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 North Lobe Creek, located in Water Division 4.

Location and Land Status. North Lobe Creek originates in an area known as "The Glade" on Pinon Mesa approximately 15 miles northeast of the community of Gateway. This recommendation addresses the portion of North Lobe Creek that starts at the headwaters and extends downstream to the headgate of the Highline Ditch, a distance of approximately 7.81 miles. The BLM manages approximately 1.51 miles of this reach, the U.S. Forest Service manages 0.57 miles, and 5.73 miles are in private ownership.

Biological Summary. North Lobe Creek is a cold water, high gradient stream. It begins in a broad, open valley on Pinon Mesa, descends through a narrow, steep, and forested canyon on the north side of Unaweep Canyon, then merges with West Creek on the floor of Unaweep Canyon. Channel size varies substantially in the lower portion of the creek as it traverses the alluvium on the north side of Unaweep Canyon. Substrate size is generally smaller in diameter in the upper portions of the stream and larger in the portion of the stream within Unaweep Canyon, where substrate size ranges from 4-inch cobbles to 3-foot boulders. Bank stability appears to be excellent.

The lower portion of the creek is generally a step pool environment, with numerous small pools and extensive vegetative cover. Limited riffle habitat and low flows are the primary limiting factors likely affecting the resident fish populations. Water quality is excellent for supporting cold water species.

Fish surveys have documented self-supporting populations of Rainbow Trout and Brown Trout. Spot surveys have revealed populations of stonefly, caddisfly, and mayfly. The creek supports a healthy riparian community comprised of narrow leaf cottonwood, alder, willow, dogwood, and hawthorn.

R2Cross Analysis. The BLM collected the following R2Cross data from North Lobe 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)
5/25/2022 #1	4.57 cfs	15.97 feet	0.43 cfs	6.34 cfs
5/25/2022 #2	4.08 cfs	9.87 feet	0.275 cfs	7.64 cfs
Averages			0.35 cfs	6.99 cfs

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

> 7.0 cubic feet per second is recommended during the peak snowmelt runoff period from April 1 through May 31. This recommendation is driven by the average velocity criteria. This flow rate will ensure that the limited pool and riffle habitat can be fully utilized during this period when the fish population is starting to become highly active. It will also ensure that there is some slower velocity habitat available in pools during peak snowmelt runoff and its accompanying high velocity conditions.
>
> 5.0 cubic feet per second is recommended during the receding limb of the snowmelt hydrograph from June 1 through June 30. This recommendation will ensure that a high percentage of riffle and pool habitat is available during this high growth period.
>
> 1.0 cubic feet per second is recommended during early to mid-summer, from July 1 through August 31. This recommendation is limited water availability. This flow rate should maintain full and sufficiently cool pools during the summer when stream temperatures can still be high, and it will provide sufficient water for passage between pools.
>
> 0.35 cubic feet per second is recommended from late summer through winter, September 1 through March 31. This recommendation is limited by water availability, but it also meets two of three instream flow criteria. This flow rate should prevent pools from becoming excessively hot during late summer and it should prevent pools from completely icing during winter, allowing 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 the CSUFlow18 regression model can provide an estimate of natural hydrology. Water availability during the irrigation season can be partially confirmed by consulting diversion records for downstream ditches, including the Highline Ditch and Loba Ditches 1 through 5.

BLM is not aware of any water rights that authorize diversion of water upstream from the Highline Ditch. However, the creek may supply water to small diversion and storage structures that are presently undecreed.

Relationship to Land Management Plans. BLM's management plan calls for actions to maintain and enhance habitat that supports fish species. Specifically, the BLM plan calls for making instream flow recommendations to the Colorado Water Conservation Board to meet minimum instream flow requirements to maintain fisheries. Finally, the plan calls for maintaining and improving the function of riparian areas to achieve advanced ecological stage for the riparian community, and it also 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 2023. 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,

ALAN BITTNER

Digitally signed by ALAN BITTNER
Date: 2023.11.20 16:35:20 -07'00'

Alan Bittner
Deputy State Director, Resources

Cc: Rob Hampson, Grand Junction Field Office
Greg Wolfgang, Grand Junction Field Office
Greg Larson, Colorado River Valley District Office

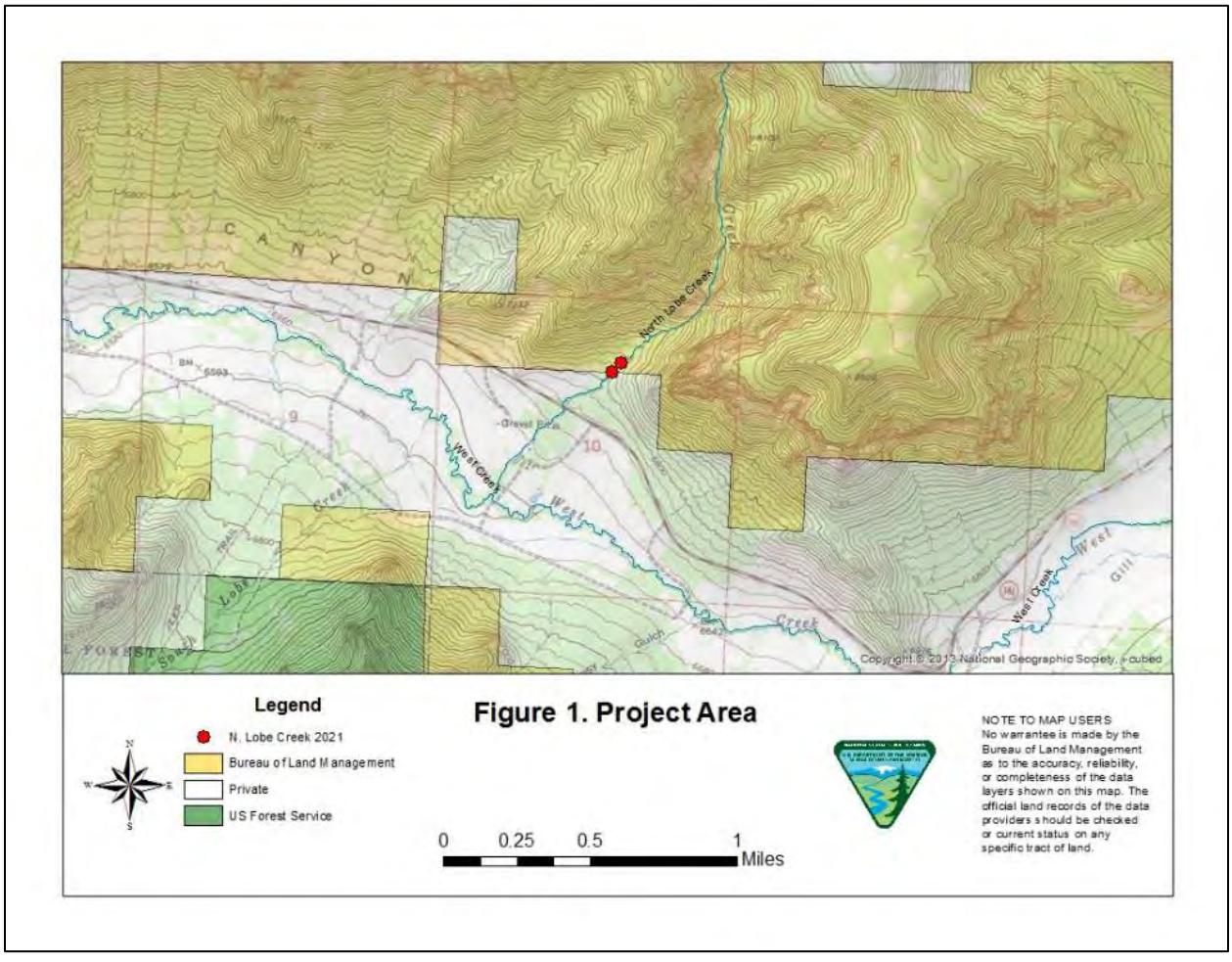
Grand Junction Field Office Stream Surveys

August 5, 2021

North Lobe Creek - Water Code #46359

Introduction:

North Lobe Creek is located southwest of Grand Junction, CO on BLM lands managed by the Grand Junction Field Office. This stream was sampled on June 21, 2021. The purpose was to determine the present status of species composition and conduct a population estimate on a portion of the stream on BLM accessed from State Highway 141. This stream had been sampled by BLM in 2019 but an accurate population estimate was not obtained due to equipment failure.



Methods:

A two-pass population estimate was completed in a 270-foot sample reach by BLM fish biologists Tom Fresques and Nick Jaramillo and BLM wildlife biologist Russ Knight using two backpack electrofishing units.

Results:

A total of 63 rainbow trout representing multiple age classes were present in the 270-foot sample reach, along with one brown trout. For this population estimate, only fish ≥150mm total length were counted as adults. **The population estimate is 20 adult brown trout +/- 0 per mile at the 95% confidence interval, and 784 adult rainbow trout +/- 65 per mile at the 95% confidence interval.**

Discussion:

North Lobe Creek could be described as a Rosgen Aa+ or A type channel based on its moderate sinuosity and steep gradient, entrenchment, and confinement within the valley. The substrate consists of boulders, cobble, and gravel. Riparian condition is good with dense woody cover comprised mainly of cottonwood and willow. Pools were small but common.

Recommendations:

- Continue to monitor drought conditions and stream flows.
- Consider temperature monitoring with a probe installed on the low end of BLM.

Photo 1. Typical habitat on North Lobe Creek.

Photo 2. North Lobe Creek Rainbow Trout.

Photo 3. North Lobe Creek Brown Trout.

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: North Lake Creek | CROSS-SECTION NO: 1

CROSS-SECTION LOCATION: At BLM-private boundary 0.5 miles upstream from confluence w/ West Creek

DATE: 5-25-12 | OBSERVERS: R. Smith

LEGAL DESCRIPTION: ¼ SECTION: NE | SECTION: 10 | TOWNSHIP: 15 N/S | RANGE: 102 E/W | PM: 6th

COUNTY: Mesa | WATERSHED: West Creek | WATER DIVISION: 4 | DOW WATER CODE:

MAP(S): USGS: GPS: Zone 12 693088 E 4293383 N | USFS:

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO | METER TYPE: M-M

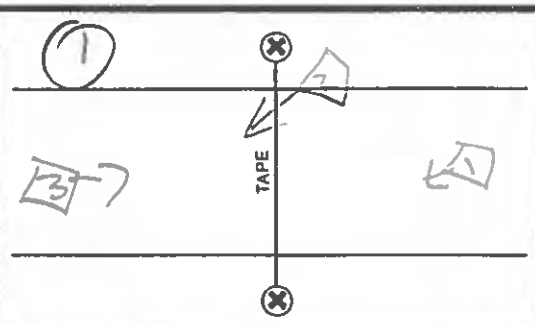
METER NUMBER: | DATE RATED: | CALIB/SPIN _____ sec | TAPE WEIGHT: surveyed _____ lbs/foot | TAPE TENSION: surveyed _____ lbs

CHANNEL BED MATERIAL SIZE RANGE: 4" cobbles to 3' 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	7.88/7.87
② WS Upstream	14.0	7.68
③ WS Downstream	2.6	8.30
SLOPE	0.62/16.6 = 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

Caddis, snail

COMMENTS

Temp: 5.6°C | pH: 8.36

Salinity: 0 ppt | Riparian - alder, narrow leaf cottonwood, Hawthorn, willow, equisetum, dogwood.

Conductivity - 53

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: North Lobe Creek	CROSS SECTION NO: 1	DATE: 5-25-22	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 10:30 am

Features (Stake (S), Grassline (G), Waterline (W), Rock (R))	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	1.7		6.91	~~7.27~~							
2.5	3.5		7.64								
	5.0		7.63								
W	5.4		7.87								
	6.5		8.27	0.40				0.22			
	7.5		8.47	0.60				0.23			
	8.5		8.57	0.70				0.16			
	9.5		8.37	0.50				0.71			
	10.0		8.42	0.55				0.77			
	10.5		8.22	0.35				1.47			
	11.0		8.27	0.35				1.56			
	11.5		8.27	0.40				1.55			
	12.0		8.37	0.50				1.03			
	12.5		8.47	0.55				1.09			
	13.0		8.82	0.95				1.32			
	13.5		8.67	0.80				1.44			
	14.0		8.67	0.75				1.08			
	14.5		8.57	0.65				1.25			
	15.0		8.22	0.35				0.57			
	15.5		8.27	0.40				1.20			
	16.0		7.92	0.05				0			
W	16.3		7.88								
	17.3		7.57								
	17.9		7.51								
G	18.5		7.28								
LS	23.0		5.98								
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: North Lobe Creek						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: At BLM-private boundary 0.5 miles upstream from confluence w/ West Creek						
DATE: 5-25-22	OBSERVERS: R. Smith					
LEGAL DESCRIPTION	¼ SECTION: NE	SECTION: 10	TOWNSHIP: 15 N/S	RANGE: 102E/W	PM: 6th	
COUNTY: Mesa	WATERSHED: West Creek	WATER DIVISION: 4	DOW WATER CODE:			
MAP(S): USGS:	GPS Zone 12 693032					
USFS:	4293308					

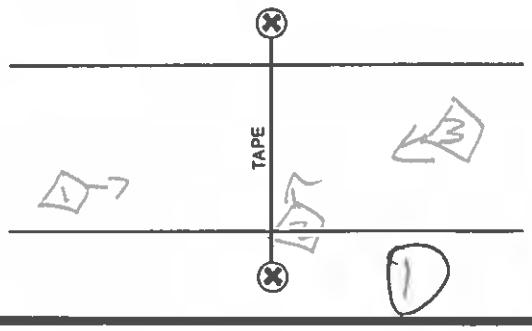
SUPPLEMENTAL DATA

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: ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: 4" cobbles to 3-foot boulders	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS:		

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	7.6/7.60
② WS Upstream	11.4	7.37
③ WS Downstream	25.6	7.63
SLOPE	0.26/14.0 = 0.0186	

SKETCH



LEGEND
Stake ⊗
Station ①
Photo ①→
Direction of Flow

AQUATIC SAMPLING SUMMARY

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

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

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

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

COMMENTS

CFB 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: North Lake Creek | CROSS SECTION NO: 2 | DATE: 5-25-22 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: _____ ft | TIME: 11:45 am

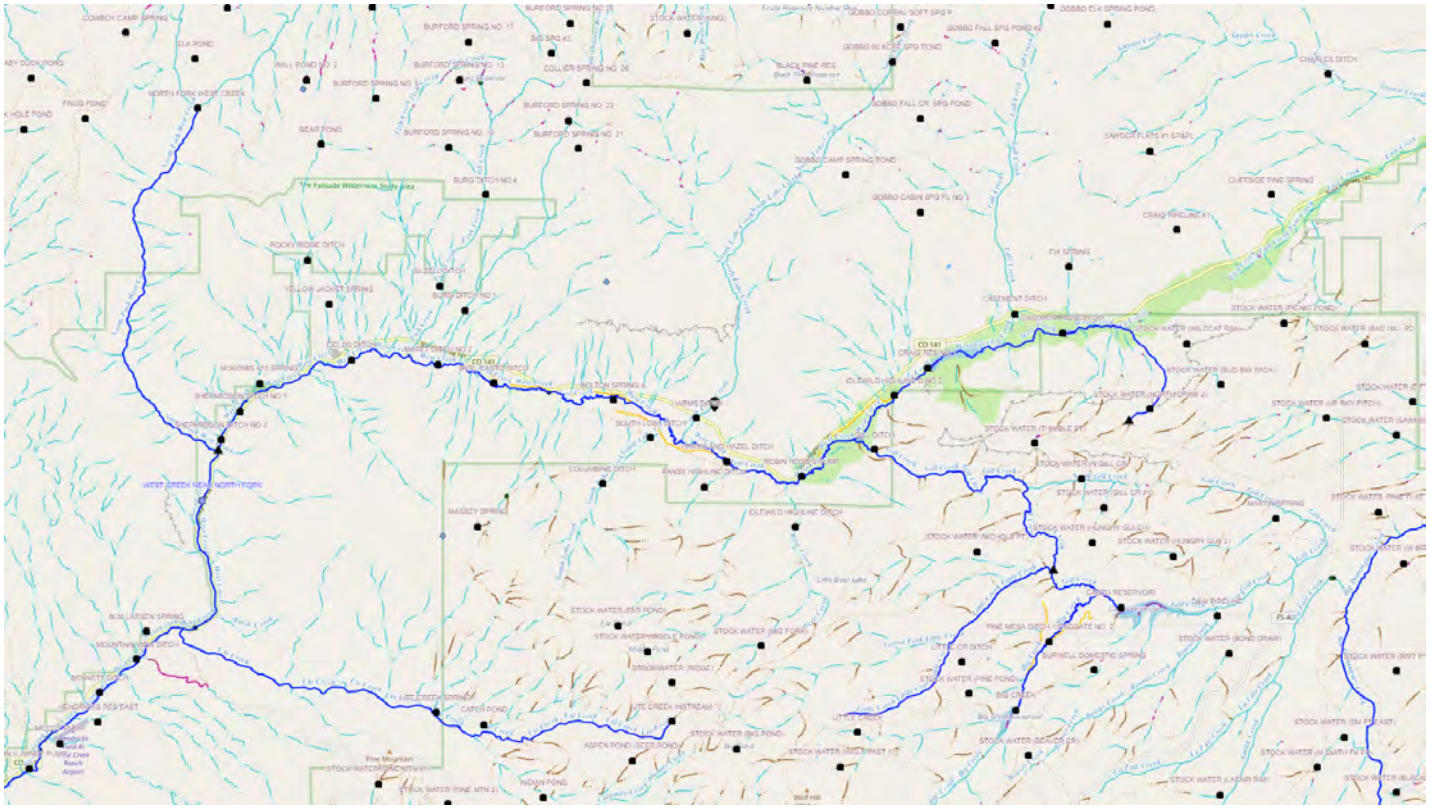
Features (Stake (S), Grassline (G), Waterline (W), Rock (R))	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		6.86								
	1.8		6.89								
G	2.1		7.05								
W	2.6		7.60								
	3.0		8.05	0.45				0.02			
	4.0		8.1	0.50				0.11			
	5.0		8.2	0.60				0.10			
	6.0		8.4	0.80				0.71			
	6.3		8.5	0.90				0.56			
	6.6		8.55	0.95				0.60			
	6.9		8.60	1.00				0.36			
	7.2		8.60	1.00				0.42			
	7.5		8.60	1.00				0.22			
	7.8		8.50	0.90				0.39			
	8.2		8.55	0.95				1.02			
	8.5		8.20	0.60				1.06			
	8.8		7.95	0.35				1.11			
	9.1		7.90	0.30				1.32			
	9.4		7.85	0.25				1.65			
	9.7		7.95	0.35				1.82			
	10.0		8.05	0.45				1.98			
	10.3		8.15	0.55				2.07			
	10.6		8.3	0.70				1.83			
	10.9		8.45	0.85				1.36			
	11.2		8.55	0.95				1.24			
	11.5		8.1	0.50				0.71			
W	11.6	7.60 →									
G	12.	7.01 →									
	12.5	6.81 →									
	13.0	6.70 →									
LS	20.5	5.95 →									
TOTALS:											

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

R2Cross RESULTS

Stream Name: North Lobe Creek
Stream Locations: At BLM-private boundary 0.5 miles upst from conf w/ West Creek
Fieldwork Date: 05/25/2022
Cross-section: 1
Observers: R. Smith
Coordinate System: UTM Zone 12
X (easting): 693088
Y (northing): 4293383
Date Processed: 07/26/2023
Slope: 0.037
Discharge: R2Cross data file: 4.57 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: North Lobe Creek 5-25-22 #1.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 15.97

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.32
Percent Wetted Perimeter (%)	50.0	0.43
Mean Velocity (ft/s)	1.0	6.34

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	7.28	15.97	0.84	1.54	13.41	16.74	100.0	0.8	0.14	1.81	24.3
	7.32	15.76	0.81	1.5	12.78	16.51	98.64	0.77	0.14	1.72	22.02
	7.37	15.49	0.77	1.45	11.99	16.23	96.94	0.74	0.14	1.61	19.36
	7.42	15.23	0.74	1.4	11.23	15.95	95.25	0.7	0.15	1.51	16.9
	7.47	14.96	0.7	1.35	10.47	15.66	93.55	0.67	0.16	1.4	14.63
	7.52	14.62	0.67	1.3	9.73	15.3	91.42	0.64	0.16	1.3	12.64
	7.57	13.99	0.64	1.25	9.02	14.66	87.56	0.62	0.17	1.24	11.16
	7.62	13.69	0.61	1.2	8.32	14.35	85.69	0.58	0.17	1.14	9.47
	7.67	11.91	0.65	1.15	7.7	12.54	74.92	0.61	0.17	1.23	9.51
	7.72	11.67	0.61	1.1	7.11	12.28	73.33	0.58	0.18	1.13	8.07
	7.77	11.42	0.57	1.05	6.53	12.01	71.74	0.54	0.18	1.04	6.76
	7.82	11.18	0.53	1.0	5.97	11.74	70.15	0.51	0.19	0.94	5.59
Waterline	7.87	10.93	0.5	0.95	5.41	11.48	68.56	0.47	0.21	0.84	4.55
	7.92	10.46	0.47	0.9	4.88	10.99	65.68	0.44	0.22	0.77	3.75
	7.97	10.25	0.43	0.85	4.36	10.76	64.28	0.41	0.23	0.67	2.93
	8.02	10.04	0.38	0.8	3.85	10.53	62.89	0.37	0.25	0.58	2.23
	8.07	9.84	0.34	0.75	3.36	10.29	61.49	0.33	0.28	0.49	1.64
	8.12	9.63	0.3	0.7	2.87	10.06	60.1	0.29	0.31	0.4	1.15
	8.17	9.42	0.25	0.65	2.39	9.83	58.7	0.24	0.35	0.32	0.76
	8.22	8.7	0.22	0.6	1.93	9.09	54.29	0.21	0.4	0.26	0.5
	8.27	7.29	0.21	0.55	1.53	7.62	45.53	0.2	0.41	0.24	0.36
	8.32	6.58	0.18	0.5	1.18	6.88	41.1	0.17	0.47	0.19	0.22
	8.37	5.87	0.15	0.45	0.87	6.13	36.65	0.14	0.55	0.14	0.12
	8.42	4.16	0.15	0.4	0.62	4.39	26.23	0.14	0.55	0.14	0.09
	8.47	3.52	0.12	0.35	0.43	3.7	22.12	0.12	0.65	0.1	0.04

	8.52	2.62	0.1	0.3	0.27	2.77	16.54	0.1	0.74	0.08	0.02
	8.57	1.56	0.11	0.25	0.17	1.68	10.03	0.1	0.73	0.09	0.01
	8.62	1.25	0.08	0.2	0.1	1.34	8.02	0.07	0.94	0.05	0.01
	8.67	0.69	0.07	0.15	0.05	0.76	4.55	0.07	1.02	0.05	0.0
	8.72	0.46	0.05	0.1	0.02	0.51	3.03	0.05	1.43	0.03	0.0
	8.77	0.23	0.02	0.05	0.01	0.25	1.51	0.02	2.55	0.01	0.0
	8.8	0.07	0.01	0.02	0.0	0.08	0.46	0.01	6.94	0.0	0.0

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

MODEL SUMMARY

Measured Flow (Qm) =	4.57	(cfs)
Calculated Flow (Qc) =	4.56	(cfs)
(Qm-Qc)/Qm * 100 =	0.20%	
Measured Waterline (WLm) =	7.88	(ft)
Calculated Waterline (WLc) =	7.87	(ft)
(WLm-WLc)/WLm * 100 =	0.06%	
Max Measured Depth (Dm) =	0.95	(ft)
Max Calculated Depth (Dc) =	0.95	(ft)
(Dm-Dc)/Dm * 100 =	0.02%	
Mean Velocity =	0.84	(ft/s)
Manning's n =	0.206	
0.4 * Qm =	1.83	(cfs)
2.5 * Qm =	11.43	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	1.7	6.91		
Bankfull	2.5	7.27		
	3.5	7.64		
	5	7.63		
Waterline	5.4	7.87	0	0
	6.5	8.27	0.4	0.22
	7.5	8.47	0.6	0.23
	8.5	8.57	0.7	0.16
	9.5	8.37	0.5	0.71
	10	8.42	0.55	0.77
	10.5	8.22	0.35	1.47
	11	8.22	0.35	1.56
	11.5	8.27	0.4	1.55
	12	8.37	0.5	1.03
	12.5	8.42	0.55	1.09
	13	8.82	0.95	1.32
	13.5	8.67	0.8	1.44
	14	8.62	0.75	1.08
	14.5	8.52	0.65	1.25
	15	8.22	0.35	0.57
	15.5	8.27	0.4	1.2
	16	7.92	0.05	0
Waterline	16.3	7.88	0	0
	17.3	7.57		
	17.9	7.51		
Bankfull	18.5	7.28		
	23	5.98		

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	0	0	0	0
0	0	0	0	0
1.17	0.4	0.42	0.09	2.02
1.02	0.6	0.6	0.14	3.02
1	0.7	0.7	0.11	2.45
1.02	0.5	0.38	0.27	5.82
0.5	0.55	0.28	0.21	4.63
0.54	0.35	0.17	0.26	5.63
0.5	0.35	0.17	0.27	5.97
0.5	0.4	0.2	0.31	6.78
0.51	0.5	0.25	0.26	5.63
0.5	0.55	0.28	0.3	6.56
0.64	0.95	0.47	0.63	13.71
0.52	0.8	0.4	0.58	12.6
0.5	0.75	0.38	0.41	8.86
0.51	0.65	0.33	0.41	8.89
0.58	0.35	0.17	0.1	2.18
0.5	0.4	0.2	0.24	5.25
0.61	0.05	0.02	0	0
0.3	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

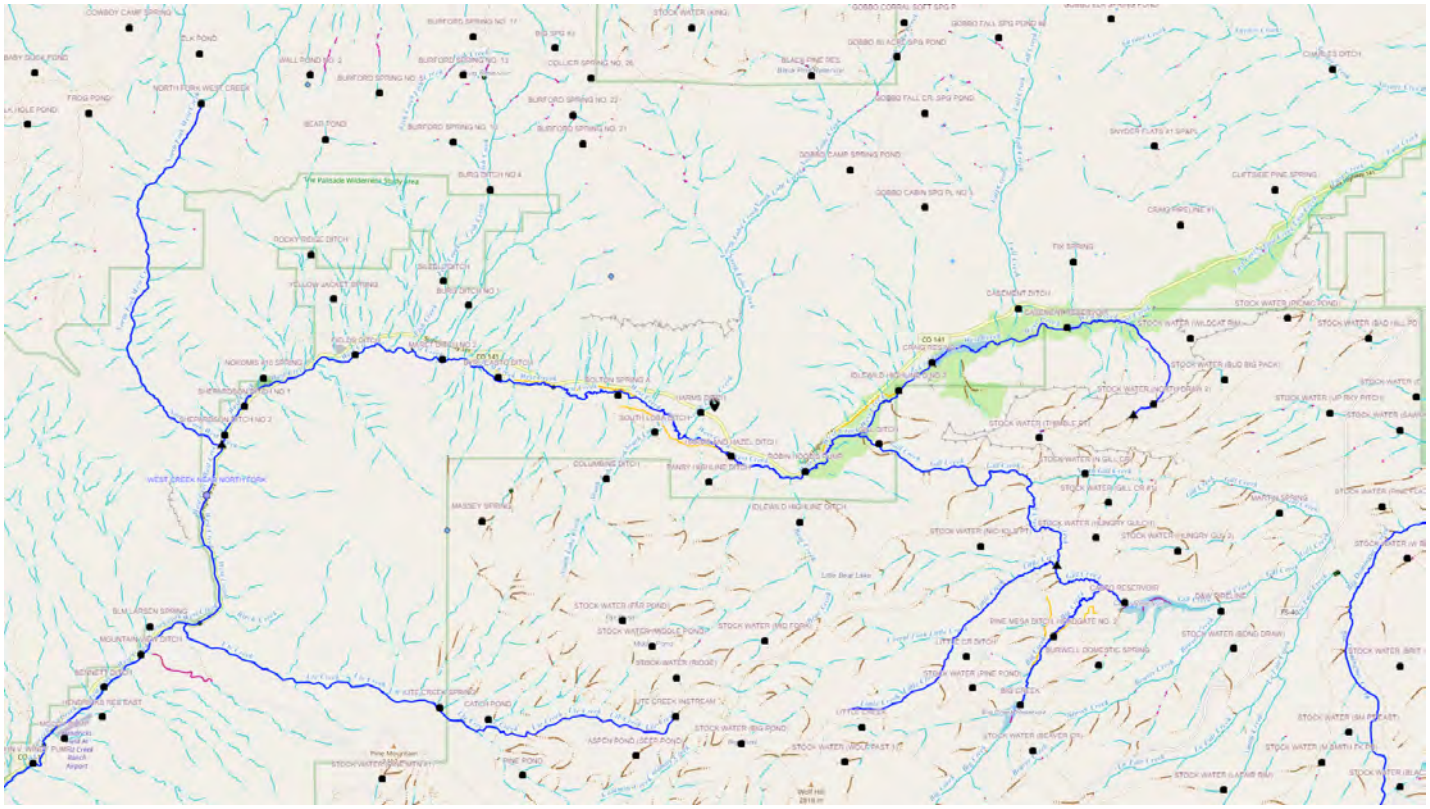
DISCLAIMER

"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: North Lobe Creek
Stream Locations: At BLM-private boundary 0.5 mile upst fr conf w/West Creek
Fieldwork Date: 05/25/2022
Cross-section: 2
Observers: R. Smith
Coordinate System: UTM Zone 12
X (easting): 693032
Y (northing): 4293308
Date Processed: 07/26/2023
Slope: 0.0186
Discharge: R2Cross data file: 4.08 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: North Lobe Creek 5-25-22 #2.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 9.87

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.11
Percent Wetted Perimeter (%)	50.0	0.28
Mean Velocity (ft/s)	1.0	7.64

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	7.05	9.87	1.11	1.55	10.93	11.73	100.0	0.93	0.13	1.5	16.35
	7.05	9.87	1.11	1.55	10.93	11.73	100.0	0.93	0.13	1.5	16.35
	7.1	9.79	1.07	1.5	10.44	11.6	98.91	0.9	0.13	1.42	14.85
	7.15	9.71	1.02	1.45	9.95	11.47	97.82	0.87	0.14	1.35	13.44
	7.2	9.63	0.98	1.4	9.47	11.34	96.73	0.83	0.14	1.28	12.1
	7.25	9.56	0.94	1.35	8.99	11.21	95.63	0.8	0.15	1.21	10.84
	7.3	9.48	0.9	1.3	8.51	11.09	94.54	0.77	0.15	1.13	9.65
	7.35	9.4	0.86	1.25	8.04	10.96	93.45	0.73	0.16	1.06	8.54
	7.4	9.32	0.81	1.2	7.57	10.83	92.36	0.7	0.16	0.99	7.5
	7.45	9.24	0.77	1.15	7.11	10.7	91.27	0.66	0.17	0.92	6.54
	7.5	9.16	0.73	1.1	6.65	10.57	90.18	0.63	0.18	0.85	5.65
	7.55	9.08	0.68	1.05	6.19	10.45	89.09	0.59	0.18	0.78	4.83
Waterline	7.6	9.0	0.64	1.0	5.74	10.32	87.99	0.56	0.19	0.71	4.08
	7.65	8.95	0.59	0.95	5.29	10.2	86.99	0.52	0.2	0.64	3.4
	7.7	8.89	0.55	0.9	4.85	10.08	85.98	0.48	0.22	0.57	2.78
	7.75	8.84	0.5	0.85	4.4	9.96	84.98	0.44	0.23	0.51	2.23
	7.8	8.78	0.45	0.8	3.96	9.85	83.97	0.4	0.25	0.44	1.75
	7.85	8.73	0.4	0.75	3.53	9.73	82.97	0.36	0.27	0.38	1.33
	7.9	8.22	0.38	0.7	3.1	9.15	78.02	0.34	0.29	0.34	1.06
	7.95	7.72	0.35	0.65	2.7	8.57	73.07	0.32	0.31	0.31	0.83
	8.0	7.45	0.31	0.6	2.32	8.21	70.05	0.28	0.33	0.26	0.61
	8.05	7.19	0.27	0.55	1.96	7.86	67.03	0.25	0.37	0.22	0.42
	8.1	5.97	0.27	0.5	1.63	6.57	56.04	0.25	0.37	0.21	0.35
	8.15	5.23	0.26	0.45	1.35	5.77	49.23	0.23	0.39	0.2	0.27
	8.2	4.53	0.24	0.4	1.11	5.02	42.81	0.22	0.41	0.18	0.2

	8.25	4.11	0.22	0.35	0.89	4.53	38.61	0.2	0.45	0.15	0.14
	8.3	3.68	0.19	0.3	0.7	4.04	34.41	0.17	0.5	0.12	0.09
	8.35	3.25	0.16	0.25	0.52	3.54	30.21	0.15	0.57	0.1	0.05
	8.4	2.83	0.13	0.2	0.37	3.05	26.01	0.12	0.67	0.07	0.03
	8.45	2.5	0.09	0.15	0.24	2.65	22.63	0.09	0.87	0.05	0.01
	8.5	2.13	0.06	0.1	0.12	2.21	18.86	0.05	1.31	0.02	0.0
	8.55	1.05	0.04	0.05	0.04	1.06	9.06	0.04	1.73	0.01	0.0
	8.59	0.74	0.01	0.02	0.01	0.74	6.3	0.01	4.17	0.0	0.0

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

MODEL SUMMARY

Measured Flow (Qm) =	4.08	(cfs)
Calculated Flow (Qc) =	4.08	(cfs)
(Qm-Qc)/Qm * 100 =	0.00%	
Measured Waterline (WLm) =	7.6	(ft)
Calculated Waterline (WLc) =	7.6	(ft)
(WLm-WLc)/WLm * 100 =	-0.00%	
Max Measured Depth (Dm) =	1	(ft)
Max Calculated Depth (Dc) =	1	(ft)
(Dm-Dc)/Dm * 100 =	0.00%	
Mean Velocity =	0.71	(ft/s)
Manning's n =	0.193	
0.4 * Qm =	1.63	(cfs)
2.5 * Qm =	10.2	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	6.86		
	1.8	6.89		
Bankfull	2.1	7.05		
Waterline	2.6	7.6	0	0
	3	8.05	0.45	0.02
	4	8.1	0.5	0.11
	5	8.2	0.6	0.1
	6	8.4	0.8	0.71
	6.3	8.5	0.9	0.56
	6.6	8.55	0.95	0.6
	6.9	8.6	1	0.36
	7.2	8.6	1	0.42
	7.5	8.6	1	0.22
	7.8	8.5	0.9	0.39
	8.2	8.55	0.95	1.02
	8.5	8.2	0.6	1.06
	8.8	7.95	0.35	1.11
	9.1	7.9	0.3	1.32
	9.4	7.85	0.25	1.65
	9.7	7.95	0.35	1.82
	10	8.05	0.45	1.98
	10.3	8.15	0.55	2.07
	10.6	8.3	0.7	1.83
	10.9	8.45	0.85	1.36
	11.2	8.55	0.95	1.24
	11.5	8.1	0.5	0.71
Waterline	11.6	7.6	0	0
Bankfull	12	7.01		
	12.5	6.81		
	15	6.7		

	20.5	5.95		

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	0	0	0	0
0.6	0.45	0.32	0.01	0.15
1	0.5	0.5	0.06	1.35
1	0.6	0.6	0.06	1.47
1.02	0.8	0.52	0.37	9.05
0.32	0.9	0.27	0.15	3.71
0.3	0.95	0.28	0.17	4.19
0.3	1	0.3	0.11	2.65
0.3	1	0.3	0.13	3.09
0.3	1	0.3	0.07	1.62
0.32	0.9	0.32	0.12	3.01
0.4	0.95	0.33	0.34	8.31
0.46	0.6	0.18	0.19	4.68
0.39	0.35	0.1	0.12	2.86
0.3	0.3	0.09	0.12	2.91
0.3	0.25	0.07	0.12	3.03
0.32	0.35	0.1	0.19	4.68
0.32	0.45	0.14	0.27	6.55
0.32	0.55	0.17	0.34	8.37
0.34	0.7	0.21	0.38	9.42
0.34	0.85	0.26	0.35	8.5
0.32	0.95	0.28	0.35	8.66
0.54	0.5	0.1	0.07	1.74
0.51	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

0	0	0	0	0

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Discharge Measurment Field Visit Data Report *(Filters: Name begins with North Lobe;)*

Div	Name	CWCB Case Number	Segment ID	Meas. Date	UTM	Location	Flow Amount (cfs)	Meas #	Rating	Station ID
4	North Lobe Creek	24/4/A-004	24/4/A-004	11/08/2023	UTMx: UTMy:	Q taken at the most uniform of the short runs we could find	0.81			

Discharge Measurement Summary

Site name	NorthlobeCreek
Site number	11082023
Operator(s)	SC
File name	NorthlobeCreek_20231108-140435.ft
Comment	

Start time	11/8/2023 1:21 PM
End time	11/8/2023 2:02 PM
Start location latitude	38.754
Start location longitude	-108.764
Calculations engine	FlowTracker2

Sensor type	Top Setting
Handheld serial number	FT2H2322005
Probe serial number	FT2P2317010
Probe firmware	1.30
Handheld software	1.7

# Stations	Avg interval (s)	Total discharge (ft³/s)
20	40	0.8074

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
6.000	2.7375	6.814

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
40	0.456	0.2949

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
39.626	0.950	0.6921

Discharge Uncertainty		
Category	**ISO**	**IVE**
Accuracy	1.0%	1.0%
Depth	0.4%	5.4%
Velocity	1.2%	12.5%
Width	0.1%	0.1%
Method	2.0%	
# Stations	2.5%	
Overall	**3.6%**	**13.7%**

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

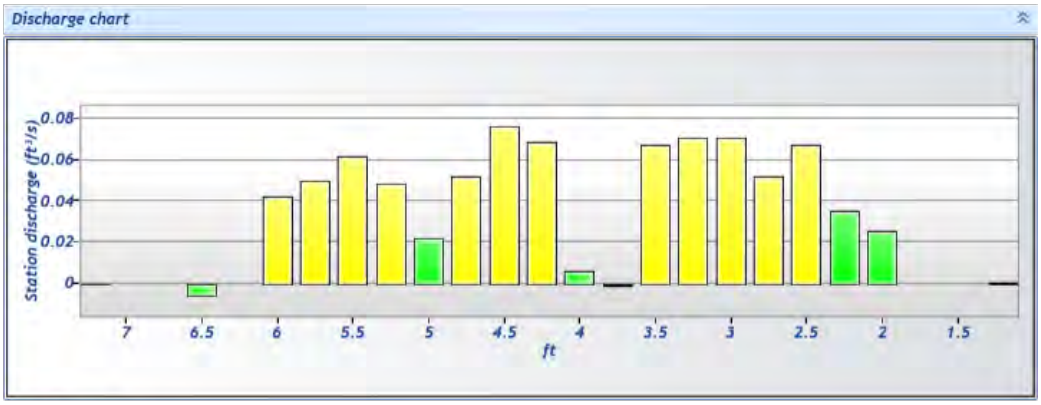
Summary overview

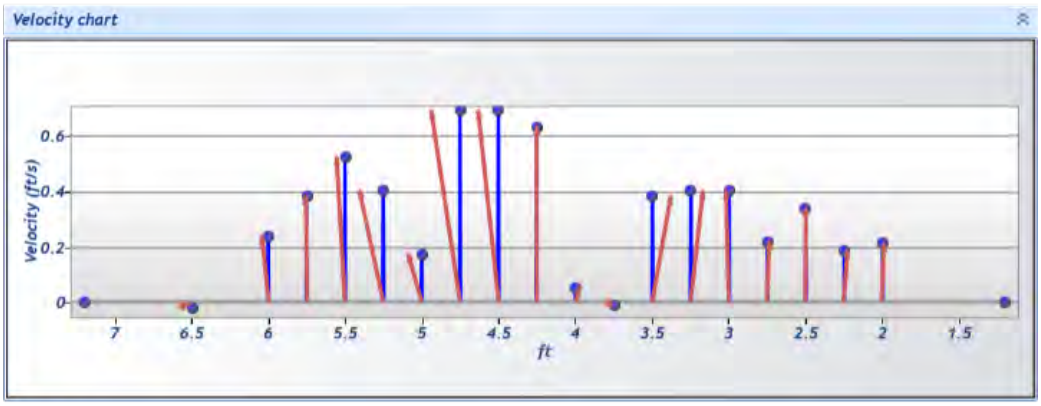
No changes were made to this file
Quality control warnings

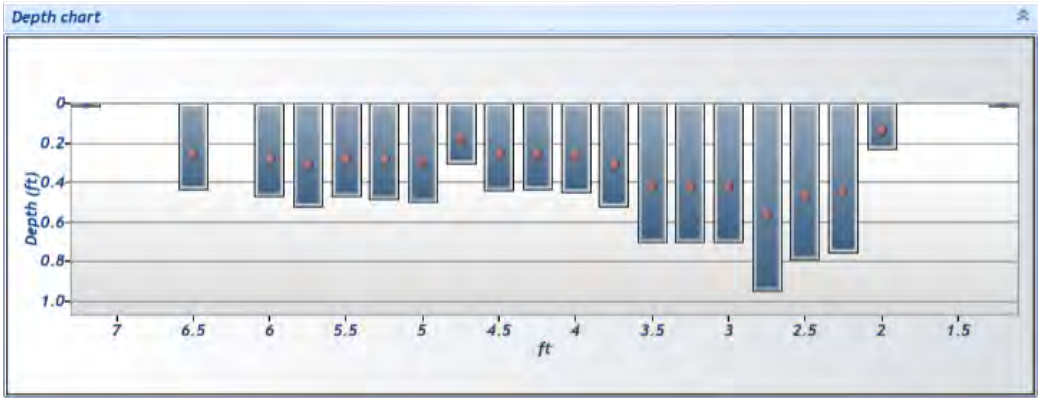
Discharge Measurement Summary

Site name	NorthlobeCreek
Site number	11082023
Operator(s)	SC
File name	NorthlobeCreek_20231108-140435.ft
Comment	

Station Warning Settings		
Station discharge OK	Station discharge < 5.00%	
Station discharge caution	5.00% >= Station discharge < 10.00%	
Station discharge warning	Station discharge >= 10.00%	







Discharge Measurement Summary

Site name	NorthlobeCreek
Site number	11082023
Operator(s)	SC
File name	NorthlobeCreek_20231108-140435.ft
Comment	

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	1:21 PM	1.200	None	0.010	0.0000	0.000	0	0.0000	1.0000	0.2117	0.0040	0.0008	0.10	√
1	1:22 PM	2.000	0.6	0.230	0.6000	0.138	63	0.2117	1.0000	0.2117	0.1208	0.0256	3.17	√
2	2:00 PM	2.250	0.6	0.750	0.6000	0.450	65	0.1885	1.0000	0.1885	0.1875	0.0353	4.38	√
3	1:25 PM	2.500	0.6	0.790	0.6000	0.474	80	0.3382	1.0000	0.3382	0.1975	0.0668	8.27	√
4	1:56 PM	2.750	0.6	0.950	0.6000	0.570	65	0.2193	1.0000	0.2193	0.2375	0.0521	6.45	√
5	1:28 PM	3.000	0.6	0.700	0.6000	0.420	80	0.4028	1.0000	0.4028	0.1750	0.0705	8.73	√
6	1:57 PM	3.250	0.6	0.700	0.6000	0.420	51	0.4018	1.0000	0.4018	0.1750	0.0703	8.71	√
7	1:29 PM	3.500	0.6	0.700	0.6000	0.420	80	0.3827	1.0000	0.3827	0.1750	0.0670	8.29	√
8	1:51 PM	3.750	0.6	0.520	0.6000	0.312	80	-0.0094	1.0000	-0.0094	0.1300	-0.0012	-0.15	√
9	1:31 PM	4.000	0.6	0.450	0.6000	0.270	80	0.0551	1.0000	0.0551	0.1125	0.0062	0.77	√
10	1:53 PM	4.250	0.6	0.430	0.6000	0.258	44	0.6328	1.0000	0.6328	0.1075	0.0680	8.43	√
11	1:33 PM	4.500	0.6	0.440	0.6000	0.264	80	0.6921	1.0000	0.6921	0.1100	0.0761	9.43	√
12	1:46 PM	4.750	0.6	0.300	0.6000	0.180	80	0.6915	1.0000	0.6915	0.0750	0.0519	6.42	√
13	1:35 PM	5.000	0.6	0.500	0.6000	0.300	80	0.1739	1.0000	0.1739	0.1250	0.0217	2.69	√
14	1:49 PM	5.250	0.6	0.480	0.6000	0.288	80	0.4024	1.0000	0.4024	0.1200	0.0483	5.98	√
15	1:37 PM	5.500	0.6	0.470	0.6000	0.282	80	0.5249	1.0000	0.5249	0.1175	0.0617	7.64	√
16	2:02 PM	5.750	0.6	0.520	0.6000	0.312	55	0.3833	1.0000	0.3833	0.1300	0.0498	6.17	√
17	1:40 PM	6.000	0.6	0.470	0.6000	0.282	80	0.2386	1.0000	0.2386	0.1763	0.0421	5.21	√
18	1:42 PM	6.500	0.6	0.430	0.6000	0.258	80	-0.0214	1.0000	-0.0214	0.2580	-0.0055	-0.69	√
19	1:44 PM	7.200	None	0.010	0.0000	0.000	0	0.0000	1.0000	-0.0214	0.0035	-0.0001	-0.01	√

Discharge Measurement Summary

Site name	NorthlobeCreek
Site number	11082023
Operator(s)	SC
File name	NorthlobeCreek_20231108-140435.ft
Comment	

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	20.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
10	1:53 PM	4.250	0.6	0.430	0.6000	0.258	Large SNR Variation
13	1:35 PM	5.000	0.6	0.500	0.6000	0.300	Velocity Angle > QC
14	1:49 PM	5.250	0.6	0.480	0.6000	0.288	Velocity Angle > QC

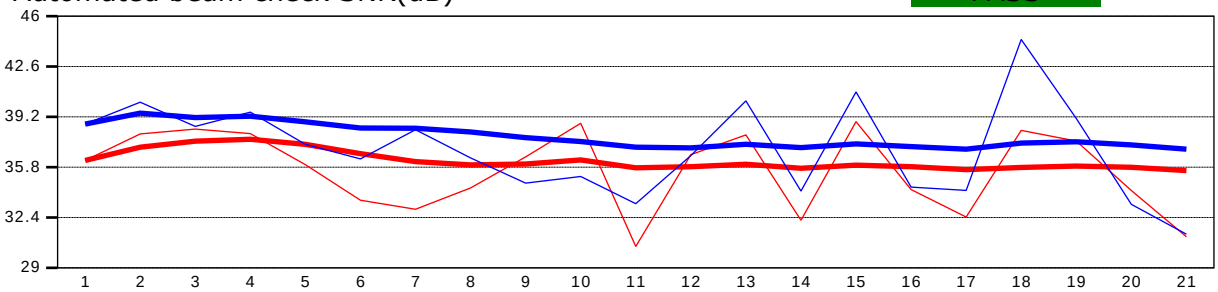
Discharge Measurement Summary

Site name	NorthlobeCreek
Site number	11082023
Operator(s)	SC
File name	NorthlobeCreek_20231108-140435.ft
Comment	

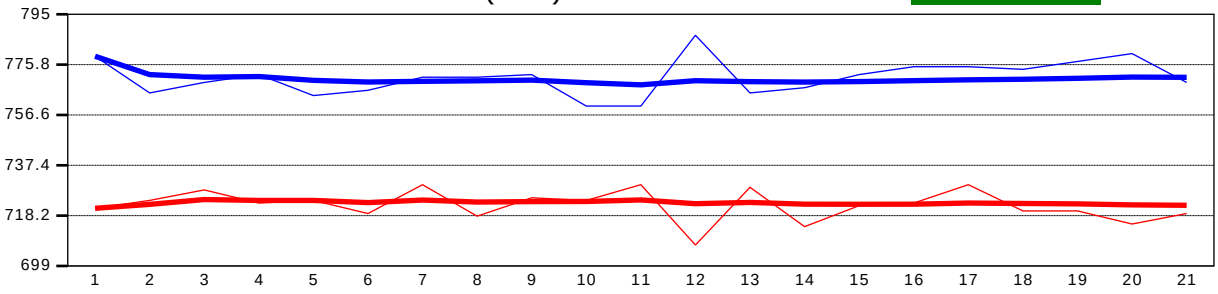
Beam 1	
Beam 2	

Automated beam check Start time 11/8/2023 1:21:07 PM

Automated beam check SNR(dB) PASS



Automated beam check Noise level(cnts) PASS



Automated beam check Quality control warnings

No quality control warnings

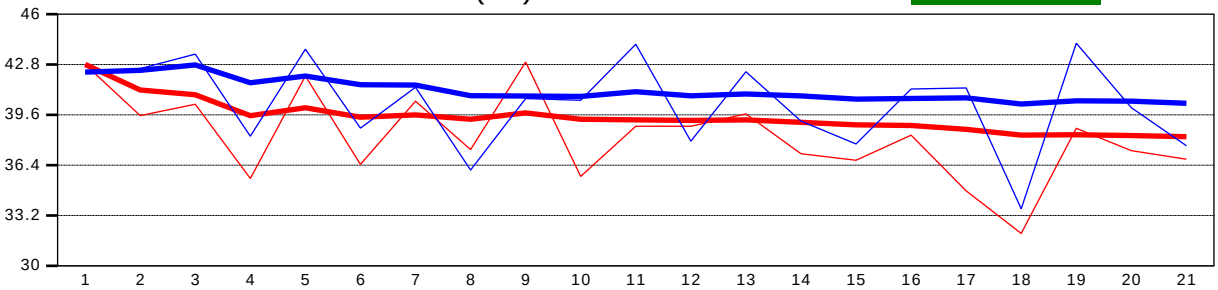
Discharge Measurement Summary

Site name	NorthlobeCreek
Site number	11082023
Operator(s)	SC
File name	NorthlobeCreek_20231108-140435.ft
Comment	

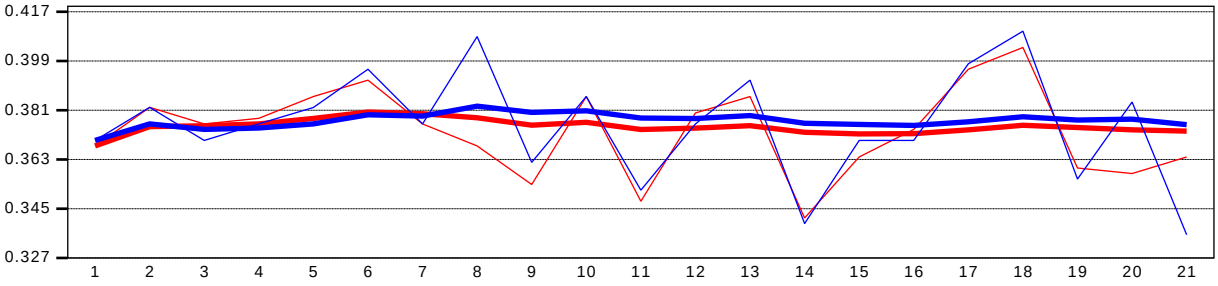
Beam 1	
Beam 2	

Automated beam check Start time 11/8/2023 1:21:07 PM

Automated beam check Peak level(dB) PASS



Automated beam check Peak position(ft) PASS



Automated beam check Quality control warnings

No quality control warnings