement Tir	ne:	Gage Reading	g:	CALCULA	TIONS PERFOR	RMED BY:		C/	LCULATIONS C	HECKED BY:	

DISCHARGE ACROSSISSECTION NOTES

STREAM NAME	· /RO	UT CRE	EK			CH	3	ON NU.:	JAIE 1/9/	2020 SHEE	TZ OF 2
BEGINNING OF	MEASUREME	NT EDGE OF	WATER LOOKING (DOWNSTREAM	LEFT/RI	GHT Gage	Reading:	ft	TIME:		
Stake (S)	Distance	Width	Total	Water	Depth	Revolutions		Veloc	ity (ft/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)	From Initial Point (ft)	(ft)	Vertical Depth From Tape/Inst (ft)	Depth (ft)	of Obser- vation (ft)		Time (sec)	At Point	Mean in Vertical	Area (ft ²)	Discharge (cfs)
CONTIN	UED A	ROM	SHEET 1								
	21.0		4.4 4.3 4.15	0,4				1.28			
	22.0		4.3	0.3				0.56			
	23.0		4.15	0.15				0			
	24,0	ļ	4-1	0.1		<u> </u>		0		-	
		ļ	-			ļ	<u> </u>				
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			ž.	٤							
TOTAL											
TOTALS:											
End of Measure	ment Tim	е:	Gage Reading:	ft	CALCULATIO	ONS PERFORME	υ BY:	C/	ALCULATIONS C	HECKED BY:	

	Data Input & Proofing	GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	Α	Q	Tape to Water
	p				Total Da	ta Points = 49				
STREAM NAME:	Trout Creek near Steamboat	1	RS & BF	0.00	5.55	na i onno = 40		0.00	0.00	0.00
	40.25901 N -107.06898 W	•	. 1.0 0. 2.	1.00	5.76			0.00	0.00	0.00
XS NUMBER:	1			2.80	5.79			0.00	0.00	0.00
	7/9/2020			4.00	5.86			0.00	0.00	0.00
OBSERVERS:	R. Smith, K. Birch, B. Logan			4.40	6.00			0.00	0.00	0.00
0 = 0 = 111 = 1101 <u>[</u>				4.60	6.22			0.00	0.00	0.00
1/4 SEC:	SW		RW	5.00	6.50	0.00	0.00	0.00	0.00	0.00
	5			6.00	6.70	0.20	0.00	0.20	0.00	6.50
	3N			7.00	6.90	0.40	0.35	0.30	0.11	6.50
RANGE:	86W			7.50	6.90	0.40	0.15	0.20	0.03	6.50
	Sixth			8.00	6.80	0.30	0.79	0.15	0.12	6.50
1				8.50	6.95	0.45	0.38	0.23	0.09	6.50
COUNTY:	Routt			9.00	6.75	0.25	0.91	0.13	0.11	6.50
WATERSHED:	Yampa River			9.50	6.90	0.40	0.94	0.20	0.19	6.50
	6			10.00	6.80	0.30	1.00	0.15	0.15	6.50
	23533			10.50	6.80	0.30	1.35	0.15	0.20	6.50
USGS MAP:				11.00	6.90	0.40	1.14	0.20	0.23	6.50
USFS MAP:				11.50	6.80	0.30	1.17	0.15	0.18	6.50
	Level and Rod Survey ▼			12.00	6.90	0.40	1.54	0.20	0.31	6.50
TAPE WT:	0.0106 lbs	/ ft		12.50	6.95	0.45	1.05	0.23	0.24	6.50
TENSION:				13.00	6.75	0.25	0.93	0.13	0.12	6.50
L				13.50	6.65	0.15	0.51	0.08	0.04	6.50
SLOPE:	0.017 ft /	ft		14.00	6.90	0.40	0.16	0.20	0.03	6.50
				14.50	7.05	0.55	0.11	0.28	0.03	6.50
				15.00	7.00	0.50	0.28	0.25	0.07	6.50
CHECKED BY:.	DATE			15.50	7.00	0.50	0.62	0.25	0.16	6.50
				16.00	6.95	0.45	0.60	0.23	0.14	6.50
ASSIGNED TO:	:DATE			16.50	6.85	0.35	0.59	0.18	0.10	6.50
				17.00	6.95	0.45	1.18	0.23	0.27	6.50
				17.50	6.85	0.35	0.98	0.18	0.17	6.50
				18.00	6.85	0.35	0.44	0.18	0.08	6.50
				18.50	6.90	0.40	0.24	0.20	0.05	6.50
				19.00	6.85	0.35	0.56	0.18	0.10	6.50
				19.50	6.90	0.40	0.53	0.20	0.11	6.50
				20.00	7.00	0.50	0.72	0.25	0.18	6.50
				20.50	6.85	0.35	0.54	0.18	0.09	6.50
				21.00	6.90	0.40	0.88	0.20	0.18	6.50
				21.50	6.90	0.40	0.12	0.20	0.02	6.50
				22.00	7.00	0.50	0.49	0.38	0.18	6.50
				23.00	6.65	0.15	0.54	0.15	0.08	6.50
				24.00	6.65	0.15	0.11	0.15	0.02	6.50
				25.00	6.60	0.10	0.00	0.20	0.00	6.50
			LW	27.90	6.50	0.00	0.00	0.00	0.00	0.00
				28.80	6.26			0.00	0.00	0.00
				29.40	6.02			0.00	0.00	0.00
		1	BF	29.50	5.42			0.00	0.00	0.00
				29.90	5.08			0.00	0.00	0.00
				30.20	4.81			0.00	0.00	0.00
			LS	30.70	4.62			0.00	0.00	0.00
							Totalal	6 001	111	
						<u>L</u>	Totals	6.90	4.14	

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

Trout Creek near Steamboat

40.25901 N -107.06898 W

#### LOCATION INFORMATION

STREAM NAME:

XS LOCATION:

XS NUMBER:	1	
DATE: OBSERVERS:	9-Jul-20 R. Smith, K. E	Birch, B. Logan
1/4 SEC: SECTION: TWP: RANGE: PM:	SW 5 3N 86W Sixth	
COUNTY: WATERSHED: DIVISION: DOW CODE:	Routt Yampa River 6 23533	
USGS MAP: USFS MAP:	0 0	
SUPPLEMENTAL DATA	=	*** NOTE *** Leave TAPE WT and TENSION at defaults for data collected
TAPE WT: TENSION:	0.0106 99999	with a survey level and rod
CHANNEL PROFILE DATA	=	
SLOPE:	0.017	
INPUT DATA CHECKED BY	Y:	DATE
ASSIGNED TO:		DATE

STREAM NAME: XS LOCATION: Trout Creek near Steamboat 40.25901 N -107.06898 W

XS NUMBER:

# DATA POINTS=

49

#### VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER	_	WETTED	WATER	AREA	Q	% (
	DIST	DEPTH	DEPTH	VEL	PERIM.	DEPTH	(Am)	(Qm)	CELI
RS & BF	0.00	5.55			0.00		0.00	0.00	0.0%
	1.00	5.76			0.00		0.00	0.00	0.0%
	2.80	5.79			0.00		0.00	0.00	0.09
	4.00	5.86			0.00		0.00	0.00	0.09
	4.40	6.00			0.00		0.00	0.00	0.09
	4.60	6.22			0.00		0.00	0.00	0.0%
RW	5.00	6.50	0.00	0.00	0.00		0.00	0.00	0.09
	6.00	6.70	0.20	0.00	1.02	0.20	0.20	0.00	0.09
	7.00	6.90	0.40	0.35	1.02	0.40	0.30	0.11	2.5%
	7.50	6.90	0.40	0.15	0.50	0.40	0.20	0.03	0.79
	8.00	6.80	0.30	0.79	0.51	0.30	0.15	0.12	2.9%
	8.50	6.95	0.45	0.38	0.52	0.45	0.23	0.09	2.19
	9.00	6.75	0.25	0.91	0.54	0.25	0.13	0.11	2.7%
	9.50	6.90	0.40	0.94	0.52	0.40	0.20	0.19	4.5%
	10.00	6.80	0.30	1.00	0.51	0.30	0.15	0.15	3.6%
	10.50	6.80	0.30	1.35	0.50	0.30	0.15	0.20	4.9%
	11.00	6.90	0.40	1.14	0.51	0.40	0.20	0.23	5.5%
	11.50	6.80	0.30	1.17	0.51	0.30	0.15	0.18	4.2%
	12.00	6.90	0.40	1.54	0.51	0.40	0.20	0.31	7.4%
	12.50	6.95	0.45	1.05	0.50	0.45	0.23	0.24	5.7%
	13.00	6.75	0.25	0.93	0.54	0.25	0.13	0.12	2.8%
	13.50	6.65	0.15	0.51	0.51	0.15	0.08	0.04	0.9%
	14.00	6.90	0.40	0.16	0.56	0.40	0.20	0.03	0.89
	14.50	7.05	0.55	0.11	0.52	0.55	0.28	0.03	0.7%
	15.00	7.00	0.50	0.28	0.50	0.50	0.25	0.07	1.79
	15.50	7.00	0.50	0.62	0.50	0.50	0.25	0.16	3.7%
	16.00	6.95	0.45	0.60	0.50	0.45	0.23	0.14	3.3%
	16.50	6.85	0.35	0.59	0.51	0.35	0.18	0.10	2.5%
	17.00	6.95	0.45	1.18	0.51	0.45	0.23	0.27	6.4%
	17.50	6.85	0.35	0.98	0.51	0.35	0.18	0.17	4.19
	18.00	6.85	0.35	0.44	0.50	0.35	0.18	0.08	1.9%
	18.50	6.90	0.40	0.24	0.50	0.40	0.20	0.05	1.29
	19.00	6.85	0.35	0.56	0.50	0.35	0.18	0.10	2.49
	19.50	6.90	0.40	0.53	0.50	0.40	0.20	0.11	2.6%
	20.00	7.00	0.50	0.72	0.51	0.50	0.25	0.18	4.3%
	20.50	6.85	0.35	0.54	0.52	0.35	0.18	0.09	2.3%
	21.00	6.90	0.40	0.88	0.50	0.40	0.20	0.18	4.29
	21.50	6.90	0.40	0.12	0.50	0.40	0.20	0.02	0.69
	22.00	7.00	0.50	0.49	0.51	0.50	0.38	0.18	4.49
	23.00	6.65	0.15	0.54	1.06	0.15	0.15	0.08	2.09
	24.00	6.65	0.15	0.11	1.00	0.15	0.15	0.02	0.49
1.147	25.00	6.60	0.10	0.00	1.00	0.10	0.20	0.00	0.09
LW	27.90	6.50	0.00	0.00	2.90		0.00	0.00	0.09
	28.80	6.26			0.00		0.00	0.00	0.09
DE	29.40	6.02			0.00		0.00	0.00	0.09
BF	29.50	5.42			0.00		0.00	0.00	0.09
	29.90 30.20	5.08			0.00 0.00		0.00 0.00	0.00 0.00	0.0% 0.0%
LS	30.20	4.81 4.62			0.00		0.00	0.00	
LO	30.70	4.02			0.00		0.00	0.00	0.0%
ΤΩ	TALS				23.35	0.55	6.90	4.14	100.0%
10	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				20.00	(Max.)	0.30	7.17	100.07

Manning's n = Hydraulic Radius= 0.1430 0.295256824

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.25901 N -107.06898 W XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER	MEAS	COMP	AREA
LINE	AREA	AREA	ERROR
	6.90	6.90	0.0%
6.25	6.90	12.78	85.4%
6.27	6.90	12.30	78.4%
6.29	6.90	11.82	71.4%
6.31	6.90	11.34	64.5%
6.33	6.90	10.86	57.5%
6.35	6.90	10.39	50.7%
6.37	6.90	9.92	43.8%
6.39	6.90	9.45	37.0%
6.41	6.90	8.98	30.2%
6.43	6.90	8.51	23.4%
6.45	6.90	8.05	16.7%
6.46	6.90	7.82	13.3%
6.47	6.90	7.58	10.0%
6.48	6.90	7.35	6.7%
6.49	6.90	7.12	3.3%
6.50	6.90	6.90	0.0%
6.51	6.90	6.67	-3.3%
6.52	6.90	6.44	-6.5%
6.53	6.90	6.22	-9.7%
6.54	6.90	6.01	-12.9%
6.55	6.90	5.79	-16.0%
6.57	6.90	5.38	-22.0%
6.59	6.90	4.97	-27.9%
6.61	6.90	4.58	-33.6%
6.63	6.90	4.20	-39.1%
6.65	6.90	3.83	-44.4%
6.67	6.90	3.49	-49.4%
6.69	6.90	3.15	-54.3%
6.71	6.90	2.82	-59.1%
6.73	6.90	2.50	-63.8%
6.75	6.90	2.18	-68.4%

WATERLINE AT ZERO AREA ERROR =

6.500

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.25901 N -107.06898 W XS NUMBER:

Constant Manning's n

 $^*GL^*$  = lowest Grassline elevation corrected for sag  $^*WL^*$  = Waterline corrected for variations in field measured water surface elevations and sag STAGING TABLE

-	DIST TO	TOP	AVG.	MAX.		WETTED	PERCENT	HYDR		AVG.
	WATER	WIDTH	DEPTH	DEPTH	AREA	PERIM.	WET PERIM	RADIUS	FLOW	VELOCITY
_	(FT)	(FT)	(FT)	(FT)	(SQ FT)	(FT)	(%)	(FT)	(CFS)	(FT/SEC)
*GL*	5.55	29.48	1.06	1.50	31.20	30.64	100.0%	1.02	42.79	1.37
	5.55	29.48	1.06	1.50	31.20	30.64	100.0%	1.02	42.79	1.37
	5.60	29.23	1.02	1.45	29.73	30.35	99.0%	0.98	39.74	1.34
	5.65	28.99	0.98	1.40	28.27	30.05	98.1%	0.94	36.79	1.30
	5.70	28.74	0.93	1.35	26.83	29.76	97.1%	0.90	33.93	1.26
	5.75	28.49	0.89	1.30	25.40	29.46	96.2%	0.86	31.18	1.23
	5.80	26.47	0.91	1.25	24.02	27.39	89.4%	0.88	29.83	1.24
	5.85	25.60	0.89	1.20	22.72	26.48	86.4%	0.86	27.80	1.22
	5.90	25.31	0.85	1.15	21.45	26.14	85.3%	0.82	25.48	1.19
	5.95	25.15	0.80	1.10	20.19	25.94	84.7%	0.78	23.15	1.15
	6.00	25.00	0.76	1.05	18.94	25.74	84.0%	0.74	20.92	1.10
	6.05	24.88	0.71	1.00	17.69	25.57	83.4%	0.69	18.75	1.06
	6.10	24.71	0.67	0.95	16.45	25.37	82.8%	0.65	16.70	1.02
	6.15	24.54	0.62	0.90	15.22	25.16	82.1%	0.60	14.75	0.97
	6.20	24.37	0.57	0.85	14.00	24.96	81.5%	0.56	12.90	0.92
	6.25	24.18	0.53	0.80	12.78	24.75	80.8%	0.52	11.15	0.87
	6.30	23.94	0.48	0.75	11.58	24.48	79.9%	0.47	9.53	0.82
	6.35	23.68	0.44	0.70	10.39	24.20	79.0%	0.43	8.01	0.77
	6.40	23.42	0.39	0.65	9.21	23.92	78.1%	0.39	6.61	0.72
	6.45	23.16	0.35	0.60	8.05	23.63	77.1%	0.34	5.32	0.66
*WL*	6.50	22.90	0.30	0.55	6.89	23.35	76.2%	0.30	4.14	0.60
	6.55	21.20	0.27	0.50	5.79	21.65	70.6%	0.27	3.26	0.56
	6.60	19.50	0.24	0.45	4.78	19.94	65.1%	0.24	2.50	0.52
	6.65	17.25	0.22	0.40	3.83	17.68	57.7%	0.22	1.87	0.49
	6.70	16.51	0.18	0.35	2.99	16.91	55.2%	0.18	1.27	0.43
	6.75	15.76	0.14	0.30	2.18	16.14	52.7%	0.14	0.78	0.36
	6.80	14.35	0.10	0.25	1.42	14.68	47.9%	0.10	0.40	0.28
	6.85	11.53	0.07	0.20	0.76	11.77	38.4%	0.06	0.16	0.22
	6.90	5.29	0.06	0.15	0.31	5.41	17.7%	0.06	0.06	0.20
	6.95	2.64	0.04	0.10	0.11	2.69	8.8%	0.04	0.02	0.16
	7.00	0.67	0.03	0.05	0.02	0.68	2.2%	0.02	0.00	0.11
	7.05	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.25901 N -107.06898 W XS NUMBER: 1

#### SUMMARY SHEET

MEASURED FLOW (Qm)=	4.14 cfs	RECOMMENDED INS	STREAM FLOW:
CALCULATED FLOW (Qc)=	4.14 cfs	===========	=========
(Qm-Qc)/Qm * 100 =	0.0 %		
		FLOW (CFS)	PERIOD
MEASURED WATERLINE (WLm)=	6.50 ft	========	======
CALCULATED WATERLINE (WLc)=	6.50 ft		
(WLm-WLc)/WLm * 100 =	0.0 %		
MAX MEASURED DEPTH (Dm)=	0.55 ft		
MAX CALCULATED DEPTH (Dc)=	0.55 ft		
(Dm-Dc)/Dm * 100	0.0 %		
(BIII-BC)/BIII 100	0.0 78		
MEAN VELOCITY=	0.60 ft/sec		
MANNING'S N=	0.143		
SLOPE=	0.017 ft/ft		
.4 * Qm =	1.7 cfs		
2.5 * Qm=	10.4 cfs		
RECOMMENDATION BY:	AGENCY		DATE:
CMCB BEVIEW BV:			DATE:

					VERT	WATER				Tape to
	Data Input & Proofing	GL=1	<b>FEATURE</b>	DIST	DEPTH	DEPTH	VEL	Α	Q	Water
	9					ata Points = 5	1			
STREAM NAME:	Trout Creek near Steamboat		RS	0.00	6.36			0.00	0.00	0.00
XS LOCATION:	40.27074 N -107.05762 W			1.00	6.60			0.00	0.00	0.00
XS NUMBER:	2	1	BF	1.30	7.20			0.00	0.00	0.00
DATE:	7/9/2020			2.00	7.66			0.00	0.00	0.00
OBSERVERS:	R. Smith, K. Birch, B. Logan			2.80	7.92			0.00	0.00	0.00
				3.50	8.06			0.00	0.00	0.00
1/4 SEC:			RW	4.70	8.20	0.00	0.00	0.00	0.00	0.00
	32			6.00	8.30	0.10	0.00	0.12	0.00	8.20
TWP:	4N			7.00	8.25	0.05	0.00	0.05	0.00	8.20
RANGE:				8.00	8.40	0.20	0.03	0.20	0.01	8.20
PM:	Sixth			9.00	8.35	0.15	0.64	0.15	0.10	8.20
				10.00	8.30	0.10	0.79	0.10	0.08	8.20
COUNTY:				11.00	8.40	0.20	0.20	0.20	0.04	8.20
WATERSHED:	Yampa River			12.00	8.45	0.25	0.20	0.25	0.05	8.20
DIVISION:	6			13.00	8.55	0.35	1.13	0.26	0.30	8.20
DOW CODE:	23533			13.50	8.50	0.30	0.94	0.15	0.14	8.20
USGS MAP:				14.00	8.50	0.30	1.05	0.15	0.16	8.20
USFS MAP:				14.50 15.00	8.65 8.50	0.45 0.30	0.56	0.23 0.15	0.13 0.09	8.20 8.20
TAPE WT:	Level and Rod Survey   V   Ibs / ft			15.50	8.65	0.30	0.57 1.00	0.13	0.09	8.20
TENSION:				16.00	8.70	0.43	1.00	0.25	0.23	8.20
TENSION.	1DS			16.50	8.70	0.50	1.42	0.25	0.36	8.20
SLOPE:	0.01695 ft / ft			17.00	8.65	0.45	2.26	0.23	0.51	8.20
0201 2.	0.01000			17.50	8.70	0.50	1.26	0.25	0.32	8.20
				18.00	8.75	0.55	1.59	0.28	0.44	8.20
CHECKED BY:	:DATE			18.50	8.85	0.65	1.40	0.33	0.46	8.20
				19.00	8.70	0.50	2.29	0.25	0.57	8.20
ASSIGNED TO	):DATE			19.50	8.75	0.55	1.32	0.28	0.36	8.20
				20.00	8.65	0.45	1.39	0.23	0.31	8.20
				20.50	8.60	0.40	0.68	0.20	0.14	8.20
				21.00	8.65	0.45	0.61	0.23	0.14	8.20
				21.50	8.55	0.35	1.49	0.18	0.26	8.20
				22.00	8.55	0.35	1.10	0.18	0.19	8.20
				22.50	8.60	0.40	1.12	0.20	0.22	8.20
				23.00	8.45	0.25	1.24	0.19	0.23	8.20
				24.00	8.45	0.25	1.66	0.25	0.42	8.20
				25.00	8.50	0.30	0.59	0.30	0.18	8.20
				26.00 27.00	8.55	0.35	0.01 1.35	0.35 0.30	0.00 0.41	8.20
				28.00	8.50 8.50	0.30 0.30	0.13	0.30	0.41	8.20 8.20
				29.00	8.25	0.05	0.13	0.30	0.04	8.20
				30.00	8.35	0.05	0.00	0.05	0.05	8.20
				31.00	8.40	0.13	0.58	0.15	0.05	8.20
			LW	32.50	8.20	0.20	0.00	0.20	0.00	0.00
			LVV	33.20	8.08	0.00	0.00	0.00	0.00	0.00
				34.20	7.78			0.00	0.00	0.00
				35.40	7.78			0.00	0.00	0.00
				36.20	7.77			0.00	0.00	0.00
				37.30	7.42			0.00	0.00	0.00
				39.30	7.30			0.00	0.00	0.00
		1	LS & BF	40.60	7.20			0.00	0.00	0.00
						_				
							Totals	7.67	7.34	

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

Trout Creek near Steamboat

40.27074 N -107.05762 W

#### LOCATION INFORMATION

STREAM NAME:

XS LOCATION:

XS NUMBER:	2	
DATE: OBSERVERS:	9-Jul-20 R. Smith, K. E	Birch, B. Logan
1/4 SEC: SECTION: TWP: RANGE: PM:	SE 32 4N 86W Sixth	
COUNTY: WATERSHED: DIVISION: DOW CODE:	Routt Yampa River 6 23533	
USGS MAP: USFS MAP:	0 0	
SUPPLEMENTAL DATA	<b>=</b>	*** NOTE *** Leave TAPE WT and TENSION at defaults for data collected
TAPE WT: TENSION:	0.0106 99999	with a survey level and rod
CHANNEL PROFILE DATA	≣	
SLOPE:	0.01695	
INPUT DATA CHECKED BY	Y:	DATE
ASSIGNED TO:		DATE

STREAM NAME: XS LOCATION:

Trout Creek near Steamboat 40.27074 N -107.05762 W

XS NUMBER:

# DATA POINTS=

2

51

#### VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER		WETTED	WATER	AREA	Q	% C
-	DIST	DEPTH	DEPTH	VEL	PERIM.	DEPTH	(Am)	(Qm)	CELI
RS	0.00	6.36			0.00		0.00	0.00	0.0%
	1.00	6.60			0.00		0.00	0.00	0.0%
BF	1.30	7.20			0.00		0.00	0.00	0.0%
	2.00	7.66			0.00		0.00	0.00	0.0%
	2.80	7.92			0.00		0.00	0.00	0.0%
	3.50	8.06			0.00		0.00	0.00	0.0%
RW	4.70	8.20	0.00	0.00	0.00		0.00	0.00	0.0%
	6.00	8.30	0.10	0.00	1.30	0.10	0.12	0.00	0.0%
	7.00	8.25	0.05	0.00	1.00	0.05	0.05	0.00	0.0%
	8.00	8.40	0.20	0.03	1.01	0.20	0.20	0.01	0.1%
	9.00	8.35	0.15	0.64	1.00	0.15	0.15	0.10	1.3%
	10.00	8.30	0.10	0.79	1.00	0.10	0.10	0.08	1.1%
	11.00	8.40	0.20	0.20	1.00	0.20	0.20	0.04	0.5%
	12.00	8.45	0.25	0.20	1.00	0.25	0.25	0.05	0.7%
	13.00	8.55	0.35	1.13	1.00	0.35	0.26	0.30	4.0%
	13.50	8.50	0.30	0.94	0.50	0.30	0.15	0.14	1.9%
	14.00	8.50	0.30	1.05	0.50	0.30	0.15	0.16	2.1%
	14.50	8.65	0.45	0.56	0.52	0.45	0.23	0.13	1.7%
	15.00	8.50	0.30	0.57	0.52	0.30	0.15	0.09	1.2%
	15.50	8.65	0.45	1.00	0.52	0.45	0.23	0.23	3.1%
	16.00	8.70	0.50	1.20	0.50	0.50	0.25	0.30	4.1%
	16.50	8.70	0.50	1.42	0.50	0.50	0.25	0.36	4.8%
	17.00	8.65	0.45	2.26	0.50	0.45	0.23	0.51	6.9%
	17.50	8.70	0.50	1.26	0.50	0.50	0.25	0.32	4.3%
	18.00	8.75	0.55	1.59	0.50	0.55	0.28	0.44	6.0%
	18.50	8.85	0.65	1.40	0.51	0.65	0.33	0.46	6.2%
	19.00	8.70	0.50	2.29	0.52	0.50	0.25	0.57	7.8%
	19.50	8.75	0.55	1.32	0.50	0.55	0.28	0.36	4.9%
	20.00	8.65	0.45	1.39	0.51	0.45	0.23	0.31	4.3%
	20.50	8.60	0.40	0.68	0.50	0.43	0.23	0.14	1.9%
	21.00	8.65	0.45	0.61	0.50	0.45	0.20	0.14	1.9%
				1.49		0.45			
	21.50 22.00	8.55	0.35		0.51 0.50		0.18 0.18	0.26	3.6%
		8.55	0.35	1.10		0.35		0.19	2.6%
	22.50	8.60	0.40	1.12	0.50	0.40	0.20	0.22	3.1%
	23.00	8.45	0.25	1.24	0.52	0.25	0.19	0.23	3.2%
	24.00	8.45	0.25	1.66	1.00	0.25	0.25	0.42	5.7%
	25.00	8.50	0.30	0.59	1.00	0.30	0.30	0.18	2.4%
	26.00	8.55	0.35	0.01	1.00	0.35	0.35	0.00	0.0%
	27.00	8.50	0.30	1.35	1.00	0.30	0.30	0.41	5.5%
	28.00	8.50	0.30	0.13	1.00	0.30	0.30	0.04	0.5%
	29.00	8.25	0.05	0.00	1.03	0.05	0.05	0.00	0.0%
	30.00	8.35	0.15	0.35	1.00	0.15	0.15	0.05	0.7%
	31.00	8.40	0.20	0.58	1.00	0.20	0.25	0.15	2.0%
LW	32.50	8.20	0.00	0.00	1.51		0.00	0.00	0.0%
	33.20	8.08			0.00		0.00	0.00	0.0%
	34.20	7.78			0.00		0.00	0.00	0.0%
	35.40	7.78			0.00		0.00	0.00	0.0%
	36.20	7.77			0.00		0.00	0.00	0.0%
	37.30	7.42			0.00		0.00	0.00	0.0%
	39.30	7.30			0.00		0.00	0.00	0.0%
LS & BF	40.60	7.20			0.00		0.00	0.00	0.0%
TC	TALS				28.05	0.65	7.67	7.34	100.0%

(Max.)

Manning's n = 0.0851 Hydraulic Radius= 0.273298454

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.27074 N -107.05762 W XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER	MEAS	COMP	AREA
LINE	AREA	AREA	ERROR
	7.67	7.67	0.0%
7.95	7.67	15.02	96.0%
7.97	7.67	14.41	88.0%
7.99	7.67	13.80	80.1%
8.01	7.67	13.20	72.2%
8.03	7.67	12.59	64.3%
8.05	7.67	12.00	56.5%
8.07	7.67	11.40	48.7%
8.09	7.67	10.81	41.0%
8.11	7.67	10.23	33.4%
8.13	7.67	9.65	25.9%
8.15	7.67	9.07	18.4%
8.16	7.67	8.79	14.7%
8.17	7.67	8.51	11.0%
8.18	7.67	8.22	7.3%
8.19	7.67	7.94	3.6%
8.20	7.67	7.67	0.0%
8.21	7.67	7.39	-3.6%
8.22	7.67	7.11	-7.2%
8.23	7.67	6.84	-10.8%
8.24	7.67	6.57	-14.3%
8.25	7.67	6.30	-17.8%
8.27	7.67	5.78	-24.6%
8.29	7.67	5.28	-31.1%
8.31	7.67	4.80	-37.3%
8.33	7.67	4.35	-43.2%
8.35	7.67	3.93	-48.8%
8.37	7.67	3.52	-54.0%
8.39	7.67	3.15	-58.9%
8.41	7.67	2.80	-63.5%
8.43	7.67	2.46	-67.9%
8.45	7.67	2.13	-72.2%

WATERLINE AT ZERO AREA ERROR =

8.200

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.27074 N -107.05762 W

XS NUMBER: Constant Manning's n

 $^*GL^*$  = lowest Grassline elevation corrected for sag  $^*WL^*$  = Waterline corrected for variations in field measured water surface elevations and sag STAGING TABLE

-	DIST TO	TOP	AVG.	MAX.	4554	WETTED	PERCENT	HYDR	El 0.14	AVG.
	WATER (FT)	WIDTH (FT)	DEPTH (FT)	DEPTH (FT)	AREA (SQ FT)	PERIM. (FT)	WET PERIM (%)	RADIUS (FT)	FLOW (CFS)	VELOCITY (FT/SEC)
-	()	(1.1)	(1.1)	(1.1)	(0011)	(1.1)	(70)	()	(0.0)	(1 1/626)
*GL*	7.20	39.30	1.05	1.65	41.13	39.86	100.0%	1.03	95.52	2.32
	7.20	39.30	1.05	1.65	41.13	39.86	100.0%	1.03	95.52	2.32
	7.25	38.57	1.02	1.60	39.18	39.12	98.1%	1.00	89.22	2.28
	7.30	37.85	0.98	1.55	37.27	38.38	96.3%	0.97	83.14	2.23
	7.35	36.94	0.96	1.50	35.40	37.45	93.9%	0.95	77.56	2.19
	7.40	36.03	0.93	1.45	33.58	36.53	91.6%	0.92	72.21	2.15
	7.45	35.53	0.89	1.40	31.79	36.00	90.3%	0.88	66.56	2.09
	7.50	35.29	0.85	1.35	30.02	35.75	89.7%	0.84	60.79	2.02
	7.55	35.06	0.81	1.30	28.27	35.49	89.0%	0.80	55.24	1.95
	7.60	34.83	0.76	1.25	26.52	35.23	88.4%	0.75	49.90	1.88
	7.65	34.59	0.72	1.20	24.78	34.98	87.7%	0.71	44.80	1.81
	7.70	34.30	0.67	1.15	23.06	34.67	87.0%	0.67	39.97	1.73
	7.75	33.99	0.63	1.10	21.35	34.34	86.1%	0.62	35.38	1.66
	7.80	31.70	0.62	1.05	19.70	32.04	80.4%	0.61	32.41	1.64
	7.85	31.38	0.58	1.00	18.13	31.71	79.5%	0.57	28.40	1.57
	7.90	31.06	0.53	0.95	16.57	31.37	78.7%	0.53	24.62	1.49
	7.95	30.68	0.49	0.90	15.02	30.98	77.7%	0.48	21.09	1.40
	8.00	30.27	0.45	0.85	13.50	30.55	76.6%	0.44	17.81	1.32
	8.05	29.85	0.40	0.80	12.00	30.12	75.6%	0.40	14.77	1.23
	8.10	29.24	0.36	0.75	10.52	29.50	74.0%	0.36	12.03	1.14
	8.15	28.52	0.32	0.70	9.07	28.77	72.2%	0.32	9.56	1.05
*WL*	8.20	27.80	0.28	0.65	7.66	28.05	70.4%	0.27	7.34	0.96
	8.25	26.77	0.24	0.60	6.30	27.02	67.8%	0.23	5.43	0.86
	8.30	23.72	0.21	0.55	5.04	23.94	60.1%	0.21	4.05	0.80
	8.35	20.81	0.19	0.50	3.93	21.01	52.7%	0.19	2.92	0.74
	8.40	17.40	0.17	0.45	2.97	17.58	44.1%	0.17	2.06	0.69
	8.45	15.20	0.14	0.40	2.13	15.38	38.6%	0.14	1.30	0.61
	8.50	11.83	0.12	0.35	1.42	11.99	30.1%	0.12	0.78	0.55
	8.55	7.67	0.12	0.30	0.92	7.79	19.5%	0.12	0.50	0.55
	8.60	6.25	0.09	0.25	0.57	6.34	15.9%	0.09	0.26	0.46
	8.65	4.50	0.07	0.20	0.30	4.55	11.4%	0.07	0.11	0.37
	8.70	2.25	0.05	0.15	0.12	2.29	5.7%	0.05	0.04	0.32
	8.75	0.83	0.05	0.10	0.04	0.86	2.2%	0.05	0.01	0.30
	8.80	0.42	0.03	0.05	0.01	0.43	1.1%	0.02	0.00	0.19
	8.85	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.27074 N -107.05762 W XS NUMBER: 2

#### SUMMARY SHEET

MEASURED FLOW (Qm)=	7.34	cfs	RECOMMENDED IN	STREAM FLOW:
CALCULATED FLOW (Qc)=	7.34	cfs	=======================================	
(Qm-Qc)/Qm * 100 =	0.0	%		
			FLOW (CFS)	PERIOD
MEASURED WATERLINE (WLm)=	8.20	ft	========	======
CALCULATED WATERLINE (WLc)=	8.20	ft		
(WLm-WLc)/WLm * 100 =	0.0	%		
MAX MEASURED DEPTH (Dm)=	0.65	ft		
MAX CALCULATED DEPTH (Dc)=	0.65	ft		
(Dm-Dc)/Dm * 100	0.0	%		
MEAN VELOCITY=	0.96	ft/sec		
MANNING'S N=	0.085			
SLOPE=	0.01695	ft/ft		
.4 * Qm =	2.9	cfs		
2.5 * Qm=	18.4			
RECOMMENDATION BY:		AGENCY		DATE:
CMCB BEVIEW BV:				DATE

XS LOCATION: 40.28929 N -107.04348 W 1 BF 0.80 2.87 0.00 0.00 0. XS NUMBER: 3 1.50 3.34 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00
STREAM NAME:       Trout Creek near Steamboat       LS       0.00       2.49       0.00       0.00       0.00       0.00         XS LOCATION:       40.28929 N -107.04348 W       1       BF       0.80       2.87       0.00       0.00       0.00         XS NUMBER:       3       1.50       3.34       0.00       0.00       0.00	0.00 0.00 0.00 0.00
XS LOCATION: 40.28929 N -107.04348 W 1 BF 0.80 2.87 0.00 0.00 0. XS NUMBER: 3 1.50 3.34 0.00 0.00 0.00	0.00 0.00 0.00 0.00
XS NUMBER: 3 1.50 3.34 0.00 0.00 0.	0.00 0.00 0.00
	0.00
DATE: 7/9/2020 2.10 3.62 0.00 0.00 0.	0.00
, , ,	.00
	1.00
	.00
TWP: 4N 6.00 4.30 0.30 0.58 0.30 0.17 4	1.00
	1.00
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	.00
20.00 4.30 0.30 1.56 0.15 0.23 4	.00
20.50 4.35 0.35 1.31 0.18 0.23 4.	.00
	.00
	.00
	.00
	.00
	0.00
	0.00
	0.00
	0.00
	0.00
	0.00
RS 29.50 2.28 0.00 0.00 0.	0.00
Totals 6.62 6.92	

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

Trout Creek near Steamboat

40.28929 N -107.04348 W

#### LOCATION INFORMATION

STREAM NAME:

XS LOCATION:

XS NUMBER:	3	
DATE: OBSERVERS:	9-Jul-20 R. Smith, K. E	Birch, B. Logan
1/4 SEC: SECTION: TWP: RANGE: PM:	SE 28 4N 86W Sixth	
COUNTY: WATERSHED: DIVISION: DOW CODE:	Routt Yampa River 6 23533	
USGS MAP: USFS MAP:	0 0	
SUPPLEMENTAL DATA	=	*** NOTE *** Leave TAPE WT and TENSION
TAPE WT: TENSION:	0.0106 99999	at defaults for data collected with a survey level and rod
CHANNEL PROFILE DATA	<b>=</b>	
SLOPE:	0.0138	
INPUT DATA CHECKED BY	Y:	DATE
ASSIGNED TO:		DATE

STREAM NAME: XS LOCATION:

Trout Creek near Steamboat 40.28929 N -107.04348 W

XS NUMBER:

3

# DATA POINTS=

45

#### VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER		WETTED	WATER	AREA	Q	% (
	DIST	DEPTH	DEPTH	VEL	PERIM.	DEPTH	(Am)	(Qm)	CEL
LS	0.00	2.49			0.00		0.00	0.00	0.0%
BF	0.80	2.87			0.00		0.00	0.00	0.0%
Di	1.50	3.34			0.00		0.00	0.00	0.0%
	2.10	3.62			0.00		0.00	0.00	0.09
LW	2.90	4.01	0.00	0.00	0.00		0.00	0.00	0.09
LVV	3.00	4.05	0.05	0.00	0.00	0.05	0.00	0.00	0.09
	4.00	4.10	0.10	0.24	1.00	0.10	0.10	0.02	0.39
	5.00	4.10	0.35	0.23	1.03	0.10	0.10	0.02	1.2
	6.00	4.30	0.30	0.58	1.00	0.30	0.30	0.00	
									2.5
	7.00	4.25	0.25	0.04	1.00	0.25	0.25	0.01	0.19
	8.00	4.35	0.35	0.80	1.00	0.35	0.35	0.28	4.09
	9.00	4.25	0.25	0.59	1.00	0.25	0.25	0.15	2.19
	10.00	4.25	0.25	1.15	1.00	0.25	0.19	0.22	3.1
	10.50	4.35	0.35	1.26	0.51	0.35	0.18	0.22	3.2
	11.00	4.50	0.50	0.45	0.52	0.50	0.25	0.11	1.6
	11.50	4.45	0.45	0.90	0.50	0.45	0.23	0.20	2.9
	12.00	4.45	0.45	1.44	0.50	0.45	0.23	0.32	4.7
	12.50	4.35	0.35	1.73	0.51	0.35	0.18	0.30	4.4
	13.00	4.45	0.45	1.96	0.51	0.45	0.23	0.44	6.4
	13.50	4.35	0.35	1.59	0.51	0.35	0.18	0.28	4.0
	14.00	4.45	0.45	1.85	0.51	0.45	0.23	0.42	6.0
	14.50	4.50	0.50	1.88	0.50	0.50	0.25	0.47	6.8
	15.00	4.45	0.45	1.97	0.50	0.45	0.23	0.44	6.4
	15.50	4.40	0.40	0.20	0.50	0.40	0.20	0.04	0.6
	16.00	4.40	0.40	1.33	0.50	0.40	0.20	0.27	3.8
	16.50	4.20	0.20	1.33	0.54	0.20	0.10	0.13	1.9
	17.00	4.25	0.25	1.18	0.50	0.25	0.13	0.15	2.1
	17.50	4.25	0.25	1.64	0.50	0.25	0.13	0.21	3.0
	18.00	4.30	0.30	1.50	0.50	0.30	0.15	0.23	3.3
	18.50	4.35	0.35	1.94	0.50	0.35	0.18	0.34	4.9
	19.00	4.35	0.35	1.40	0.50	0.35	0.18	0.25	3.5
	19.50	4.50	0.50	0.63	0.52	0.50	0.25	0.16	2.3
	20.00	4.30	0.30	1.56	0.54	0.30	0.15	0.23	3.4
	20.50	4.35	0.35	1.31	0.50	0.35	0.18	0.23	3.3
	21.00	4.40	0.40	1.28	0.50	0.40	0.30	0.38	5.6
	22.00	4.30	0.30	0.56	1.00	0.30	0.30	0.17	2.4
	23.00	4.15	0.15	0.00	1.01	0.15	0.15	0.00	0.0
	24.00	4.10	0.10	0.00	1.00	0.10	0.08	0.00	0.0
RW	24.50	4.00	0.00	0.00	0.51		0.00	0.00	0.0
	26.30	3.92			0.00		0.00	0.00	0.0
	27.30	3.87			0.00		0.00	0.00	0.0
	28.00	3.40			0.00		0.00	0.00	0.0
BF	28.20	2.88			0.00		0.00	0.00	0.0
	28.70	2.60			0.00		0.00	0.00	0.0
RS	29.50	2.28			0.00		0.00	0.00	0.0
	25.50	2.20			0.00		0.00	0.00	0.0
TO	TALS				21.87	0.5	6.62	6.92	100.0
10	1,720				21.07	(Max )	0.02	0.32	100.0

(Max.)

0.0752 0.302433927

Manning's n = Hydraulic Radius=

STREAM NAME: XS LOCATION: Trout Creek near Steamboat 40.28929 N -107.04348 W

XS NUMBER:

#### WATER LINE COMPARISON TABLE

WATER LINE         MEAS AREA         COMP AREA           6.62         6.51           3.76         6.62         12.49           3.78         6.62         11.99           3.80         6.62         11.49           3.82         6.62         10.99           3.84         6.62         10.50           3.86         6.62         10.00           3.88         6.62         9.51           3.90         6.62         9.02           3.94         6.62         8.54           3.96         6.62         7.61           3.97         6.62         7.39	AREA ERROR  -1.6% 88.9% 81.3% 73.7% 66.2% 58.7% 51.2% 43.7%
6.62 6.51 3.76 6.62 12.49 3.78 6.62 11.99 3.80 6.62 11.49 3.82 6.62 10.99 3.84 6.62 10.50 3.86 6.62 10.00 3.88 6.62 9.51 3.90 6.62 9.02 3.92 6.62 8.54 3.94 6.62 8.07 3.96 6.62 7.61	-1.6% 88.9% 81.3% 73.7% 66.2% 58.7% 51.2% 43.7%
3.76     6.62     12.49       3.78     6.62     11.99       3.80     6.62     11.49       3.82     6.62     10.99       3.84     6.62     10.50       3.86     6.62     10.00       3.88     6.62     9.51       3.90     6.62     9.02       3.92     6.62     8.54       3.94     6.62     8.07       3.96     6.62     7.61	88.9% 81.3% 73.7% 66.2% 58.7% 51.2% 43.7%
3.76     6.62     12.49       3.78     6.62     11.99       3.80     6.62     11.49       3.82     6.62     10.99       3.84     6.62     10.50       3.86     6.62     10.00       3.88     6.62     9.51       3.90     6.62     9.02       3.92     6.62     8.54       3.94     6.62     8.07       3.96     6.62     7.61	88.9% 81.3% 73.7% 66.2% 58.7% 51.2% 43.7%
3.78     6.62     11.99       3.80     6.62     11.49       3.82     6.62     10.99       3.84     6.62     10.50       3.86     6.62     10.00       3.88     6.62     9.51       3.90     6.62     9.02       3.92     6.62     8.54       3.94     6.62     8.07       3.96     6.62     7.61	81.3% 73.7% 66.2% 58.7% 51.2% 43.7%
3.80     6.62     11.49       3.82     6.62     10.99       3.84     6.62     10.50       3.86     6.62     10.00       3.88     6.62     9.51       3.90     6.62     9.02       3.92     6.62     8.54       3.94     6.62     8.07       3.96     6.62     7.61	73.7% 66.2% 58.7% 51.2% 43.7%
3.82 6.62 10.99 3.84 6.62 10.50 3.86 6.62 10.00 3.88 6.62 9.51 3.90 6.62 9.02 3.92 6.62 8.54 3.94 6.62 8.07 3.96 6.62 7.61	66.2% 58.7% 51.2% 43.7%
3.84     6.62     10.50       3.86     6.62     10.00       3.88     6.62     9.51       3.90     6.62     9.02       3.92     6.62     8.54       3.94     6.62     8.07       3.96     6.62     7.61	58.7% 51.2% 43.7%
3.86     6.62     10.00       3.88     6.62     9.51       3.90     6.62     9.02       3.92     6.62     8.54       3.94     6.62     8.07       3.96     6.62     7.61	51.2% 43.7%
3.88       6.62       9.51         3.90       6.62       9.02         3.92       6.62       8.54         3.94       6.62       8.07         3.96       6.62       7.61	43.7%
3.90       6.62       9.02         3.92       6.62       8.54         3.94       6.62       8.07         3.96       6.62       7.61	
3.92       6.62       8.54         3.94       6.62       8.07         3.96       6.62       7.61	
3.94 6.62 8.07 3.96 6.62 7.61	36.4%
3.96 6.62 7.61	29.1%
	22.0%
3.97 6.62 7.39	15.1%
0.02	11.7%
3.98 6.62 7.16	8.3%
3.99 6.62 6.94	5.0%
4.00 6.62 6.72	1.6%
4.01 6.62 6.51	-1.6%
4.02 6.62 6.29	-4.9%
4.03 6.62 6.08	-8.1%
4.04 6.62 5.86	-11.4%
4.05 6.62 5.65	-14.6%
4.06 6.62 5.44	-17.8%
4.08 6.62 5.02	-24.1%
4.10 6.62 4.61	-30.3%
4.12 6.62 4.22	-36.3%
4.14 6.62 3.83	-42.1%
4.16 6.62 3.45	-47.9%
4.18 6.62 3.08	-53.5%
4.20 6.62 2.71	-59.1%
4.22 6.62 2.34	-64.6%
4.24 6.62 1.99	CO 00/
4.26 6.62 1.65	-69.9%

WATERLINE AT ZERO AREA ERROR =

4.000

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.28929 N -107.04348 W

XS NUMBER: 3 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	TOP	AVG.	MAX.		WETTED	PERCENT	HYDR		AVG.
	WATER	WIDTH	DEPTH	DEPTH	AREA	PERIM.	WET PERIM	RADIUS	FLOW	VELOCITY
_	(FT)	(FT)	(FT)	(FT)	(SQ FT)	(FT)	(%)	(FT)	(CFS)	(FT/SEC)
*GL*	2.88	27.39	1.30	1.62	35.61	28.45	100.0%	1.25	95.99	2.70
	3.00	27.16	1.19	1.50	32.34	28.11	98.8%	1.15	82.40	2.55
	3.05	27.07	1.14	1.45	30.98	27.97	98.3%	1.11	76.98	2.48
	3.10	26.97	1.10	1.40	29.63	27.82	97.8%	1.07	71.72	2.42
	3.15	26.88	1.05	1.35	28.29	27.68	97.3%	1.02	66.60	2.35
	3.20	26.79	1.01	1.30	26.94	27.54	96.8%	0.98	61.63	2.29
	3.25	26.69	0.96	1.25	25.61	27.39	96.3%	0.93	56.81	2.22
	3.30	26.60	0.91	1.20	24.28	27.25	95.8%	0.89	52.16	2.15
	3.35	26.50	0.87	1.15	22.95	27.10	95.2%	0.85	47.66	2.08
	3.40	26.37	0.82	1.10	21.63	26.93	94.6%	0.80	43.36	2.00
	3.45	26.19	0.78	1.05	20.31	26.72	93.9%	0.76	39.26	1.93
	3.50	26.01	0.73	1.00	19.01	26.51	93.2%	0.72	35.33	1.86
	3.55	25.83	0.69	0.95	17.71	26.30	92.5%	0.67	31.57	1.78
	3.60	25.64	0.64	0.90	16.42	26.10	91.7%	0.63	27.99	1.70
	3.65	25.47	0.59	0.85	15.15	25.89	91.0%	0.58	24.59	1.62
	3.70	25.29	0.55	0.80	13.88	25.69	90.3%	0.54	21.36	1.54
	3.75	25.11	0.50	0.75	12.62	25.48	89.6%	0.50	18.33	1.45
	3.80	24.93	0.46	0.70	11.37	25.28	88.8%	0.45	15.48	1.36
	3.85	24.76	0.41	0.65	10.12	25.08	88.1%	0.40	12.83	1.27
	3.90	24.02	0.37	0.60	8.90	24.32	85.5%	0.37	10.56	1.19
	3.95	22.85	0.34	0.55	7.73	23.13	81.3%	0.33	8.63	1.12
*WL*	4.00	21.62	0.31	0.50	6.61	21.90	77.0%	0.30	6.91	1.04
	4.05	21.25	0.26	0.45	5.54	21.51	75.6%	0.26	5.21	0.94
	4.10	20.00	0.23	0.40	4.51	20.25	71.2%	0.22	3.85	0.85
	4.15	18.80	0.19	0.35	3.54	19.05	66.9%	0.19	2.68	0.76
	4.20	18.27	0.14	0.30	2.62	18.50	65.0%	0.14	1.65	0.63
	4.25	15.61	0.11	0.25	1.73	15.82	55.6%	0.11	0.92	0.53
	4.30	12.20	0.08	0.20	1.04	12.38	43.5%	0.08	0.46	0.44
	4.35	7.50	0.07	0.15	0.53	7.64	26.8%	0.07	0.21	0.39
	4.40	4.42	0.05	0.10	0.22	4.49	15.8%	0.05	0.07	0.31
										0.20
	4.45	1.96	0.02	0.05	0.05	1.99	7.0%	0.02	0.01	

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.28929 N -107.04348 W XS NUMBER: 3

#### SUMMARY SHEET

MEASURED FLOW (Qm)=	6.92 c		RECOMMENDED INS	TREAM FLOW:
CALCULATED FLOW (Qc)=	6.91 c			========
(Qm-Qc)/Qm * 100 =	0.1 %	b		
			FLOW (CFS)	PERIOD
MEASURED WATERLINE (WLm)=	4.01 ft		========	======
CALCULATED WATERLINE (WLc)=	4.00 ft			
WLm-WLc)/WLm * 100 =	0.1 %			
MAX MEASURED DEPTH (Dm)=	0.50 ft			
MAX CALCULATED DEPTH (Dc)=	0.50 ft			
Dm-Dc)/Dm * 100	0.0 %			
MEAN VELOCITY=	1.04 ft	lsec		
MANNING'S N=	0.075	300		
SLOPE=	0.075 0.0138 ft	/f+		
SLOPE=	0.0136 10	11.		
4 * Qm =	2.8 c			
2.5 * Qm=	17.3 c	s		
RECOMMENDATION BY:		AGENCY		DATE:
CMCD DEVIEW DV:				DATE



## Attachment 4 FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER CONSERVATION BOAR	D	_			LOC	ATIC	I NC	NFO	RMA	TIOI	N								OF
STREAM NAME:	out !	Cre.	ek	-	·K	иo	44	- /	2av	(C)	-	V	100	CR	ΥC	- (	CROSS	SECTIO	N NO.
CROSS-SECTION LOCATION:		0.25	908	7					-1.				1	<u></u>	<u>/\                                    </u>	,			
	-10	7.06				土	15	(-+-											
DATE: 8 - 25-20 OBS	ERVERS:	2,5	m	th	. 11	B.	1/8	_	O K	7. 4	K.	5	2	08	1,	1,	K	-์ท ก	100
LEGAL % SEC	TION:			V;	-	1	OWNS	НІР		N	/S	RANG	E:		E	:/W	PM:		
COUNTY: DUTT		WATERSHE	ED: 1/1/1	P(A	Pi	VCR		W	ATER D	VISION	į.				DOW	WATER	CODE:	5	
USGS:		1 100	V V (P		1 12	* 0 1			(	()	-						<u></u>		
MAP(S): USFS:			۲.					Ţ,		4									
					SU	PPL	EME	NTA	L DA	TA									
SAG TAPE SECTION SAME AS DISCHARGE SECTION:	YES / N	Ъ	ETER TY	PE:	MAI	RSI	+ =												
METER NUMBER:		DATE RAT	ED:				8/SPIN			sec	TAPE	A R	vey	ed	bs/foot		DUIK E TENS		ted
CHANNEL BED MATERIAL SIZ	E RANGE:	, ,				TONE.	2,0111		OGRAP		_		_			РНОТО			
GRAVEL /	400QL			Ť						•		) = "							- 20=
					CH	ANN	ELF	ROI	TILE	DAT	Α								
STATION	DI FR	STANCE OM TAPE	H)				ING (f	0					(	PE	3				LEGEND:
Tape @ Stake L8	DATE RATED:  SIZE RANGE:    GOBBLE    GOBBLE    DISTANCE (#)   DO	. (7)	4.9		200		_							-		Slake 🛞			
Tape & Slake RB		-		80			S K E				ш			St	Station (1)				
WS @ Tape LB/RB		- Discourse					10		E T C	~			TAPE					P	holo 🕩
2 WS Upstream					·, 3				" _			1 -						-	ation of Figure
3 WS Downstream	- 0		_	_	.86			-	1	-		4	LB (					Dire	ction of Flow
SLOPE	51				012			_						-				1	
H: 26.1	7.02	7 0.0	113	AC	UAT	ic s	AMI	PLIN	G SI	JMM	ARY								
STREAM ELECTROFISHED: Y	ES/NO	DISTANCE	ELECT	ROFIS	HED:_		1	F	ISH CA	UGHT:	YES/NC	,		WATE	RCHEN	AISTRY .	SAMPL	ED: YE	S/NO
		LENGTH	- FREQ	UENCI	DISTR	RIBUTIO	ON BY	DNE-IN	ICH SIZ	E GROI	JPS (1.	0-1.9, 2	2.0-2.9	ETC.)					
SPECIES (FILL IN)			1	2	3	4	5	8	7	8	9	10	11	12	13	14	15	>15	TOTAL
		7300,000000				-									-			_	
							-	$\vdash$							-				
AQUATIC INSECTS IN STREAM	SECTION BY	COMMON	OR SCIE	NTIFIC	ORDE	R NAM	E:		-								10 as 5		
								-			_		-			-		_	
					82	CC	MM	ENT	S							-		-	
			1111/2-01					L Logge						West.					
* -	100.522																		

DISCHARGATEROBETS ACTION NOTES

Distance From Initial Point (ft)	EDGE OF (0.0 AT ST/	WATER LOOKING I AKE)  Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of	Gage Re	ading:	ti	TIME:		
From Initial Point (ft)	Width	Total Vertical Depth From Tape/inst (it)	Water Depth	Depth of	Revolutions		Veloci	u (ft /coc)		
Initial Point (ft)	(ft)	Depth From Tape/Inst (ft)				ı	V610C1	ly (III/Sec)		117/6
2.75 1.4		- 02		Observation (it)		Time (sec)	At Point	Mean in Vertical	Area (ft ² )	Discharg (cfs)
1,4		5,80								-
		5,80						· ·		
2, n + 1		5.89								
		6.04					<u> </u>			
3.5										
4,7		6,06				-				1 1
5.45		6.62				<del>                                     </del>				
0.0		7	0.2				0.04			
7.0			n,35				0.02			
8.0	•		0.55							
							1.68			
							1,34			
						1	1.82			
			0.5		- No		1.53			
			0.8				2.03			
		1					1.82			
			0.4				2,52			
			0.6				2.63			
							1.83			
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3115							1.69		))) <u> </u>	
22,0			0.6				1.49	-6		
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29.0	-	6.58		A (1)	Shut					10 = 3
		6.40				ie.				
30.2		5.70								
30,9		5,07								
31.4		4.82				30 Nove 2000	***			
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# Attachment 4 FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



#### LOCATION INFORMATION

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	USGS: USFS: USFS:  CON DEATE  ON DESTABLE  START TAPE LB/ Stream DWINSTREAM D	USGS: USFS:  CTION SAME AS SECTION: BER: ED MATERIAL SIZE  ION P Stake LB P Stake RB  Tape LB/RB  stream  DWINSTREAM  ECTROFISHED: YE	ME: TROUT CONTION LOCATION:  TION LOCATION:  USGS: USFS:  CCTION SAME AS YES NO SECTION:  BER:  ED MATERIAL SIZE RANGE:  ON FRO P Stake LB P Stake AB  Tape LB/RB  stream  DWINSTREAM  ECTROFISHED: YES/NO  BLL IN)	ME: TROUT CRECTION LOCATION:  TION LOCATION:  USGS: USFS:  CCTION SAME AS SECTION:  WATER  CON DISTANCE FROM TAP  Stake LB 0.0  Stake RB 0.0  Stake RB 0.0  Stake RB 0.0  Stake RB 0.0  ECTROFISHED: YES/NO DIST  LEN  CLL IN)	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  WATERSHED:  USGS:  USFS:  U	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  WATERSHED:  USGS: USFS:  CCTION SAME AS YES NO METER TY SECTION:  DATE RATED:  DATE RATED:  DON DISTANCE (II)  P Stake LB O.O  P Stake RB O.O  Tape LB/RB O.O  Stream  DISTANCE ELECTION:  DISTANCE ELECTI	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  WATERSHED:  USGS: USFS:  CCTION SAME AS SECTION:  WATER TYPE:  DATE RATED:  DATE RATED:  DATE RATED:  DON PROM TAPE (H)  P Stake RB  O.O  P Stake RB  O.O  DISTANCE (H)  P Stake RB  O.O  DISTANCE (H)  D Stake RB  O.O  D Stake RB  O.O  D Stake RB  O.O  D STANCE STANCE STANCE  LENGTH - FREQUENCY  STANCE STANCE STANCE  LENGTH - FREQUENCY	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  N	ME: TROUT CREEK TION LOCATION:  WATERSHED:  USGS:  USFS:  SUPPLE  CITION SAME AS SECTION:  WATERSHED:  USGS:  USFS:  CHANNI  ON PISTANCE (II) ROD READ:  P STAKE RB 0.0  P STAKE RB 0.0  P STAKE RB 0.0  AQUATIC S  ECTROFISHED: YES/NO DISTANCE ELECTROFISHED:  LENGTH - FREQUENCY DISTRIBUTION  LENGTH	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  N % SECTION: SECTION: TOWNSH  WATERSHED:  USGS:  USFS:  SUPPLEMENT  SECTION SAME AS SECTION: TOWNSH  BERI: DATE RATED: CALIB/SPIN:  CHANNEL P  ON FIRM TAPE (1) ROD READING (1)  P Stake LB O.O  P Stake RB O.O  Tape LB/RB O.O  STANCE BERI: DATE RATED: CALIB/SPIN:  LENGTH - FREQUENCY DISTRIBUTION BY COMMON OR SCIENTIFIC ORDER NAME.	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  N K SECTION: SECTION: TOWNSHIP  WATERSHED: W  USGS:  USFS:  SUPPLEMENTA  SECTION SAME AS SECTION: TOWNSHIP  WATERSHED: V  WATERSHED: V  WATERSHED: V  CALIB/SPIN:  CHANNEL PRO  CHANNEL PRO  ON DISTANCE (ft) ROD READING (ft)  PROM TAPE (ft) ROD READING (ft)  PSTANCE RB  O.O  STANCE RB  O.O  Tape LB/RB  O.O  LENGTH - FREQUENCY DISTRIBUTION BY ONE-1  SECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:	ME: TROUT CREEK TION LOCATION:  OBSERVERS:  N	AQUATIC SAMPLING SUMM  CETROPISHED:  DATE RATED:  DATE RATED:  CHANNEL PROFILE DATA  CHANEL PROFILE DATA  CHANNEL PROFILE DATA  CHANNEL PROFILE DATA  CHAN	ME: TROUT CREEK TION LOCATION:  OBSERVERS.  N & SECTION: SECTION: TOWNSHIP: N/S  WATER DIVISION:  USGS:  USFS:  SUPPLEMENTAL DATA  ECTION SAME AS (ES) NO METER TYPE: MARCH  BER: DATE RATED: CALIB/SPIN: 50C TAPE W.  PHOTOGRAPHS TAKEN: YES  CHANNEL PROFILE DATA  ON DISTANCE (II) ROD READING (II)  P STANCE (III) ROD READING (III)  P STANCE (III) ROD READING (III)  S & E C C C C C C C C C C C C C C C C C C	TON LOCATION:  CHANNEL PROFILE DATA  CHANNEL	OBSERVERS:  N X SECTION:  WATERSHED:  WATERSHED:  WATER DIVISION:  WATER D	ME: TROUT CREEK TION LOCATION:  OBSERVERS.  N & SECTION: SECTION: TOWNSHIP N/S RANGE:  WATERSHED: WATER DIVISION:  USGS:  USGS:  USFS:  SUPPLEMENTAL DATA  CICION SAME AS SECTION: SECT	ME: TROUT CREEK TION LOCATION:    V. SECTION:	ME TROUT CREEK TION LOCATION.  OBSERVERS:  N 15 SECTION:  WATERSHED:  WATER DIVISION:  WATER DIVISION:  SECTION:  WATER DIVISION:  SECTION:  WATER DIVISION:  SECTION:  WATER DIVISION:  SECTION SAME AS  WES) NO  METER TYPE MACH  PHOTOGRAPHS TAKEN YES/NO  NUMBER OF PHOTOGRAPHS TAKEN YES/NO  NUMBER OF PHOTOGRAPHS TAKEN YES/NO  CHANNEL PROFILE DATA  ON  PROM TAME (II)  PROM TAME (II)  PROM TAME  ROD READING (II)  SECTION SAME AS  AQUATIC SAMPLING SUMMARY  ECTROFISHED YES/NO  DISTANCE  AQUATIC SAMPLING SUMMARY  ECTROFISHED YES/NO  DISTANCE ELECTROFISHED II FISH CAUGHT YES/NO  WATER CHEMISTRY  LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  SECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME	CROSS  TON LOCATION:  OBSERVERS:  N	CROSS-SECTION  OBSERVERS.  N N SECTION SECTION SECTION TOWNSHIP N/S RANGE: E/W PM.  WATERSHED WATER DIVISION DOW WATER CODE:  USGS:  USFS:  SUPPLEMENTAL DATA  CCTION SAME AS SESTION METER TYPE MACH BER: DATE RATED: CALIBISEN SECTION NUMBER OF PHOTOGRAPHS:  DIVIDIANCE RANGE: PHOTOGRAPHS TAKEN, YES/HO NUMBER OF PHOTOGRAPHS:  CHANNEL PROFILE DATA  CHANNEL PROFILE DATA  CHANNEL PROFILE DATA  CHANNEL PROFILE DATA  AQUATIC SAMPLING SUMMARY  ECTROPISHED VES/NO DISTANCE ELECTROPISHED IN FISH CAUGHT, YES/NO WATER CHEMISTRY SAMPLED YES  LENGTH - PREQUENCY DISTANCE HOLD BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)  LLIMI 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 >15  SECTIS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME		

DISCHARRECARDAGASECTION NOTES

STREAM NAME:	T/21	υV	'+ (R	rex				CROS	S-SECTION	NO.:	D	ATE:/25	SHEET	2 of 2
BEGINNING OF A	MEASUREM	ENT	EDGE OF W	ATER LOOKING D	OWNSTREAM;	LEFT RIG	HT G	age Re	ading:	ft	TIN	AE:		
υ) C1-1-2 (C1	Distance	1	1				Revolu	tions		Veloc	ity (	lt/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)	From Initial Point		Width (H)	Total Vertical Depth From Tape/Inst	Water Depth (It)	Depth of Obser- vation (ft)			Time (sec)	At Point		Mean in Vertical	Area ([t ² ]	Discharge (cfs)
CONTI	231	5	FRUM	123 200	0.6					1.08				
	24.0	5			0.35					0.85				
	25.0			-	0.3					0,48				
	26.1				0.2					0.32	$\Box$			
	27,0				0.2						$\dashv$			
	28,0			-1	0.1					0.0				
		$\perp$									_			
		$\perp$												
		$\perp$												
														20,52
		_							_		$\dashv$			
		-								-	$\dashv$			
		_		'							$\dashv$			
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-		$\dashv$												
TOTALS:		+												
	1					CALCULAT	IONS PE	RFORME	D BY:	— т	CA	LCULATIONS (	HECKED BY	
End of Measu	rement	Tim	ie:	Gage Readin	g:	J. J			- 6		-			



### FATTACH THE PROPERTY AND THE PROPERTY AN



#### LOCATION INFORMATION

STREAM NAME:	TRO	UT	RE	EK			***	n	nd	d	le	X	S						C	ROSS-	SECTIO	N NO.:
CROSS-SECTION LO	OCATION:	40.	27	07-	7.		10 -	0	F)				924	6			8, 0		43			200
		1071	057	760	)					-											-	
DATE: 8/25/2	OBSE	RVERS: R	SMI	TH	,	7 /	とんく	o 7	T,	K,	J	CHE	EL	, ,	3,4	06,	g~)					
LEGAL DESCRIPTION	1/4 SEC			SECT	ION:	:			TOWN	ISHIF	); 			/S	RANGE				/W	PM;		
COUNTY	T		WATER	SHED:	VI	POI	121	V	UR.		WA	TER DI	VISION	6				DOW V	VATER O	SODE:	5	
USGS:						1											,					
USFS:						- 150	- 7167	/*L.**		_							A		-h. B., ride		. 1	
							SUI	PPI	LEM	EN	ITA	L DA	TA									
SAG TAPE SECTION DISCHARGE SECTION		YES	و)	METE	R TYI	PE: /	MAR	54	<del> </del>													
METER NUMBER:			DATE	RATED:				CA	LIB/SF	INI:	_		sec	TAPE V	VEIGHT	RVC	YE	5/1001	TAPI	V 1/2 E TENS	vey	e 0  lbs
CHANNEL BED MAT	ERIAL SIZ	E RANGE:								P	нотс	GRAPI	45 TAK	-			NUMBI	ER OF F	чото	SRAPH:	S:	
	CHANNEL PROFILE DATA																					
STATION	STATION FROM TAPE (III) ROD READING (III)																					
Tape @ Stake	LB		0.0	1			.7.	.2	0		$\Box$	_				7					- St	ake 🛞
Tape & Stake	ЯВ		0.0				6	. 5	2													ation (1)
1 WS @ Tape LE	B/RB		0.0			8.	30	/	8,3	30				7		TAPE					Pi	noto ()
2 WS Upstream		3	1.3			+	66	7			_  '	H									$\vdash$	
3 WS Downstrea	am	24	.2			8	7	/_								2,,,6	3		7		Dire	ction of Flow
SLOPE	V 24	1.08	/	55,	S	133	0.	0/	9.5						. 7	Z _{IGB}	<b>У</b>	-	- 1		0 0	
= =						AC	TAU	ГІС	SAR	ИPI	LIN	G SI	JMM	ARY	,							
STREAM ELECTRO	FISHED: Y	ES/NO	DIST	NCE EL	.ECT	ROFIS	HED:_		_ft		F	ISH CA	UGHT:	YES/N	)		WATE	RCHEN	MISTRY	SAMPL	ED: YE	S/NO
	Ш		LEN	TH - FF	REQI	DENC	r DISTI	RIBU	TION E	10 YE	NE-IN	CH SIZ	E GRO	UPS (1.	0-1.9,	2.0-2.9	ETC.)					
SPECIES (FILL IN)	5			1		2	3	4	5	;	6	7	8	9	10	11	12	13	14	15	>15	TOTAL
11					$\dashv$			$\vdash$	+	$\dashv$					-			-				
									$\perp$													
									V _d													
AQUATIC INSECTS I	IN STREAM	1 SECTION E	SY COMM	ION OR	SCIE	NTIFK	ORD	ER N	AME:													
611		<del></del>																_				
								. (	COM	ME	ENT	S									413	

CONDUCTIVITY /60

Salinota

C CO + OC

DISCHARATECERRESE SECTION NOTES

STREAM NAME:	TROC	IT CREE	K				CROS	S-SECTION	I NO.:	DATE /2	25	SHEET	10F2
BEGINNING OF M	KEASUREME	EDGE OF W	ATER LOOKING E	OWNSTREAM:	LEFT / RIGI	HT G	age Re	ading:	ft	TIME: //	100000		
Stake (S)	Distance	Wldth	Total	Water	Depth	Revolu	tions		Velo	city (ft/sec)			
Stake (S) Grassline (G) Waterline (W) Rock (R)	From Initial Point (ft)	(n)	Vertical Depth From Tape/inst (it)	Depth (h)	of Obser- vation (ft)		:	Time (sec)	At Point	Mean ii Vertica	n (	res (t ² )	Discharge (cfs)
2 PIN	0.60		6.52										
	1.0		6.56						_				
	1,5		6.72										
-	1.8		12.94										
RF	1,9		7.42										
100000	2.6		7.64										
	3,2		7,95							_	_		
	3.6		8.05										_
	3.8		224										
ZEW	4.6		230			_				·			
	5,5			0.05					0.3				
	6,5			0.2					0.08	<u>'                                    </u>			
	7.5			0.2					0.0				
	25			0.2		•			0,07				
	9,5			0.25					1,75				
	10,5			0.2					1,2				
	11.5			0.15					1.08				
Δ	12.5			0.35					0.11		-		
	13,5	-		0.3					1,22		-		
	14,5			0,4					1.02				1000
	15.D			0.5					1.03				
	15.5			0.3					0.58				
	16.0			0.6				-	1,72				
	16,5			0.5				ļ	1.81				
	17.0			٥,5		-		-	1.69				
	17.5	ļ		0,5		,		ļ	1.46		-		
	18.0			0.65					1.26	_			
	18,5			0.55					2,38				
	19.0	9-1-1		0.55				-	2.40		_		
	19,5	CD4 177 A	LED ON	0.55 2rd p	37.55			-	1,92				
LEW	33.4	COPPIE	8,30	2 7.	rou.			+	1	_			
2500	34.1		8.13			*		<del>                                     </del>		_		-	
	34.7		7.97										
	35,9	- 1 /	7.81										
	36,4		8.03										
	37.0		7.80										
*			7.51		AT2*	35	15	an	CRROY	2, the	CD/S	RCCI	valve 20)
	40.0		7,51			18	38	1/1	ote ac	dded u	n 8	131/	20)
BF	41.1		7.40										7
	42.4		7.24										
LPIN	44,4		7.20		100000000000000000000000000000000000000	************		0 2000000000000000000000000000000000000					
TOTALS:													
End of Measu	rement	Time:	Gage Readin	ig:f	CALCULAT	IONS PE	RFORM	ED BY:		CALCULATI	ONS CHE	KED BY:	



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## Attachment A FOR INSTREAM FLOW DETERMINATIONS



#### LOCATION INFORMATION

CONSERV	'ATION	BOAR	D			99		AHIC	714 IL	STO.	MIVIA	HOP	Ä								
STREAM NA	AME:	TRO	ut (	REE	K													C	ROSS	SECTIO	N NO.:
CROSS-SEC				-																	٠
									-												
DATE: 8/2	25/2	OBS	ERVERS:																		
LEGAL DESCRIPTIO	N N	% SEC	TION:		SECTIO	d:		TO	OWNSH	IIP:		N,	/S	RANGE	:		Ε	/W	PM;		
COUNTY:				WATERSH	IED:			1.00		W	ATER DI	VISION:					DOW V	VATER (	CODE:		
	USGS:			i i																	
MAP(S):	USFS:																				
							SUF	PPLE	EME	NTA	L DA	TA					-			72.1	
SAG TAPE SI DISCHARGE			(YES) N	0 1	METER T	YPE:									-						
METER NUM				DATE RA	TED:			CALII	B/SPIN:			sec	TAPEV	P V	८५२	d	bs/foot	I SI	MZN E TENS	/cy	Col
CHANNEL B	ED MATE	RIAL SIZ	E RANGE:		<u> </u>		_				OGRAPI				Ī			РНОТО		_	100
	1-1-10						CHA	NN	EL P	ROF	ILE	DAT	A								
STAT	ION		DI	STANCE OM TAPE	(11)	<b>T</b>	ROL	READ	ING (II	, ,			÷	_				10.5	_	_	LEGEND:
	e Stake L	.B	FH	Q.O	1.0	+				$\dashv$					(	9					
^	Stake R	B	is .	0.0							s K										ake 🛞
1 ws @	Tape LB/	RB		0.0					•		E T C				TAPE						ation ()
2 ws up	ostream										Ĥ										
3 ws De	ownstread	n									-					8)				Direc	ction of Flow
SLOPE			· .					:		$\perp$						シ 					-
						AG	TAU	IC S	AME	PLIN	G SI	JMM	ARY								
STREAM EL	ECTROF	ISHED: 1	/ES/NO	DISTAN	CE ELEC	TAOFIS	HED:	[1			FISH CA	UGHT-	YES/NO	)		WATE	RCHEN	AISTRY	SAMPL	ED: YES	S/NO
				LENGT	H - FREC	UENC	) DISTR	HBUTIC	ON BY (	DNE-IN	ICH SIZ	E GRO	UPS (1.	0-1.9, 2	.0-2.9	, ETC.)					
SPECIES (F	ILE IN)	1			1	2	3	4	5	6	7	В	9	10	11	12	13	14	15	>15	TOTAL
					-		_				-		_			_	_			-	
								_								3	-	-	_	┼	
					1	77			<del>  .    </del>						1	- 31					
AQUATIC IN	SECTS IN	STREAM	A SECTION B	Y СОММО	N OR SC	ENTIFIC	ORDE	R NAM	IE:												
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								CC	ММС	ENT	ΓS										
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																			1		

DISCHARGE/CROSS4SECTION NOTES

STREAM NAME:	TROU	T CREE	K_				CROS	SECTION	NO.:	DATE:/25	SHEE	1 <u>2</u> 05 <u>2</u>
BEGINNING OF A	MEASUREME	NT EDGE OF W	/ATER LOOKING D KE)	OWNSTREAM	LEFT RIG	HT G	age Re	ading:	It	TIME:		
Sloke (S)	Distance From	Luc-dals	Total	18/21/25	Depth	Revolu	tions	14.7.7.	Veloc	ity (ft/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)	From Initial Point	cel fr	Vertical Depth From Tape/Inst	Depth (ft)	of Obser- vation (It)			Time (sec)	At Point	Mean in Vertical	Area (it ² )	Discharge (cfs)
	20		0.6	7					2.15		,	
_	20-5		0.55	=					2.21			
	21.0		0.5						1.20			
	21.5		0.4						1.78	<u> </u>		
	22.0		0.35						1.00			
	23,0		0.45						1.20 1.78 2.28 1.82 1.32			
	24,0		0.35		_	-			1.32			
	25,0		0.3						1.78	-		
	26,0		0.3						0.77	_		
	27.0		0.3						1.05			
	28.0		0.35						0.78			-
	29.0		0.35 0.3 0.3	_					0.17			
	30.0		0.3						0.68		-	
	31.0		0.3						1.24			
	32,0		0.3				_		0,4/			
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						77.12.50						
TOTALS:		_										
End of Measu	rement	Time: /2:49	Gage Readin	ng:	CALCULA	TIONS PE	FORM	ED BY:		CALCULATIONS	CHECKED BY	f:



### FAHACOMONTA FOR INSTREAM FLOW DETERMINATIONS



#### LOCATION INFORMATION

CONSERVATION BOAR	lD .			LUC	AIIU	11 IV	IFU	THE	1101	N.				650				1
STREAM NAME: TROU	ST CREEK		レ	עעט	CR	)	15			The state of the s					0	ROSS	SECTIO	N NO.:
CROSS-SECTION LOCATION	The same of the sa					0.000		471		400				100	- 10			7.0
	-107.04340		± 14	464				-				Se						
	SERVERS: R. SMIT!					K			(		3, (							
EGAL % SE ESCRIPTION	CTION:	ECTION	4:		TO	OWNSH	IIP:		N,	/S	RANGE	E:		E	/W	РМ:		
COUNTY:	WATERSHE	D: VV )	PA	R	1 V	CR	W	TER DI	VISION:	6				DOW V	VATER O	35		
USGS: MAP(S):	1		•															
usfs:											. 73							
				SUF	PPLE	EME	NTA	L DA	TA									
SAG TAPE SECTION SAME A	S YES NO MI	ETER IN	rPE:	Ma	RC	h	- 1									-		
METER NUMBER:	DATE RAT	ED:			Ť	B/SPIN:		•	sec	TAPE	W R	Ve	Yea	os/loot	TAP	S V		MEE
CHANNEL BED MATERIAL SI	IZE RANGE:			0.	TONEIL	2/01/114.	РНОТ	-116 275	HS TAK	_		Ī				GRAPH		
		_		0111							_							100
				CHA	INN	ELP	KOF	ILE	DAT	A								
STATION	DISTANCE FROM TAPE	ft)	$\perp$		READ	<u> </u>						- (	9					LEGEND:
Tape @ Stake LB	0.0		_		10/01		$\dashv$	-	_	_			_	-		_	- sı	take 🕱
Tape & Stake RB	0.0				:34	/		S K E		_		ďη					St	ration (1
① WS @ Tape LB/RB	0.0		+	1.05		4.0		E   T   C				TAPE		K			P	holo 🗘
2 WS Upstream	50.3			<u>3,3</u>	- Allen			-									- Dice	ection of Flo
3 WS Downstream SLOPE		)		/ '	/ <del>2</del>		$\dashv$				R	(	•					-
SLOPE	.78 / 57	7.3		0.0	in the	CU	_			- 200	5000		_		_	_		
		-	AC	TAU	IC S	AME	PLIN	G SI	JMM	ARY	'							
STREAM ELECTROFISHED:	YESMO DISTANC	E ELEC.	TROFIS	HED:_				ISH CA	UGHT-	YES/NO			WATE	RCHE	AISTRY	SAMPL	LED: YE	S/NO
	LENGTH	· FREC	UENC	Ŧ	RIBUTIO	ON BY	ONE-IN	ICH SIZ	E GRO	UPS (1.	0-1.9, : I	2.0-2.9	, ETC.)				T	
SPECIES (FILL IN)		1	2	3	4	5	6	7	8	9	10	1.1	12	13	14	15	>15	TOTAL
		-									_						=	
															_			
AOMATIC MEGOTO IN STOCK	AM SECTION BY COLUMN	00.00	ENTIFE											<u> </u>				
AQUATIC INSECTS IN STREA		OH SCI	ENTIFI		H NAM	16												
					CC	MMC	EN	5										
																		8
								÷									_	

DISCHARGE/CROSS/SECTION NOTES

STREAM NAME:	TRO	UT CRE	FK			CROS	SS-SECTION	1 NO.	DAJE /25	SHEE	T/OF2
EGINNING OF M		1	/ATER LOOKING DI	OWNSTREAM	LEFT / RIC	Gage Re	رغم عد	ft	TIME: /:30		
Stake (S)	Distance	\\/idth	Total	Water	Depth	Revolutions		Velo	city (ft/sec)		
Stake (S) Grassline (G) Waterline (W) Rock (R)	From Initial Point (ft)	(ft)	Verlical Depth From Tape/Inst (II)	Depth (ft)	of Obser- vation (ft)		Time (sec)	At Point	Mean in Vertical	Area (It ² )	Discharg (cfs)
2 PIN	1.0		2.34				1				
	1.5		2.68		<u> </u>						
	2.0		272								
BF	<u>, इ.स.</u> इ.ड		2.72 2.99 3.94								
0.0			3.74								
2Fu)	5.5		4.04					4			
	6,5		KEN.		0.2		ļ	0.05			-
	7.5				0.75		-	1.11			
	8.5				0.5			1.09			
	9,0							1.66			ļ
	9.5				0.55			1.64			
	10.0-				0.5		<u> </u>	1.95			
	10,5			<u> </u>	0.5			1.76			1
	11.0				0.5 0.5 0.35		1	2.07			1 4
	11.5				0,5			2.65			
	12.0			7	0.35		<u> </u>	1.74			-
	12,5				0.45			1.70			
	13.0				0-51		-	2.05			-
	13.5				0,45		11	1.02			
	14.0				0.5		-	2.02			
	141.5				0.45			1.62			
	15.0				0.6			1.24			
	15,5				0.65			2.06	4		
	16.0				0.6			214			
	16.5				0.6			2.42			
	17.0				0.5		1	2.02			
	17.5				0.55			1,77			
	18.5				0.45			1,91			
					1,5		-	1.97			
	19,0	v			0.5	_		1,75			
er94	20.0				0.5			1.33			
	31.0		,		0.35			1.27	-		+
	33.0				0.3			0.81	-		
	23.0 a4.0		-		0.4			0.49			+
	25.0	)			0-35			7.08			
		1866	PAGE ?	<u></u>	0.00			7,5,7,7,7			
LEW	28.0		4.05								1
	28,5		3,72							_	
	29.0		3,44								
BF	29,7		2.98								
LPIN	30.5		2.62		_						
			\$3000000000000000000000000000000000000	Access to the second	d control control	a laconomica de la composición del la composición del composición de la composición de la composición del composición del composición de la composición de l	60 Mary 200 (200 (200 (200 (200 (200 (200 (200	CS DECEMBER AND ADDRESS OF THE PARTY OF THE	entrare providentales acceptantes		



### Attachment 4 FOR INSTREAM FLOW DETERMINATIONS



CONSERV	ATION	BOARD	1				LOC	AHO	MA FLA	IFUI	TIVIA	TIOT	4								/1
STREAM NA	ME:	TR	OUT	CI	256	E		_	LO	W	erz	XS	III.					C	ROSS-	SECTION	1 110:
CROSS-SECT	TION LOC	ATION:		1657										)							, , , , , , , , , , , , , , , , , , , ,
DATE: 8/	25/2		RVERS:											. ,							
LEGAL DESCRIPTION	N	V4 SEC1	10%:		SECTIO	N:			OWNSH			N,	/8	RANGE	:			/W	PM:		
COUNTY:				WATERS	HED:					WA	TER DI	IVISION:					DOW W	/ATER (	CODE:		
MAP(S):	USGS:																				
	USFS:		T. III Ca. Was		-				_											-	
							SUI	PPLE	EME	NTA	L DA	ATA									
SAG TAPE SE			YES) N	0	METER T	YPE:	=			I.			-								-1
METER NUM				DATE R	ATED:			CALIE	B/SPIN:			sec	S TAPE V	M/Z	vey	ce	os/foot		SV)	2VC	MECI
CHANNEL BE	D MATE	RIAL SIZI	RANGE:							РНОТО	OGRAP	HS TAK	EN: YES	S/NO		NUMBI	ER OF F		GRAPH:		
- ^							CHA	NN	EL P	ROF	ILE	DAT	A								
			D	ISTANCE	25 62	_				Ť	27	246.20				_			-		POEND:
STATI	ON Stake L	В	FR	O.O	(ft)	+	ROC	READ	ING (ft)						(	3					LEGEND:
_	Stake R	-		0.0	70.20	+		- / 1			s   -									- 1	ake 🛞
	Tape LB/	RB		0.0		$\top$				$\neg$	K E T				TAPE						ation (1)
	stream					†					Н				-						noto ()-
	wnstream	,						***		$\exists$	-									- Direc	ction of Flow
SLOPE															•	9					
						A	QUAT	ric s	AMF	LIN	G S	UMM	IARY								-1
STREAM EL	ECTROFI	SHED: Y	ES/NO	DISTA	NCE ELEC	CTROF	SHED:_	tr		F	ISH C	AUGHT:	YES/NO	)	T	WATE	RCHEN	AISTRY	SAMPL	ED: YES	S/NO
	_			LENG	TH - FRE	QUEN	CY DISTI	RIBUTI	ON BY C	DNE-IN	CH SI	ZE GRO	UPS (1	0-1.9. 2	.0-2.9	ETC.)			_		
SPECIES (FI	ILL IN				1	2	3	4	5	6	7	В	9	10	11	12	13	14	15	>15	TOTAL
				_																-	
					-	┼	-	-			<del> </del>	-	-	1		-	<b> </b>				
					+	-			1629				=					-			
AQUATIC IN	SECTS IN	STREAM	SECTION E	Y COMM	ON OR SC	IENTIF	IC ORDI	ER NAM	(E:								Ī		<u>'                                     </u>		7
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								C	ММС	ENT	ſS										
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DISCHARGE COMPOSES

STREAM NAME:	TRO	リレナ	C	RCEK			113.07	CROS	S-SECTION	NO.:	DATE: /25		SHEET	2 or 7.
BEGINNING OF	THE RESIDENCE OF THE PERSON NAMED IN	A CONTRACTOR OF THE PARTY OF TH			DOWNSTREAM	LEFT / RIC	ант с	age Re	ading:		TIME			
and the second second second	V	100,000	-				Revolu	tions			ty (ft/sec)		1	
Steke (S) Grass Ine (G) Water line (W) Rock (R)	From Initial Point	veel	P	Total Vertical Depth From Tape/Inst	Water Depth (ft)	Depth of Obser- vation (ft)	nevola	110115	Time (sec)	At Point	Mean in Vertical	Area (It ² )	3	O scharge (cfs)
-	310		1		0.2					0.90.				
	25				0.15					0.05				
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				•										1
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70741												1		
TOTALS:	1			T						L.,				
End of Measu	rement	Time: 💭 🚜	10	Gage Readin	9:	CALCULAT	TIONS PER	FORME	D BY:		CALCULATIONS	CHECKE	D BY:	

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

#### LOCATION INFORMATION

STREAM NAME: XS LOCATION: XS NUMBER:		near Steamboat 107.068998 W
DATE: OBSERVERS:	25-Aug-20 R Smith, B Lo	ogan, K Scheel, T Knott
1/4 SEC: SECTION: TWP: RANGE: PM:	SW 5 3N 86W Sixth	
COUNTY: WATERSHED: DIVISION: DOW CODE:	Routt Yampa River 6 0	
USGS MAP: USFS MAP:	0 0	
SUPPLEMENTAL DATA	=	*** NOTE *** Leave TAPE WT and TENSION
TAPE WT: TENSION:	0.0106 99999	at defaults for data collected with a survey level and rod
CHANNEL PROFILE DATA	<u>\</u>	
SLOPE:	0.01268657	
INPUT DATA CHECKED B	Y:	DATE
ASSIGNED TO:		DATE

STREAM NAME:

Trout Creek near Steamboat 40.25908 N -107.068998 W

XS NUMBER:

# DATA POINTS=

48

#### VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER		WETTED	WATER	AREA	Q	% C
	DIST	DEPTH	DEPTH	VEL	PERIM.	DEPTH	(Am)	(Qm)	CELL
S	0.60	5.80			0.00		0.00	0.00	0.0%
BF	0.75	5.80			0.00		0.00	0.00	0.0%
ы	1.40	5.89			0.00		0.00	0.00	0.0%
	2.00	6.04			0.00		0.00	0.00	0.0%
	3.50	6.03			0.00		0.00	0.00	0.07
	4.70	6.06			0.00		0.00	0.00	0.0%
REW	5.45	6.62			0.00		0.00	0.00	0.0%
IXE VV	6.00	6.80	0.20	0.04	0.58	0.20	0.16	0.00	0.07
	7.00	6.95	0.35	0.02	1.01	0.25	0.35	0.01	0.07
	8.00	7.15	0.55	0.91	1.02	0.55	0.33	0.38	2.9%
	8.50	7.13	0.50	1.68	0.50	0.50	0.41	0.38	3.3%
	9.00	7.10 7.25		1.34	0.50	0.65	0.25	0.42	3.4%
			0.65						
	9.50 10.00	7.00	0.40	1.82 1.89	0.56	0.40	0.20	0.36	2.8%
	10.50	7.10 7.10	0.50		0.51 0.50	0.50	0.25 0.25	0.47	3.7% 3.0%
			0.50	1.53		0.50		0.38	
	11.00	7.40	0.80	2.03	0.58	0.80	0.40	0.81	6.3%
	11.50	7.10	0.50	1.82	0.58	0.50	0.25	0.46	3.5%
	12.00	7.00	0.40	2.52	0.51	0.40	0.20	0.50	3.9%
	12.50	7.20	0.60	2.63	0.54	0.60	0.30	0.79	6.1%
	13.00	7.10	0.50	1.83	0.51	0.50	0.25	0.46	3.6%
	13.50	7.15	0.55	1.22	0.50	0.55	0.28	0.34	2.6%
	14.00	7.20	0.60	1.38	0.50	0.60	0.45	0.62	4.8%
	15.00	7.30	0.70	0.92	1.00	0.70	0.70	0.64	5.0%
	16.00	7.25	0.65	0.92	1.00	0.65	0.49	0.45	3.5%
	16.50	7.30	0.70	1.21	0.50	0.70	0.35	0.42	3.3%
	17.00	7.30	0.70	0.15	0.50	0.70	0.35	0.05	0.4%
	17.50	7.30	0.70	0.87	0.50	0.70	0.35	0.30	2.4%
	18.00	7.00	0.40	1.77	0.58	0.40	0.20	0.35	2.8%
	18.50	7.15	0.55	1.14	0.52	0.55	0.28	0.31	2.4%
	19.00	7.10	0.50	0.87	0.50	0.50	0.25	0.22	1.7%
	19.50	7.00	0.40	1.33	0.51	0.40	0.20	0.27	2.1%
	20.00	7.20	0.60	1.27	0.54	0.60	0.30	0.38	3.0%
	20.50	7.25	0.65	1.72	0.50	0.65	0.33	0.56	4.4%
	21.00	7.30	0.70	0.68	0.50	0.70	0.35	0.24	1.9%
	21.50	7.25	0.65	1.69	0.50	0.65	0.33	0.55	4.3%
	22.00	7.20	0.60	1.49	0.50	0.60	0.30	0.45	3.5%
	22.50	7.25	0.65	0.66	0.50	0.65	0.33	0.21	1.7%
	23.00	7.20	0.60	1.08	0.50	0.60	0.45	0.49	3.8%
	24.00	6.95	0.35	0.85	1.03	0.35	0.35	0.30	2.3%
	25.00	6.90	0.30	0.48	1.00	0.30	0.30	0.14	1.1%
	26.00	6.80	0.20	0.00	1.00	0.20	0.20	0.00	0.0%
	27.00	6.80	0.20	0.32	1.00	0.20	0.20	0.06	0.5%
	28.00	6.70	0.10	0.00	1.00	0.10	0.10	0.00	0.0%
LEW	29.00	6.58			1.01		0.00	0.00	0.0%
	30.10	6.40			0.00		0.00	0.00	0.0%
BF	30.20	5.70			0.00		0.00	0.00	0.0%
	30.90	5.07			0.00		0.00	0.00	0.0%
S	31.40	4.82			0.00		0.00	0.00	0.0%
									455.
TC	TALS				24.16	0.8 (Max.)	11.01	12.84	100.0%
						(I//IOV )			

(Max.)

Manning's n = 0.0849 Hydraulic Radius= 0.455476421

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.25908 N -107.068998 W XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER	MEAS	COMP	AREA
LINE	AREA	AREA	ERROR
	11.01	11.00	0.0%
6.35	11.01	17.09	55.3%
6.37	11.01	16.59	50.8%
6.39	11.01	16.09	46.2%
6.41	11.01	15.59	41.7%
6.43	11.01	15.10	37.2%
6.45	11.01	14.60	32.7%
6.47	11.01	14.11	28.3%
6.49	11.01	13.63	23.8%
6.51	11.01	13.14	19.4%
6.53	11.01	12.66	15.1%
6.55	11.01	12.18	10.7%
6.56	11.01	11.95	8.6%
6.57	11.01	11.71	6.4%
6.58	11.01	11.47	4.2%
6.59	11.01	11.24	2.1%
6.60	11.01	11.00	0.0%
6.61	11.01	10.77	-2.1%
6.62	11.01	10.54	-4.3%
6.63	11.01	10.30	-6.4%
6.64	11.01	10.07	-8.5%
6.65	11.01	9.84	-10.5%
6.67	11.01	9.39	-14.7%
6.69	11.01	8.94	-18.8%
6.71	11.01	8.49	-22.8%
6.73	11.01	8.05	-26.8%
6.75	11.01	7.62	-30.8%
6.77	11.01	7.19	-34.7%
6.79	11.01	6.76	-38.6%
6.81	11.01	6.35	-42.3%
6.83	11.01	5.96	-45.9%
6.85	11.01	5.57	-49.4%

WATERLINE AT ZERO AREA ERROR =

6.600

Constant Manning's n

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.25908 N -107.068998 W XS NUMBER:

*GL* = lowest Grassline elevation corrected for sag
*WL* = Waterline corrected for variations in field measured water surface elevations and sag STAGING TABLE

•	DIST TO	TOP	AVG.	MAX.		WETTED	PERCENT	HYDR		AVG.
	WATER	WIDTH	DEPTH	DEPTH	AREA	PERIM.	WET PERIM	RADIUS	FLOW	VELOCITY
-	(FT)	(FT)	(FT)	(FT)	(SQ FT)	(FT)	(%)	(FT)	(CFS)	(FT/SEC)
*GL*	5.80	29.44	1.08	1.60	31.81	30.79	100.0%	1.03	64.06	2.01
	5.85	29.07	1.04	1.55	30.35	30.38	98.7%	1.00	59.77	1.97
	5.90	28.73	1.01	1.50	28.90	30.00	97.4%	0.96	55.57	1.92
	5.95	28.52	0.96	1.45	27.47	29.74	96.6%	0.92	51.36	1.87
	6.00	28.32	0.92	1.40	26.05	29.48	95.7%	0.88	47.28	1.81
	6.05	25.85	0.95	1.35	24.67	26.97	87.6%	0.91	45.82	1.86
	6.10	25.39	0.92	1.30	23.39	26.45	85.9%	0.88	42.49	1.82
	6.15	25.32	0.87	1.25	22.13	26.31	85.5%	0.84	38.86	1.76
	6.20	25.24	0.83	1.20	20.86	26.18	85.0%	0.80	35.35	1.69
	6.25	25.17	0.78	1.15	19.60	26.05	84.6%	0.75	31.97	1.63
	6.30	25.09	0.73	1.10	18.35	25.91	84.1%	0.71	28.73	1.57
	6.35	25.02	0.68	1.05	17.09	25.78	83.7%	0.66	25.62	1.50
	6.40	24.95	0.64	1.00	15.84	25.64	83.3%	0.62	22.66	1.43
	6.45	24.57	0.59	0.95	14.61	25.25	82.0%	0.58	19.99	1.37
	6.50	24.20	0.55	0.90	13.39	24.86	80.7%	0.54	17.47	1.30
	6.55	23.83	0.51	0.85	12.19	24.47	79.4%	0.50	15.09	1.24
*WL*	6.60	23.41	0.47	0.80	11.00	24.03	78.0%	0.46	12.89	1.17
	6.65	22.88	0.43	0.75	9.85	23.48	76.2%	0.42	10.88	1.10
	6.70	22.31	0.39	0.70	8.72	22.90	74.4%	0.38	9.03	1.04
	6.75	21.65	0.35	0.65	7.62	22.24	72.2%	0.34	7.35	0.97
	6.80	20.00	0.33	0.60	6.55	20.57	66.8%	0.32	6.02	0.92
	6.85	19.17	0.29	0.55	5.57	19.73	64.1%	0.28	4.73	0.85
	6.90	18.34	0.25	0.50	4.64	18.89	61.4%	0.25	3.58	0.77
	6.95	17.00	0.22	0.45	3.75	17.55	57.0%	0.21	2.64	0.70
	7.00	16.55	0.18	0.40	2.91	17.10	55.5%	0.17	1.76	0.61
	7.05	14.75	0.14	0.35	2.13	15.22	49.4%	0.14	1.13	0.53
	7.10	12.46	0.12	0.30	1.44	12.84	41.7%	0.11	0.66	0.46
	7.15	9.32	0.10	0.25	0.89	9.60	31.2%	0.09	0.36	0.40
	7.20	7.61	0.06	0.20	0.47	7.79	25.3%	0.06	0.14	0.30
	7.25	4.59	0.04	0.15	0.17	4.70	15.3%	0.04	0.03	0.21
	7.30	0.33	0.05	0.10	0.02	0.39	1.3%	0.04	0.00	0.24
	7.35	0.17	0.03	0.05	0.00	0.19	0.6%	0.02	0.00	0.15
	7.40	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.25908 N -107.068998 W XS NUMBER: 1

#### SUMMARY SHEET

CALCULATED FLOW (Qc)=	12.84		RECOMMENDED INS	TREAM FLOW:
	12.89		=======================================	========
(Qm-Qc)/Qm * 100 =	-0.4	%	FLOW (CFS)	PERIOD
MEASURED WATERLINE (WLm)=	6.60	ft	=======	======
CALCULATED WATERLINE (WLc)=	6.60	ft		
(WLm-WLc)/WLm * 100 =	0.0	%		
MAX MEASURED DEPTH (Dm)=	0.80	ft		
MAX CALCULATED DEPTH (Dc)=	0.80	ft		
(Dm-Dc)/Dm * 100	0.0	%		
MEAN VELOCITY=	1.17	ft/sec		
MANNING'S N=	0.085			
SLOPE=	0.01268657	ft/ft		
.4 * Qm =	5.1	cfs		
2.5 * Qm=	32.1	cfs		
RECOMMENDATION BY:		AGENCY		DATE

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

#### LOCATION INFORMATION

STREAM NAME: XS LOCATION: XS NUMBER:	Trout Creek n 40.27077 N -	near Steamboat 107.05760 W
DATE: OBSERVERS:	25-Aug-20 R Smith, B Lo	ogan, K Scheel, T Knott
1/4 SEC: SECTION: TWP: RANGE: PM:	SW 5 3N 86W Sixth	
COUNTY: WATERSHED: DIVISION: DOW CODE:	Routt Yampa River 6 0	
USGS MAP: USFS MAP:	0 0	
SUPPLEMENTAL DATA	-	*** NOTE *** Leave TAPE WT and TENSION at defaults for data collected
TAPE WT: TENSION:	0.0106 99999	with a survey level and rod
CHANNEL PROFILE DATA	<u> </u>	
SLOPE:	0.01945946	
INPUT DATA CHECKED BY	Y:	DATE
ASSIGNED TO:		DATE

56

STREAM NAME: XS LOCATION:

Trout Creek near Steamboat 40.27077 N -107.05760 W

XS NUMBER:

# DATA POINTS=

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER	_	WETTED	WATER	AREA	Q	%
	DIST	DEPTH	DEPTH	VEL	PERIM.	DEPTH	(Am)	(Qm)	CEL
S	0.60	6.52			0.00		0.00	0.00	0.0
	1.00	6.56			0.00		0.00	0.00	0.0
	1.50	6.72			0.00		0.00	0.00	0.0
DE	1.80	6.94			0.00		0.00	0.00	0.0
BF	1.90	7.42			0.00		0.00	0.00	0.0
	2.60	7.64			0.00		0.00	0.00	0.0
	3.20	7.95			0.00		0.00	0.00	0.0
	3.60	8.05			0.00		0.00	0.00	0.0
REW	3.80 4.60	8.24			0.00		0.00	0.00	0.0
KEVV	5.50	8.30 8.35	0.05	0.37	0.00 0.90	0.05	0.00 0.05	0.00 0.02	0.0 0.1
	6.50		0.05 0.20			0.05		0.02	
	7.50	8.50 8.50		0.08 0.00	1.01 1.00	0.20	0.20 0.20	0.02	0.1 0.0
	8.50	8.50	0.20 0.20	0.07	1.00	0.20	0.20	0.00	0.0
	9.50	8.55	0.25	1.75	1.00	0.25	0.25	0.44	3.7
	10.50	8.50	0.20	1.20	1.00	0.20	0.20	0.44	2.0
	11.50	8.45	0.15	1.08	1.00	0.20	0.20	0.16	1.4
	12.50	8.65	0.35	0.11	1.02	0.15	0.15	0.10	0.3
	13.50	8.60	0.30	1.22	1.02	0.30	0.30	0.37	3.1
	14.50	8.70	0.40	1.02	1.00	0.40	0.30	0.31	2.6
	15.00	8.80	0.50	1.03	0.51	0.50	0.30	0.26	2.2
	15.50	8.60	0.30	0.58	0.54	0.30	0.15	0.09	0.7
	16.00	8.90	0.60	1.72	0.58	0.60	0.30	0.52	4.3
	16.50	8.80	0.50	1.81	0.51	0.50	0.25	0.45	3.8
	17.00	8.80	0.50	1.69	0.50	0.50	0.25	0.42	3.5
	17.50	8.80	0.50	1.46	0.50	0.50	0.25	0.42	3.1
	18.00	8.95	0.65	1.26	0.52	0.65	0.33	0.41	3.4
	18.50	8.90	0.60	2.38	0.50	0.60	0.30	0.71	6.0
	19.00	8.85	0.55	2.40	0.50	0.55	0.38	0.66	5.5
	19.50	8.85	0.55	1.92	0.50	0.55	0.28	0.53	4.4
	20.00	8.90	0.60	2.15	0.50	0.60	0.30	0.65	5.4
	20.50	8.85	0.55	2.21	0.50	0.55	0.28	0.61	5.1
	21.00	8.80	0.50	1.20	0.50	0.50	0.25	0.30	2.5
	21.50	8.70	0.40	1.78	0.51	0.40	0.20	0.36	3.0
	22.00	8.65	0.35	2.28	0.50	0.35	0.26	0.60	5.0
	23.00	8.75	0.45	1.82	1.00	0.45	0.45	0.82	6.9
	24.00	8.65	0.35	1.32	1.00	0.35	0.35	0.46	3.9
	25.00	8.60	0.30	1.78	1.00	0.30	0.30	0.53	4.5
	26.00	8.60	0.30	0.77	1.00	0.30	0.30	0.23	1.9
	27.00	8.60	0.30	1.05	1.00	0.30	0.30	0.32	2.6
	28.00	8.65	0.35	0.78	1.00	0.35	0.35	0.27	2.3
	29.00	8.65	0.35	0.17	1.00	0.35	0.35	0.06	0.5
	30.00	8.60	0.30	0.68	1.00	0.30	0.30	0.20	1.7
	31.00	8.60	0.30	1.24	1.00	0.30	0.30	0.37	3.1
	32.00	8.60	0.30	0.41	1.00	0.30	0.36	0.15	1.2
_EW	33.40	8.30			1.43		0.00	0.00	0.0
	34.10	8.13			0.00		0.00	0.00	0.0
	34.70	7.97			0.00		0.00	0.00	0.0
	35.90	7.81			0.00		0.00	0.00	0.0
	36.40	8.03			0.00		0.00	0.00	0.0
	37.00	7.80			0.00		0.00	0.00	0.0
	38.00	7.51			0.00		0.00	0.00	0.0
	40.00	7.51			0.00		0.00	0.00	0.0
3F	41.10	7.40			0.00		0.00	0.00	0.0
	42.40	7.24			0.00		0.00	0.00	0.0
3	44.40	7.20			0.00		0.00	0.00	0.0
Τ0	TALS				29.08	0.65	9.47	11.93	100.0

(Max.) Manning's n =

0.0779

Manning's n = 0.0779 Hydraulic Radius= 0.325696333

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.27077 N -107.05760 W XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER	MEAS	COMP	AREA
LINE	AREA	AREA	ERROR
	9.47	9.47	0.0%
8.05	9.47	16.99	79.4%
8.07	9.47	16.38	72.9%
8.09	9.47	15.76	66.5%
8.11	9.47	15.15	60.0%
8.13	9.47	14.54	53.6%
8.15	9.47	13.94	47.2%
8.17	9.47	13.33	40.8%
8.19	9.47	12.73	34.4%
8.21	9.47	12.13	28.1%
8.23	9.47	11.53	21.7%
8.25	9.47	10.93	15.4%
8.26	9.47	10.64	12.3%
8.27	9.47	10.34	9.2%
8.28	9.47	10.05	6.1%
8.29	9.47	9.76	3.1%
8.30	9.47	9.47	0.0%
8.31	9.47	9.18	-3.0%
8.32	9.47	8.90	-6.0%
8.33	9.47	8.62	-9.0%
8.34	9.47	8.34	-12.0%
8.35	9.47	8.06	-14.9%
8.37	9.47	7.51	-20.7%
8.39	9.47	6.96	-26.5%
8.41	9.47	6.42	-32.2%
8.43	9.47	5.88	-37.9%
8.45	9.47	5.35	-43.5%
8.47	9.47	4.83	-49.0%
8.49	9.47	4.32	-54.4%
8.51	9.47	3.84	-59.4%
8.53	9.47	3.41	-64.0%
8.55	9.47	2.99	-68.4%

WATERLINE AT ZERO AREA ERROR =

8.300

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.27077 N -107.05760 W

XS NUMBER: Constant Manning's n

*GL* = lowest Grassline elevation corrected for sag
*WL* = Waterline corrected for variations in field measured water surface elevations and sag STAGING TABLE

•	DIST TO	TOP	AVG.	MAX.		WETTED	PERCENT	HYDR		AVG.
	WATER	WIDTH	DEPTH	DEPTH	AREA	PERIM.	WET PERIM	RADIUS	FLOW	VELOCITY
-	(FT)	(FT)	(FT)	(FT)	(SQ FT)	(FT)	(%)	(FT)	(CFS)	(FT/SEC)
*GL*	7.42	39.00	0.99	1.53	38.67	39.66	100.0%	0.98	101.24	2.62
	7.45	38.60	0.97	1.50	37.51	39.26	99.0%	0.96	96.87	2.58
	7.50	37.95	0.94	1.45	35.60	38.59	97.3%	0.92	89.79	2.52
	7.55	35.55	0.95	1.40	33.79	36.18	91.2%	0.93	85.95	2.54
	7.60	35.22	0.91	1.35	32.02	35.83	90.3%	0.89	79.09	2.47
	7.65	34.90	0.87	1.30	30.27	35.50	89.5%	0.85	72.46	2.39
	7.70	34.63	0.82	1.25	28.53	35.21	88.8%	0.81	66.01	2.31
	7.75	34.36	0.78	1.20	26.81	34.92	88.0%	0.77	59.82	2.23
	7.80	34.09	0.74	1.15	25.09	34.63	87.3%	0.72	53.89	2.15
	7.85	33.47	0.70	1.10	23.40	33.98	85.7%	0.69	48.59	2.08
	7.90	32.76	0.66	1.05	21.75	33.23	83.8%	0.65	43.64	2.01
	7.95	32.04	0.63	1.00	20.13	32.48	81.9%	0.62	38.95	1.93
	8.00	31.33	0.59	0.95	18.54	31.74	80.0%	0.58	34.50	1.86
	8.05	30.80	0.55	0.90	16.99	31.19	78.6%	0.54	30.18	1.78
	8.10	30.56	0.51	0.85	15.46	30.92	78.0%	0.50	25.92	1.68
	8.15	30.31	0.46	0.80	13.94	30.64	77.3%	0.45	21.94	1.57
	8.20	30.05	0.41	0.75	12.43	30.36	76.5%	0.41	18.24	1.47
	8.25	29.67	0.37	0.70	10.93	29.96	75.5%	0.36	14.86	1.36
*WL*	8.30	28.80	0.33	0.65	9.47	29.08	73.3%	0.33	11.93	1.26
	8.35	27.67	0.29	0.60	8.06	27.94	70.4%	0.29	9.37	1.16
	8.40	27.10	0.25	0.55	6.69	27.36	69.0%	0.24	6.96	1.04
	8.45	26.53	0.20	0.50	5.35	26.78	67.5%	0.20	4.86	0.91
	8.50	22.72	0.18	0.45	4.07	22.95	57.9%	0.18	3.42	0.84
	8.55	20.23	0.15	0.40	2.99	20.46	51.6%	0.15	2.21	0.74
	8.60	15.75	0.13	0.35	1.99	15.96	40.2%	0.12	1.33	0.67
	8.65	9.79	0.14	0.30	1.33	9.97	25.1%	0.13	0.92	0.70
	8.70	7.58	0.12	0.25	0.90	7.73	19.5%	0.12	0.57	0.63
	8.75	5.88	0.10	0.20	0.56	5.98	15.1%	0.09	0.31	0.55
	8.80	4.17	0.07	0.15	0.28	4.24	10.7%	0.07	0.12	0.44
	8.85	2.67	0.04	0.10	0.10	2.71	6.8%	0.04	0.03	0.30
	8.90	0.67	0.03	0.05	0.02	0.68	1.7%	0.02	0.00	0.23
	8.95	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.27077 N -107.05760 W XS NUMBER: 2

#### SUMMARY SHEET

1.93 cfs 0.0 % 3.30 ft 3.30 ft 0.0 % 0.65 ft 0.05 ft 0.078 1.26 ft/sec 078 5946 ft/ft 4.8 cfs 29.8 cfs	,	FLOW (C		PERIOI	
3.30 ft 3.30 ft 0.0 % 0.65 ft 0.65 ft 0.0 % 1.26 ft/sec 078 5946 ft/ft 4.8 cfs	,				
3.30 ft 0.0 % 0.65 ft 0.65 ft 0.0 % 1.26 ft/sec 078 5946 ft/ft 4.8 cfs	,				
3.30 ft 0.0 % 0.65 ft 0.65 ft 0.0 % 1.26 ft/sec 078 5946 ft/ft 4.8 cfs					==
0.0 % 0.65 ft 0.65 ft 0.0 % 1.26 ft/sec 0.078 5946 ft/ft 4.8 cfs	<b>,</b>				
0.65 ft 0.65 ft 0.0 % 1.26 ft/sec 078 5946 ft/ft 4.8 cfs					
0.65 ft 0.0 % 1.26 ft/sec 078 5946 ft/ft 4.8 cfs	,				
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1.26 ft/sec 078 5946 ft/ft 4.8 cfs	;				
078 5946 ft/ft 4.8 cfs	;				
078 5946 ft/ft 4.8 cfs					
5946 ft/ft 4.8 cfs					
29.8 cts					
,	GENCY			DATE:	
<i>F</i>	OLINO I			DATE	
			AGENCY	AGENCY	AGENCY

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

#### LOCATION INFORMATION

STREAM NAME: XS LOCATION: XS NUMBER:	Trout Creek r 40.28930 N - 3	near Steamboat 107.04340 W
DATE: OBSERVERS:	25-Aug-20 R Smith, B Lo	ogan, K Scheel, T Knott
1/4 SEC: SECTION: TWP: RANGE: PM:	SW 5 3N 86W Sixth	
COUNTY: WATERSHED: DIVISION: DOW CODE:	Routt Yampa River 6 0	
USGS MAP: USFS MAP:	0	
SUPPLEMENTAL DATA	=	*** NOTE *** Leave TAPE WT and TENSION at defaults for data collected
TAPE WT: TENSION:	0.0106 99999	with a survey level and rod
CHANNEL PROFILE DATA	<u>\</u>	
SLOPE:	0.01361257	
INPUT DATA CHECKED B	Y:	DATE
ASSIGNED TO:		DATE

STREAM NAME: XS LOCATION:

Trout Creek near Steamboat 40.28930 N -107.04340 W

XS NUMBER:

# DATA POINTS=

43

#### VALUES COMPUTED FROM RAW FIELD DATA

S BF REW	1.00 1.50 2.00 2.30 3.30 5.50 6.50 7.50 8.50 9.00 9.50 10.00 11.50 12.00 12.50 13.00 13.50	2.34 2.68 2.72 2.99 3.94 4.04 4.24 4.29 4.54 4.59 4.54 4.54 4.54 4.54 4.54 4.5	0.20 0.25 0.50 0.25 0.55 0.50 0.50	0.05 1.11 1.09 1.66 1.64 1.95	9ERIM.  0.00 0.00 0.00 0.00 0.00 0.00 1.02 1.00 1.03 0.56 0.58 0.50	0.20 0.25 0.50 0.25 0.55 0.55	(Am)  0.00 0.00 0.00 0.00 0.00 0.00 0.20 0.25 0.38 0.13 0.28 0.25	(Qm)  0.00 0.00 0.00 0.00 0.00 0.00 0.01 0.28 0.41 0.21 0.45	0.0 0.0 0.0 0.0 0.0 0.0 0.1 2.3 3.3 1.7
BF	1.50 2.00 2.30 3.30 5.50 6.50 7.50 8.50 9.00 9.50 10.00 11.50 11.50 12.00 12.50 13.00	2.68 2.72 2.99 3.94 4.04 4.24 4.29 4.54 4.59 4.54 4.54 4.54 4.54 4.54	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	0.00 0.00 0.00 0.00 0.00 1.02 1.00 1.03 0.56 0.58 0.50	0.25 0.50 0.25 0.55 0.50	0.00 0.00 0.00 0.00 0.00 0.20 0.25 0.38 0.13 0.28	0.00 0.00 0.00 0.00 0.00 0.01 0.28 0.41 0.21	0.0 0.0 0.0 0.0 0.1 2.3 3.3
BF	1.50 2.00 2.30 3.30 5.50 6.50 7.50 8.50 9.00 9.50 10.00 11.50 11.50 12.00 12.50 13.00	2.68 2.72 2.99 3.94 4.04 4.24 4.29 4.54 4.59 4.54 4.54 4.54 4.54 4.54	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	0.00 0.00 0.00 0.00 0.00 1.02 1.00 1.03 0.56 0.58 0.50	0.25 0.50 0.25 0.55 0.50	0.00 0.00 0.00 0.00 0.00 0.20 0.25 0.38 0.13 0.28	0.00 0.00 0.00 0.00 0.00 0.01 0.28 0.41 0.21	0.0 0.0 0.0 0.0 0.1 2.3 3.3
	2.00 2.30 3.30 5.50 6.50 7.50 8.50 9.00 9.50 10.00 11.50 11.50 12.00 12.50 13.00	2.72 2.99 3.94 4.04 4.24 4.29 4.54 4.59 4.54 4.54 4.54 4.54 4.54	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	0.00 0.00 0.00 0.00 1.02 1.00 1.03 0.56 0.58	0.25 0.50 0.25 0.55 0.50	0.00 0.00 0.00 0.00 0.20 0.25 0.38 0.13 0.28	0.00 0.00 0.00 0.00 0.01 0.28 0.41 0.21 0.45	0.0 0.0 0.0 0.1 2.3 3.3
	2.30 3.30 5.50 6.50 7.50 8.50 9.00 9.50 10.00 11.50 11.50 12.00 13.00	2.99 3.94 4.04 4.24 4.29 4.54 4.29 4.59 4.54 4.54 4.54 4.54 4.54 4.39	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	0.00 0.00 0.00 1.02 1.00 1.03 0.56 0.58	0.25 0.50 0.25 0.55 0.50	0.00 0.00 0.00 0.20 0.25 0.38 0.13 0.28	0.00 0.00 0.00 0.01 0.28 0.41 0.21	0.0 0.0 0.1 2.3 3.3
	3.30 5.50 6.50 7.50 8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00	3.94 4.04 4.24 4.29 4.54 4.29 4.59 4.54 4.54 4.54 4.54	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	0.00 0.00 1.02 1.00 1.03 0.56 0.58	0.25 0.50 0.25 0.55 0.50	0.00 0.00 0.20 0.25 0.38 0.13 0.28	0.00 0.00 0.01 0.28 0.41 0.21	0.0 0.0 0.1 2.3 3.3
REW	5.50 6.50 7.50 8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 13.00	4.04 4.24 4.29 4.54 4.29 4.59 4.54 4.54 4.54 4.54 4.39	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	0.00 1.02 1.00 1.03 0.56 0.58 0.50	0.25 0.50 0.25 0.55 0.50	0.00 0.20 0.25 0.38 0.13 0.28	0.00 0.01 0.28 0.41 0.21 0.45	0.0 0.1 2.3 3.3 1.7
TXL VV	6.50 7.50 8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 13.00	4.24 4.29 4.54 4.29 4.59 4.54 4.54 4.54 4.54 4.39	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	1.02 1.00 1.03 0.56 0.58 0.50	0.25 0.50 0.25 0.55 0.50	0.20 0.25 0.38 0.13 0.28	0.01 0.28 0.41 0.21 0.45	0.1 2.3 3.3 1.7
	7.50 8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00	4.29 4.54 4.29 4.59 4.54 4.54 4.54 4.54 4.39	0.25 0.50 0.25 0.55 0.50 0.50	1.11 1.09 1.66 1.64 1.95 1.76	1.00 1.03 0.56 0.58 0.50	0.25 0.50 0.25 0.55 0.50	0.25 0.38 0.13 0.28	0.28 0.41 0.21 0.45	2.3 3.3 1.5
	8.50 9.00 9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00	4.54 4.29 4.59 4.54 4.54 4.54 4.54 4.39	0.50 0.25 0.55 0.50 0.50 0.50	1.09 1.66 1.64 1.95 1.76	1.03 0.56 0.58 0.50	0.50 0.25 0.55 0.50	0.38 0.13 0.28	0.41 0.21 0.45	3.1 1.1
	9.00 9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00	4.29 4.59 4.54 4.54 4.54 4.54 4.39	0.25 0.55 0.50 0.50 0.50	1.66 1.64 1.95 1.76	0.56 0.58 0.50	0.25 0.55 0.50	0.13 0.28	0.21 0.45	1.3
	9.50 10.00 10.50 11.00 11.50 12.00 12.50 13.00	4.59 4.54 4.54 4.54 4.54 4.39	0.55 0.50 0.50 0.50	1.64 1.95 1.76	0.58 0.50	0.55 0.50	0.28	0.45	
	10.00 10.50 11.00 11.50 12.00 12.50 13.00	4.54 4.54 4.54 4.54 4.39	0.50 0.50 0.50	1.95 1.76	0.50	0.50			٥.
	10.50 11.00 11.50 12.00 12.50 13.00	4.54 4.54 4.54 4.39	0.50 0.50	1.76				0.40	4 /
	11.00 11.50 12.00 12.50 13.00	4.54 4.54 4.39	0.50		0.50	0.50		0.49	4.0
	11.50 12.00 12.50 13.00	4.54 4.39			0.50	0.50	0.25	0.44	3.0
	12.00 12.50 13.00	4.39	0.50	2.07	0.50	0.50	0.25	0.52	4.:
	12.50 13.00			2.65	0.50	0.50	0.25	0.66	5.
	13.00		0.35	1.74	0.52	0.35	0.18	0.30	2.
			0.45	1.70	0.51	0.45	0.23	0.38	3.
	13.50	4.44	0.40	2.05	0.50	0.40	0.20	0.41	3.
		4.49	0.45	1.02	0.50	0.45	0.23	0.23	1.
	14.00	4.54	0.50	2.02	0.50	0.50	0.25	0.51	4.
	14.50	4.49	0.45	1.62	0.50	0.45	0.23	0.36	3.
	15.00	4.64	0.60	1.24	0.52	0.60	0.30	0.37	3.
	15.50	4.69	0.65	2.06	0.50	0.65	0.33	0.67	5.
	16.00	4.64	0.60	2.14	0.50	0.60	0.30	0.64	5.
	16.50	4.64	0.60	2.42	0.50	0.60	0.30	0.73	5.
	17.00	4.54	0.50	2.02	0.51	0.50	0.25	0.51	4.
	17.50	4.59	0.55	1.77	0.50	0.55	0.28	0.49	4.
	18.00	4.49	0.45	1.91	0.51	0.45	0.23	0.43	3.
	18.50	4.54	0.50	1.97	0.50	0.50	0.25	0.49	4.
	19.00	4.54	0.50	0.75	0.50	0.50	0.38	0.28	2.
	20.00	4.54	0.50	1.33	1.00	0.50	0.50	0.67	5.
	21.00	4.39	0.35	1.27	1.01	0.35	0.35	0.44	3.
	22.00	4.34	0.30	0.81	1.00	0.30	0.30	0.24	2.
	23.00	4.44	0.40	0.49	1.00	0.40	0.40	0.20	1.
	24.00	4.44	0.40	0.59	1.00	0.40	0.40	0.24	1.
	25.00	4.39	0.35	0.08	1.00	0.35	0.35	0.03	0.
	26.00	4.24	0.20	0.90	1.01	0.20	0.20	0.18	1.
	27.00	4.19	0.15	0.05	1.00	0.15	0.15	0.01	0.
LEW	28.00	4.05			1.01		0.00	0.00	0.
	28.50	3.72			0.00		0.00	0.00	0.
	29.00	3.44			0.00		0.00	0.00	0.
BF	29.70	2.98			0.00		0.00	0.00	0.
S	30.50	2.62			0.00		0.00	0.00	0.
TOTA					22.83	0.65	8.78	12.26	100.

1

(Max.)

Manning's n = Hydraulic Radius=

0.0656 0.384346102

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.28930 N -107.04340 W XS NUMBER: 3

WATER LINE COMPARISON TABLE

#### WATER **MEAS** COMP AREA LINE AREA **ERROR** AREA 8.78 8.67 -1.2% 3.80 8.78 14.78 68.5% 8.78 3.82 14.28 62.7% 8.78 57.0% 3.84 13.77 3.86 8.78 13.27 51.3% 3.88 8.78 12.77 45.5% 3.90 8.78 12.27 39.8% 3.92 8.78 11.77 34.2% 3.94 8.78 11.27 28.5% 3.96 8.78 10.78 22.8% 3.98 8.78 10.29 17.3% 4.00 8.78 9.82 11.9% 4.01 8.78 9.58 9.2% 4.02 8.78 9.35 6.6% 4.03 8.78 9.12 3.9% 4.04 8.78 8.89 1.3% 4.05 8.78 8.67 -1.2% 4.06 8.78 8.44 -3.8% 4.07 8.78 8.22 -6.3% 8.78 4.08 8.00 -8.9% 8.78 4.09 7.78 -11.4% 4.10 8.78 7.56 -13.9% 8.78 -18.8% 4.12 7.12 4.14 8.78 -23.7% 6.69 4.16 8.78 6.27 -28.6% 8.78 5.84 -33.4% 4.18 4.20 8.78 5.43 -38.1%

WATERLINE AT ZERO AREA ERROR =

8.78

8.78

8.78

8.78

8.78

5.02

4.62

4.24

3.86

3.49

4.22

4.24

4.26

4.28

4.30

4.040

-42.8%

-47.3%

-51.7% -56.0%

-60.2%

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.28930 N -107.04340 W XS NUMBER: 3

XS NUMBER: 3 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	TOP	AVG.	MAX.		WETTED	PERCENT	HYDR		AVG.
	WATER	WIDTH	DEPTH	DEPTH	AREA	PERIM.	WET PERIM	RADIUS	FLOW	VELOCITY
_	(FT)	(FT)	(FT)	(FT)	(SQ FT)	(FT)	(%)	(FT)	(CFS)	(FT/SEC)
*GL*	2.99	27.38	1.31	1.70	35.98	28.40	100.0%	1.27	111.34	3.09
	3.04	27.26	1.27	1.65	34.60	28.24	99.4%	1.23	104.76	3.03
	3.09	27.13	1.23	1.60	33.24	28.08	98.8%	1.18	98.37	2.96
	3.14	27.00	1.18	1.55	31.89	27.91	98.3%	1.14	92.15	2.89
	3.19	26.87	1.14	1.50	30.54	27.75	97.7%	1.10	86.09	2.82
	3.24	26.74	1.09	1.45	29.20	27.59	97.1%	1.06	80.20	2.75
	3.29	26.61	1.05	1.40	27.87	27.42	96.5%	1.02	74.49	2.67
	3.34	26.48	1.00	1.35	26.54	27.26	96.0%	0.97	68.94	2.60
	3.39	26.35	0.96	1.30	25.22	27.09	95.4%	0.93	63.57	2.52
	3.44	26.23	0.91	1.25	23.91	26.93	94.8%	0.89	58.38	2.44
	3.49	26.08	0.87	1.20	22.60	26.76	94.2%	0.84	53.39	2.36
	3.54	25.94	0.82	1.15	21.30	26.58	93.6%	0.80	48.58	2.28
	3.59	25.80	0.78	1.10	20.01	26.41	93.0%	0.76	43.96	2.20
	3.64	25.66	0.73	1.05	18.72	26.23	92.3%	0.71	39.52	2.11
	3.69	25.52	0.68	1.00	17.44	26.06	91.7%	0.67	35.28	2.02
	3.74	25.38	0.64	0.95	16.17	25.89	91.1%	0.62	31.23	1.93
	3.79	25.25	0.59	0.90	14.90	25.72	90.6%	0.58	27.38	1.84
	3.84	25.12	0.54	0.85	13.64	25.56	90.0%	0.53	23.73	1.74
	3.89	24.99	0.50	0.80	12.39	25.40	89.4%	0.49	20.30	1.64
	3.94	24.86	0.45	0.75	11.14	25.23	88.8%	0.44	17.09	1.53
	3.99	23.69	0.42	0.70	9.93	24.04	84.6%	0.41	14.56	1.47
*WL*	4.04	22.51	0.39	0.65	8.77	22.85	80.4%	0.38	12.26	1.40
	4.09	21.96	0.35	0.60	7.66	22.28	78.5%	0.34	9.94	1.30
	4.14	21.35	0.31	0.55	6.58	21.67	76.3%	0.30	7.86	1.19
	4.19	20.74	0.27	0.50	5.53	21.05	74.1%	0.26	5.99	1.08
	4.24	19.49	0.23	0.45	4.52	19.79	69.7%	0.23	4.46	0.99
	4.29	18.16	0.20	0.40	3.58	18.46	65.0%	0.19	3.17	0.89
	4.34	17.44	0.15	0.35	2.69	17.70	62.3%	0.15	2.02	0.75
	4.39	15.22	0.12	0.30	1.87	15.44	54.4%	0.12	1.21	0.65
	4.44	11.59	0.10	0.25	1.18	11.76	41.4%	0.10	0.67	0.57
	4.49	9.45	0.07	0.20	0.65	9.57	33.7%	0.07	0.29	0.44
	4.54	3.66	0.07	0.15	0.25	3.71	13.1%	0.07	0.11	0.44
	4.59	1.91	0.06	0.10	0.11	1.93	6.8%	0.06	0.04	0.39
	4.64	1.00	0.02	0.05	0.02	1.00	3.5%	0.02	0.01	0.22

STREAM NAME: Trout Creek near Steamboat XS LOCATION: 40.28930 N -107.04340 W XS NUMBER: 3

#### SUMMARY SHEET

MEASURED FLOW (Qm)=	12.26		RECOMMENDED INS	TREAM FLOW:
CALCULATED FLOW (Qc)=	12.26		===========	========
(Qm-Qc)/Qm * 100 =	0.1	%	FLOW (CFS)	PERIOD
MEASURED WATERLINE (WLm)=	4.05	ft	======================================	PERIOD =======
CALCULATED WATERLINE (WLc)=	4.04			
(WLm-WLc)/WLm * 100 =	0.1			
(112 1123), 112	0	,,		
MAX MEASURED DEPTH (Dm)=	0.65	ft		
MAX CALCULATED DEPTH (Dc)=	0.65	ft		
(Dm-Dc)/Dm * 100	0.0	%		
MEAN VELOCITY=	1.40	ft/sec		
MANNING'S N=	0.066			
SLOPE=	0.01361257	ft/ft		
.4 * Qm =	4.9	cfs		
2.5 * Qm=	30.7			
RATIONALE FOR RECOMMENDATION:				
		AGENCY		DATE: