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:
7250 (CO0-932)

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 the unnamed tributary to Willow Creek that flows through Ways Gulch, located in Water Division 6.

Location and Land Status. The unnamed tributary originates on the south flank of Hahns Peak and flows into Willow Creek just downstream from Steamboat Lake. This recommendation addresses the portion of the unnamed tributary that starts at the headwaters and extends downstream to the lower most BLM-private land boundary at Latitude 40.80941 degrees North, Longitude -106.91879 degrees West, a distance of approximately 2.1 miles. BLM manages approximately 0.5 miles of this reach, the U.S. Forest Service manages 1.5 miles, and 0.1 miles are in private ownership.

Biological Summary. This unnamed tributary to Willow Creek is a cold water, high gradient stream. It begins in a narrow, densely forested valley, and then emerges into a wide meadow area that surrounds Steamboat Lake. Substrate is generally from small to large in diameter, ranging from gravels to 1-foot boulders. Beaver activity is extensive on the upper portions of the stream, resulting in many ponds that are able to support fish populations during low flow periods. A low quantity of riffle habitat is a limiting factor for the fish population.

Water quality is excellent for supporting cold water species. Fish surveys have documented a self-supporting population of native mountain suckers. Spot surveys have revealed abundant populations of stonefly, caddisfly, and mayfly.

The unnamed tributary in Ways Gulch supports a healthy riparian community comprised of spruce, willow, and alder. Bank stability appears to be good, except in areas of high livestock usage.

R2Cross Analysis. BLM collected the following R2Cross data from the unnamed tributary to Willow Creek that flows through Ways Gulch:

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)
5/14/2021 #1	2.50 cfs	7.60 feet	0.9007 cfs	1.3166 cfs
5/14/2021 #2	2.27 cfs	9.00 feet	0.6601 cfs	1.2275 cfs
		Averages:	0.78 cfs	1.27 cfs

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

> 1.30 cubic feet per second is recommended during the snowmelt runoff period and early summer, from May 1 through July 31. This recommendation is driven by the average depth criteria. This flow rate will ensure that the riffle habitat can be fully utilized during the spring and summer period, when fish are spawning and moving actively between pools.
>
> 0.50 cubic feet per second is recommended during late summer, from August 1 through September 30. This recommendation is driven by the mean velocity criteria. This flow rate should maintain full and sufficiently cool pools during late summer when stream temperatures can still be high and provide sufficient water for passage between pools.
>
> 0.20 cubic feet per second is recommended during the cold weather period from October 1 through April 30. This recommendation is driven by naturally limited water availability. This flow rate 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 CSUFlows can provide an estimate of natural hydrology. One nearby gage may provide an estimate of the seasonality of flows, because it is located on a watershed with similar characteristics. USGS Gage 09240800, on South Fork Elk River near Clark, is located on a larger watershed but appears to be relatively unaffected by diversion and storage operations.

BLM is not aware of any water rights that authorize diversion of water directly from this 4.5-mile tributary to Willow Creek. However, there are multiple water rights on springs located within the Ways Gulch watershed.

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 2022. 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: 2023.11.14 13:16:32 -07'00'

Alan Bittner
Deputy State Director, Resources

Cc: Kymm Gresset, Little Snake Field Office
Eric Scherff, Little Snake Field Office
Elijah Waters, Northwest District Manager

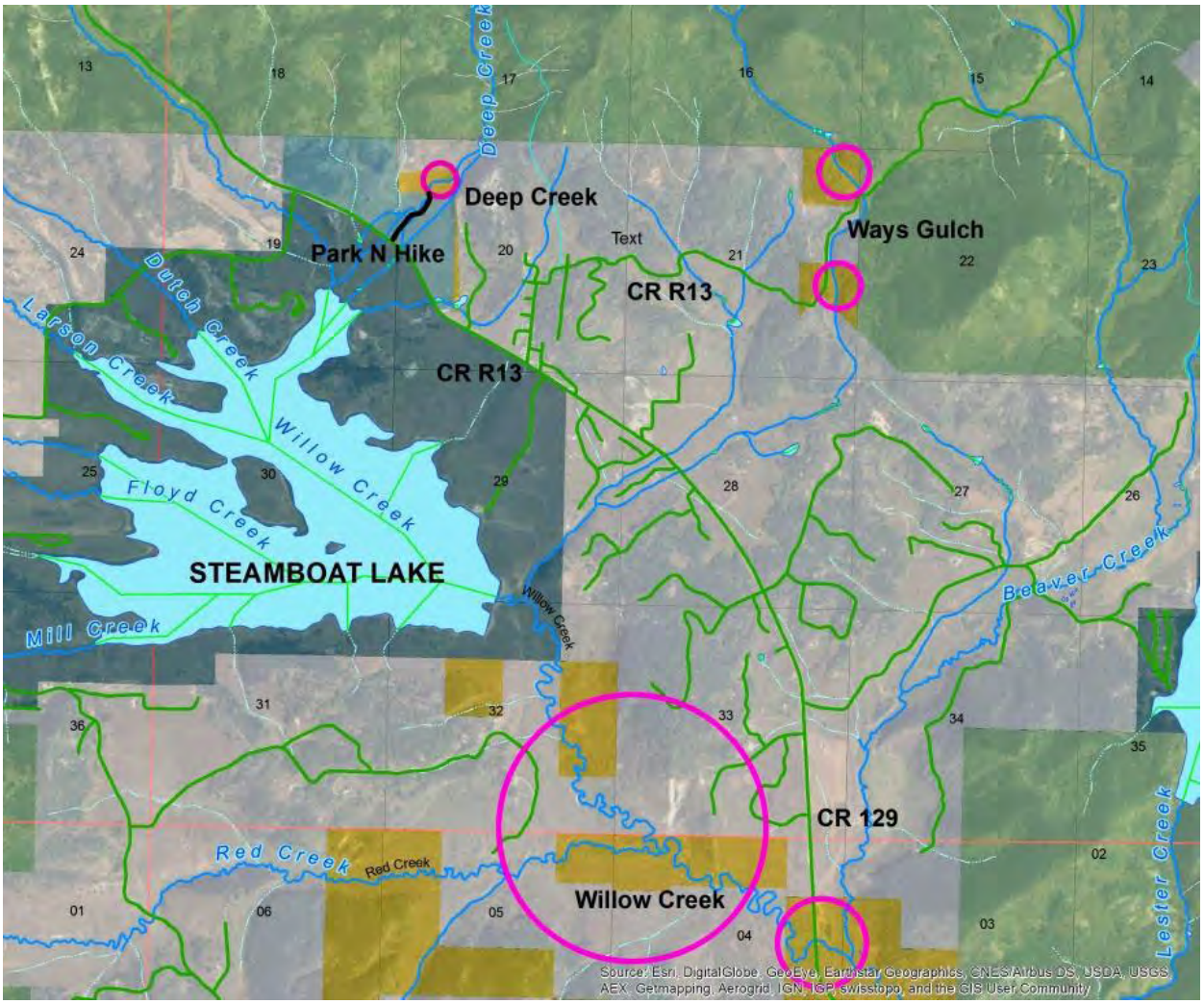
Little Snake Field Office

Stream Sampling July 2016

Ways Gulch - Water Code: 21515

Introduction:

Ways Gulch, located north of Clark, Colorado, on lands managed by the Little Snake Field Office, was sampled on July 20, 2016. Ways Gulch is tributary to Willow Creek which then enters Steamboat Lake. Sampling was conducted to determine fishery status and species composition. One backpack shocker was used to sample approximately 125 feet of stream. The sample reach contained several beaver ponds. Mountain Suckers were the only species seen or collected. Amphibians were also looked for and one Tiger Salamander was found. Personnel present included: Tom Fresques, Shawn Wiser, Nate Higginson, and Kristen Doyle, BLM and Brian Hodge, Trout Unlimited.



Mountain Sucker – tubercules present, in spawing coloration

Mountain Sucker mouth

Mountain Sucker

Tiger Salamander

Representative habitat - just upstream of road crossing

Discussion:

Ways Gulch is a small perennial stream and contains a small population of native Mountain Suckers. All fish collected appeared healthy and a couple of age classes were noted. Sampling was difficult as limited flowing habitat was present. The stream is primarily beaver ponds with small sections of deep runs in between. More fish were seen than were captured, all presumed mountain suckers. A few male suckers were in spawning condition as evidenced by body coloration and tubercules on the caudal fins.

Riparian vegetation is dense and is comprised primarily of willows and sedge. The stream was well shaded. Stream habitat was largely a series of beaver ponds with some deep, slow runs and limited riffle habitat in between larger ponds. Stream substrates were primarily fine sediments with some limited gravel and cobble habitat in the small riffle areas. Water temperatures at the time of sampling were 63.9°F.

Recommendations:

- Consider sampling a downstream reach on BLM lands and look for habitat suitable to complete a population estimate

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Ways Gulch						CROSS-SECTION NO: 1	
CROSS-SECTION LOCATION: On southern BLM ownership parcel							
DATE: 5-14-21	OBSERVERS: R. Smith, E. Schorff						
LEGAL DESCRIPTION	¼ SECTION: 21	SECTION: NE SE	TOWNSHIP: 10 N/S	RANGE: 85 E/W	PM: 6th		
COUNTY: Routt	WATERSHED: Elk River	WATER DIVISION: 6	DOW WATER CODE: 21575				
MAP(S): USGS:	Zone 13 339176 4519464						
USFS:							

SUPPLEMENTAL DATA

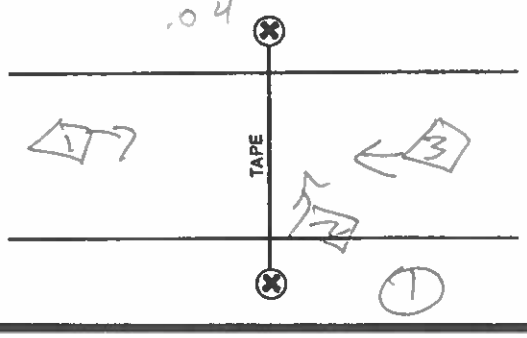
SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: M-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed lbs/foot	TAPE TENSION: surveyed lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel no 1-foot boulders	PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: 3		

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	5.95/5.95
② WS Upstream	10.5	5.64
③ WS Downstream	18.5	6.28
SLOPE	0.64/29.0 = .022	

3.6
2.8
.04

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

pH = 8.05
conductivity = 48
Temp = 4.1° C
0.0 = salinity

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:	CROSS-SECTION NO.:	DATE:	SHEET ___ OF ___
Wars Gulch	1	5-14-21	

BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 10:00 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)
LS	0.0		4.52								
BF	1.3		5.08								
RW	1.8		5.95	Ø				Ø			
	2.1		6	.05				Ø			
	2.4		6	.05				Ø			
	2.7		6.05	.1				.44			
	3.0		6.2	.25				.95			
	3.3		6.2	.25				.89			
	3.6		6.2	.25				.91			
	3.9		6.25	.30				1.67			
	4.2		6.3	.35				2.19			
	4.5		6.15	.20				2.69			
	4.7		6.15	.20				2.21			
	4.9		6.15	.20				1.88			
	5.1		6.35	.40				2.04			
	5.3		6.3	.35				2.19			
	5.5		6.3	.35				1.82			
	5.7		6.35	.4				2.37			
	5.9		6.35	.4				2.17			
	6.1		6.35	.4				1.69			
	6.3		6.35	.4				1.23			
	6.5		6.25	.3				1.93			
	6.7		6.3	.35				2.09			
	6.9		6.3	.35				2.09			
	7.1		6.25	.3				1.46			
	7.3		6.2	.25				0.90			
	7.6		6.15	.2				0.08			
	7.9		6.05	.1				Ø			
LW	8.1		5.95	Ø				Ø			
	8.8		5.45								
BF	8.9		5.08								
RS	9.9		4.25								
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: Ways Gulch						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: On southern BLM ownership parcel.						
DATE: 5-14-21	OBSERVERS: R. Smith, E. Scharff					
LEGAL DESCRIPTION	¼ SECTION: 21	SECTION: NE SE	TOWNSHIP: 10 N/S	RANGE: 85 E/W	PM: 6th	
COUNTY: Routt	WATERSHED: Elk River	WATER DIVISION: 6	DOW WATER CODE: 21515			
MAP(S): USGS:	Zone 13 338169					
USFS:	4519430					

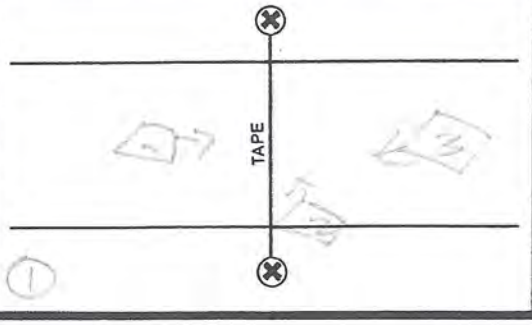
SUPPLEMENTAL DATA

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	6.2 / 6.2
② WS Upstream	1.5	6.16
③ WS Downstream	6.3	6.46
SLOPE	.30 / 7.8 = .038	

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

CFDF 1-85

DISCHARGE/CROSS SECTION NO[illegible]

STREAM NAME: Ways Gulch	CROSS-SECTION NO.: 2	DATE: 5-14-21	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 11:00 am

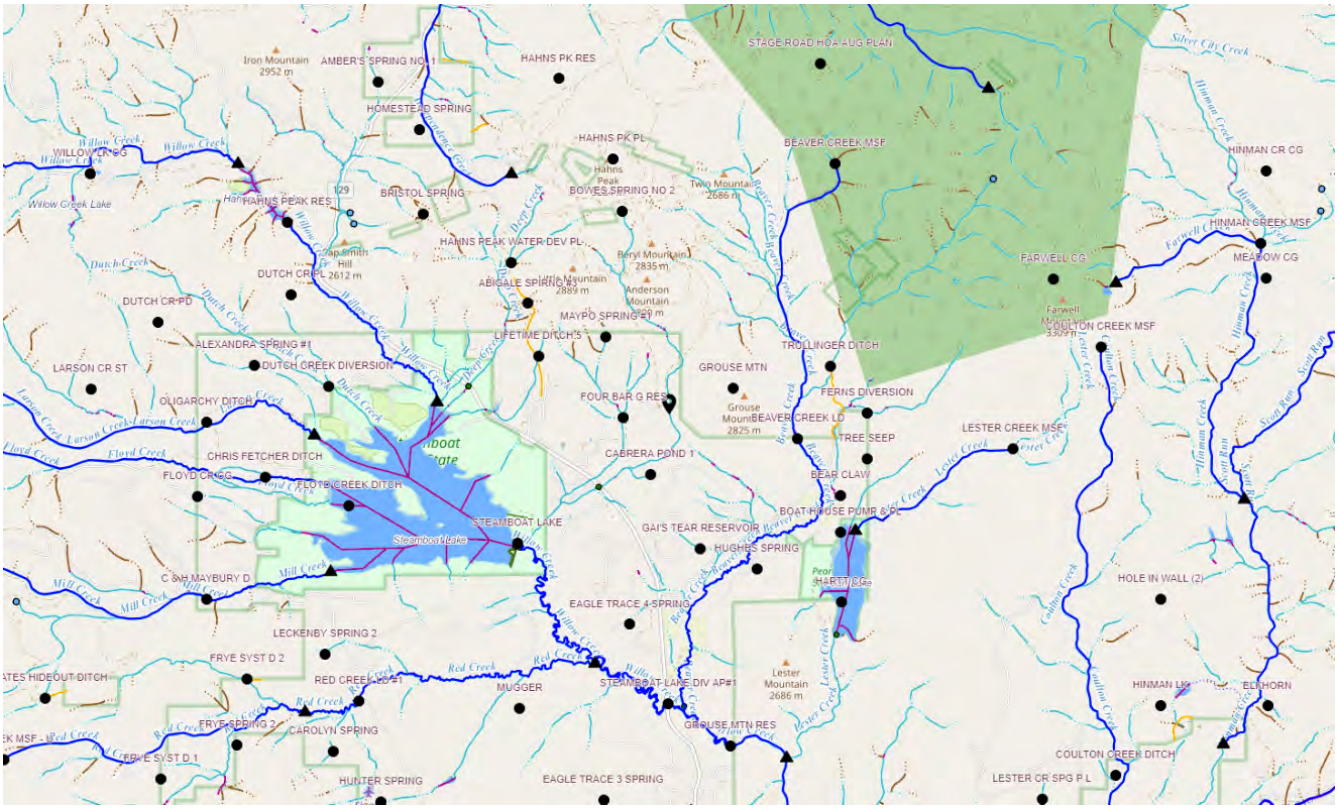
Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
LRS	1.7		5.68								
RBF	2.5		5.78								
	3.3		5.86								
	3.7		6.06								
RLW	3.9		6.20					0			
	4.1		6.6	0.40				0.45			
	4.3		6.65	0.45				1.09			
	4.5		6.65	0.45				0.73			
	4.7		6.7	0.50				1.68			
	4.9		6.7	0.50				2.03			
	5.1		6.7	0.50				1.32			
	5.3		6.65	0.45				1.26			
	5.5		6.65	0.45				1.0			
	5.7		6.6	0.40				1.46			
	5.9		6.55	0.35				2.21			
	6.1		6.5	0.30				1.43			
	6.3		6.5	0.30				2.14			
	6.5		6.5	0.30				2.30			
	6.7		6.5	0.30				1.72			
	6.9		6.5	0.30				2.04			
	7.1		6.5	0.30				1.67			
	7.3		6.5	0.30				1.61			
	7.5		6.45	0.25				1.03			
	7.7		6.4	0.20				1.74			
	7.9		6.4	0.20				1.22			
	8.1		6.5	0.30				1.24			
	8.3		6.5	0.30				0.56			
	8.5		6.35	0.25				0.24			
LW	8.8		6.30					0			
	9.1		6.04								
	10.8		5.84								
LS/RBF	11.7		5.80								
TOTALS:											

End of Measurement	Time: 11:45	Gage Reading: _____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

R2Cross RESULTS

Stream Name: Ways Gulch
Stream Locations: On southern BLM ownership parcel
Fieldwork Date: 05/14/2021
Cross-section: 1
Observers: R Smith, E Scherff
Coordinate System: UTM Zone 13
X (easting): 338176
Y (northing): 4519464
Date Processed: 09/14/2023
Slope: 0.022
Discharge: R2Cross data file: 2.5 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Ways Gulch 5-14-21 #1.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 7.6

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	1.32
Percent Wetted Perimeter (%)	50.0	0.26
Mean Velocity (ft/s)	1.0	0.9

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	5.08	7.6	1.01	1.27	7.71	8.82	100.0	0.87	0.03	6.25	48.17
	5.1	7.58	1.0	1.25	7.56	8.77	99.5	0.86	0.03	6.17	46.62
	5.15	7.54	0.95	1.2	7.18	8.66	98.26	0.83	0.03	5.97	42.85
	5.2	7.5	0.91	1.15	6.8	8.55	97.02	0.8	0.03	5.76	39.19
	5.25	7.46	0.86	1.1	6.43	8.44	95.78	0.76	0.03	5.55	35.65
	5.3	7.41	0.82	1.05	6.06	8.33	94.54	0.73	0.03	5.32	32.24
	5.35	7.37	0.77	1.0	5.69	8.22	93.29	0.69	0.03	5.09	28.94
	5.4	7.33	0.73	0.95	5.32	8.11	92.05	0.66	0.03	4.85	25.78
	5.45	7.29	0.68	0.9	4.95	8.01	90.81	0.62	0.03	4.59	22.76
	5.5	7.19	0.64	0.85	4.59	7.86	89.18	0.58	0.04	4.35	19.98
	5.55	7.09	0.6	0.8	4.24	7.72	87.55	0.55	0.04	4.09	17.34
	5.6	6.99	0.56	0.75	3.88	7.57	85.92	0.51	0.04	3.83	14.87
	5.65	6.89	0.51	0.7	3.54	7.43	84.29	0.48	0.04	3.55	12.56
	5.7	6.79	0.47	0.65	3.19	7.29	82.66	0.44	0.04	3.26	10.42
	5.75	6.69	0.43	0.6	2.86	7.14	81.03	0.4	0.04	2.96	8.45
	5.8	6.6	0.38	0.55	2.52	7.0	79.4	0.36	0.04	2.64	6.66
	5.85	6.5	0.34	0.5	2.2	6.86	77.77	0.32	0.04	2.31	5.07
	5.9	6.4	0.29	0.45	1.87	6.71	76.14	0.28	0.05	1.96	3.68
Waterline	5.95	6.3	0.25	0.4	1.56	6.57	74.51	0.24	0.05	1.6	2.5
	6.0	5.6	0.22	0.35	1.25	5.85	66.39	0.21	0.06	1.41	1.76
	6.05	5.2	0.19	0.3	0.98	5.44	61.67	0.18	0.06	1.13	1.11
	6.1	4.95	0.15	0.25	0.73	5.17	58.61	0.14	0.07	0.81	0.59
	6.15	4.3	0.11	0.2	0.49	4.5	51.01	0.11	0.09	0.56	0.27
	6.2	3.15	0.09	0.15	0.29	3.3	37.42	0.09	0.11	0.41	0.12
	6.25	2.5	0.06	0.1	0.15	2.61	29.56	0.06	0.15	0.21	0.03

	6.3	1.15	0.04	0.05	0.04	1.19	13.55	0.04	0.21	0.11	0.01
	6.33	0.76	0.01	0.01	0.01	0.78	8.83	0.01	0.49	0.02	0.0

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

MODEL SUMMARY

Measured Flow (Qm) =	2.5	(cfs)
Calculated Flow (Qc) =	2.5	(cfs)
(Qm-Qc)/Qm * 100 =	-0.00%	
Measured Waterline (WLm) =	5.95	(ft)
Calculated Waterline (WLc) =	5.95	(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 =	1.6	(ft/s)
Manning's n =	0.053	
0.4 * Qm =	1	(cfs)
2.5 * Qm =	6.24	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	4.52		
Bankfull	1.3	5.08		
Waterline	1.8	5.95	0	0
	2.1	6	0.05	0
	2.4	6	0.05	0
	2.7	6.05	0.1	0.44
	3	6.2	0.25	0.95
	3.3	6.2	0.25	0.89
	3.6	6.2	0.25	0.91
	3.9	6.25	0.3	1.67
	4.2	6.3	0.35	2.19
	4.5	6.15	0.2	2.68
	4.7	6.15	0.2	2.21
	4.9	6.15	0.2	1.88
	5.1	6.35	0.4	2.04
	5.3	6.3	0.35	2.19
	5.5	6.3	0.35	1.82
	5.7	6.35	0.4	2.37
	5.9	6.35	0.4	2.17
	6.1	6.35	0.4	1.69
	6.3	6.35	0.4	1.23
	6.5	6.25	0.3	1.93
	6.7	6.3	0.35	2.09
	6.9	6.3	0.35	2.09
	7.1	6.25	0.3	1.46
	7.3	6.2	0.25	0.9
	7.6	6.15	0.2	0.08
	7.9	6.05	0.1	0
Waterline	8.1	5.95	0	0
	8.8	5.45		

Bankfull	8.9	5.08
	9.9	4.25

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
0.3	0.05	0.01	0	0
0.3	0.05	0.01	0	0
0.3	0.1	0.03	0.01	0.53
0.34	0.25	0.07	0.07	2.86
0.3	0.25	0.07	0.07	2.67
0.3	0.25	0.07	0.07	2.73
0.3	0.3	0.09	0.15	6.02
0.3	0.35	0.1	0.23	9.22
0.34	0.2	0.05	0.13	5.37
0.2	0.2	0.04	0.09	3.54
0.2	0.2	0.04	0.08	3.01
0.28	0.4	0.08	0.16	6.54
0.21	0.35	0.07	0.15	6.14
0.2	0.35	0.07	0.13	5.11
0.21	0.4	0.08	0.19	7.6
0.2	0.4	0.08	0.17	6.96
0.2	0.4	0.08	0.14	5.42
0.2	0.4	0.08	0.1	3.94
0.22	0.3	0.06	0.12	4.64
0.21	0.35	0.07	0.15	5.86
0.2	0.35	0.07	0.15	5.86
0.21	0.3	0.06	0.09	3.51
0.21	0.25	0.06	0.06	2.25
0.3	0.2	0.06	0	0.19
0.32	0.1	0.03	0	0
0.22	0	0	0	0
0	0	0	0	0

0	0	0	0	0
0	0	0	0	0

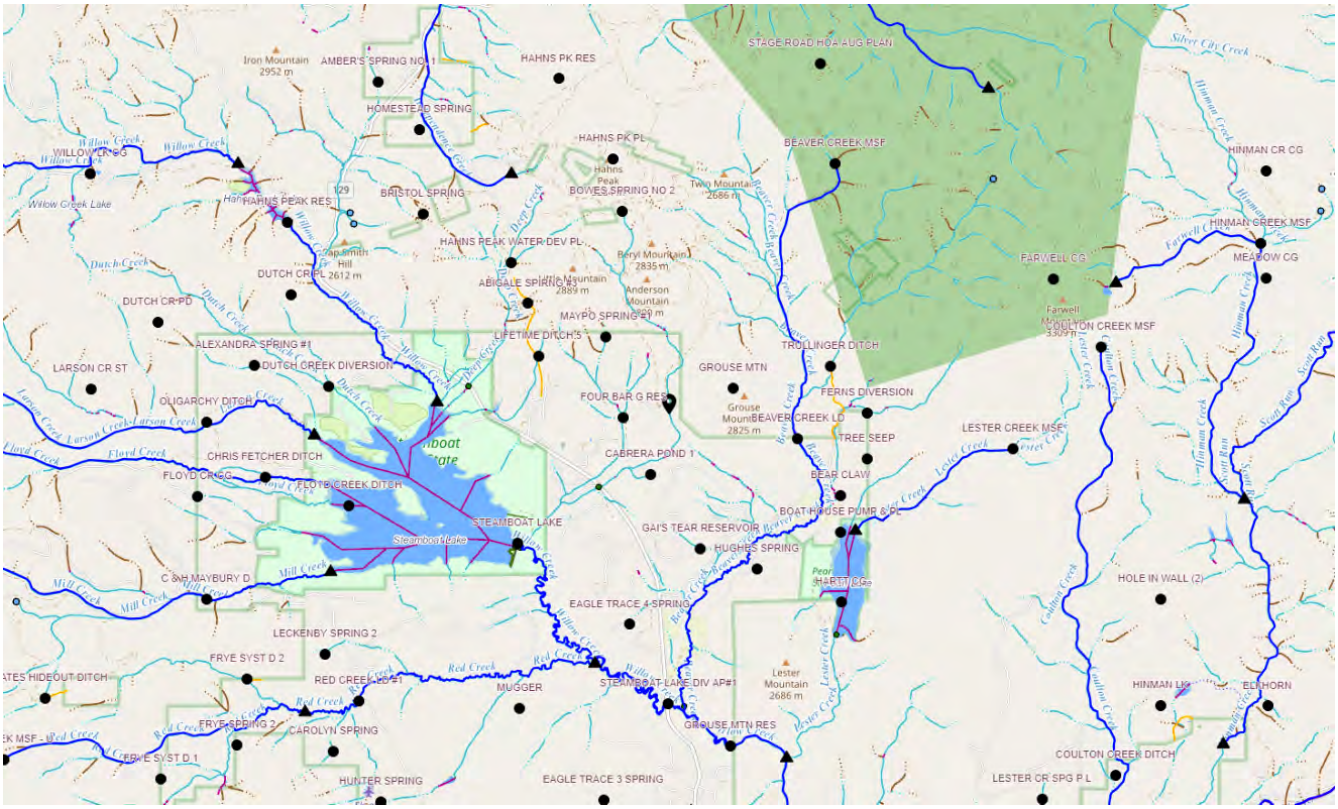
DISCLAIMER

"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: Ways Gulch
Stream Locations: On southern BLM ownership parcel
Fieldwork Date: 05/14/2021
Cross-section: 2
Observers: R Smith, E Scherff
Coordinate System: UTM Zone 13
X (easting): 338169
Y (northing): 4519430
Date Processed: 09/14/2023
Slope: 0.038
Discharge: R2Cross data file: 2.27 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Ways Gulch 5-14-21 #2.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 9.0

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.66
Percent Wetted Perimeter (%)	50.0	0.38
Mean Velocity (ft/s)	1.0	1.23

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	9.0	0.45	0.9	4.09	9.56	100.0	0.43	0.07	2.22	9.08
	5.82	8.27	0.47	0.88	3.89	8.83	92.34	0.44	0.07	2.31	9.01
	5.84	7.61	0.49	0.85	3.72	8.17	85.4	0.46	0.07	2.41	8.96
	5.87	7.25	0.49	0.83	3.55	7.81	81.65	0.45	0.07	2.41	8.55
	5.89	7.02	0.48	0.81	3.39	7.57	79.15	0.45	0.07	2.36	8.0
	5.91	6.79	0.48	0.79	3.23	7.33	76.64	0.44	0.07	2.32	7.49
	5.93	6.56	0.47	0.77	3.08	7.09	74.14	0.43	0.07	2.27	7.01
	5.96	6.32	0.46	0.74	2.94	6.85	71.64	0.43	0.07	2.23	6.56
	5.98	6.09	0.46	0.72	2.8	6.61	69.14	0.42	0.07	2.19	6.14
	6.0	5.86	0.45	0.7	2.66	6.37	66.64	0.42	0.08	2.16	5.74
	6.03	5.63	0.45	0.68	2.54	6.13	64.13	0.41	0.08	2.12	5.38
	6.05	5.45	0.44	0.65	2.41	5.94	62.14	0.41	0.08	2.07	4.99
	6.07	5.36	0.43	0.63	2.29	5.85	61.15	0.39	0.08	1.97	4.52
	6.09	5.28	0.41	0.61	2.17	5.75	60.18	0.38	0.08	1.88	4.07
	6.12	5.2	0.39	0.58	2.05	5.66	59.22	0.36	0.08	1.78	3.64
	6.14	5.12	0.38	0.56	1.94	5.57	58.26	0.35	0.09	1.68	3.25
	6.16	5.04	0.36	0.54	1.82	5.48	57.3	0.33	0.09	1.58	2.87
	6.18	4.96	0.34	0.52	1.71	5.39	56.35	0.32	0.09	1.48	2.53
Waterline	6.2	4.9	0.33	0.5	1.62	5.32	55.6	0.31	0.09	1.4	2.27
	6.21	4.89	0.33	0.49	1.6	5.3	55.46	0.3	0.09	1.38	2.2
	6.23	4.85	0.31	0.47	1.49	5.24	54.83	0.28	0.1	1.27	1.88
	6.25	4.82	0.29	0.45	1.38	5.18	54.2	0.27	0.1	1.16	1.6
	6.27	4.78	0.27	0.43	1.27	5.12	53.57	0.25	0.11	1.05	1.33
	6.29	4.74	0.25	0.41	1.16	5.06	52.94	0.23	0.12	0.94	1.09
	6.32	4.7	0.23	0.38	1.06	5.0	52.31	0.21	0.12	0.83	0.88

	6.34	4.66	0.2	0.36	0.95	4.94	51.68	0.19	0.13	0.73	0.69
	6.36	4.62	0.18	0.34	0.85	4.88	51.05	0.17	0.14	0.63	0.53
	6.38	4.59	0.16	0.32	0.75	4.82	50.42	0.15	0.16	0.53	0.39
	6.41	4.3	0.15	0.29	0.64	4.51	47.2	0.14	0.17	0.47	0.3
	6.43	4.13	0.13	0.27	0.55	4.31	45.07	0.13	0.18	0.4	0.22
	6.45	3.95	0.12	0.25	0.46	4.1	42.88	0.11	0.21	0.33	0.15
	6.47	3.71	0.1	0.23	0.37	3.84	40.15	0.1	0.23	0.27	0.1
	6.5	3.48	0.08	0.2	0.29	3.58	37.42	0.08	0.27	0.2	0.06
	6.52	1.96	0.12	0.18	0.24	2.04	21.38	0.12	0.2	0.36	0.09
	6.54	1.86	0.11	0.16	0.2	1.93	20.14	0.1	0.22	0.29	0.06
	6.57	1.76	0.09	0.14	0.16	1.81	18.91	0.09	0.25	0.23	0.04
	6.59	1.66	0.07	0.11	0.12	1.69	17.68	0.07	0.3	0.17	0.02
	6.61	1.52	0.06	0.09	0.08	1.54	16.13	0.05	0.37	0.11	0.01
	6.63	1.34	0.04	0.07	0.05	1.36	14.19	0.04	0.49	0.07	0.0
	6.66	0.76	0.03	0.04	0.03	0.77	8.06	0.03	0.55	0.06	0.0
	6.68	0.58	0.02	0.02	0.01	0.59	6.12	0.02	0.89	0.02	0.0

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

MODEL SUMMARY

Measured Flow (Qm) =	2.27	(cfs)
Calculated Flow (Qc) =	2.27	(cfs)
(Qm-Qc)/Qm * 100 =	0.00%	
Measured Waterline (WLm) =	6.2	(ft)
Calculated Waterline (WLc) =	6.2	(ft)
(WLm-WLc)/WLm * 100 =	-0.00%	
Max Measured Depth (Dm) =	0.5	(ft)
Max Calculated Depth (Dc) =	0.5	(ft)
(Dm-Dc)/Dm * 100 =	0.00%	
Mean Velocity =	1.4	(ft/s)
Manning's n =	0.094	
0.4 * Qm =	0.91	(cfs)
2.5 * Qm =	5.68	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	1.7	5.68		
Bankfull	2.5	5.78		
	3.3	5.86		
	3.7	6.08		
Waterline	3.9	6.2	0	0
	4.1	6.6	0.4	0.45
	4.3	6.65	0.45	1.09
	4.5	6.65	0.45	0.73
	4.7	6.7	0.5	1.68
	4.9	6.7	0.5	2.03
	5.1	6.7	0.5	1.32
	5.3	6.65	0.45	1.26
	5.5	6.65	0.45	1
	5.7	6.6	0.4	1.46
	5.9	6.55	0.35	2.21
	6.1	6.5	0.3	1.9
	6.3	6.5	0.3	2.14
	6.5	6.5	0.3	2.3
	6.7	6.5	0.3	1.72
	6.9	6.5	0.3	2.04
	7.1	6.5	0.3	1.67
	7.3	6.5	0.3	1.61
	7.5	6.45	0.25	1.03
	7.7	6.4	0.2	1.74
	7.9	6.4	0.2	1.22
	8.1	6.5	0.3	1.24
	8.3	6.5	0.3	0.56
	8.5	6.45	0.25	0.24
Waterline	8.8	6.2	0	0
	9.1	6.04		

	10.8	5.84
Bankfull	11.7	5.8

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
0.45	0.4	0.08	0.04	1.58
0.21	0.45	0.09	0.1	4.32
0.2	0.45	0.09	0.07	2.89
0.21	0.5	0.1	0.17	7.39
0.2	0.5	0.1	0.2	8.93
0.2	0.5	0.1	0.13	5.81
0.21	0.45	0.09	0.11	4.99
0.2	0.45	0.09	0.09	3.96
0.21	0.4	0.08	0.12	5.14
0.21	0.35	0.07	0.15	6.8
0.21	0.3	0.06	0.11	5.01
0.2	0.3	0.06	0.13	5.65
0.2	0.3	0.06	0.14	6.07
0.2	0.3	0.06	0.1	4.54
0.2	0.3	0.06	0.12	5.38
0.2	0.3	0.06	0.1	4.41
0.2	0.3	0.06	0.1	4.25
0.21	0.25	0.05	0.05	2.27
0.21	0.2	0.04	0.07	3.06
0.2	0.2	0.04	0.05	2.15
0.22	0.3	0.06	0.07	3.27
0.2	0.3	0.06	0.03	1.48
0.21	0.25	0.06	0.01	0.66
0.39	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 Ways Gulch;)*

Div	Name	CWCB Case Number	Segment ID	Meas. Date	UTM	Location	Flow Amount (cfs)	Meas #	Rating	Station ID
6	Ways Gulch		23/6/A-002	07/20/2023	UTMx: UTMy:	measurement taken at ways gulch downstream and near steamboat lake	0.17			
6	Ways Gulch		23/6/A-002	07/20/2023	UTMx: UTMy:	measurement taken at ways gulch downstream and near steamboat lake	0.21			

Discharge Measurement Summary

Site name	Ways gulch nr steamboat lake
Site number	07202023 RD XING BLM
Operator(s)	Lfs
File name	Ways gulch nr steamboat lake_20230720-113615.ft
Comment	

Start time	7/20/2023 11:10 AM
End time	7/20/2023 11:35 AM
Start location latitude	40.822
Start location longitude	-106.910
Calculations engine	FlowTracker2

Sensor type	Top Setting
Handheld serial number	FT2H1747037
Probe serial number	FT2P1747048
Probe firmware	1.30
Handheld software	1.7

# Stations	Avg interval (s)	Total discharge (ft³/s)
36	40	0.1713

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
9.700	2.2843	9.843

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
43	0.235	0.0750

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
60.991	0.300	0.3779

Discharge Uncertainty		
Category	**ISO**	**IVE**
Accuracy	1.0%	1.0%
Depth	0.5%	15.7%
Velocity	3.4%	30.7%
Width	0.2%	0.2%
Method	2.7%	
# Stations	1.4%	
Overall	**4.7%**	**34.5%**

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 %

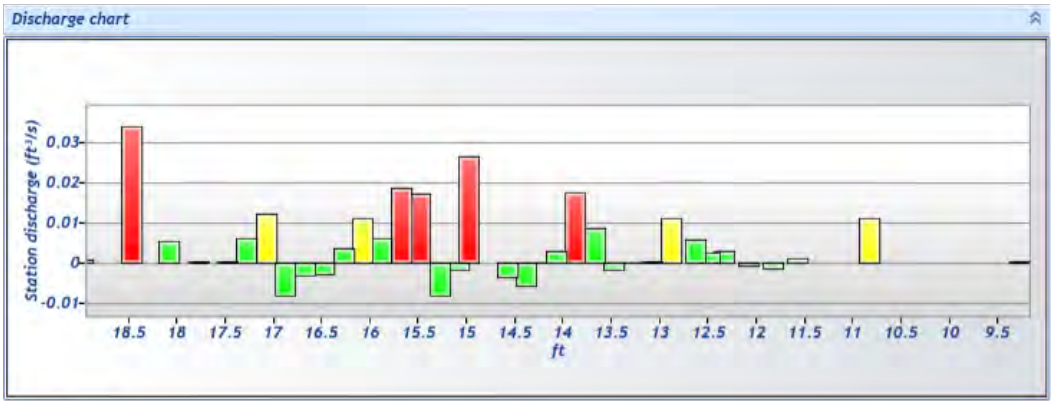
Summary overview

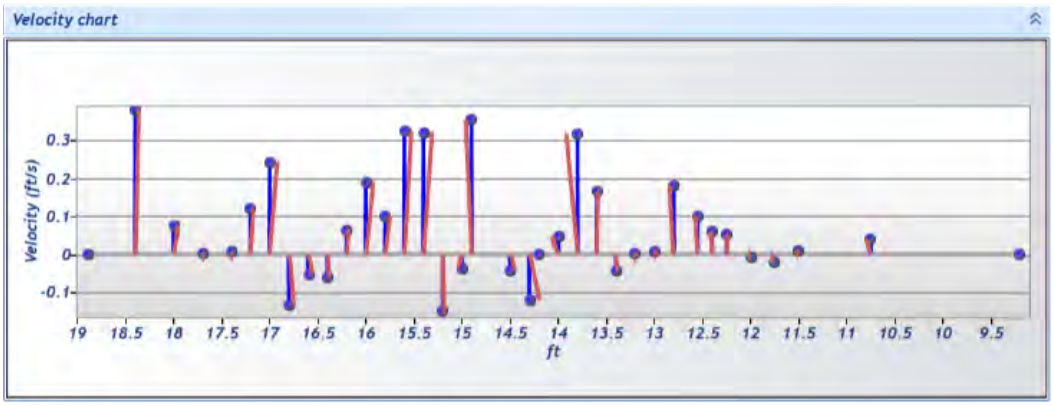
No changes were made to this file
Quality control warnings

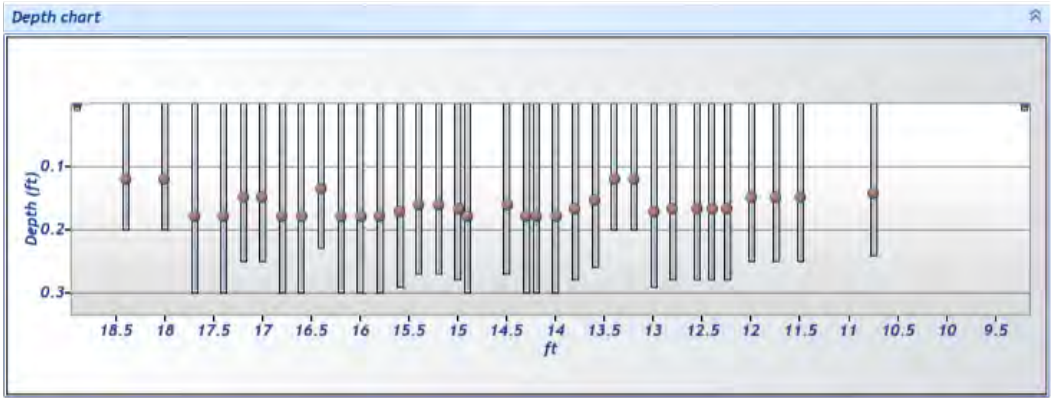
Discharge Measurement Summary

Site name	Ways gulch nr steamboat lake
Site number	07202023 RD XING BLM
Operator(s)	Lfs
File name	Ways gulch nr steamboat lake_20230720-113615.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	Ways gulch nr steamboat lake
Site number	07202023 RD XING BLM
Operator(s)	Lfs
File name	Ways gulch nr steamboat lake_20230720-113615.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	11:10 AM	9.200	None	0.010	0.0000	0.000	0	0.0000	1.0000	0.0406	0.0078	0.0003	0.18	✓
1	11:11 AM	10.750	0.6	0.240	0.6000	0.144	25	0.0406	1.0000	0.0406	0.2760	0.0112	6.54	✓
2	11:12 AM	11.500	0.6	0.250	0.6000	0.150	17	0.0103	1.0000	0.0103	0.1250	0.0013	0.75	✓
3	11:13 AM	11.750	0.6	0.250	0.6000	0.150	21	-0.0208	1.0000	-0.0208	0.0625	-0.0013	-0.76	✓
4	11:13 AM	12.000	0.6	0.250	0.6000	0.150	17	-0.0081	1.0000	-0.0081	0.0625	-0.0005	-0.30	✓
5	11:14 AM	12.250	0.6	0.280	0.6000	0.168	32	0.0517	1.0000	0.0517	0.0560	0.0029	1.69	✓
6	11:15 AM	12.400	0.6	0.280	0.6000	0.168	32	0.0593	1.0000	0.0593	0.0420	0.0025	1.45	✓
7	11:17 AM	12.550	0.6	0.280	0.6000	0.168	15	0.1020	1.0000	0.1020	0.0560	0.0057	3.34	✓
8	11:18 AM	12.800	0.6	0.280	0.6000	0.168	23	0.1786	1.0000	0.1786	0.0630	0.0112	6.57	✓
9	11:19 AM	13.000	0.6	0.290	0.6000	0.174	25	0.0063	1.0000	0.0063	0.0580	0.0004	0.21	✓
10	11:19 AM	13.200	0.6	0.200	0.6000	0.120	20	0.0037	1.0000	0.0037	0.0400	0.0001	0.09	✓
11	11:20 AM	13.400	0.6	0.200	0.6000	0.120	23	-0.0408	1.0000	-0.0408	0.0400	-0.0016	-0.95	✓
12	11:20 AM	13.600	0.6	0.260	0.6000	0.156	27	0.1641	1.0000	0.1641	0.0520	0.0085	4.98	✓
13	11:21 AM	13.800	0.6	0.280	0.6000	0.168	19	0.3160	1.0000	0.3160	0.0560	0.0177	10.33	✓
14	11:22 AM	14.000	0.6	0.300	0.6000	0.180	20	0.0466	1.0000	0.0466	0.0600	0.0028	1.63	✓
15	11:22 AM	14.200	0.6	0.300	0.6000	0.180	24	0.0001	1.0000	0.0001	0.0450	0.0000	0.00	✓
16	11:27 AM	14.300	0.6	0.300	0.6000	0.180	14	-0.1214	1.0000	-0.1214	0.0450	-0.0055	-3.19	✓
17	11:23 AM	14.500	0.6	0.270	0.6000	0.162	13	-0.0413	1.0000	-0.0413	0.0810	-0.0033	-1.95	✓
18	11:26 AM	14.900	0.6	0.300	0.6000	0.180	21	0.3521	1.0000	0.3521	0.0750	0.0264	15.42	✓
19	11:23 AM	15.000	0.6	0.280	0.6000	0.168	22	-0.0392	1.0000	-0.0392	0.0420	-0.0016	-0.96	✓
20	11:24 AM	15.200	0.6	0.270	0.6000	0.162	15	-0.1484	1.0000	-0.1484	0.0540	-0.0080	-4.68	✓
21	11:25 AM	15.400	0.6	0.270	0.6000	0.162	15	0.3192	1.0000	0.3192	0.0540	0.0172	10.06	✓
22	11:25 AM	15.600	0.6	0.290	0.6000	0.174	20	0.3213	1.0000	0.3213	0.0580	0.0186	10.88	✓
23	11:26 AM	15.800	0.6	0.300	0.6000	0.180	21	0.1003	1.0000	0.1003	0.0600	0.0060	3.52	✓
24	11:28 AM	16.000	0.6	0.300	0.6000	0.180	23	0.1863	1.0000	0.1863	0.0600	0.0112	6.53	✓
25	11:29 AM	16.200	0.6	0.300	0.6000	0.180	18	0.0621	1.0000	0.0621	0.0600	0.0037	2.18	✓
26	11:29 AM	16.400	0.6	0.230	0.6000	0.138	25	-0.0597	1.0000	-0.0597	0.0460	-0.0027	-1.60	✓
27	11:30 AM	16.600	0.6	0.300	0.6000	0.180	17	-0.0521	1.0000	-0.0521	0.0600	-0.0031	-1.83	✓
28	11:31 AM	16.800	0.6	0.300	0.6000	0.180	20	-0.1331	1.0000	-0.1331	0.0600	-0.0080	-4.66	✓
29	11:31 AM	17.000	0.6	0.250	0.6000	0.150	23	0.2406	1.0000	0.2406	0.0500	0.0120	7.02	✓
30	11:32 AM	17.200	0.6	0.250	0.6000	0.150	19	0.1199	1.0000	0.1199	0.0500	0.0060	3.50	✓
31	11:32 AM	17.400	0.6	0.300	0.6000	0.180	13	0.0066	1.0000	0.0066	0.0750	0.0005	0.29	✓
32	11:33 AM	17.700	0.6	0.300	0.6000	0.180	11	0.0043	1.0000	0.0043	0.0900	0.0004	0.23	✓
33	11:34 AM	18.000	0.6	0.200	0.6000	0.120	12	0.0757	1.0000	0.0757	0.0700	0.0053	3.09	✓
34	11:34 AM	18.400	0.6	0.200	0.6000	0.120	27	0.3779	1.0000	0.3779	0.0900	0.0340	19.86	✓
35	11:35 AM	18.900	None	0.010	0.0000	0.000	0	0.0000	1.0000	0.3779	0.0025	0.0009	0.55	✓

Discharge Measurement Summary

Site name	Ways gulch nr steamboat lake
Site number	07202023 RD XING BLM
Operator(s)	Lfs
File name	Ways gulch nr steamboat lake_20230720-113615.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
3	11:13 AM	11.750	0.6	0.250	0.6000	0.150	Stn Spacing > QC
4	11:13 AM	12.000	0.6	0.250	0.6000	0.150	Stn Spacing > QC
12	11:20 AM	13.600	0.6	0.260	0.6000	0.156	High % Spikes
13	11:21 AM	13.800	0.6	0.280	0.6000	0.168	Velocity Angle > QC,High Stn % Discharge
16	11:27 AM	14.300	0.6	0.300	0.6000	0.180	Velocity Angle > QC
18	11:26 AM	14.900	0.6	0.300	0.6000	0.180	High Stn % Discharge
20	11:24 AM	15.200	0.6	0.270	0.6000	0.162	Velocity Angle > QC
21	11:25 AM	15.400	0.6	0.270	0.6000	0.162	High Stn % Discharge
22	11:25 AM	15.600	0.6	0.290	0.6000	0.174	High Stn % Discharge
23	11:26 AM	15.800	0.6	0.300	0.6000	0.180	Velocity Angle > QC
24	11:28 AM	16.000	0.6	0.300	0.6000	0.180	Velocity Angle > QC
27	11:30 AM	16.600	0.6	0.300	0.6000	0.180	Boundary Interference
28	11:31 AM	16.800	0.6	0.300	0.6000	0.180	Velocity Angle > QC
29	11:31 AM	17.000	0.6	0.250	0.6000	0.150	Boundary Interference
31	11:32 AM	17.400	0.6	0.300	0.6000	0.180	Large SNR Variation,SNR Threshold Variation
32	11:33 AM	17.700	0.6	0.300	0.6000	0.180	Boundary Interference
33	11:34 AM	18.000	0.6	0.200	0.6000	0.120	Velocity Angle > QC
34	11:34 AM	18.400	0.6	0.200	0.6000	0.120	High Stn % Discharge

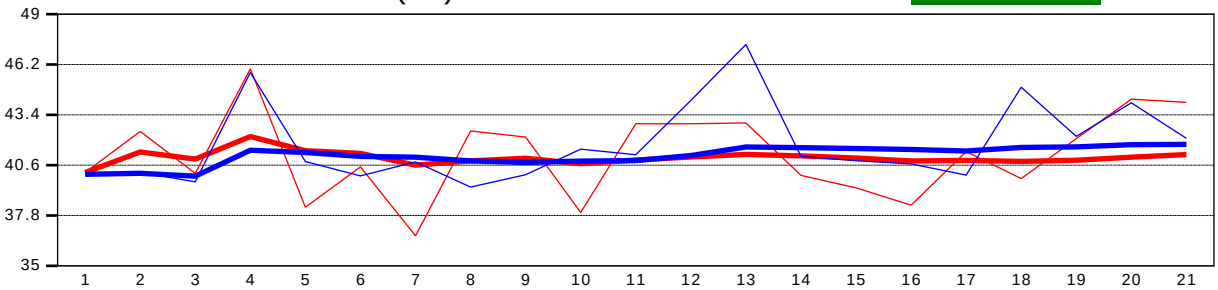
Discharge Measurement Summary

Site name	Ways gulch nr steamboat lake
Site number	07202023 RD XING BLM
Operator(s)	Lfs
File name	Ways gulch nr steamboat lake_20230720-113615.ft
Comment	

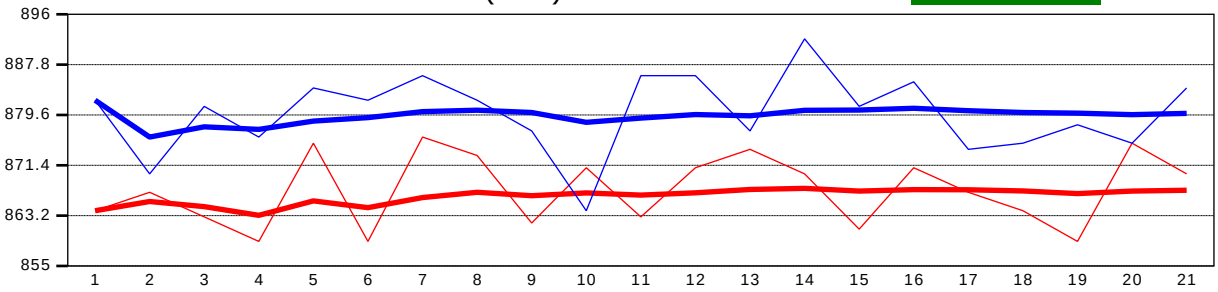
Beam 1	
Beam 2	

Automated beam check Start time 7/20/2023 11:10:20 AM

Automated beam check SNR(dB) PASS



Automated beam check Noise level(cnts) PASS



Automated beam check Quality control warnings

No quality control warnings

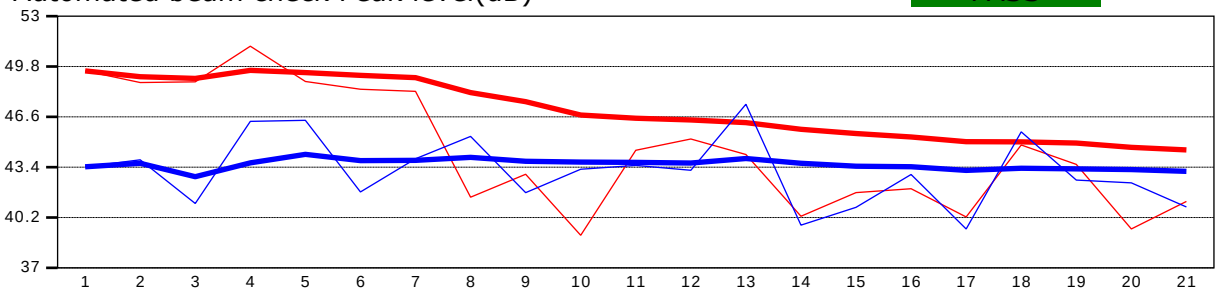
Discharge Measurement Summary

Site name	Ways gulch nr steamboat lake
Site number	07202023 RD XING BLM
Operator(s)	Lfs
File name	Ways gulch nr steamboat lake_20230720-113615.ft
Comment	

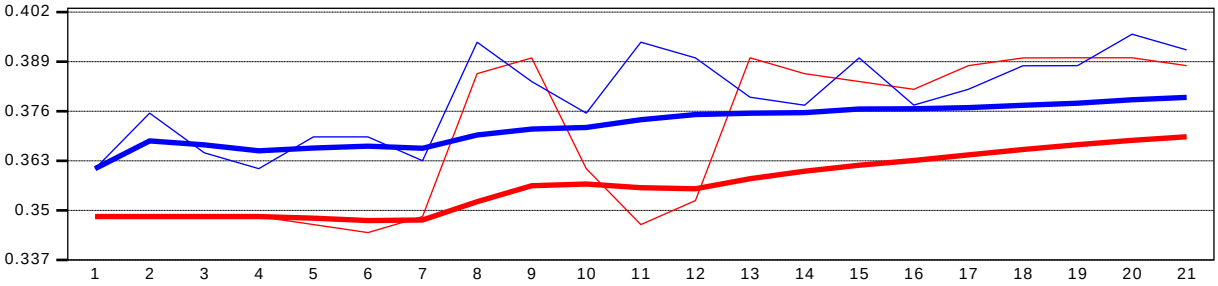
Beam 1	
Beam 2	

Automated beam check Start time 7/20/2023 11:10:20 AM

Automated beam check Peak level(dB) PASS



Automated beam check Peak position(ft) PASS



Automated beam check Quality control warnings

No quality control warnings

Discharge Measurement Summary

Site name	Ways gulch dwnstm
Site number	END BLM Q2
Operator(s)	Lfs
File name	Ways gulch dwnstm_20230720-122041.ft
Comment	

Start time	7/20/2023 12:10 PM
End time	7/20/2023 12:19 PM
Start location latitude	40.810
Start location longitude	-106.919
Calculations engine	FlowTracker2

Sensor type	Top Setting
Handheld serial number	FT2H1747037
Probe serial number	FT2P1747048
Probe firmware	1.30
Handheld software	1.7

# Stations	Avg interval (s)	Total discharge (ft³/s)
14	40	0.2054

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
3.600	0.8495	3.804

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
43	0.236	0.2418

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
67.173	0.380	0.7208

Discharge Uncertainty		
Category	**ISO**	**IVE**
Accuracy	1.0%	1.0%
Depth	0.6%	17.9%
Velocity	4.5%	17.3%
Width	0.2%	0.2%
Method	3.1%	
# Stations	3.6%	
Overall	**6.7%**	**24.9%**

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 %

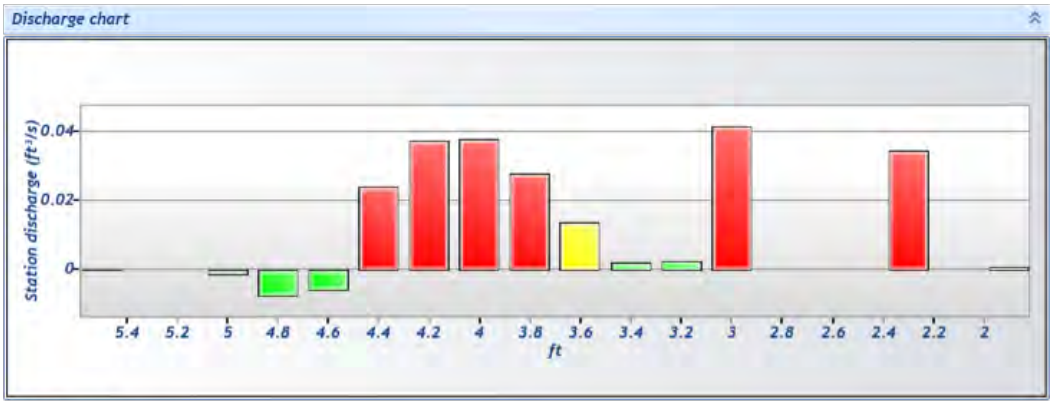
Summary overview

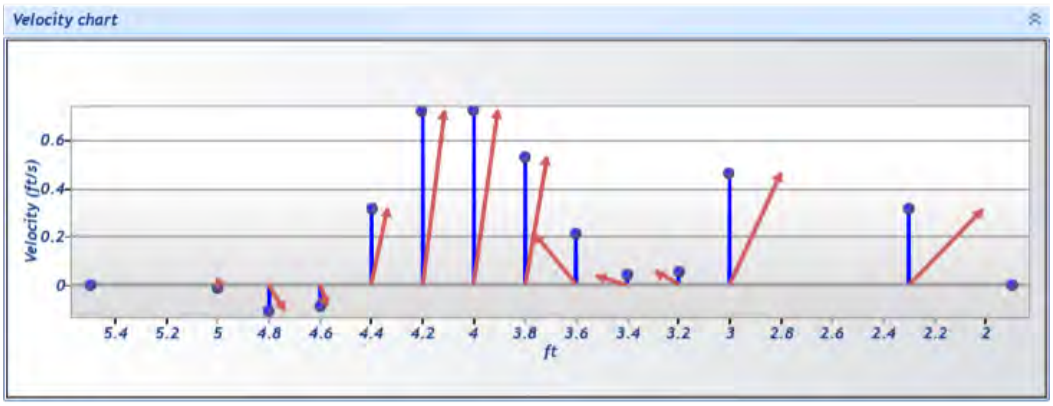
No changes were made to this file
Quality control warnings

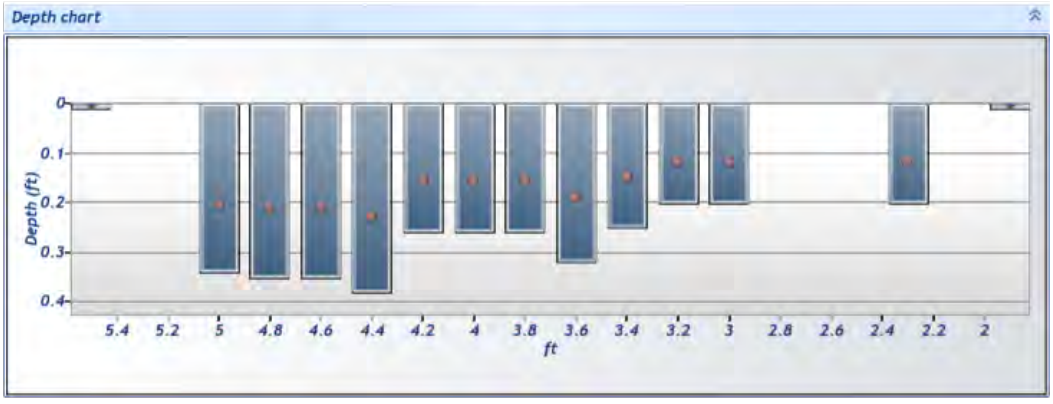
Discharge Measurement Summary

Site name	Ways gulch dwnstm
Site number	END BLM Q2
Operator(s)	Lfs
File name	Ways gulch dwnstm_20230720-122041.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	Ways gulch dwnstm
Site number	END BLM Q2
Operator(s)	Lfs
File name	Ways gulch dwnstm_20230720-122041.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	12:10 PM	1.900	None	0.010	0.0000	0.000	0	0.0000	1.0000	0.3111	0.0020	0.0006	0.30	✓
1	12:11 PM	2.300	0.6	0.200	0.6000	0.120	25	0.3111	1.0000	0.3111	0.1100	0.0342	16.66	✓
2	12:12 PM	3.000	0.6	0.200	0.6000	0.120	28	0.4615	1.0000	0.4615	0.0900	0.0415	20.23	✓
3	12:12 PM	3.200	0.6	0.200	0.6000	0.120	13	0.0555	1.0000	0.0555	0.0400	0.0022	1.08	✓
4	12:13 PM	3.400	0.6	0.250	0.6000	0.150	29	0.0388	1.0000	0.0388	0.0500	0.0019	0.94	✓
5	12:14 PM	3.600	0.6	0.320	0.6000	0.192	24	0.2120	1.0000	0.2120	0.0640	0.0136	6.61	✓
6	12:14 PM	3.800	0.6	0.260	0.6000	0.156	22	0.5291	1.0000	0.5291	0.0520	0.0275	13.40	✓
7	12:15 PM	4.000	0.6	0.260	0.6000	0.156	26	0.7208	1.0000	0.7208	0.0520	0.0375	18.25	✓
8	12:16 PM	4.200	0.6	0.260	0.6000	0.156	15	0.7181	1.0000	0.7181	0.0520	0.0373	18.18	✓
9	12:17 PM	4.400	0.6	0.380	0.6000	0.228	18	0.3160	1.0000	0.3160	0.0760	0.0240	11.69	✓
10	12:18 PM	4.600	0.6	0.350	0.6000	0.210	24	-0.0868	1.0000	-0.0868	0.0700	-0.0061	-2.96	✓
11	12:18 PM	4.800	0.6	0.350	0.6000	0.210	24	-0.1078	1.0000	-0.1078	0.0700	-0.0075	-3.67	✓
12	12:19 PM	5.000	0.6	0.340	0.6000	0.204	22	-0.0121	1.0000	-0.0121	0.1190	-0.0014	-0.70	✓
13	12:19 PM	5.500	None	0.010	0.0000	0.000	0	0.0000	1.0000	-0.0121	0.0025	0.0000	-0.01	✓

Discharge Measurement Summary

Site name	Ways gulch dwnstm
Site number	END BLM Q2
Operator(s)	Lfs
File name	Ways gulch dwnstm_20230720-122041.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
1	12:11 PM	2.300	0.6	0.200	0.6000	0.120	Boundary Interference,Standard Error > QC,Velocity Angle > QC,High Stn % Discharge
2	12:12 PM	3.000	0.6	0.200	0.6000	0.120	Velocity Angle > QC,High Stn % Discharge
4	12:13 PM	3.400	0.6	0.250	0.6000	0.150	Stn Spacing > QC
5	12:14 PM	3.600	0.6	0.320	0.6000	0.192	Velocity Angle > QC
6	12:14 PM	3.800	0.6	0.260	0.6000	0.156	Standard Error > QC,High Stn % Discharge
7	12:15 PM	4.000	0.6	0.260	0.6000	0.156	Standard Error > QC,High Stn % Discharge
8	12:16 PM	4.200	0.6	0.260	0.6000	0.156	Standard Error > QC,High Stn % Discharge
9	12:17 PM	4.400	0.6	0.380	0.6000	0.228	Standard Error > QC,High Stn % Discharge
10	12:18 PM	4.600	0.6	0.350	0.6000	0.210	Boundary Interference,Beam SNRs Not Similar,Velocity Angle > QC
11	12:18 PM	4.800	0.6	0.350	0.6000	0.210	Velocity Angle > QC
12	12:19 PM	5.000	0.6	0.340	0.6000	0.204	Boundary Interference
13	12:19 PM	5.500	None	0.010	0.0000	0.000	Stn Spacing > QC

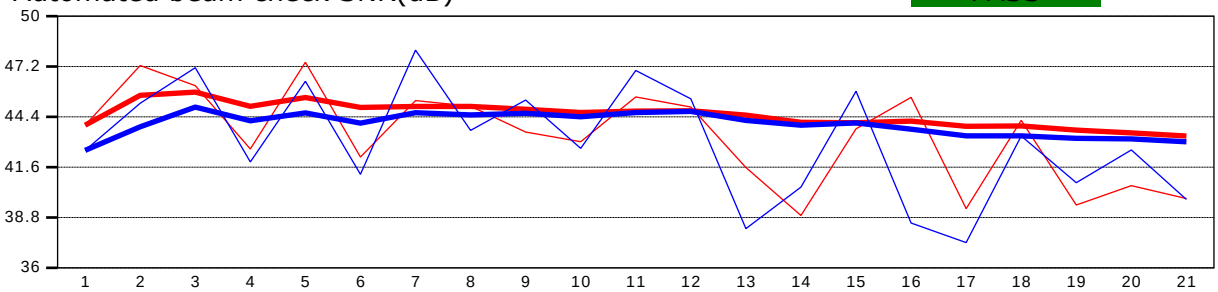
Discharge Measurement Summary

Site name	Ways gulch dwnstm
Site number	END BLM Q2
Operator(s)	Lfs
File name	Ways gulch dwnstm_20230720-122041.ft
Comment	

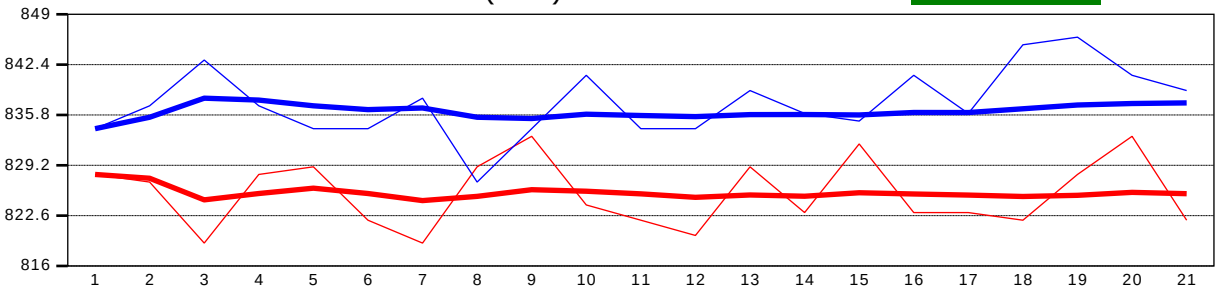
Beam 1	
Beam 2	

Automated beam check Start time 7/20/2023 12:10:26 PM

Automated beam check SNR(dB) PASS



Automated beam check Noise level(cnts) PASS



Automated beam check Quality control warnings

No quality control warnings

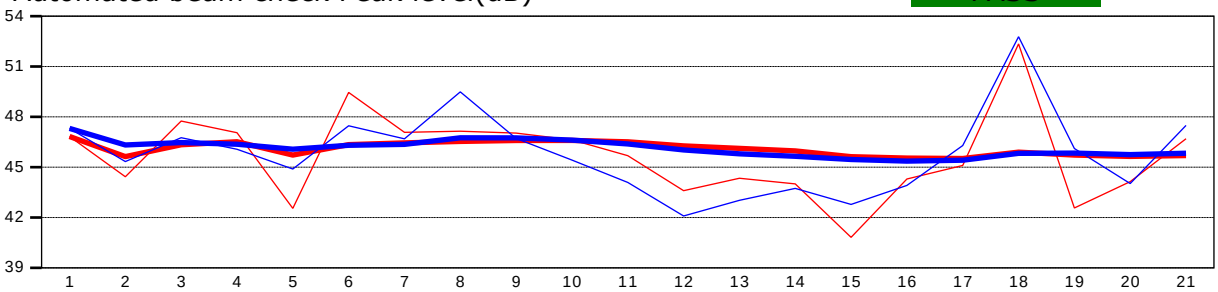
Discharge Measurement Summary

Site name	Ways gulch dwnstm
Site number	END BLM Q2
Operator(s)	Lfs
File name	Ways gulch dwnstm_20230720-122041.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 7/20/2023 12:10:26 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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