United States Department of the Interior
BUREAU OF LAND MANAGEMENT

Colorado State Office
Denver Federal Center, Building 40
Lakewood, Colorado 80225
www.blm.gov/colorado

In Reply Refer To:
CO-932 (7250)

Mr. Rob Viehl
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Mr. Viehl:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an instream flow water right on Goat Creek, located in Water Division 4.

Location and Land Status. Goat Creek originates on the east flank of Lone Cone, approximately eight miles southeast of Miramonte Reservoir. Goat Creek flows into Beaver Creek approximately eight miles east of Miramonte Reservoir. This recommendation addresses Goat Creek from the confluence with Galloway Creek to the confluence with Beaver Creek, a distance of approximately 2.0 miles. The BLM manages 0.6 miles of this reach and approximately 1.4 miles are in private ownership.

Biological Summary. Goat Creek is a cold water, high gradient stream. The reach that is the subject of this recommendation flows through a narrow valley that ranges from ¼ to ½ mile in width. The creek flows mostly through densely forested areas, but occasionally flows through meadows and wetland areas. Substrate is generally from medium to large in size, ranging from gravels to 1-foot boulders. Water quality is good for supporting cold water species. Fish surveys have documented naturally reproducing population of mottled sculpin, with a small number of speckled dace.

Goat Creek supports a healthy riparian community comprised of spruce, alder, and willow species. Bank stability appears to be good, except in areas of high livestock usage. Stream flow appears to be highly stable and is likely supported by spring discharge and well-developed beaver dam complexes. Flow rates close to bank full were noted during extreme drought conditions in 2020.

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

Cross Section Date	Discharge Rate	Top Width	Winter Flow Recommendation (meets 2 of 3 hydraulic criteria)	Summer Flow Recommendation (meets 3 of 3 hydraulic criteria)
06/30/2020 #1	0.51 cfs	6.20 feet	0.80 cfs	1.05 cfs

06/30/2020 #2	0.43 cfs	4.07 feet	0.61 cfs	0.64 cfs
05/12/2021 #1	0.63 cfs	4.50 feet	0.68 cfs	0.74 cfs
05/12/2021 #2	0.60 cfs	5.27 feet	0.35 cfs	1.39 cfs
		Averages:	0.61 cfs	0.96 cfs

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

> 0.95 cubic feet per second is recommended during the snowmelt runoff period and summer, from April 1 through June 15. This recommendation is driven by the average velocity criteria. Goat Creek has limited riffle habitat, so protecting this flow rate will ensure that the limited habitat can be fully utilized during the snowmelt period, when fish are spawning and moving actively between pools.
>
> 0.60 cubic feet per second is recommended during summer and early fall, from June 16 through October 31. This recommendation is driven by the average depth criteria. This flow rate should provide adequate physical habitat for the fish population to complete important parts of its life cycle before cold temperatures arrive.
>
> 0.35 cubic feet per second is recommended during the cold weather period from November 1 through March 31. This recommendation is driven by naturally limited water availability. This flow rate should prevent pools from completely icing and will allow the fish population to successfully overwinter.

Water Availability. BLM recommends using a variety of data sources to confirm water availability, because BLM is not aware of any historical gage data on this creek. Use of CSUFlows can provide an estimate of natural hydrology. One nearby gage may provide an estimate of the seasonality of flows, because it is located within the same watershed. USGS Gage 09173000, on Beaver Creek near Norwood, has a 40-year period of record. However, this gage data must be adjusted to reflect the large volume of water that is diverted from the Beaver Creek watershed upstream from the gage.

BLM is aware of only one water right near the proposed instream flow reach:

> Norwood Water Commission Goat Creek Pump Station – 175 cfs conditional, 2010 priority. The decreed point of diversion is located on Beaver Creek just downstream from the lower terminus of the proposed reach. Alternate points of diversion for this water right are located upstream from the proposed instream flow reach on Goat Creek and on tributaries to Goat Creek.

Relationship to Land Management Plans. The BLM Resource Management Plan calls for making instream flow recommendations to the Colorado Water Conservation Board to meet minimum instream flow requirements to maintain fisheries. The plan also calls for maintaining and improving the function of riparian areas to achieve advanced ecological stage for the riparian community, and it calls for protecting riparian and wetland systems from activities that could

degrade those habitats. Establishing an instream flow water right would assist in meeting these objectives.

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

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

Sincerely,

JOEL HUMPHRIES Digitally signed by JOEL HUMPHRIES Date: 2024.11.27 09:04:50 -07'00' for

Alan Bittner
Deputy State Director
Resources

Cc: Kevin Hyatt, Uncompahgre Field Office
Dan Ben-Horin, Uncompahgre Field Office
Stephanie McCormick, Southwest District Manager

Uncompahgre Field Office Stream Survey

May 2021

Goat Creek

Introduction:

Goat Creek is a small sized mountain stream, located to the southwest of Placerville (Figure 1). The stream is a tributary to Beaver Creek, which then flows into the San Miguel River; managed by the Uncompahgre Field Office. Goat Creek has not been surveyed in the past. Survey was conducted because of an instream flow protection recommendation submitted to the Colorado Water Conservation Board.

Method:

Goat Creek was surveyed on May 26, 2020 by Russ Japuntich, Southwest District Fish Biologist, and Justin Abeles, Fisheries Technician. The survey site location is 10.7 miles on Road M44 off of CO HWY 145 (Figure 2). One reach of the stream was shocked using one backpack shocker from the confluence of Goat Creek and Beaver Creek (Picture 1) up to the culvert on Road M44 (Picture 2) for an approximate distance of 1500 feet.

Analysis:

32 native fish were captured in the reach with one Speckled Dace (*Rhinichthys osculus*) and the rest being Mottled Sculpin (*Cottus bairdii*). The data of species, length, and weight are in Table 1. The growth stages/age classes of the surveyed Mottled Sculpin are in Figure 3.

Discussion:

32 total fish were captured fairly evenly distributed within the reach. There was quality habitat present with decent amounts of macroinvertebrates found in the nets while surveying. Lots of woody debris, pools, beaver activity, good riffle sections, and adequate bank vegetation (alder, willows, sedges, equisetum, bull rushes, rushes). Lower reach was mainly silty with beaver activity gradually changing into a B channel on the upper part of the reach with large rocks and woody material. Water was at peak or close to peak flow with Mottled Sculpin (of varying size classes) found throughout the entire survey reach. One Speckled Dace (Picture 3) with spawning colors was found in the reach. Survey was conducted from the confluence of Goat Creek and Beaver Creek up to the culvert on the M44 Road. The culvert (Picture 4) was slightly

elevated above the creek (about an inch or two) and during low flow could potentially cause difficulty for fish passage. Shocking was conducted above the culvert outside of the survey to see if there was any presence of fish. One small ~40mm Mottled Sculpin was found above the culvert.

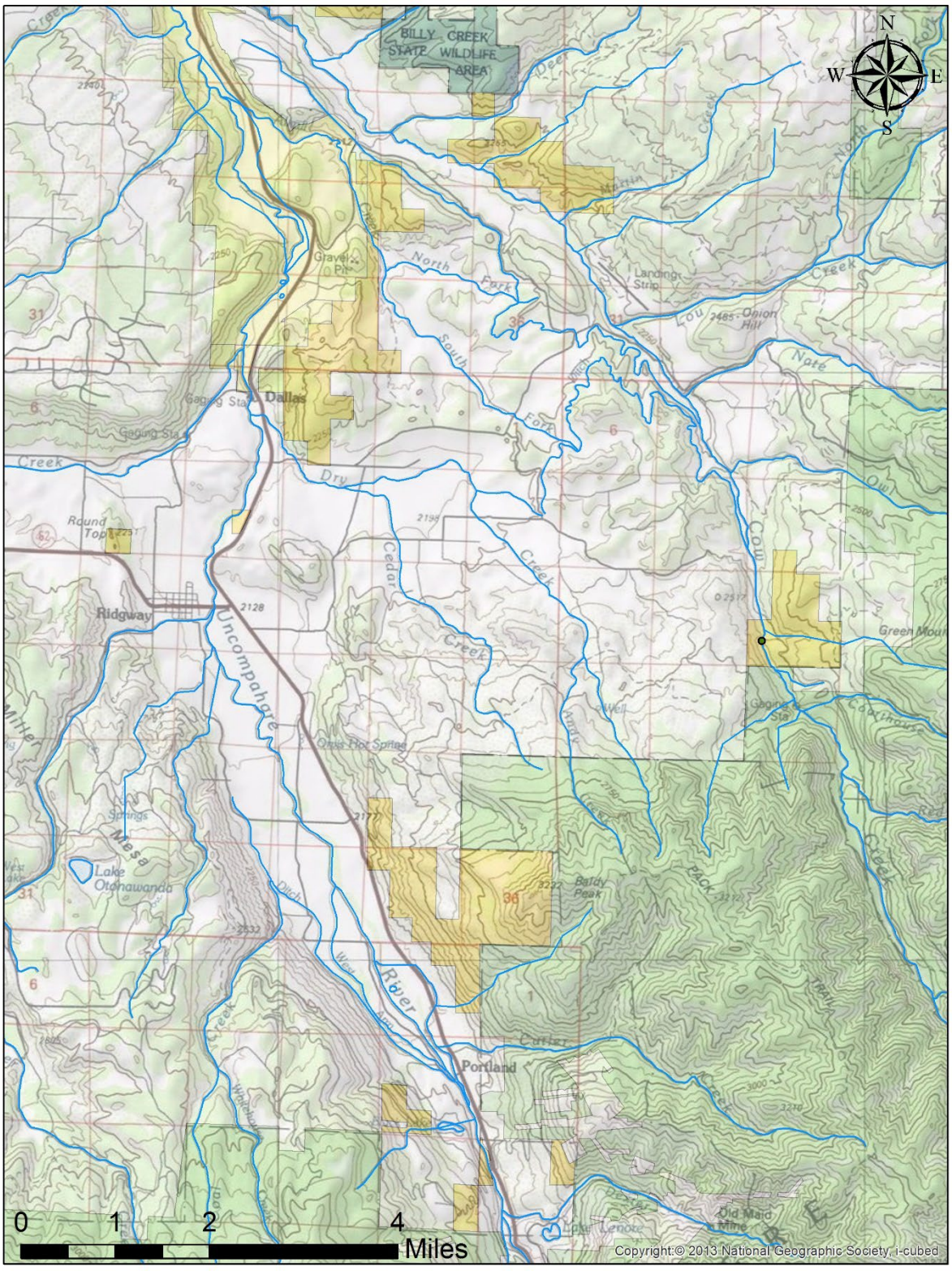


Figure 1: Shows survey location in relation to Placerville.

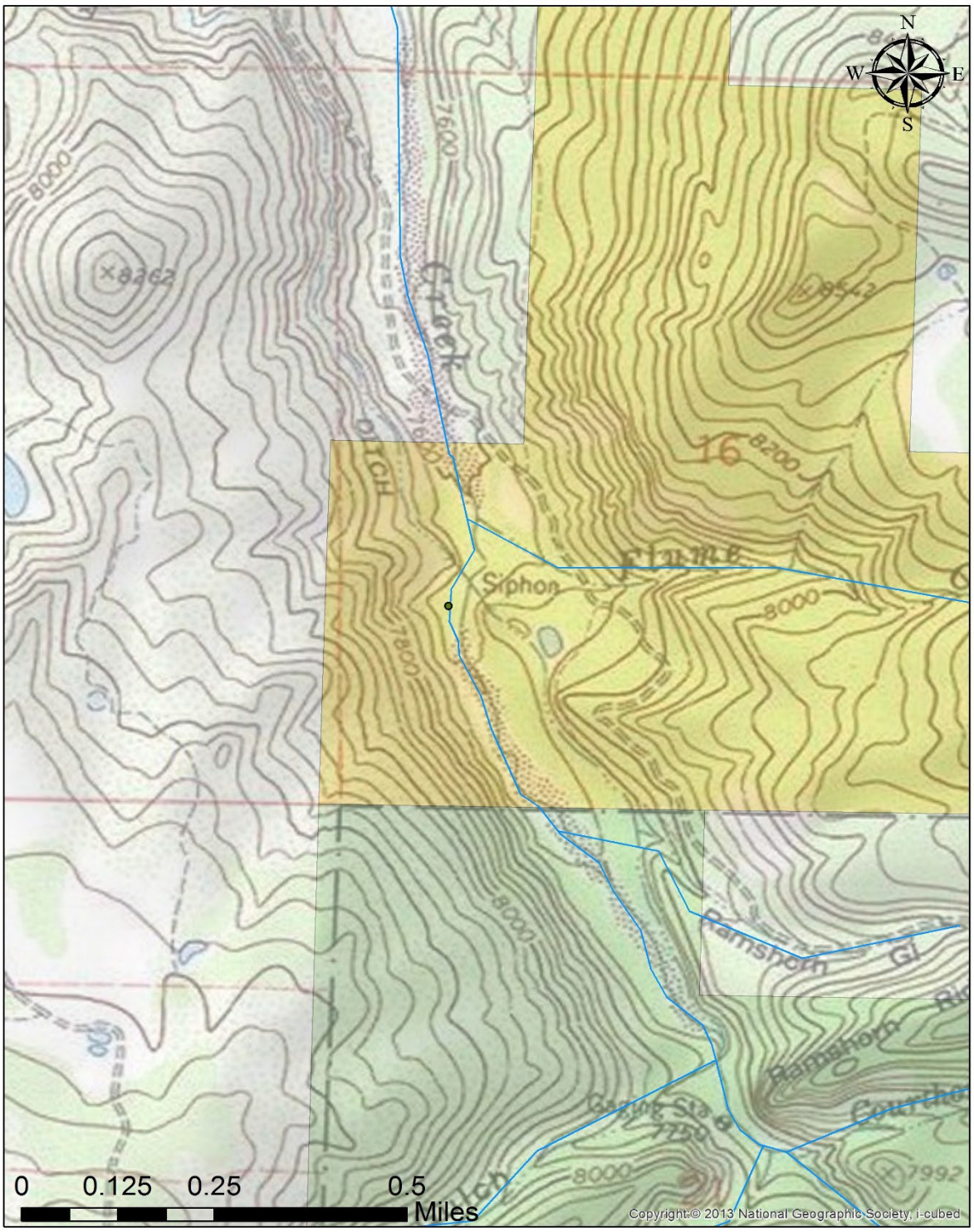


Figure 2: Survey location on Goat Creek. Bottom UTM: 12S 746223 4206314, Top UTM: 746166 4205906

Picture 1: Bottom of reach with UTMS.

Picture 2: Top of reach with UTMs.

#	Pass	Species	Length	Weight
1	1	MTS	125	24
2	1	MTS	101	13
3	1	MTS	128	23
4	1	MTS	91	10
5	1	MTS	115	19
6	1	MTS	97	12
7	1	MTS	92	11
8	1	MTS	104	17
9	1	MTS	103	19
10	1	MTS	99	17
11	1	MTS	86	7
12	1	MTS	95	9
13	1	MTS	69	2
14	1	MTS	96	8
15	1	MTS	72	3
16	1	MTS	97	10
17	1	SPD	92	8
18	1	MTS	79	5

19	1	MTS	70	4
20	1	MTS	66	2
21	1	MTS	62	2
22	1	MTS	84	6
23	1	MTS	61	2
24	1	MTS	90	6
25	1	MTS	85	5
26	1	MTS	73	4
27	1	MTS	51	1
28	1	MTS	40	-
29	1	MTS	75	4
30	1	MTS	63	3
31	1	MTS	72	4
32	1	MTS	42	-

Table 1: List of species, lengths, and weights from survey. SPD=Speckled Dace; MTS=Mottled Sculpin.

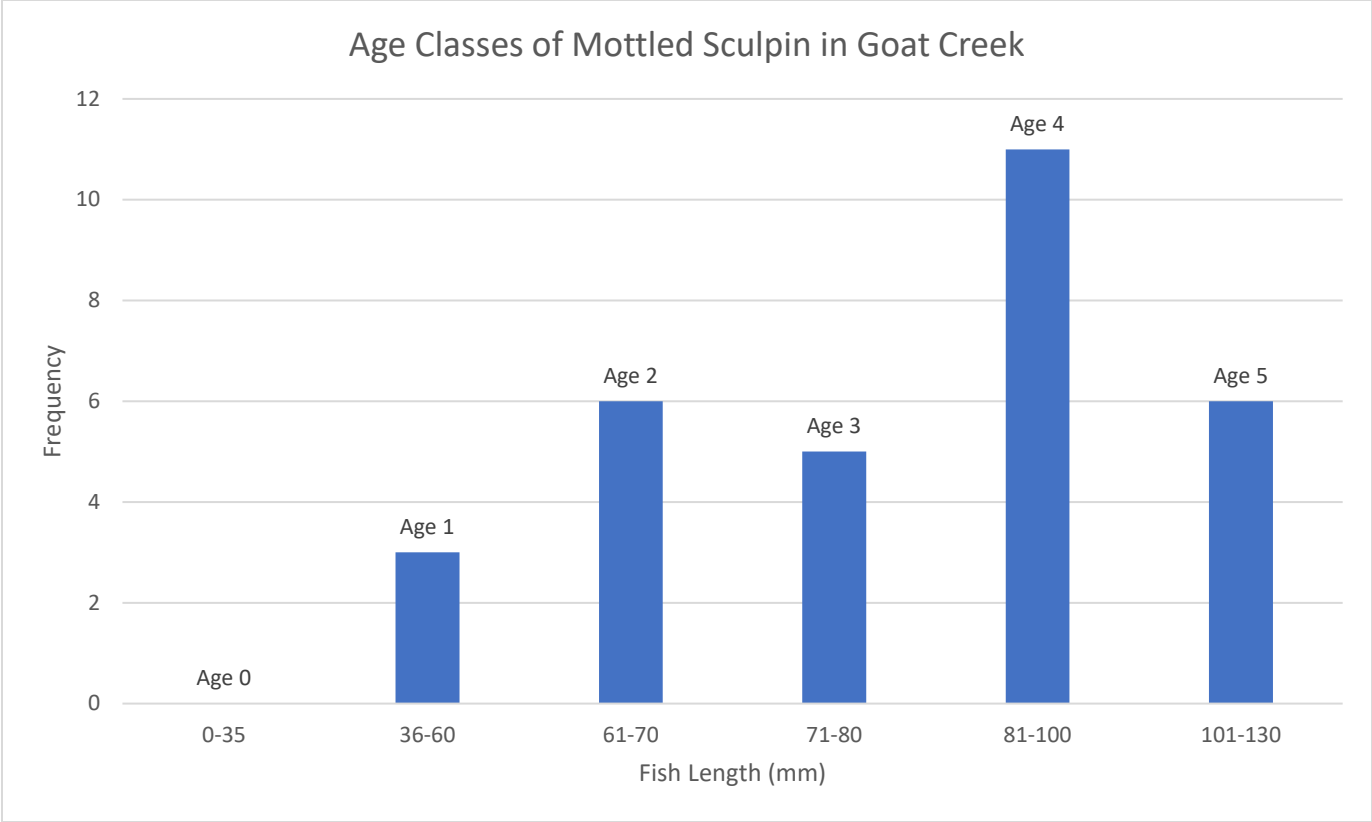
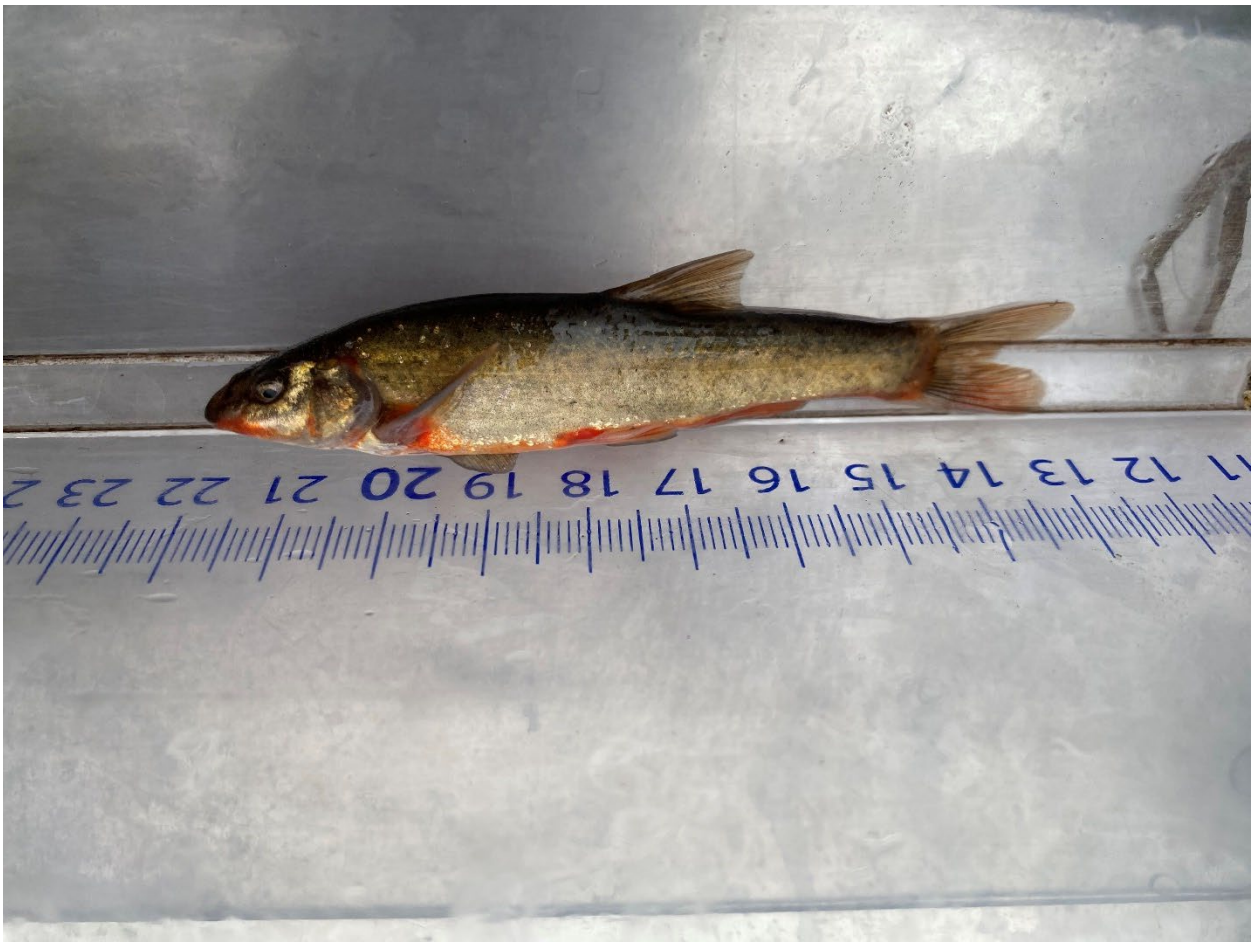


Figure 3: Age classes of Mottled Sculpin in Goat Creek.



Picture 3: Speckled Dace (*Rhinichthys osculus*) with spawning colors.

Picture 4: Culvert on Road M44 that is elevated about 1-2 inches above Goat Creek.

Pictures 5 & 6: Fisheries Tech Justin Abeles backpack shocking Goat Creek. Mottled Sculpin in survey measuring tray.

COLORADO
Department of Natural Resources

Date	5/12/2021
Observer	R Smith, J Sondergard
Cross-section#	1
Coordinate System	UTM Zone 12
X (easting)	746173
Y (northing)	4205921

R2CROSS CROSS-SECTION NOTES

Stream Name	Stream Location	Slope
Goat Creek	Approx. 80 feet downstream from Beef Trail Road Crossing	0.034

Feature	Distance From Initial Point (ft)	Rod Height (ft)	Water Depth (ft)	Velocity (ft/s)
	0	6.1		
Bankfull	5	6.45		
Waterline	5.5	6.95	0	0
	5.9	7	0.05	0
	6.2	7	0.05	0.08
	6.5	7.1	0.15	0.77
	6.7	7.25	0.3	1.86
	6.9	7.3	0.35	1.64
	7.1	7.25	0.3	1.16
	7.3	7.2	0.25	1.45
	7.5	7.25	0.3	2.01
	7.7	7.25	0.3	1.34
	7.9	7.25	0.3	0.25
	8.1	7.15	0.2	0.08
	8.3	7.2	0.25	0.06
	8.5	7.15	0.2	0.1
	8.7	7.1	0.15	0.15
Waterline	9	6.95	0	0
Bankfull	9.5	6.45		
	13.2	5.45		

COLORADO
Department of Natural Resources

Date	5/12/2021
Observer	R Smith, J Sondergard
Cross-section#	2
Coordinate System	UTM Zone 12
X (easting)	746171
Y (northing)	4205870

R2CROSS CROSS-SECTION NOTES

Stream Name	**Stream Location**	**Slope**
Goat Creek	150 feet upstream from Beef Trail Road Crossing	0.036

Feature	**Distance From Initial Point (ft)**	**Rod Height (ft)**	**Water Depth (ft)**	**Velocity (ft/s)**
	0	5.36		
Bankfull	4.4	5.92		
Waterline	4.9	6.25	0	0
	5.6	6.4	0.15	0.02
	5.8	6.55	0.3	0.46
	6	6.65	0.4	0.73
	6.2	6.65	0.4	0.86
	6.4	6.55	0.3	1.35
	6.6	6.5	0.25	0.93
	6.8	6.5	0.25	0.89
	7	6.45	0.2	1.01
	7.2	6.6	0.35	1.11
	7.4	6.6	0.35	1.02
	7.6	6.55	0.3	0.67
	7.8	6.5	0.25	0.37
	8	6.55	0.3	0.21
	8.2	6.55	0.3	0.22
	8.4	6.45	0.2	0
	8.6	6.35	0.1	0
Waterline	8.7	6.25	0	0
Bankfull	9.7	5.91		
	14.2	5.44		

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Goat Creek						CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: 250 ft. upstream from Beef Trail Road Crossing							
DATE: 6-30-20	OBSERVERS: R. Smith, J. Sondergaard						
LEGAL DESCRIPTION	¼ SECTION: SW	SECTION: 21	TOWNSHIP: 43 (N)/S	RANGE: 12 (E)/W	PM: NM		
COUNTY: San Miguel	WATERSHED: San Miguel R	WATER DIVISION: 4	DOW WATER CODE: 40345				
MAP(S): USGS: Zone 12 37.96636							
USFS: 745944 4205780 -108.20028							

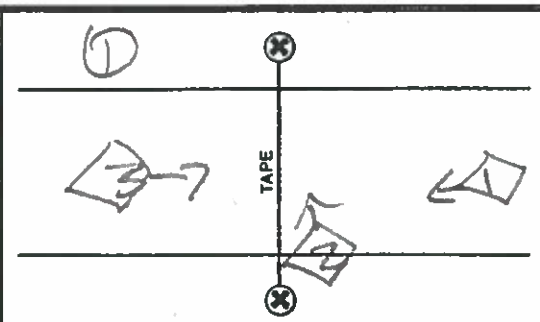
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: (YES) / NO	METER TYPE: M-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to 1-foot boulders	PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: 3		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	surveyed
⊗ Tape @ Stake RB	0.0	surveyed
① WS @ Tape LB/RB	0.0	6.25/6.25
② WS Upstream	7.8'	6.00
③ WS Downstream	10.8'	6.66
SLOPE	0.66 / 17.8' = 0.037	

SKETCH



AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/(NO)	DISTANCE ELECTROFISHED: ____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/(NO)

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

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

abundant stonefly, limited mayfly & caddisfly

COMMENTS

Strong evidence of spring-fed flow. In extreme, drought conditions, flow is only slightly below bankfull, as indicated by moss lines & vegetation. Willow - alder - spruce riparian

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:	CROSS-SECTION NO.:	DATE:	SHEET ___ OF ___
Goat Creek	1	6-30-23	

BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)	LEFT / RIGHT	Gage Reading: _____ ft	TIME: 2:00 pm

Features: Stake (S), Grassline (G), Waterline (W), Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft^2)	Discharge (cfs)
								At Point	Mean in Vertical		
RS	0.0		5.36								
G	1.8		5.80								
W	2.5		6.25								
	2.8		6.40		0.15			0.47			
	3.0		6.35		0.10			0.95			
	3.2		6.35		0.10			0.40			
	3.4		6.4		0.15			0.28			
	3.6		6.4		0.15			0			
	3.8		6.45		0.20			0.36			
	4.0		6.45		0.20			0.57			
	4.2		6.45		0.20			0.92			
	4.4		6.45		0.20			1.76			
	4.6		6.45		0.20			0.96			
	4.8		6.45		0.20			0.10			
	5.0		6.45		0.20			0.72			
	5.2		6.45		0.20			1.61			
	5.4		6.4		0.15			1.35			
	5.6		6.4		0.15			0.80			
	5.8		6.5		0.25			0.19			
	6.0		6.55		0.30			0.08			
	6.2		6.45		0.20			0.17			
	6.4		6.4		0.15			0.60			
	6.6		6.4		0.15			1.45			
	6.8		6.4		0.15			1.14			
W	7.0		6.25								
G	8.0		5.80								
LS	9.5		5.55								
TOTALS:											

End of Measurement	Time:	Gage Reading: _____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Goat Creek						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: 100 ft. downstream from Beef Trail Road Crossing						
DATE: 10-30-20	OBSERVERS: R. Smith, J. Sondergard					
LEGAL DESCRIPTION	¼ SECTION: SW	SECTION: 21	TOWNSHIP: 43(N)/S	RANGE: 12 (E)W	PM: NM	
COUNTY: San Miguel	WATERSHED: San Miguel R.	WATER DIVISION: 4	DOW WATER CODE: 40345			
MAP(S): USGS:	Zone 13 219143					
USFS:	4207067					

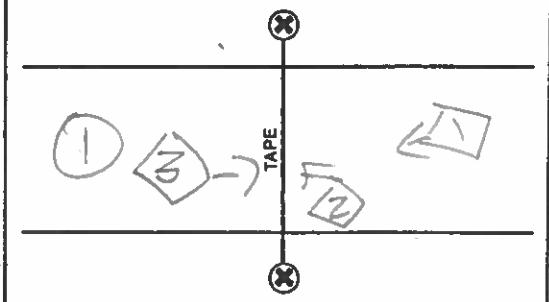
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: M-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to 2-foot boulders	PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: 3		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	surveyed
⊗ Tape @ Stake RB	0.0	surveyed
① WS @ Tape LB/RB	0.0	3.65/3.65
② WS Upstream	8.4'	3.16
③ WS Downstream	23.0'	4.12
SLOPE	0.96/31.4 = .031	

SKETCH



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

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/(NO)	DISTANCE ELECTROFISHED: ____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/(NO)

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

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

stonefly - abundant mayfly & caddisfly - a few

COMMENTS

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:	CROSS-SECTION NO.:	DATE:	SHEET ___ OF ___
Goat Creek	2	6-30-20	

BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 3:10

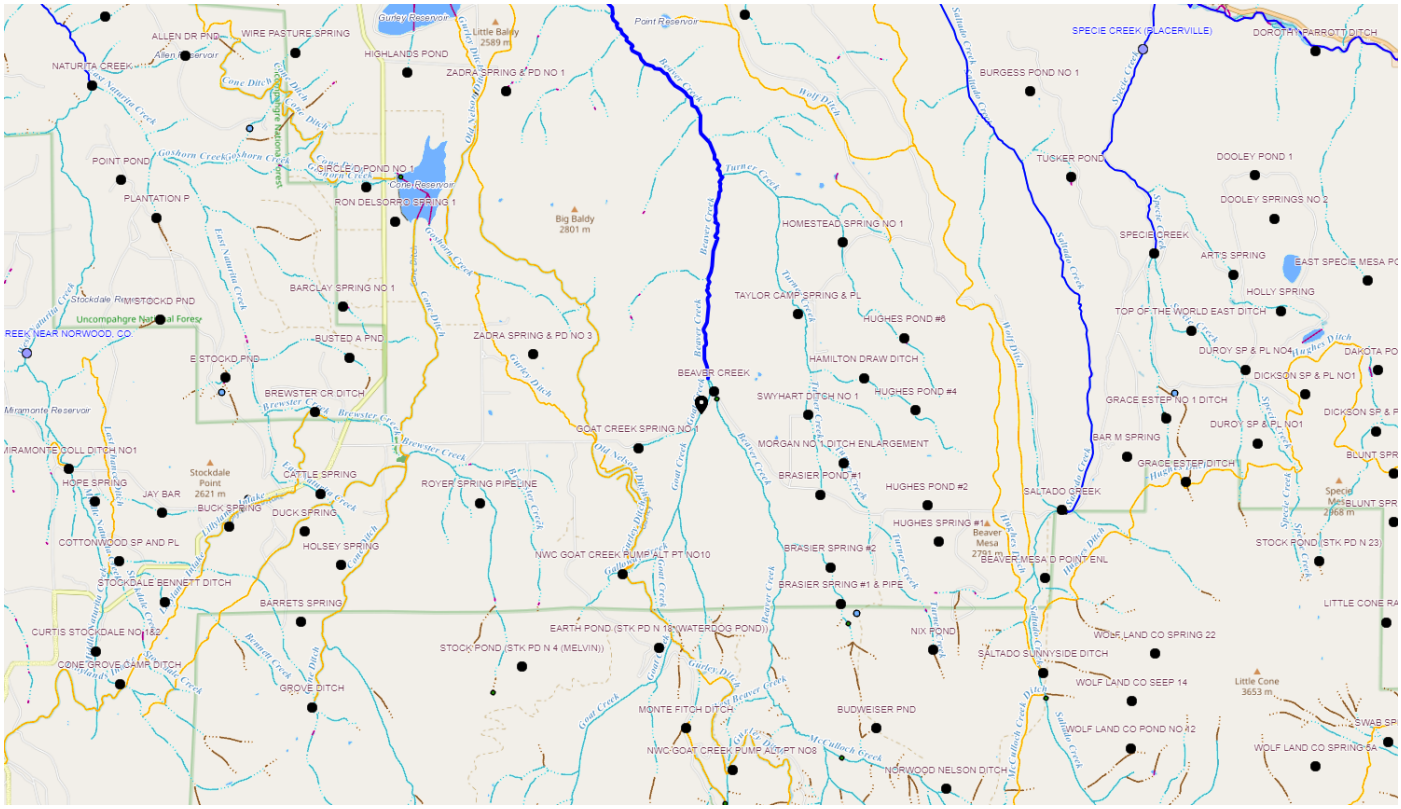
Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Obser-vation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		2.95								
G	3.4		3.36								
W	3.7		3.65								
	3.8		3.7		0.05			0.07			
	4.2		3.7		0.05			0.03			
	4.4		3.75		0.10			0.73			
	4.6		3.85		0.20			1.88			
	4.8		3.9		0.25			1.38			
	5.0		3.85		0.20			0.53			
	5.2		3.9		0.25			0.59			
	5.4		3.9		0.25			0.90			
	5.6		3.9		0.25			1.46			
	5.8		3.85		0.20			1.16			
	6.0		3.85		0.20			1.24			
	6.2		3.85		0.20			0.14			
	6.4		3.85		0.20			0			
	6.6		3.85		0.20			0.10			
W	10.7		3.65								
G	11.5		3.35								
LS	9.9		2.74								
TOTALS:											

End of Measurement	Time:	Gage Reading: _____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

R2Cross RESULTS

Stream Name: Goat Creek
Stream Locations: Approx. 80 feet downstream from Beef Trail Road Crossing
Fieldwork Date: 05/12/2021
Cross-section: 1
Observers: R Smith, J Sondergard
Coordinate System: UTM Zone 12
X (easting): 746173
Y (northing): 4205921
Date Processed: 04/04/2024
Slope: 0.034
Discharge: R2Cross data file: 0.63 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Goat Creek 5-12-21 #1.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 4.5

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.74
Percent Wetted Perimeter (%)	50.0	0.23
Mean Velocity (ft/s)	1.0	0.68

STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (sq ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Manning's n	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	6.45	4.5	0.59	0.85	2.66	5.09	100.0	0.52	0.05	3.82	10.15
	6.47	4.46	0.57	0.83	2.56	5.03	98.82	0.51	0.05	3.71	9.51
	6.49	4.42	0.56	0.81	2.47	4.97	97.64	0.5	0.05	3.61	8.9
	6.51	4.37	0.54	0.79	2.37	4.91	96.45	0.48	0.05	3.5	8.3
	6.54	4.33	0.53	0.77	2.28	4.85	95.27	0.47	0.05	3.39	7.73
	6.56	4.29	0.51	0.74	2.19	4.79	94.09	0.46	0.05	3.28	7.17
	6.58	4.25	0.49	0.72	2.1	4.73	92.91	0.44	0.05	3.16	6.64
	6.6	4.2	0.48	0.7	2.01	4.66	91.73	0.43	0.05	3.05	6.13
	6.62	4.16	0.46	0.68	1.92	4.6	90.55	0.42	0.05	2.93	5.63
	6.64	4.12	0.45	0.66	1.83	4.54	89.36	0.4	0.05	2.81	5.16
	6.66	4.08	0.43	0.64	1.75	4.48	88.18	0.39	0.05	2.69	4.7
	6.68	4.03	0.41	0.62	1.66	4.42	87.0	0.38	0.06	2.57	4.27
	6.71	3.99	0.39	0.59	1.58	4.36	85.82	0.36	0.06	2.45	3.86
	6.73	3.95	0.38	0.57	1.49	4.3	84.64	0.35	0.06	2.33	3.47
	6.75	3.9	0.36	0.55	1.41	4.24	83.45	0.33	0.06	2.2	3.1
	6.77	3.86	0.34	0.53	1.32	4.18	82.27	0.32	0.06	2.07	2.75
	6.79	3.82	0.33	0.51	1.24	4.12	81.09	0.3	0.06	1.95	2.42
	6.81	3.78	0.31	0.49	1.16	4.06	79.91	0.29	0.07	1.82	2.11
	6.83	3.73	0.29	0.47	1.08	4.0	78.73	0.27	0.07	1.69	1.83
	6.85	3.69	0.27	0.45	1.0	3.94	77.55	0.25	0.07	1.56	1.56
	6.88	3.65	0.25	0.42	0.93	3.88	76.36	0.24	0.07	1.42	1.32
	6.9	3.61	0.24	0.4	0.85	3.82	75.18	0.22	0.08	1.29	1.1
	6.92	3.56	0.22	0.38	0.77	3.76	74.0	0.21	0.08	1.16	0.9
	6.94	3.52	0.2	0.36	0.7	3.7	72.82	0.19	0.09	1.03	0.72
Waterline	6.95	3.5	0.19	0.35	0.66	3.67	72.2	0.18	0.09	0.96	0.63

	6.96	3.4	0.18	0.34	0.62	3.57	70.17	0.17	0.09	0.93	0.58
	6.98	3.19	0.17	0.32	0.55	3.35	65.86	0.17	0.1	0.85	0.47
	7.0	2.69	0.18	0.3	0.49	2.84	55.9	0.17	0.09	0.9	0.44
	7.02	2.58	0.17	0.28	0.43	2.73	53.65	0.16	0.1	0.81	0.35
	7.04	2.48	0.15	0.26	0.38	2.61	51.39	0.14	0.11	0.71	0.27
	7.07	2.37	0.14	0.23	0.33	2.5	49.14	0.13	0.12	0.61	0.2
	7.09	2.26	0.12	0.21	0.28	2.38	46.88	0.12	0.13	0.52	0.14
	7.11	2.15	0.11	0.19	0.23	2.27	44.56	0.1	0.14	0.43	0.1
	7.13	2.04	0.09	0.17	0.19	2.14	42.14	0.09	0.16	0.34	0.06
	7.15	1.92	0.08	0.15	0.14	2.01	39.56	0.07	0.19	0.25	0.04
	7.17	1.68	0.06	0.13	0.11	1.75	34.49	0.06	0.21	0.2	0.02
	7.19	1.44	0.05	0.11	0.07	1.5	29.41	0.05	0.25	0.14	0.01
	7.21	1.2	0.04	0.09	0.04	1.24	24.33	0.04	0.32	0.09	0.0
	7.24	0.96	0.02	0.06	0.02	0.98	19.26	0.02	0.48	0.05	0.0
	7.26	0.34	0.02	0.04	0.01	0.35	6.89	0.02	0.52	0.04	0.0
	7.28	0.17	0.01	0.02	0.0	0.18	3.45	0.01	0.92	0.01	0.0

This Manning's roughness coefficient was calculated based on velocity estimates from the Ferguson VPE method

MODEL SUMMARY

Measured Flow (Qm) =	0.63	(cfs)
Calculated Flow (Qc) =	0.63	(cfs)
(Qm-Qc)/Qm * 100 =	-0.01%	
Measured Waterline (WLm) =	6.95	(ft)
Calculated Waterline (WLc) =	6.95	(ft)
(WLm-WLc)/WLm * 100 =	0.00%	
Max Measured Depth (Dm) =	0.35	(ft)
Max Calculated Depth (Dc) =	0.35	(ft)
(Dm-Dc)/Dm * 100 =	-0.01%	
Mean Velocity =	0.96	(ft/s)
Manning's n =	0.091	
0.4 * Qm =	0.25	(cfs)
2.5 * Qm =	1.58	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	6.1		
Bankfull	5	6.45		
Waterline	5.5	6.95	0	0
	5.9	7	0.05	0
	6.2	7	0.05	0.08
	6.5	7.1	0.15	0.77
	6.7	7.25	0.3	1.86
	6.9	7.3	0.35	1.64
	7.1	7.25	0.3	1.16
	7.3	7.2	0.25	1.45
	7.5	7.25	0.3	2.01
	7.7	7.25	0.3	1.34
	7.9	7.25	0.3	0.25
	8.1	7.15	0.2	0.08
	8.3	7.2	0.25	0.06
	8.5	7.15	0.2	0.1
	8.7	7.1	0.15	0.15
Waterline	9	6.95	0	0
Bankfull	9.5	6.45		
	13.2	5.45		

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (ft^2)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.4	0.05	0.02	0	0
0.3	0.05	0.01	0	0.19
0.32	0.15	0.04	0.03	4.58
0.25	0.3	0.06	0.11	17.7
0.21	0.35	0.07	0.11	18.21
0.21	0.3	0.06	0.07	11.04
0.21	0.25	0.05	0.07	11.5
0.21	0.3	0.06	0.12	19.13
0.2	0.3	0.06	0.08	12.75
0.2	0.3	0.06	0.01	2.38
0.22	0.2	0.04	0	0.51
0.21	0.25	0.05	0	0.48
0.21	0.2	0.04	0	0.63
0.21	0.15	0.04	0.01	0.89
0.34	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

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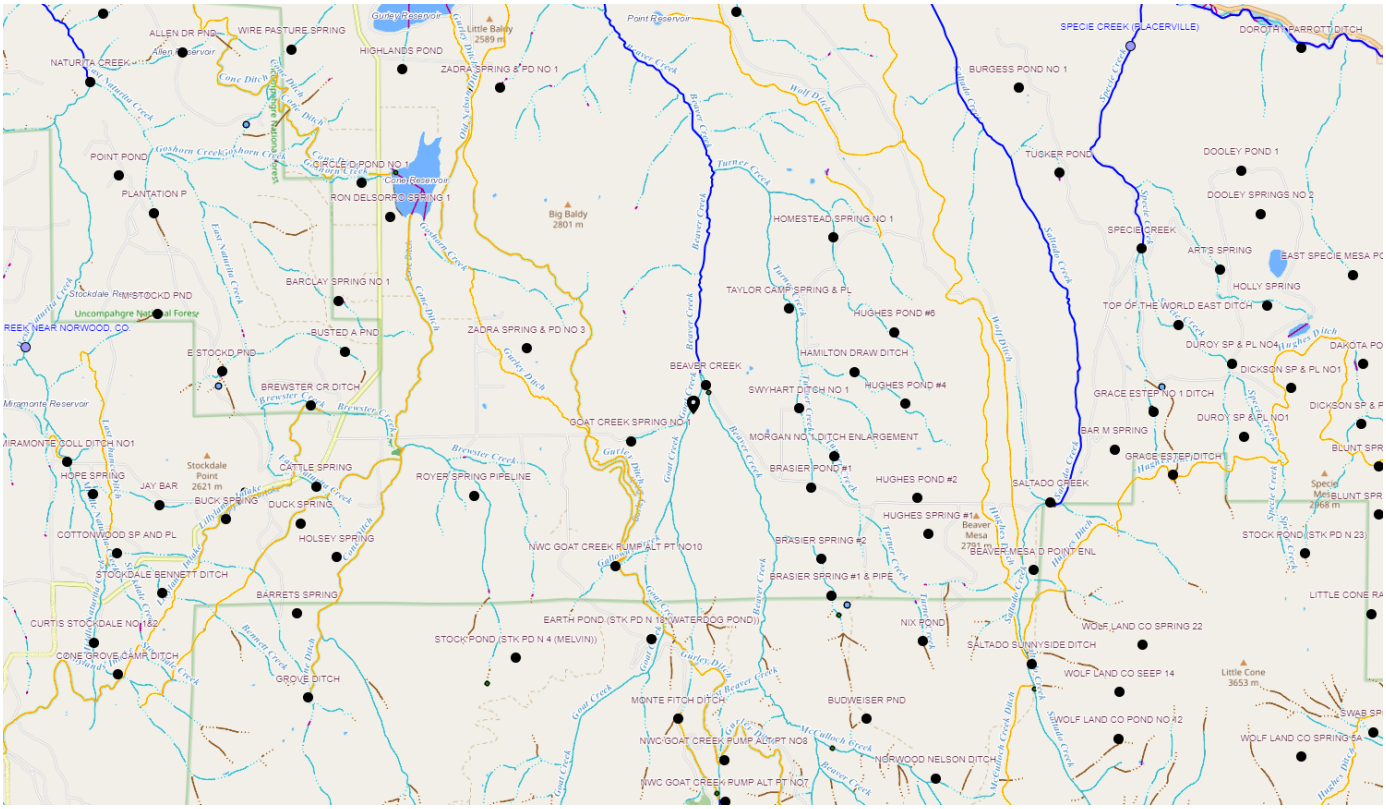
R2Cross RESULTS

Stream Name: Goat Creek
Stream Locations: 150 feet upstream from Beef Trail Road Crossing
Fieldwork Date: 05/12/2021
Cross-section: 2
Observers: R Smith, J Sondergard
Coordinate System: UTM Zone 12
X (easting): 746171
Y (northing): 4205870
Date Processed: 06/22/2024
Slope: 0.036
Discharge: R2Cross data file: 0.6 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Goat Creek 5-12-21 #2 Ferguson.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 5.27

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.35
Percent Wetted Perimeter (%)	50.0	0.04
Mean Velocity (ft/s)	1.0	1.39

STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (sq ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Manning's n	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	5.92	5.27	0.46	0.73	2.41	5.71	100.0	0.42	0.1	1.64	3.95
	5.94	5.19	0.45	0.71	2.31	5.62	98.43	0.41	0.1	1.58	3.66
	5.96	5.11	0.43	0.69	2.22	5.53	96.85	0.4	0.1	1.53	3.39
	5.97	5.03	0.42	0.68	2.13	5.44	95.28	0.39	0.1	1.47	3.13
	5.99	4.95	0.41	0.66	2.04	5.35	93.7	0.38	0.1	1.42	2.89
	6.01	4.86	0.4	0.64	1.95	5.26	92.13	0.37	0.11	1.36	2.65
	6.03	4.78	0.39	0.62	1.86	5.17	90.56	0.36	0.11	1.31	2.43
	6.05	4.7	0.38	0.6	1.77	5.08	88.98	0.35	0.11	1.25	2.22
	6.07	4.62	0.37	0.58	1.69	4.99	87.41	0.34	0.11	1.2	2.02
	6.08	4.54	0.35	0.57	1.6	4.9	85.83	0.33	0.12	1.14	1.84
	6.1	4.46	0.34	0.55	1.52	4.81	84.26	0.32	0.12	1.09	1.66
	6.12	4.38	0.33	0.53	1.44	4.72	82.69	0.31	0.12	1.04	1.49
	6.14	4.29	0.32	0.51	1.36	4.63	81.11	0.29	0.13	0.98	1.34
	6.16	4.21	0.3	0.49	1.28	4.54	79.54	0.28	0.13	0.93	1.19
	6.18	4.13	0.29	0.47	1.21	4.45	77.96	0.27	0.14	0.88	1.06
	6.19	4.05	0.28	0.46	1.13	4.36	76.39	0.26	0.14	0.82	0.93
	6.21	3.97	0.27	0.44	1.06	4.27	74.82	0.25	0.14	0.77	0.82
	6.23	3.89	0.25	0.42	0.99	4.18	73.24	0.24	0.15	0.72	0.71
	6.25	3.81	0.24	0.4	0.92	4.09	71.67	0.22	0.16	0.66	0.61
Waterline	6.25	3.8	0.24	0.4	0.91	4.08	71.54	0.22	0.16	0.66	0.6
	6.27	3.71	0.23	0.38	0.85	3.98	69.72	0.21	0.16	0.62	0.52
	6.29	3.6	0.22	0.36	0.78	3.87	67.74	0.2	0.17	0.57	0.45
	6.3	3.5	0.21	0.35	0.72	3.75	65.77	0.19	0.18	0.53	0.38
	6.32	3.39	0.19	0.33	0.66	3.64	63.79	0.18	0.19	0.48	0.31
	6.34	3.29	0.18	0.31	0.59	3.53	61.81	0.17	0.2	0.44	0.26

	6.36	3.18	0.17	0.29	0.54	3.41	59.71	0.16	0.21	0.39	0.21
	6.38	3.06	0.16	0.27	0.48	3.28	57.47	0.15	0.22	0.35	0.17
	6.39	2.94	0.14	0.26	0.42	3.15	55.23	0.13	0.24	0.31	0.13
	6.41	2.86	0.13	0.24	0.37	3.06	53.68	0.12	0.26	0.27	0.1
	6.43	2.8	0.11	0.22	0.32	2.99	52.44	0.11	0.29	0.22	0.07
	6.45	2.74	0.1	0.2	0.27	2.93	51.26	0.09	0.32	0.18	0.05
	6.47	2.58	0.09	0.18	0.22	2.75	48.16	0.08	0.36	0.14	0.03
	6.49	2.42	0.07	0.16	0.17	2.57	45.07	0.07	0.42	0.11	0.02
	6.5	2.03	0.07	0.15	0.13	2.16	37.88	0.06	0.45	0.1	0.01
	6.52	1.73	0.06	0.13	0.1	1.83	32.15	0.05	0.51	0.08	0.01
	6.54	1.42	0.05	0.11	0.07	1.51	26.41	0.05	0.57	0.06	0.0
	6.56	0.98	0.05	0.09	0.05	1.05	18.35	0.05	0.58	0.06	0.0
	6.58	0.81	0.04	0.07	0.03	0.86	15.06	0.04	0.7	0.04	0.0
	6.6	0.64	0.03	0.05	0.02	0.67	11.78	0.03	0.9	0.03	0.0
	6.61	0.35	0.03	0.04	0.01	0.36	6.36	0.03	0.88	0.03	0.0
	6.63	0.27	0.02	0.02	0.0	0.28	4.93	0.02	1.43	0.01	0.0

This Manning's roughness coefficient was calculated based on velocity estimates from the Ferguson VPE method

MODEL SUMMARY

Measured Flow (Qm) =	0.6	(cfs)
Calculated Flow (Qc) =	0.6	(cfs)
(Qm-Qc)/Qm * 100 =	0.00%	
Measured Waterline (WLm) =	6.25	(ft)
Calculated Waterline (WLc) =	6.25	(ft)
(WLm-WLc)/WLm * 100 =	-0.00%	
Max Measured Depth (Dm) =	0.4	(ft)
Max Calculated Depth (Dc) =	0.4	(ft)
(Dm-Dc)/Dm * 100 =	0.00%	
Mean Velocity =	0.66	(ft/s)
Manning's n =	0.157	
0.4 * Qm =	0.24	(cfs)
2.5 * Qm =	1.51	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	5.36		
Bankfull	4.4	5.92		
Waterline	4.9	6.25	0	0
	5.6	6.4	0.15	0.02
	5.8	6.55	0.3	0.46
	6	6.65	0.4	0.73
	6.2	6.65	0.4	0.86
	6.4	6.55	0.3	1.35
	6.6	6.5	0.25	0.93
	6.8	6.5	0.25	0.89
	7	6.45	0.2	1.01
	7.2	6.6	0.35	1.11
	7.4	6.6	0.35	1.02
	7.6	6.55	0.3	0.67
	7.8	6.5	0.25	0.37
	8	6.55	0.3	0.21
	8.2	6.55	0.3	0.22
	8.4	6.45	0.2	0
	8.6	6.35	0.1	0
Waterline	8.7	6.25	0	0
Bankfull	9.7	5.91		
	14.2	5.44		

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (ft^2)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.72	0.15	0.07	0	0.22
0.25	0.3	0.06	0.03	4.58
0.22	0.4	0.08	0.06	9.7
0.2	0.4	0.08	0.07	11.43
0.22	0.3	0.06	0.08	13.45
0.21	0.25	0.05	0.05	7.72
0.2	0.25	0.05	0.04	7.39
0.21	0.2	0.04	0.04	6.71
0.25	0.35	0.07	0.08	12.9
0.2	0.35	0.07	0.07	11.86
0.21	0.3	0.06	0.04	6.68
0.21	0.25	0.05	0.02	3.07
0.21	0.3	0.06	0.01	2.09
0.2	0.3	0.06	0.01	2.19
0.22	0.2	0.04	0	0
0.22	0.1	0.01	0	0
0.14	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

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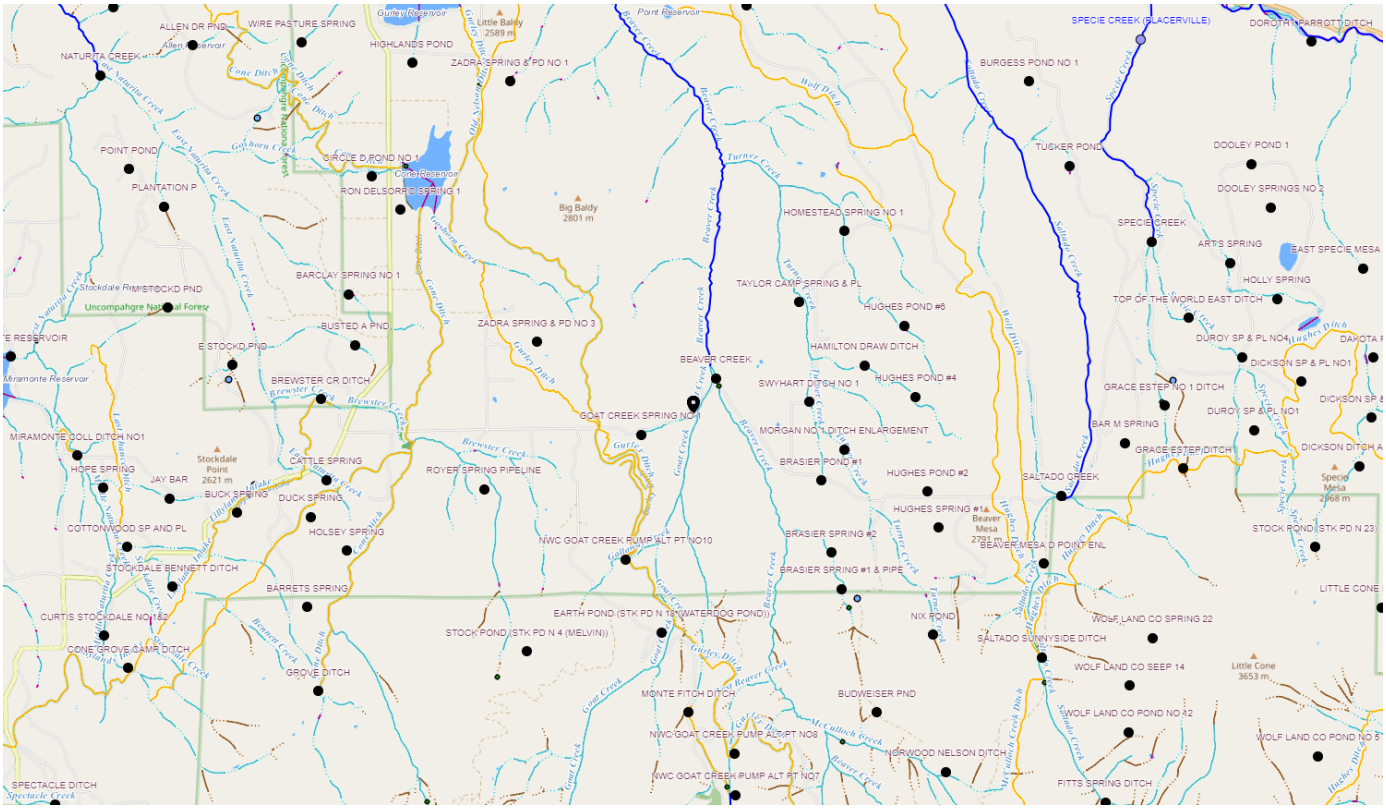
R2Cross RESULTS

Stream Name: Goat Creek
Stream Locations: 200 feet upstream from Beef Trail Road Crossing
Fieldwork Date: 06/30/2020
Cross-section: 1
Observers: R. Smith, J. Sondergard
Coordinate System: UTM Zone 12
X (easting): 745944
Y (northing): 4205780
Date Processed: 06/22/2024
Slope: 0.037
Discharge: R2Cross data file: 0.51 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Goat Creek 6-30-20 #1 Ferguson.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 6.2

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.8
Percent Wetted Perimeter (%)	50.0	0.02
Mean Velocity (ft/s)	1.0	1.05

STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (sq ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Manning's n	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	5.8	6.2	0.51	0.75	3.16	6.6	100.0	0.48	0.06	2.99	9.46
	5.82	6.13	0.5	0.73	3.05	6.52	98.78	0.47	0.06	2.9	8.83
	5.84	6.06	0.48	0.71	2.94	6.44	97.56	0.46	0.06	2.8	8.23
	5.86	5.99	0.47	0.69	2.82	6.36	96.35	0.44	0.06	2.71	7.65
	5.88	5.92	0.46	0.68	2.71	6.28	95.13	0.43	0.06	2.62	7.09
	5.89	5.85	0.44	0.66	2.6	6.2	93.91	0.42	0.06	2.52	6.56
	5.91	5.78	0.43	0.64	2.49	6.12	92.69	0.41	0.06	2.43	6.05
	5.93	5.7	0.42	0.62	2.38	6.04	91.47	0.39	0.07	2.33	5.56
	5.95	5.63	0.4	0.6	2.28	5.96	90.26	0.38	0.07	2.24	5.09
	5.97	5.56	0.39	0.58	2.17	5.88	89.04	0.37	0.07	2.14	4.65
	5.99	5.49	0.38	0.56	2.07	5.79	87.82	0.36	0.07	2.04	4.22
	6.01	5.42	0.36	0.54	1.97	5.71	86.6	0.34	0.07	1.94	3.82
	6.03	5.35	0.35	0.53	1.87	5.63	85.38	0.33	0.07	1.85	3.45
	6.04	5.28	0.33	0.51	1.77	5.55	84.17	0.32	0.08	1.75	3.09
	6.06	5.21	0.32	0.49	1.67	5.47	82.95	0.3	0.08	1.65	2.75
	6.08	5.14	0.31	0.47	1.57	5.39	81.73	0.29	0.08	1.55	2.44
	6.1	5.07	0.29	0.45	1.47	5.31	80.51	0.28	0.08	1.45	2.14
	6.12	5.0	0.28	0.43	1.38	5.23	79.29	0.26	0.09	1.35	1.87
	6.14	4.92	0.26	0.41	1.29	5.15	78.08	0.25	0.09	1.26	1.62
	6.16	4.85	0.25	0.39	1.2	5.07	76.86	0.24	0.09	1.16	1.38
	6.17	4.78	0.23	0.38	1.11	4.99	75.64	0.22	0.1	1.06	1.17
	6.19	4.71	0.22	0.36	1.02	4.91	74.42	0.21	0.1	0.96	0.98
	6.21	4.64	0.2	0.34	0.93	4.83	73.2	0.19	0.11	0.87	0.81
	6.23	4.57	0.18	0.32	0.84	4.75	71.99	0.18	0.12	0.77	0.65
	6.25	4.5	0.17	0.3	0.76	4.67	70.77	0.16	0.13	0.68	0.51

Waterline	6.25	4.5	0.17	0.3	0.76	4.67	70.77	0.16	0.13	0.68	0.51
	6.27	4.44	0.15	0.28	0.67	4.6	69.66	0.15	0.14	0.59	0.39
	6.29	4.38	0.14	0.26	0.59	4.52	68.55	0.13	0.15	0.5	0.29
	6.31	4.31	0.12	0.24	0.51	4.45	67.44	0.11	0.16	0.41	0.21
	6.33	4.25	0.1	0.23	0.43	4.38	66.33	0.1	0.19	0.33	0.14
	6.34	4.19	0.08	0.21	0.35	4.3	65.22	0.08	0.22	0.25	0.09
	6.36	3.83	0.07	0.19	0.28	3.93	59.52	0.07	0.25	0.2	0.05
	6.38	3.61	0.06	0.17	0.21	3.7	56.07	0.06	0.3	0.14	0.03
	6.4	2.6	0.05	0.15	0.14	2.67	40.49	0.05	0.31	0.13	0.02
	6.42	2.34	0.04	0.13	0.09	2.4	36.34	0.04	0.4	0.08	0.01
	6.44	2.08	0.03	0.11	0.05	2.12	32.19	0.02	0.58	0.04	0.0
	6.46	0.48	0.05	0.09	0.02	0.51	7.78	0.05	0.34	0.11	0.0
	6.47	0.4	0.04	0.08	0.02	0.43	6.51	0.04	0.41	0.08	0.0
	6.49	0.32	0.03	0.06	0.01	0.35	5.24	0.03	0.53	0.05	0.0
	6.51	0.22	0.02	0.04	0.0	0.24	3.61	0.02	0.77	0.03	0.0
	6.53	0.11	0.01	0.02	0.0	0.12	1.81	0.01	1.37	0.01	0.0

This Manning's roughness coefficient was calculated based on velocity estimates from the Ferguson VPE method

MODEL SUMMARY

Measured Flow (Qm) =	0.51	(cfs)
Calculated Flow (Qc) =	0.51	(cfs)
(Qm-Qc)/Qm * 100 =	0.01%	
Measured Waterline (WLm) =	6.25	(ft)
Calculated Waterline (WLc) =	6.25	(ft)
(WLm-WLc)/WLm * 100 =	-0.00%	
Max Measured Depth (Dm) =	0.3	(ft)
Max Calculated Depth (Dc) =	0.3	(ft)
(Dm-Dc)/Dm * 100 =	0.01%	
Mean Velocity =	0.68	(ft/s)
Manning's n =	0.125	
0.4 * Qm =	0.21	(cfs)
2.5 * Qm =	1.29	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	5.36		
Bankfull	1.8	5.8		
Waterline	2.5	6.25	0	0
	2.8	6.4	0.15	0.47
	3	6.35	0.1	0.95
	3.2	6.35	0.1	0.4
	3.4	6.4	0.15	0.28
	3.6	6.4	0.15	0
	3.8	6.45	0.2	0.36
	4	6.45	0.2	0.57
	4.2	6.45	0.2	0.92
	4.4	6.45	0.2	1.76
	4.6	6.45	0.2	0.96
	4.8	6.45	0.2	0.1
	5	6.45	0.2	0.72
	5.2	6.45	0.2	1.61
	5.4	6.4	0.15	1.35
	5.6	6.4	0.15	0.8
	5.8	6.5	0.25	0.19
	6	6.55	0.3	0.08
	6.2	6.45	0.2	0.17
	6.4	6.4	0.15	0.6
	6.6	6.4	0.15	1.45
	6.8	6.4	0.15	1.14
Waterline	7	6.25	0	0
Bankfull	8	5.8		
	9.5	5.55		

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (ft^2)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.34	0.15	0.04	0.02	3.43
0.21	0.1	0.02	0.02	3.69
0.2	0.1	0.02	0.01	1.55
0.21	0.15	0.03	0.01	1.63
0.2	0.15	0.03	0	0
0.21	0.2	0.04	0.01	2.8
0.2	0.2	0.04	0.02	4.43
0.2	0.2	0.04	0.04	7.16
0.2	0.2	0.04	0.07	13.69
0.2	0.2	0.04	0.04	7.47
0.2	0.2	0.04	0	0.78
0.2	0.2	0.04	0.03	5.6
0.2	0.2	0.04	0.06	12.52
0.21	0.15	0.03	0.04	7.87
0.2	0.15	0.03	0.02	4.67
0.22	0.25	0.05	0.01	1.85
0.21	0.3	0.06	0	0.93
0.22	0.2	0.04	0.01	1.32
0.21	0.15	0.03	0.02	3.5
0.2	0.15	0.03	0.04	8.46
0.2	0.15	0.03	0.03	6.65
0.25	0	0	0	0
0	0	0	0	0
0	0	0	0	0

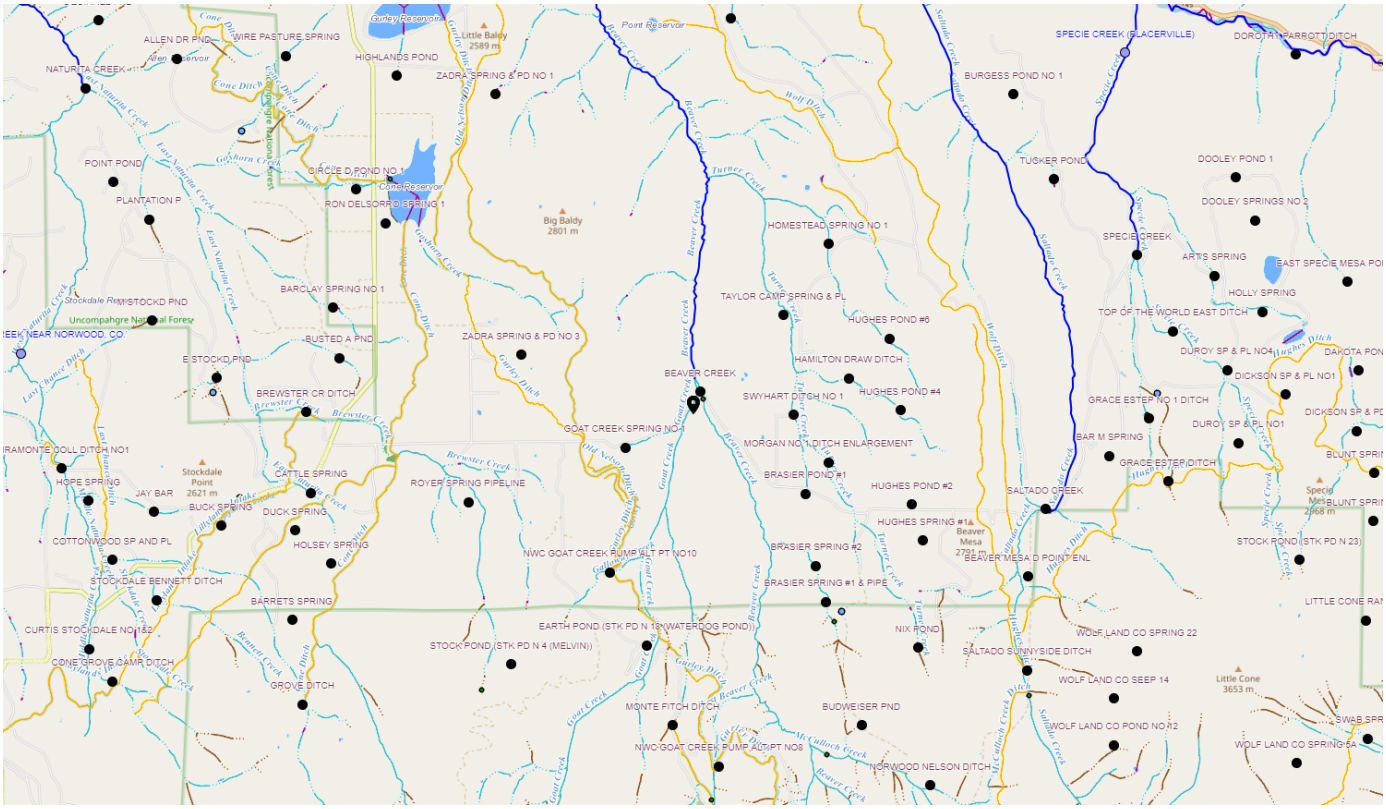
DISCLAIMER

"The Colorado Water Conservation Board makes no representations about the use of the software contained in the R2Cross platform for any purpose besides that for which it was designed. To the maximum extent permitted by applicable law, all information, modeling results, and software are provided “as is” without warranty or condition of any kind, including all implied warranties or conditions of merchantability, or fitness for a particular purpose. The user assumes all responsibility for the accuracy and suitability of this program for a specific application. In no event shall the Colorado Water Conservation Board or any state agency, official or employee be liable for any direct, indirect, punitive, incidental, special, consequential damages or any damages whatsoever including, without limitation, damages for loss of use, data, profits, or savings arising from the implementation, reliance on, or use of or inability to use the R2Cross platform.

R2Cross RESULTS

Stream Name: Goat Creek
Stream Locations: UTM Zone 13 219143 4207067
Fieldwork Date: 06/30/2020
Cross-section: 2
Observers: R. Smith, J. Sondergard
Coordinate System: UTM Zone 13
X (easting): 219143
Y (northing): 4207067
Date Processed: 06/22/2024
Slope: 0.031
Discharge: R2Cross data file: 0.43 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Goat Creek 6-30-20 #2 Ferguson.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 4.07

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.64
Percent Wetted Perimeter (%)	50.0	0.04
Mean Velocity (ft/s)	1.0	0.61

STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (sq ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Manning's n	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	3.36	4.07	0.38	0.54	1.54	4.43	100.0	0.35	0.06	2.33	3.6
	3.37	4.02	0.37	0.53	1.49	4.38	98.69	0.34	0.06	2.27	3.37
	3.39	3.97	0.36	0.51	1.43	4.32	97.39	0.33	0.06	2.2	3.15
	3.4	3.92	0.35	0.5	1.38	4.26	96.08	0.32	0.06	2.13	2.94
	3.41	3.87	0.34	0.49	1.33	4.2	94.78	0.32	0.06	2.06	2.74
	3.43	3.82	0.33	0.47	1.28	4.14	93.47	0.31	0.06	2.0	2.55
	3.44	3.77	0.32	0.46	1.23	4.09	92.17	0.3	0.06	1.93	2.36
	3.45	3.72	0.32	0.45	1.17	4.03	90.86	0.29	0.06	1.86	2.19
	3.47	3.67	0.31	0.43	1.12	3.97	89.56	0.28	0.06	1.79	2.02
	3.48	3.62	0.3	0.42	1.08	3.91	88.25	0.27	0.06	1.72	1.85
	3.5	3.57	0.29	0.41	1.03	3.85	86.95	0.27	0.07	1.65	1.7
	3.51	3.52	0.28	0.39	0.98	3.8	85.64	0.26	0.07	1.58	1.55
	3.52	3.47	0.27	0.38	0.93	3.74	84.33	0.25	0.07	1.51	1.41
	3.54	3.42	0.26	0.36	0.89	3.68	83.03	0.24	0.07	1.44	1.28
	3.55	3.37	0.25	0.35	0.84	3.62	81.72	0.23	0.07	1.37	1.15
	3.56	3.32	0.24	0.34	0.79	3.56	80.42	0.22	0.07	1.3	1.03
	3.58	3.27	0.23	0.32	0.75	3.51	79.11	0.21	0.08	1.23	0.92
	3.59	3.22	0.22	0.31	0.71	3.45	77.81	0.2	0.08	1.16	0.82
	3.6	3.17	0.21	0.3	0.66	3.39	76.5	0.2	0.08	1.09	0.72
	3.62	3.12	0.2	0.28	0.62	3.33	75.2	0.19	0.08	1.01	0.63
	3.63	3.07	0.19	0.27	0.58	3.28	73.89	0.18	0.09	0.94	0.55
	3.64	3.02	0.18	0.26	0.54	3.22	72.58	0.17	0.09	0.87	0.47
Waterline	3.65	3.0	0.17	0.25	0.52	3.19	71.96	0.16	0.09	0.84	0.43
	3.66	2.98	0.17	0.24	0.5	3.17	71.43	0.16	0.1	0.8	0.4
	3.67	2.95	0.15	0.23	0.46	3.12	70.41	0.15	0.1	0.72	0.33

	3.68	2.92	0.14	0.22	0.42	3.08	69.38	0.14	0.11	0.65	0.27
	3.7	2.88	0.13	0.2	0.38	3.03	68.36	0.12	0.11	0.58	0.22
	3.71	2.43	0.14	0.19	0.34	2.56	57.85	0.13	0.11	0.64	0.22
	3.72	2.36	0.13	0.18	0.31	2.49	56.25	0.12	0.11	0.58	0.18
	3.74	2.3	0.12	0.16	0.28	2.42	54.66	0.12	0.12	0.52	0.14
	3.75	2.25	0.11	0.15	0.25	2.36	53.12	0.11	0.13	0.45	0.11
	3.77	2.21	0.1	0.14	0.22	2.31	52.1	0.09	0.14	0.39	0.08
	3.78	2.18	0.09	0.12	0.19	2.26	51.08	0.08	0.16	0.32	0.06
	3.79	2.15	0.07	0.11	0.16	2.22	50.06	0.07	0.18	0.26	0.04
	3.81	2.11	0.06	0.09	0.13	2.17	49.04	0.06	0.2	0.2	0.03
	3.82	2.08	0.05	0.08	0.1	2.13	48.02	0.05	0.24	0.14	0.01
	3.83	2.04	0.04	0.07	0.08	2.08	47.0	0.04	0.31	0.09	0.01
	3.85	2.01	0.02	0.05	0.05	2.04	45.97	0.02	0.44	0.05	0.0
	3.86	1.05	0.03	0.04	0.03	1.07	24.09	0.03	0.39	0.06	0.0
	3.87	0.83	0.02	0.03	0.02	0.85	19.07	0.02	0.51	0.04	0.0

This Manning's roughness coefficient was calculated based on velocity estimates from the Ferguson VPE method

MODEL SUMMARY

Measured Flow (Qm) =	0.43	(cfs)
Calculated Flow (Qc) =	0.43	(cfs)
(Qm-Qc)/Qm * 100 =	0.01%	
Measured Waterline (WLm) =	3.65	(ft)
Calculated Waterline (WLc) =	3.65	(ft)
(WLm-WLc)/WLm * 100 =	-0.00%	
Max Measured Depth (Dm) =	0.25	(ft)
Max Calculated Depth (Dc) =	0.25	(ft)
(Dm-Dc)/Dm * 100 =	0.00%	
Mean Velocity =	0.84	(ft/s)
Manning's n =	0.093	
0.4 * Qm =	0.17	(cfs)
2.5 * Qm =	1.08	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	2.95		
Bankfull	3.4	3.36		
Waterline	3.7	3.65	0	0
	3.8	3.7	0.05	0.07
	4.2	3.7	0.05	0.03
	4.4	3.75	0.1	0.73
	4.6	3.85	0.2	1.88
	4.8	3.9	0.25	1.38
	5	3.85	0.2	0.53
	5.2	3.9	0.25	0.59
	5.4	3.9	0.25	0.9
	5.6	3.9	0.25	1.46
	5.8	3.85	0.2	1.16
	6	3.85	0.2	1.24
	6.2	3.85	0.2	0.14
	6.4	3.85	0.2	0
	6.6	3.85	0.2	0.1
Waterline	6.7	3.65	0	0
Bankfull	7.5	3.35		
	9.9	2.74		

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (ft^2)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.11	0.05	0.01	0	0.2
0.4	0.05	0.01	0	0.1
0.21	0.1	0.02	0.01	3.37
0.22	0.2	0.04	0.08	17.35
0.21	0.25	0.05	0.07	15.92
0.21	0.2	0.04	0.02	4.89
0.21	0.25	0.05	0.03	6.81
0.2	0.25	0.05	0.04	10.38
0.2	0.25	0.05	0.07	16.84
0.21	0.2	0.04	0.05	10.71
0.2	0.2	0.04	0.05	11.44
0.2	0.2	0.04	0.01	1.29
0.2	0.2	0.04	0	0
0.2	0.2	0.03	0	0.69
0.22	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

"The Colorado Water Conservation Board makes no representations about the use of the software contained in the R2Cross platform for any purpose besides that for which it was designed. To the maximum extent permitted by applicable law, all information, modeling results, and software are provided “as is” without warranty or condition of any kind, including all implied warranties or conditions of merchantability, or fitness for a particular purpose. The user assumes all responsibility for the accuracy and suitability of this program for a specific application. In no event shall the Colorado Water Conservation Board or any state agency, official or employee be liable for any direct, indirect, punitive, incidental, special, consequential damages or any damages whatsoever including, without limitation, damages for loss of use, data, profits, or savings arising from the implementation, reliance on, or use of or inability to use the R2Cross platform.

General Site Field Visit Data Report *(Filters: Name begins with Goat Creek; Division = 4;)*

Type		Div	Name	CWCB Case Number	Segment ID	Visit Date	Location Description	Watershed Name
Stream		4	Goat Creek		22/4/A-001	5/1/2012	Goat Creek above confluence with Beaver Creek	San Miguel
	Remarks	Date	Remark					
		01/05/12 09:54	CWCB Staff met with stake holders and explored the stream stretch.					
	GPS Log	No GPS Log records for this visit.						
	Photo Log	No Photo Log records for this visit.						

Discharge Measurment Field Visit Data Report *(Filters: Name begins with Goat Creek; Division = 4;)*

Div	Name	CWCB Case Number	Segment ID	Meas. Date	UTM	Location	Flow Amount (cfs)	Meas #	Standar Error	Station ID
4	Goat Creek		22/4/A-001	06/28/2022	UTMx: 746155 UTMy: 4205855	Goat Creek 150' upstream of Beef Trail Rd	0.43	1	5%	
4	Goat Creek		22/4/A-001	06/28/2022	UTMx: 746180 UTMy: 4205924	Goat Creek 80' downstream of Beef Trail Rd	0.42	2	5%	
4	Goat Creek		22/4/A-001	08/18/2022	UTMx: 746155 UTMy: 4205855	Goat Creek 150' upstream of Beef Trail Rd	0.64	3	5%	
4	Goat Creek		22/4/A-001	08/18/2022	UTMx: 746180 UTMy: 4205924	Goat Creek 80' downstream of Beef Trail Rd	0.74	4	5%	
4	Goat Creek		22/4/A-001	10/28/2022	UTMx: 746155 UTMy: 4205855	Goat Creek 150' upstream of Beef Trail Rd	0.58	5		
4	Goat Creek		22/4/A-001	10/28/2022	UTMx: 746180 UTMy: 4205924	Goat Creek 80' downstream of Beef Trail Rd	0.66	6