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 Wheeler Creek, located in Water Division 6.

Location and Land Status. Wheeler Creek is tributary to South Fork Big Creek near the community of Pearl in North Park. This recommendation covers the stream reach from the headwaters on Independence Mountain to the headgate of the Akers Ditch, a distance of approximately 3.0 miles. Approximately 2.0 miles of the stream segment is located on lands managed by BLM, while the remaining 1.0 mile is located on privately owned lands.

Biological Summary. Wheeler Creek is a moderate gradient stream with small to medium-sized substrate. The upper part of the creek flows through gently sloping forested areas, and the lower portions of the creek flow through meadow habitat. The riparian community is composed of spruce, alder, and multiple species of willow. The stream provides a good mixture of undercut banks, run, and riffles for fish habitat. Fishery surveys indicate that the stream supports a self-sustaining population of brook trout with a variety of age classes.

R2Cross Analysis. BLM collected the following R2Cross data from the creek:

Date	Discharge	Top Width	Winter (2 of 3 criteria hydraulic criteria)	Summer (3 of 3 criteria hydraulic criteria)
07/16/2020 #1	0.44 cfs	6.55 feet	1.38 cfs	3.01 cfs
06/16/2021 #1	0.89 cfs	6.10 feet	0.69 cfs	0.89 cfs
06/16/2021 #2	0.77 cfs	4.29 feet	0.61 cfs	0.98 cfs
		Averages:	**0.89 cfs**	**1.63 cfs**

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

1.6 cfs is recommended for the snowmelt runoff period, from May 1 through June 30. This flow should provide an advantageous amount of physical habitat when the fish population is starting to become very active and feeding.

0.90 cfs is recommended during the base flow period from July 1 through October 31. This flow rate meets two of the three instream flow criteria, is driven by the average depth criteria and provides sufficient physical habitat when the fish population is gaining weight to survive the long cold weather period in this location. BLM believes that providing this flow will also ensure sufficient physical habitat availability for spawning during October.

0.65 cfs is recommended during late fall and winter, from November 1 through February 29. This recommendation is driven by limited water availability. This flow rate should provide sufficient water circulation to prevent total icing in pools that are critical for overwintering fish.

0.9 cfs is recommended during late winter and early spring, from March 1 through April 30. Flow rates in the creek are beginning to rise during this period due to lower elevation snowmelt runoff. This recommendation meets two of the three instream flow criteria and will provide habitat for fry that have emerged prior to May 1 in March and April.

Water Availability. BLM is not aware of any water rights within the proposed instream flow reach.

The BLM recommends using a variety of data sources to confirm water availability. BLM is not aware of any historical gage data on Wheeler Creek or for the larger South Fork Big Creek watershed in which Wheeler Creek is located. The use of Streamstats and CSUFlows can provide an estimate of natural water availability. Unfortunately, diversion records for the Akers Ditch and Wheeler Ditch, located downstream, are very limited and do not provide comprehensive information that supports year-round water availability determinations.

Relationship to Management Plans. BLM is very interested in instream flow protection for Wheeler Creek because it is one of the few fisheries managed by BLM in North Park. In addition, the creek is experiencing the effects of a 2015 fire within the watershed that appears to be delivering additional sediment to the creek. Under the current resource management plan, the Wheeler Creek watershed is being managed to recover from the fire, so any land disturbing projects that are implemented are designed to avoid the riparian corridor and avoid additional erosion. The watershed will continue to be managed for dispersed recreational use and livestock grazing.

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 the Division of 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 16:39:12 -07'00'

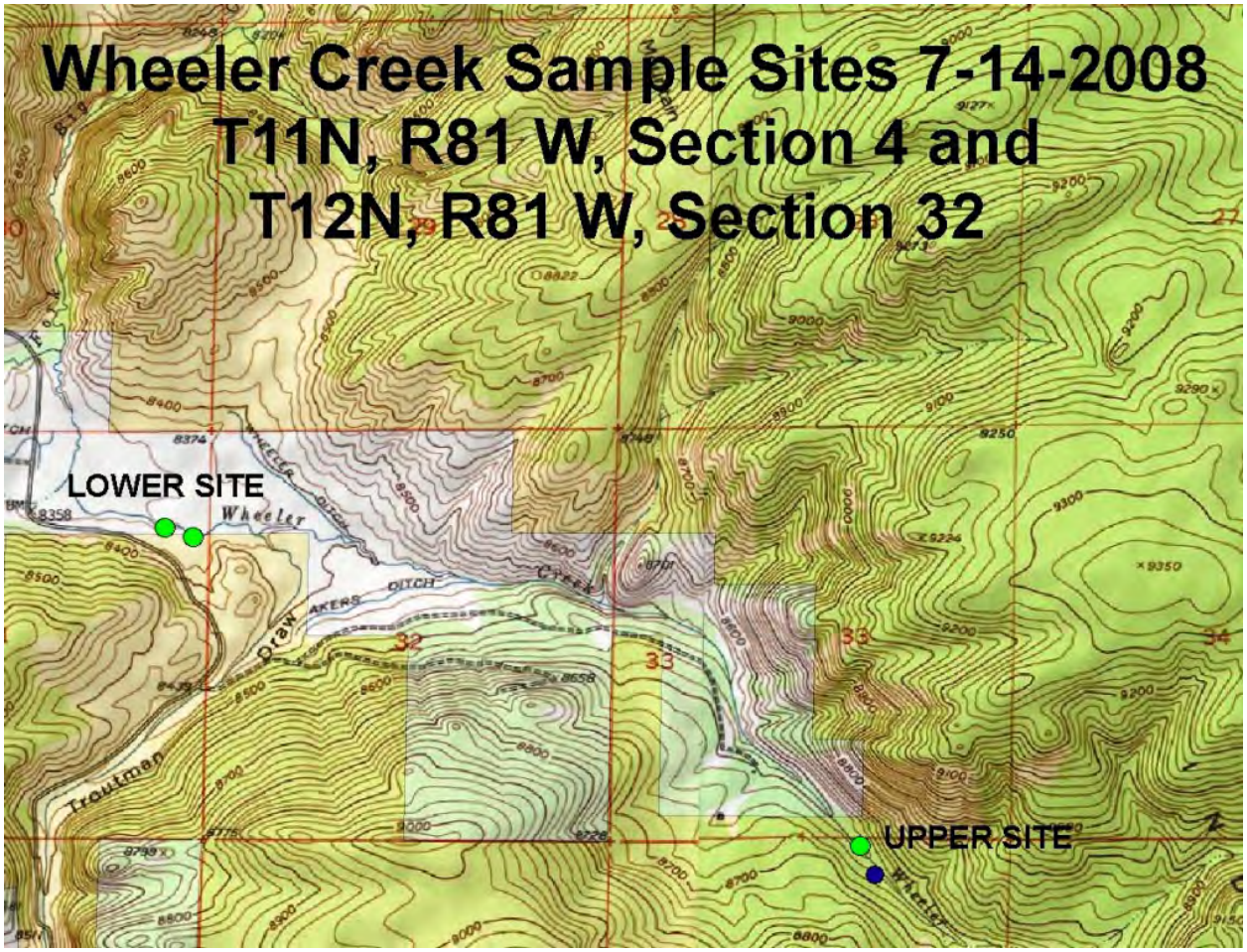
Alan Bittner
Deputy State Director, Resources

cc: Paula Belcher, Kremmling Field Office
Steve Leonard, Kremmling Field Office
Elijah Waters, Northwest District Office

Kremmling Field Office Stream Surveys
July 2008

Wheeler Creek - Water Code #12562

Wheeler Creek, located north of Walden, CO near Pearl on BLM lands managed by the Kremmling Field Office was sampled on July 14, 2008. Wheeler Creek is tributary to South Fork Big Creek, and then the North Platte River. Two sites were sampled and a two-pass removal population estimate was conducted on the lower reach and attempted at the upper reach (fish escaped from the first pass and an estimate was not completed). See data sheets below for specifics. All work was done in support of the Colorado BLM in-stream flow program. Sampling was conducted via backpack electro-shocker and approximately 300 feet of stream was sampled at the upper site and 450 feet at the lower site. Personnel present were Todd Allai, KRFO, Hydrologist Technician, Gregor Dekleva, Biological Technician, GSFO, and Alex Griffith, Biological Technician, GSFO.



Lower Wheeler Creek

Brook Trout

YOY Brook Trout

STREAM SURVEY FISH SAMPLING FORM

WATER Wheeler Creek (Lower) H2O CODE 12562 DATE 7/14/08

GEAR BPE EFFORT 300 ft. STATION #_____ PASS # 1&2

CREW Dekleva, Griffith, Allai DRAINAGE North Platte LOCATION GPS

Pass	species	length	weight		species	length	weight	Pass
1	BRK	210			BRK	255		2
1	BRK	275			BRK	233		2
1	BRK	207			BRK	175		2
1	BRK	149			BRK	239		2
1	BRK	154			BRK	171		2
1	BRK	51			BRK	49		2
1	BRK	51			BRK	46		2
1	BRK	41						
1	BRK	27						
1	BRK	37						
1	BRK	42						
1	LOC	127						
1	LOC	204						

GPS Location: See Map

Notes: Stream Width 1-6 ft. Sample Reach 300 ft.
Conductivity: Electroshocker settings

Discussion:

The stream is small and narrow with some good undercut banks which provide cover and refuge from flow velocity. Riparian vegetation varied from fair to good with willows, sedges, and rushes present. Brook trout were the dominant species with a couple of brown trout also captured. All fish collected appeared healthy and robust. Aquatic insect productivity appears to be good with a diversity of caddis, mayflies, and aquatic and terrestrial fly species present.

This reach was also sampled back on 6-10-08 and no fish were collected. This was due to very low conductivities that made shocking difficult/impossible at that time.

Recommendations:

- Pursue instream flow recommendation for this stream reach

Upper Wheeler Creek

Upper Wheeler Creek

STREAM SURVEY FISH SAMPLING FORM

WATER Wheeler Creek (Upper) H2O CODE 12562 DATE 7/14/08

GEAR BPE EFFORT 450 ft. STATION #_____ PASS # 1&2

CREW Dekleva, Griffith, Allai DRAINAGE North Platte LOCATION GPS

Pass	species	length	weight		species	length	weight	Pass
1	BRK	88			BRK	146		2
1	BRK	182			BRK	85		2
1	BRK	124			BRK	36		2
1	BRK	215			BRK	136		2
1	BRK	71			BRK	escaped		2
1	BRK	36			BRK	escaped		2
1	BRK	escaped						
1	BRK	escaped						
1	BRK	escaped						
1	BRK	escaped						

1	BRK	escaped						
1	BRK	escaped						
1	BRK	escaped						

GPS Location: See Map

Notes: Stream Width__2-4_____ft. Sample Reach__450_____ft.
Conductivity: Electroshocker settings

Discussion:

A two-pass removal estimate was attempted, but first pass fish escaped back into the stream and due to time constraints repeat sampling was not performed. Riparian habitat was in good condition with a diversity of vegetation including willows, sedges, aspen, reed grass, and alder. Pools and runs were abundant providing good habitat complexity and diversity. Brook trout were the only species found in the upper reach. All fish collected were healthy and robust and several age classes were present. Aquatic insects present were mayflies, caddis, and stone flies.

This reach was also sampled back on 6-10-08 and no fish were collected. This was due to very low conductivities that made shocking difficult/impossible at that time.

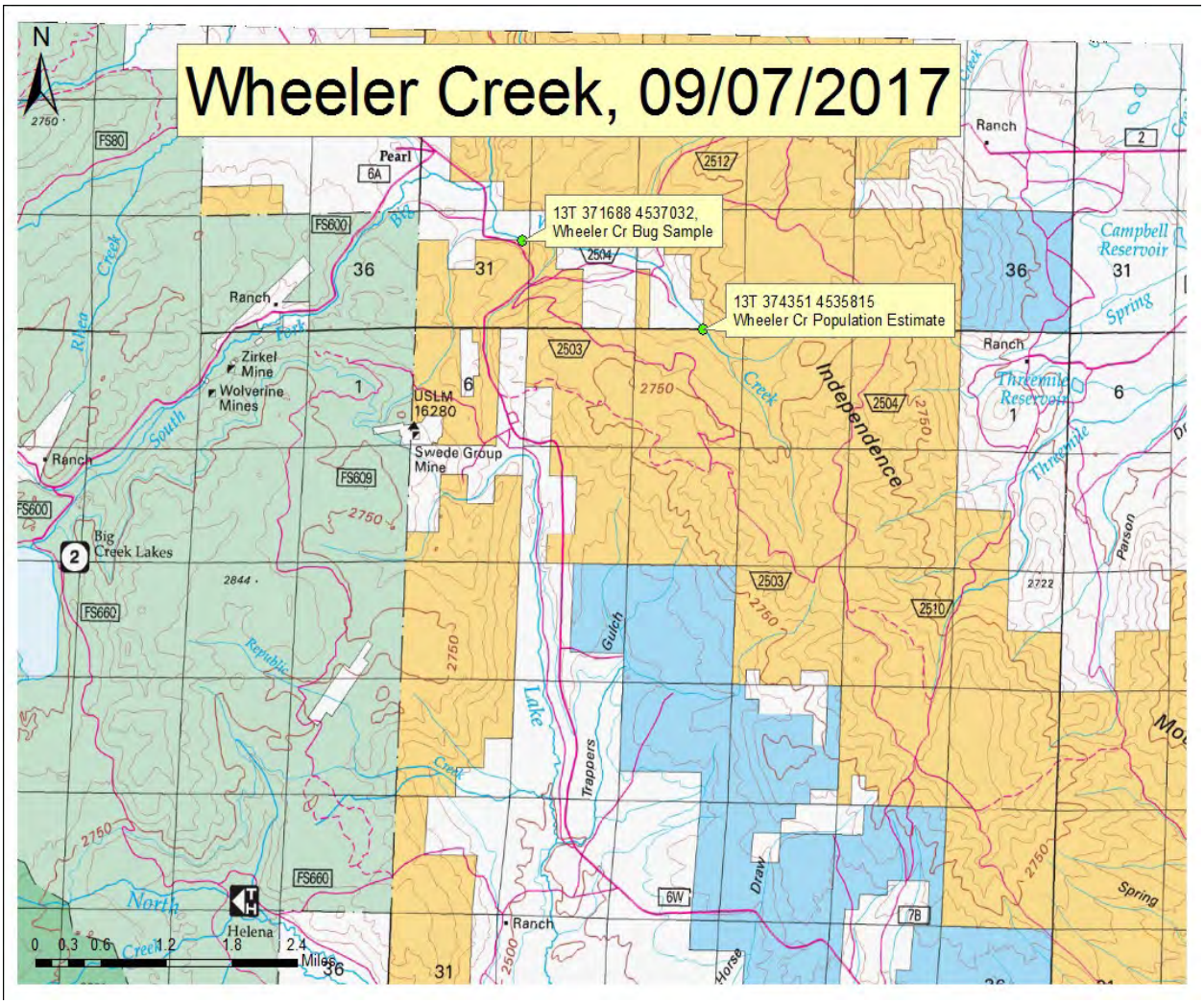
Recommendations:

- Pursue instream flow recommendation for the creek

Kremmling Field Office
Stream Sampling September 2017

Wheeler Creek – Water Code 12562

Introduction:
Wheeler Creek, located northwest of Cowdrey, CO on public lands managed by the Kremmling Field Office, was sampled on September 7, 2017. Wheeler Creek is tributary to South Fork Big Creek. Sampling was conducted to obtain a population estimate on the resident Brook Trout fishery and collect a macroinvertebrate sample. This stream is within the boundary of the 2016 Beaver Creek Fire. The fire burned within the Wheeler Creek watershed and near the creek in the upper reaches of the stream. Data collected will be compared to previous fish sampling and macroinvertebrate data collected prior to the fire. Sampling was conducted by Tom Fresques and Austin Wenke, BLM, and Kyle Battige and Crew Colorado Parks & Wildlife.



Beaver Creek fire near the fish sampling site on Wheeler Creek

Representative photo of Wheeler Creek in the sampled reach and burned area

Collecting a macroinvertebrate sample in lower Wheeler Creek

Discussion:

Wheeler Creek is a small perennial stream that contains a resident Brook Trout population. Based on the sampling effort, the population estimate for Brook Trout at the site is **27 adult fish (≥130mm) + or – 18 fish at the 95% confidence interval, and 607 adult fish + or – 404 fish per stream mile at the 95% confidence interval.** This wide variance in the estimate is due to the collection of a high percentage of the total catch of fish ≥130 mm total length on the second pass. This estimate could be run again at a different length cutoff with different, perhaps better, results. This same site was sampled back in 2008 but due to escapement which resulted in a lack of length data, population estimate analysis was not completed. Total catch at the site in 2008 was 19 fish, compared to 108 fish in 2017.

Based on the data, it would appear that fish densities have increased substantially at the sample site since the last sample in 2008, although this comparison is more of relative abundance vs. two population estimates. Several age classes of fish were noted including many young-of-year and all fish collected appeared healthy.

A macroinvertebrate sample was collected in a lower reach of the stream on BLM lands at the same site where bugs were collected in 2016. The collection was a composite sample of 8 randomly selected riffles comprising a total sampled area of $8ft^2$. The bug sample collected was

sent to BLM National Aquatic Monitoring Center at Utah State University for processing. The data, once obtained, will be compared to the sample collected in 2016 to determine any changes in macroinvertebrate species composition or densities.

The fire burned in the upper portions of the watershed including adjacent and in some cases directly along the stream. Some spruce fir trees were burned and the stream corridor is generally more open then pre fire conditions. Grasses provide a larger percentage of thermal shading and cover now. Riparian areas that were burned appear to be rebounding quickly and overall, riparian condition appeared good.

Recommendations:

- Interpret invertebrate data upon receiving it from the Bug Lab and compare to the 2016 sample data at the same location
- Based on some literature, potential effects from fire may have a lag time of a few years at a watershed scale. We will likely sample the same site again in 2019 and reassess and compare fish and bug densities and habitat then

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: Wheeler Creek						CROSS-SECTION NO: 1	
CROSS-SECTION LOCATION: 100 ft. downstream from confluence with Ekabo Creek							
DATE: 7-16-20	OBSERVERS: K. Smith, P. Belcher						
LEGAL DESCRIPTION	¼ SECTION: NE	SECTION: 4	TOWNSHIP: 11 (N)S	RANGE: 81 E/(W)	PM: 6th		
COUNTY: Jackson	WATERSHED: Big Creek	WATER DIVISION: 6	DOW WATER CODE: 12562				
MAP(S): USGS: Zone 13 374870		GPS 40.96089091					
USFS: 4535484		-106.48931058					

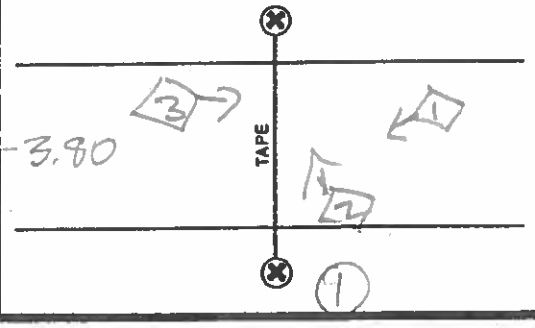
SUPPLEMENTAL DATA

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	6.3 – 6.90/6.90
② WS Upstream	4.8	7.05
③ WS Downstream	10.7	6.45
SLOPE	0.6 / 15.5 = .0387	

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:

stoneFly, caddisfly

COMMENTS

Stream has withstood Wheeler Creek fire very well – low sediment, woody debris, vigorous vegetation.

Riparian = spruce, willow, alder, carex

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:	CROSS-SECTION NO:	DATE:	SHEET ___ OF ___
Wheeler Creek	1	7-16-20	

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

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		5.30								
LF	1.1		6.13								
	1.5		6.50								
	2.6		6.66								
	3.2		6.70								
RW	3.8		6.90								
	4.2		6.95	0.05				0.40			
	4.4		7.0	0.1				0.84			
	4.6		7.0	0.1				0.79			
	4.8		7.05	0.15				1.07			
	5.0		7.15	0.25				0.72			
	5.2		7.15	0.25				1.99			
	5.4		7.15	0.25				2.12			
	5.6		7.10	0.2				2.52			
	5.8		7.0	0.1				1.3			
	6.0		7.0	0.1				0.54			
	6.2		6.95	0.05				0			
LW	6.3		6.90								
	6.7		6.45								
	7.0		6.26								
RF	7.8		6.10								
LS	8.9		5.95								
TOTALS:											

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

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: Wheeler Creek						CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: Approx. 400 ft. upstream from BLM-private boundary							
DATE: 6-16-21	OBSERVERS: R. Smith, P. Bekler						
LEGAL DESCRIPTION	¼ SECTION: NE	SECTION: 4	TOWNSHIP: 11 (N)/S	RANGE: 81 E/W	PM: 6th		
COUNTY: Jackson	WATERSHED: N. Platte	WATER DIVISION: 6	DOW WATER CODE: 12562				
MAP(S): USGS: 13N 374414 4535793	GPS + 40. 57' 49.1" - 106 29' 32.7"						
USFS:							

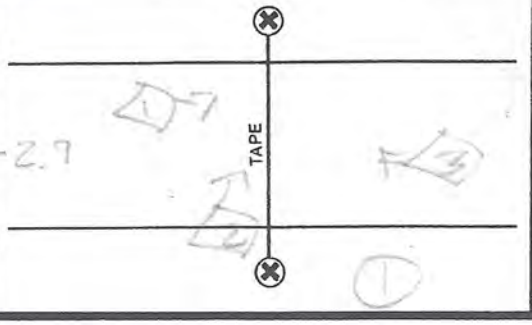
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE:			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: _____ lbs/foot	TAPE TENSION: _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to 6-inch cobbles	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS:		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0 6.8 - 7.90 / 7.90	
② WS Upstream	5.0	7.84
③ WS Downstream	14.0	8.04
SLOPE	.20 / 19.0 = .011	

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:
stonefly, caddisfly

COMMENTS

pH = 7.82
Temp = 10.0°C
Cond = 627
Salinity = 0.0

riparian = alder / willow / spruce

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Wheeler Creek	CROSS-SECTION NO.: 1	DATE: 6-16-21	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	0.0		6.93								
BF	2.2		7.20								
	2.4		7.44								
	2.8		7.68								
RW	2.9		7.90								
→	3.1		8.15	0.25				0.19			
	3.3		8.1	0.2				0.28			
	3.5		8.15	0.25				0.70			
	3.7		8.1	0.20				1.07			
	3.9		8.1	0.20				1.14			
	4.1		8.1	0.20				1.83			
	4.3		8.15	0.25				1.93			
	4.5		8.1	0.2				1.47			
	4.7		8.15	0.25				1.60			
	4.9		8.15	0.25				1.65			
	5.1		8.15	0.25				1.47			
	5.3		8.15	0.25				1.57			
	5.5		8.1	0.20				1.31			
	5.7		8.1	0.2				1.21			
	5.9		8.1	0.2				1.36			
	6.1		8.05	0.15				0.97			
	6.3		8.05	0.15				0.34			
	6.5		8.1	0.2				0.26			
LW	6.8		7.90								
	7.1		7.68								
	7.6		7.44								
RBF	8.3		7.20								
	10.9		6.92								
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: Wheeler Creek						CROSS-SECTION NO.: 2	
CROSS-SECTION LOCATION: Approx. 300 ft. upstream from BLM-private boundary							
DATE: 6-16-2	OBSERVERS: C. Smith, P. Belcher						
LEGAL DESCRIPTION	¼ SECTION: NE	SECTION: 4	TOWNSHIP: 11 N/S	RANGE: 81 E/W	PM: 6th		
COUNTY: Jackson	WATERSHED: N. Platte	WATER DIVISION: 6	DOW WATER CODE: 12562				
MAP(S): USGS: 13N 374375 4535806		40° 57' 49.5" - 106° 29' 34.4"					
USFS:							

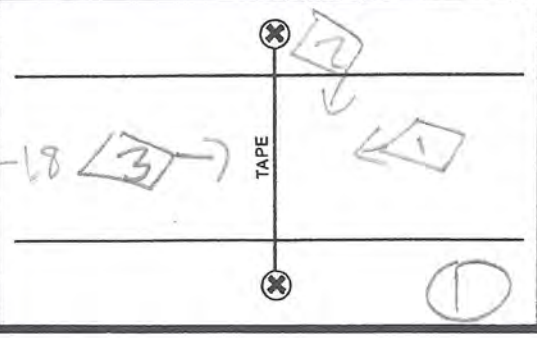
SUPPLEMENTAL DATA

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: sand to 6-inch cobbles	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: 2		

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 5.7	5.55 / 5.55
② WS Upstream	6.5	5.43
③ WS Downstream	9.2	5.73
SLOPE	0.3 / 15.7 = .019	

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

DISCHARGE/CROSS SECTION N ES

STREAM NAME: Wheeler Creek	CROSS-SECTION NO.: 2	DATE: 6-16-21	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 11:30

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		4.18								
	1.0		4.48								
RBF	1.6		4.89								
	1.7		5.20								
RW	1.8		5.55								
	2.0		5.65	0.1				0.08			
	2.2		5.7	.15				0.12			
	2.4		5.75	0.2				0.31			
	2.6		5.75	0.2				1.08			
	2.8		5.8	.25				1.51			
	3.0		5.8	.25				1.37			
	3.2	5.85	5.85	0.3				1.08			
	3.4		5.85	0.3				1.23			
	3.6	<3.7	5.85	0.3	<0.3			1.22	<1.44		
	3.8		5.85	0.3				1.40			
	4.0		5.75	0.2				1.27			
	4.2		5.8	0.25				1.24			
	4.4		5.75	0.2				0.78			
	4.6		5.8	0.25				0.76			
	4.8		5.75	0.2				0.66			
	5.0		5.75	.2				0.62			
	5.2		5.75	.2				0.33			
	5.4		5.75	.2				0.37			
	5.6		5.8	.25				0.13			
	5.7		5.85	.3				0.08			
LW	5.8		5.55								
RBF	5.9		4.84								
	6.2		4.60								
LS	8.0		4.11								
TOTALS:											

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

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: Wheeler Creek						CROSS-SECTION NO: 1	
CROSS-SECTION LOCATION: 100 ft. downstream from confluence with Ekabo Creek							
DATE: 7-16-20	OBSERVERS: K. Smith, P. Belcher						
LEGAL DESCRIPTION	¼ SECTION: NE	SECTION: 4	TOWNSHIP: 11 (N)S	RANGE: 81 E/(W)	PM: 6th		
COUNTY: Jackson	WATERSHED: Big Creek	WATER DIVISION: 6	DOW WATER CODE: 12562				
MAP(S): USGS: Zone 13 374870		GPS 40.96089091					
USFS: 4535484		-106.48931058					

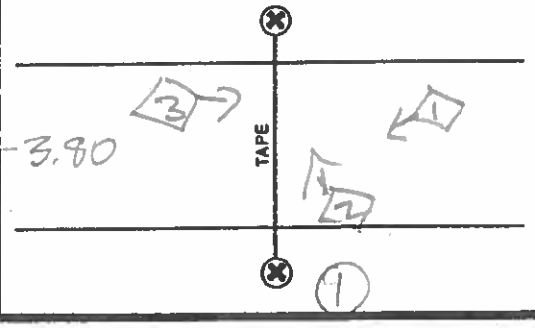
SUPPLEMENTAL DATA

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	6.3 – 6.90/6.90
② WS Upstream	4.8	7.05
③ WS Downstream	10.7	6.45
SLOPE	0.6 / 15.5 = .0387	

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:

stoneFly, caddisfly

COMMENTS

Stream has withstood Wheeler Creek fire very well – low sediment, woody debris, vigorous vegetation.

Riparian = spruce, willow, alder, carex

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:	CROSS-SECTION NO:	DATE:	SHEET ___ OF ___
Wheeler Creek	1	7-16-20	

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

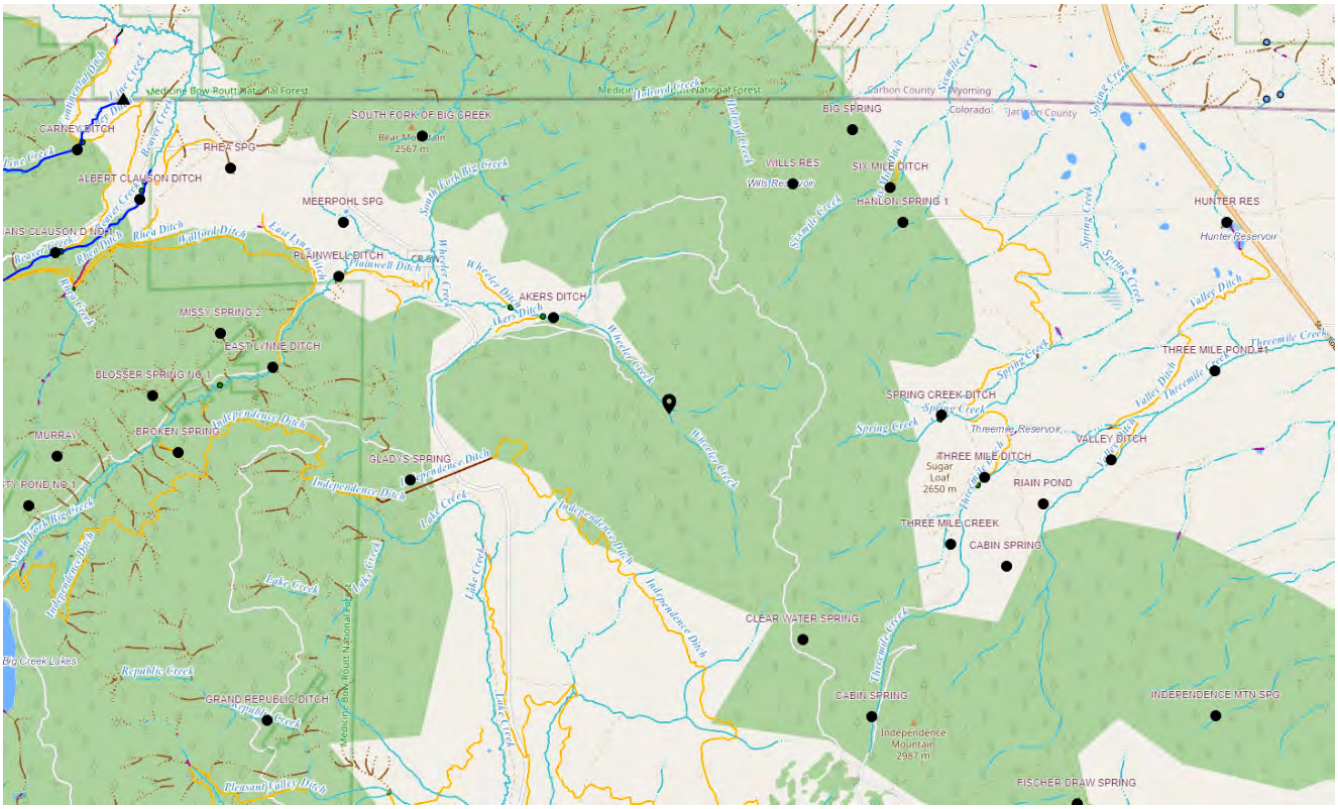
Features: Stake (S), Grassline (G), Waterline (W), Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft^2)	Discharge (cfs)
LS	0.0		5.30								
LF	1.1		6.13								
	1.5		6.50								
	2.6		6.66								
	3.2		6.70								
RW	3.8		6.90								
	4.2		6.95	0.05				0.40			
	4.4		7.0	0.1				0.84			
	4.6		7.0	0.1				0.79			
	4.8		7.05	0.15				1.07			
	5.0		7.15	0.25				0.72			
	5.2		7.15	0.25				1.99			
	5.4		7.15	0.25				2.12			
	5.6		7.10	0.2				2.52			
	5.8		7.0	0.1				1.3			
	6.0		7.0	0.1				0.54			
	6.2		6.95	0.05				0			
LW	6.3		6.90								
	6.7		6.45								
	7.0		6.26								
RF	7.8		6.10								
LS	8.9		5.95								
TOTALS:											

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

R2Cross RESULTS

Stream Name: Wheeler Creek
Stream Locations: 100 ft downstream from conf Ekabo Creek
Fieldwork Date: 07/16/2020
Cross-section: 1
Observers: R Smith, P Belcher
Coordinate System: UTM Zone 13
X (easting): 374670
Y (northing): 4535484
Date Processed: 08/31/2023
Slope: 0.0387
Discharge: R2Cross data file: 0.44 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Wheeler Creek 7-16-20 #1.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 6.55

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	1.38
Percent Wetted Perimeter (%)	50.0	3.01
Mean Velocity (ft/s)	1.0	0.1

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	6.13	6.55	0.59	1.02	3.87	7.14	100.0	0.54	0.03	6.72	26.01
	6.15	6.43	0.58	1.0	3.74	7.01	98.16	0.53	0.03	6.63	24.81
	6.2	6.12	0.56	0.95	3.43	6.68	93.56	0.51	0.03	6.42	21.99
	6.25	5.82	0.54	0.9	3.13	6.35	88.95	0.49	0.03	6.2	19.4
	6.3	5.65	0.5	0.85	2.84	6.15	86.16	0.46	0.03	5.87	16.69
	6.35	5.52	0.46	0.8	2.56	5.99	83.82	0.43	0.03	5.49	14.08
	6.4	5.39	0.43	0.75	2.29	5.82	81.48	0.39	0.03	5.1	11.67
	6.45	5.25	0.39	0.7	2.02	5.65	79.14	0.36	0.03	4.67	9.46
	6.5	5.16	0.34	0.65	1.76	5.51	77.17	0.32	0.03	4.2	7.41
	6.55	4.77	0.32	0.6	1.52	5.1	71.37	0.3	0.03	3.91	5.93
	6.6	4.38	0.29	0.55	1.29	4.68	65.57	0.28	0.03	3.61	4.65
	6.65	3.99	0.27	0.5	1.08	4.27	59.77	0.25	0.04	3.31	3.57
	6.7	3.28	0.27	0.45	0.9	3.53	49.44	0.25	0.04	3.32	2.97
	6.75	3.08	0.24	0.4	0.74	3.31	46.29	0.22	0.04	2.89	2.13
	6.8	2.89	0.2	0.35	0.59	3.08	43.14	0.19	0.04	2.43	1.42
	6.85	2.69	0.17	0.3	0.45	2.86	39.99	0.16	0.04	1.93	0.86
Waterline	6.9	2.5	0.13	0.25	0.32	2.63	36.83	0.12	0.05	1.39	0.44
	6.95	2.0	0.1	0.2	0.2	2.12	29.62	0.1	0.06	1.04	0.21
	7.0	1.0	0.11	0.15	0.11	1.1	15.45	0.1	0.06	1.15	0.13
	7.05	0.9	0.07	0.1	0.07	0.94	13.18	0.07	0.07	0.69	0.05
	7.1	0.7	0.04	0.05	0.03	0.72	10.05	0.04	0.12	0.28	0.01
	7.13	0.49	0.01	0.01	0.01	0.5	6.94	0.01	0.28	0.06	0.0

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

MODEL SUMMARY

Measured Flow (Qm) =	0.44	(cfs)
Calculated Flow (Qc) =	0.44	(cfs)
(Qm-Qc)/Qm * 100 =	0.03%	
Measured Waterline (WLm) =	6.9	(ft)
Calculated Waterline (WLc) =	6.9	(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 =	0.01%	
Mean Velocity =	1.39	(ft/s)
Manning's n =	0.051	
0.4 * Qm =	0.18	(cfs)
2.5 * Qm =	1.11	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	5.3		
Bankfull	1.1	6.13		
	1.5	6.5		
	2.6	6.66		
	3.2	6.7		
Waterline	3.8	6.9	0	0
	4.2	6.95	0.05	0.4
	4.4	7	0.1	0.84
	4.8	7	0.1	0.79
	4.8	7.05	0.15	1.07
	5	7.15	0.25	0.72
	5.2	7.15	0.25	1.99
	5.4	7.15	0.25	2.12
	5.6	7.1	0.2	2.52
	5.8	7	0.1	1.3
	6	7	0.1	0.54
	6.2	6.95	0.05	0
Waterline	6.3	6.9	0	0
	6.7	6.45		
	7	6.26		
Bankfull	7.8	6.1		
	8.9	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	0	0	0	0
0	0	0	0	0
0.4	0.05	0.01	0.01	1.36
0.21	0.1	0.03	0.03	5.7
0.4	0.1	0.02	0.02	3.57
0.05	0.15	0.01	0.02	3.63
0.22	0.25	0.05	0.04	8.14
0.2	0.25	0.05	0.1	22.5
0.2	0.25	0.05	0.11	23.97
0.21	0.2	0.04	0.1	22.8
0.22	0.1	0.02	0.03	5.88
0.2	0.1	0.02	0.01	2.44
0.21	0.05	0.01	0	0
0.11	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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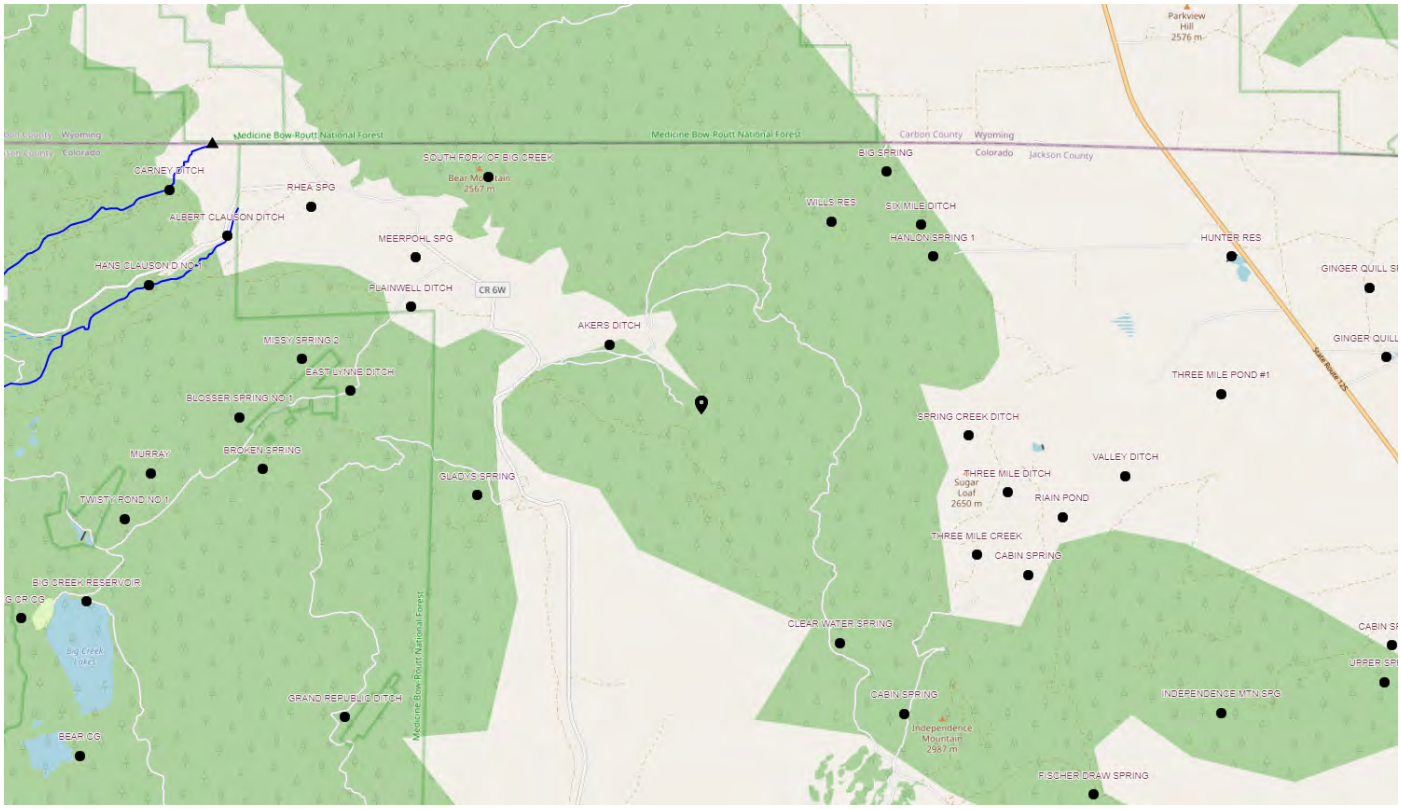
R2Cross RESULTS

Stream Name: Wheeler Creek
Stream Locations: 400 ft upst from BLM-private boundary NE/4 Sec 4 T11N R81W
Fieldwork Date: 06/16/2021
Cross-section: 1
Observers: R Smith, P Belcher
Coordinate System: UTM Zone 13
X (easting): 374414
Y (northing): 4535793
Date Processed: 01/03/2024
Slope: 0.011
Discharge: R2Cross data file: 0.89 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Wheeler Creek 6-16-21 #1.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 6.1

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.89
Percent Wetted Perimeter (%)	50.0	0.05
Mean Velocity (ft/s)	1.0	0.69

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	7.2	6.1	0.68	0.95	4.18	6.82	100.0	0.61	0.03	3.75	15.68
	7.22	6.01	0.67	0.93	4.03	6.72	98.47	0.6	0.03	3.69	14.89
	7.25	5.92	0.66	0.9	3.89	6.62	96.95	0.59	0.03	3.63	14.13
	7.27	5.83	0.64	0.88	3.75	6.51	95.42	0.58	0.03	3.57	13.39
	7.29	5.74	0.63	0.85	3.62	6.41	93.89	0.56	0.03	3.5	12.67
	7.32	5.65	0.62	0.83	3.48	6.3	92.37	0.55	0.03	3.44	11.97
	7.34	5.57	0.6	0.81	3.35	6.2	90.84	0.54	0.03	3.37	11.29
	7.37	5.48	0.59	0.78	3.22	6.09	89.32	0.53	0.03	3.31	10.63
	7.39	5.39	0.57	0.76	3.09	5.99	87.79	0.52	0.03	3.24	10.0
	7.41	5.3	0.56	0.74	2.96	5.89	86.26	0.5	0.03	3.17	9.38
	7.44	5.21	0.54	0.71	2.84	5.78	84.74	0.49	0.03	3.1	8.79
	7.46	5.12	0.53	0.69	2.71	5.68	83.25	0.48	0.03	3.03	8.21
	7.49	5.03	0.52	0.67	2.59	5.58	81.77	0.46	0.03	2.95	7.65
	7.51	4.94	0.5	0.64	2.47	5.48	80.29	0.45	0.03	2.88	7.12
	7.53	4.85	0.49	0.62	2.36	5.38	78.81	0.44	0.03	2.8	6.6
	7.56	4.76	0.47	0.59	2.24	5.28	77.33	0.43	0.03	2.72	6.1
	7.58	4.67	0.46	0.57	2.13	5.18	75.85	0.41	0.03	2.64	5.63
	7.6	4.59	0.44	0.55	2.02	5.07	74.37	0.4	0.03	2.56	5.17
	7.63	4.5	0.43	0.52	1.91	4.97	72.88	0.38	0.03	2.48	4.74
	7.65	4.41	0.41	0.5	1.81	4.87	71.4	0.37	0.03	2.39	4.32
	7.67	4.32	0.39	0.47	1.7	4.77	69.92	0.36	0.03	2.3	3.92
	7.7	4.27	0.38	0.45	1.6	4.7	68.84	0.34	0.03	2.2	3.52
	7.72	4.22	0.36	0.43	1.5	4.63	67.87	0.32	0.04	2.09	3.14
	7.75	4.18	0.34	0.4	1.4	4.56	66.9	0.31	0.04	1.98	2.77
	7.77	4.14	0.31	0.38	1.3	4.5	65.93	0.29	0.04	1.86	2.42

	7.79	4.09	0.29	0.36	1.2	4.43	64.96	0.27	0.04	1.74	2.09
	7.82	4.05	0.27	0.33	1.11	4.37	63.99	0.25	0.04	1.61	1.79
	7.84	4.01	0.25	0.31	1.01	4.3	63.02	0.24	0.04	1.48	1.5
	7.87	3.96	0.23	0.28	0.92	4.23	62.05	0.22	0.04	1.35	1.24
	7.89	3.92	0.21	0.26	0.82	4.17	61.08	0.2	0.04	1.21	1.0
Waterline	7.9	3.9	0.2	0.25	0.78	4.14	60.62	0.19	0.04	1.14	0.89
	7.91	3.87	0.19	0.24	0.73	4.1	60.05	0.18	0.05	1.07	0.78
	7.94	3.82	0.17	0.21	0.64	4.02	58.98	0.16	0.05	0.93	0.59
	7.96	3.76	0.15	0.19	0.55	3.95	57.91	0.14	0.05	0.78	0.43
	7.98	3.71	0.12	0.17	0.46	3.88	56.83	0.12	0.06	0.64	0.29
	8.01	3.65	0.1	0.14	0.37	3.8	55.76	0.1	0.07	0.49	0.18
	8.03	3.6	0.08	0.12	0.29	3.73	54.69	0.08	0.08	0.35	0.1
	8.05	3.3	0.06	0.1	0.2	3.42	50.08	0.06	0.1	0.24	0.05
	8.08	3.06	0.04	0.07	0.13	3.15	46.13	0.04	0.13	0.14	0.02
	8.1	1.97	0.03	0.05	0.06	2.03	29.78	0.03	0.17	0.09	0.01
	8.13	1.28	0.02	0.02	0.02	1.32	19.29	0.02	0.27	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) =	0.89	(cfs)
Calculated Flow (Qc) =	0.89	(cfs)
(Qm-Qc)/Qm * 100 =	0.01%	
Measured Waterline (WLm) =	7.9	(ft)
Calculated Waterline (WLc) =	7.9	(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 =	1.14	(ft/s)
Manning's n =	0.045	
0.4 * Qm =	0.36	(cfs)
2.5 * Qm =	2.23	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	6.83		
Bankfull	2.2	7.2		
	2.4	7.44		
	2.8	7.68		
Waterline	2.9	7.9	0	0
	3.1	8.15	0.25	0.19
	3.3	8.1	0.2	0.28
	3.5	8.15	0.25	0.7
	3.7	8.1	0.2	1.07
	3.9	8.1	0.2	1.14
	4.1	8.1	0.2	1.83
	4.3	8.15	0.25	1.93
	4.5	8.1	0.2	1.47
	4.7	8.15	0.25	1.6
	4.9	8.15	0.25	1.65
	5.1	8.15	0.25	1.47
	5.3	8.15	0.25	1.57
	5.5	8.1	0.2	1.31
	5.7	8.1	0.2	1.21
	5.9	8.1	0.2	1.36
	6.1	8.05	0.15	0.92
	6.3	8.05	0.15	0.34
	6.5	8.1	0.2	0.26
Waterline	6.8	7.9	0	0
	7.1	7.68		
	7.6	7.44		
Bankfull	8.3	7.2		
	10.9	6.92		

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
0.32	0.25	0.05	0.01	1.06
0.21	0.2	0.04	0.01	1.25
0.21	0.25	0.05	0.04	3.92
0.21	0.2	0.04	0.04	4.79
0.2	0.2	0.04	0.05	5.11
0.2	0.2	0.04	0.07	8.2
0.21	0.25	0.05	0.1	10.81
0.21	0.2	0.04	0.06	6.58
0.21	0.25	0.05	0.08	8.96
0.2	0.25	0.05	0.08	9.24
0.2	0.25	0.05	0.07	8.23
0.2	0.25	0.05	0.08	8.79
0.21	0.2	0.04	0.05	5.87
0.2	0.2	0.04	0.05	5.42
0.2	0.2	0.04	0.05	6.09
0.21	0.15	0.03	0.03	3.09
0.2	0.15	0.03	0.01	1.14
0.21	0.2	0.05	0.01	1.46
0.36	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

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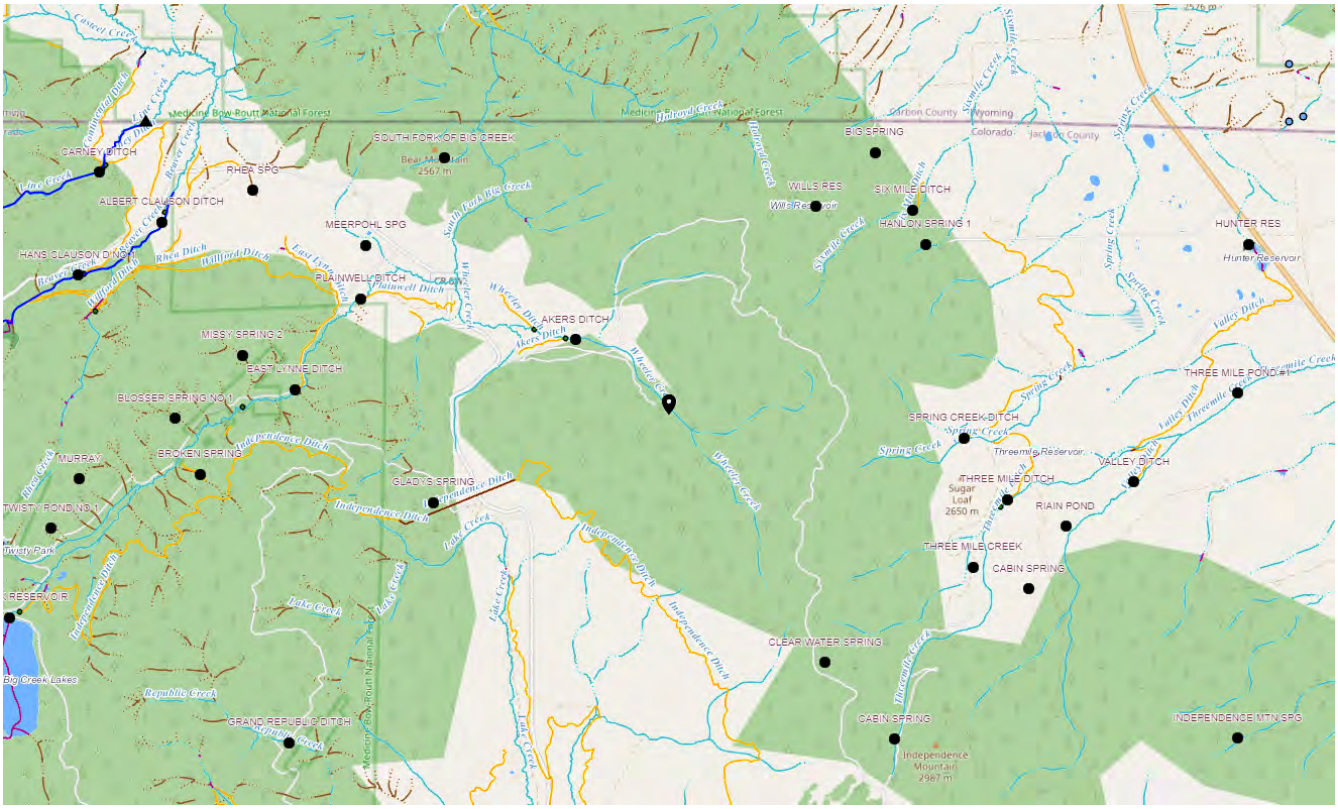
R2Cross RESULTS

Stream Name: Wheeler Creek
Stream Locations: 300 ft upst from BLM-private boundary NE/4 Sec 4 T11N R81W
Fieldwork Date: 06/16/2021
Cross-section: 2
Observers: R Smith, P Belcher
Coordinate System: UTM Zone 13
X (easting): 374375
Y (northing): 4535806
Date Processed: 08/31/2023
Slope: 0.019
Discharge: R2Cross data file: 0.77 (cfs)
Computation method: Ferguson VPE
R2Cross data filename: Wheeler Creek 6-16-21 #2 corrected.xlsx
R2Cross version: 2.0.2

LOCATION



ANALYSIS RESULTS

Habitat Criteria Results

Bankfull top width (ft) = 4.29

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	0.61
Percent Wetted Perimeter (%)	50.0	0.02
Mean Velocity (ft/s)	1.0	0.98

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	4.89	4.29	0.84	0.96	3.61	5.69	100.0	0.64	0.04	3.6	13.02
	4.91	4.28	0.82	0.94	3.51	5.64	99.13	0.62	0.04	3.53	12.38
	4.94	4.27	0.8	0.91	3.41	5.59	98.26	0.61	0.04	3.45	11.75
	4.96	4.26	0.78	0.89	3.3	5.54	97.39	0.6	0.04	3.37	11.14
	4.99	4.25	0.75	0.86	3.2	5.49	96.52	0.58	0.04	3.29	10.53
	5.01	4.24	0.73	0.84	3.1	5.44	95.65	0.57	0.04	3.21	9.94
	5.03	4.23	0.71	0.82	3.0	5.39	94.78	0.56	0.04	3.12	9.36
	5.06	4.22	0.69	0.79	2.9	5.34	93.91	0.54	0.04	3.04	8.8
	5.08	4.2	0.67	0.77	2.8	5.29	93.04	0.53	0.05	2.95	8.25
	5.11	4.19	0.64	0.74	2.7	5.24	92.17	0.51	0.05	2.86	7.71
	5.13	4.18	0.62	0.72	2.6	5.19	91.3	0.5	0.05	2.77	7.18
	5.15	4.17	0.6	0.7	2.49	5.14	90.43	0.49	0.05	2.68	6.67
	5.18	4.16	0.58	0.67	2.4	5.09	89.56	0.47	0.05	2.58	6.18
	5.2	4.15	0.55	0.65	2.3	5.04	88.7	0.46	0.05	2.48	5.7
	5.23	4.14	0.53	0.62	2.2	4.99	87.83	0.44	0.05	2.38	5.24
	5.25	4.13	0.51	0.6	2.1	4.95	86.97	0.42	0.05	2.28	4.79
	5.27	4.12	0.49	0.58	2.0	4.9	86.1	0.41	0.05	2.18	4.36
	5.3	4.11	0.46	0.55	1.9	4.85	85.23	0.39	0.05	2.08	3.94
	5.32	4.1	0.44	0.53	1.8	4.8	84.37	0.38	0.05	1.97	3.54
	5.35	4.09	0.42	0.5	1.7	4.75	83.5	0.36	0.06	1.86	3.17
	5.37	4.08	0.39	0.48	1.6	4.7	82.64	0.34	0.06	1.75	2.81
	5.39	4.07	0.37	0.46	1.51	4.65	81.77	0.32	0.06	1.64	2.47
	5.42	4.06	0.35	0.43	1.41	4.6	80.91	0.31	0.06	1.52	2.15
	5.44	4.05	0.32	0.41	1.31	4.55	80.04	0.29	0.06	1.41	1.85
	5.47	4.04	0.3	0.38	1.22	4.5	79.18	0.27	0.07	1.29	1.57

	5.49	4.03	0.28	0.36	1.12	4.45	78.31	0.25	0.07	1.17	1.31
	5.51	4.02	0.25	0.34	1.02	4.4	77.45	0.23	0.07	1.05	1.08
	5.54	4.01	0.23	0.31	0.93	4.36	76.58	0.21	0.08	0.93	0.87
Waterline	5.55	4.0	0.22	0.3	0.88	4.33	76.15	0.2	0.08	0.88	0.77
	5.56	3.97	0.21	0.29	0.83	4.29	75.46	0.19	0.08	0.82	0.68
	5.59	3.92	0.19	0.26	0.74	4.21	74.07	0.17	0.09	0.71	0.52
	5.61	3.86	0.17	0.24	0.64	4.13	72.68	0.16	0.1	0.6	0.39
	5.63	3.8	0.14	0.22	0.55	4.05	71.29	0.14	0.11	0.5	0.27
	5.66	3.73	0.12	0.19	0.46	3.96	69.64	0.12	0.12	0.4	0.18
	5.68	3.63	0.1	0.17	0.37	3.84	67.45	0.1	0.14	0.3	0.11
	5.71	3.52	0.08	0.14	0.29	3.71	65.27	0.08	0.17	0.22	0.06
	5.73	3.42	0.06	0.12	0.2	3.59	63.08	0.06	0.22	0.14	0.03
	5.75	2.43	0.05	0.1	0.12	2.57	45.22	0.05	0.25	0.11	0.01
	5.78	1.8	0.04	0.07	0.07	1.9	33.39	0.04	0.3	0.08	0.01
	5.8	1.0	0.04	0.05	0.04	1.06	18.7	0.04	0.32	0.07	0.0
	5.83	0.8	0.02	0.02	0.02	0.83	14.62	0.02	0.51	0.03	0.0

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

MODEL SUMMARY

Measured Flow (Qm) =	0.77	(cfs)
Calculated Flow (Qc) =	0.77	(cfs)
(Qm-Qc)/Qm * 100 =	-0.00%	
Measured Waterline (WLm) =	5.55	(ft)
Calculated Waterline (WLc) =	5.55	(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 =	-0.00%	
Mean Velocity =	0.88	(ft/s)
Manning's n =	0.081	
0.4 * Qm =	0.31	(cfs)
2.5 * Qm =	1.92	(cfs)

FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	4.18		
	1	4.48		
Bankfull	1.6	4.89		
	1.7	5.2		
Waterline	1.8	5.55	0	0
	2	5.65	0.1	0.08
	2.2	5.7	0.15	0.12
	2.4	5.75	0.2	0.31
	2.6	5.75	0.2	1.08
	2.8	5.8	0.25	1.51
	3	5.8	0.25	1.32
	3.2	5.85	0.3	1.08
	3.4	5.85	0.3	1.23
	3.6	5.85	0.3	1.22
	3.7	5.85	0.3	1.41
	3.8	5.85	0.3	1.4
	4	5.75	0.2	1.27
	4.2	5.8	0.25	1.24
	4.4	5.75	0.2	0.78
	4.6	5.8	0.25	0.78
	4.8	5.75	0.2	0.6
	5	5.75	0.2	0.62
	5.2	5.75	0.2	0.33
	5.4	5.75	0.2	0.37
	5.6	5.8	0.25	0.13
	5.7	5.85	0.3	0.08
Waterline	5.8	5.55	0	0
Bankfull	5.9	4.84		
	6.2	4.6		
	8	4.11		

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
0.22	0.1	0.02	0	0.21
0.21	0.15	0.03	0	0.47
0.21	0.2	0.04	0.01	1.61
0.2	0.2	0.04	0.04	5.62
0.21	0.25	0.05	0.08	9.83
0.2	0.25	0.05	0.07	8.59
0.21	0.3	0.06	0.06	8.44
0.2	0.3	0.06	0.07	9.61
0.2	0.3	0.04	0.05	7.15
0.1	0.3	0.03	0.04	5.51
0.1	0.3	0.04	0.06	8.2
0.22	0.2	0.04	0.05	6.61
0.21	0.25	0.05	0.06	8.07
0.21	0.2	0.04	0.03	4.06
0.21	0.25	0.05	0.04	5.08
0.21	0.2	0.04	0.02	3.12
0.2	0.2	0.04	0.02	3.23
0.2	0.2	0.04	0.01	1.72
0.2	0.2	0.04	0.01	1.93
0.21	0.25	0.04	0	0.63
0.11	0.3	0.03	0	0.31
0.32	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

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Discharge Measurment Field Visit Data Report *(Filters: Name begins with Wheeler Creek;)*

Div	Name	CWCB Case Number	Segment ID	Meas. Date	UTM	Location	Flow Amount (cfs)	Meas #	Rating	Station ID
6	Wheeler Creek		23/6/A-001	06/23/1980	UTMx: UTMy:		1.25			
6	Wheeler Creek		23/6/A-001	07/14/1989	UTMx: UTMy:		0.13			
6	Wheeler Creek		23/6/A-001	08/24/1989	UTMx: UTMy:		0.09			
6	Wheeler Creek		23/6/A-001	07/30/1990	UTMx: UTMy:		0.07			
6	Wheeler Creek		23/6/A-001	07/12/1991	UTMx: UTMy:		0.17			
6	Wheeler Creek		23/6/A-001	06/25/1992	UTMx: UTMy:		0.2			
6	Wheeler Creek		23/6/A-001	06/21/1993	UTMx: UTMy:		1.73			
6	Wheeler Creek		23/6/A-001	06/09/2004	UTMx: UTMy:		0.09			
6	Wheeler Creek		23/6/A-001	05/13/2009	UTMx: UTMy:		19.92			
6	Wheeler Creek		23/6/A-001	06/18/2009	UTMx: UTMy:		3.52			
6	Wheeler Creek		23/6/A-001	06/22/2009	UTMx: UTMy:		5.11			
6	Wheeler Creek		23/6/A-001	06/30/2009	UTMx: UTMy:		3.5			
6	Wheeler Creek		23/6/A-001	07/14/2009	UTMx: UTMy:		2.55			
6	Wheeler Creek		23/6/A-001	07/21/2009	UTMx: UTMy:		1.37			
6	Wheeler Creek		23/6/A-001	08/07/2009	UTMx: UTMy:		1.22			
6	Wheeler Creek		23/6/A-001	09/09/2009	UTMx: UTMy:		0.74			
6	Wheeler Creek		23/6/A-001	06/09/2010	UTMx: UTMy:		7.21			
6	Wheeler Creek		23/6/A-001	07/01/2010	UTMx: UTMy:		1.67			
6	Wheeler Creek		23/6/A-001	07/21/2010	UTMx: UTMy:		1.2			
6	Wheeler Creek		23/6/A-001	07/29/2010	UTMx: UTMy:		1.58			
6	Wheeler Creek		23/6/A-001	09/07/2010	UTMx: UTMy:		0.52			
6	Wheeler Creek		23/6/A-001	06/28/2011	UTMx: UTMy:		8.17			
6	Wheeler Creek		23/6/A-001	07/21/2011	UTMx: UTMy:		3.05			

6	Wheeler Creek		23/6/A-001	08/01/2011	UTMx: UTMy:		1.76			
6	Wheeler Creek		23/6/A-001	08/24/2011	UTMx: UTMy:		0.94			
6	Wheeler Creek		23/6/A-001	08/30/2011	UTMx: UTMy:		1.76			
6	Wheeler Creek		23/6/A-001	07/29/2014	UTMx: UTMy:		0.88			
6	Wheeler Creek		23/6/A-001	09/29/2023	UTMx: UTMy:		0.16			

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	0	0.292	0					Pygmy				
	0.583	0.5	0		0	0				0.000	0.000	0
	1	0.459	0.3		40	44		0.916		0.138	0.126	0.100752
	1.5	0.5	0.4		55	46		1.196		0.200	0.239	0.191261
	2	0.55	0.4		50	43		1.164		0.220	0.256	0.204741
	2.6	0.5	0.4		50	45		1.114		0.200	0.223	0.178054
	3	0.45	0.4		35	40		0.883		0.180	0.159	0.127052
	3.5	0.5	0.4		30	40		0.761		0.200	0.152	0.121642
	4	0.5	0.3		25	51		0.507		0.150	0.076	0.060792
	4.5	0.5	0.2		10	58		0.196		0.100	0.020	0.015706
	5	0.25	0		0	0				0.000	0.000	0
TOTALS:	5.00	5.00						0.396		1.388	1.251	
	6/23/1980				looking upstream L-R							
	16:00				Pre- / Post-							
	Surveyer: A Tips, Utz											
	EC	95	uS/cm		beaver observed, DO 7 mg/L, sampled at 11 N, R 81 W., Sec. 4 NWNE							
	Sal	0										
	pH	7.5-8.0			"wading, upstream, 300 ft upstream of bridge, east of BLM fence"							
	Temp	14	C		field crew calculated 1.30 ft3/sec							

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
lew	1	0.25	0					**Pygmy**				
	1.5	0.5	0.1		25	62		0.422		0.050	0.021	0.167532
	2	0.5	0.12		27	60		0.468		0.060	0.028	0.222811
	2.5	0.5	0.1	rock	39	61		0.653		0.050	0.033	0.259125
	3	0.5	0.15		35	61		0.589		0.075	0.044	0.350532
	3.5	0.35	0.05							0.018	0.000	0
	3.7	0.25								0.000	0.000	0
	4	0.15								0.000	0.000	0
rew												
TOTALS:	3.00	3.00						0.125		0.253	0.126	
	7/14/1989				looking upstream L-R							
					Pre- / Post-							
	Surveyer: A Ledford											
	EC		uS/cm		up from culvert							
	Sal	0										
	pH				respin 58 sec							
	Temp	18	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
rew	0.35	0.325	0		0			**Pygmy**				
	1	0.575	0.05		35	67		0.538		0.029	0.015	0.182422
	1.5	0.5	0.15		33	83		0.416		0.075	0.031	0.368108
	2	0.5	0.15		30	61		0.508		0.075	0.038	0.44947
	2.5	0.45	0.15									
lew	2.9	0.2	0.00									
		0										
TOTALS:	2.55	2.55						0.086		0.179	0.085	
	8/24/1989		13:50		looking upstream L-R							
					Pre- / Post-							
	Surveyer:	Ledford, McCallie										
	EC		uS/cm		up from culvert							
	Sal	0										
	pH				prespin 62 sec							
	Temp	18	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
low	0.2	0.1	0.00		0			**Pygmy**				
	0.4	0.2	0.05							0.010	0.000	0
	0.6	0.2	0.05							0.010	0.000	0
	0.8	0.2	0.13		50	63		0.803		0.026	0.021	0.282574
	1	0.2	0.10		11	63		0.199		0.020	0.004	0.053729
	1.2	0.2	0.12		40	69		0.594		0.024	0.014	0.192975
	1.4	0.2	0.12		52	67		0.786		0.024	0.019	0.255277
	1.6	0.2	0.15		35	68		0.531		0.030	0.016	0.215445
	1.8	0.2								0.000	0.000	
row	2	0.1										
TOTALS:	1.80	1.80						0.171		0.144	0.074	
	7/30/1990				looking upstream L-R							
					Pre- / Post-							
	Surveyer: A Ledford											
	EC	120	uS/cm		up from culvert							
	Sal	0			dead branches in the willows on either side of road. Stream is low, cows present, salt on creek							
	pH	8.13			prespin 82 sec							
	Temp	14	C									
		air temp 20 C										

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
low	0.9	0.3	0.10		0			**Pygmy**				
	1.5	0.55	0.15		7	60		0.142		0.083	0.012	0.067361
	2	0.5	0.22		39	60		0.663		0.110	0.073	0.419429
	2.5	0.5	0.17		28	60		0.484		0.085	0.041	0.23655
	3	0.5	0.20		27	60		0.468		0.100	0.047	0.268931
	3.5	0.6	0.08			60		0.028		0.048	0.001	0.007729
	4.2	0.35	0.00							0.000	0.000	0
row												
TOTALS:	-0.90	3.30						0.105		0.426	0.174	
	7/12/1991	11:45			looking upstream L-R							
					Pre- / Post-							
	Surveyer: A Ledford											
	EC	90	uS/cm		about 50 yds down from road crossing							
	Sal	0										
	pH				prespin 88 sec							
	Temp		C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell		
low	1.1	0.25	0.23					**0.484**		0.058	0.028	0.141237		
	1.6	0.5	0.28					0.956		0.140	0.134	0.679236		
	2.1	0.5	0.20					0.284		0.100	0.028	0.14413		
	2.6	0.5	0.15					0.093		0.075	0.007	0.035398		
	3.1	0.45	0.12							0.054	0.000	0		0.000
	3.5	0.2								0.000	0.000	0		
										0.000	0.000	0		
row														
TOTALS:	2.40	2.40						0.078		0.427	0.197			
	6/25/1992	11:00			looking upstream L-R									
					Pre- / Post-									
	Surveyer:	Ledford						overcast, rain						
	EC	94	uS/cm											
	Sal	0						undercut banks-	partial flow measured					
	pH				prespin 70 sec									
	Temp		C											

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell		
low	0.3	0.1	0.05							0.005	0.000	0		
	0.5	0.2	0.10							0.020	0.000	0		
	0.7	0.2	0.17							0.034	0.000	0		
	0.9	0.2	0.28		55	60		0.924		0.056	0.052	0.029865		
	1.1	0.2	0.29		59	60		0.989		0.058	0.057	0.033113		0.000
	1.3	0.2	0.30		71	60		1.184		0.060	0.071	0.041025		
	1.5	0.2	0.39		95	60		1.575		0.078	0.123	0.070934		
	1.7	0.2	0.48		107	60		1.770		0.096	0.170	0.098135		
	1.9	0.2	0.48		125	60		2.063		0.096	0.198	0.114382		
row	2.1	0.2	0.46		121	60		1.998		0.092	0.184	0.106156		
	2.3	0.2	0.53		100	60		1.656		0.106	0.176	0.10138		
	2.5	0.2	0.55		117	60		1.933		0.110	0.213	0.122789		
	2.7	0.2	0.49		122	60		2.015		0.098	0.197	0.114001		
	2.9	0.2	0.43		84	60		1.396		0.086	0.120	0.069314		
	3.1	0.2	0.43		74	60		1.233		0.086	0.106	0.061228		
	3.3	0.2	0.26		43	60		0.728		0.052	0.038	0.021865		
	3.5	0.2	0.18		45	60		0.761		0.036	0.027	0.015814		
	3.7	0.2	0.10							0.020	0.000	0		
	3.9	0.1	0.00							0.000	0.000	0		
TOTALS:	3.60	3.60						0.829		1.189	1.732			
	6/21/1993	12:10			looking upstream L-R									
					Pre- / Post-									
	Surveyer: A Webking							overcast, rain						
	EC	78	uS/cm	at 15 C										
	Sal	0						undercut banks- partial flow measured						
	pH				prespin 2:14, post 2:30									
	Temp	15	C											

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	Area	Discharge	% each cell
	4.08	0.545	0					0.000	0.000	0
	5.17	1.085	0.2				0.42	0.217	0.091	1
	6.25	0.54	0					0.000	0.000	0
TOTALS:										
	2.17	2.17						0.217	0.091	
	6/9/2004				looking upstream L-R					
					Pre- / Post-					
	Surveyer: A Lawrence/McGuire									
	EC		uS/cm							
	Sal									
	pH							R2 Cross Data Collected		
	Temp		C							

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	1.9	0.25						**PRICE <40/ >40 revolutns**				
	2.4	0.35	1.9		31	30		2.273		0.665	1.511	0.075859
	2.6	0.3	1.9		45	30		3.285		0.570	1.872	0.093985
	3	0.4	1.9		49	30		3.574		0.760	2.716	0.136351
	3.4	0.35	2		58	30		4.225		0.700	2.958	0.148459
	3.7	0.3	2		56	30		4.081		0.600	2.448	0.122894
	4	0.3	1.9		46	30		3.357		0.570	1.914	0.096055
	4.3	0.35	1.8		29	30		2.127		0.630	1.340	0.067271
	4.7	0.35	1.85		27	30		1.982		0.648	1.283	0.064416
	5	0.35	1.8		30	30		2.200		0.630	1.386	0.069568
	5.4	0.4	1.7		28	30		2.055		0.680	1.397	0.070129
	5.8	0.35	1.6		19	30		1.401		0.560	0.784	0.039371
	6.1	0.4	1.6		6	30		0.456		0.640	0.292	0.014649
	6.6	0.45	0.9		0	30		0.020		0.405	0.008	0.000407
	7	0.45	0.5		0	30		0.020		0.225	0.005	0.000226
	7.5	0.5	0.5		0	30		0.020		0.250	0.005	0.000251
	8	0.55	0.2		0	30		0.020		0.110	0.002	0.00011
	8.6	0.3	0		0	30		0.020		0.000	0.000	0
TOTALS:	6.70	6.70						1.830		8.643	19.923	
	5/13/2009				looking upstream L-R							
	13:15				Pre- / Post-							
	Surveyer: Allai/Belcher											
	EC	76.3	uS/cm		windy, clear, cold							
	Sal	0										
	pH	na										
	Temp	6	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
								PRICE <40/ >40 revolutns				
	1.2	0.2	0		0	30		0.020		0.000	0.000	0
	1.6	0.25	0.4		0	30		0.020		0.100	0.002	0.000569
	1.7	0.15	0.45		0	30		0.030		0.068	0.002	0.000576
	1.9	0.2	0.5		21	30		1.549		0.100	0.155	0.044036
	2.1	0.25	0.5		23	30		1.694		0.125	0.212	0.060186
	2.4	0.25	0.5		32	30		2.345		0.125	0.293	0.08332
	2.6	0.2	0.6		47	30		3.430		0.120	0.412	0.117002
	2.8	0.25	0.6		38	30		2.779		0.150	0.417	0.118492
	3.1	0.35	0.55		41	30		2.999		0.193	0.577	0.16414
	3.5	0.45	0.5		40	30		2.927		0.225	0.659	0.187204
	4	0.4	0.6		45	30		3.290		0.240	0.790	0.224475
	4.3	0.3	0.6		43	30		3.140		0.180	0.565	0.160697
	4.6	0.25	0.6		46	30		3.357		0.150	0.504	0.143168
	4.8	0.3	0.55		37	30		2.709		0.165	0.447	0.127057
	5.2	0.35	0.4		16	30		1.183		0.140	0.166	0.047071
	5.5	0.55	0.3		19	30		1.401		0.165	0.231	0.065702
	6.3	0.4	0		0	30		0.020		0.000	0.000	0
TOTALS:												
	5.10	5.10						2.106		2.245	3.518	
	6/18/2009				looking upstream L-R			PRICE meter				
	11:30				Pre- 1 min 15 sec+ / Post- 1 min 15 sec +							
	Surveyer: Allai/Belcher							scattered drizzles				
	EC	68.2	uS/cm		windy, cloudy							
	Sal	0										
	pH											
	Temp	8.8	C									
	sp. cond.	98.5	uS/cm									

angle coefficient	distance from initial pt	Width	Depth	Obser- vation Depth	Revol- utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
								PRICE <40/ >40 revolutns				
	1.3	0.55	0		0	30		0.020		0.000	0.000	0
	2.4	0.65	0.6		24	30		1.764		0.390	0.688	0.134771
	2.6	0.2	0.65		31	30		2.273		0.130	0.295	0.057878
	2.8	0.2	0.6		37	30		2.709		0.120	0.325	0.063675
	3	0.25	0.6		42	30		3.068		0.150	0.460	0.090153
	3.3	0.3	0.5		43	30		3.140		0.150	0.471	0.092278
	3.6	0.35	0.5		41	30		2.996		0.175	0.524	0.102698
	4	0.45	0.45		58	30		4.225		0.203	0.856	0.167617
	4.5	0.5	0.3		34	30		2.491		0.150	0.374	0.073188
	5	0.5	0.3		25	30		1.837		0.150	0.276	0.05397
	5.5	0.95	0.4		30	30		2.200		0.380	0.836	0.163772
	6.9	0.7	0		0	30		0.030		0.000	0.000	0
TOTALS:												
	5.60	5.60						2.670		1.998	5.105	
	6/22/2009				looking upstream L-R			PRICE meter				
	14:15				Pre-94 sec+ / Post- 89 sec							
	Surveyer: Allai							scattered drizzles				
	EC	79	uS/cm		windy, cloudy							
	Sal	0										
	pH											
	Temp	13.7	C									
	sp. cond.	100.3	uS/cm									

angle coefficient	distance from initial pt	Width	Depth	Obser- vation Depth	Revol- utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	0.70	0.60	0.00		0	30.00		0.028		0.00	0.00	0.00
	1.9	0.65	0.5		19	30		0.647		0.325	0.210	0.06012
	2	0.1	0.5		47	30		1.559		0.050	0.078	0.022289
	2.1	0.15	0.5		68	30		2.243		0.075	0.168	0.048104
	2.3	0.2	0.6		69	30		2.275		0.120	0.273	0.078085
	2.5	0.2	0.6		87	30		2.861		0.120	0.343	0.098204
	2.7	0.25	0.6		90	30		2.959		0.150	0.444	0.126947
	3	0.25	0.5		80	30		2.633		0.125	0.329	0.094146
	3.2	0.25	0.6		63	30		2.080		0.150	0.312	0.089223
	3.5	0.25	0.4		67	30		2.210		0.100	0.221	0.063208
	3.7	0.25	0.3		75	30		2.471		0.075	0.185	0.052995
	4	0.3	0.3		71	30		2.340		0.090	0.211	0.06024
	4.3	0.3	0.3		72	30		2.373		0.090	0.214	0.061079
	4.6	0.35	0.3		73	30		2.405		0.105	0.253	0.072236
	5	0.3	0.2		65	30		2.145		0.060	0.129	0.036807
	5.2	0.2	0.2		42	30		1.396		0.040	0.056	0.015969
	5.4	0.55	0.2		19	30		0.647		0.110	0.071	0.020348
	6.3	0.45	0		0	30		0.028		0.000	0.000	0
TOTALS:	5.60	5.60						2.078		1.785	3.496	
	date:	6/30/2009			looking upstream L-R							
	time:	13:00			Pre- 58 / Post- 52							
	Surveyer:	Allai										
	EC	83.9	uS/cm		clear, sunny , warm							
	SC	108.5	uS/cm									
	Sal	0.1	ppt									
	pH											
	Temp	13.2	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	0.90	0.30	0.00		0	30.00				0.00		
	1.5	0.35	0.5		10	30.00		0.354		0.175	0.062	0.024298
	1.6	0.1	0.5		20	30.00		0.679		0.050	0.034	0.013335
	1.7	0.1	0.5		50	30.00		1.656		0.050	0.083	0.032513
	1.8	0.1	0.5		52	30.00		1.721		0.050	0.086	0.033792
	1.9	0.1	0.5		48	30.00		1.591		0.050	0.080	0.031234
	2	0.1	0.5		52	30.00		1.721		0.050	0.086	0.033792
	2.1	0.15	0.5		65	30.00		2.145		0.075	0.161	0.063153
	2.3	0.2	0.5		77	30.00		2.536		0.100	0.254	0.099546
	2.5	0.2	0.5		75	30.00		2.471		0.100	0.247	0.096989
	2.7	0.2	0.5		60	30.00		1.982		0.100	0.198	0.077811
	2.9	0.25	0.4		60	30.00		1.982		0.100	0.198	0.077811
	3.2	0.3	0.3		75	30.00		2.471		0.090	0.222	0.08729
	3.5	0.3	0.3		63	30.00		2.080		0.090	0.187	0.073482
	3.8	0.3	0.3		68	30.00		2.243		0.090	0.202	0.079236
	4.1	0.25	0.2		80	30.00		2.633		0.050	0.132	0.051691
	4.3	0.35	0.2		64	30.00		2.112		0.070	0.148	0.058048
	4.8	0.7	0.2		36	30.00		1.200		0.140	0.168	0.065977
	5.7	0.45	0		0	30		0.028		0.000	0.000	0
TOTALS:	4.80	4.80						1.663		1.430	2.547	
	date:	7/14/2009			looking upstream L-R							
	time:	11:33			Pre- 49 / Post- 53							
	Surveyer: Allai											
	EC	91.1	uS/cm		clear ,sunny ,warm							
	SC	119.8	uS/cm									
	Sal	0.1	ppt									
	pH											
	Temp	12.4	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	2.10	0.30	0.00		0	30.00				0.00		
	2.7	0.35	0.25		5	30		0.191		0.088	0.017	0.012148
	2.8	0.1	0.3		2	30		0.093		0.030	0.003	0.002033
	2.9	0.1	0.3		23	30		0.777		0.030	0.023	0.01696
	3	0.15	0.3		81	30		2.666		0.045	0.120	0.08728
	3.2	0.2	0.3		43	30		1.428		0.060	0.086	0.062352
	3.4	0.2	0.3		64	30		2.112		0.060	0.127	0.092205
	3.6	0.2	0.25		31	30		1.038		0.050	0.052	0.037744
	3.8	0.2	0.25		28	30		0.940		0.050	0.047	0.034189
	4	0.2	0.2		60	30		1.982		0.040	0.079	0.057679
	4.2	0.2	0.25		76	30		2.503		0.050	0.125	0.091054
	4.4	0.2	0.25		62	30		2.047		0.050	0.102	0.074468
	4.6	0.2	0.25		65	30		2.145		0.050	0.107	0.078022
	4.8	0.2	0.25		48	30		1.591		0.050	0.080	0.057883
	5	0.2	0.25		32	30		1.070		0.050	0.054	0.038928
	5.2	0.2	0.25		68	30		2.243		0.050	0.112	0.081577
	5.4	0.2	0.25		44	30		1.461		0.050	0.073	0.053144
	5.6	0.2	0.25		41	30		1.363		0.050	0.068	0.04959
	5.8	0.35	0.2		43	30		1.428		0.070	0.100	0.072743
	6.3	0.25	0		0	30		0.028		0.000	0.000	0
TOTALS:	4.20	4.20						1.427		0.923	1.374	
	date:	7/21/2009			looking upstream L-R							
	time:	12:00			Pre- 58 / Post- 59							
	Surveyer:	Allai										
	EC	96.1	uS/cm		clear, warm, sunny							
	SC	126.2	uS/cm									
	Sal	0.1	ppt									
	pH	7.72										
	Temp	12.7	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	1.60	0.25	0.00		0	30.00				0.00		
	2.1	0.4	0.2		11	30		0.386		0.080	0.031	0.025372
	2.4	0.25	0.2		21	30		0.712		0.050	0.036	0.029228
	2.6	0.2	0.2		28	30		0.940		0.040	0.038	0.03087
	2.8	0.2	0.3		53	30		1.754		0.060	0.105	0.086417
	3	0.3	0.3		60	30		1.982		0.090	0.178	0.146472
	3.4	0.3	0.25		56	30		1.852		0.075	0.139	0.114038
	3.6	0.2	0.25		53	30		1.754		0.050	0.088	0.072014
	3.8	0.2	0.25		43	30		1.428		0.050	0.071	0.058643
	4	0.2	0.2		41	30		1.363		0.040	0.055	0.044775
	4.2	0.25	0.3		40	30		1.331		0.075	0.100	0.081948
	4.5	0.35	0.3		40	30		1.331		0.105	0.140	0.114728
	4.9	0.35	0.2		45	30		1.494		0.070	0.105	0.085845
	5.2	0.25	0.2		31	30		1.038		0.050	0.052	0.042599
	5.4	0.45	0.2		27	30		0.907		0.090	0.082	0.067051
	6.1	0.35	0		0	30		0.028		0.000	0.000	0
TOTALS:	4.50	4.50						1.220		0.925	1.218	
	date:	8/7/2009			looking upstream L-R							
	time:	10:56			Pre- 56 / Post- 53							
	Surveyer:	Allai										
	EC	103	uS/cm		clear, breezy, cool							
	SC	135.2	uS/cm									
	Sal	0.1	ppt		cows grazing on wheeler crk							
	pH	7.91										
	Temp	12.5	C									

angle coefficient	distance from initial pt	Width	Depth	Obser- vation Depth	Revol- utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	1.95	0.38	0.00		0	30		0.03		0.00	0.00	
	2.7	0.425	0.25		19	30		0.65		0.106	0.069	0.092423
	2.8	0.1	0.25		21	30		0.712		0.025	0.018	0.023937
	2.9	0.15	0.2		39	30		1.298		0.030	0.039	0.052376
	3.1	0.2	0.2		25	30		0.842		0.040	0.034	0.045307
	3.3	0.2	0.25		35	30		1.168		0.050	0.058	0.078534
	3.5	0.2	0.3		65	30		2.145		0.060	0.129	0.173081
	3.7	0.2	0.2		42	30		1.396		0.040	0.056	0.075091
	3.9	0.2	0.2		31	30		1.038		0.040	0.042	0.055819
	4.1	0.2	0.2		45	30		1.494		0.040	0.060	0.080347
	4.3	0.2	0.3		38	30		1.266		0.060	0.076	0.102124
	4.5	0.15	0.2		43	30		1.428		0.030	0.043	0.057632
	4.6	0.15	0.2		27	30		0.907		0.030	0.027	0.036608
	4.8	0.2	0.15		9	30		0.321		0.030	0.010	0.012956
	5	0.6	0.15		28	30		0.940		0.090	0.085	0.113766
	6	0.5	0		0	30		0.028		0.000	0.000	0
TOTALS:	4.05	4.05						1.042		0.671	0.744	
	date:	9/9/2009			looking upstream L-R							
	time:	10:45			Pre- 58 / Post- 57							
	Surveyer: Allai											
	EC	103.4	uS/cm		clear, warming up, slight breeze							
	SC	145.7	uS/cm									
	Sal	0.1	ppt									
	pH	8.04										
	Temp	9.9	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
								PRICE <40/ >40 revolutns				
lew	1.1	0.2	0		0	30		0.020				
	1.5	0.3	0.9		0	30		0.020		0.270	0.005	0.000749
	1.7	0.15	0.9		1	30		0.093		0.135	0.013	0.001736
	1.8	0.15	0.9		4	32		0.293		0.135	0.039	0.00548
	2	0.2	0.9		4	36		0.262		0.180	0.047	0.00655
	2.2	0.2	0.8		4	32		0.293		0.160	0.047	0.006494
	2.4	0.2	0.8		9	30		0.674		0.160	0.108	0.014965
	2.6	0.2	0.9		13	32		0.906		0.180	0.163	0.022621
	2.8	0.2	0.9		11	30		0.819		0.180	0.147	0.020466
	3	0.25	1		13	30		0.965		0.250	0.241	0.033466
	3.3	0.3	1.05		13	30		0.965		0.315	0.304	0.042168
	3.6	0.25	1.2		19	30		1.401		0.300	0.420	0.058311
	3.8	0.2	1.2		20	30		1.473		0.240	0.354	0.049069
	4	0.2	1.4		19	30		1.401		0.280	0.392	0.054423
	4.2	0.25	1.4		19	30		1.401		0.350	0.490	0.068029
	4.5	0.25	1.5		20	30		1.473		0.375	0.553	0.07667
	4.7	0.2	1.6		20	30		1.473		0.320	0.471	0.065425
	4.9	0.2	1.6		26	30		1.909		0.320	0.611	0.084786
	5.1	0.2	1.6		27	30		1.982		0.320	0.634	0.088013
	5.3	0.15	1.7		26	30		1.909		0.255	0.487	0.067564
	5.4	0.15	1.6		24	30		1.764		0.240	0.423	0.058749
	5.6	0.2	1.6		21	30		1.546		0.320	0.495	0.068652
	5.8	0.45	1		23	30		1.691		0.450	0.761	0.105617
	6.5	0.35	0		0	30		0.020		0.000	0.000	0
TOTALS:	5.40	5.40						1.076		5.735	7.206	
	date	6/9/10			looking upstream L-R					**Price >40 rev = (rev/time)* 2.17+.03**		
	time	14:30			Pre- 92/ Post-97							
	Surveyer: Allai											
	EC	87.4	uS/cm		overcast, calm, warm							
	SC	64.3	uS/cm									
	Sal	0	ppt									
	pH	7.21										
	Temp	11.2	C									

angle coefficient	distance from initial pt	Width	Depth	Obser- vation Depth	Revol- utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
	2.4	0.15				30.00		0.028		0.00		
	2.7	0.25	0.5		14	30		0.484		0.125	0.060	0.036224
	2.9	0.15	0.6		15	30		0.517		0.090	0.046	0.027836
	3	0.1	0.6		20	30		0.679		0.060	0.041	0.024408
	3.1	0.15	0.6		23	30		0.777		0.090	0.070	0.041877
	3.3	0.2	0.7		26	30		0.875		0.140	0.122	0.073333
	3.5	0.2	0.75		29	30		0.972		0.150	0.146	0.087347
	3.7	0.25	0.75		30	30		1.005		0.188	0.188	0.11284
	4	0.3	0.8		26	30		0.875		0.240	0.210	0.125714
	4.3	0.3	0.75		22	30		0.744		0.225	0.168	0.100305
	4.6	0.25	0.95		21	30		0.712		0.238	0.169	0.101246
	4.8	0.2	0.9		22	30		0.744		0.180	0.134	0.080244
	5	0.25	0.8		24	30		0.810		0.200	0.162	0.096961
	5.3	0.25	0.7		26	30		0.875		0.175	0.153	0.091666
	5.5	0.1	0		0	30		0.028		0.000	0.000	0
TOTALS:	3.10	3.10						0.675		2.100	1.670	
	Wheeler Creek at culvert											
	date:	7/1/10			looking upstream L-R							
	time:	12:00			Pre- 102/ Post-94							
	Surveyer: Allai											
	EC	104.3	uS/cm		clear, sunny, warm							
	SC	78.8	uS/cm									
	Sal	0.1	ppt									
	pH	7.69										
	Temp	12.2	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
lew	1.30	0.125				30.00		0.028				0.00
	1.55	0.2	0.5		0	30.00		0.028		0.100	0.003	0.002342
	1.7	0.125	0.5		8	30		0.289		0.063	0.018	0.015085
	1.8	0.1	0.55		14	30		0.484		0.055	0.027	0.022265
	1.9	0.1	0.5		16	30		0.549		0.050	0.027	0.022965
	2	0.1	0.5		21	30		0.712		0.050	0.036	0.029776
	2.1	0.2	0.5		27	30		0.907		0.100	0.091	0.075897
	2.4	0.2	0.55		30	30		1.005		0.110	0.111	0.092477
	2.5	0.15	0.55		27	30		0.907		0.083	0.075	0.062615
	2.7	0.2	0.55		25	30		0.842		0.110	0.093	0.077494
	2.9	0.2	0.55		27	30		0.907		0.110	0.100	0.083487
	3.1	0.2	0.55		29	30		0.972		0.110	0.107	0.089481
	3.3	0.25	0.65		28	30		0.940		0.163	0.153	0.12776
	3.6	0.25	0.7		27	30		0.907		0.175	0.159	0.132821
	3.8	0.2	0.6		24	30		0.810		0.120	0.097	0.08127
	4	0.2	0.2		35	30		1.168		0.040	0.047	0.039077
	4.2	0.225	0.2		36	30		1.200		0.045	0.054	0.045187
rew	4.45	0.125	0		0	30		0.028		0.000	0.000	0
		0						#DIV/0!		0.000	#DIV/0!	#DIV/0!
		0						#DIV/0!		0.000	#DIV/0!	#DIV/0!
		0						#DIV/0!		0.000	#DIV/0!	#DIV/0!
		0						#DIV/0!		0.000	#DIV/0!	#DIV/0!
		0						#DIV/0!		0.000	#DIV/0!	#DIV/0!
		0						#DIV/0!		0.000	#DIV/0!	#DIV/0!
		0						#DIV/0!		0.000	#DIV/0!	
TOTALS:	3.15	3.15						0.705		1.483	1.195	

	Location:	county road crossing										
	date:	7/21/2010			looking upstream L-R							
	time:	13:30			Pre- 99 / Post- 93							
	Surveyer:	Allai										
	EC	120.3	uS/cm		cloudy, gusty , t-storms r			Observations:				
	SC	93.2	uS/cm									
	Sal	0.1	ppt									
	pH	7.78										
	Temp	13.2	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
lew	1.35	0.125	0.00		0.00	30.00		0.028		0.00	0.00	0.00
	1.6	0.175	0.55		0	30		0.028		0.096	0.003	0.00171
	1.7	0.1	0.6		9	30		0.321		0.060	0.019	0.012228
	1.8	0.1	0.5		11	30		0.386		0.050	0.019	0.012257
	1.9	0.1	0.5		17	30		0.582		0.050	0.029	0.018458
	2	0.1	0.5		25	30		0.842		0.050	0.042	0.026725
	2.1	0.1	0.55		33	30		1.103		0.055	0.061	0.038493
	2.2	0.15	0.55		37	30		1.233		0.083	0.102	0.06456
	2.4	0.2	0.55		37	30		1.233		0.110	0.136	0.08608
	2.6	0.2	0.55		30	30		1.005		0.110	0.111	0.070164
	2.8	0.15	0.5		29	30		0.972		0.075	0.073	0.046289
	2.9	0.1	0.55		36	30		1.200		0.055	0.066	0.041903
	3	0.15	0.55		40	30		1.331		0.083	0.110	0.069675
	3.2	0.2	0.6		40	30		1.331		0.120	0.160	0.101346
	3.4	0.2	0.6		40	30		1.331		0.120	0.160	0.101346
	3.6	0.2	0.6		32	30		1.070		0.120	0.128	0.081503
	3.8	0.2	0.6		29	30		0.972		0.120	0.117	0.074062
	4	0.2	0.5		34	30		1.135		0.100	0.114	0.072053
	4.2	0.15	0.4		40	30		1.331		0.060	0.080	0.050673
	4.3	0.1	0.4		36	30		1.200		0.040	0.048	0.030475
rew	4.4	0.05	0		0	30		0.028		0.000	0.000	0
TOTALS:	3.05	3.05						0.889		1.556	1.576	
	Location:	below county road crossing										
	date:	7/29/2010			looking upstream L-R							
	time:	11:30			Pre-63 / Post- 59							
	Surveyer:	Allai										
	EC	133.4	uS/cm					Observations:				
	SC	103.1	uS/cm		cloudy, warm, rained last night							
	Sal	0.1	ppt									
	pH	7.78										
	Temp	13.1	C									

angle coefficient	distance from initial pt	Width	Depth	Obser- vation Depth	Revol- utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
lew	1.20	0.05	0.00		0.00	30.00		0.028		0.00	0.00	0.00
	1.3	0.1	0.3		0	30		0.028		0.030	0.001	0.001616
	1.4	0.15	0.3		8	33		0.265		0.045	0.012	0.022923
	1.6	0.2	0.3		11	30		0.386		0.060	0.023	0.044573
	1.8	0.2	0.3		22	30		0.744		0.060	0.045	0.085915
	2	0.2	0.3		23	30		0.777		0.060	0.047	0.089673
	2.2	0.2	0.3		25	30		0.842		0.060	0.051	0.09719
	2.4	0.2	0.3		18	30		0.614		0.060	0.037	0.070881
	2.6	0.2	0.3		30	30		1.005		0.060	0.060	0.115981
	2.8	0.2	0.3		21	30		0.712		0.060	0.043	0.082156
	3	0.2	0.3		27	30		0.907		0.060	0.054	0.104706
	3.2	0.2	0.4		17	30		0.582		0.080	0.047	0.089497
	3.4	0.2	0.4		13	31		0.438		0.080	0.035	0.067351
	3.6	0.2	0.3		17	30		0.582		0.060	0.035	0.067123
	3.8	0.25	0.3		12	30		0.419		0.075	0.031	0.060414
rew	4.1	0.15	0		0	30		0.028		0.000	0.000	0
TOTALS:	2.90	2.90					avg=	0.522		0.850	0.520	
	Location:											
	date:	9/7/2010			looking upstream L-R							
	time:	12:30			Pre- 68/ Post- 84							
	Surveyer: Allai											
	EC	137	uS/cm		clear sunny calm warmin			Observations:				
	SC	97.7	uS/cm									
	Sal	0.1	ppt									
	pH	7.84										
	Temp	10	C									

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
								PRICE <40/ >40 revolutns				
rew	2.7	0.1	0		0	40		0.020		0.000	0.000	0.00%
	2.9	0.25	0.3		10	40		0.565		0.075	0.042	0.52%
	3.2	0.35	0.5		15	40		0.838		0.175	0.147	1.80%
	3.6	0.35	1.1		18	40		1.001		0.385	0.385	4.72%
	3.9	0.2	1.4		24	40		1.328		0.280	0.372	4.55%
	4	0.15	1.5		33	40		1.819		0.225	0.409	5.01%
	4.2	0.25	2		42	40		2.309		0.500	1.155	14.14%
	4.5	0.3	1.9		39	40		2.146		0.570	1.223	14.98%
	4.8	0.25	1.9		37	40		2.037		0.475	0.967	11.85%
	5.00	0.2	1.9		33	40		1.819		0.380	0.691	8.46%
	5.20	0.15	1.9		31	40		1.710		0.285	0.487	5.97%
	5.30	0.15	1.9		29	40		1.601		0.285	0.456	5.59%
	5.5	0.3	1.9		26	40		1.437		0.570	0.819	10.03%
	5.9	0.35	1.9		24	40		1.328		0.665	0.883	10.82%
	6.2	0.3	0.6		11	40		0.620		0.180	0.112	1.37%
	6.5	0.35	0.2		4	40		0.238		0.070	0.017	0.20%
lew	6.9	0.2	0		0	0		0.000		0.000	0.000	0.00%
TOTALS:	4.20	4.20						0.671		5.120	8.165	
	Location:	wheelerCrk meadow										
	date	6/28/11			looking upstream r-l					**Price >40 rev = (rev/time)* 2.17+.03**		
	time	13:35			Pre- 80+ / Post- 80+							
	Surveyer:	wilk/belcher										
	EC	104.3	uS/cm									
	SC	85.5	uS/cm									
	Sal	0.1	ppt			Observations:						
	pH	7.44	15.7				evidence of overbank flows					
	Temp	15.60	C				banks still very wet					
							uplands drying, forbs in bloom					
						Note: this is below previous sampling point at culvert.... additional flow from Troutman Draw						

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
								PRICE <40/ >40 revolutns				
LEW	1.4	0.05						0.000		0.000	0.000	0
	1.5	0.2	1.3		3	40		0.184		0.260	0.048	0.015631
	1.8	0.3	1.3		6	40		0.347		0.390	0.135	0.044339
	2.1	0.3	1.4		21	40		1.165		0.420	0.489	0.160243
	2.4	0.3	1.4		24	40		1.328		0.420	0.558	0.182742
	2.7	0.3	1.4		22	40		1.219		0.420	0.512	0.167742
	3	0.3	1.2		23	40		1.274		0.360	0.458	0.150207
	3.3	0.3	1		21	40		1.165		0.300	0.349	0.114459
	3.6	0.3	1		17	40		0.947		0.300	0.284	0.093032
	3.9	0.3	1		13	40		0.729		0.300	0.219	0.071605
REW	4.2	0.15						0.000		0.000	0.000	0
	2.80	2.80						0.270		3.170	3.052	
	Location:	Wheeler Creek at meadow										
	date	7/21/11			looking upstream L-R					**Price >40 rev = (rev/time)* 2.17+.03**		
	time	1125			Pre-	/ Post-						
TOTALS:	Surveyer:	Wilk			good	good						
	EC	130.6	uS/cm									
	SC	102.4	uS/cm	13.8				Observations:				
	Sal	0.1	ppt					sunny warm				
	pH	7.84						partly cloudy				
	Temp	14.3	C					collected water samples				
								no sign cows				
								plants have good vigor				
								seeded out				
								been raining recently				

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
LEW	1.2	0.05	0		0	0		0		0.000	0.000	0.0%
	1.3	0.15	1		4	40		0.126		0.150	0.019	1.1%
	1.5	0.2	1		7	40		0.199		0.200	0.040	2.3%
	1.7	0.2	1		24	40		0.614		0.200	0.123	7.0%
	1.9	0.2	1.1		43	40		1.078		0.220	0.237	13.4%
	2.1	0.2	1		41	40		1.029		0.200	0.206	11.7%
	2.3	0.2	0.95		39	40		0.981		0.190	0.186	10.6%
	2.5	0.2	0.9		41	40		1.029		0.180	0.185	10.5%
	2.7	0.2	0.9		39	40		0.981		0.180	0.177	10.0%
	2.9	0.2	1		37	40		0.932		0.200	0.186	10.6%
	3.1	0.2	0.9		34	40		0.858		0.180	0.155	8.8%
	3.3	0.2	0.85		26	40		0.663		0.170	0.113	6.4%
	3.5	0.2	0.75		21	40		0.541		0.150	0.081	4.6%
	3.7	0.15	0.7		21	40		0.541		0.105	0.057	3.2%
REW	3.8	0.05	0		0	0		0.000		0.000	0.000	0.0%
TOTALS:	2.60	2.60						0.638		2.325	1.764	

Location:	wheelerCrk				
date:	8/1/2011		looking upstream L-R		
time:	1300		Pre- / Post-		
Surveyer:	Wilk		good	good	
EC	136.1	uS/cm			
SC	114.3	uS/cm	16.7C		
Sal	0.1	ppt			
pH	7.76				
Temp	16.9	C			

Observations:
about 50 or so cows in area
veg around stream looks good
dominated by sedges and some grass
few willows in area
some sign cows have been in stream area but still looks good
cows in upland areas
cloudy breezy
may rain

angle coefficient	distance from initial pt	Width	Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each c
rew	1	0.05		0	0		0		0.000	0.000	0.0%
	1.1	0.2	0.4	10	40		0.272		0.080	0.022	2.3%
	1.4	0.3	0.6	23	40		0.590		0.180	0.106	11.3%
	1.7	0.3	0.6	28	40		0.712		0.180	0.128	13.6%
	2	0.3	0.6	29	40		0.736		0.180	0.133	14.1%
	2.3	0.3	0.7	31	40		0.785		0.210	0.165	17.6%
	2.6	0.3	0.7	31	40		0.785		0.210	0.165	17.6%
	2.9	0.3	0.7	26	40		0.663		0.210	0.139	14.8%
	3.2	0.3	0.7	12	40		0.321		0.210	0.067	7.2%
	3.5	0.2	0.7	3	40		0.101		0.140	0.014	1.5%
lew	3.6	0.05	0	0	0		0.000		0.000	0.000	0.0%
TOTALS:	2.60	2.60					0.451		1.600	0.939	

Location:	wheelerCrk			
date:	8/24/2011		looking upstream L-R	
time:	1115		Pre- / Post-	
Surveyer:	Wilk		Good	
EC	144.2	uS/cm		
SC	112.4	uS/cm	13.3C	
Sal	0.1	ppt		
pH	7.94			
Temp	13.5	C		

Observations:
veg looks good seeded starting to dry
no cows little evidence they were here
a cow trail runs along stream
sunny warm breezy

angle coefficient	distance from initial pt	Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
								PRICE <40/ >40 revolutns				
rew	0.9	0.05	0		0	0		0.000		0.000	0.000	0
	1	0.15	0.4		9	40		0.511		0.060	0.031	0.01736
	1.2	0.2	0.4		17	40		0.947		0.080	0.076	0.042915
	1.4	0.2	0.4		23	40		1.274		0.080	0.102	0.057742
	1.6	0.2	0.4		23	40		1.274		0.080	0.102	0.057742
	1.8	0.2	0.5		26	40		1.437		0.100	0.144	0.081444
	2	0.2	0.5		27	40		1.492		0.100	0.149	0.084532
	2.2	0.2	0.6		31	40		1.710		0.120	0.205	0.116265
	2.4	0.2	0.6		33	40		1.819		0.120	0.218	0.123679
	2.6	0.2	0.65		33	40		1.819		0.130	0.236	0.133985
	2.8	0.2	0.65		33	40		1.819		0.130	0.236	0.133985
	3	0.2	0.65		18	40		1.001		0.130	0.130	0.073753
	3.2	0.2	0.7		7	40		0.402		0.140	0.056	0.031858
	3.4	0.2	0.65		6	40		0.347		0.130	0.045	0.025567
	3.6	0.15	0.65		6	40		0.347		0.098	0.034	0.019175
lew	3.7	0.05	0		0	0		0.000		0.000	0.000	0
TOTALS:	2.80	2.80						0.522		1.498	1.764	
	Location:	wheelerCrk										
	date	8/30/2011			looking upstream L-R					**Price >40 rev = (rev/time)* 2.17+.03**		
	time	13:20			Pre-	/ Post-						
	Surveyer:	Wilk			good	good						
	EC	146.8	uS/cm	15.5								
	SC	118.5	uS/cm					Observations:				
	Sal	0.11	ppt					veg looks good seeded				
	pH	7.83						looking like it will rain				
	Temp	15.7	C					veg pretty dry				
								little sign of use				

	distance from initial pt	Width	Depth	velocity mean in vertical	Area	Discharge	% each cell
lew	2	0.1	0.5	0.670	0.050	0.034	3.82
	2.2	0.15	0.5	0.840	0.075	0.063	7.18
	2.3	0.1	0.5	0.960	0.050	0.048	5.47
	2.4	0.1	0.5	0.890	0.050	0.045	5.07
	2.5	0.1	0.4	0.930	0.040	0.037	4.24
	2.6	0.15	0.4	0.920	0.060	0.055	6.294902497
	2.8	0.15	0.3	0.940	0.045	0.042	4.823811153
	2.9	0.2	0.3	0.850	0.060	0.051	5.815942525
	3.2	0.2	0.3	0.940	0.060	0.056	6.431748204
	3.3	0.15	0.3	0.910	0.045	0.041	4.669859733
	3.5	0.15	0.3	1.140	0.045	0.051	5.850153951
	3.6	0.15	0.3	0.840	0.045	0.038	4.310639754
	3.8	0.25	0.3	0.870	0.075	0.065	7.440985289
	4.1	0.3	0.2	0.970	0.060	0.058	6.637016764
	4.4	0.35	0.2	0.900	0.070	0.063	7.184399589
	4.8	0.35	0.2	0.860	0.070	0.060	6.865092941
	5.1	0.3	0.2	0.640	0.060	0.038	4.379062607
	5.4	0.25	0.2	0.510	0.050	0.026	2.907971262
rew	5.6	0.1	0.2	0.260	0.020	0.005	0.592998061
TOTALS:	3.60	3.60			1.030	0.877	
				0.834			
	Location:	wheeler creek					
	date:	7/29/2014					
	time:	12:00					
	Surveyer:	Stypinski					
	EC	127.4	uS/cm				
	SC	100.6	uS/cm	Observations:			
	Sal	0.1	ppt				
	pH	7.6					
	Temp	14.1	C				

Width	Depth	Obser-vation Depth	Revol-utions	Time (s)	velocity at point	velocity mean in vertical	Adjusted for hori- zontal angle	Area	Discharge	% each cell
0.25	0.03		0.00	40.00						
0.35	0.05		0	40		0.028		0.018	0.000	0.00
0.3	0.05		0	40		0.028		0.015	0.007	0.003121
0.35	0.05		17	40		0.443		0.018	0.016	0.04235
0.25	0.14		37	40		0.932		0.035	0.031	0.103863
0.2	0.15		35	40		0.883		0.030	0.033	0.196834
0.15	0.17		44	40		1.103		0.026	0.031	0.210723
0.25	0.16		48	40		1.200		0.040	0.011	0.194984
0.3	0.08		10	40		0.272		0.024	0.014	0.069368
0.2	0.09		22	40		0.565		0.018	0.013	0.08643
0.15	0.4		28	40		0.712		0.060	0.002	0.081625
0.05	0.04		0	40		0.028		0.002	0.000	0.010701
2.80								0.285	0.157	
						0.563				
Wheeler Creek										
9/29/2023			looking upstream L-R							
13:25	14:00		Pre- / Post-		90/					
Vasquez, Logan, Belcher, Cromratie Clemons, Viehl										
	uS/cm									
	uS/cm					Observations:	Approximately 40.962996 N			
	ppt									
	C