United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7210

In Reply Refer To:
7250 (CO-932)

December 8, 2020

Ms. Linda Bassi
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an instream flow water right on Watson Creek, located in Water Division 6.

**Location and Land Status**. Watson Creek originates at Heart Lake on the east side of the Flattops Mountains, approximately 7.0 miles southwest of the community of Yampa. Watson Creek flows into the Yampa River approximately two miles downstream from Yampa. This recommendation addresses the portion of Watson Creek that starts at the confluence with Moody Creek and extends downstream to the headgate of the Hardscrabble Ditch, a distance of approximately 6.5 miles. The BLM manages 0.3 miles of this reach, while approximately 5.2 miles are in private ownership.

**Biological Summary.** Watson Creek is a cool water, low to moderate gradient stream. The reach that is the subject of this recommendation flows through shallow valley that ranges from ¼ to ½ mile in width. The reach flows through agricultural lands primarily used for livestock grazing. Substrate is generally from small to medium in size, ranging from sands and gravels to four-inch cobbles. Water quality is acceptable for supporting cool water fish species, but the creek does appear to be affected by nutrient loading.

Fish surveys have documented self-supporting populations of longnose suckers, whitehead suckers, and creek chub. Spot surveys have indicated populations of mayfly, caddisfly, and other macroinvertebrate species that tolerate cool to warm water habitats.

The creek supports a riparian community of willow, sedges, and rush species, which are more abundant in areas that are fenced off from grazing. Bank stability appears to be good, except in areas of high livestock usage.

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

| Cross Section Date | Discharge Rate | Top Width | Winter Flow Recommendation (meets 2 of 3 hydraulic criteria) | Summer Flow Recommendation (meets 3 of 3 hydraulic criteria) |
|---|---|---|---|---|
| 08/2/2017 #1 | 2.52 cfs | 12.77 feet | 1.10 cfs | 2.27 cfs |
| 08/2/2017 #2 | 2.57 cfs | 10.19 feet | Out of range | 1.57 cfs |
| | | Averages: | 1.10 cfs | 1.92 cfs |

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

> 1.90 cubic feet per second is recommended during the snowmelt runoff period, from April 1 to June 21. This recommendation is driven by the average depth criteria and wetted perimeter criteria. During the early irrigation season, which typically begins in May, maintaining this flow rate in the creek would provide adequate habitat for maintaining fish species while irrigation diversions occur. This flow rate will maintain sufficient physical habitat in the creek for the fish population to complete important parts of their life cycle while physical habitat is abundant due to higher flows.
>
> An instream flow water right is not recommended for the peak irrigation season, from June 22 through August 15. Several ditches in the recommended reach regularly sweep the stream, leaving short stretches that are completely dried up. Colorado Water Conservation Board regulations require that water be available throughout the entire reach to make an instream flow appropriation. However, the stream receives substantial return flows from irrigation downstream from the short stretches that are dried up. BLM believes the self-sustaining nature of the fish community provides evidence that these fishes migrate to portions of the creek where return flows accrue, allowing them to survive during high diversion periods.
>
> 1.10 cubic feet per second is recommended during late summer, fall, and winter, from August 16 through March 31. This recommendation is driven by the average velocity criteria. This flow rate should provide adequate habitat during late summer and fall for the fish populations to complete important parts of their life cycle after habitat is restricted during the annual period of high irrigation diversions. This flow rate should also prevent complete icing of the numerous pools in this reach, allowing the fish populations to overwinter.

**Water Availability.** The BLM recommends using a variety of data sources to confirm water availability, because the BLM is not aware of any historical gage data on this creek. Use of Streamstats can provide an estimate of natural hydrology, but this estimate may have to be modified by adjusting for irrigation diversions and return flows. One nearby gage may provide an estimate of the seasonality of flows, because it is located on a watershed with similar characteristics. USGS Gage 09238000, on Oak Creek near the

community of Oak Creek, is located on a smaller watershed but appears to be relatively unaffected by diversion and storage operations. Analysis of diversion records and installation of a pressure transducer would also assist in analyzing the impact of diversions on stream flows, while recognizing that return flows from irrigation accrue to the channel quickly because of the narrow width of the stream valley.

The BLM is aware of the following water rights within the proposed instream flow reach:

Powell Ditch 1 – 1.0 cfs
Powell Ditch 2 – 2.0 cfs
Laramore Ditch – 5.0 cfs
Ferguson Ditch – 15.0 cfs

The BLM is aware of the following water upstream from the recommended reach:

Moody Ditch – 5.0 cfs
Bijou Ditch – 5.0 cfs
Mohr Ditch – 0.66 cfs
Hill Ditch – 4.52 cfs
Homer Buttricks Ditch – 3.0 cfs
Patton Ditch – 4.0 cfs
Heart Lake Reservoir – 283 acre-feet

**Relationship to Land Management Plans.** The BLM's management plan calls for improvement and recovery of current and historic fisheries as a means of increasing native fish populations. In addition, the BLM plan calls for making instream flow recommendations to the Colorado Water Conservation Board to meet minimum instream flow requirements to maintain native 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 further sources of degradation. 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 2018. The 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
Deputy State Director, Resources

cc: Bruce Sillitoe, Little Snake Field Office
Eric Scherff, Little Snake Field Office
Cathy Cook, Northwest District Manager

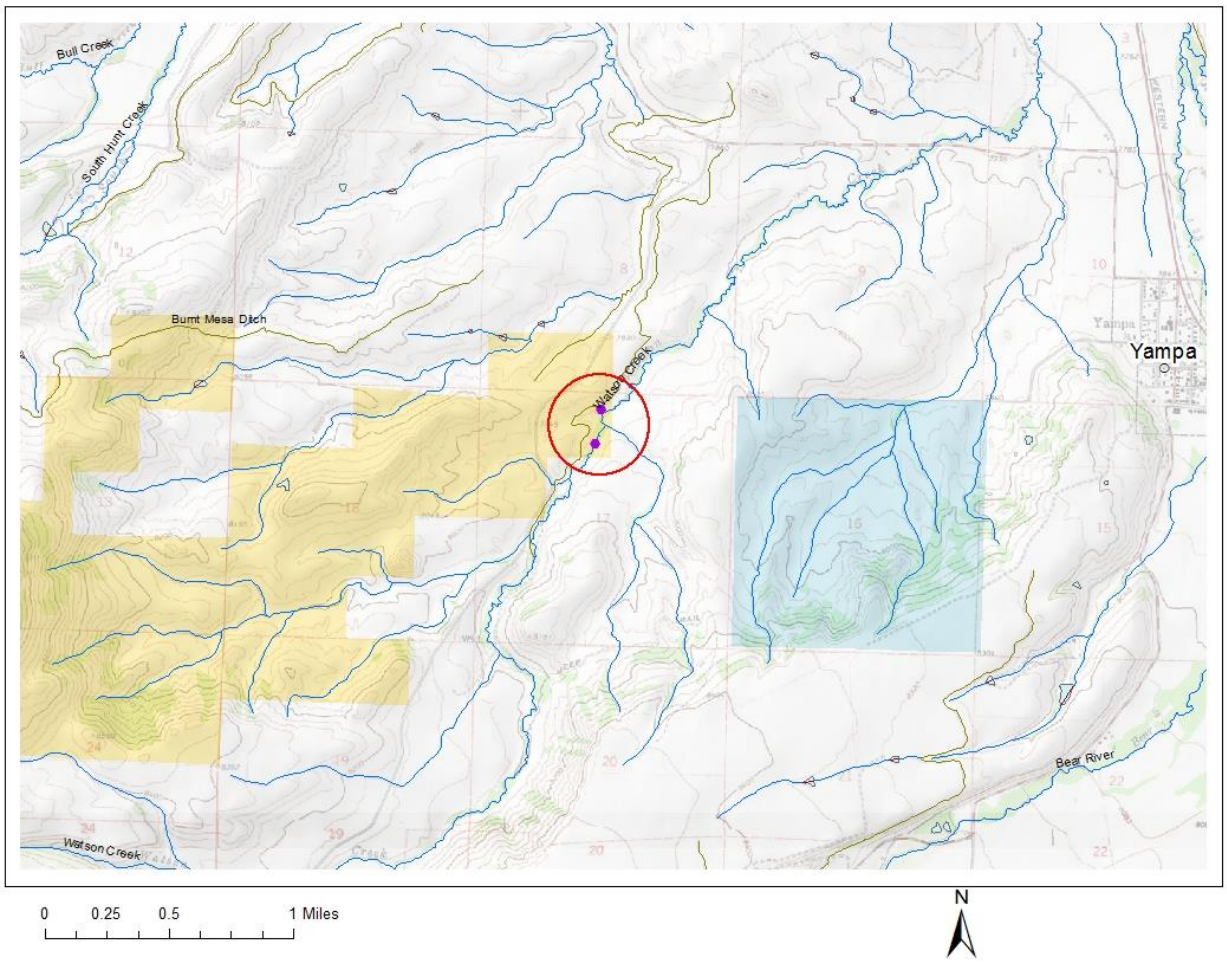
# Little Snake Field Office

## Stream Sampling July 2016

Watson Creek - Water Code: 22676

**Introduction**:

Watson Creek, located west of Yampa, Colorado on BLM lands managed by the Little Snake Field Office, was sampled on July 18, 2016. Watson Creek is tributary to the Yampa River. Sampling was conducted to obtain baseline information on fishery status and species composition. One backpack electrofisher was used to sample limited flowing stream habitat in approximately 125 feet of stream. This stream was primarily a series of beaver dams and ponds with some small reaches of slow moving water with deep pools and a lot of silt, which made sampling difficult. Capture efficiency was poor. Fish species collected included: White Suckers, Longnose Sucker, and Creek Chub. Personnel present were Tom Fresques, Nate Higginson, and Kristen Doyle, BLM.



**White Sucker**

**Longnose Sucker**

**Creek Chub**

**Representative habitat**

**Representative habitat**

**Discussion:**

Watson Creek is a small stream that appears to be used extensively for irrigation purposes. A total of 6 fish were collected including four white suckers, one longnose sucker, and one creek chub. Additional fish were seen but were not collected due to poor sampling efficiency. Some very small larval fish were also noted but not collected. Sampling was difficult as the stream is a series of beaver ponds with low gradient, deep runs and pools between. Riffle habitat was very limited.

Riparian habitat is comprised primarily of sedges, rushes, riparian grasses, and a few willows. Stream shading is limited. Stream habitats are comprised primarily of beaver ponds with deep slow runs and pools and limited riffle habitat outside of beaver pond areas. Many pools were >3 feet in depth. Substrate was comprised primarily of fine sediments - silt / clay with limited gravels.

**Recommendations:**

- Consider other sampling techniques, such as seining

COLORADO WATER CONSERVATION BOARD

# FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

## LOCATION INFORMATION

| | | | | | | |
|---|---|---|---|---|---|---|
| STREAM NAME: Watson Creek | | | | | | CROSS-SECTION NO.: 1 |
| CROSS-SECTION LOCATION: At BLM - private boundary | | | | | | |
| DATE: 8-2-17 | OBSERVERS: R. Smith, E. Scharff | | | | | |
| LEGAL DESCRIPTION | ¼ SECTION: NE NW | SECTION: 17 | TOWNSHIP: 20 N/S | RANGE: 85 E/W | PM: 6th | |
| COUNTY: Routt | WATERSHED: Yampa R. | WATER DIVISION: | DOW WATER CODE: 22676 | | | |
| MAP(S): USGS: | Zone 13 333772 4446171 | | | | | |
| USFS: | | | | | | |

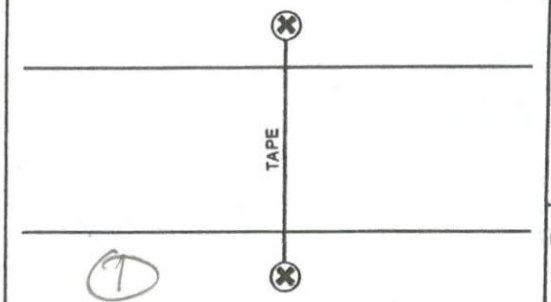
## SUPPLEMENTAL DATA

| | | | | | |
|---|---|---|---|---|---|
| GAG 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: gravels to 4" cobbles | PHOTOGRAPHS TAKEN: YES/NO | NUMBER OF PHOTOGRAPHS: 3 | | | |

## CHANNEL PROFILE DATA

| STATION | DISTANCE FROM TAPE (ft) | ROD READING (ft) |
|---|---|---|
| ⊗ Tape @ Stake LB | 0.0 | surveyed |
| ⊗ Tape @ Stake RB | 0.0 | surveyed |
| ① WS @ Tape LB/RB | 0.0 | 7.75 / 7.75 |
| ② WS Upstream | 13.0 | 7.60 |
| ③ WS Downstream | 8.8 | 7.78 |
| SLOPE | 0.18 / 21.8 = .008 | |

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

Willow - sedge - rush riparian.

Ph =
Temp =
Cond =

# DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Watson Creek | CROSS-SECTION NO.: 1 | DATE: 8-2-17 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading: _____ ft | TIME: 10:00 am

| Stake (S) Grassline (G) Waterline (W) Rock (R) | Distance From Initial Point (ft) | Width (ft) | Total Vertical Depth From Tape/Inst (ft) | Water Depth (ft) | Depth of Obser-vation (ft) | Revolutions | Time (sec) | Velocity (ft/sec) At Point | Velocity (ft/sec) Mean in Vertical | Area ($ft^2$) | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LS | 2.0 | | 5.19 | | | | | | | | |
| G | 3.0 | | 5.95 | | | | | | | | |
| | 4.3 | | 7.52 | | | | | | | | |
| | 6.0 | | 7.78 | | | | | | | | |
| | 8.2 | | 7.72 | | | | | | | | |
| LW | 9.7 | | 7.75 | | | | | | | | |
| | 10.0 | | 7.85 | 0.10 | | | | Ø | | | |
| | 10.3 | | 7.95 | 0.20 | | | | Ø | | | |
| | 10.6 | | 8.05 | 0.30 | | | | 0.45 | | | |
| | 10.9 | | 8.05 | 0.30 | | | | 0.96 | | | |
| | 11.2 | | 8.05 | 0.30 | | | | 1.30 | | | |
| | 11.5 | | 8.05 | 0.30 | | | | 1.37 | | | |
| | 11.7 | | 8.10 | 0.35 | | | | 1.26 | | | |
| | 11.9 | | 8.10 | 0.35 | | | | 1.80 | | | |
| | 12.1 | | 8.10 | 0.35 | | | | 1.89 | | | |
| | 12.3 | | 8.15 | 0.40 | | | | 2.09 | | | |
| | 12.5 | | 8.20 | 0.45 | | | | 2.08 | | | |
| | 12.7 | | 8.25 | 0.50 | | | | 2.46 | | | |
| | 12.9 | | 8.25 | 0.50 | | | | 2.28 | | | |
| | 13.1 | | 8.25 | 0.50 | | | | 2.31 | | | |
| | 13.3 | | 8.30 | 0.55 | | | | 1.98 | | | |
| | 13.5 | | 8.25 | 0.50 | | | | 1.49 | | | |
| | 13.7 | | 8.25 | 0.50 | | | | 1.10 | | | |
| | 13.9 | | 8.20 | 0.45 | | | | 0.90 | | | |
| | 14.1 | | 8.15 | 0.4 | | | | 0.62 | | | |
| | 14.3 | | 8.15 | 0.4 | | | | 0.54 | | | |
| | 14.5 | | 8.15 | 0.4 | | | | 0.59 | | | |
| | 14.7 | | 8.15 | 0.4 | | | | 0.53 | | | |
| | 14.9 | | 8.05 | 0.3 | | | | 0.39 | | | |
| | 15.1 | | 7.85 | 0.1 | | | | 0.09 | | | |
| RW | 15.3 | | 7.75 | | | | | | | | |
| G | 15.8 | | 5.85 | | | | | | | | |
| RS | 16.3 | | 4.60 | | | | | | | | |
| 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: Watson Creek | CROSS-SECTION NO.: 2

CROSS-SECTION LOCATION: At BLM - Private boundary

DATE: 8-2-17 | OBSERVERS: R. Smith, E. Scherff

LEGAL DESCRIPTION | ¼ SECTION: NE NW | SECTION: 17 | TOWNSHIP: 2 N/S | RANGE: 85 E/W | PM: 6th

COUNTY: Routt | WATERSHED: Yampa R. | WATER DIVISION: 6 | DOW WATER CODE: 22676

MAP(S): USGS: | USFS:

## SUPPLEMENTAL DATA

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

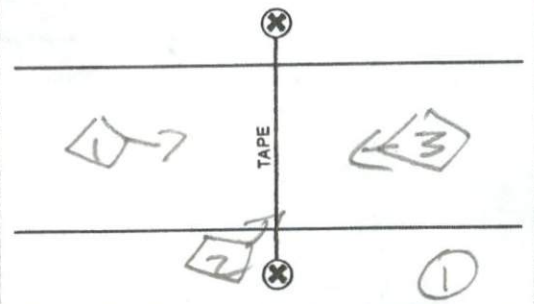
METER NUMBER: | DATE RATED: | CALIB/SPIN: ____ sec | TAPE WEIGHT: surveyed ____ lbs/foot | TAPE TENSION: surveyed ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: gravel to 4" cobbles | PHOTOGRAPHS TAKEN: YES/NO | NUMBER OF PHOTOGRAPHS: 3

## CHANNEL PROFILE DATA

| STATION | DISTANCE FROM TAPE (ft) | ROD READING (ft) |
|---|---|---|
| ⊗ Tape @ Stake LB | 0.0 | surveyed |
| ⊗ Tape @ Stake RB | 0.0 | surveyed |
| ① WS @ Tape LB/RB | 0.0 | 7.90/7.90 |
| ② WS Upstream | 11.0 | 7.77 |
| ③ WS Downstream | 6.0 | 7.95 |
| SLOPE | 0.18/17.0 = .01 | |

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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| caddisflies, amelids, mayflies, | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

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

## COMMENTS

pH 7.69

Temp Water 14.7 °C

SC 228 µS/cm

# DISCHARGE/CROSS SECTION NOTES

| STREAM NAME: Watson Creek | CROSS-SECTION NO: 2 | DATE: 8-2-17 | SHEET ___ OF ___ |
|---|---|---|---|
| BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: _____ ft | TIME: 10:40 am |

| Stake (S) Grassline (G) Waterline (W) Rock (R) | Distance From Initial Point (ft) | Width (ft) | Total Vertical Depth From Tape/Inst (ft) | Water Depth (ft) | Depth of Observation (ft) | Revolutions | Time (sec) | Velocity (ft/sec) | | Area ($ft^2$) | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | At Point | Mean in Vertical | | |
| RS | 2.3 | | 4.70 | | | | | | | | |
| G | 3.8 | | 6.26 | | | | | | | | |
| | 5.3 | | 6.62 | | | | | | | | |
| | 6.0 | | 6.95 | | | | | | | | |
| RW | 6.9 | | 7.90 | | | | | | | | |
| | 7.2 | | 8.0 | 0.10 | | | | 0.04 | | | |
| | 7.5 | | 8.05 | 0.15 | | | | 0.37 | | | |
| | 7.8 | | 8.1 | 0.20 | | | | 0.56 | | | |
| | 8.1 | | 8.1 | 0.20 | | | | 0.74 | | | |
| | 8.4 | | 8.1 | 0.20 | | | | 0.89 | | | |
| | 8.7 | | 8.1 | 0.20 | | | | 1.26 | | | |
| | 9.0 | | 8.15 | 0.25 | | | | 1.44 | | | |
| | 9.2 | | 8.2 | 0.30 | | | | 1.64 | | | |
| | 9.4 | | 8.2 | 0.30 | | | | 1.76 | | | |
| | 9.6 | | 8.25 | 0.35 | | | | 2.05 | | | |
| | 9.8 | | 8.25 | 0.35 | | | | 2.18 | | | |
| | 10.0 | | 8.25 | 0.35 | | | | 2.20 | | | |
| | 10.2 | | 8.25 | 0.35 | | | | 1.89 | | | |
| | 10.4 | | 8.3 | 0.40 | | | | 1.93 | | | |
| | 10.6 | | 8.3 | 0.40 | | | | 2.12 | | | |
| | 10.8 | | 8.25 | 0.35 | | | | 2.23 | | | |
| | 11.0 | | 8.2 | 0.30 | | | | 2.29 | | | |
| | 11.2 | | 8.2 | 0.30 | | | | 2.22 | | | |
| | 11.4 | | 8.2 | 0.30 | | | | 2.17 | | | |
| | 11.6 | | 8.2 | 0.30 | | | | 1.86 | | | |
| | 11.8 | | 8.2 | 0.30 | | | | 1.53 | | | |
| | 12.0 | | 8.2 | 0.30 | | | | 1.15 | | | |
| | 12.2 | | 8.2 | 0.30 | | | | 0.66 | | | |
| | 12.4 | | 8.2 | 0.30 | | | | 0.60 | | | |
| | 12.6 | | 8.2 | 0.30 | | | | 0.70 | | | |
| | 12.8 | | 8.2 | 0.30 | | | | 0.84 | | | |
| | 13.1 | | 8.25 | 0.35 | | | | 0.72 | | | |
| | 13.4 | | 8.2 | 0.30 | | | | 0.63 | | | |
| | 13.7 | | 7.95 | 0.05 | | | | 0.07 | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| RW | 13.8 | | 7.90 | | | | | | | | |
| G | 14.0 | | 6.20 | | | | | | | | |
| | 14.4 | | 5.36 | | | | | | | | |
| RS | 15.7 | | 4.96 | | | | | | | | |
| | | | | | | | | | | | |
| TOTALS: | | | | | | | | | | | |

| End of Measurement | Time: 10:53 | Gage Reading: _____ ft | CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY: |
|---|---|---|---|---|

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

LOCATION INFORMATION

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-Private Boundary |
| XS NUMBER: | 1 |
| DATE: | 2-Aug-17 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | 0 |
| USFS MAP: | 0 |

SUPPLEMENTAL DATA

*** NOTE ***
Leave TAPE WT and TENSION
at defaults for data collected
with a survey level and rod

| | |
|---|---|
| TAPE WT: | 0.0106 |
| TENSION: | 99999 |

CHANNEL PROFILE DATA

| | |
|---|---|
| SLOPE: | 0.008 |

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: ….....……..…….....DATE.....

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

# DATA POINTS= 33

VALUES COMPUTED FROM RAW FIELD DATA

| | FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | WETTED PERIM. | WATER DEPTH | AREA (Am) | Q (Qm) | % Q CELL |
|---|---|---|---|---|---|---|---|---|---|---|
| | LS | 2.00 | 5.19 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| 1 | G | 3.00 | 5.95 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 4.30 | 7.52 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 6.00 | 7.78 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 8.20 | 7.72 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | LW | 9.70 | 7.75 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 10.00 | 7.85 | 0.10 | 0.00 | 0.32 | 0.10 | 0.03 | 0.00 | 0.0% |
| | | 10.30 | 7.95 | 0.20 | 0.00 | 0.32 | 0.20 | 0.06 | 0.00 | 0.0% |
| | | 10.60 | 8.05 | 0.30 | 0.45 | 0.32 | 0.30 | 0.09 | 0.04 | 1.6% |
| | | 10.90 | 8.05 | 0.30 | 0.96 | 0.30 | 0.30 | 0.09 | 0.09 | 3.4% |
| | | 11.20 | 8.05 | 0.30 | 1.30 | 0.30 | 0.30 | 0.09 | 0.12 | 4.6% |
| | | 11.50 | 8.05 | 0.30 | 1.37 | 0.30 | 0.30 | 0.08 | 0.10 | 4.1% |
| | | 11.70 | 8.10 | 0.35 | 1.26 | 0.21 | 0.35 | 0.07 | 0.09 | 3.5% |
| | | 11.90 | 8.10 | 0.35 | 1.80 | 0.20 | 0.35 | 0.07 | 0.13 | 5.0% |
| | | 12.10 | 8.10 | 0.35 | 1.89 | 0.20 | 0.35 | 0.07 | 0.13 | 5.3% |
| | | 12.30 | 8.15 | 0.40 | 2.09 | 0.21 | 0.40 | 0.08 | 0.17 | 6.6% |
| | | 12.50 | 8.20 | 0.45 | 2.08 | 0.21 | 0.45 | 0.09 | 0.19 | 7.4% |
| | | 12.70 | 8.25 | 0.50 | 2.46 | 0.21 | 0.50 | 0.10 | 0.25 | 9.8% |
| | | 12.90 | 8.25 | 0.50 | 2.28 | 0.20 | 0.50 | 0.10 | 0.23 | 9.1% |
| | | 13.10 | 8.25 | 0.50 | 2.31 | 0.20 | 0.50 | 0.10 | 0.23 | 9.2% |
| | | 13.30 | 8.30 | 0.55 | 1.98 | 0.21 | 0.55 | 0.11 | 0.22 | 8.6% |
| | | 13.50 | 8.25 | 0.50 | 1.49 | 0.21 | 0.50 | 0.10 | 0.15 | 5.9% |
| | | 13.70 | 8.25 | 0.50 | 1.10 | 0.20 | 0.50 | 0.10 | 0.11 | 4.4% |
| | | 13.90 | 8.20 | 0.45 | 0.90 | 0.21 | 0.45 | 0.09 | 0.08 | 3.2% |
| | | 14.10 | 8.15 | 0.40 | 0.62 | 0.21 | 0.40 | 0.08 | 0.05 | 2.0% |
| | | 14.30 | 8.15 | 0.40 | 0.54 | 0.20 | 0.40 | 0.08 | 0.04 | 1.7% |
| | | 14.50 | 8.15 | 0.40 | 0.59 | 0.20 | 0.40 | 0.08 | 0.05 | 1.9% |
| | | 14.70 | 8.15 | 0.40 | 0.53 | 0.20 | 0.40 | 0.08 | 0.04 | 1.7% |
| | | 14.90 | 8.05 | 0.30 | 0.39 | 0.22 | 0.30 | 0.06 | 0.02 | 0.9% |
| | | 15.10 | 7.85 | 0.10 | 0.09 | 0.28 | 0.10 | 0.02 | 0.00 | 0.1% |
| | RW | 15.30 | 7.75 | 0.00 | 0.00 | 0.22 | | 0.00 | 0.00 | 0.0% |
| 1 | G | 15.80 | 5.85 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | RS | 16.30 | 4.60 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | TOTALS ---------- | | | | | 5.83 | 0.55 (Max.) | 1.92 | 2.52 | 100.0% |

Manning's n = 0.0481
Hydraulic Radius= 0.32858716

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

WATER LINE COMPARISON TABLE

| WATER LINE | MEAS AREA | COMP AREA | AREA ERROR |
|---|---|---|---|
| | 1.92 | 1.93 | 1.0% |
| 7.50 | 1.92 | 4.48 | 134.0% |
| 7.52 | 1.92 | 4.26 | 122.4% |
| 7.54 | 1.92 | 4.04 | 110.9% |
| 7.56 | 1.92 | 3.82 | 99.6% |
| 7.58 | 1.92 | 3.61 | 88.4% |
| 7.60 | 1.92 | 3.40 | 77.4% |
| 7.62 | 1.92 | 3.19 | 66.4% |
| 7.64 | 1.92 | 2.98 | 55.7% |
| 7.66 | 1.92 | 2.78 | 45.0% |
| 7.68 | 1.92 | 2.58 | 34.6% |
| 7.70 | 1.92 | 2.38 | 24.2% |
| 7.71 | 1.92 | 2.28 | 19.1% |
| 7.72 | 1.92 | 2.18 | 14.0% |
| 7.73 | 1.92 | 2.09 | 9.2% |
| 7.74 | 1.92 | 2.01 | 4.9% |
| 7.75 | 1.92 | 1.93 | 1.0% |
| 7.76 | 1.92 | 1.87 | -2.5% |
| 7.77 | 1.92 | 1.81 | -5.7% |
| 7.78 | 1.92 | 1.75 | -8.7% |
| 7.79 | 1.92 | 1.70 | -11.5% |
| 7.80 | 1.92 | 1.64 | -14.3% |
| 7.82 | 1.92 | 1.54 | -19.8% |
| 7.84 | 1.92 | 1.43 | -25.3% |
| 7.86 | 1.92 | 1.33 | -30.6% |
| 7.88 | 1.92 | 1.23 | -35.8% |
| 7.90 | 1.92 | 1.13 | -41.0% |
| 7.92 | 1.92 | 1.03 | -46.1% |
| 7.94 | 1.92 | 0.94 | -51.1% |
| 7.96 | 1.92 | 0.84 | -56.0% |
| 7.98 | 1.92 | 0.75 | -60.8% |
| 8.00 | 1.92 | 0.66 | -65.5% |

WATERLINE AT ZERO
AREA ERROR = 7.753

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

Constant Manning's n

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

| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 5.95 | 12.77 | 1.80 | 2.35 | 22.97 | 15.15 | 100.0% | 1.52 | 83.71 | 3.64 |
| | 6.75 | 11.90 | 1.10 | 1.55 | 13.06 | 13.28 | 87.6% | 0.98 | 35.69 | 2.73 |
| | 6.80 | 11.84 | 1.05 | 1.50 | 12.47 | 13.16 | 86.9% | 0.95 | 33.23 | 2.66 |
| | 6.85 | 11.79 | 1.01 | 1.45 | 11.88 | 13.04 | 86.1% | 0.91 | 30.83 | 2.59 |
| | 6.90 | 11.73 | 0.96 | 1.40 | 11.29 | 12.93 | 85.3% | 0.87 | 28.50 | 2.52 |
| | 6.95 | 11.68 | 0.92 | 1.35 | 10.71 | 12.81 | 84.6% | 0.84 | 26.24 | 2.45 |
| | 7.00 | 11.62 | 0.87 | 1.30 | 10.12 | 12.69 | 83.8% | 0.80 | 24.05 | 2.38 |
| | 7.05 | 11.57 | 0.82 | 1.25 | 9.54 | 12.58 | 83.0% | 0.76 | 21.93 | 2.30 |
| | 7.10 | 11.52 | 0.78 | 1.20 | 8.97 | 12.46 | 82.2% | 0.72 | 19.89 | 2.22 |
| | 7.15 | 11.46 | 0.73 | 1.15 | 8.39 | 12.34 | 81.5% | 0.68 | 17.92 | 2.14 |
| | 7.20 | 11.41 | 0.69 | 1.10 | 7.82 | 12.23 | 80.7% | 0.64 | 16.03 | 2.05 |
| | 7.25 | 11.35 | 0.64 | 1.05 | 7.25 | 12.11 | 79.9% | 0.60 | 14.23 | 1.96 |
| | 7.30 | 11.30 | 0.59 | 1.00 | 6.69 | 11.99 | 79.2% | 0.56 | 12.51 | 1.87 |
| | 7.35 | 11.24 | 0.54 | 0.95 | 6.12 | 11.88 | 78.4% | 0.52 | 10.87 | 1.78 |
| | 7.40 | 11.19 | 0.50 | 0.90 | 5.56 | 11.76 | 77.6% | 0.47 | 9.32 | 1.68 |
| | 7.45 | 11.13 | 0.45 | 0.85 | 5.00 | 11.64 | 76.9% | 0.43 | 7.87 | 1.57 |
| | 7.50 | 11.08 | 0.40 | 0.80 | 4.45 | 11.53 | 76.1% | 0.39 | 6.51 | 1.46 |
| | 7.55 | 10.84 | 0.36 | 0.75 | 3.90 | 11.23 | 74.2% | 0.35 | 5.32 | 1.36 |
| | 7.60 | 10.50 | 0.32 | 0.70 | 3.37 | 10.85 | 71.6% | 0.31 | 4.26 | 1.27 |
| | 7.65 | 10.16 | 0.28 | 0.65 | 2.85 | 10.47 | 69.1% | 0.27 | 3.30 | 1.16 |
| | 7.70 | 9.82 | 0.24 | 0.60 | 2.35 | 10.09 | 66.6% | 0.23 | 2.46 | 1.05 |
| *WL* | 7.75 | 6.76 | 0.28 | 0.55 | 1.91 | 6.98 | 46.1% | 0.27 | 2.23 | 1.17 |
| | 7.80 | 5.34 | 0.30 | 0.50 | 1.63 | 5.54 | 36.6% | 0.29 | 1.98 | 1.22 |
| | 7.85 | 5.09 | 0.27 | 0.45 | 1.37 | 5.27 | 34.8% | 0.26 | 1.53 | 1.12 |
| | 7.90 | 4.89 | 0.23 | 0.40 | 1.12 | 5.05 | 33.3% | 0.22 | 1.13 | 1.01 |
| | 7.95 | 4.69 | 0.19 | 0.35 | 0.88 | 4.82 | 31.8% | 0.18 | 0.78 | 0.89 |
| | 8.00 | 4.49 | 0.14 | 0.30 | 0.65 | 4.59 | 30.3% | 0.14 | 0.48 | 0.75 |
| | 8.05 | 3.38 | 0.13 | 0.25 | 0.43 | 3.45 | 22.8% | 0.12 | 0.30 | 0.69 |
| | 8.10 | 2.68 | 0.10 | 0.20 | 0.27 | 2.74 | 18.1% | 0.10 | 0.16 | 0.59 |
| | 8.15 | 1.78 | 0.08 | 0.15 | 0.14 | 1.81 | 12.0% | 0.08 | 0.07 | 0.51 |
| | 8.20 | 1.38 | 0.05 | 0.10 | 0.07 | 1.40 | 9.2% | 0.05 | 0.02 | 0.36 |
| | 8.25 | 0.38 | 0.02 | 0.05 | 0.01 | 0.39 | 2.6% | 0.02 | 0.00 | 0.22 |

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

SUMMARY SHEET

| | | |
|---|---|---|
| MEASURED FLOW (Qm)= | 2.52 | cfs |
| CALCULATED FLOW (Qc)= | 2.23 | cfs |
| (Qm-Qc)/Qm * 100 = | 11.4 | % |
| MEASURED WATERLINE (WLm)= | 7.75 | ft |
| CALCULATED WATERLINE (WLc)= | 7.75 | ft |
| (WLm-WLc)/WLm * 100 = | 0.0 | % |
| MAX MEASURED DEPTH (Dm)= | 0.55 | ft |
| MAX CALCULATED DEPTH (Dc)= | 0.55 | ft |
| (Dm-Dc)/Dm * 100 | 0.5 | % |
| MEAN VELOCITY= | 1.17 | ft/sec |
| MANNING'S N= | 0.048 | |
| SLOPE= | 0.008 | ft/ft |
| .4 * Qm = | 1.0 | cfs |
| 2.5 * Qm= | 6.3 | cfs |

RECOMMENDED INSTREAM FLOW:
==========

| FLOW (CFS) | PERIOD |
|---|---|
| ========== | ======== |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

RATIONALE FOR RECOMMENDATION:
==========

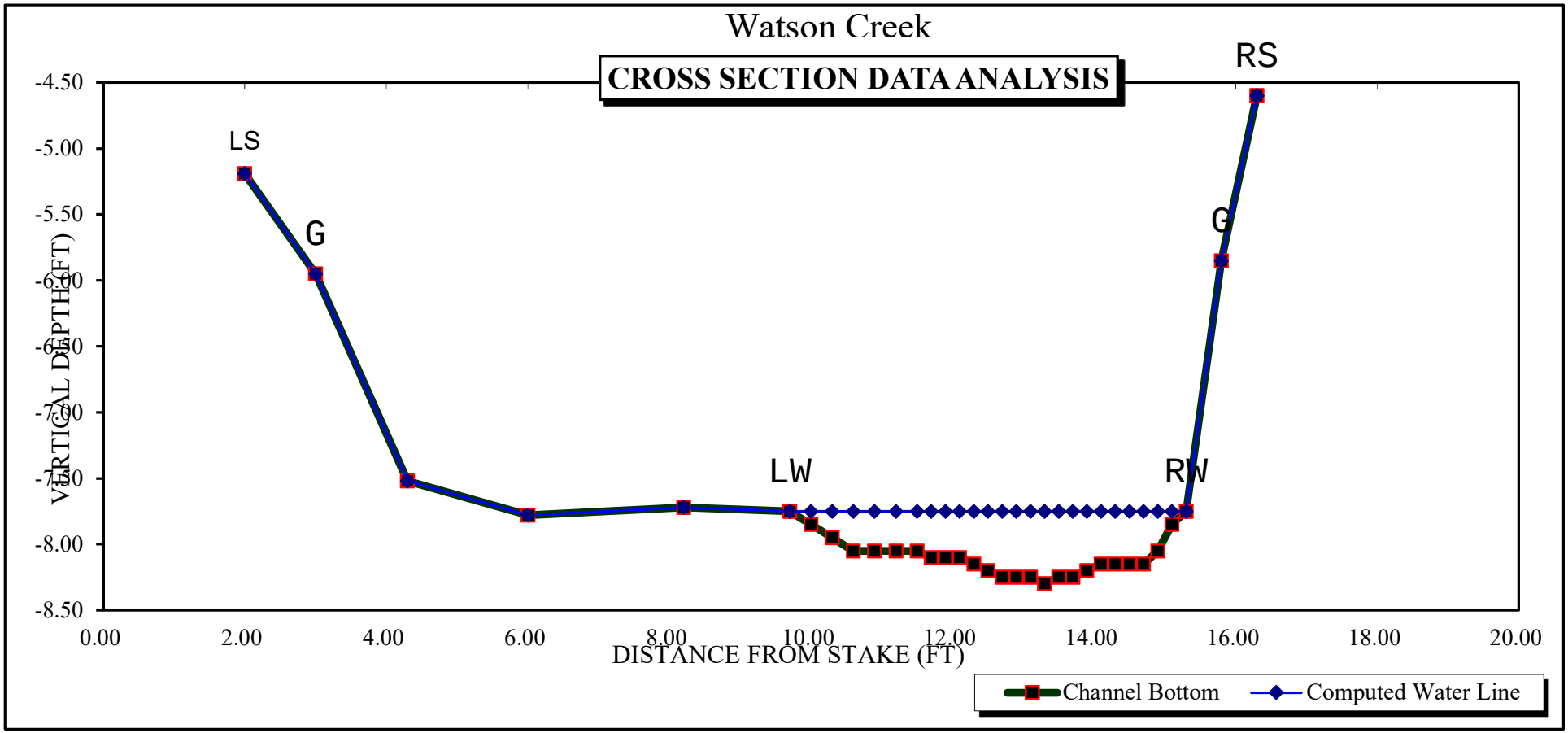
RECOMMENDATION BY: …….. AGENCY…….. DATE:……

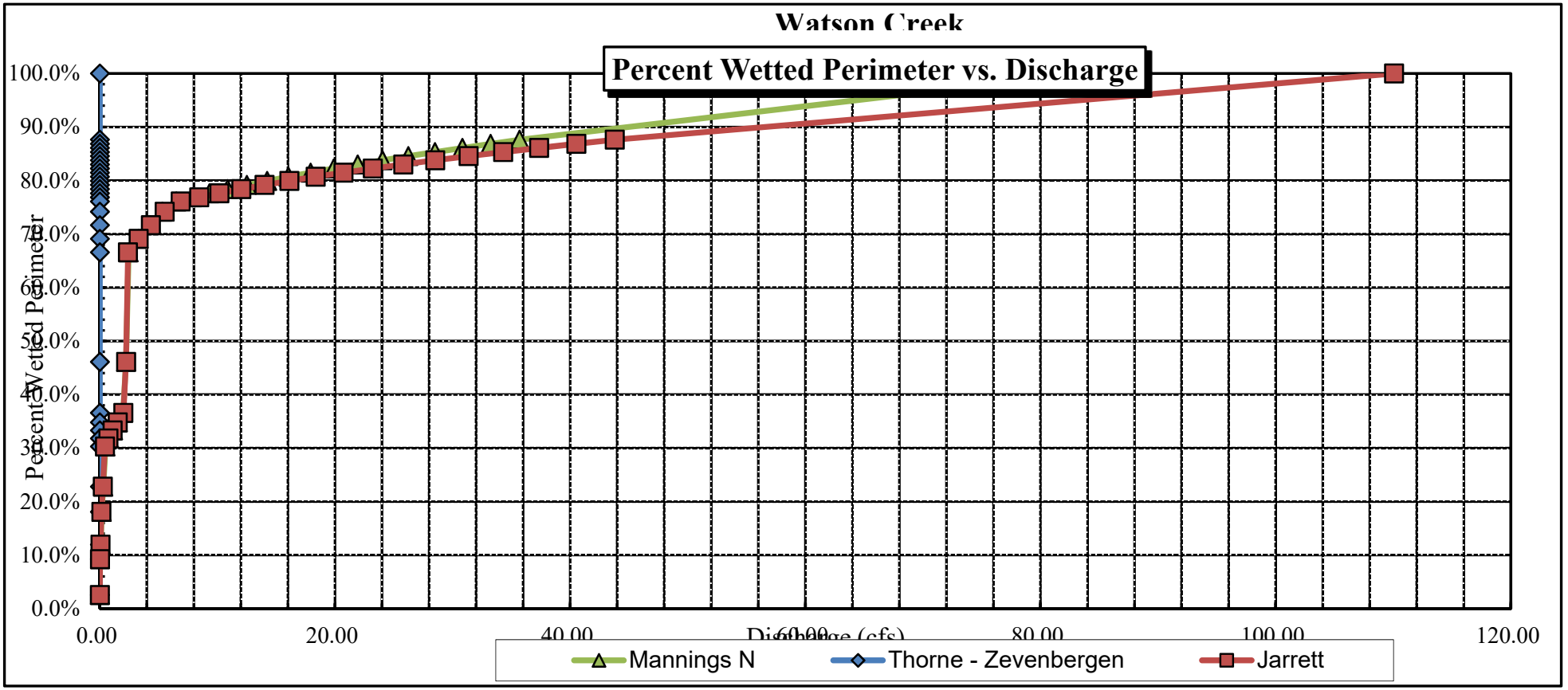
CWCB REVIEW BY: …….. DATE:……

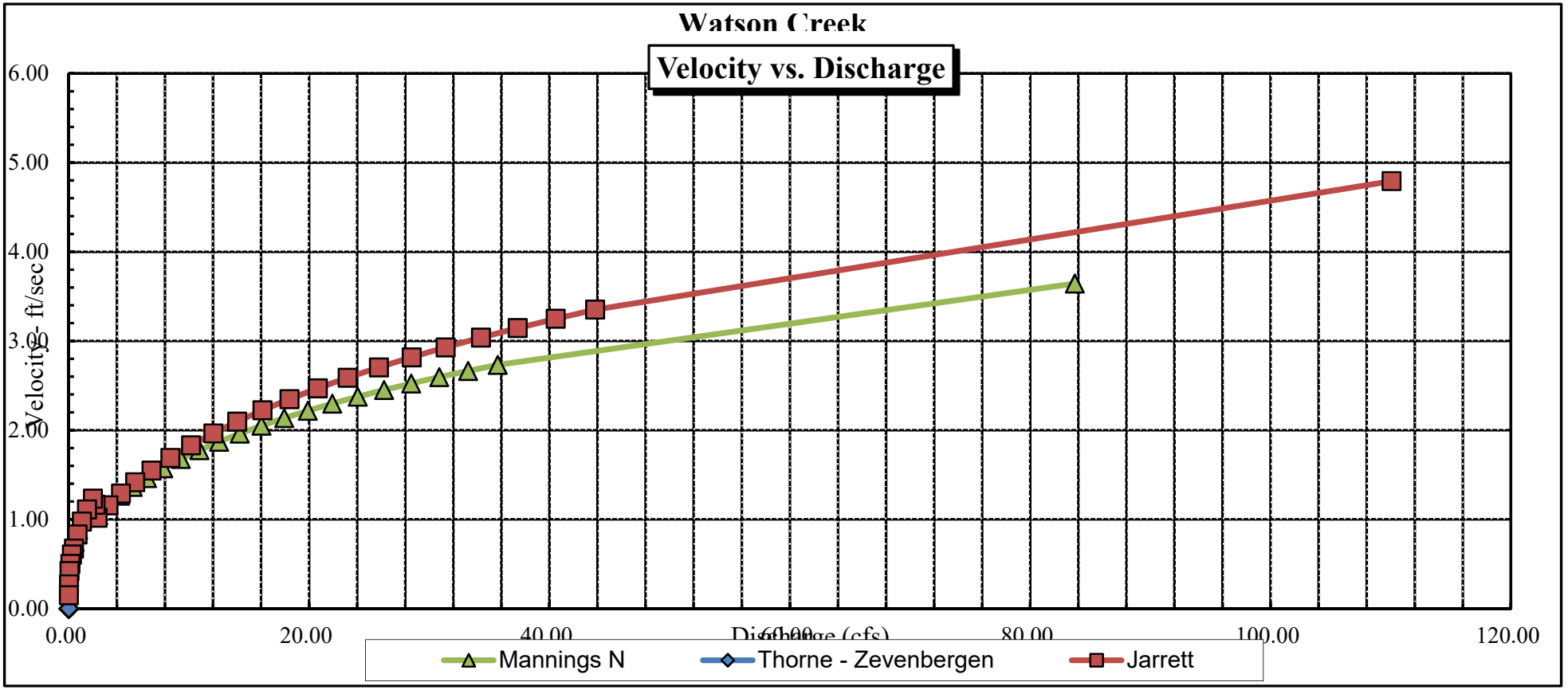
STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

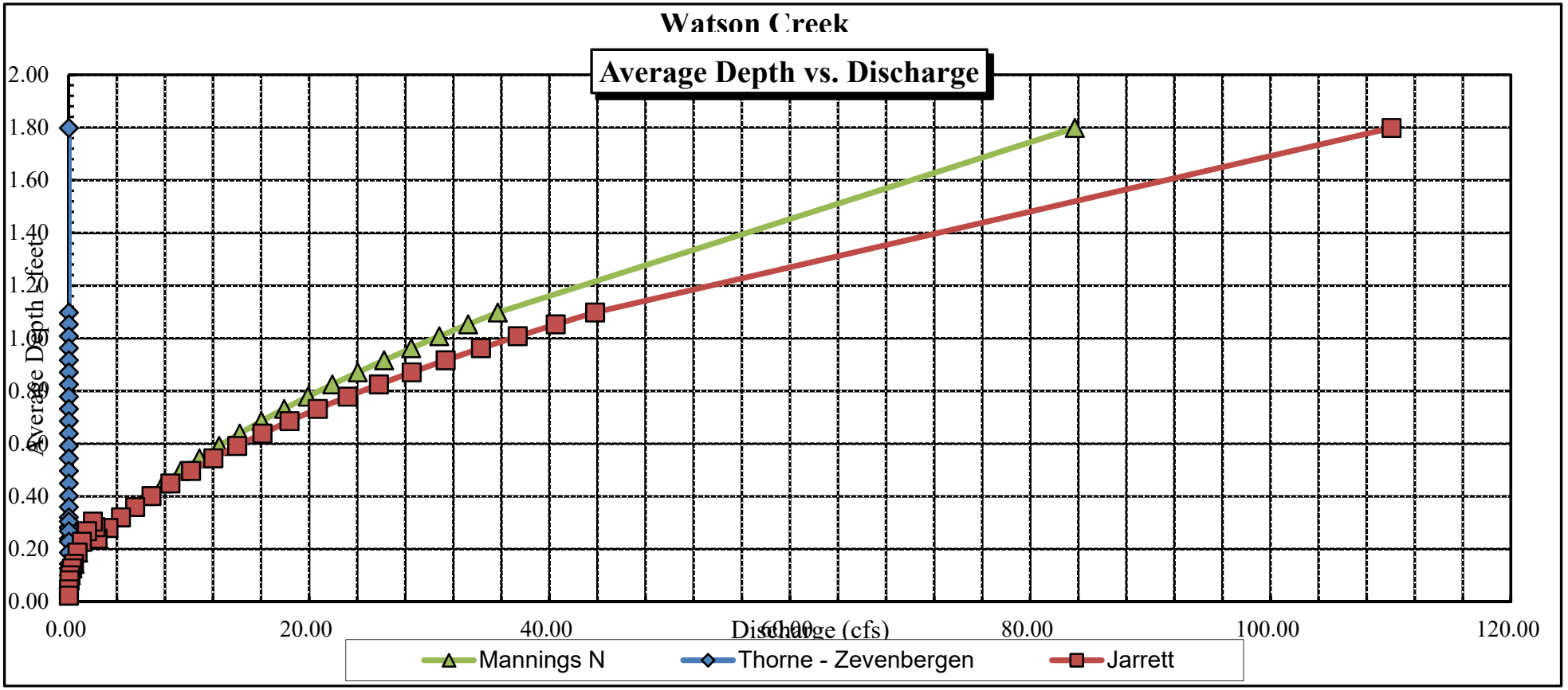
*GL* = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

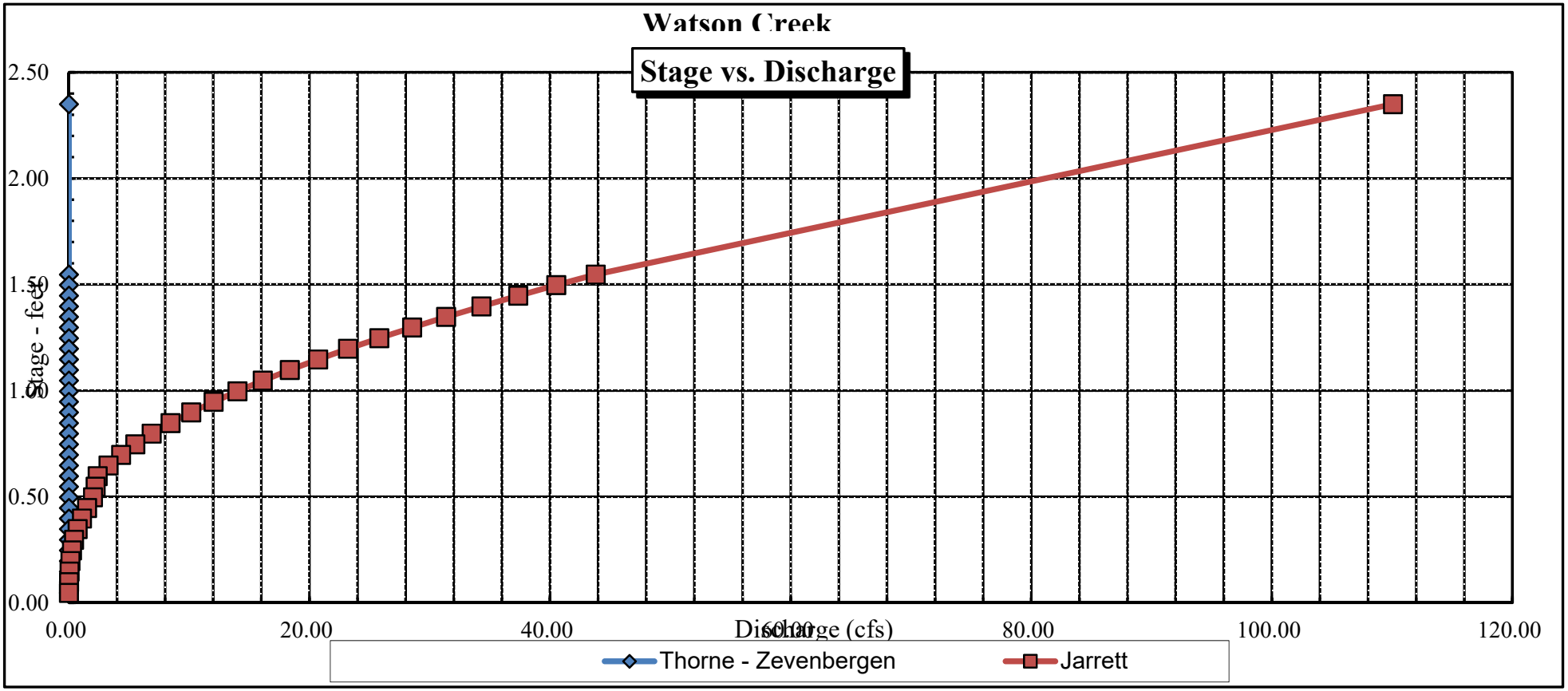
| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 5.95 | 12.77 | 1.80 | 2.35 | 22.97 | 15.15 | 100.0% | 1.52 | 110.07 | 4.79 |
| | 6.75 | 11.90 | 1.10 | 1.55 | 13.06 | 13.28 | 87.6% | 0.98 | 43.79 | 3.35 |
| | 6.80 | 11.84 | 1.05 | 1.50 | 12.47 | 13.16 | 86.9% | 0.95 | 40.52 | 3.25 |
| | 6.85 | 11.79 | 1.01 | 1.45 | 11.88 | 13.04 | 86.1% | 0.91 | 37.36 | 3.14 |
| | 6.90 | 11.73 | 0.96 | 1.40 | 11.29 | 12.93 | 85.3% | 0.87 | 34.30 | 3.04 |
| | 6.95 | 11.68 | 0.92 | 1.35 | 10.71 | 12.81 | 84.6% | 0.84 | 31.36 | 2.93 |
| | 7.00 | 11.62 | 0.87 | 1.30 | 10.12 | 12.69 | 83.8% | 0.80 | 28.53 | 2.82 |
| | 7.05 | 11.57 | 0.82 | 1.25 | 9.54 | 12.58 | 83.0% | 0.76 | 25.81 | 2.70 |
| | 7.10 | 11.52 | 0.78 | 1.20 | 8.97 | 12.46 | 82.2% | 0.72 | 23.21 | 2.59 |
| | 7.15 | 11.46 | 0.73 | 1.15 | 8.39 | 12.34 | 81.5% | 0.68 | 20.73 | 2.47 |
| | 7.20 | 11.41 | 0.69 | 1.10 | 7.82 | 12.23 | 80.7% | 0.64 | 18.36 | 2.35 |
| | 7.25 | 11.35 | 0.64 | 1.05 | 7.25 | 12.11 | 79.9% | 0.60 | 16.12 | 2.22 |
| | 7.30 | 11.30 | 0.59 | 1.00 | 6.69 | 11.99 | 79.2% | 0.56 | 14.01 | 2.10 |
| | 7.35 | 11.24 | 0.54 | 0.95 | 6.12 | 11.88 | 78.4% | 0.52 | 12.03 | 1.96 |
| | 7.40 | 11.19 | 0.50 | 0.90 | 5.56 | 11.76 | 77.6% | 0.47 | 10.17 | 1.83 |
| | 7.45 | 11.13 | 0.45 | 0.85 | 5.00 | 11.64 | 76.9% | 0.43 | 8.46 | 1.69 |
| | 7.50 | 11.08 | 0.40 | 0.80 | 4.45 | 11.53 | 76.1% | 0.39 | 6.88 | 1.55 |
| | 7.55 | 10.84 | 0.36 | 0.75 | 3.90 | 11.23 | 74.2% | 0.35 | 5.52 | 1.42 |
| | 7.60 | 10.50 | 0.32 | 0.70 | 3.37 | 10.85 | 71.6% | 0.31 | 4.34 | 1.29 |
| | 7.65 | 10.16 | 0.28 | 0.65 | 2.85 | 10.47 | 69.1% | 0.27 | 3.30 | 1.16 |
| | 7.70 | 9.82 | 0.24 | 0.60 | 2.35 | 10.09 | 66.6% | 0.23 | 2.39 | 1.02 |
| *WL* | 7.75 | 6.76 | 0.28 | 0.55 | 1.91 | 6.98 | 46.1% | 0.27 | 2.23 | 1.17 |
| | 7.80 | 5.34 | 0.30 | 0.50 | 1.63 | 5.54 | 36.6% | 0.29 | 2.00 | 1.23 |
| | 7.85 | 5.09 | 0.27 | 0.45 | 1.37 | 5.27 | 34.8% | 0.26 | 1.52 | 1.11 |
| | 7.90 | 4.89 | 0.23 | 0.40 | 1.12 | 5.05 | 33.3% | 0.22 | 1.09 | 0.98 |
| | 7.95 | 4.69 | 0.19 | 0.35 | 0.88 | 4.82 | 31.8% | 0.18 | 0.73 | 0.83 |
| | 8.00 | 4.49 | 0.14 | 0.30 | 0.65 | 4.59 | 30.3% | 0.14 | 0.44 | 0.67 |
| | 8.05 | 3.38 | 0.13 | 0.25 | 0.43 | 3.45 | 22.8% | 0.12 | 0.26 | 0.61 |
| | 8.10 | 2.68 | 0.10 | 0.20 | 0.27 | 2.74 | 18.1% | 0.10 | 0.13 | 0.50 |
| | 8.15 | 1.78 | 0.08 | 0.15 | 0.14 | 1.81 | 12.0% | 0.08 | 0.06 | 0.42 |
| | 8.20 | 1.38 | 0.05 | 0.10 | 0.07 | 1.40 | 9.2% | 0.05 | 0.02 | 0.27 |
| | 8.25 | 0.38 | 0.02 | 0.05 | 0.01 | 0.39 | 2.6% | 0.02 | 0.00 | 0.15 |


Watson Creek
CROSS SECTION DATA ANALYSIS
LS
G
LW
RW
G
RS
-4.50
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
-8.00
-8.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Watson Creek
Percent Wetted Perimeter vs. Discharge
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percent Wetted Perimeter
0.00
20.00
40.00
80.00
100.00
120.00
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Velocity vs. Discharge
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Velocity- ft/sec
0.00
20.00
40.00
80.00
100.00
120.00
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Average Depth vs. Discharge
Average Depth (feet)
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Stage vs. Discharge
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
20.00
40.00
60.00
80.00
100.00
120.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

## Data Input & Proofing

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-Private Boundary |
| XS NUMBER: | 1 |
| DATE: | 8/2/2017 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | |
| USFS MAP: | |
| | Level and Rod Survey |
| TAPE WT: | 0.0106 lbs / ft |
| TENSION: | 99999 lbs |
| SLOPE: | 0.008 ft / ft |

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

| GL=1 | FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | A | Q | Tape to Water |
|---|---|---|---|---|---|---|---|---|
| | | | Total Data Points = 33 | | | | | |
| | LS | 2.00 | 5.19 | | | 0.00 | 0.00 | 0.00 |
| 1 | G | 3.00 | 5.95 | | | 0.00 | 0.00 | 0.00 |
| | | 4.30 | 7.52 | | | 0.00 | 0.00 | 0.00 |
| | | 6.00 | 7.78 | | | 0.00 | 0.00 | 0.00 |
| | | 8.20 | 7.72 | | | 0.00 | 0.00 | 0.00 |
| | LW | 9.70 | 7.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 10.00 | 7.85 | 0.10 | 0.00 | 0.03 | 0.00 | 7.75 |
| | | 10.30 | 7.95 | 0.20 | 0.00 | 0.06 | 0.00 | 7.75 |
| | | 10.60 | 8.05 | 0.30 | 0.45 | 0.09 | 0.04 | 7.75 |
| | | 10.90 | 8.05 | 0.30 | 0.96 | 0.09 | 0.09 | 7.75 |
| | | 11.20 | 8.05 | 0.30 | 1.30 | 0.09 | 0.12 | 7.75 |
| | | 11.50 | 8.05 | 0.30 | 1.37 | 0.08 | 0.10 | 7.75 |
| | | 11.70 | 8.10 | 0.35 | 1.26 | 0.07 | 0.09 | 7.75 |
| | | 11.90 | 8.10 | 0.35 | 1.80 | 0.07 | 0.13 | 7.75 |
| | | 12.10 | 8.10 | 0.35 | 1.89 | 0.07 | 0.13 | 7.75 |
| | | 12.30 | 8.15 | 0.40 | 2.09 | 0.08 | 0.17 | 7.75 |
| | | 12.50 | 8.20 | 0.45 | 2.08 | 0.09 | 0.19 | 7.75 |
| | | 12.70 | 8.25 | 0.50 | 2.46 | 0.10 | 0.25 | 7.75 |
| | | 12.90 | 8.25 | 0.50 | 2.28 | 0.10 | 0.23 | 7.75 |
| | | 13.10 | 8.25 | 0.50 | 2.31 | 0.10 | 0.23 | 7.75 |
| | | 13.30 | 8.30 | 0.55 | 1.98 | 0.11 | 0.22 | 7.75 |
| | | 13.50 | 8.25 | 0.50 | 1.49 | 0.10 | 0.15 | 7.75 |
| | | 13.70 | 8.25 | 0.50 | 1.10 | 0.10 | 0.11 | 7.75 |
| | | 13.90 | 8.20 | 0.45 | 0.90 | 0.09 | 0.08 | 7.75 |
| | | 14.10 | 8.15 | 0.40 | 0.62 | 0.08 | 0.05 | 7.75 |
| | | 14.30 | 8.15 | 0.40 | 0.54 | 0.08 | 0.04 | 7.75 |
| | | 14.50 | 8.15 | 0.40 | 0.59 | 0.08 | 0.05 | 7.75 |
| | | 14.70 | 8.15 | 0.40 | 0.53 | 0.08 | 0.04 | 7.75 |
| | | 14.90 | 8.05 | 0.30 | 0.39 | 0.06 | 0.02 | 7.75 |
| | | 15.10 | 7.85 | 0.10 | 0.09 | 0.02 | 0.00 | 7.75 |
| | RW | 15.30 | 7.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | G | 15.80 | 5.85 | | | 0.00 | 0.00 | 0.00 |
| | RS | 16.30 | 4.60 | | | 0.00 | 0.00 | 0.00 |
| | | | | | Totals | 1.92 | 2.52 | |

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

LOCATION INFORMATION

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-private boundary |
| XS NUMBER: | 2 |
| DATE: | 2-Aug-17 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | 0 |
| USFS MAP: | 0 |

SUPPLEMENTAL DATA

| | | |
|---|---|---|
| | | *** NOTE *** |
| | | Leave TAPE WT and TENSION |
| | | at defaults for data collected |
| TAPE WT: | 0.0106 | with a survey level and rod |
| TENSION: | 99999 | |

CHANNEL PROFILE DATA

| | |
|---|---|
| SLOPE: | 0.01 |

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: ….....……..…….....DATE.....

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

# DATA POINTS= 38

VALUES COMPUTED FROM RAW FIELD DATA

| FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | WETTED PERIM. | WATER DEPTH | AREA (Am) | Q (Qm) | % Q CELL |
|---|---|---|---|---|---|---|---|---|---|
| RS | 2.30 | 4.70 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| 1 G | 3.80 | 6.26 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 5.30 | 6.62 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 6.00 | 6.95 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| RW | 6.90 | 7.90 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 7.20 | 8.00 | 0.10 | 0.04 | 0.32 | 0.10 | 0.03 | 0.00 | 0.0% |
| | 7.50 | 8.05 | 0.15 | 0.37 | 0.30 | 0.15 | 0.05 | 0.02 | 0.6% |
| | 7.80 | 8.10 | 0.20 | 0.56 | 0.30 | 0.20 | 0.06 | 0.03 | 1.3% |
| | 8.10 | 8.10 | 0.20 | 0.74 | 0.30 | 0.20 | 0.06 | 0.04 | 1.7% |
| | 8.40 | 8.10 | 0.20 | 0.89 | 0.30 | 0.20 | 0.06 | 0.05 | 2.1% |
| | 8.70 | 8.10 | 0.20 | 1.26 | 0.30 | 0.20 | 0.06 | 0.08 | 2.9% |
| | 9.00 | 8.15 | 0.25 | 1.44 | 0.30 | 0.25 | 0.06 | 0.09 | 3.5% |
| | 9.20 | 8.20 | 0.30 | 1.64 | 0.21 | 0.30 | 0.06 | 0.10 | 3.8% |
| | 9.40 | 8.20 | 0.30 | 1.76 | 0.20 | 0.30 | 0.06 | 0.11 | 4.1% |
| | 9.60 | 8.25 | 0.35 | 2.05 | 0.21 | 0.35 | 0.07 | 0.14 | 5.6% |
| | 9.80 | 8.25 | 0.35 | 2.18 | 0.20 | 0.35 | 0.07 | 0.15 | 5.9% |
| | 10.00 | 8.25 | 0.35 | 2.20 | 0.20 | 0.35 | 0.07 | 0.15 | 6.0% |
| | 10.20 | 8.25 | 0.35 | 1.89 | 0.20 | 0.35 | 0.07 | 0.13 | 5.2% |
| | 10.40 | 8.30 | 0.40 | 1.93 | 0.21 | 0.40 | 0.08 | 0.15 | 6.0% |
| | 10.60 | 8.30 | 0.40 | 2.12 | 0.20 | 0.40 | 0.08 | 0.17 | 6.6% |
| | 10.80 | 8.25 | 0.35 | 2.23 | 0.21 | 0.35 | 0.07 | 0.16 | 6.1% |
| | 11.00 | 8.20 | 0.30 | 2.29 | 0.21 | 0.30 | 0.06 | 0.14 | 5.4% |
| | 11.20 | 8.20 | 0.30 | 2.22 | 0.20 | 0.30 | 0.06 | 0.13 | 5.2% |
| | 11.40 | 8.20 | 0.30 | 2.17 | 0.20 | 0.30 | 0.06 | 0.13 | 5.1% |
| | 11.60 | 8.20 | 0.30 | 1.86 | 0.20 | 0.30 | 0.06 | 0.11 | 4.3% |
| | 11.80 | 8.20 | 0.30 | 1.53 | 0.20 | 0.30 | 0.06 | 0.09 | 3.6% |
| | 12.00 | 8.20 | 0.30 | 1.15 | 0.20 | 0.30 | 0.06 | 0.07 | 2.7% |
| | 12.20 | 8.20 | 0.30 | 0.66 | 0.20 | 0.30 | 0.06 | 0.04 | 1.5% |
| | 12.40 | 8.20 | 0.30 | 0.60 | 0.20 | 0.30 | 0.06 | 0.04 | 1.4% |
| | 12.60 | 8.20 | 0.30 | 0.70 | 0.20 | 0.30 | 0.06 | 0.04 | 1.6% |
| | 12.80 | 8.20 | 0.30 | 0.84 | 0.20 | 0.30 | 0.08 | 0.06 | 2.5% |
| | 13.10 | 8.25 | 0.35 | 0.72 | 0.30 | 0.35 | 0.11 | 0.08 | 2.9% |
| | 13.40 | 8.20 | 0.30 | 0.63 | 0.30 | 0.30 | 0.09 | 0.06 | 2.2% |
| | 13.70 | 7.95 | 0.05 | 0.07 | 0.39 | 0.05 | 0.01 | 0.00 | 0.0% |
| LW | 13.80 | 7.90 | 0.00 | 0.00 | 0.11 | | 0.00 | 0.00 | 0.0% |
| 1 G | 14.00 | 6.20 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 14.40 | 5.36 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| LS | 15.70 | 4.96 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| TOTALS ---------- | | | | | 7.07 | 0.4 (Max.) | 1.83 | 2.57 | 100.0% |

Manning's n = 0.0429
Hydraulic Radius= 0.25848617

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

WATER LINE COMPARISON TABLE

| WATER LINE | MEAS AREA | COMP AREA | AREA ERROR |
|---|---|---|---|
| | 1.83 | 1.83 | 0.0% |
| 7.65 | 1.83 | 3.59 | 96.2% |
| 7.67 | 1.83 | 3.44 | 88.4% |
| 7.69 | 1.83 | 3.30 | 80.6% |
| 7.71 | 1.83 | 3.16 | 72.8% |
| 7.73 | 1.83 | 3.02 | 65.0% |
| 7.75 | 1.83 | 2.87 | 57.3% |
| 7.77 | 1.83 | 2.73 | 49.6% |
| 7.79 | 1.83 | 2.59 | 41.9% |
| 7.81 | 1.83 | 2.45 | 34.2% |
| 7.83 | 1.83 | 2.31 | 26.6% |
| 7.85 | 1.83 | 2.17 | 19.0% |
| 7.86 | 1.83 | 2.10 | 15.1% |
| 7.87 | 1.83 | 2.03 | 11.4% |
| 7.88 | 1.83 | 1.97 | 7.6% |
| 7.89 | 1.83 | 1.90 | 3.8% |
| 7.90 | 1.83 | 1.83 | 0.0% |
| 7.91 | 1.83 | 1.76 | -3.8% |
| 7.92 | 1.83 | 1.69 | -7.5% |
| 7.93 | 1.83 | 1.62 | -11.2% |
| 7.94 | 1.83 | 1.56 | -14.9% |
| 7.95 | 1.83 | 1.49 | -18.5% |
| 7.97 | 1.83 | 1.36 | -25.8% |
| 7.99 | 1.83 | 1.23 | -32.9% |
| 8.01 | 1.83 | 1.10 | -39.9% |
| 8.03 | 1.83 | 0.97 | -46.8% |
| 8.05 | 1.83 | 0.85 | -53.6% |
| 8.07 | 1.83 | 0.73 | -60.1% |
| 8.09 | 1.83 | 0.61 | -66.6% |
| 8.11 | 1.83 | 0.51 | -72.3% |
| 8.13 | 1.83 | 0.41 | -77.4% |
| 8.15 | 1.83 | 0.32 | -82.4% |

WATERLINE AT ZERO
AREA ERROR = 7.900

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

Constant Manning's n

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

| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 6.26 | 10.19 | 1.47 | 2.04 | 14.99 | 12.35 | 100.0% | 1.21 | 59.07 | 3.94 |
| | 6.90 | 8.02 | 1.15 | 1.40 | 9.26 | 9.50 | 77.0% | 0.97 | 31.53 | 3.40 |
| | 6.95 | 7.91 | 1.12 | 1.35 | 8.86 | 9.34 | 75.6% | 0.95 | 29.65 | 3.35 |
| | 7.00 | 7.86 | 1.08 | 1.30 | 8.47 | 9.22 | 74.6% | 0.92 | 27.72 | 3.27 |
| | 7.05 | 7.81 | 1.03 | 1.25 | 8.08 | 9.10 | 73.7% | 0.89 | 25.84 | 3.20 |
| | 7.10 | 7.75 | 0.99 | 1.20 | 7.69 | 8.98 | 72.7% | 0.86 | 24.01 | 3.12 |
| | 7.15 | 7.70 | 0.95 | 1.15 | 7.30 | 8.86 | 71.7% | 0.82 | 22.23 | 3.04 |
| | 7.20 | 7.65 | 0.90 | 1.10 | 6.92 | 8.74 | 70.8% | 0.79 | 20.50 | 2.96 |
| | 7.25 | 7.59 | 0.86 | 1.05 | 6.54 | 8.62 | 69.8% | 0.76 | 18.83 | 2.88 |
| | 7.30 | 7.54 | 0.82 | 1.00 | 6.16 | 8.50 | 68.9% | 0.72 | 17.21 | 2.79 |
| | 7.35 | 7.49 | 0.77 | 0.95 | 5.78 | 8.38 | 67.9% | 0.69 | 15.64 | 2.70 |
| | 7.40 | 7.43 | 0.73 | 0.90 | 5.41 | 8.26 | 66.9% | 0.65 | 14.13 | 2.61 |
| | 7.45 | 7.38 | 0.68 | 0.85 | 5.04 | 8.14 | 66.0% | 0.62 | 12.68 | 2.52 |
| | 7.50 | 7.33 | 0.64 | 0.80 | 4.67 | 8.02 | 65.0% | 0.58 | 11.29 | 2.42 |
| | 7.55 | 7.27 | 0.59 | 0.75 | 4.31 | 7.90 | 64.0% | 0.54 | 9.95 | 2.31 |
| | 7.60 | 7.22 | 0.55 | 0.70 | 3.95 | 7.79 | 63.1% | 0.51 | 8.69 | 2.20 |
| | 7.65 | 7.17 | 0.50 | 0.65 | 3.59 | 7.67 | 62.1% | 0.47 | 7.48 | 2.09 |
| | 7.70 | 7.11 | 0.45 | 0.60 | 3.23 | 7.55 | 61.1% | 0.43 | 6.35 | 1.97 |
| | 7.75 | 7.06 | 0.41 | 0.55 | 2.87 | 7.43 | 60.2% | 0.39 | 5.29 | 1.84 |
| | 7.80 | 7.01 | 0.36 | 0.50 | 2.52 | 7.31 | 59.2% | 0.35 | 4.30 | 1.70 |
| | 7.85 | 6.95 | 0.31 | 0.45 | 2.17 | 7.19 | 58.2% | 0.30 | 3.39 | 1.56 |
| *WL* | 7.90 | 6.90 | 0.26 | 0.40 | 1.83 | 7.07 | 57.3% | 0.26 | 2.57 | 1.41 |
| | 7.95 | 6.65 | 0.22 | 0.35 | 1.49 | 6.80 | 55.1% | 0.22 | 1.87 | 1.26 |
| | 8.00 | 6.44 | 0.18 | 0.30 | 1.16 | 6.56 | 53.2% | 0.18 | 1.27 | 1.09 |
| | 8.05 | 6.08 | 0.14 | 0.25 | 0.85 | 6.18 | 50.1% | 0.14 | 0.78 | 0.92 |
| | 8.10 | 4.82 | 0.11 | 0.20 | 0.55 | 4.90 | 39.7% | 0.11 | 0.45 | 0.81 |
| | 8.15 | 4.46 | 0.07 | 0.15 | 0.32 | 4.52 | 36.6% | 0.07 | 0.19 | 0.59 |
| | 8.20 | 2.20 | 0.05 | 0.10 | 0.11 | 2.23 | 18.1% | 0.05 | 0.05 | 0.45 |
| | 8.25 | 0.60 | 0.03 | 0.05 | 0.02 | 0.61 | 5.0% | 0.03 | 0.01 | 0.35 |
| | 8.30 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.0% | #DIV/0! | #DIV/0! | #DIV/0! |

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

SUMMARY SHEET

| | | |
|---|---|---|
| MEASURED FLOW (Qm)= | 2.57 | cfs |
| CALCULATED FLOW (Qc)= | 2.57 | cfs |
| (Qm-Qc)/Qm * 100 = | 0.0 | % |
| MEASURED WATERLINE (WLm)= | 7.90 | ft |
| CALCULATED WATERLINE (WLc)= | 7.90 | ft |
| (WLm-WLc)/WLm * 100 = | 0.0 | % |
| MAX MEASURED DEPTH (Dm)= | 0.40 | ft |
| MAX CALCULATED DEPTH (Dc)= | 0.40 | ft |
| (Dm-Dc)/Dm * 100 | 0.0 | % |
| MEAN VELOCITY= | 1.41 | ft/sec |
| MANNING'S N= | 0.043 | |
| SLOPE= | 0.01 | ft/ft |
| .4 * Qm = | 1.0 | cfs |
| 2.5 * Qm= | 6.4 | cfs |

RECOMMENDED INSTREAM FLOW:
==========

| FLOW (CFS) | PERIOD |
|---|---|
| ========== | ======== |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

RATIONALE FOR RECOMMENDATION:
==========

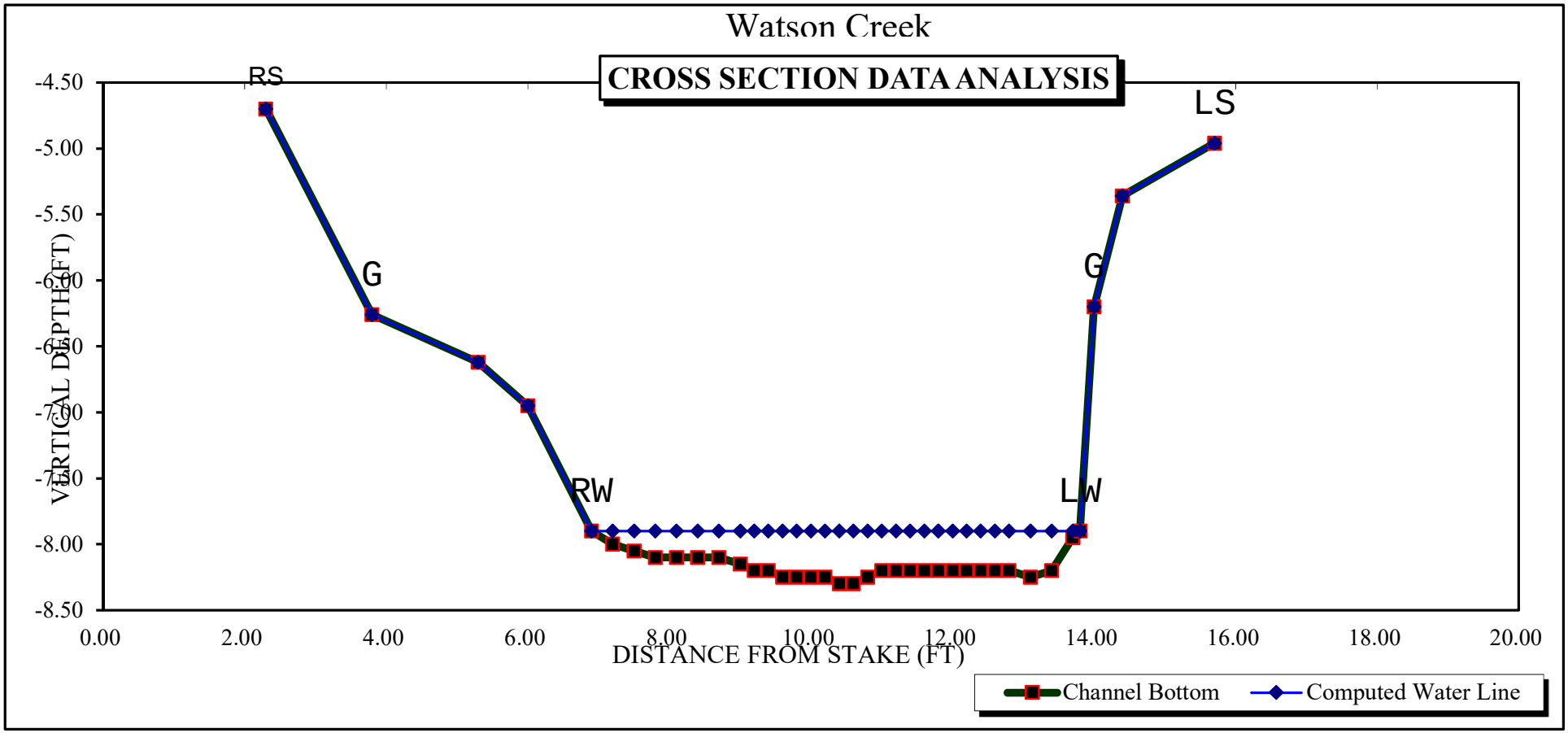
RECOMMENDATION BY: …… AGENCY…… DATE:……

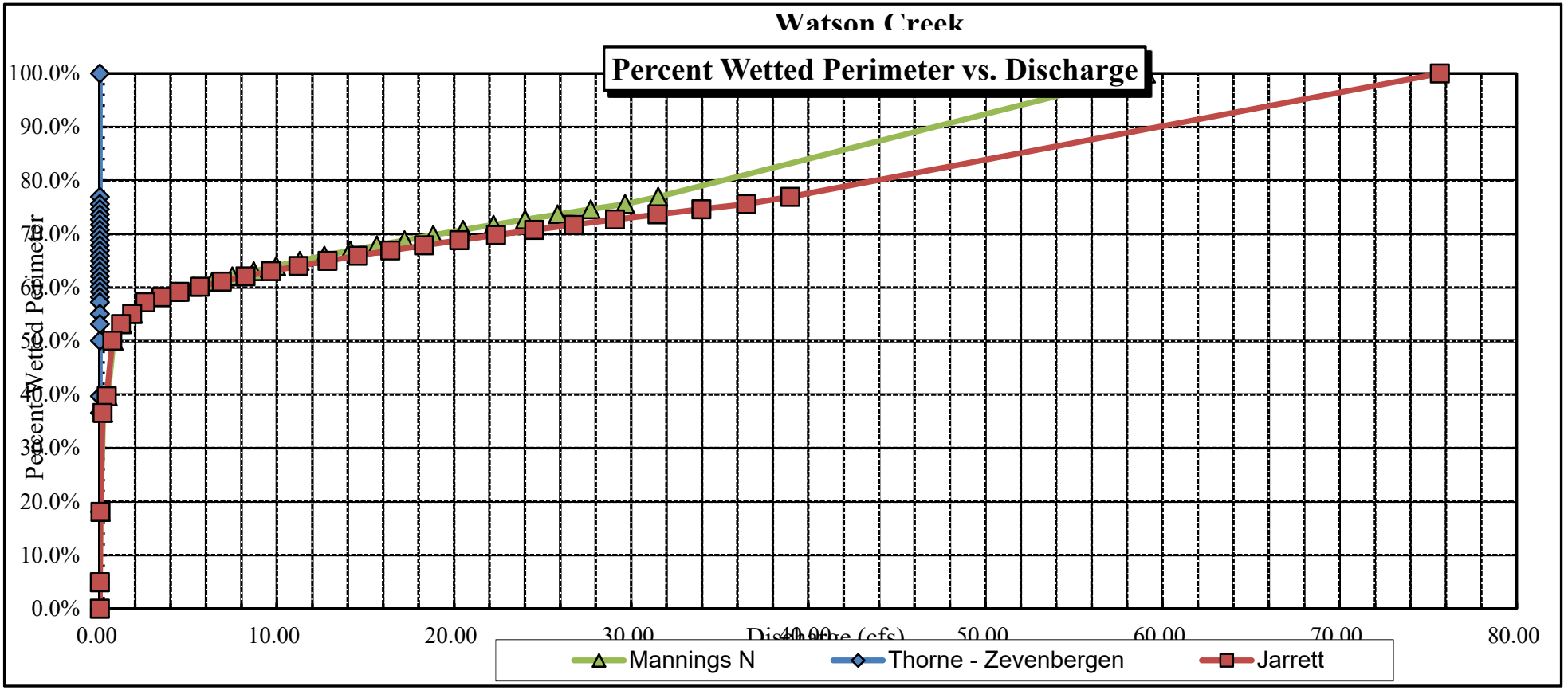
CWCB REVIEW BY: …… DATE:……

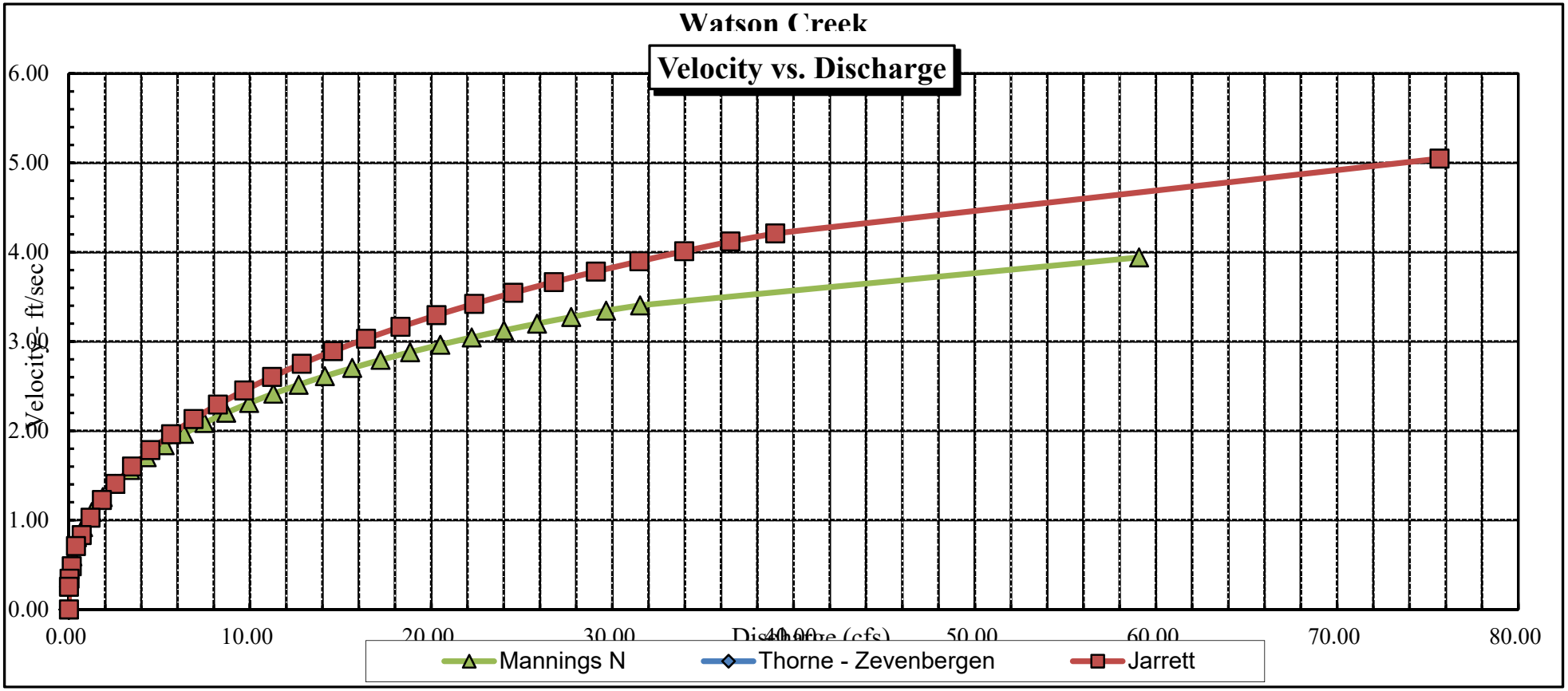
STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

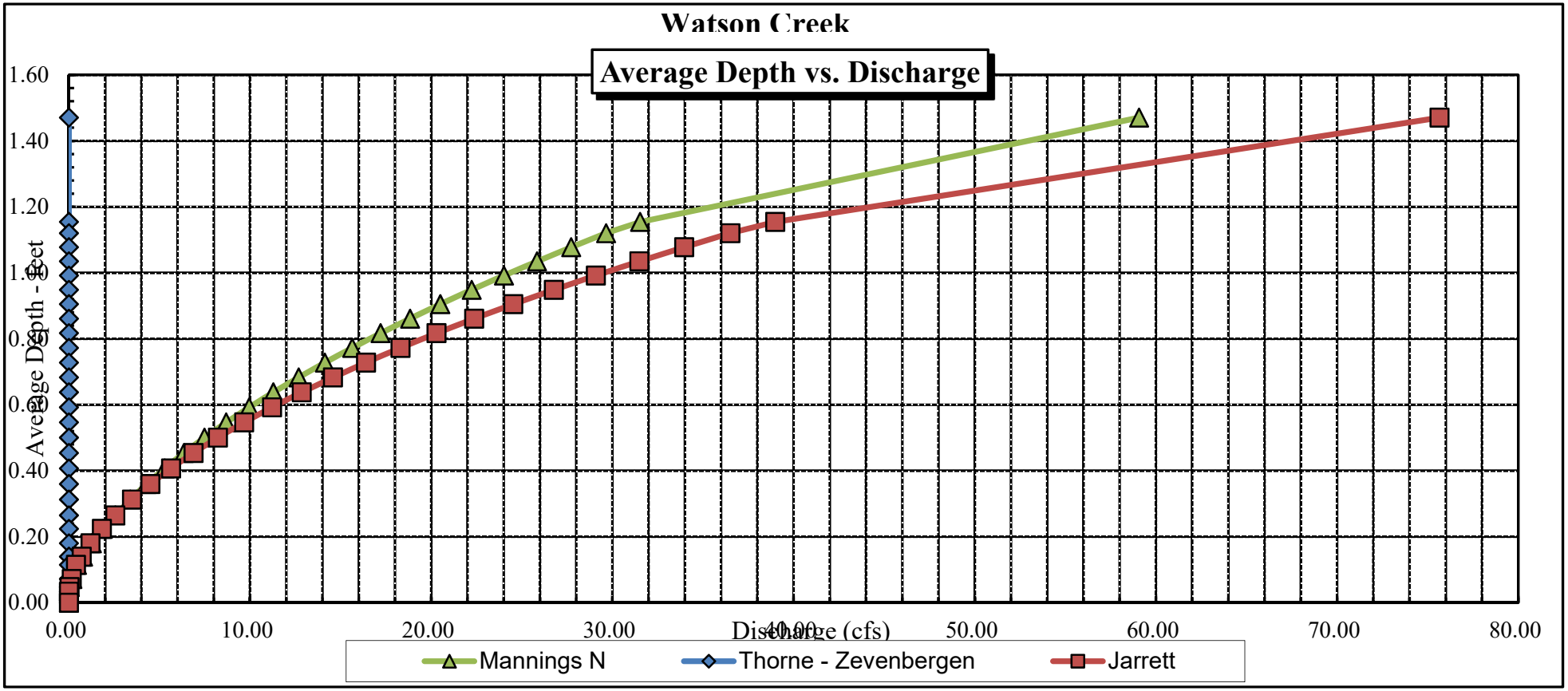
*GL* = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

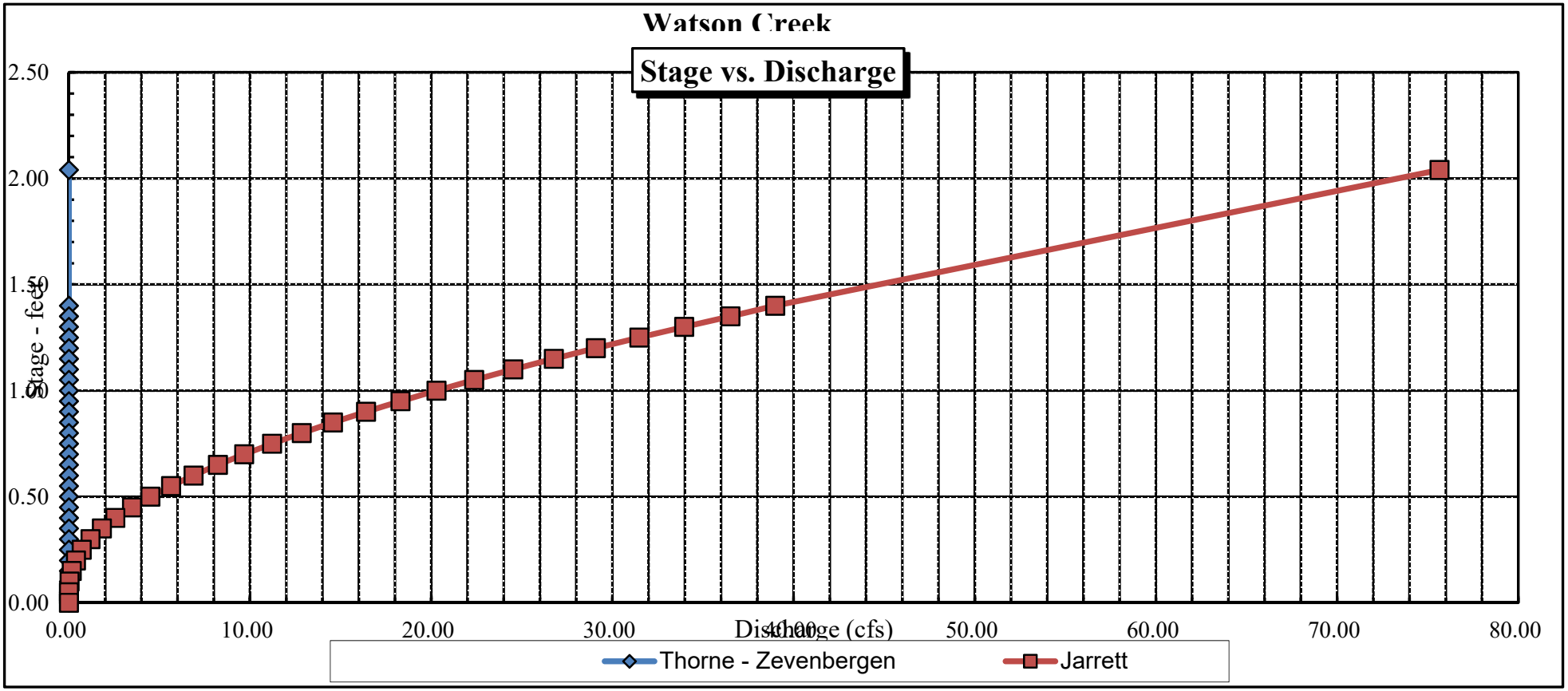
| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 6.26 | 10.19 | 1.47 | 2.04 | 14.99 | 12.35 | 100.0% | 1.21 | 75.66 | 5.05 |
| | 6.90 | 8.02 | 1.15 | 1.40 | 9.26 | 9.50 | 77.0% | 0.97 | 38.99 | 4.21 |
| | 6.95 | 7.91 | 1.12 | 1.35 | 8.86 | 9.34 | 75.6% | 0.95 | 36.51 | 4.12 |
| | 7.00 | 7.86 | 1.08 | 1.30 | 8.47 | 9.22 | 74.6% | 0.92 | 33.96 | 4.01 |
| | 7.05 | 7.81 | 1.03 | 1.25 | 8.08 | 9.10 | 73.7% | 0.89 | 31.48 | 3.90 |
| | 7.10 | 7.75 | 0.99 | 1.20 | 7.69 | 8.98 | 72.7% | 0.86 | 29.09 | 3.78 |
| | 7.15 | 7.70 | 0.95 | 1.15 | 7.30 | 8.86 | 71.7% | 0.82 | 26.77 | 3.67 |
| | 7.20 | 7.65 | 0.90 | 1.10 | 6.92 | 8.74 | 70.8% | 0.79 | 24.53 | 3.55 |
| | 7.25 | 7.59 | 0.86 | 1.05 | 6.54 | 8.62 | 69.8% | 0.76 | 22.37 | 3.42 |
| | 7.30 | 7.54 | 0.82 | 1.00 | 6.16 | 8.50 | 68.9% | 0.72 | 20.29 | 3.29 |
| | 7.35 | 7.49 | 0.77 | 0.95 | 5.78 | 8.38 | 67.9% | 0.69 | 18.30 | 3.16 |
| | 7.40 | 7.43 | 0.73 | 0.90 | 5.41 | 8.26 | 66.9% | 0.65 | 16.40 | 3.03 |
| | 7.45 | 7.38 | 0.68 | 0.85 | 5.04 | 8.14 | 66.0% | 0.62 | 14.58 | 2.89 |
| | 7.50 | 7.33 | 0.64 | 0.80 | 4.67 | 8.02 | 65.0% | 0.58 | 12.85 | 2.75 |
| | 7.55 | 7.27 | 0.59 | 0.75 | 4.31 | 7.90 | 64.0% | 0.54 | 11.22 | 2.60 |
| | 7.60 | 7.22 | 0.55 | 0.70 | 3.95 | 7.79 | 63.1% | 0.51 | 9.67 | 2.45 |
| | 7.65 | 7.17 | 0.50 | 0.65 | 3.59 | 7.67 | 62.1% | 0.47 | 8.23 | 2.29 |
| | 7.70 | 7.11 | 0.45 | 0.60 | 3.23 | 7.55 | 61.1% | 0.43 | 6.88 | 2.13 |
| | 7.75 | 7.06 | 0.41 | 0.55 | 2.87 | 7.43 | 60.2% | 0.39 | 5.64 | 1.96 |
| | 7.80 | 7.01 | 0.36 | 0.50 | 2.52 | 7.31 | 59.2% | 0.35 | 4.50 | 1.78 |
| | 7.85 | 6.95 | 0.31 | 0.45 | 2.17 | 7.19 | 58.2% | 0.30 | 3.48 | 1.60 |
| *WL* | 7.90 | 6.90 | 0.26 | 0.40 | 1.83 | 7.07 | 57.3% | 0.26 | 2.57 | 1.41 |
| | 7.95 | 6.65 | 0.22 | 0.35 | 1.49 | 6.80 | 55.1% | 0.22 | 1.82 | 1.22 |
| | 8.00 | 6.44 | 0.18 | 0.30 | 1.16 | 6.56 | 53.2% | 0.18 | 1.19 | 1.03 |
| | 8.05 | 6.08 | 0.14 | 0.25 | 0.85 | 6.18 | 50.1% | 0.14 | 0.71 | 0.83 |
| | 8.10 | 4.82 | 0.11 | 0.20 | 0.55 | 4.90 | 39.7% | 0.11 | 0.39 | 0.71 |
| | 8.15 | 4.46 | 0.07 | 0.15 | 0.32 | 4.52 | 36.6% | 0.07 | 0.16 | 0.48 |
| | 8.20 | 2.20 | 0.05 | 0.10 | 0.11 | 2.23 | 18.1% | 0.05 | 0.04 | 0.34 |
| | 8.25 | 0.60 | 0.03 | 0.05 | 0.02 | 0.61 | 5.0% | 0.03 | 0.01 | 0.25 |
| | 8.30 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.0% | #DIV/0! | #DIV/0! | #DIV/0! |


Watson Creek
CROSS SECTION DATA ANALYSIS
RS
G
RW
LW
G
LS
-4.50
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
-8.00
-8.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Watson Creek
Percent Wetted Perimeter vs. Discharge
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percent Wetted Perimeter
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Velocity vs. Discharge
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Velocity - ft/sec
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Average Depth vs. Discharge
Average Depth - Feet
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Stage vs. Discharge
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

## Data Input & Proofing

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-private boundary |
| XS NUMBER: | 2 |
| DATE: | 8/2/2017 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | |
| USFS MAP: | |
| | Level and Rod Survey |
| TAPE WT: | 0.0106 lbs / ft |
| TENSION: | 99999 lbs |
| SLOPE: | 0.01 ft / ft |

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

| GL=1 | FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | A | Q | Tape to Water |
|---|---|---|---|---|---|---|---|---|
| | | | Total Data Points = 38 | | | | | |
| | RS | 2.30 | 4.70 | | | 0.00 | 0.00 | 0.00 |
| 1 | G | 3.80 | 6.26 | | | 0.00 | 0.00 | 0.00 |
| | | 5.30 | 6.62 | | | 0.00 | 0.00 | 0.00 |
| | | 6.00 | 6.95 | | | 0.00 | 0.00 | 0.00 |
| | RW | 6.90 | 7.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 7.20 | 8.00 | 0.10 | 0.04 | 0.03 | 0.00 | 7.90 |
| | | 7.50 | 8.05 | 0.15 | 0.37 | 0.05 | 0.02 | 7.90 |
| | | 7.80 | 8.10 | 0.20 | 0.56 | 0.06 | 0.03 | 7.90 |
| | | 8.10 | 8.10 | 0.20 | 0.74 | 0.06 | 0.04 | 7.90 |
| | | 8.40 | 8.10 | 0.20 | 0.89 | 0.06 | 0.05 | 7.90 |
| | | 8.70 | 8.10 | 0.20 | 1.26 | 0.06 | 0.08 | 7.90 |
| | | 9.00 | 8.15 | 0.25 | 1.44 | 0.06 | 0.09 | 7.90 |
| | | 9.20 | 8.20 | 0.30 | 1.64 | 0.06 | 0.10 | 7.90 |
| | | 9.40 | 8.20 | 0.30 | 1.76 | 0.06 | 0.11 | 7.90 |
| | | 9.60 | 8.25 | 0.35 | 2.05 | 0.07 | 0.14 | 7.90 |
| | | 9.80 | 8.25 | 0.35 | 2.18 | 0.07 | 0.15 | 7.90 |
| | | 10.00 | 8.25 | 0.35 | 2.20 | 0.07 | 0.15 | 7.90 |
| | | 10.20 | 8.25 | 0.35 | 1.89 | 0.07 | 0.13 | 7.90 |
| | | 10.40 | 8.30 | 0.40 | 1.93 | 0.08 | 0.15 | 7.90 |
| | | 10.60 | 8.30 | 0.40 | 2.12 | 0.08 | 0.17 | 7.90 |
| | | 10.80 | 8.25 | 0.35 | 2.23 | 0.07 | 0.16 | 7.90 |
| | | 11.00 | 8.20 | 0.30 | 2.29 | 0.06 | 0.14 | 7.90 |
| | | 11.20 | 8.20 | 0.30 | 2.22 | 0.06 | 0.13 | 7.90 |
| | | 11.40 | 8.20 | 0.30 | 2.17 | 0.06 | 0.13 | 7.90 |
| | | 11.60 | 8.20 | 0.30 | 1.86 | 0.06 | 0.11 | 7.90 |
| | | 11.80 | 8.20 | 0.30 | 1.53 | 0.06 | 0.09 | 7.90 |
| | | 12.00 | 8.20 | 0.30 | 1.15 | 0.06 | 0.07 | 7.90 |
| | | 12.20 | 8.20 | 0.30 | 0.66 | 0.06 | 0.04 | 7.90 |
| | | 12.40 | 8.20 | 0.30 | 0.60 | 0.06 | 0.04 | 7.90 |
| | | 12.60 | 8.20 | 0.30 | 0.70 | 0.06 | 0.04 | 7.90 |
| | | 12.80 | 8.20 | 0.30 | 0.84 | 0.08 | 0.06 | 7.90 |
| | | 13.10 | 8.25 | 0.35 | 0.72 | 0.11 | 0.08 | 7.90 |
| | | 13.40 | 8.20 | 0.30 | 0.63 | 0.09 | 0.06 | 7.90 |
| | | 13.70 | 7.95 | 0.05 | 0.07 | 0.01 | 0.00 | 7.90 |
| | LW | 13.80 | 7.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | G | 14.00 | 6.20 | | | 0.00 | 0.00 | 0.00 |
| | | 14.40 | 5.36 | | | 0.00 | 0.00 | 0.00 |
| | LS | 15.70 | 4.96 | | | 0.00 | 0.00 | 0.00 |
| | | | | | Totals | 1.83 | 2.57 | |

COLORADO
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

# Watson Creek CWCB Temporary Streamgage

**Location:** 13N 335480 4447863

**Installation Date:** 5/6/2019

**Equipment:** Onset Hobo MX2001 water level logger, staff gage

**Description:** The streamgage consists of a data logger and pressure transducer protected in a 2 inch PVC pipe, secured to the bank with a t-pot fence post. The pressure transducer measured water level and temperature on 15 minute intervals in a large pool formed by a culvert. A co-located staff gage was used as a secondary water level measurement device.

**Discharge Measurment Field Visit Data Report** *(Filters: Name begins with Watson Creek; Division = 6;)*

| Div | Name | CWCB Case Number | Segment ID | Meas. Date | UTM | Location | Flow Amount (cfs) | Meas # | Rating | Station ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | Watson Creek | | 19/6/A-008 | 05/07/2018 | UTMx: 333610 UTMy: 4445869 | Watson Creek on BLM land | 6.24 | 1 | Fair(8%) | 507 |
| 6 | Watson Creek | | 19/6/A-008 | 05/06/2019 | UTMx: 335840 UTMy: 4447863 | Watson Creek at Co Rd 17 | 12.8648 | 2 | Fair(8%) | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 06/04/2019 | UTMx: 335840 UTMy: 4447863 | Watson Creek at Co Rd 17 | 12.28 | 3 | Good(5%) | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 06/28/2019 | UTMx: 335840 UTMy: 4447863 | Watson Creek 50ft upstream of gage | 11.54 | 4 | G | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 07/29/2019 | UTMx: 335840 UTMy: 4447863 | Watson Creek 20ft DS of gage | 10.25 | 5 | P | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 07/29/2019 | UTMx: 333604 UTMy: 4445870 | Watson Creek at BLM boundary | 4.62 | | F | |
| 6 | Watson Creek | | 19/6/A-008 | 11/07/2019 | UTMx: 335840 UTMy: 4447863 | Watson Creek - 100ft US of temp gage | 3.6 | 6 | Fair | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 12/06/2019 | UTMx: 335840 UTMy: 4447863 | Watson Creek 10ft downstream of temp gage | 2.94 | 7 | G | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 07/08/2020 | UTMx: 335840 UTMy: 4447863 | Upstream of co rd 117 culvert | 3.59 | 8 | P | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 07/23/2020 | UTMx: 335840 UTMy: 4447863 | 10ft fromstream of Temp gage | 6.16 | 9 | G | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 09/18/2020 | UTMx: 335840 UTMy: 4447863 | 30ft upst of gage | 2.58 | 10 | G | WATSOND6 |
| 6 | Watson Creek | | 19/6/A-008 | 10/11/2020 | UTMx: 335840 UTMy: 4447863 | WATSOND6 gage | 2.53 | 11 | P | WATSOND6 |

# Discharge Measurement Summary

## File Information

| | |
|---|---|
| File name | 20180507_Watson Creek - D6.ft |
| Start date and time | 5/7/2018 3:43 PM |
| Calculations engine | FlowTracker2 |
| Data collection mode | Discharge |

## Discharge Summary

| | | | |
|---|---|---|---|
| Start time | 5/7/2018 3:45:54 PM | End time | 5/7/2018 4:30:37 PM |
| # Stations | 23 | Avg interval | 40 |
| Mean depth | 1.564 ft | | |
| Mean velocity | 0.4694 ft/s | Total width | 8.500 ft |
| Mean SNR | 45 dB | Total area | 13.2900 ft² |
| Mean temp | 54.592 °F | Total discharge | 6.2383 ft³/s |

## System Information

| | |
|---|---|
| Sensor type | Top Setting |
| Handheld serial number | FT2H1747037 |
| Probe serial number | FT2P1747048 |
| Probe firmware | 1.23 |
| Handheld software | 1.4 |

## Site Details

| | |
|---|---|
| Site name | Watson Creek - D6 |
| Site number | 0507 |
| Operator(s) | Jack Landers |
| Comment | Spot meas |

## Discharge Uncertainty

| Category | ISO | IVE |
|---|---|---|
| Accuracy | 1.0% | 1.0% |
| Depth | 0.1% | 1.4% |
| Velocity | 0.5% | 3.2% |
| Width | 0.1% | 0.1% |
| Method | 1.2% | |
| # Stations | 2.2% | |
| Overall | 2.8% | 3.6% |

## Discharge Settings

| | |
|---|---|
| Discharge equation | Mid Section |
| Discharge uncertainty | IVE |
| Discharge reference | Rated |

## Station Warning Settings

| | | |
|---|---|---|
| Station discharge caution | 5.00 | % |
| Station discharge warning | 10.00 | % |
| Maximum depth change | 50.00 | % |
| Maximum spacing change | 100.00 | % |

## Summary overview

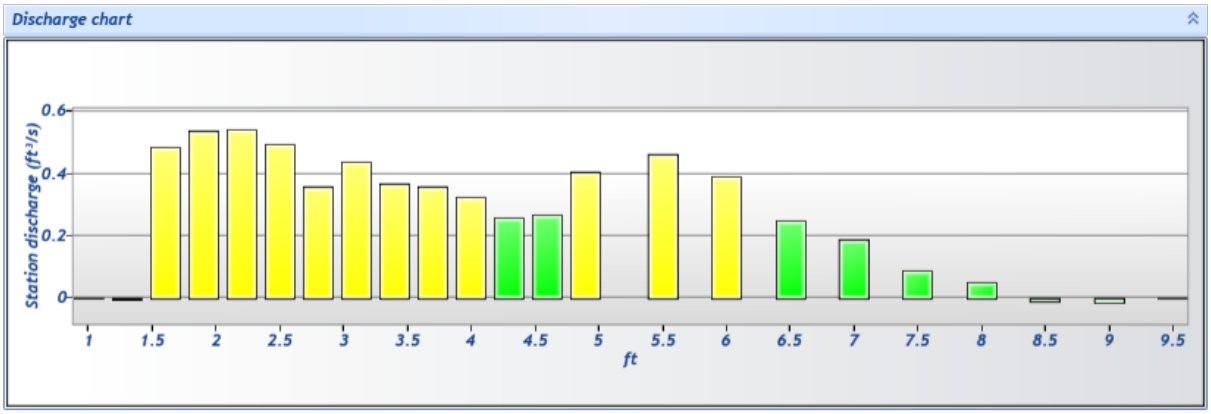
No changes were made to this file
Quality control warnings

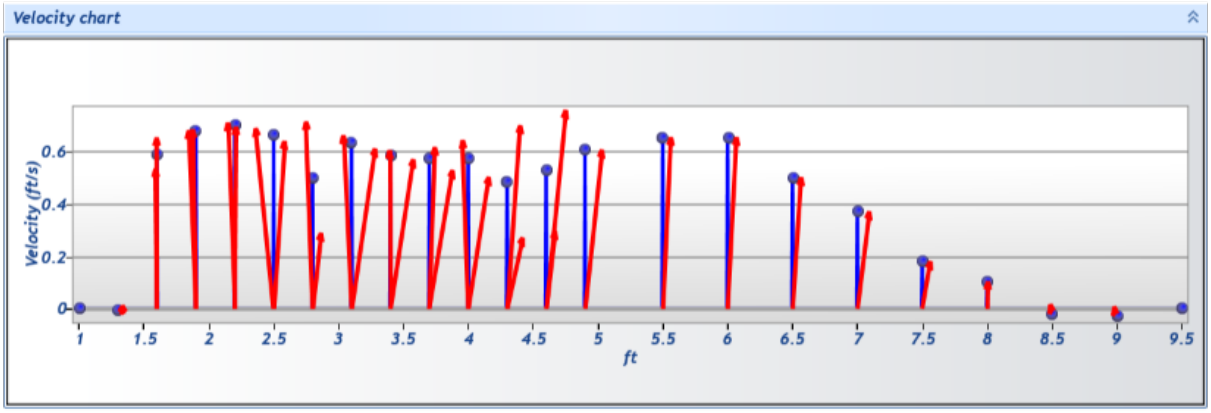
## Data Collection Settings

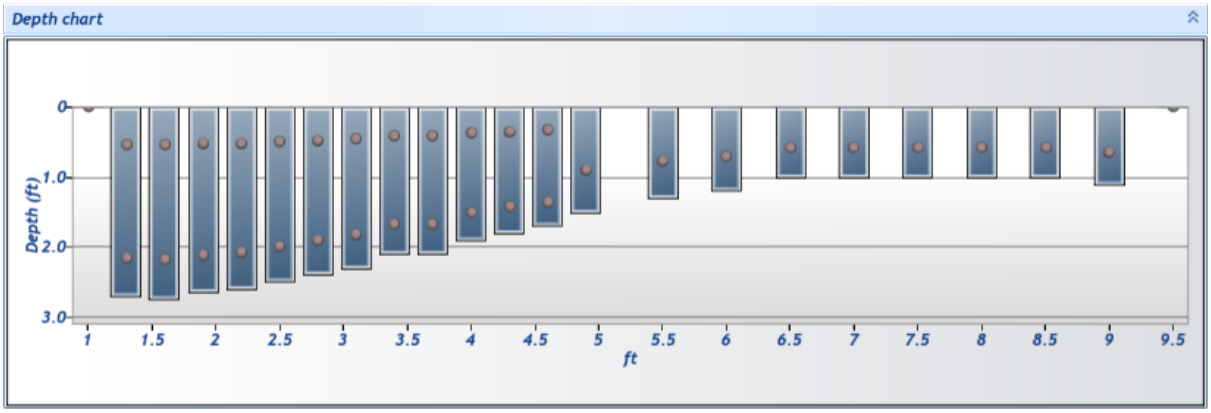
| | | |
|---|---|---|
| Salinity | 0.000 | PSS-78 |
| Temperature | | °F |
| Sound speed | | ft/s |
| Mounting correction | 0.00 | % |

## Quality Control Settings

| | | |
|---|---|---|
| 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 |


Discharge chart
Station discharge (ft³/s)
0.6
0.4
0.2
0
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
ft


Velocity chart
Velocity (ft/s)
0.6
0.4
0.2
0
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
ft


Depth chart
Depth (ft)
0
1.0
2.0
3.0
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
ft

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (ft/s) | Correction | Mean Velocity (ft/s) | Area ($ft^2$) | Flow ($ft^3/s$) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3:45 PM | 1.000 | None | 0.000 | 0.0000 | 0.000 | 0 | 0.0000 | 1.0000 | -0.0056 | 0.0000 | 0.0000 | 0.00 | ✓ |
| 1 | 3:46 PM | 1.300 | 0.2/0.8 | 2.700 | 0.2000 | 0.540 | 80 | 0.0005 | 1.0000 | -0.0056 | 0.8100 | -0.0045 | -0.07 | ✓ |
| 1 | 3:46 PM | 1.300 | 0.2/0.8 | 2.700 | 0.8000 | 2.160 | 80 | -0.0117 | 1.0000 | -0.0056 | 0.8100 | -0.0045 | -0.07 | ✓ |
| 2 | 3:50 PM | 1.600 | 0.2/0.8 | 2.750 | 0.2000 | 0.550 | 80 | 0.5292 | 1.0000 | 0.5888 | 0.8250 | 0.4858 | 7.79 | ✓ |
| 2 | 3:50 PM | 1.600 | 0.2/0.8 | 2.750 | 0.8000 | 2.200 | 80 | 0.6483 | 1.0000 | 0.5888 | 0.8250 | 0.4858 | 7.79 | ✓ |
| 3 | 3:52 PM | 1.900 | 0.2/0.8 | 2.650 | 0.2000 | 0.530 | 80 | 0.6776 | 1.0000 | 0.6788 | 0.7950 | 0.5397 | 8.65 | ✓ |
| 3 | 3:52 PM | 1.900 | 0.2/0.8 | 2.650 | 0.8000 | 2.120 | 80 | 0.6800 | 1.0000 | 0.6788 | 0.7950 | 0.5397 | 8.65 | ✓ |
| 4 | 3:55 PM | 2.200 | 0.2/0.8 | 2.600 | 0.2000 | 0.520 | 80 | 0.7041 | 1.0000 | 0.6967 | 0.7800 | 0.5435 | 8.71 | ✓ |
| 4 | 3:55 PM | 2.200 | 0.2/0.8 | 2.600 | 0.8000 | 2.080 | 80 | 0.6893 | 1.0000 | 0.6967 | 0.7800 | 0.5435 | 8.71 | ✓ |
| 5 | 3:57 PM | 2.500 | 0.2/0.8 | 2.500 | 0.2000 | 0.500 | 80 | 0.6831 | 1.0000 | 0.6601 | 0.7500 | 0.4951 | 7.94 | ✓ |
| 5 | 3:57 PM | 2.500 | 0.2/0.8 | 2.500 | 0.8000 | 2.000 | 80 | 0.6371 | 1.0000 | 0.6601 | 0.7500 | 0.4951 | 7.94 | ✓ |
| 6 | 4:00 PM | 2.800 | 0.2/0.8 | 2.400 | 0.2000 | 0.480 | 80 | 0.7082 | 1.0000 | 0.4974 | 0.7200 | 0.3581 | 5.74 | ✓ |
| 6 | 4:00 PM | 2.800 | 0.2/0.8 | 2.400 | 0.8000 | 1.920 | 80 | 0.2865 | 1.0000 | 0.4974 | 0.7200 | 0.3581 | 5.74 | ✓ |
| 7 | 4:03 PM | 3.100 | 0.2/0.8 | 2.300 | 0.2000 | 0.460 | 80 | 0.6558 | 1.0000 | 0.6315 | 0.6900 | 0.4358 | 6.99 | ✓ |
| 7 | 4:03 PM | 3.100 | 0.2/0.8 | 2.300 | 0.8000 | 1.840 | 80 | 0.6073 | 1.0000 | 0.6315 | 0.6900 | 0.4358 | 6.99 | ✓ |
| 8 | 4:06 PM | 3.400 | 0.2/0.8 | 2.100 | 0.2000 | 0.420 | 80 | 0.6000 | 1.0000 | 0.5829 | 0.6300 | 0.3672 | 5.89 | ✓ |
| 8 | 4:06 PM | 3.400 | 0.2/0.8 | 2.100 | 0.8000 | 1.680 | 80 | 0.5658 | 1.0000 | 0.5829 | 0.6300 | 0.3672 | 5.89 | ✓ |
| 9 | 4:08 PM | 3.700 | 0.2/0.8 | 2.100 | 0.2000 | 0.420 | 80 | 0.6126 | 1.0000 | 0.5682 | 0.6300 | 0.3579 | 5.74 | ✓ |
| 9 | 4:08 PM | 3.700 | 0.2/0.8 | 2.100 | 0.8000 | 1.680 | 80 | 0.5237 | 1.0000 | 0.5682 | 0.6300 | 0.3579 | 5.74 | ✓ |
| 10 | 4:11 PM | 4.000 | 0.2/0.8 | 1.900 | 0.2000 | 0.380 | 80 | 0.6389 | 1.0000 | 0.5681 | 0.5700 | 0.3238 | 5.19 | ✓ |
| 10 | 4:11 PM | 4.000 | 0.2/0.8 | 1.900 | 0.8000 | 1.520 | 80 | 0.4974 | 1.0000 | 0.5681 | 0.5700 | 0.3238 | 5.19 | ✓ |
| 11 | 4:14 PM | 4.300 | 0.2/0.8 | 1.800 | 0.2000 | 0.360 | 80 | 0.6939 | 1.0000 | 0.4817 | 0.5400 | 0.2601 | 4.17 | ✓ |
| 11 | 4:14 PM | 4.300 | 0.2/0.8 | 1.800 | 0.8000 | 1.440 | 80 | 0.2696 | 1.0000 | 0.4817 | 0.5400 | 0.2601 | 4.17 | ✓ |
| 12 | 4:16 PM | 4.600 | 0.2/0.8 | 1.700 | 0.2000 | 0.340 | 80 | 0.7532 | 1.0000 | 0.5237 | 0.5100 | 0.2671 | 4.28 | ✓ |
| 12 | 4:16 PM | 4.600 | 0.2/0.8 | 1.700 | 0.8000 | 1.360 | 80 | 0.2943 | 1.0000 | 0.5237 | 0.5100 | 0.2671 | 4.28 | ✓ |
| 13 | 4:18 PM | 4.900 | 0.6 | 1.500 | 0.6000 | 0.900 | 80 | 0.6018 | 1.0000 | 0.6018 | 0.6750 | 0.4062 | 6.51 | ✓ |
| 14 | 4:19 PM | 5.500 | 0.6 | 1.300 | 0.6000 | 0.780 | 80 | 0.6491 | 1.0000 | 0.6491 | 0.7150 | 0.4641 | 7.44 | ✓ |
| 15 | 4:21 PM | 6.000 | 0.6 | 1.200 | 0.6000 | 0.720 | 80 | 0.6496 | 1.0000 | 0.6496 | 0.6000 | 0.3898 | 6.25 | ✓ |
| 16 | 4:22 PM | 6.500 | 0.6 | 1.000 | 0.6000 | 0.600 | 80 | 0.4965 | 1.0000 | 0.4965 | 0.5000 | 0.2482 | 3.98 | ✓ |
| 17 | 4:24 PM | 7.000 | 0.6 | 1.000 | 0.6000 | 0.600 | 80 | 0.3701 | 1.0000 | 0.3701 | 0.5000 | 0.1850 | 2.97 | ✓ |
| 18 | 4:25 PM | 7.500 | 0.6 | 1.000 | 0.6000 | 0.600 | 80 | 0.1784 | 1.0000 | 0.1784 | 0.5000 | 0.0892 | 1.43 | ✓ |
| 19 | 4:27 PM | 8.000 | 0.6 | 1.000 | 0.6000 | 0.600 | 80 | 0.1029 | 1.0000 | 0.1029 | 0.5000 | 0.0515 | 0.83 | ✓ |
| 20 | 4:28 PM | 8.500 | 0.6 | 1.000 | 0.6000 | 0.600 | 80 | -0.0208 | 1.0000 | -0.0208 | 0.5000 | -0.0104 | -0.17 | ✓ |
| 21 | 4:29 PM | 9.000 | 0.6 | 1.100 | 0.6000 | 0.660 | 80 | -0.0272 | 1.0000 | -0.0272 | 0.5500 | -0.0149 | -0.24 | ✓ |
| 22 | 4:30 PM | 9.500 | None | 0.000 | 0.0000 | 0.000 | 0 | 0.0000 | 1.0000 | -0.0272 | 0.0000 | 0.0000 | 0.00 | ✓ |

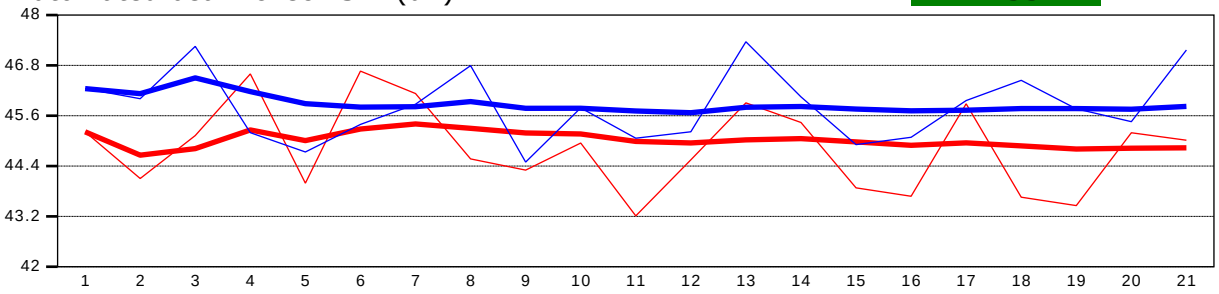
Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 3:46 PM | 1.300 | 0.2/0.8 | 2.700 | 0.2000 | 0.540 | Water Depth > QC,Boundary Interference,Large SNR Variation |
| 1 | 3:46 PM | 1.300 | 0.2/0.8 | 2.700 | 0.8000 | 2.160 | Water Depth > QC,Boundary Interference,Large SNR Variation |
| 6 | 4:00 PM | 2.800 | 0.2/0.8 | 2.400 | 0.2000 | 0.480 | Low SNR,Beam SNRs Not Similar,SNR Threshold Variation,Standard Error > QC,High % Spikes |
| 6 | 4:00 PM | 2.800 | 0.2/0.8 | 2.400 | 0.8000 | 1.920 | Low SNR,Beam SNRs Not Similar,SNR Threshold Variation,Standard Error > QC,High % Spikes |
| 11 | 4:14 PM | 4.300 | 0.2/0.8 | 1.800 | 0.2000 | 0.360 | Velocity Angle > QC |
| 11 | 4:14 PM | 4.300 | 0.2/0.8 | 1.800 | 0.8000 | 1.440 | Velocity Angle > QC |
| 18 | 4:25 PM | 7.500 | 0.6 | 1.000 | 0.6000 | 0.600 | Large SNR Variation,SNR Threshold Variation |
| 21 | 4:29 PM | 9.000 | 0.6 | 1.100 | 0.6000 | 0.660 | Large SNR Variation |
| 22 | 4:30 PM | 9.500 | None | 0.000 | 0.0000 | 0.000 | Water Depth > QC |

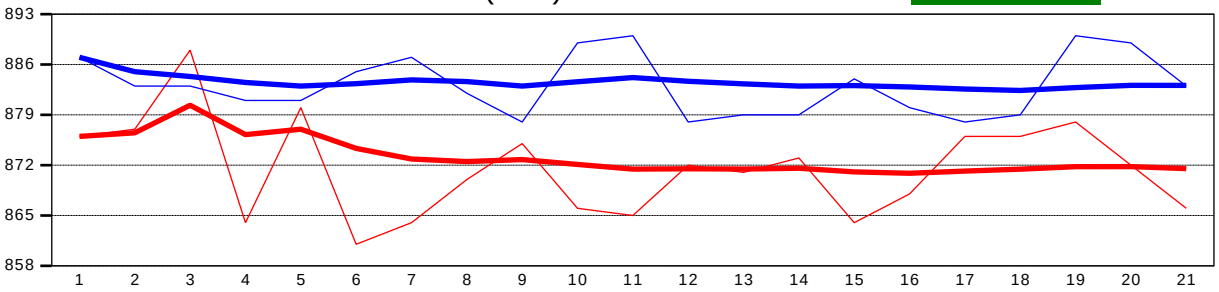
11/20/2018 12:12:07 PM

Automated beam check Start time 5/7/2018 3:45:14 PM

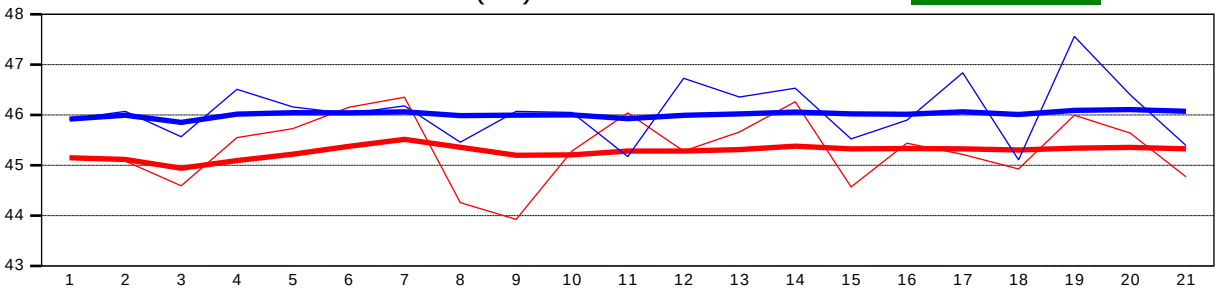
Automated beam check SNR(dB) PASS



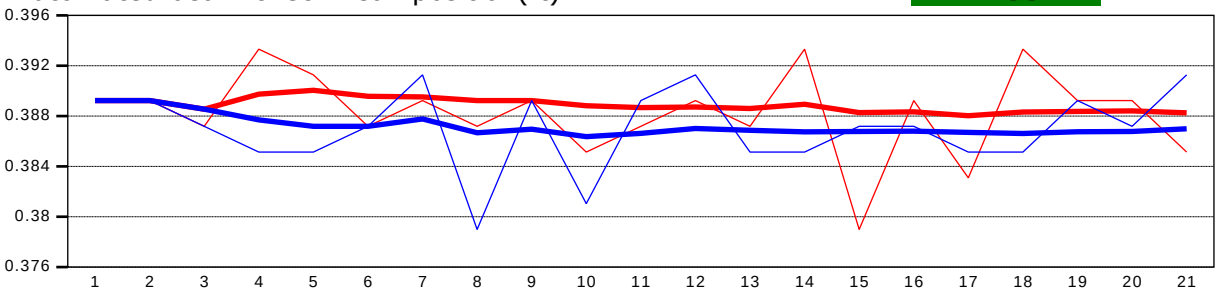

Automated beam check Noise level(cnts) PASS




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** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Start time** | 5/6/2019 3:36 PM |
| **End time** | 5/6/2019 4:10 PM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 22 | 40 | 12.865 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 9.000 | 0.945 | 10.278 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 46.345 | 1.130 | 0.385 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 11.732 | 1.800 | 0.518 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.2% | 1.9% |
| **Velocity** | 0.3% | 3.6% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.7% | |
| **# Stations** | 2.3% | |
| **Overall** | **3.0%** | **4.2%** |

| | |
|---|---|
| **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 % |

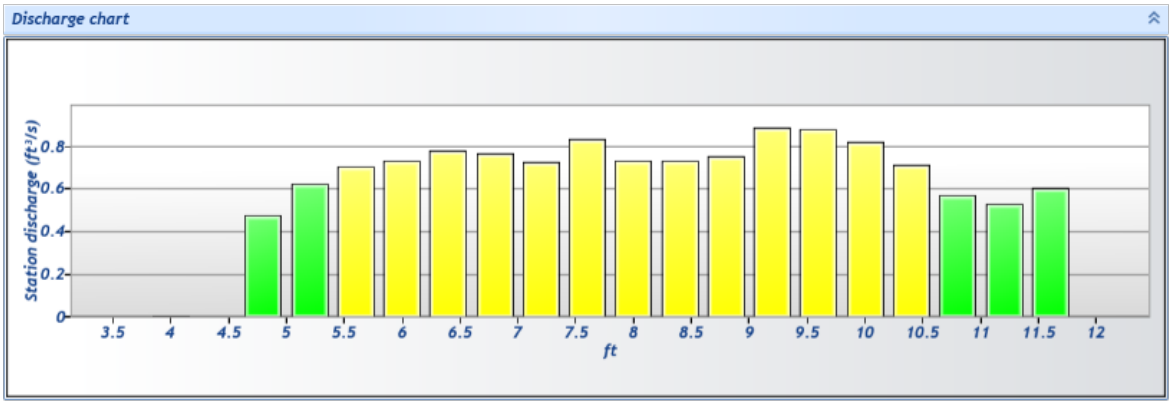
**Summary overview**

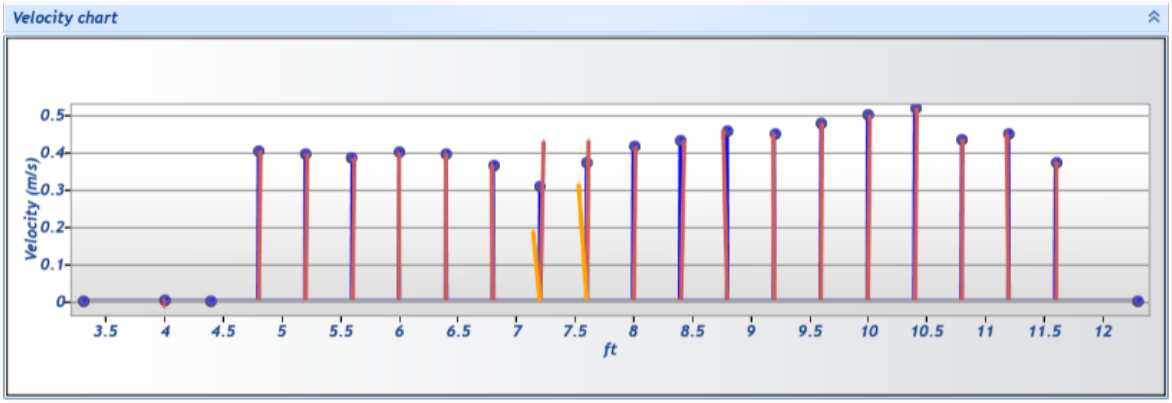
No changes were made to this file
Quality control warnings

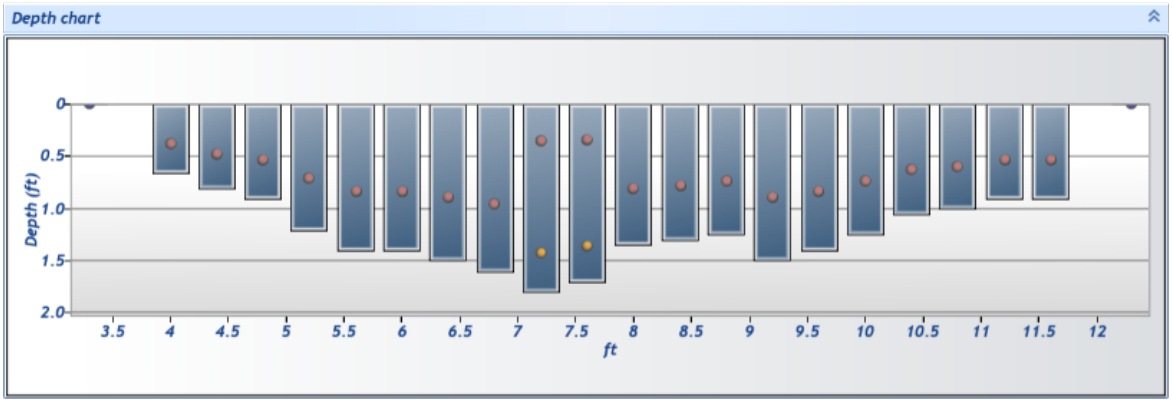
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

| Station Warning Settings | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 3:36 PM | 3.300 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.003 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 3:37 PM | 4.000 | 0.6 | 0.650 | 0.600 | 0.390 | 80 | 0.003 | 1.000 | 0.003 | 0.033 | 0.004 | 0.027 | ✓ |
| 2 | 3:38 PM | 4.400 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.000 | 1.000 | 0.000 | 0.030 | 0.000 | 0.001 | ✓ |
| 3 | 3:39 PM | 4.800 | 0.6 | 0.900 | 0.600 | 0.540 | 80 | 0.403 | 1.000 | 0.403 | 0.033 | 0.476 | 3.702 | ✓ |
| 4 | 3:40 PM | 5.200 | 0.6 | 1.200 | 0.600 | 0.720 | 80 | 0.395 | 1.000 | 0.395 | 0.045 | 0.622 | 4.838 | ✓ |
| 5 | 3:41 PM | 5.600 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.384 | 1.000 | 0.384 | 0.052 | 0.706 | 5.488 | ✓ |
| 6 | 3:42 PM | 6.000 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.398 | 1.000 | 0.398 | 0.052 | 0.731 | 5.680 | ✓ |
| 7 | 3:44 PM | 6.400 | 0.6 | 1.500 | 0.600 | 0.900 | 80 | 0.396 | 1.000 | 0.396 | 0.056 | 0.780 | 6.066 | ✓ |
| 8 | 3:45 PM | 6.800 | 0.6 | 1.600 | 0.600 | 0.960 | 80 | 0.365 | 1.000 | 0.365 | 0.059 | 0.767 | 5.962 | ✓ |
| 9 | 3:46 PM | 7.200 | 0.2/0.8 | 1.800 | 0.200 | 0.360 | 80 | 0.429 | 1.000 | 0.308 | 0.067 | 0.728 | 5.659 | ✓ |
| 9 | 3:46 PM | 7.200 | 0.2/0.8 | 1.800 | 0.800 | 1.440 | 80 | 0.188 | 1.000 | 0.308 | 0.067 | 0.728 | 5.659 | ✓ |
| 10 | 3:48 PM | 7.600 | 0.2/0.8 | 1.700 | 0.200 | 0.340 | 80 | 0.430 | 1.000 | 0.372 | 0.063 | 0.831 | 6.458 | ✓ |
| 10 | 3:48 PM | 7.600 | 0.2/0.8 | 1.700 | 0.800 | 1.360 | 80 | 0.314 | 1.000 | 0.372 | 0.063 | 0.831 | 6.458 | ✓ |
| 11 | 3:50 PM | 8.000 | 0.6 | 1.350 | 0.600 | 0.810 | 80 | 0.413 | 1.000 | 0.413 | 0.050 | 0.732 | 5.690 | ✓ |
| 12 | 3:51 PM | 8.400 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.431 | 1.000 | 0.431 | 0.048 | 0.735 | 5.713 | ✓ |
| 13 | 3:52 PM | 8.800 | 0.6 | 1.250 | 0.600 | 0.750 | 80 | 0.459 | 1.000 | 0.459 | 0.046 | 0.753 | 5.851 | ✓ |
| 14 | 3:54 PM | 9.200 | 0.6 | 1.500 | 0.600 | 0.900 | 80 | 0.449 | 1.000 | 0.449 | 0.056 | 0.885 | 6.875 | ✓ |
| 15 | 3:55 PM | 9.600 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.478 | 1.000 | 0.478 | 0.052 | 0.878 | 6.825 | ✓ |
| 16 | 3:56 PM | 10.000 | 0.6 | 1.250 | 0.600 | 0.750 | 80 | 0.499 | 1.000 | 0.499 | 0.046 | 0.819 | 6.363 | ✓ |
| 17 | 3:57 PM | 10.400 | 0.6 | 1.050 | 0.600 | 0.630 | 80 | 0.518 | 1.000 | 0.518 | 0.039 | 0.714 | 5.546 | ✓ |
| 18 | 3:58 PM | 10.800 | 0.6 | 1.000 | 0.600 | 0.600 | 80 | 0.434 | 1.000 | 0.434 | 0.037 | 0.570 | 4.432 | ✓ |
| 19 | 3:59 PM | 11.200 | 0.6 | 0.900 | 0.600 | 0.540 | 80 | 0.448 | 1.000 | 0.448 | 0.033 | 0.529 | 4.111 | ✓ |
| 20 | 4:09 PM | 11.600 | 0.6 | 0.900 | 0.600 | 0.540 | 80 | 0.373 | 1.000 | 0.373 | 0.046 | 0.606 | 4.711 | ✓ |
| 21 | 4:10 PM | 12.300 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.373 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 3:37 PM | 4.000 | 0.6 | 0.650 | 0.600 | 0.390 | Beam SNRs Not Similar,Large SNR Variation |
| 2 | 3:38 PM | 4.400 | 0.6 | 0.800 | 0.600 | 0.480 | Large SNR Variation |
| 21 | 4:10 PM | 12.300 | None | 0.000 | 0.000 | 0.000 | Water Depth > QC |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

Supplemental data summary

| Gauge height time | Gauge height (ft) | Rated discharge (ft³/s) | Temperature (°C) | Salinity (PSS-78) | Gauge height comments |
|---|---|---|---|---|---|
| 5/6/2019 3:36 PM | 3.100 | | | | |

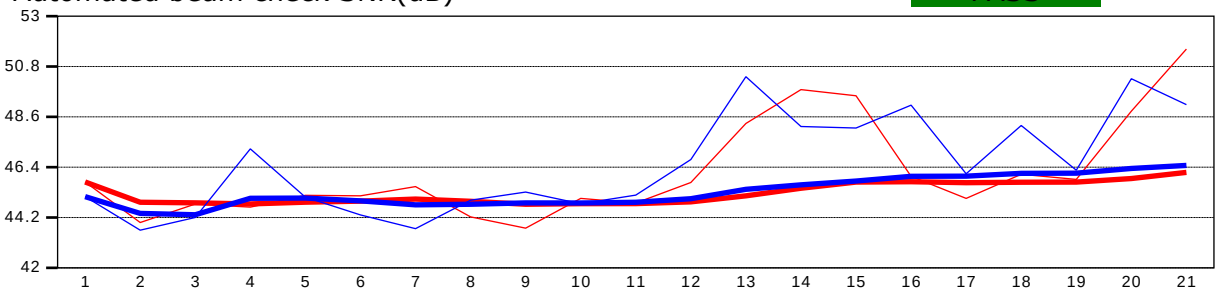
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

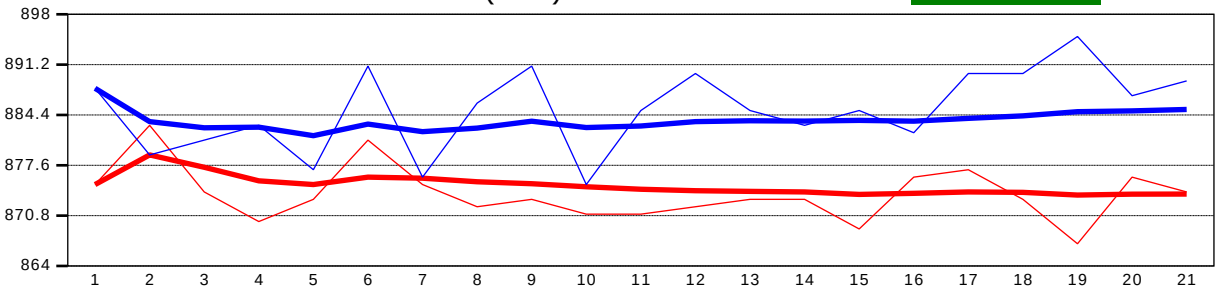
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 5/6/2019 3:35:40 PM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

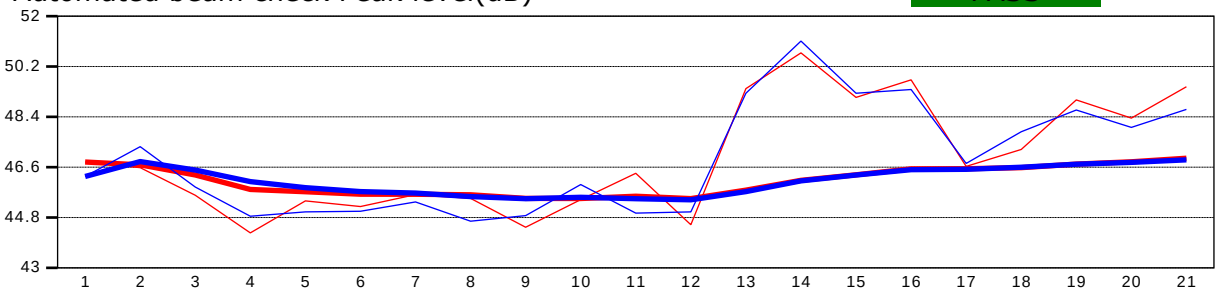
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | WATSOND6 |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | WATSOND6_20190506-161141.ft |
| **Comment** | Temp gage |

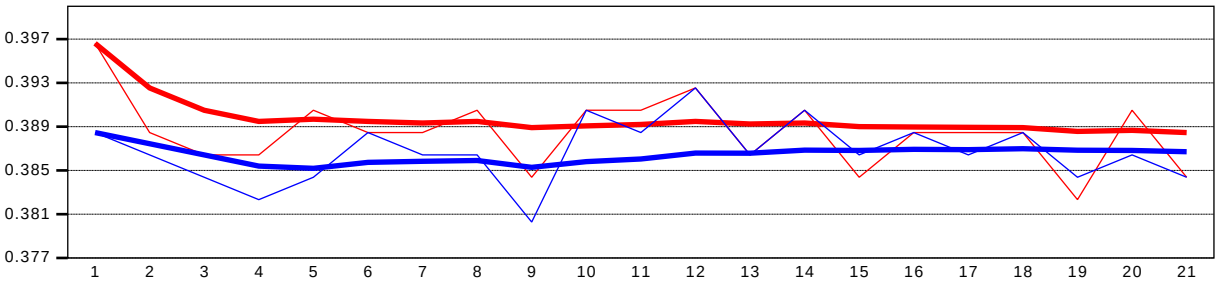
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 5/6/2019 3:35:40 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

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Start time** | 6/4/2019 9:34 AM |
| **End time** | 6/4/2019 10:00 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 24 | 40 | 12.285 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 11.600 | 1.167 | 12.905 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 46.391 | 1.083 | 0.298 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 10.428 | 1.300 | 0.462 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.1% | 2.0% |
| **Velocity** | 0.7% | 4.5% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.7% | |
| **# Stations** | 2.1% | |
| **Overall** | **3.0%** | **5.0%** |

| | |
|---|---|
| **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**

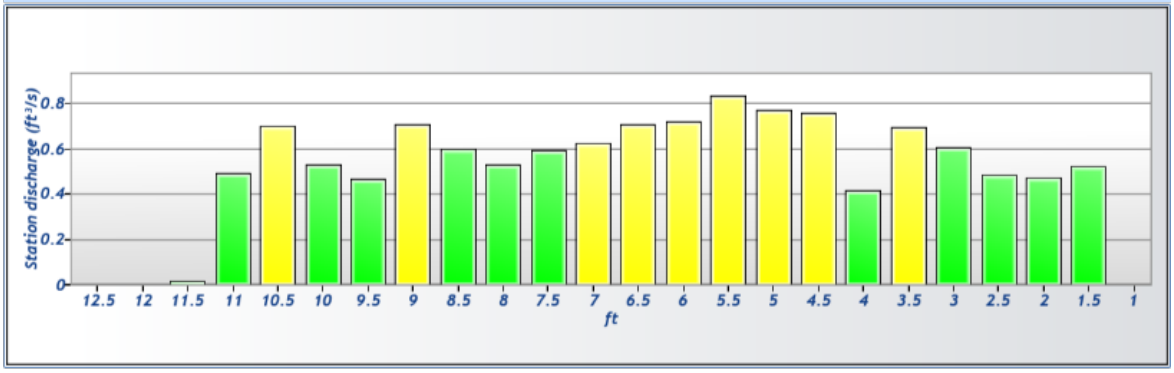
No changes were made to this file
Quality control warnings

# Discharge Measurement Summary

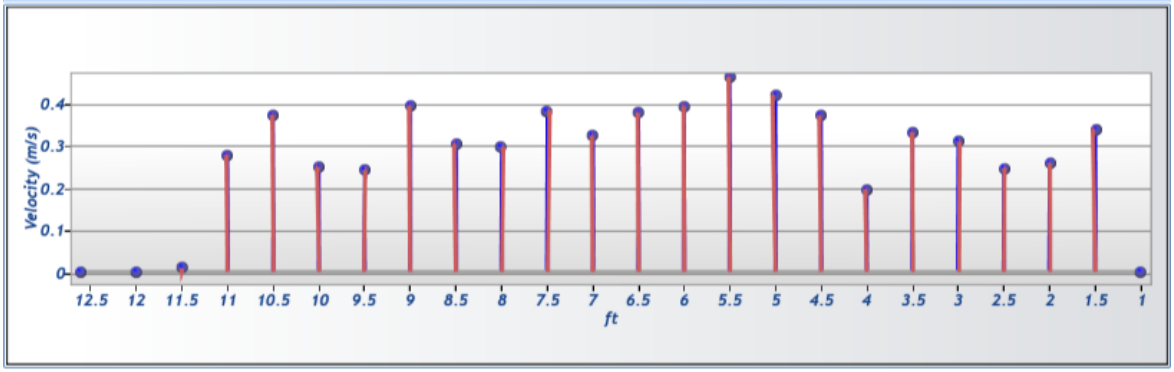
| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

| Station Warning Settings | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |

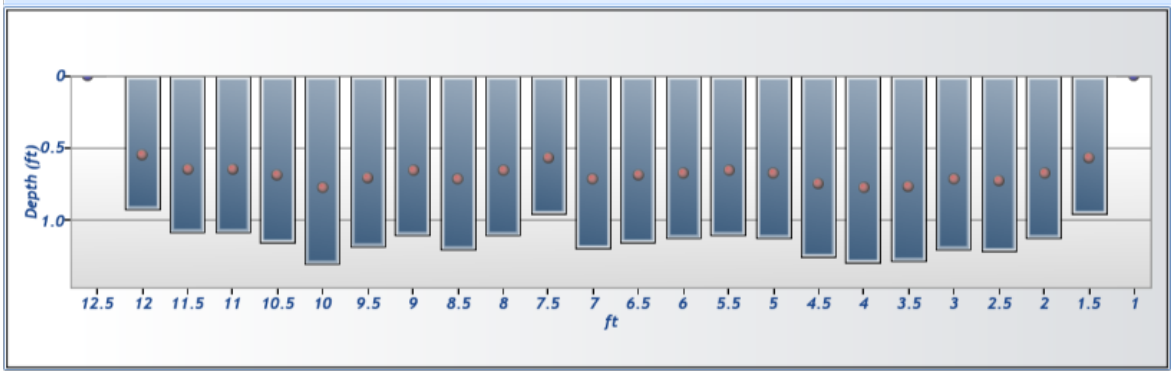
Discharge chart




Velocity chart




Depth chart



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 9:34 AM | 1.000 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.339 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 9:35 AM | 1.500 | 0.6 | 0.950 | 0.600 | 0.570 | 80 | 0.339 | 1.000 | 0.339 | 0.044 | 0.528 | 4.298 | ✓ |
| 2 | 9:36 AM | 2.000 | 0.6 | 1.120 | 0.600 | 0.672 | 80 | 0.258 | 1.000 | 0.258 | 0.052 | 0.474 | 3.855 | ✓ |
| 3 | 9:38 AM | 2.500 | 0.6 | 1.210 | 0.600 | 0.726 | 80 | 0.247 | 1.000 | 0.247 | 0.056 | 0.490 | 3.988 | ✓ |
| 4 | 9:39 AM | 3.000 | 0.6 | 1.200 | 0.600 | 0.720 | 80 | 0.308 | 1.000 | 0.308 | 0.056 | 0.607 | 4.942 | ✓ |
| 5 | 9:40 AM | 3.500 | 0.6 | 1.280 | 0.600 | 0.768 | 80 | 0.331 | 1.000 | 0.331 | 0.059 | 0.696 | 5.665 | ✓ |
| 6 | 9:41 AM | 4.000 | 0.6 | 1.290 | 0.600 | 0.774 | 80 | 0.196 | 1.000 | 0.196 | 0.060 | 0.415 | 3.382 | ✓ |
| 7 | 9:42 AM | 4.500 | 0.6 | 1.250 | 0.600 | 0.750 | 80 | 0.370 | 1.000 | 0.370 | 0.058 | 0.759 | 6.176 | ✓ |
| 8 | 9:43 AM | 5.000 | 0.6 | 1.120 | 0.600 | 0.672 | 80 | 0.420 | 1.000 | 0.420 | 0.052 | 0.771 | 6.279 | ✓ |
| 9 | 9:44 AM | 5.500 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.462 | 1.000 | 0.462 | 0.051 | 0.833 | 6.780 | ✓ |
| 10 | 9:45 AM | 6.000 | 0.6 | 1.120 | 0.600 | 0.672 | 80 | 0.393 | 1.000 | 0.393 | 0.052 | 0.722 | 5.875 | ✓ |
| 11 | 9:47 AM | 6.500 | 0.6 | 1.150 | 0.600 | 0.690 | 80 | 0.377 | 1.000 | 0.377 | 0.053 | 0.711 | 5.788 | ✓ |
| 12 | 9:48 AM | 7.000 | 0.6 | 1.190 | 0.600 | 0.714 | 80 | 0.322 | 1.000 | 0.322 | 0.055 | 0.629 | 5.122 | ✓ |
| 13 | 9:49 AM | 7.500 | 0.6 | 0.950 | 0.600 | 0.570 | 80 | 0.383 | 1.000 | 0.383 | 0.044 | 0.596 | 4.852 | ✓ |
| 14 | 9:50 AM | 8.000 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.296 | 1.000 | 0.296 | 0.051 | 0.534 | 4.349 | ✓ |
| 15 | 9:51 AM | 8.500 | 0.6 | 1.200 | 0.600 | 0.720 | 80 | 0.304 | 1.000 | 0.304 | 0.056 | 0.599 | 4.872 | ✓ |
| 16 | 9:52 AM | 9.000 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.393 | 1.000 | 0.393 | 0.051 | 0.709 | 5.775 | ✓ |
| 17 | 9:53 AM | 9.500 | 0.6 | 1.180 | 0.600 | 0.708 | 80 | 0.242 | 1.000 | 0.242 | 0.055 | 0.469 | 3.815 | ✓ |
| 18 | 9:54 AM | 10.000 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.249 | 1.000 | 0.249 | 0.060 | 0.531 | 4.321 | ✓ |
| 19 | 9:56 AM | 10.500 | 0.6 | 1.150 | 0.600 | 0.690 | 80 | 0.372 | 1.000 | 0.372 | 0.053 | 0.702 | 5.712 | ✓ |
| 20 | 9:57 AM | 11.000 | 0.6 | 1.080 | 0.600 | 0.648 | 80 | 0.278 | 1.000 | 0.278 | 0.050 | 0.492 | 4.004 | ✓ |
| 21 | 9:58 AM | 11.500 | 0.6 | 1.080 | 0.600 | 0.648 | 80 | 0.010 | 1.000 | 0.010 | 0.050 | 0.018 | 0.149 | ✓ |
| 22 | 9:59 AM | 12.000 | 0.6 | 0.920 | 0.600 | 0.552 | 80 | 0.000 | 1.000 | 0.000 | 0.047 | 0.000 | 0.002 | ✓ |
| 23 | 10:00 AM | 12.600 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 6 | 9:41 AM | 4.000 | 0.6 | 1.290 | 0.600 | 0.774 | Standard Error > QC |
| 7 | 9:42 AM | 4.500 | 0.6 | 1.250 | 0.600 | 0.750 | Standard Error > QC |
| 9 | 9:44 AM | 5.500 | 0.6 | 1.100 | 0.600 | 0.660 | Standard Error > QC |
| 10 | 9:45 AM | 6.000 | 0.6 | 1.120 | 0.600 | 0.672 | Standard Error > QC |
| 12 | 9:48 AM | 7.000 | 0.6 | 1.190 | 0.600 | 0.714 | Large SNR Variation |
| 14 | 9:50 AM | 8.000 | 0.6 | 1.100 | 0.600 | 0.660 | Standard Error > QC |
| 15 | 9:51 AM | 8.500 | 0.6 | 1.200 | 0.600 | 0.720 | Standard Error > QC |
| 16 | 9:52 AM | 9.000 | 0.6 | 1.100 | 0.600 | 0.660 | Standard Error > QC |
| 18 | 9:54 AM | 10.000 | 0.6 | 1.300 | 0.600 | 0.780 | Standard Error > QC |
| 21 | 9:58 AM | 11.500 | 0.6 | 1.080 | 0.600 | 0.648 | Boundary Interference,Large SNR Variation |
| 22 | 9:59 AM | 12.000 | 0.6 | 0.920 | 0.600 | 0.552 | Beam SNRs Not Similar,SNR Threshold Variation |
| 23 | 10:00 AM | 12.600 | None | 0.000 | 0.000 | 0.000 | Water Depth > QC |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

Supplemental data summary

| Gauge height time | Gauge height (ft) | Rated discharge (ft³/s) | Temperature (°C) | Salinity (PSS-78) | Gauge height comments |
|---|---|---|---|---|---|
| 6/4/2019 10:00 AM | 3.030 | | | | |

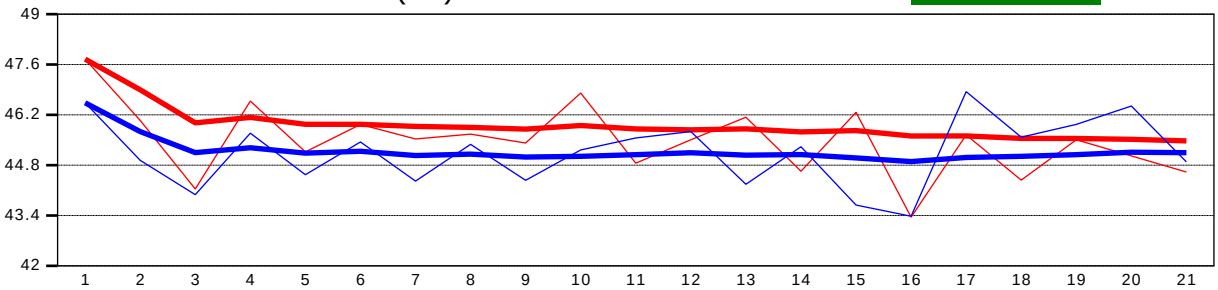
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

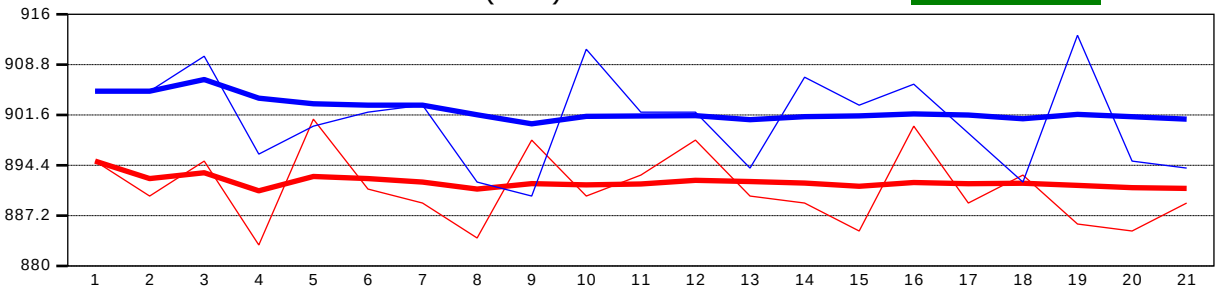
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 6/4/2019 9:34:10 AM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

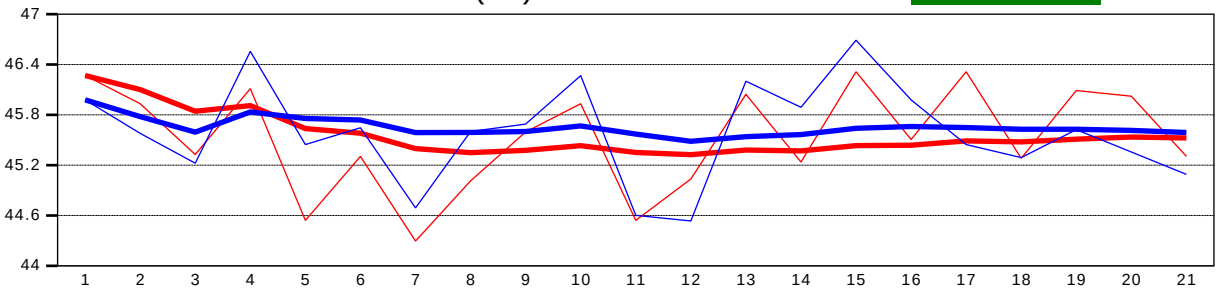
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr |
| **Site number** | 002 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr_20190604-100146.ft |
| **Comment** | Temp gage |

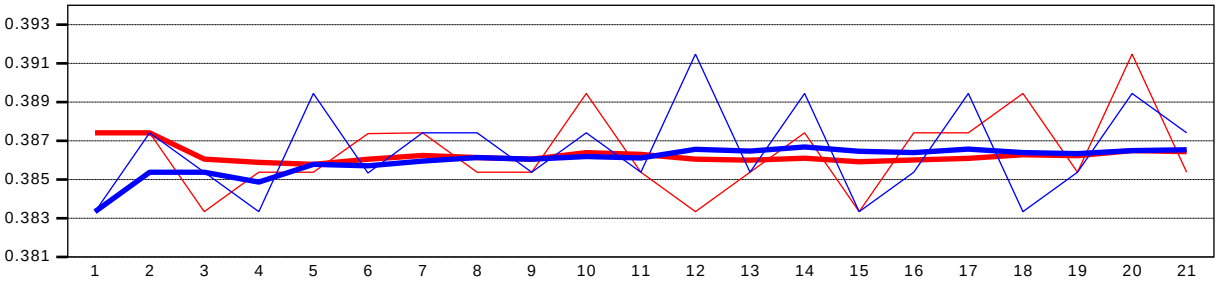
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 6/4/2019 9:34:10 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** | Watson Creek D6 |
| **Site number** | 003 |
| **Operator(s)** | JEL |
| **File name** | Watson Creek D6_20190628-104748.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Start time** | 6/28/2019 10:18 AM |
| **End time** | 6/28/2019 10:44 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 23 | 40 | 11.543 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 11.100 | 1.087 | 12.390 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 43.636 | 1.054 | 0.301 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 13.475 | 1.700 | 0.390 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.2% | 1.9% |
| **Velocity** | 0.7% | 3.0% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.8% | |
| **# Stations** | 2.2% | |
| **Overall** | **3.1%** | **3.7%** |

| | |
|---|---|
| **Discharge equation** | Mid Section |
| **Discharge uncertainty** | IVE |
| **Discharge reference** | Rated |

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

**Summary overview**

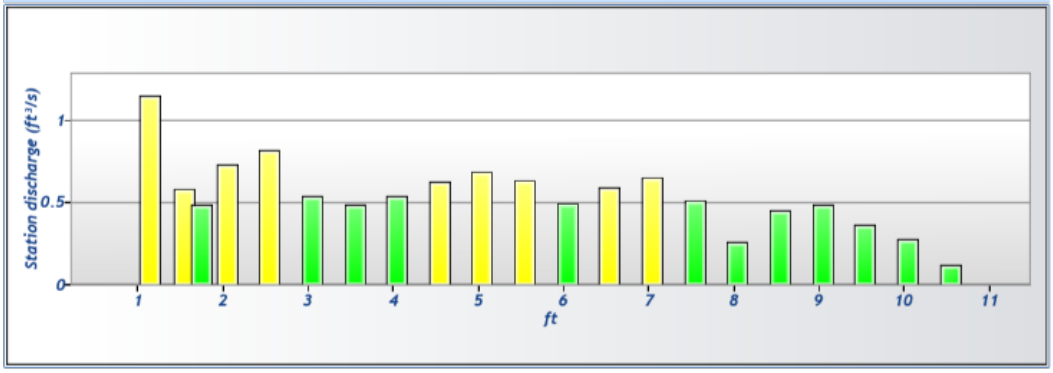
No changes were made to this file
Quality control warnings

# Discharge Measurement Summary

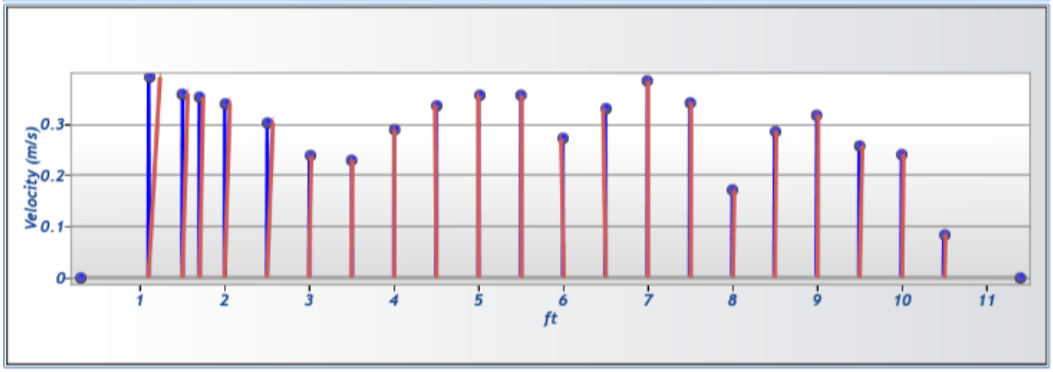
| | |
|---|---|
| **Site name** | Watson Creek D6 |
| **Site number** | 003 |
| **Operator(s)** | JEL |
| **File name** | Watson Creek D6_20190628-104748.ft |
| **Comment** | Temp gage |

| Station Warning Settings | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |

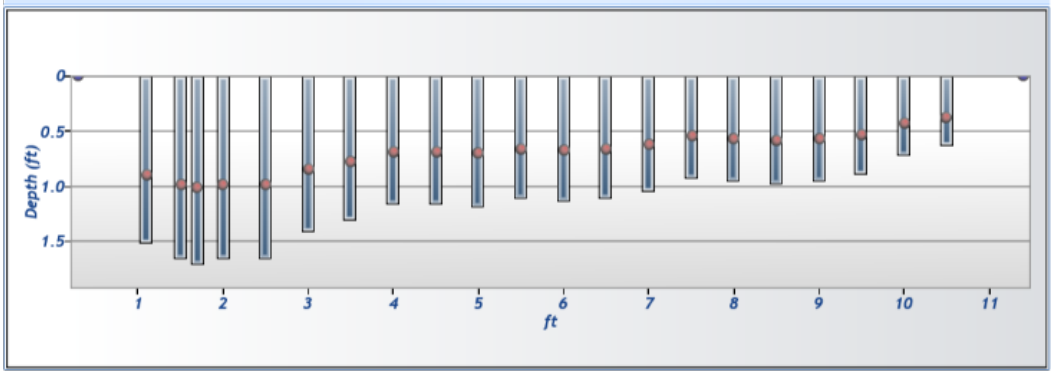
Discharge chart




Velocity chart




Depth chart



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek D6 |
| **Site number** | 003 |
| **Operator(s)** | JEL |
| **File name** | Watson Creek D6_20190628-104748.ft |
| **Comment** | Temp gage |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 10:18 AM | 0.300 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.390 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 10:19 AM | 1.100 | 0.6 | 1.500 | 0.600 | 0.900 | 80 | 0.390 | 1.000 | 0.390 | 0.084 | 1.151 | 9.973 | ✓ |
| 2 | 10:20 AM | 1.500 | 0.6 | 1.650 | 0.600 | 0.990 | 80 | 0.358 | 1.000 | 0.358 | 0.046 | 0.582 | 5.040 | ✓ |
| 3 | 10:44 AM | 1.700 | 0.6 | 1.700 | 0.600 | 1.020 | 80 | 0.351 | 1.000 | 0.351 | 0.039 | 0.489 | 4.237 | ✓ |
| 4 | 10:22 AM | 2.000 | 0.6 | 1.650 | 0.600 | 0.990 | 80 | 0.339 | 1.000 | 0.339 | 0.061 | 0.734 | 6.359 | ✓ |
| 5 | 10:23 AM | 2.500 | 0.6 | 1.650 | 0.600 | 0.990 | 80 | 0.302 | 1.000 | 0.302 | 0.077 | 0.818 | 7.086 | ✓ |
| 6 | 10:24 AM | 3.000 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.236 | 1.000 | 0.236 | 0.065 | 0.543 | 4.704 | ✓ |
| 7 | 10:25 AM | 3.500 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.229 | 1.000 | 0.229 | 0.060 | 0.489 | 4.237 | ✓ |
| 8 | 10:27 AM | 4.000 | 0.6 | 1.150 | 0.600 | 0.690 | 80 | 0.288 | 1.000 | 0.288 | 0.053 | 0.543 | 4.704 | ✓ |
| 9 | 10:28 AM | 4.500 | 0.6 | 1.150 | 0.600 | 0.690 | 80 | 0.335 | 1.000 | 0.335 | 0.053 | 0.633 | 5.483 | ✓ |
| 10 | 10:29 AM | 5.000 | 0.6 | 1.180 | 0.600 | 0.708 | 80 | 0.355 | 1.000 | 0.355 | 0.055 | 0.688 | 5.959 | ✓ |
| 11 | 10:30 AM | 5.500 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.354 | 1.000 | 0.354 | 0.051 | 0.639 | 5.537 | ✓ |
| 12 | 10:31 AM | 6.000 | 0.6 | 1.120 | 0.600 | 0.672 | 80 | 0.270 | 1.000 | 0.270 | 0.052 | 0.495 | 4.291 | ✓ |
| 13 | 10:33 AM | 6.500 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.329 | 1.000 | 0.329 | 0.051 | 0.593 | 5.135 | ✓ |
| 14 | 10:34 AM | 7.000 | 0.6 | 1.040 | 0.600 | 0.624 | 80 | 0.382 | 1.000 | 0.382 | 0.048 | 0.652 | 5.649 | ✓ |
| 15 | 10:35 AM | 7.500 | 0.6 | 0.920 | 0.600 | 0.552 | 80 | 0.341 | 1.000 | 0.341 | 0.043 | 0.514 | 4.454 | ✓ |
| 16 | 10:36 AM | 8.000 | 0.6 | 0.950 | 0.600 | 0.570 | 80 | 0.171 | 1.000 | 0.171 | 0.044 | 0.266 | 2.306 | ✓ |
| 17 | 10:37 AM | 8.500 | 0.6 | 0.970 | 0.600 | 0.582 | 80 | 0.284 | 1.000 | 0.284 | 0.045 | 0.452 | 3.914 | ✓ |
| 18 | 10:38 AM | 9.000 | 0.6 | 0.950 | 0.600 | 0.570 | 80 | 0.317 | 1.000 | 0.317 | 0.044 | 0.493 | 4.275 | ✓ |
| 19 | 10:39 AM | 9.500 | 0.6 | 0.880 | 0.600 | 0.528 | 80 | 0.256 | 1.000 | 0.256 | 0.041 | 0.369 | 3.198 | ✓ |
| 20 | 10:41 AM | 10.000 | 0.6 | 0.710 | 0.600 | 0.426 | 80 | 0.240 | 1.000 | 0.240 | 0.033 | 0.280 | 2.422 | ✓ |
| 21 | 10:42 AM | 10.500 | 0.6 | 0.620 | 0.600 | 0.372 | 80 | 0.084 | 1.000 | 0.084 | 0.040 | 0.120 | 1.037 | ✓ |
| 22 | 10:43 AM | 11.400 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.084 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek D6 |
| **Site number** | 003 |
| **Operator(s)** | JEL |
| **File name** | Watson Creek D6_20190628-104748.ft |
| **Comment** | Temp gage |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 4 | 10:22 AM | 2.000 | 0.6 | 1.650 | 0.600 | 0.990 | Standard Error > QC |
| 5 | 10:23 AM | 2.500 | 0.6 | 1.650 | 0.600 | 0.990 | Large SNR Variation |
| 6 | 10:24 AM | 3.000 | 0.6 | 1.400 | 0.600 | 0.840 | Standard Error > QC |
| 16 | 10:36 AM | 8.000 | 0.6 | 0.950 | 0.600 | 0.570 | Standard Error > QC |

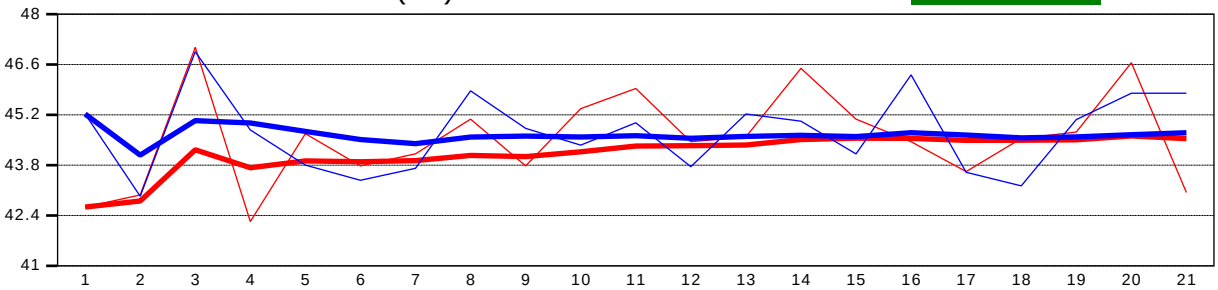
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek D6 |
| **Site number** | 003 |
| **Operator(s)** | JEL |
| **File name** | Watson Creek D6_20190628-104748.ft |
| **Comment** | Temp gage |

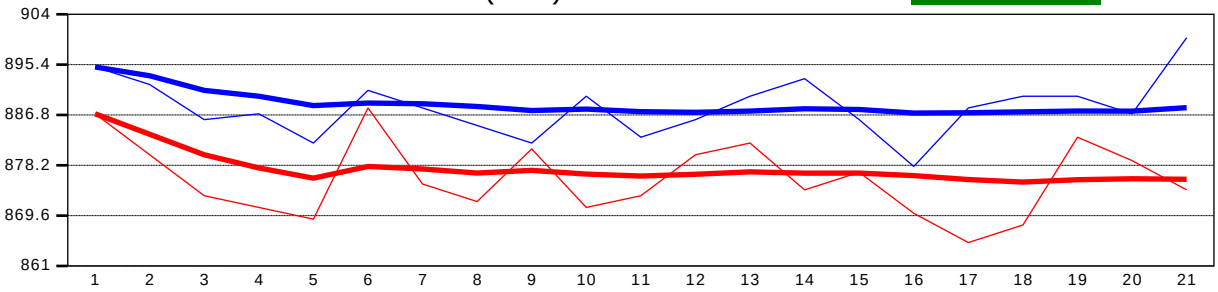
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 6/28/2019 10:18:31 AM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

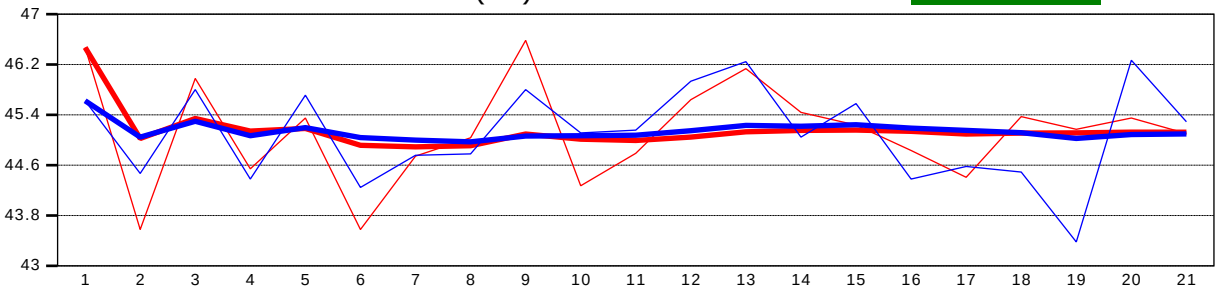
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek D6 |
| **Site number** | 003 |
| **Operator(s)** | JEL |
| **File name** | Watson Creek D6_20190628-104748.ft |
| **Comment** | Temp gage |

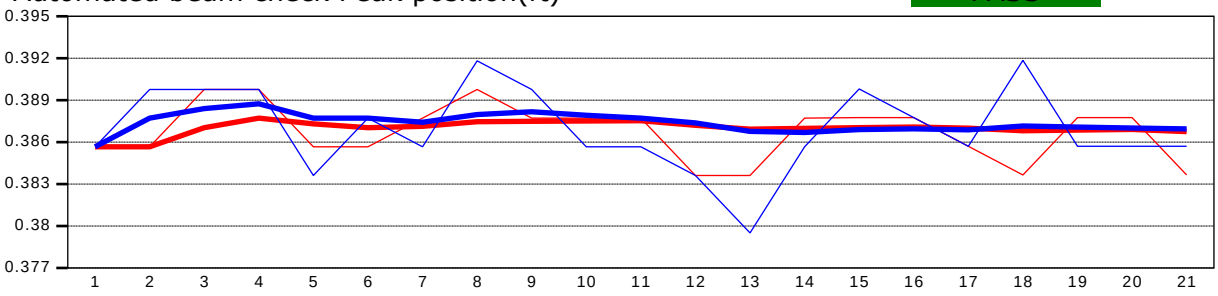
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 6/28/2019 10:18:31 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** | Watson Creek at Co Rd 17 |
| **Site number** | 004 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20190729-162757.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Start time** | 7/29/2019 4:12 PM |
| **End time** | 7/29/2019 4:27 PM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 14 | 40 | 10.249 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 5.100 | 0.490 | 6.687 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 41.315 | 1.035 | 0.592 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 20.248 | 1.630 | 0.752 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.2% | 3.1% |
| **Velocity** | 0.5% | 3.6% |
| **Width** | 0.1% | 0.1% |
| **Method** | 2.2% | |
| **# Stations** | 3.6% | |
| **Overall** | **4.4%** | **4.8%** |

| | |
|---|---|
| **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 % |

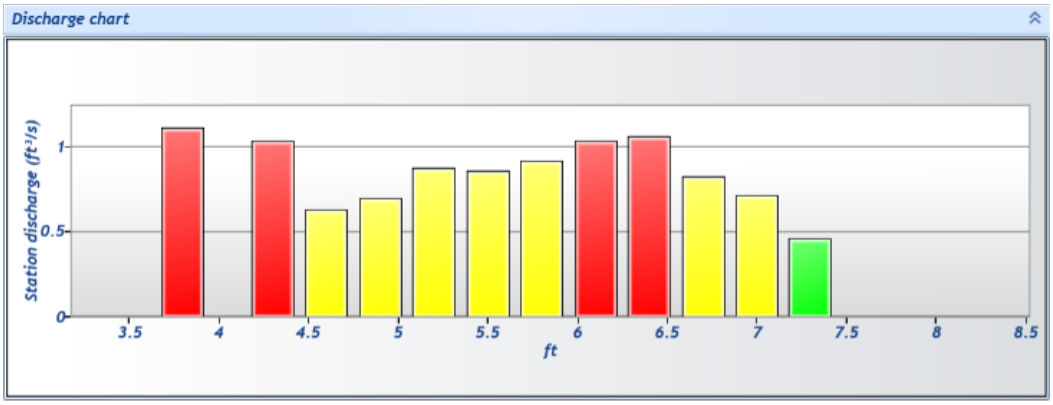
**Summary overview**

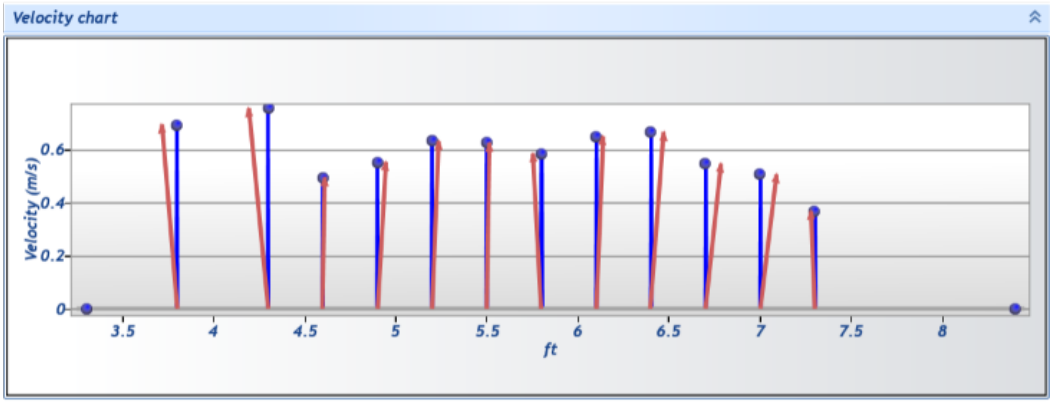
No changes were made to this file
Quality control warnings

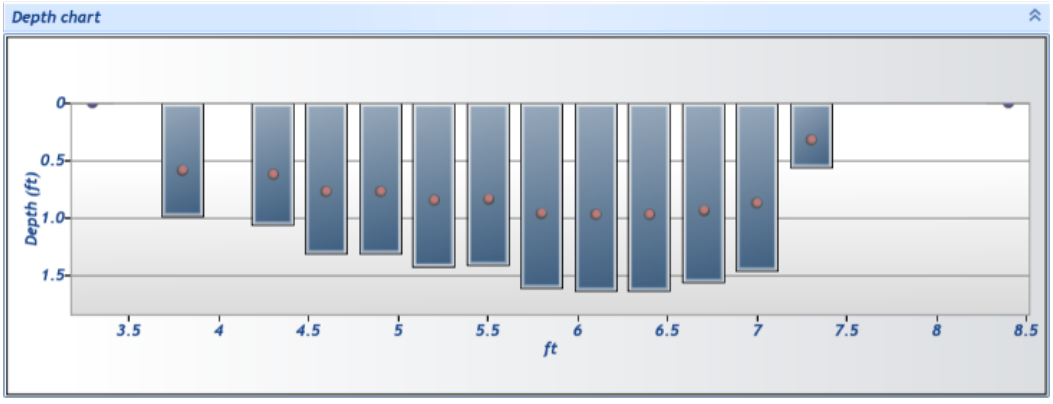
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 004 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20190729-162757.ft |
| **Comment** | Temp gage |

| **Station Warning Settings** | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 004 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20190729-162757.ft |
| **Comment** | Temp gage |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4:12 PM | 3.300 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.691 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 4:12 PM | 3.800 | 0.6 | 0.980 | 0.600 | 0.588 | 80 | 0.691 | 1.000 | 0.691 | 0.046 | 1.111 | 10.844 | ✓ |
| 2 | 4:14 PM | 4.300 | 0.6 | 1.050 | 0.600 | 0.630 | 80 | 0.752 | 1.000 | 0.752 | 0.039 | 1.037 | 10.114 | ✓ |
| 3 | 4:15 PM | 4.600 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.493 | 1.000 | 0.493 | 0.036 | 0.631 | 6.154 | ✓ |
| 4 | 4:17 PM | 4.900 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.550 | 1.000 | 0.550 | 0.036 | 0.704 | 6.869 | ✓ |
| 5 | 4:18 PM | 5.200 | 0.6 | 1.420 | 0.600 | 0.852 | 80 | 0.629 | 1.000 | 0.629 | 0.040 | 0.878 | 8.571 | ✓ |
| 6 | 4:19 PM | 5.500 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.623 | 1.000 | 0.623 | 0.039 | 0.858 | 8.370 | ✓ |
| 7 | 4:20 PM | 5.800 | 0.6 | 1.600 | 0.600 | 0.960 | 80 | 0.582 | 1.000 | 0.582 | 0.045 | 0.917 | 8.943 | ✓ |
| 8 | 4:21 PM | 6.100 | 0.6 | 1.630 | 0.600 | 0.978 | 80 | 0.646 | 1.000 | 0.646 | 0.045 | 1.037 | 10.119 | ✓ |
| 9 | 4:22 PM | 6.400 | 0.6 | 1.630 | 0.600 | 0.978 | 80 | 0.663 | 1.000 | 0.663 | 0.045 | 1.064 | 10.384 | ✓ |
| 10 | 4:23 PM | 6.700 | 0.6 | 1.550 | 0.600 | 0.930 | 80 | 0.544 | 1.000 | 0.544 | 0.043 | 0.830 | 8.100 | ✓ |
| 11 | 4:24 PM | 7.000 | 0.6 | 1.450 | 0.600 | 0.870 | 80 | 0.504 | 1.000 | 0.504 | 0.040 | 0.719 | 7.016 | ✓ |
| 12 | 4:25 PM | 7.300 | 0.6 | 0.550 | 0.600 | 0.330 | 80 | 0.366 | 1.000 | 0.366 | 0.036 | 0.463 | 4.517 | ✓ |
| 13 | 4:27 PM | 8.400 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.366 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 004 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20190729-162757.ft |
| **Comment** | Temp gage |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 4:12 PM | 3.800 | 0.6 | 0.980 | 0.600 | 0.588 | Boundary Interference,High Stn % Discharge |
| 2 | 4:14 PM | 4.300 | 0.6 | 1.050 | 0.600 | 0.630 | High Stn % Discharge |
| 3 | 4:15 PM | 4.600 | 0.6 | 1.300 | 0.600 | 0.780 | Standard Error > QC |
| 4 | 4:17 PM | 4.900 | 0.6 | 1.300 | 0.600 | 0.780 | Standard Error > QC |
| 5 | 4:18 PM | 5.200 | 0.6 | 1.420 | 0.600 | 0.852 | Standard Error > QC |
| 6 | 4:19 PM | 5.500 | 0.6 | 1.400 | 0.600 | 0.840 | Standard Error > QC |
| 7 | 4:20 PM | 5.800 | 0.6 | 1.600 | 0.600 | 0.960 | Standard Error > QC |
| 8 | 4:21 PM | 6.100 | 0.6 | 1.630 | 0.600 | 0.978 | High Stn % Discharge |
| 9 | 4:22 PM | 6.400 | 0.6 | 1.630 | 0.600 | 0.978 | High Stn % Discharge |
| 10 | 4:23 PM | 6.700 | 0.6 | 1.550 | 0.600 | 0.930 | Standard Error > QC |
| 11 | 4:24 PM | 7.000 | 0.6 | 1.450 | 0.600 | 0.870 | Standard Error > QC |
| 13 | 4:27 PM | 8.400 | None | 0.000 | 0.000 | 0.000 | Stn Spacing > QC |

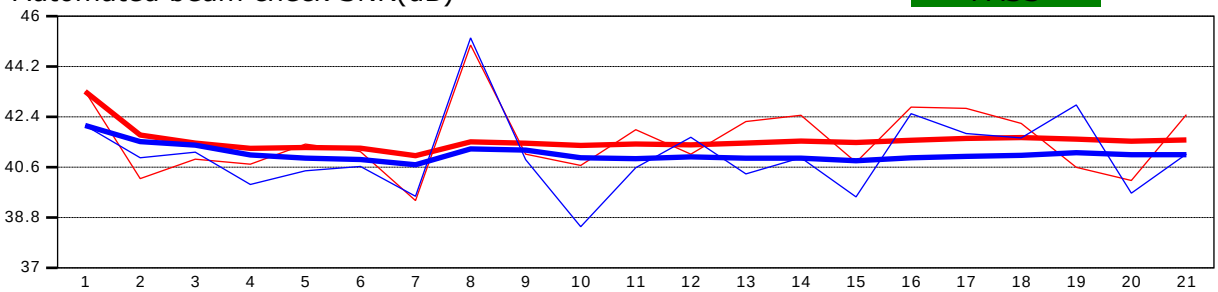
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 004 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20190729-162757.ft |
| **Comment** | Temp gage |

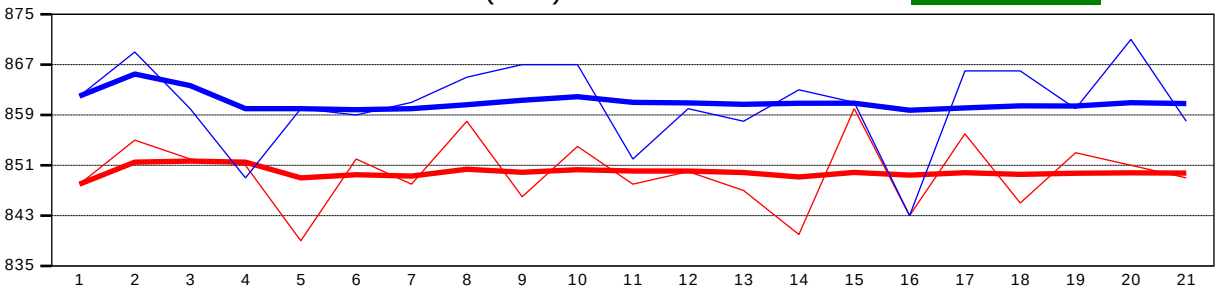
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/29/2019 4:11:54 PM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

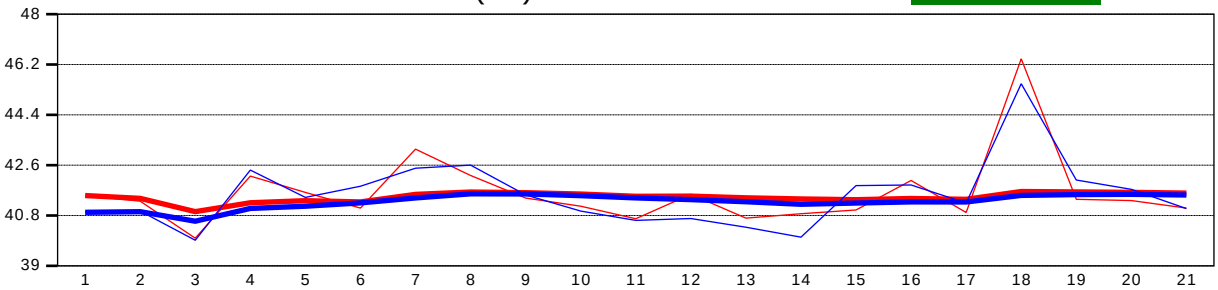
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 004 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20190729-162757.ft |
| **Comment** | Temp gage |

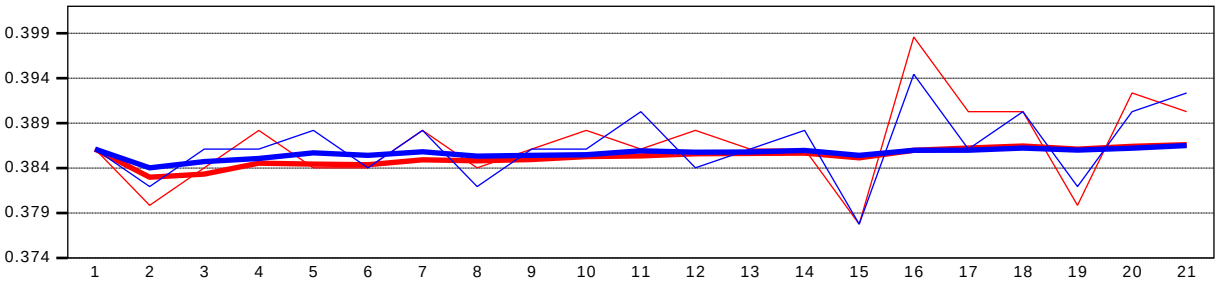
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/29/2019 4:11:54 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

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Start time** | 11/7/2019 11:24 AM |
| **End time** | 11/7/2019 11:58 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 25 | 40 | 3.601 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 11.800 | 0.553 | 12.229 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 34.993 | 0.504 | 0.184 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 1.974 | 0.820 | 0.320 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.4% | 4.4% |
| **Velocity** | 0.7% | 7.2% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.8% | |
| **# Stations** | 2.0% | |
| **Overall** | **3.0%** | **8.5%** |

| | |
|---|---|
| **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**

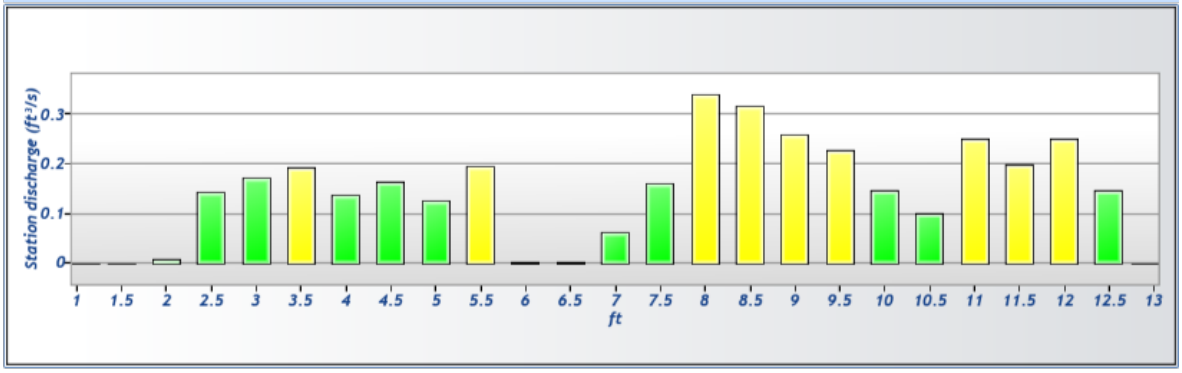
No changes were made to this file
Quality control warnings

# Discharge Measurement Summary

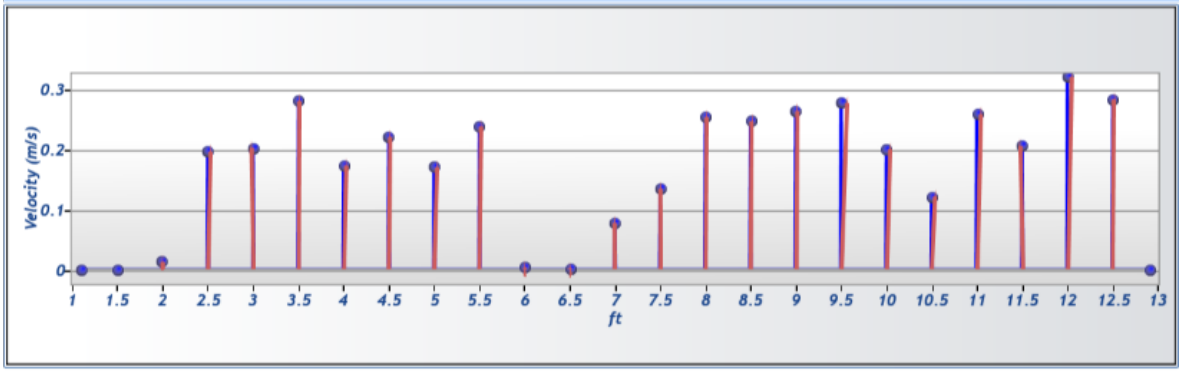
| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

| **Station Warning Settings** | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |

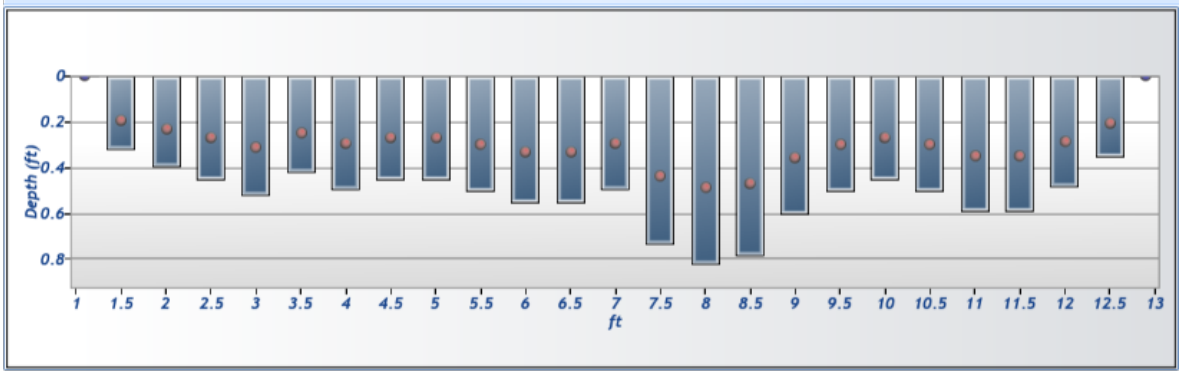
Discharge chart




Velocity chart




Depth chart



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 11:24 AM | 1.100 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | -0.001 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 11:26 AM | 1.500 | 0.6 | 0.320 | 0.600 | 0.192 | 80 | -0.001 | 1.000 | -0.001 | 0.013 | 0.000 | -0.011 | ✓ |
| 2 | 11:28 AM | 2.000 | 0.6 | 0.390 | 0.600 | 0.234 | 80 | 0.012 | 1.000 | 0.012 | 0.018 | 0.008 | 0.219 | ✓ |
| 3 | 11:29 AM | 2.500 | 0.6 | 0.450 | 0.600 | 0.270 | 80 | 0.196 | 1.000 | 0.196 | 0.021 | 0.144 | 4.011 | ✓ |
| 4 | 11:31 AM | 3.000 | 0.6 | 0.520 | 0.600 | 0.312 | 80 | 0.202 | 1.000 | 0.202 | 0.024 | 0.172 | 4.788 | ✓ |
| 5 | 11:33 AM | 3.500 | 0.6 | 0.420 | 0.600 | 0.252 | 80 | 0.280 | 1.000 | 0.280 | 0.020 | 0.193 | 5.356 | ✓ |
| 6 | 11:34 AM | 4.000 | 0.6 | 0.490 | 0.600 | 0.294 | 80 | 0.173 | 1.000 | 0.173 | 0.023 | 0.139 | 3.854 | ✓ |
| 7 | 11:36 AM | 4.500 | 0.6 | 0.450 | 0.600 | 0.270 | 80 | 0.220 | 1.000 | 0.220 | 0.021 | 0.162 | 4.512 | ✓ |
| 8 | 11:37 AM | 5.000 | 0.6 | 0.450 | 0.600 | 0.270 | 80 | 0.170 | 1.000 | 0.170 | 0.021 | 0.125 | 3.480 | ✓ |
| 9 | 11:39 AM | 5.500 | 0.6 | 0.500 | 0.600 | 0.300 | 80 | 0.238 | 1.000 | 0.238 | 0.023 | 0.195 | 5.414 | ✓ |
| 10 | 11:40 AM | 6.000 | 0.6 | 0.550 | 0.600 | 0.330 | 80 | 0.003 | 1.000 | 0.003 | 0.026 | 0.003 | 0.072 | ✓ |
| 11 | 11:41 AM | 6.500 | 0.6 | 0.550 | 0.600 | 0.330 | 80 | 0.002 | 1.000 | 0.002 | 0.026 | 0.002 | 0.053 | ✓ |
| 12 | 11:43 AM | 7.000 | 0.6 | 0.490 | 0.600 | 0.294 | 80 | 0.077 | 1.000 | 0.077 | 0.023 | 0.062 | 1.720 | ✓ |
| 13 | 11:44 AM | 7.500 | 0.6 | 0.730 | 0.600 | 0.438 | 80 | 0.134 | 1.000 | 0.134 | 0.034 | 0.160 | 4.456 | ✓ |
| 14 | 11:45 AM | 8.000 | 0.6 | 0.820 | 0.600 | 0.492 | 80 | 0.253 | 1.000 | 0.253 | 0.038 | 0.341 | 9.465 | ✓ |
| 15 | 11:47 AM | 8.500 | 0.6 | 0.780 | 0.600 | 0.468 | 80 | 0.247 | 1.000 | 0.247 | 0.036 | 0.316 | 8.763 | ✓ |
| 16 | 11:48 AM | 9.000 | 0.6 | 0.600 | 0.600 | 0.360 | 80 | 0.263 | 1.000 | 0.263 | 0.028 | 0.259 | 7.195 | ✓ |
| 17 | 11:50 AM | 9.500 | 0.6 | 0.500 | 0.600 | 0.300 | 80 | 0.276 | 1.000 | 0.276 | 0.023 | 0.227 | 6.297 | ✓ |
| 18 | 11:51 AM | 10.000 | 0.6 | 0.450 | 0.600 | 0.270 | 80 | 0.200 | 1.000 | 0.200 | 0.021 | 0.148 | 4.102 | ✓ |
| 19 | 11:52 AM | 10.500 | 0.6 | 0.500 | 0.600 | 0.300 | 80 | 0.121 | 1.000 | 0.121 | 0.023 | 0.099 | 2.761 | ✓ |
| 20 | 11:53 AM | 11.000 | 0.6 | 0.590 | 0.600 | 0.354 | 80 | 0.258 | 1.000 | 0.258 | 0.027 | 0.249 | 6.926 | ✓ |
| 21 | 11:54 AM | 11.500 | 0.6 | 0.590 | 0.600 | 0.354 | 80 | 0.205 | 1.000 | 0.205 | 0.027 | 0.199 | 5.520 | ✓ |
| 22 | 11:55 AM | 12.000 | 0.6 | 0.480 | 0.600 | 0.288 | 80 | 0.320 | 1.000 | 0.320 | 0.022 | 0.252 | 6.990 | ✓ |
| 23 | 11:56 AM | 12.500 | 0.6 | 0.350 | 0.600 | 0.210 | 80 | 0.283 | 1.000 | 0.283 | 0.015 | 0.146 | 4.060 | ✓ |
| 24 | 11:58 AM | 12.900 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.283 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 11:26 AM | 1.500 | 0.6 | 0.320 | 0.600 | 0.192 | Boundary Interference,Beam SNRs Not Similar,Large SNR Variation |
| 2 | 11:28 AM | 2.000 | 0.6 | 0.390 | 0.600 | 0.234 | Boundary Interference,Large SNR Variation |
| 3 | 11:29 AM | 2.500 | 0.6 | 0.450 | 0.600 | 0.270 | Boundary Interference |
| 6 | 11:34 AM | 4.000 | 0.6 | 0.490 | 0.600 | 0.294 | Beam SNRs Not Similar,SNR Threshold Variation |
| 10 | 11:40 AM | 6.000 | 0.6 | 0.550 | 0.600 | 0.330 | Large SNR Variation,SNR Threshold Variation |
| 11 | 11:41 AM | 6.500 | 0.6 | 0.550 | 0.600 | 0.330 | Large SNR Variation,SNR Threshold Variation,High % Spikes |
| 12 | 11:43 AM | 7.000 | 0.6 | 0.490 | 0.600 | 0.294 | Large SNR Variation |
| 13 | 11:44 AM | 7.500 | 0.6 | 0.730 | 0.600 | 0.438 | Boundary Interference |
| 21 | 11:54 AM | 11.500 | 0.6 | 0.590 | 0.600 | 0.354 | Boundary Interference |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

Supplemental data summary

| Gauge height time | Gauge height (ft) | Rated discharge (ft³/s) | Temperature (°C) | Salinity (PSS-78) | Gauge height comments |
|---|---|---|---|---|---|
| 11/7/2019 11:58 AM | 2.550 | | | | |

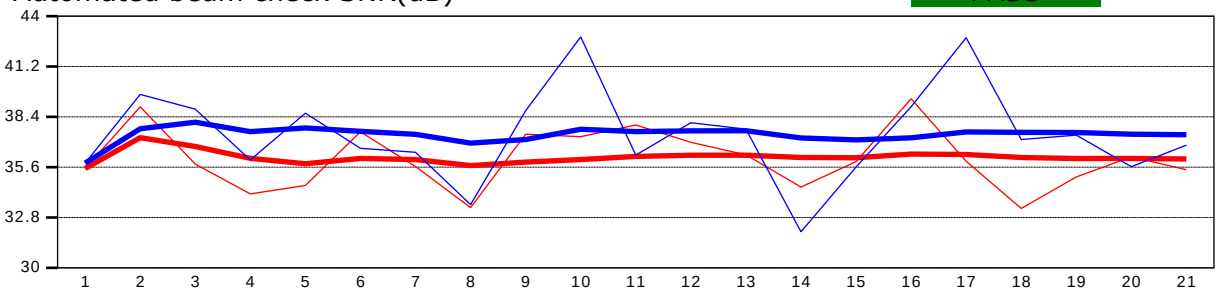
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 11/7/2019 11:23:46 AM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS


**Automated beam check Quality control warnings**

No quality control warnings

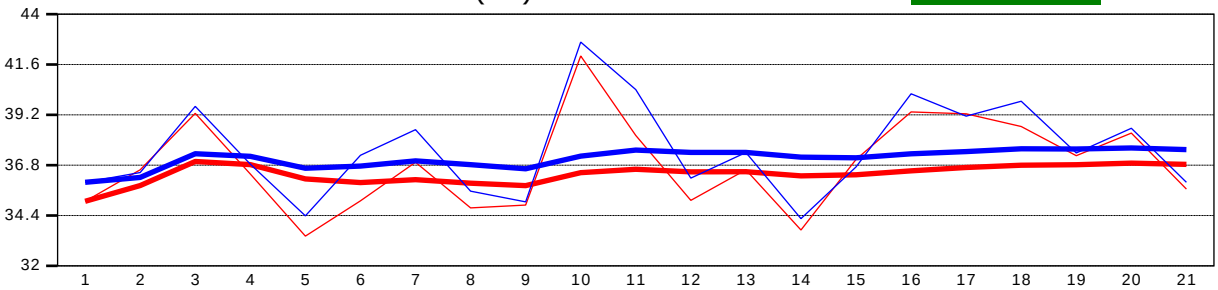
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 005 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191107-120140.ft |
| **Comment** | Temp gage |

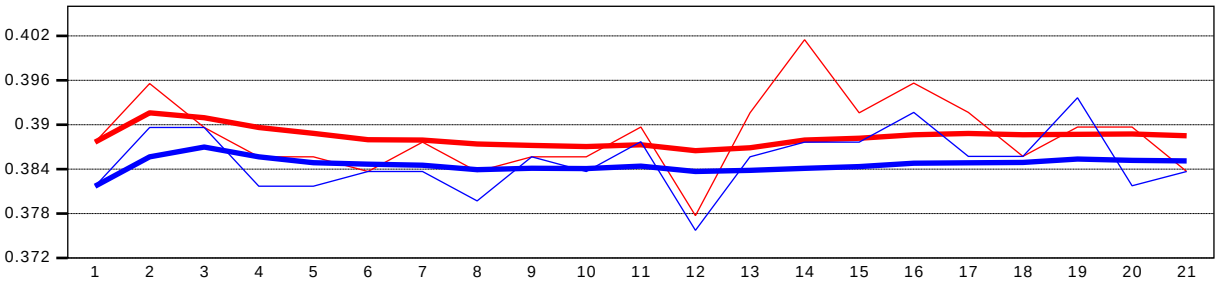
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 11/7/2019 11:23:46 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** | Watson Creek at Co Rd 17 |
| **Site number** | 6 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191206-094320.ft |
| **Comment** | Temp gage |

| | |
|---|---|
| **Start time** | 12/6/2019 9:16 AM |
| **End time** | 12/6/2019 9:42 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 25 | 40 | 2.944 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 7.600 | 0.394 | 8.036 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 42.039 | 0.558 | 0.212 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 0.808 | 0.860 | 0.293 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.4% | 3.4% |
| **Velocity** | 0.2% | 2.9% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.8% | |
| **# Stations** | 2.0% | |
| **Overall** | **2.9%** | **4.6%** |

| | |
|---|---|
| **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**

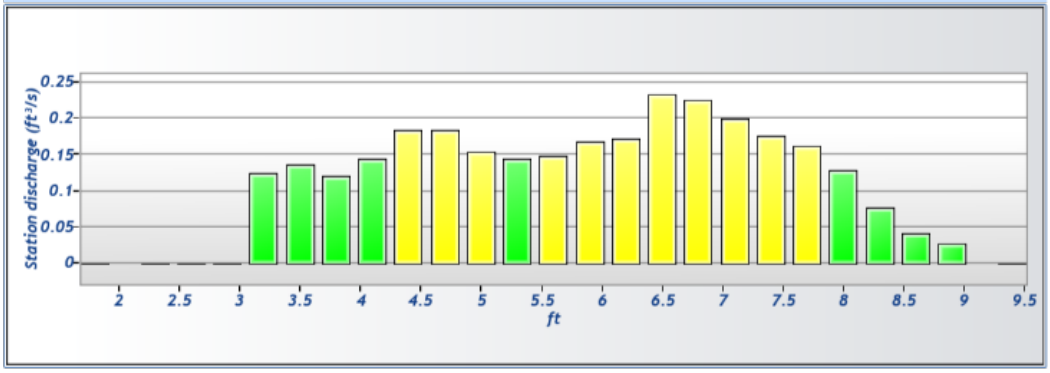
No changes were made to this file
Quality control warnings

# Discharge Measurement Summary

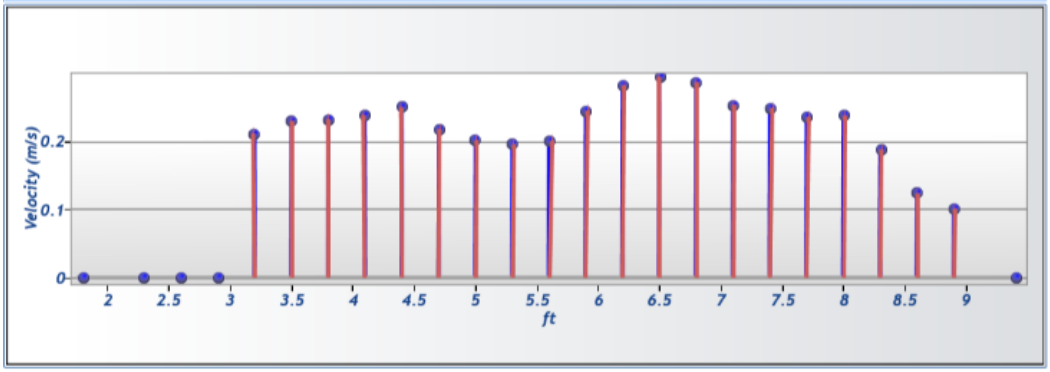
| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 6 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191206-094320.ft |
| **Comment** | Temp gage |

| **Station Warning Settings** | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |

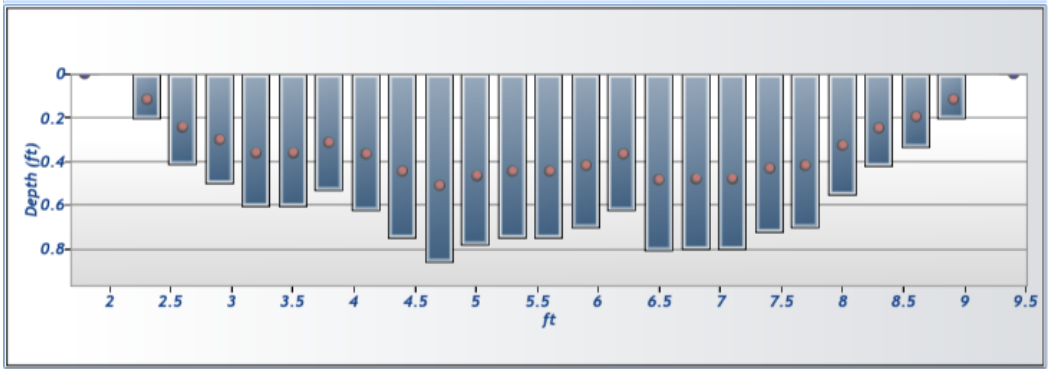
Discharge chart




Velocity chart




Depth chart



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 6 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191206-094320.ft |
| **Comment** | Temp gage |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 9:16 AM | 1.800 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 9:17 AM | 2.300 | 0.6 | 0.200 | 0.600 | 0.120 | 80 | 0.000 | 1.000 | 0.000 | 0.007 | 0.000 | 0.003 | ✓ |
| 2 | 9:18 AM | 2.600 | 0.6 | 0.410 | 0.600 | 0.246 | 80 | 0.000 | 1.000 | 0.000 | 0.011 | 0.000 | 0.004 | ✓ |
| 3 | 9:19 AM | 2.900 | 0.6 | 0.500 | 0.600 | 0.300 | 80 | 0.000 | 1.000 | 0.000 | 0.014 | 0.000 | -0.004 | ✓ |
| 4 | 9:20 AM | 3.200 | 0.6 | 0.600 | 0.600 | 0.360 | 80 | 0.211 | 1.000 | 0.211 | 0.017 | 0.124 | 4.223 | ✓ |
| 5 | 9:21 AM | 3.500 | 0.6 | 0.600 | 0.600 | 0.360 | 80 | 0.229 | 1.000 | 0.229 | 0.017 | 0.135 | 4.589 | ✓ |
| 6 | 9:22 AM | 3.800 | 0.6 | 0.530 | 0.600 | 0.318 | 80 | 0.231 | 1.000 | 0.231 | 0.015 | 0.121 | 4.095 | ✓ |
| 7 | 9:24 AM | 4.100 | 0.6 | 0.620 | 0.600 | 0.372 | 80 | 0.237 | 1.000 | 0.237 | 0.017 | 0.145 | 4.917 | ✓ |
| 8 | 9:25 AM | 4.400 | 0.6 | 0.750 | 0.600 | 0.450 | 80 | 0.249 | 1.000 | 0.249 | 0.021 | 0.184 | 6.239 | ✓ |
| 9 | 9:26 AM | 4.700 | 0.6 | 0.860 | 0.600 | 0.516 | 80 | 0.217 | 1.000 | 0.217 | 0.024 | 0.184 | 6.241 | ✓ |
| 10 | 9:27 AM | 5.000 | 0.6 | 0.780 | 0.600 | 0.468 | 80 | 0.201 | 1.000 | 0.201 | 0.022 | 0.154 | 5.231 | ✓ |
| 11 | 9:28 AM | 5.300 | 0.6 | 0.750 | 0.600 | 0.450 | 80 | 0.195 | 1.000 | 0.195 | 0.021 | 0.144 | 4.879 | ✓ |
| 12 | 9:29 AM | 5.600 | 0.6 | 0.750 | 0.600 | 0.450 | 80 | 0.200 | 1.000 | 0.200 | 0.021 | 0.148 | 5.020 | ✓ |
| 13 | 9:30 AM | 5.900 | 0.6 | 0.700 | 0.600 | 0.420 | 80 | 0.244 | 1.000 | 0.244 | 0.020 | 0.168 | 5.714 | ✓ |
| 14 | 9:31 AM | 6.200 | 0.6 | 0.620 | 0.600 | 0.372 | 80 | 0.281 | 1.000 | 0.281 | 0.017 | 0.171 | 5.823 | ✓ |
| 15 | 9:32 AM | 6.500 | 0.6 | 0.810 | 0.600 | 0.486 | 80 | 0.293 | 1.000 | 0.293 | 0.023 | 0.234 | 7.934 | ✓ |
| 16 | 9:33 AM | 6.800 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.286 | 1.000 | 0.286 | 0.022 | 0.225 | 7.637 | ✓ |
| 17 | 9:34 AM | 7.100 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.252 | 1.000 | 0.252 | 0.022 | 0.199 | 6.752 | ✓ |
| 18 | 9:35 AM | 7.400 | 0.6 | 0.720 | 0.600 | 0.432 | 80 | 0.248 | 1.000 | 0.248 | 0.020 | 0.176 | 5.971 | ✓ |
| 19 | 9:36 AM | 7.700 | 0.6 | 0.700 | 0.600 | 0.420 | 80 | 0.235 | 1.000 | 0.235 | 0.020 | 0.162 | 5.492 | ✓ |
| 20 | 9:37 AM | 8.000 | 0.6 | 0.550 | 0.600 | 0.330 | 80 | 0.237 | 1.000 | 0.237 | 0.015 | 0.128 | 4.351 | ✓ |
| 21 | 9:38 AM | 8.300 | 0.6 | 0.420 | 0.600 | 0.252 | 80 | 0.187 | 1.000 | 0.187 | 0.012 | 0.077 | 2.632 | ✓ |
| 22 | 9:39 AM | 8.600 | 0.6 | 0.330 | 0.600 | 0.198 | 80 | 0.123 | 1.000 | 0.123 | 0.009 | 0.040 | 1.357 | ✓ |
| 23 | 9:41 AM | 8.900 | 0.6 | 0.200 | 0.600 | 0.120 | 80 | 0.101 | 1.000 | 0.101 | 0.007 | 0.027 | 0.902 | ✓ |
| 24 | 9:42 AM | 9.400 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.101 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 6 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191206-094320.ft |
| **Comment** | Temp gage |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 9:17 AM | 2.300 | 0.6 | 0.200 | 0.600 | 0.120 | SNR Threshold Variation |
| 2 | 9:18 AM | 2.600 | 0.6 | 0.410 | 0.600 | 0.246 | Boundary Interference |
| 3 | 9:19 AM | 2.900 | 0.6 | 0.500 | 0.600 | 0.300 | SNR Threshold Variation |

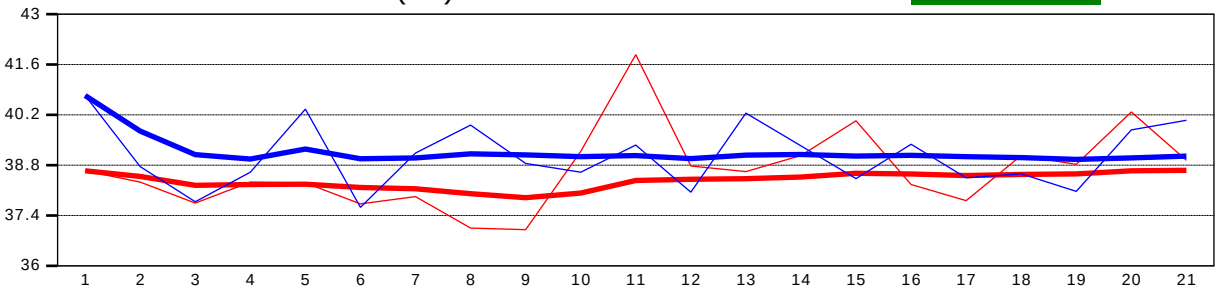
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 6 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191206-094320.ft |
| **Comment** | Temp gage |

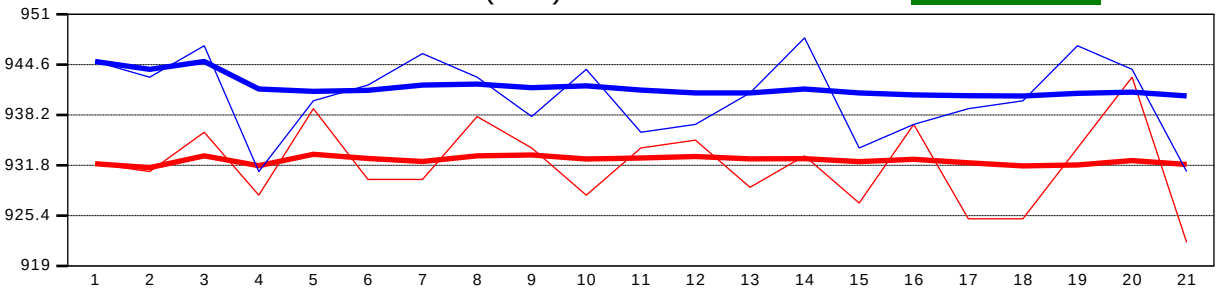
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 12/6/2019 9:16:24 AM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

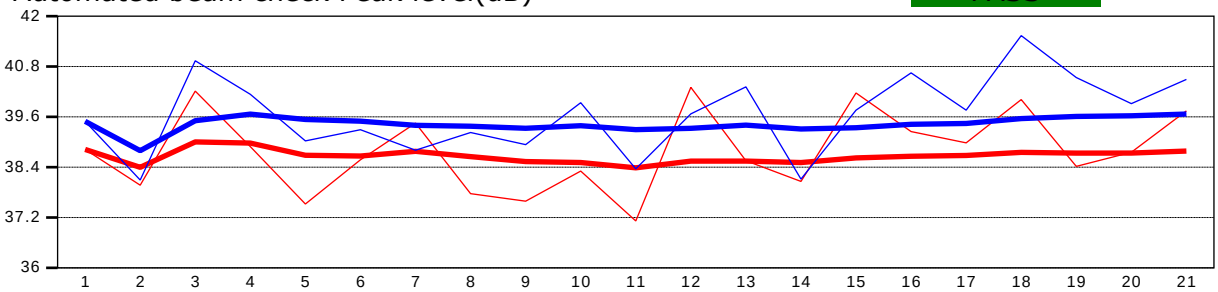
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 6 |
| **Operator(s)** | Jack Landers |
| **File name** | Watson Creek at Co Rd 17_20191206-094320.ft |
| **Comment** | Temp gage |

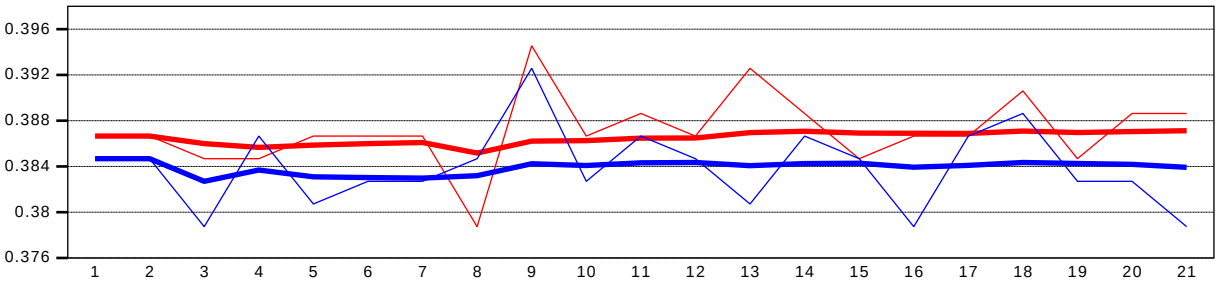
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 12/6/2019 9:16:24 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** | Watson Creek at Co Rd 17 |
| **Site number** | 782020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200708-114621.ft |
| **Comment** | 0.67 staffg |

| | |
|---|---|
| **Start time** | 7/8/2020 10:56 AM |
| **End time** | 7/8/2020 11:33 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **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) |
|---|---|---|
| 26 | 40 | 3.595 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 15.650 | 1.221 | 16.103 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 44.573 | 0.840 | 0.083 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 15.670 | 1.400 | 0.213 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.2% | 2.5% |
| **Velocity** | 1.7% | 12.9% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.9% | |
| **# Stations** | 2.0% | |
| **Overall** | **3.4%** | **13.2%** |

| | |
|---|---|
| **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 % |

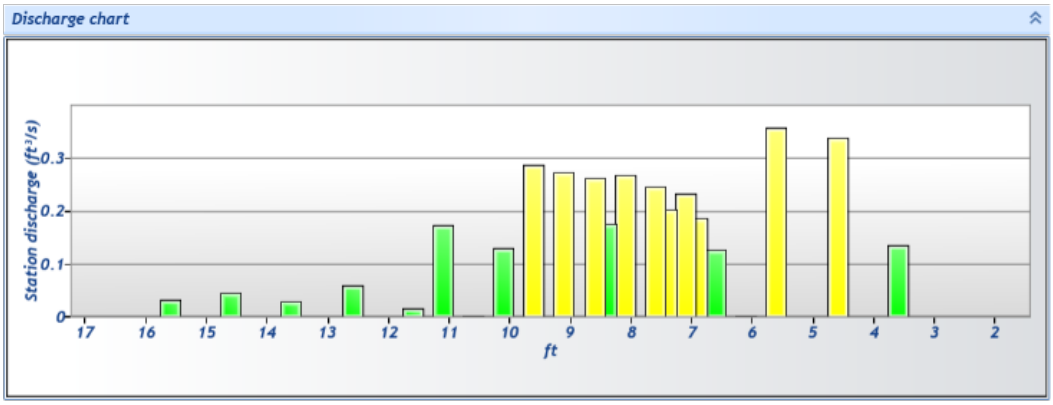
**Summary overview**

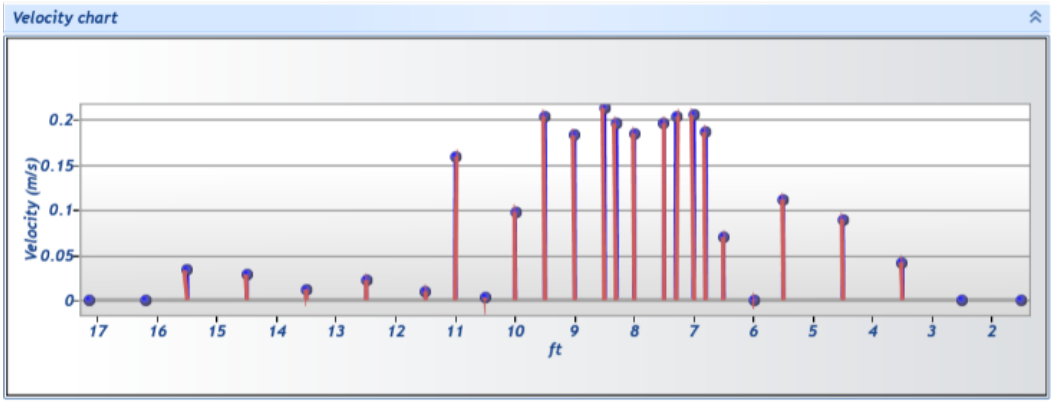
No changes were made to this file
Quality control warnings

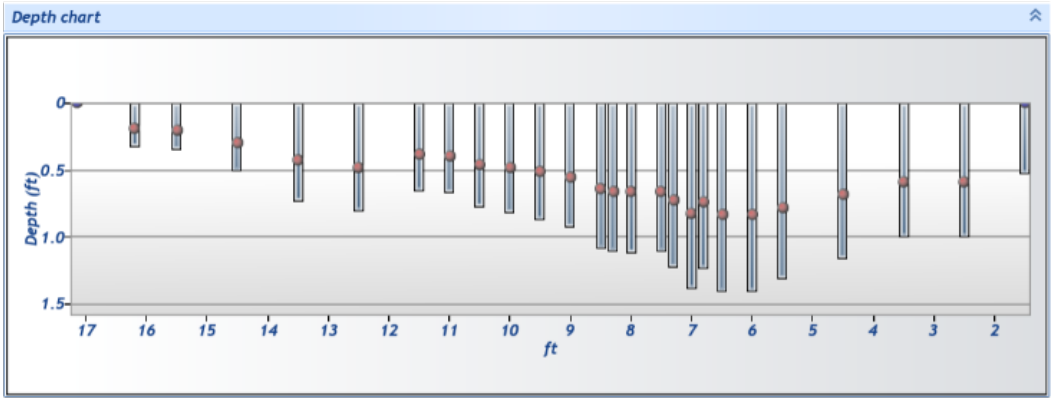
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 782020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200708-114621.ft |
| **Comment** | 0.67 staffg |

| **Station Warning Settings** | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 782020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200708-114621.ft |
| **Comment** | 0.67 staffg |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 11:27 AM | 1.500 | None | 0.520 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.024 | 0.000 | 0.000 | ✓ |
| 24 | 11:25 AM | 2.500 | 0.6 | 0.990 | 0.600 | 0.594 | 80 | 0.000 | 1.000 | 0.000 | 0.092 | 0.000 | 0.014 | ✓ |
| 23 | 11:24 AM | 3.500 | 0.6 | 0.990 | 0.600 | 0.594 | 80 | 0.042 | 1.000 | 0.042 | 0.092 | 0.136 | 3.794 | ✓ |
| 22 | 11:23 AM | 4.500 | 0.6 | 1.150 | 0.600 | 0.690 | 80 | 0.090 | 1.000 | 0.090 | 0.107 | 0.339 | 9.437 | ✓ |
| 21 | 11:21 AM | 5.500 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.112 | 1.000 | 0.112 | 0.091 | 0.357 | 9.928 | ✓ |
| 20 | 11:28 AM | 6.000 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.001 | 1.000 | 0.001 | 0.065 | 0.002 | 0.069 | ✓ |
| 19 | 11:19 AM | 6.500 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.070 | 1.000 | 0.070 | 0.052 | 0.129 | 3.579 | ✓ |
| 18 | 11:31 AM | 6.800 | 0.6 | 1.230 | 0.600 | 0.738 | 80 | 0.186 | 1.000 | 0.186 | 0.029 | 0.188 | 5.222 | ✓ |
| 17 | 11:18 AM | 7.000 | 0.6 | 1.380 | 0.600 | 0.828 | 80 | 0.205 | 1.000 | 0.205 | 0.032 | 0.232 | 6.453 | ✓ |
| 16 | 11:30 AM | 7.300 | 0.6 | 1.220 | 0.600 | 0.732 | 80 | 0.204 | 1.000 | 0.204 | 0.028 | 0.204 | 5.676 | ✓ |
| 15 | 11:17 AM | 7.500 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.196 | 1.000 | 0.196 | 0.036 | 0.247 | 6.878 | ✓ |
| 14 | 11:16 AM | 8.000 | 0.6 | 1.110 | 0.600 | 0.666 | 80 | 0.185 | 1.000 | 0.185 | 0.041 | 0.269 | 7.481 | ✓ |
| 13 | 11:33 AM | 8.300 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.196 | 1.000 | 0.196 | 0.026 | 0.177 | 4.917 | ✓ |
| 12 | 11:14 AM | 8.500 | 0.6 | 1.080 | 0.600 | 0.648 | 80 | 0.213 | 1.000 | 0.213 | 0.035 | 0.264 | 7.338 | ✓ |
| 11 | 11:13 AM | 9.000 | 0.6 | 0.920 | 0.600 | 0.552 | 80 | 0.182 | 1.000 | 0.182 | 0.043 | 0.275 | 7.651 | ✓ |
| 10 | 11:11 AM | 9.500 | 0.6 | 0.860 | 0.600 | 0.516 | 80 | 0.204 | 1.000 | 0.204 | 0.040 | 0.287 | 7.996 | ✓ |
| 9 | 11:10 AM | 10.000 | 0.6 | 0.810 | 0.600 | 0.486 | 80 | 0.098 | 1.000 | 0.098 | 0.038 | 0.130 | 3.623 | ✓ |
| 8 | 11:09 AM | 10.500 | 0.6 | 0.770 | 0.600 | 0.462 | 80 | 0.003 | 1.000 | 0.003 | 0.036 | 0.004 | 0.099 | ✓ |
| 7 | 11:07 AM | 11.000 | 0.6 | 0.660 | 0.600 | 0.396 | 80 | 0.159 | 1.000 | 0.159 | 0.031 | 0.172 | 4.795 | ✓ |
| 6 | 11:05 AM | 11.500 | 0.6 | 0.650 | 0.600 | 0.390 | 80 | 0.010 | 1.000 | 0.010 | 0.045 | 0.016 | 0.438 | ✓ |
| 5 | 11:04 AM | 12.500 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.022 | 1.000 | 0.022 | 0.074 | 0.059 | 1.632 | ✓ |
| 4 | 11:02 AM | 13.500 | 0.6 | 0.720 | 0.600 | 0.432 | 80 | 0.012 | 1.000 | 0.012 | 0.067 | 0.029 | 0.807 | ✓ |
| 3 | 11:00 AM | 14.500 | 0.6 | 0.500 | 0.600 | 0.300 | 80 | 0.028 | 1.000 | 0.028 | 0.046 | 0.047 | 1.298 | ✓ |
| 2 | 10:59 AM | 15.500 | 0.6 | 0.340 | 0.600 | 0.204 | 80 | 0.033 | 1.000 | 0.033 | 0.027 | 0.031 | 0.872 | ✓ |
| 1 | 10:57 AM | 16.200 | 0.6 | 0.320 | 0.600 | 0.192 | 80 | 0.000 | 1.000 | 0.000 | 0.025 | 0.000 | 0.002 | ✓ |
| 0 | 10:56 AM | 17.150 | None | 0.010 | 0.000 | 0.000 | 0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 782020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200708-114621.ft |
| **Comment** | 0.67 staffg |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 24 | 11:25 AM | 2.500 | 0.6 | 0.990 | 0.600 | 0.594 | Beam SNRs Not Similar,Large SNR Variation |
| 23 | 11:24 AM | 3.500 | 0.6 | 0.990 | 0.600 | 0.594 | Velocity Angle > QC |
| 22 | 11:23 AM | 4.500 | 0.6 | 1.150 | 0.600 | 0.690 | Boundary Interference,Large SNR Variation,Standard Error > QC |
| 21 | 11:21 AM | 5.500 | 0.6 | 1.300 | 0.600 | 0.780 | Large SNR Variation |
| 20 | 11:28 AM | 6.000 | 0.6 | 1.400 | 0.600 | 0.840 | Large SNR Variation |
| 19 | 11:19 AM | 6.500 | 0.6 | 1.400 | 0.600 | 0.840 | Boundary Interference |
| 9 | 11:10 AM | 10.000 | 0.6 | 0.810 | 0.600 | 0.486 | Large SNR Variation |
| 8 | 11:09 AM | 10.500 | 0.6 | 0.770 | 0.600 | 0.462 | Large SNR Variation,SNR Threshold Variation |
| 6 | 11:05 AM | 11.500 | 0.6 | 0.650 | 0.600 | 0.390 | Boundary Interference |
| 3 | 11:00 AM | 14.500 | 0.6 | 0.500 | 0.600 | 0.300 | Boundary Interference,Velocity Angle > QC |
| 2 | 10:59 AM | 15.500 | 0.6 | 0.340 | 0.600 | 0.204 | Velocity Angle > QC |
| 1 | 10:57 AM | 16.200 | 0.6 | 0.320 | 0.600 | 0.192 | Large SNR Variation,SNR Threshold Variation |

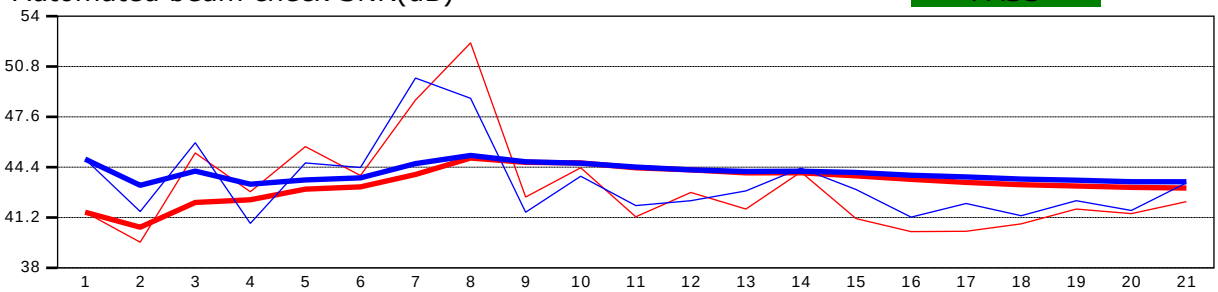
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 782020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200708-114621.ft |
| **Comment** | 0.67 staffg |

| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/8/2020 10:56:00 AM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS


**Automated beam check Quality control warnings**

No quality control warnings

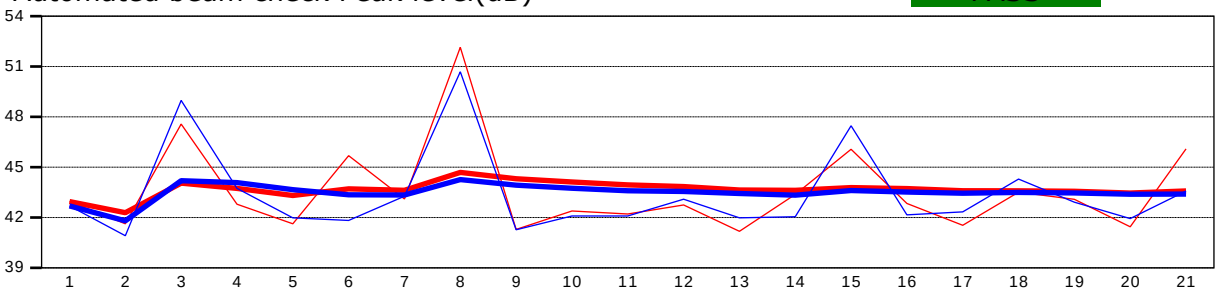
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 782020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200708-114621.ft |
| **Comment** | 0.67 staffg |

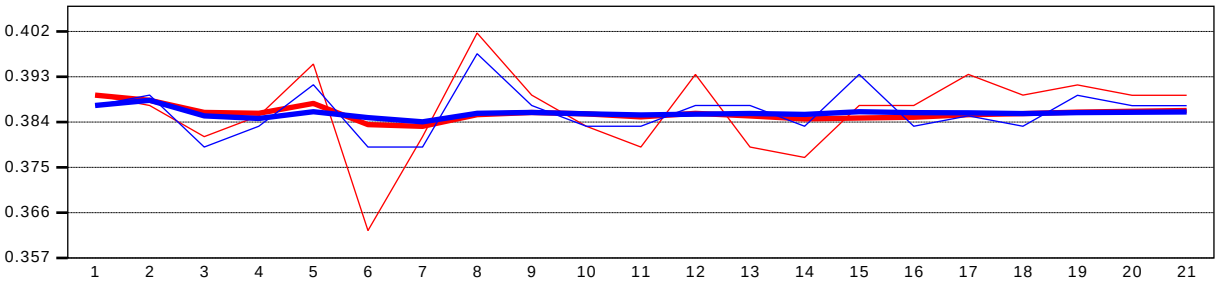
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/8/2020 10:56:00 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** | Watson Creek at Co Rd 17 |
| **Site number** | 72320 |
| **Operator(s)** | Kara |
| **File name** | Watson Creek at Co Rd 17_20200723-102009.ft |
| **Comment** | |

| | |
|---|---|
| **Start time** | 7/23/2020 9:36 AM |
| **End time** | 7/23/2020 10:09 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **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) |
|---|---|---|
| 24 | 40 | 6.160 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 12.300 | 1.153 | 12.987 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 39.687 | 1.009 | 0.151 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 15.726 | 1.550 | 0.352 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.1% | 2.3% |
| **Velocity** | 1.0% | 6.5% |
| **Width** | 0.1% | 0.1% |
| **Method** | 2.2% | |
| **# Stations** | 2.1% | |
| **Overall** | **3.4%** | **7.0%** |

| | |
|---|---|
| **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**

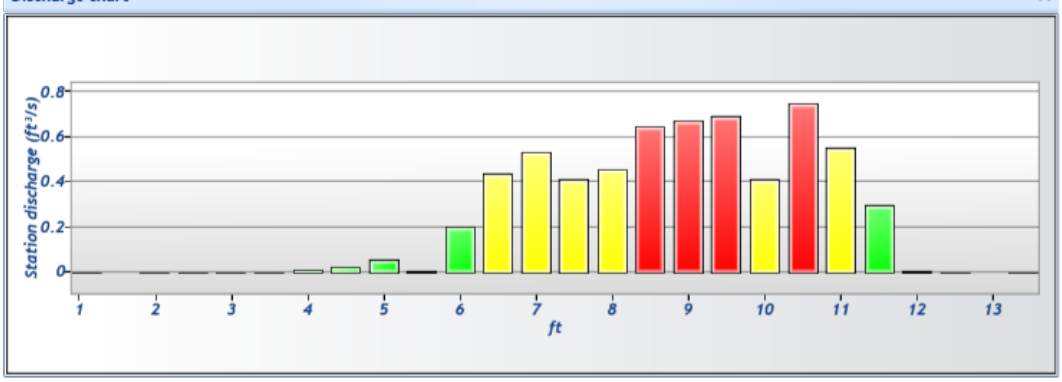
No changes were made to this file
Quality control warnings

# Discharge Measurement Summary

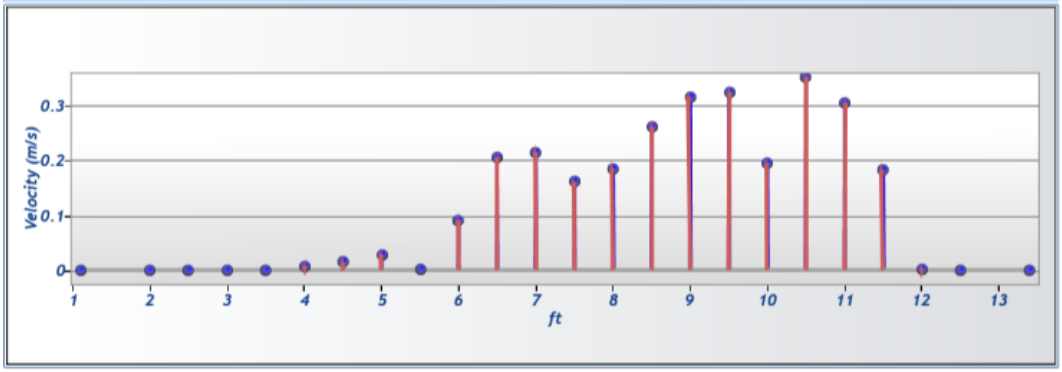
| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 72320 |
| **Operator(s)** | Kara |
| **File name** | Watson Creek at Co Rd 17_20200723-102009.ft |
| **Comment** | |

| Station Warning Settings | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |

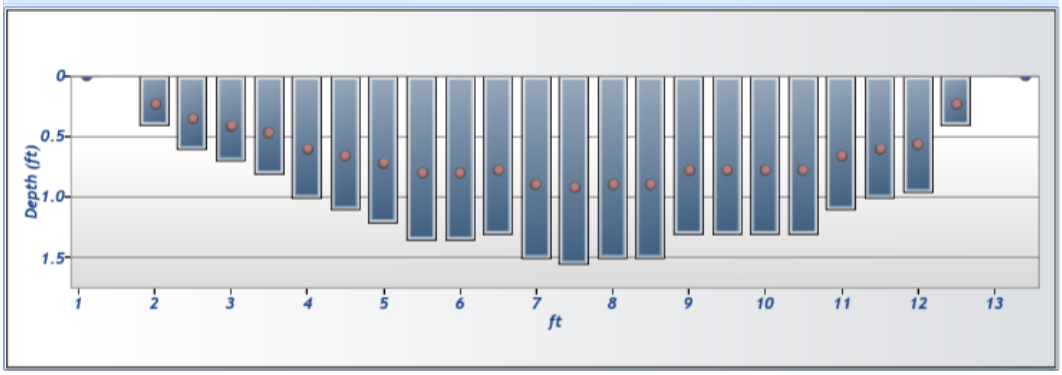
Discharge chart




Velocity chart




Depth chart



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 72320 |
| **Operator(s)** | Kara |
| **File name** | Watson Creek at Co Rd 17_20200723-102009.ft |
| **Comment** | |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 9:36 AM | 1.100 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 9:37 AM | 2.000 | 0.6 | 0.400 | 0.600 | 0.240 | 80 | 0.000 | 1.000 | 0.000 | 0.026 | 0.000 | 0.004 | ✓ |
| 2 | 9:39 AM | 2.500 | 0.6 | 0.600 | 0.600 | 0.360 | 80 | 0.000 | 1.000 | 0.000 | 0.028 | 0.000 | -0.002 | ✓ |
| 3 | 9:41 AM | 3.000 | 0.6 | 0.700 | 0.600 | 0.420 | 80 | 0.000 | 1.000 | 0.000 | 0.033 | 0.000 | -0.003 | ✓ |
| 4 | 9:43 AM | 3.500 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.000 | 1.000 | 0.000 | 0.037 | 0.000 | 0.001 | ✓ |
| 5 | 9:44 AM | 4.000 | 0.6 | 1.000 | 0.600 | 0.600 | 80 | 0.008 | 1.000 | 0.008 | 0.046 | 0.013 | 0.216 | ✓ |
| 6 | 9:45 AM | 4.500 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.015 | 1.000 | 0.015 | 0.051 | 0.026 | 0.429 | ✓ |
| 7 | 9:47 AM | 5.000 | 0.6 | 1.200 | 0.600 | 0.720 | 80 | 0.029 | 1.000 | 0.029 | 0.056 | 0.057 | 0.932 | ✓ |
| 8 | 9:48 AM | 5.500 | 0.6 | 1.350 | 0.600 | 0.810 | 80 | 0.001 | 1.000 | 0.001 | 0.063 | 0.002 | 0.029 | ✓ |
| 9 | 9:49 AM | 6.000 | 0.6 | 1.350 | 0.600 | 0.810 | 80 | 0.091 | 1.000 | 0.091 | 0.063 | 0.203 | 3.288 | ✓ |
| 10 | 9:51 AM | 6.500 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.205 | 1.000 | 0.205 | 0.060 | 0.437 | 7.096 | ✓ |
| 11 | 9:52 AM | 7.000 | 0.6 | 1.500 | 0.600 | 0.900 | 80 | 0.215 | 1.000 | 0.215 | 0.070 | 0.529 | 8.594 | ✓ |
| 12 | 9:54 AM | 7.500 | 0.6 | 1.550 | 0.600 | 0.930 | 80 | 0.161 | 1.000 | 0.161 | 0.072 | 0.408 | 6.628 | ✓ |
| 13 | 9:55 AM | 8.000 | 0.6 | 1.500 | 0.600 | 0.900 | 80 | 0.185 | 1.000 | 0.185 | 0.070 | 0.456 | 7.405 | ✓ |
| 14 | 9:57 AM | 8.500 | 0.6 | 1.500 | 0.600 | 0.900 | 80 | 0.262 | 1.000 | 0.262 | 0.070 | 0.644 | 10.447 | ✓ |
| 15 | 9:58 AM | 9.000 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.316 | 1.000 | 0.316 | 0.060 | 0.674 | 10.936 | ✓ |
| 16 | 9:59 AM | 9.500 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.324 | 1.000 | 0.324 | 0.060 | 0.691 | 11.218 | ✓ |
| 17 | 10:00 AM | 10.000 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.194 | 1.000 | 0.194 | 0.060 | 0.414 | 6.726 | ✓ |
| 18 | 10:03 AM | 10.500 | 0.6 | 1.300 | 0.600 | 0.780 | 80 | 0.352 | 1.000 | 0.352 | 0.060 | 0.750 | 12.175 | ✓ |
| 19 | 10:04 AM | 11.000 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.305 | 1.000 | 0.305 | 0.051 | 0.550 | 8.930 | ✓ |
| 20 | 10:05 AM | 11.500 | 0.6 | 1.000 | 0.600 | 0.600 | 80 | 0.183 | 1.000 | 0.183 | 0.046 | 0.300 | 4.862 | ✓ |
| 21 | 10:06 AM | 12.000 | 0.6 | 0.950 | 0.600 | 0.570 | 80 | 0.003 | 1.000 | 0.003 | 0.044 | 0.005 | 0.082 | ✓ |
| 22 | 10:08 AM | 12.500 | 0.6 | 0.400 | 0.600 | 0.240 | 80 | 0.000 | 1.000 | 0.000 | 0.026 | 0.000 | 0.006 | ✓ |
| 23 | 10:09 AM | 13.400 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 72320 |
| **Operator(s)** | Kara |
| **File name** | Watson Creek at Co Rd 17_20200723-102009.ft |
| **Comment** | |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 9:37 AM | 2.000 | 0.6 | 0.400 | 0.600 | 0.240 | Boundary Interference |
| 2 | 9:39 AM | 2.500 | 0.6 | 0.600 | 0.600 | 0.360 | SNR Threshold Variation |
| 4 | 9:43 AM | 3.500 | 0.6 | 0.800 | 0.600 | 0.480 | Large SNR Variation,SNR Threshold Variation |
| 5 | 9:44 AM | 4.000 | 0.6 | 1.000 | 0.600 | 0.600 | Boundary Interference |
| 6 | 9:45 AM | 4.500 | 0.6 | 1.100 | 0.600 | 0.660 | Large SNR Variation |
| 7 | 9:47 AM | 5.000 | 0.6 | 1.200 | 0.600 | 0.720 | Boundary Interference,Large SNR Variation,SNR Threshold Variation |
| 8 | 9:48 AM | 5.500 | 0.6 | 1.350 | 0.600 | 0.810 | Large SNR Variation,SNR Threshold Variation |
| 9 | 9:49 AM | 6.000 | 0.6 | 1.350 | 0.600 | 0.810 | Large SNR Variation |
| 13 | 9:55 AM | 8.000 | 0.6 | 1.500 | 0.600 | 0.900 | Large SNR Variation,Standard Error > QC |
| 14 | 9:57 AM | 8.500 | 0.6 | 1.500 | 0.600 | 0.900 | High Stn % Discharge |
| 15 | 9:58 AM | 9.000 | 0.6 | 1.300 | 0.600 | 0.780 | High Stn % Discharge |
| 16 | 9:59 AM | 9.500 | 0.6 | 1.300 | 0.600 | 0.780 | High Stn % Discharge |
| 17 | 10:00 AM | 10.000 | 0.6 | 1.300 | 0.600 | 0.780 | Standard Error > QC |
| 18 | 10:03 AM | 10.500 | 0.6 | 1.300 | 0.600 | 0.780 | High Stn % Discharge |
| 20 | 10:05 AM | 11.500 | 0.6 | 1.000 | 0.600 | 0.600 | SNR Threshold Variation |
| 21 | 10:06 AM | 12.000 | 0.6 | 0.950 | 0.600 | 0.570 | Boundary Interference,Large SNR Variation,SNR Threshold Variation |
| 22 | 10:08 AM | 12.500 | 0.6 | 0.400 | 0.600 | 0.240 | Boundary Interference,Beam SNRs Not Similar,SNR Threshold Variation |

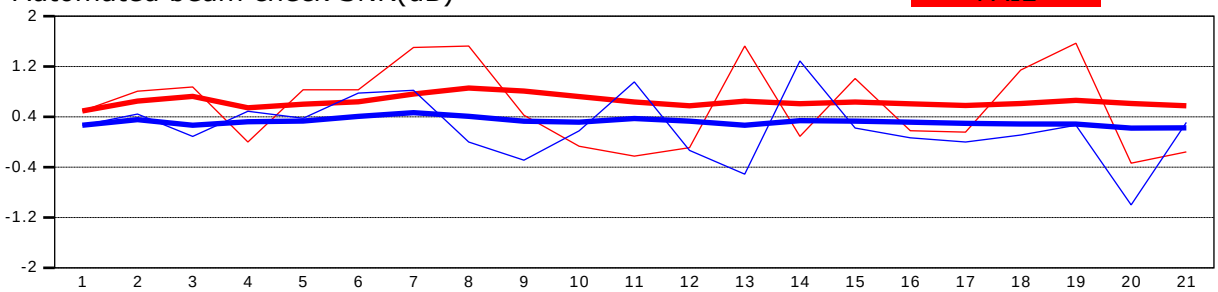
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 72320 |
| **Operator(s)** | Kara |
| **File name** | Watson Creek at Co Rd 17_20200723-102009.ft |
| **Comment** | |

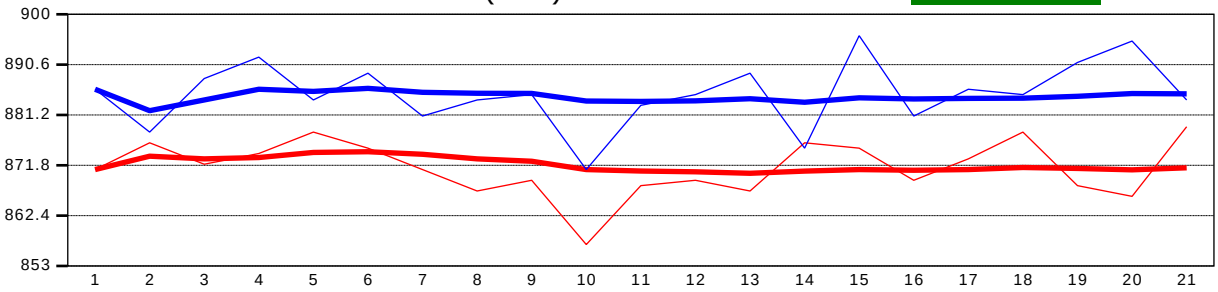
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/23/2020 9:36:05 AM

Automated beam check SNR(dB) FAIL




Automated beam check Noise level(cnts) PASS




| **Automated beam check Quality control warnings** |
|---|
| Low SNR |

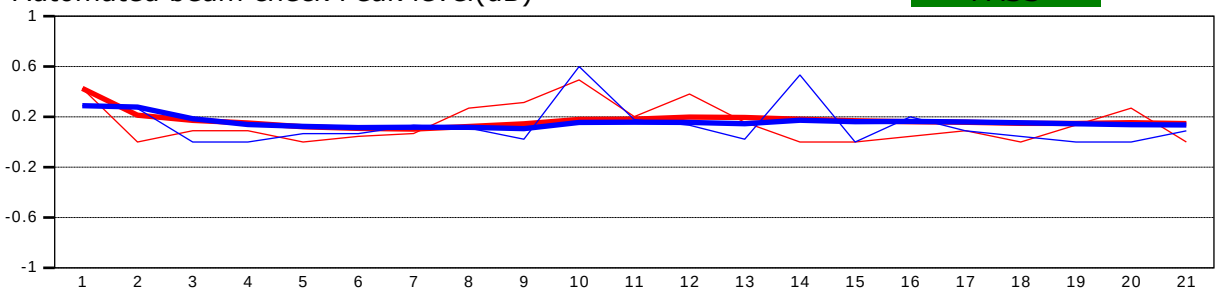
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 72320 |
| **Operator(s)** | Kara |
| **File name** | Watson Creek at Co Rd 17_20200723-102009.ft |
| **Comment** | |

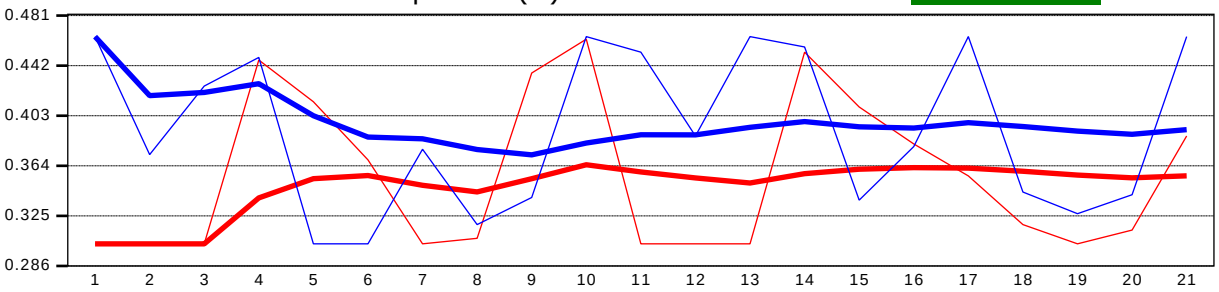
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/23/2020 9:36:05 AM

Automated beam check Peak level(dB) PASS




Automated beam check Peak position(ft) PASS




| **Automated beam check Quality control warnings** |
|---|
| Low SNR |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 9182020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200918-113506.ft |
| **Comment** | |

| | |
|---|---|
| **Start time** | 9/18/2020 10:51 AM |
| **End time** | 9/18/2020 11:32 AM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **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) |
|---|---|---|
| 26 | 40 | 2.583 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 11.300 | 0.920 | 11.914 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 37.422 | 0.876 | 0.079 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 10.450 | 1.360 | 0.160 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.1% | 2.0% |
| **Velocity** | 0.7% | 4.3% |
| **Width** | 0.1% | 0.1% |
| **Method** | 1.7% | |
| **# Stations** | 2.0% | |
| **Overall** | **2.9%** | **4.9%** |

| | |
|---|---|
| **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 % |

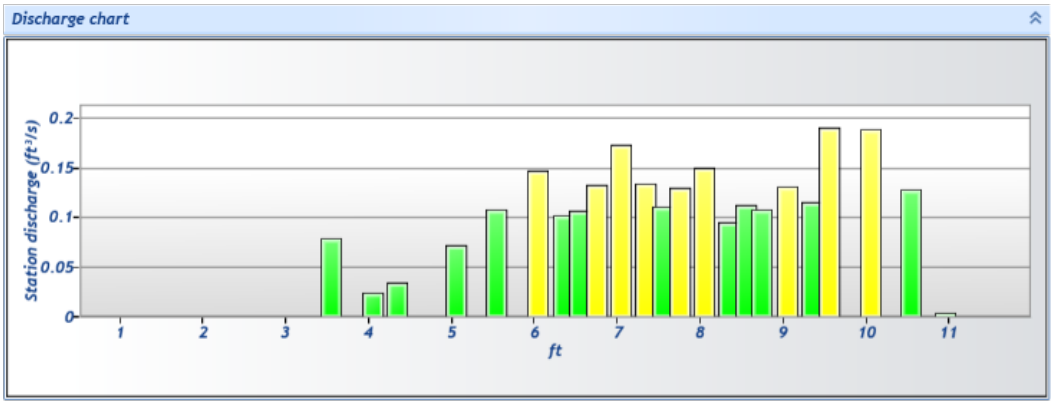
**Summary overview**

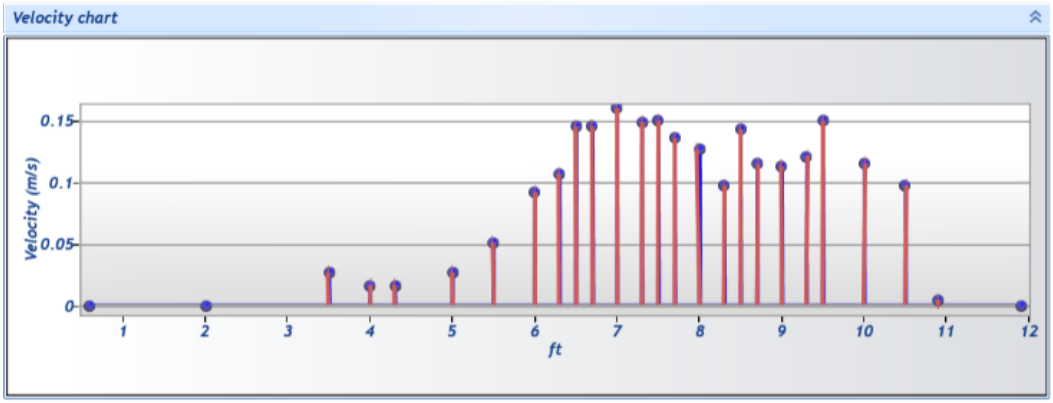
No changes were made to this file
Quality control warnings

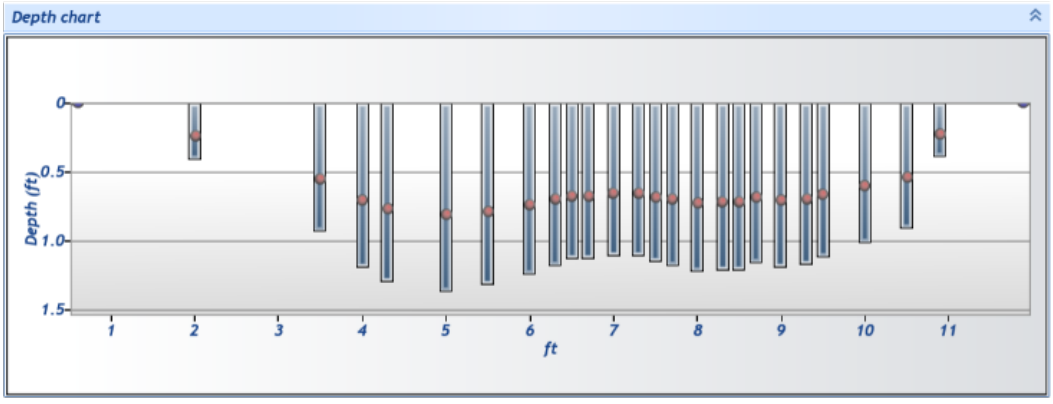
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 9182020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200918-113506.ft |
| **Comment** | |

| **Station Warning Settings** | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 9182020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200918-113506.ft |
| **Comment** | |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 11:19 AM | 0.600 | None | 0.010 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.000 | 0.001 | 0.000 | 0.000 | ✓ |
| 24 | 11:17 AM | 2.000 | 0.6 | 0.400 | 0.600 | 0.240 | 80 | 0.000 | 1.000 | 0.000 | 0.054 | 0.000 | 0.012 | ✓ |
| 23 | 11:15 AM | 3.500 | 0.6 | 0.920 | 0.600 | 0.552 | 80 | 0.026 | 1.000 | 0.026 | 0.085 | 0.080 | 3.090 | ✓ |
| 22 | 11:13 AM | 4.000 | 0.6 | 1.180 | 0.600 | 0.708 | 80 | 0.016 | 1.000 | 0.016 | 0.044 | 0.025 | 0.976 | ✓ |
| 21 | 11:12 AM | 4.300 | 0.6 | 1.280 | 0.600 | 0.768 | 80 | 0.016 | 1.000 | 0.016 | 0.059 | 0.034 | 1.321 | ✓ |
| 20 | 11:08 AM | 5.000 | 0.6 | 1.360 | 0.600 | 0.816 | 80 | 0.027 | 1.000 | 0.027 | 0.076 | 0.072 | 2.779 | ✓ |
| 19 | 11:06 AM | 5.500 | 0.6 | 1.310 | 0.600 | 0.786 | 80 | 0.051 | 1.000 | 0.051 | 0.061 | 0.109 | 4.208 | ✓ |
| 18 | 11:05 AM | 6.000 | 0.6 | 1.230 | 0.600 | 0.738 | 80 | 0.092 | 1.000 | 0.092 | 0.046 | 0.148 | 5.719 | ✓ |
| 17 | 11:20 AM | 6.300 | 0.6 | 1.170 | 0.600 | 0.702 | 80 | 0.107 | 1.000 | 0.107 | 0.027 | 0.102 | 3.964 | ✓ |
| 16 | 11:04 AM | 6.500 | 0.6 | 1.120 | 0.600 | 0.672 | 80 | 0.145 | 1.000 | 0.145 | 0.021 | 0.106 | 4.119 | ✓ |
| 15 | 11:22 AM | 6.700 | 0.6 | 1.120 | 0.600 | 0.672 | 80 | 0.145 | 1.000 | 0.145 | 0.026 | 0.133 | 5.159 | ✓ |
| 14 | 11:02 AM | 7.000 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.160 | 1.000 | 0.160 | 0.031 | 0.173 | 6.704 | ✓ |
| 13 | 11:24 AM | 7.300 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.148 | 1.000 | 0.148 | 0.026 | 0.134 | 5.185 | ✓ |
| 12 | 11:01 AM | 7.500 | 0.6 | 1.140 | 0.600 | 0.684 | 80 | 0.150 | 1.000 | 0.150 | 0.021 | 0.112 | 4.332 | ✓ |
| 11 | 11:27 AM | 7.700 | 0.6 | 1.170 | 0.600 | 0.702 | 80 | 0.135 | 1.000 | 0.135 | 0.027 | 0.130 | 5.027 | ✓ |
| 10 | 10:59 AM | 8.000 | 0.6 | 1.210 | 0.600 | 0.726 | 80 | 0.126 | 1.000 | 0.126 | 0.034 | 0.151 | 5.832 | ✓ |
| 9 | 11:25 AM | 8.300 | 0.6 | 1.200 | 0.600 | 0.720 | 80 | 0.097 | 1.000 | 0.097 | 0.028 | 0.095 | 3.696 | ✓ |
| 8 | 10:57 AM | 8.500 | 0.6 | 1.200 | 0.600 | 0.720 | 80 | 0.142 | 1.000 | 0.142 | 0.022 | 0.112 | 4.340 | ✓ |
| 7 | 11:29 AM | 8.700 | 0.6 | 1.150 | 0.600 | 0.690 | 80 | 0.114 | 1.000 | 0.114 | 0.027 | 0.108 | 4.177 | ✓ |
| 6 | 10:56 AM | 9.000 | 0.6 | 1.180 | 0.600 | 0.708 | 80 | 0.113 | 1.000 | 0.113 | 0.033 | 0.131 | 5.077 | ✓ |
| 5 | 11:30 AM | 9.300 | 0.6 | 1.160 | 0.600 | 0.696 | 80 | 0.121 | 1.000 | 0.121 | 0.027 | 0.115 | 4.466 | ✓ |
| 4 | 10:55 AM | 9.500 | 0.6 | 1.110 | 0.600 | 0.666 | 80 | 0.149 | 1.000 | 0.149 | 0.036 | 0.190 | 7.365 | ✓ |
| 3 | 10:53 AM | 10.000 | 0.6 | 1.000 | 0.600 | 0.600 | 80 | 0.115 | 1.000 | 0.115 | 0.046 | 0.189 | 7.315 | ✓ |
| 2 | 10:52 AM | 10.500 | 0.6 | 0.900 | 0.600 | 0.540 | 80 | 0.097 | 1.000 | 0.097 | 0.038 | 0.129 | 4.987 | ✓ |
| 1 | 11:32 AM | 10.900 | 0.6 | 0.380 | 0.600 | 0.228 | 80 | 0.004 | 1.000 | 0.004 | 0.025 | 0.004 | 0.145 | ✓ |
| 0 | 10:51 AM | 11.900 | None | 0.010 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.004 | 0.000 | 0.000 | 0.003 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 9182020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200918-113506.ft |
| **Comment** | |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 24 | 11:17 AM | 2.000 | 0.6 | 0.400 | 0.600 | 0.240 | Boundary Interference,SNR Threshold Variation |
| 23 | 11:15 AM | 3.500 | 0.6 | 0.920 | 0.600 | 0.552 | Velocity Angle > QC |
| 22 | 11:13 AM | 4.000 | 0.6 | 1.180 | 0.600 | 0.708 | Boundary Interference |
| 21 | 11:12 AM | 4.300 | 0.6 | 1.280 | 0.600 | 0.768 | Stn Spacing > QC |
| 20 | 11:08 AM | 5.000 | 0.6 | 1.360 | 0.600 | 0.816 | Velocity Angle > QC |
| 1 | 11:32 AM | 10.900 | 0.6 | 0.380 | 0.600 | 0.228 | Large SNR Variation,SNR Threshold Variation |
| 0 | 10:51 AM | 11.900 | None | 0.010 | 0.000 | 0.000 | Stn Spacing > QC |

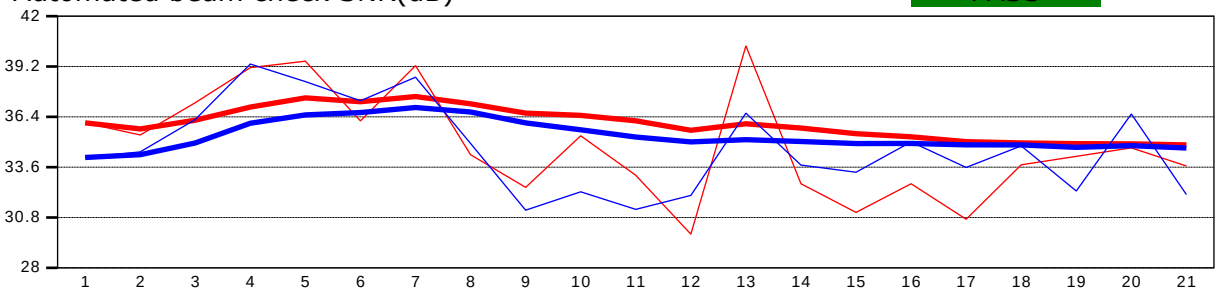
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 9182020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200918-113506.ft |
| **Comment** | |

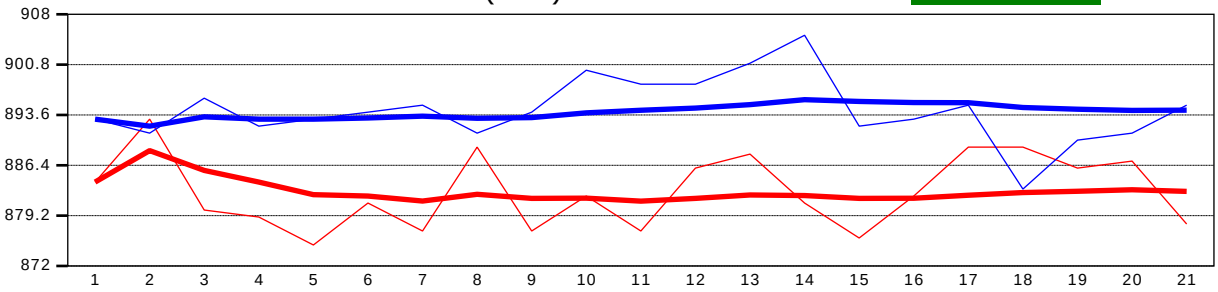
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 9/18/2020 10:49:56 AM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

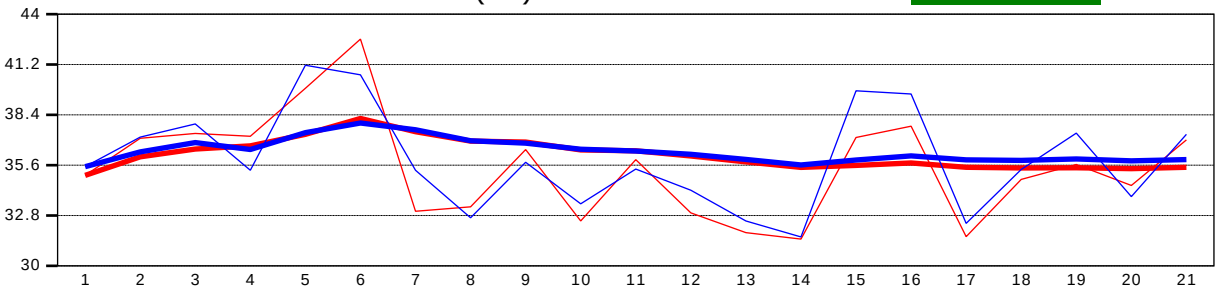
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 9182020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20200918-113506.ft |
| **Comment** | |

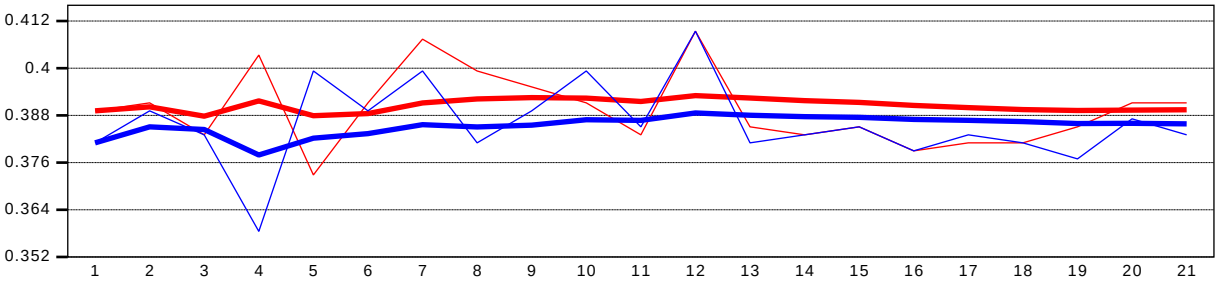
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 9/18/2020 10:49:56 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** | Watson Creek at Co Rd 17 |
| **Site number** | 10112020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20201011-153428.ft |
| **Comment** | |

| | |
|---|---|
| **Start time** | 10/11/2020 3:01 PM |
| **End time** | 10/11/2020 3:31 PM |
| **Start location latitude** | 40.165 |
| **Start location longitude** | -106.928 |
| **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) |
|---|---|---|
| 24 | 40 | 2.525 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 15.700 | 1.286 | 16.434 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 37.428 | 0.882 | 0.056 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 7.632 | 1.420 | -0.215 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.4% | 6.7% |
| **Velocity** | 22.5% | 13.1% |
| **Width** | 0.2% | 0.2% |
| **Method** | 2.7% | |
| **# Stations** | 2.1% | |
| **Overall** | **22.8%** | **14.7%** |

| | |
|---|---|
| **Discharge equation** | Mid Section |
| **Discharge uncertainty** | IVE |
| **Discharge reference** | Rated |

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

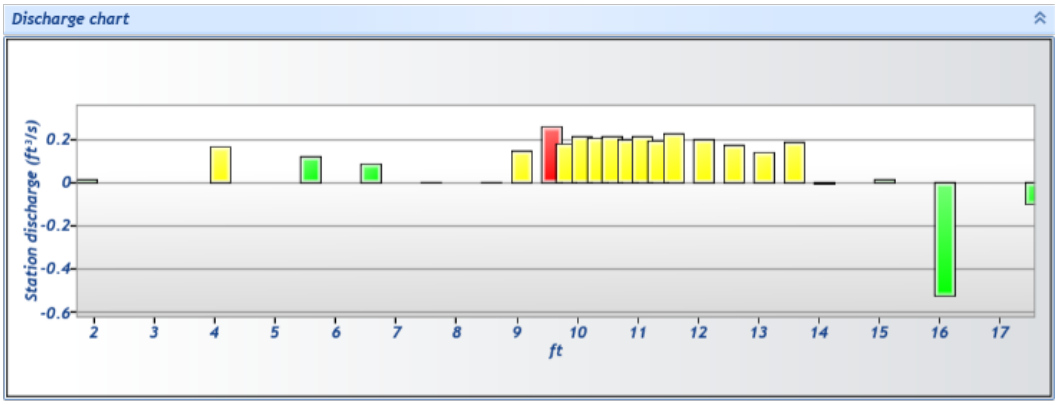
**Summary overview**

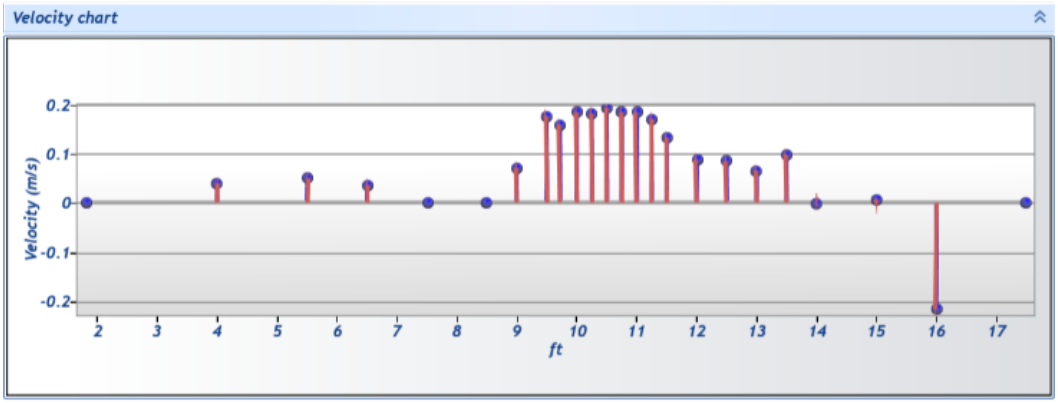
No changes were made to this file
Quality control warnings

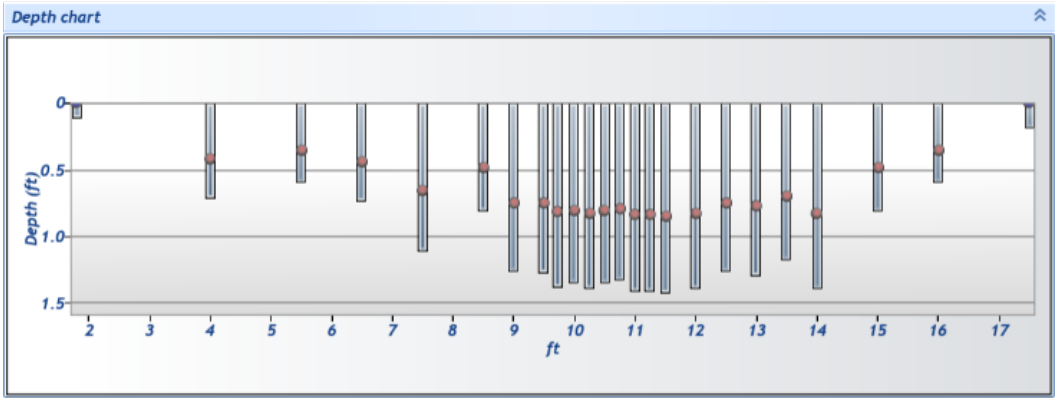
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 10112020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20201011-153428.ft |
| **Comment** | |

| **Station Warning Settings** | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 10112020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20201011-153428.ft |
| **Comment** | |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 3:25 PM | 1.800 | None | 0.100 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.039 | 0.010 | 0.014 | 0.561 | ✓ |
| 22 | 3:23 PM | 4.000 | 0.6 | 0.700 | 0.600 | 0.420 | 80 | 0.039 | 1.000 | 0.039 | 0.120 | 0.167 | 6.603 | ✓ |
| 21 | 3:22 PM | 5.500 | 0.6 | 0.590 | 0.600 | 0.354 | 80 | 0.049 | 1.000 | 0.049 | 0.069 | 0.119 | 4.705 | ✓ |
| 20 | 3:21 PM | 6.500 | 0.6 | 0.730 | 0.600 | 0.438 | 80 | 0.036 | 1.000 | 0.036 | 0.068 | 0.085 | 3.371 | ✓ |
| 19 | 3:19 PM | 7.500 | 0.6 | 1.100 | 0.600 | 0.660 | 80 | 0.000 | 1.000 | 0.000 | 0.102 | -0.001 | -0.033 | ✓ |
| 18 | 3:18 PM | 8.500 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.000 | 1.000 | 0.000 | 0.056 | 0.001 | 0.022 | ✓ |
| 17 | 3:17 PM | 9.000 | 0.6 | 1.250 | 0.600 | 0.750 | 80 | 0.070 | 1.000 | 0.070 | 0.058 | 0.144 | 5.712 | ✓ |
| 16 | 3:15 PM | 9.500 | 0.6 | 1.260 | 0.600 | 0.756 | 80 | 0.176 | 1.000 | 0.176 | 0.042 | 0.262 | 10.362 | ✓ |
| 15 | 3:26 PM | 9.720 | 0.6 | 1.370 | 0.600 | 0.822 | 80 | 0.159 | 1.000 | 0.159 | 0.032 | 0.178 | 7.056 | ✓ |
| 14 | 3:14 PM | 10.000 | 0.6 | 1.340 | 0.600 | 0.804 | 80 | 0.183 | 1.000 | 0.183 | 0.033 | 0.213 | 8.452 | ✓ |
| 13 | 3:27 PM | 10.250 | 0.6 | 1.380 | 0.600 | 0.828 | 80 | 0.180 | 1.000 | 0.180 | 0.032 | 0.204 | 8.080 | ✓ |
| 12 | 3:13 PM | 10.500 | 0.6 | 1.340 | 0.600 | 0.804 | 80 | 0.192 | 1.000 | 0.192 | 0.031 | 0.211 | 8.350 | ✓ |
| 11 | 3:29 PM | 10.750 | 0.6 | 1.320 | 0.600 | 0.792 | 80 | 0.183 | 1.000 | 0.183 | 0.031 | 0.199 | 7.865 | ✓ |
| 10 | 3:12 PM | 11.000 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.183 | 1.000 | 0.183 | 0.033 | 0.210 | 8.335 | ✓ |
| 9 | 3:31 PM | 11.250 | 0.6 | 1.400 | 0.600 | 0.840 | 80 | 0.170 | 1.000 | 0.170 | 0.033 | 0.195 | 7.709 | ✓ |
| 8 | 3:11 PM | 11.500 | 0.6 | 1.420 | 0.600 | 0.852 | 80 | 0.132 | 1.000 | 0.132 | 0.049 | 0.230 | 9.108 | ✓ |
| 7 | 3:09 PM | 12.000 | 0.6 | 1.380 | 0.600 | 0.828 | 80 | 0.088 | 1.000 | 0.088 | 0.064 | 0.199 | 7.872 | ✓ |
| 6 | 3:08 PM | 12.500 | 0.6 | 1.250 | 0.600 | 0.750 | 80 | 0.084 | 1.000 | 0.084 | 0.058 | 0.172 | 6.806 | ✓ |
| 5 | 3:07 PM | 13.000 | 0.6 | 1.290 | 0.600 | 0.774 | 80 | 0.065 | 1.000 | 0.065 | 0.060 | 0.137 | 5.444 | ✓ |
| 4 | 3:06 PM | 13.500 | 0.6 | 1.170 | 0.600 | 0.702 | 80 | 0.098 | 1.000 | 0.098 | 0.054 | 0.187 | 7.415 | ✓ |
| 3 | 3:04 PM | 14.000 | 0.6 | 1.380 | 0.600 | 0.828 | 80 | -0.001 | 1.000 | -0.001 | 0.096 | -0.004 | -0.159 | ✓ |
| 2 | 3:03 PM | 15.000 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.007 | 1.000 | 0.007 | 0.074 | 0.018 | 0.697 | ✓ |
| 1 | 3:01 PM | 16.000 | 0.6 | 0.590 | 0.600 | 0.354 | 80 | -0.215 | 1.000 | -0.215 | 0.069 | -0.519 | -20.569 | ✓ |
| 0 | 3:01 PM | 17.500 | None | 0.180 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | -0.215 | 0.013 | -0.095 | -3.765 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 10112020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20201011-153428.ft |
| **Comment** | |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 19 | 3:19 PM | 7.500 | 0.6 | 1.100 | 0.600 | 0.660 | Boundary Interference,Beam SNRs Not Similar,Large SNR Variation |
| 18 | 3:18 PM | 8.500 | 0.6 | 0.800 | 0.600 | 0.480 | Boundary Interference,SNR Threshold Variation |
| 16 | 3:15 PM | 9.500 | 0.6 | 1.260 | 0.600 | 0.756 | High Stn % Discharge |
| 3 | 3:04 PM | 14.000 | 0.6 | 1.380 | 0.600 | 0.828 | SNR Threshold Variation |
| 2 | 3:03 PM | 15.000 | 0.6 | 0.800 | 0.600 | 0.480 | SNR Threshold Variation |
| 1 | 3:01 PM | 16.000 | 0.6 | 0.590 | 0.600 | 0.354 | Low SNR,SNR Threshold Variation,Standard Error > QC,Velocity Angle > QC |

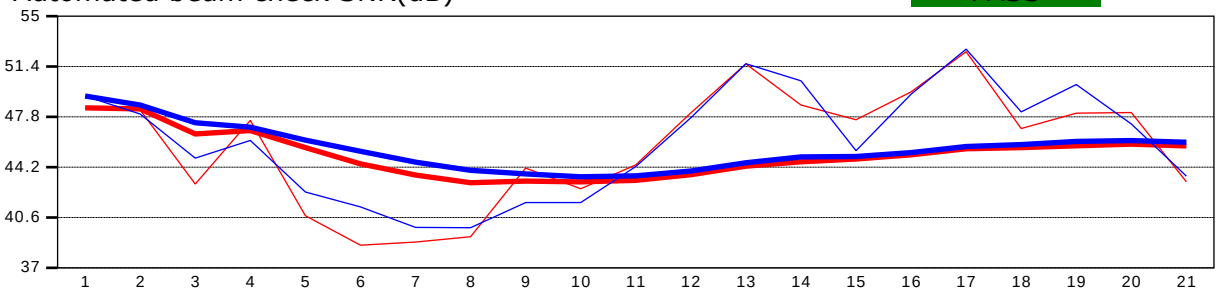
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 10112020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20201011-153428.ft |
| **Comment** | |

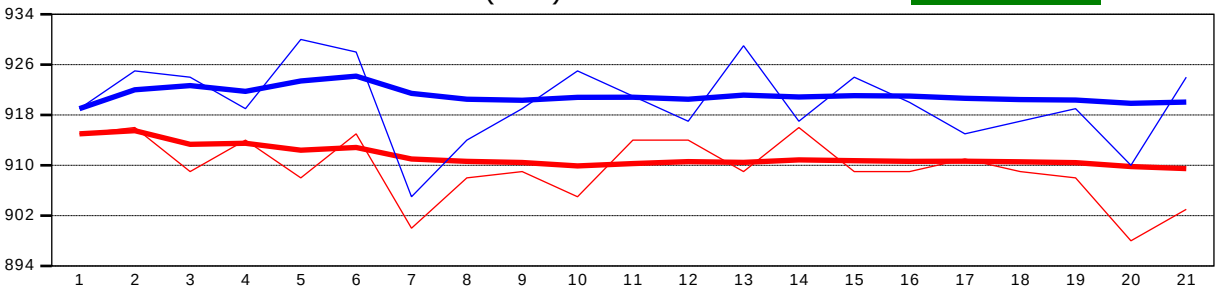
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 10/11/2020 3:00:16 PM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

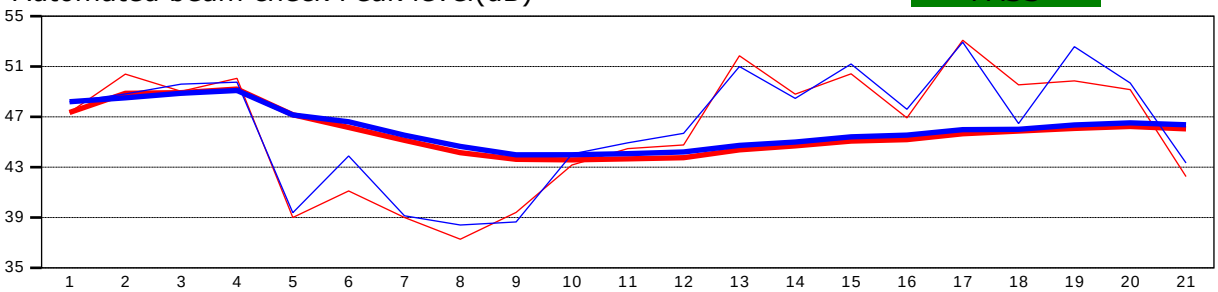
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Creek at Co Rd 17 |
| **Site number** | 10112020 |
| **Operator(s)** | Laura FS |
| **File name** | Watson Creek at Co Rd 17_20201011-153428.ft |
| **Comment** | |

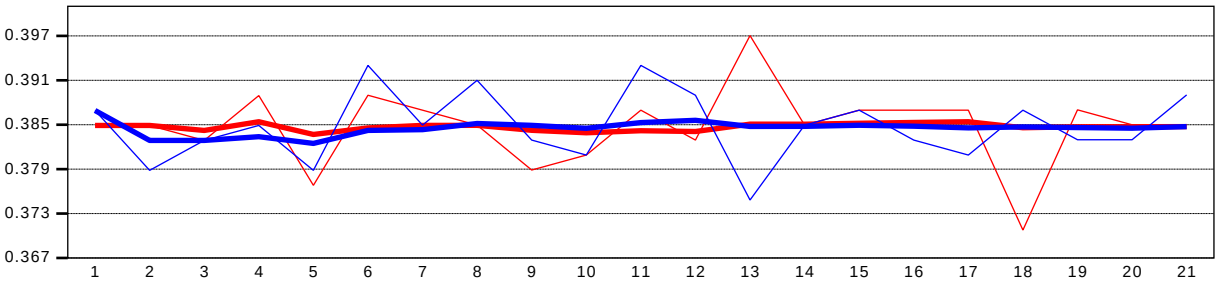
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 10/11/2020 3:00:16 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

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr on BLM |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr on BLM_20190729-180034.ft |
| **Comment** | Spot meas |

| | |
|---|---|
| **Start time** | 7/29/2019 5:38 PM |
| **End time** | 7/29/2019 5:59 PM |
| **Start location latitude** | 40.147 |
| **Start location longitude** | -106.953 |
| **Calculations engine** | FlowTracker2 |

| | |
|---|---|
| **Sensor type** | Top Setting |
| **Handheld serial number** | FT2H1747037 |
| **Probe serial number** | FT2P1747048 |
| **Probe firmware** | 1.23 |
| **Handheld software** | 1.4 |

| # Stations | Avg interval (s) | Total discharge (ft³/s) |
|---|---|---|
| 14 | 40 | 4.621 |

| Total width (ft) | Total area (m²) | Wetted Perimeter (ft) |
|---|---|---|
| 6.800 | 1.047 | 9.889 |

| Mean SNR (dB) | Mean depth (ft) | Mean velocity (m/s) |
|---|---|---|
| 42.815 | 1.657 | 0.125 |

| Mean temp (°C) | Max depth (ft) | Max velocity (m/s) |
|---|---|---|
| 17.453 | 2.850 | 0.176 |

| Discharge Uncertainty | | |
|---|---|---|
| **Category** | **ISO** | **IVE** |
| **Accuracy** | 1.0% | 1.0% |
| **Depth** | 0.2% | 1.6% |
| **Velocity** | 0.5% | 3.8% |
| **Width** | 0.2% | 0.2% |
| **Method** | 1.5% | |
| **# Stations** | 3.6% | |
| **Overall** | **4.0%** | **4.3%** |

| | |
|---|---|
| **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**

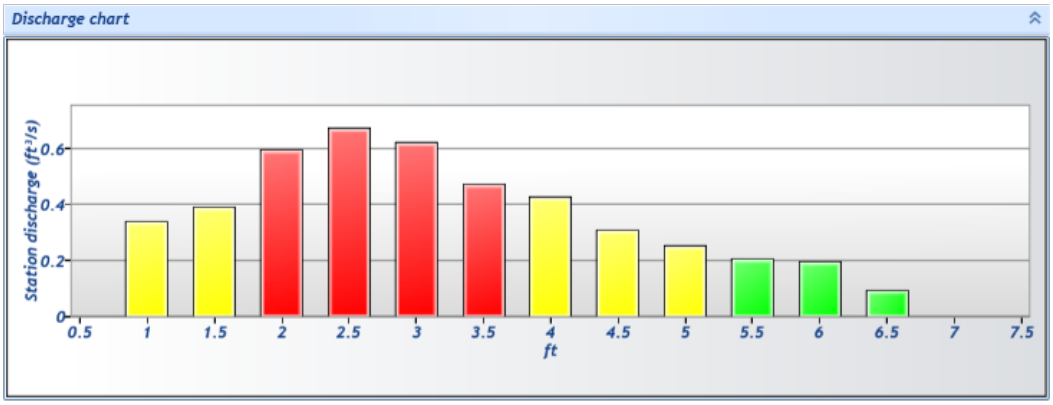
No changes were made to this file
Quality control warnings

# Discharge Measurement Summary

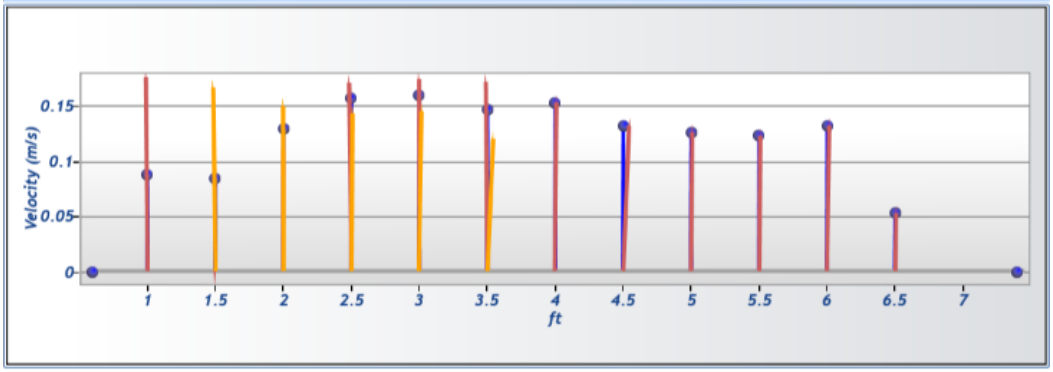
| | |
|---|---|
| **Site name** | Watson Cr on BLM |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr on BLM_20190729-180034.ft |
| **Comment** | Spot meas |

| Station Warning Settings | |
|---|---|
| **Station discharge OK** | Station discharge < 5.000% |
| **Station discharge caution** | 5.000% >= Station discharge < 10.000% |
| **Station discharge warning** | Station discharge >= 10.000% |

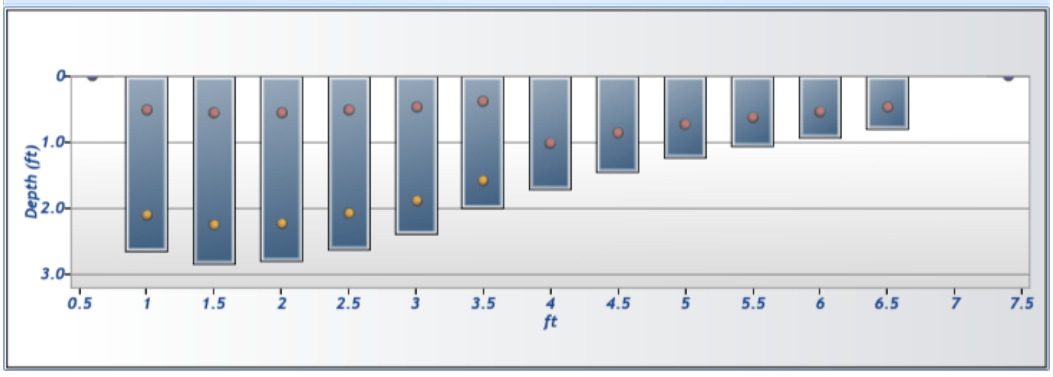
Discharge chart




Velocity chart




Depth chart



# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr on BLM |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr on BLM_20190729-180034.ft |
| **Comment** | Spot meas |

Measurement results

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Samples | Velocity (m/s) | Correction | Mean Velocity (m/s) | Area (m²) | Flow (ft³/s) | %Q | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 5:38 PM | 0.600 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.088 | 0.000 | 0.000 | 0.000 | ✓ |
| 1 | 5:39 PM | 1.000 | 0.2/0.8 | 2.650 | 0.200 | 0.530 | 80 | 0.000 | 1.000 | 0.088 | 0.111 | 0.343 | 7.429 | ✓ |
| 1 | 5:39 PM | 1.000 | 0.2/0.8 | 2.650 | 0.800 | 2.120 | 80 | 0.176 | 1.000 | 0.088 | 0.111 | 0.343 | 7.429 | ✓ |
| 2 | 5:42 PM | 1.500 | 0.2/0.8 | 2.850 | 0.200 | 0.570 | 80 | 0.002 | 1.000 | 0.084 | 0.132 | 0.394 | 8.518 | ✓ |
| 2 | 5:42 PM | 1.500 | 0.2/0.8 | 2.850 | 0.800 | 2.280 | 80 | 0.167 | 1.000 | 0.084 | 0.132 | 0.394 | 8.518 | ✓ |
| 3 | 5:44 PM | 2.000 | 0.2/0.8 | 2.800 | 0.200 | 0.560 | 80 | 0.111 | 1.000 | 0.130 | 0.130 | 0.598 | 12.935 | ✓ |
| 3 | 5:44 PM | 2.000 | 0.2/0.8 | 2.800 | 0.800 | 2.240 | 80 | 0.150 | 1.000 | 0.130 | 0.130 | 0.598 | 12.935 | ✓ |
| 4 | 5:46 PM | 2.500 | 0.2/0.8 | 2.620 | 0.200 | 0.524 | 80 | 0.171 | 1.000 | 0.157 | 0.122 | 0.675 | 14.601 | ✓ |
| 4 | 5:46 PM | 2.500 | 0.2/0.8 | 2.620 | 0.800 | 2.096 | 80 | 0.143 | 1.000 | 0.157 | 0.122 | 0.675 | 14.601 | ✓ |
| 5 | 5:48 PM | 3.000 | 0.2/0.8 | 2.380 | 0.200 | 0.476 | 80 | 0.174 | 1.000 | 0.160 | 0.111 | 0.623 | 13.490 | ✓ |
| 5 | 5:48 PM | 3.000 | 0.2/0.8 | 2.380 | 0.800 | 1.904 | 80 | 0.145 | 1.000 | 0.160 | 0.111 | 0.623 | 13.490 | ✓ |
| 6 | 5:51 PM | 3.500 | 0.2/0.8 | 2.000 | 0.200 | 0.400 | 80 | 0.172 | 1.000 | 0.146 | 0.093 | 0.479 | 10.360 | ✓ |
| 6 | 5:51 PM | 3.500 | 0.2/0.8 | 2.000 | 0.800 | 1.600 | 80 | 0.120 | 1.000 | 0.146 | 0.093 | 0.479 | 10.360 | ✓ |
| 7 | 5:53 PM | 4.000 | 0.6 | 1.720 | 0.600 | 1.032 | 80 | 0.153 | 1.000 | 0.153 | 0.080 | 0.432 | 9.342 | ✓ |
| 8 | 5:54 PM | 4.500 | 0.6 | 1.450 | 0.600 | 0.870 | 80 | 0.132 | 1.000 | 0.132 | 0.067 | 0.314 | 6.793 | ✓ |
| 9 | 5:55 PM | 5.000 | 0.6 | 1.240 | 0.600 | 0.744 | 80 | 0.126 | 1.000 | 0.126 | 0.058 | 0.257 | 5.554 | ✓ |
| 10 | 5:56 PM | 5.500 | 0.6 | 1.050 | 0.600 | 0.630 | 80 | 0.123 | 1.000 | 0.123 | 0.049 | 0.212 | 4.578 | ✓ |
| 11 | 5:57 PM | 6.000 | 0.6 | 0.920 | 0.600 | 0.552 | 80 | 0.132 | 1.000 | 0.132 | 0.043 | 0.199 | 4.312 | ✓ |
| 12 | 5:58 PM | 6.500 | 0.6 | 0.800 | 0.600 | 0.480 | 80 | 0.053 | 1.000 | 0.053 | 0.052 | 0.097 | 2.089 | ✓ |
| 13 | 5:59 PM | 7.400 | None | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 1.000 | 0.053 | 0.000 | 0.000 | 0.000 | ✓ |

# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr on BLM |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr on BLM_20190729-180034.ft |
| **Comment** | Spot meas |

| **Quality Control Settings** | |
|---|---|
| **Maximum depth change** | 50.000% |
| **Maximum spacing change** | 100.000% |
| **SNR threshold** | 10.000 dB |
| **Standard error threshold** | 0.010 m/s |
| **Spike threshold** | 10.000% |
| **Maximum velocity angle** | 20.000 deg |
| **Maximum tilt angle** | 5.000 deg |

Quality control warnings

| St# | Time | Location (ft) | Method | Depth (ft) | %Depth | Measured Depth (ft) | Warnings |
|---|---|---|---|---|---|---|---|
| 1 | 5:39 PM | 1.000 | 0.2/0.8 | 2.650 | 0.200 | 0.530 | Water Depth > QC,Approaching Low SNR,Beam SNRs Not Similar,Large SNR Variation,SNR Threshold Variation |
| 1 | 5:39 PM | 1.000 | 0.2/0.8 | 2.650 | 0.800 | 2.120 | Water Depth > QC,Approaching Low SNR,Beam SNRs Not Similar,Large SNR Variation,SNR Threshold Variation |
| 2 | 5:42 PM | 1.500 | 0.2/0.8 | 2.850 | 0.200 | 0.570 | Boundary Interference |
| 2 | 5:42 PM | 1.500 | 0.2/0.8 | 2.850 | 0.800 | 2.280 | Boundary Interference |
| 3 | 5:44 PM | 2.000 | 0.2/0.8 | 2.800 | 0.200 | 0.560 | High Stn % Discharge |
| 3 | 5:44 PM | 2.000 | 0.2/0.8 | 2.800 | 0.800 | 2.240 | High Stn % Discharge |
| 4 | 5:46 PM | 2.500 | 0.2/0.8 | 2.620 | 0.200 | 0.524 | High Stn % Discharge |
| 4 | 5:46 PM | 2.500 | 0.2/0.8 | 2.620 | 0.800 | 2.096 | High Stn % Discharge |
| 5 | 5:48 PM | 3.000 | 0.2/0.8 | 2.380 | 0.200 | 0.476 | High Stn % Discharge |
| 5 | 5:48 PM | 3.000 | 0.2/0.8 | 2.380 | 0.800 | 1.904 | High Stn % Discharge |
| 6 | 5:51 PM | 3.500 | 0.2/0.8 | 2.000 | 0.200 | 0.400 | High Stn % Discharge |
| 6 | 5:51 PM | 3.500 | 0.2/0.8 | 2.000 | 0.800 | 1.600 | High Stn % Discharge |
| 13 | 5:59 PM | 7.400 | None | 0.000 | 0.000 | 0.000 | Water Depth > QC |

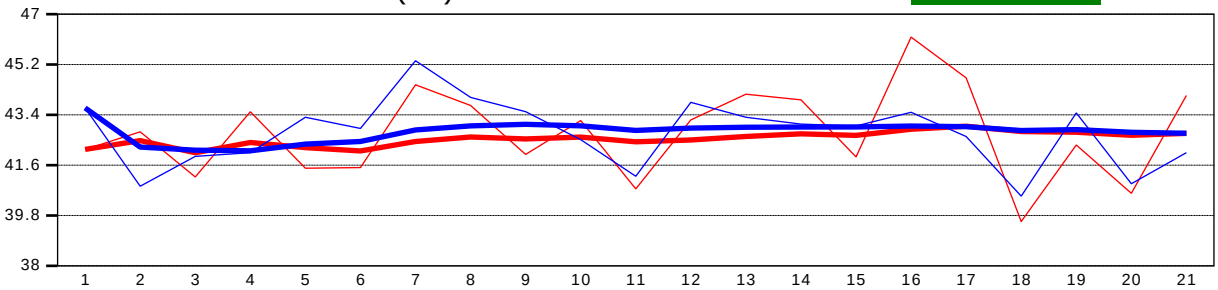
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr on BLM |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr on BLM_20190729-180034.ft |
| **Comment** | Spot meas |

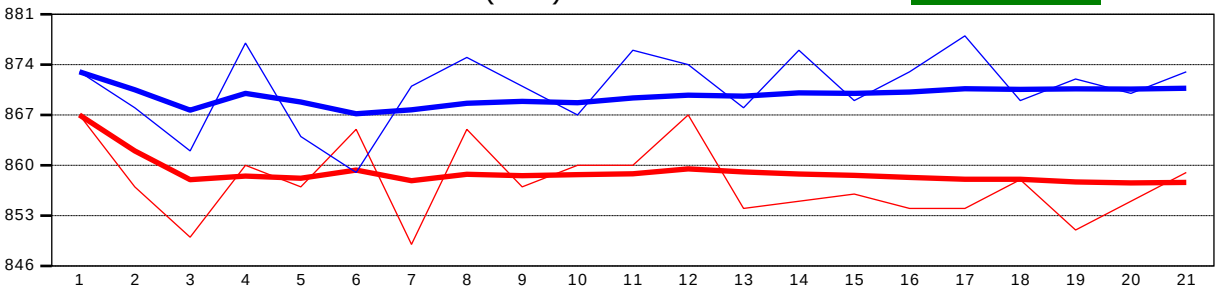
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/29/2019 5:38:15 PM

Automated beam check SNR(dB) PASS




Automated beam check Noise level(cnts) PASS




**Automated beam check Quality control warnings**

No quality control warnings

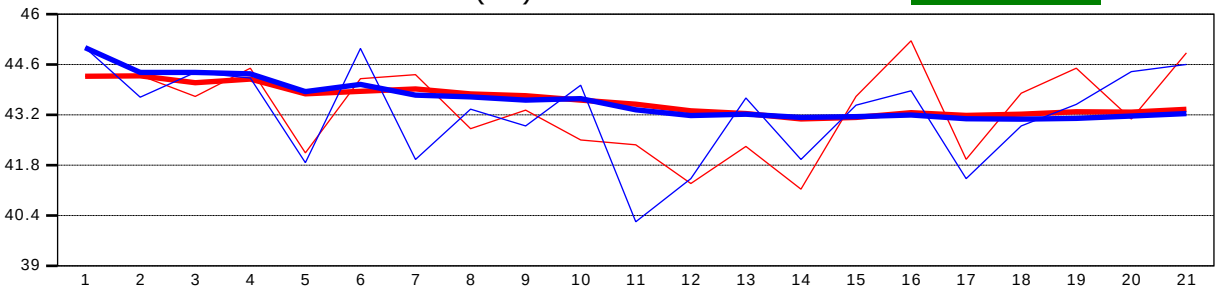
# Discharge Measurement Summary

| | |
|---|---|
| **Site name** | Watson Cr on BLM |
| **Site number** | 001 |
| **Operator(s)** | JEL |
| **File name** | Watson Cr on BLM_20190729-180034.ft |
| **Comment** | Spot meas |

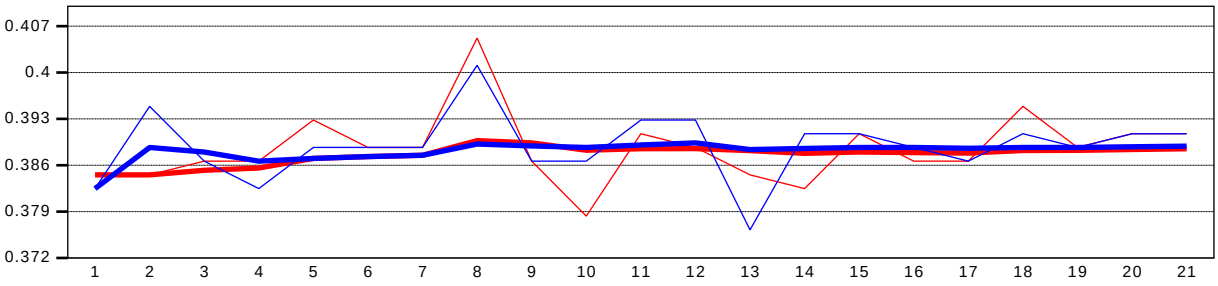
| | |
|---|---|
| **Beam 1** | |
| **Beam 2** | |

Automated beam check Start time 7/29/2019 5:38:15 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

**DRAFT RECOMMENDATION – SUBJECT TO CHANGE**

Ms. Linda Bassi
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an increase to the instream flow water right on Watson Creek, located in Water Division 6.

**Location and Land Status**. Watson Creek originates at Heart Lake on the east side of the Flattops Mountains, approximately 7.0 miles southwest of the community of Yampa. Watson Creek flows into the Yampa River approximately two miles downstream from Yampa. This recommendation addresses the portion of Watson Creek that starts at the confluence with Moody Creek and extends downstream to the headgate of the Hardscrabble Ditch, a distance of approximately 6.5 miles. The BLM manages 0.3 miles of this reach, while approximately 5.2 miles are in private ownership.

**Biological Summary.** Watson Creek is a cool water, low to moderate gradient stream. The reach that is the subject of this recommendation flows through shallow valley that ranges from ¼ to ½ mile in width. The reach flows through agricultural lands primarily used for livestock grazing. Substrate is generally from small to medium in size, ranging from sands and gravels to 4 inch cobbles. Water quality is acceptable for supporting cool water fish species, but the creek does appear to be affected by nutrient loading.

Fish surveys have documented self-supporting populations of longnose suckers, whitehead suckers, and creek chub. Spot surveys have indicated populations of mayfly, caddisfly, and other macroinvertebrate species that tolerate cool to warm water habitats.

The creek supports a riparian community of willow, sedges, and rush species, which are more abundant in areas that are fenced off from grazing. Bank stability appears to be good, except in areas of high livestock usage.

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

| Cross Section Date | Discharge Rate | Top Width | Winter Flow Recommendation (meets 2 of 3 hydraulic criteria) | Summer Flow Recommendation (meets 3 of 3 hydraulic criteria) |
|---|---|---|---|---|
| 08/2/2017 #1 | 2.52 cfs | 12.77 feet | 1.10 cfs | 2.27 cfs |
| 08/2/2017 #2 | 2.57 cfs | 10.19 feet | 1.01 cfs | 1.57 cfs |
| | | Averages: | 1.05 cfs | 1.92 cfs |

BLM's analysis of this data, coordinated with Colorado Parks and Wildlife, indicates that the

following flows are needed to protect the natural environment to a reasonable degree.

> 1.90 cubic feet per second is recommended during the warm weather period, from April 1 to October 31. This recommendation is driven by the average depth criteria and wetted perimeter criteria. During the irrigation season, maintaining this flow rate in the creek would provide adequate habitat for maintaining fish species while irrigation diversions occur. This flow rate will maintain sufficient physical habitat in the creek for the fish population to complete important parts of their life cycle before cold temperatures reduce fish activity for the winter.
>
> 1.05 cubic feet per second is recommended during cold weather period, from November 1 through March 31. This recommendation is driven by the average velocity criteria. This flow rate should prevent complete icing of the numerous pools in this reach, allowing the fish population to overwinter.

**Water Availability.** The 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 Streamstats can provide an estimate of natural hydrology, but this estimate may have to be modified by adjusting for irrigation diversions and return flows. One nearby gages may provide an estimate of natural hydrology, because it is located on a watershed with similar characteristics. USGS Gage 09238000, on Oak Creek near the community of Oak Creek, is located on a smaller watershed, but appears to be relatively unaffected by diversion and storage operations. Diversion records would also assist in analyzing the impact of diversions on stream flows, while recognizing that return flows from irrigation accrue to the channel quickly because of the narrow width of the stream valley.

The BLM is aware of the following water rights within the proposed instream flow reach:

Powell Ditch 1 – 1.0 cfs
Powell Ditch 2 – 2.0 cfs
Laramore Ditch – 5.0 cfs
Ferguson Ditch – 15.0 cfs

The BLM is aware of the following water upstream from the recommended reach:

Moody Ditch – 5.0 cfs
Bijou Ditch – 5.0 cfs
Mohr Ditch – 0.66 cfs
Hill Ditch – 4.52 cfs
Homer Buttricks Ditch – 3.0 cfs
Patton Ditch – 4.0 cfs
Heart Lake Reservoir – 283 acre feet

**Relationship to Land Management Plans.** The BLM's management plan calls for improvement and recovery of current and historic fisheries as a means of increasing native fish populations. In addition, the BLM plan calls for making instream flow recommendations to the

Colorado Water Conservation Board to meet minimum instream flow requirements to maintain native 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 further sources of degradation. 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 2018. We thank 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,

Brian St. George
Deputy State Director
Resources and Fire

Cc: Bruce Sillitoe, Little Snake FO
Eric Scherff, Little Snake FO
Andrew Archuleta, Northwest District Manager

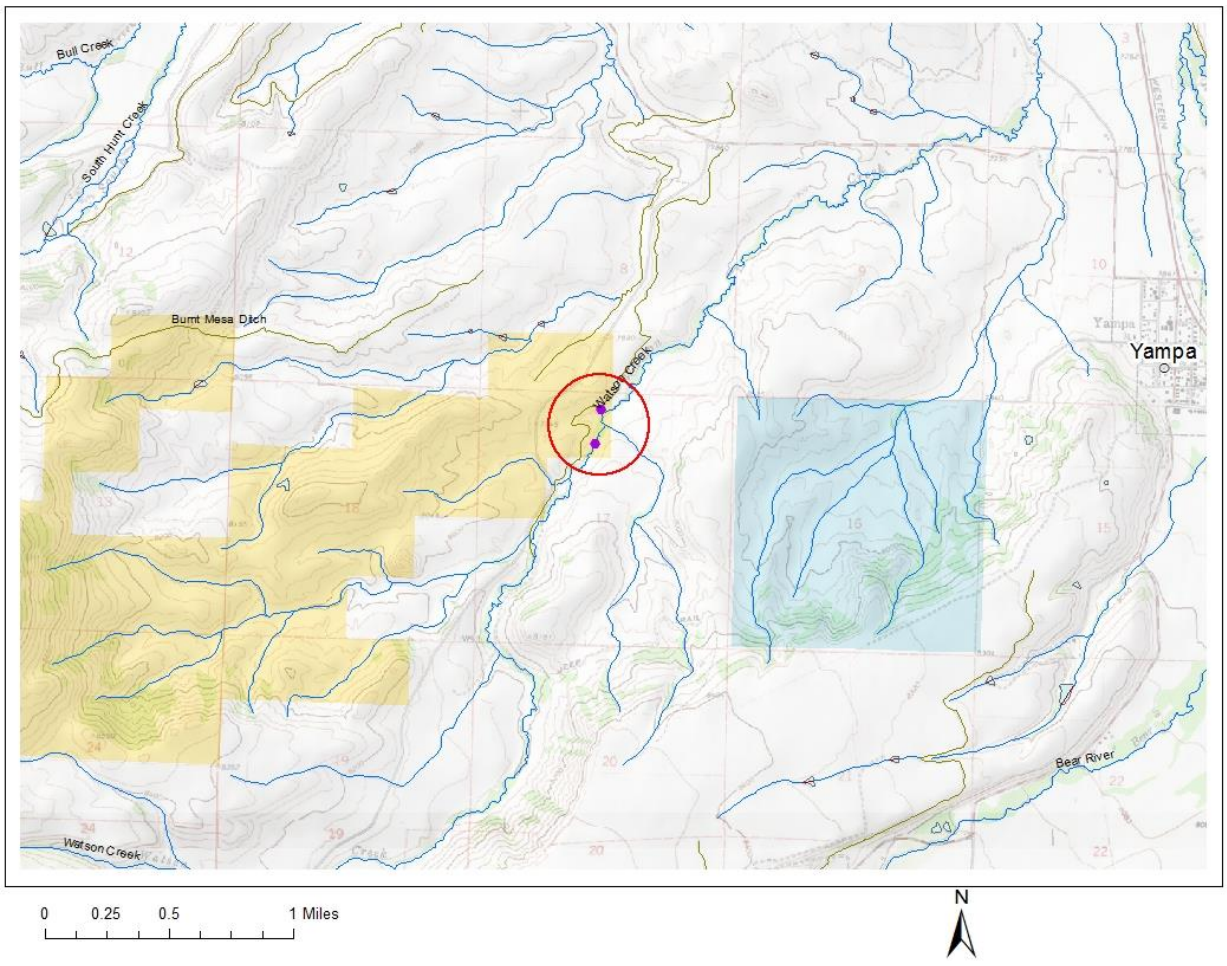
# Little Snake Field Office

## Stream Sampling July 2016

Watson Creek - Water Code: 22676

**Introduction**:

Watson Creek, located west of Yampa, Colorado on BLM lands managed by the Little Snake Field Office, was sampled on July 18, 2016. Watson Creek is tributary to the Yampa River. Sampling was conducted to obtain baseline information on fishery status and species composition. One backpack electrofisher was used to sample limited flowing stream habitat in approximately 125 feet of stream. This stream was primarily a series of beaver dams and ponds with some small reaches of slow moving water with deep pools and a lot of silt, which made sampling difficult. Capture efficiency was poor. Fish species collected included: White Suckers, Longnose Sucker, and Creek Chub. Personnel present were Tom Fresques, Nate Higginson, and Kristen Doyle, BLM.



**White Sucker**

**Longnose Sucker**

**Creek Chub**

**Representative habitat**

**Representative habitat**

**Discussion:**

Watson Creek is a small stream that appears to be used extensively for irrigation purposes. A total of 6 fish were collected including four white suckers, one longnose sucker, and one creek chub. Additional fish were seen but were not collected due to poor sampling efficiency. Some very small larval fish were also noted but not collected. Sampling was difficult as the stream is a series of beaver ponds with low gradient, deep runs and pools between. Riffle habitat was very limited.

Riparian habitat is comprised primarily of sedges, rushes, riparian grasses, and a few willows. Stream shading is limited. Stream habitats are comprised primarily of beaver ponds with deep slow runs and pools and limited riffle habitat outside of beaver pond areas. Many pools were >3 feet in depth. Substrate was comprised primarily of fine sediments - silt / clay with limited gravels.

**Recommendations:**

- Consider other sampling techniques, such as seining

COLORADO WATER CONSERVATION BOARD

# FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

## LOCATION INFORMATION

| | | | | | | |
|---|---|---|---|---|---|---|
| STREAM NAME: Watson Creek | | | | | | CROSS-SECTION NO.: 1 |
| CROSS-SECTION LOCATION: At BLM - private boundary | | | | | | |
| DATE: 8-2-17 | OBSERVERS: R. Smith, E. Scharff | | | | | |
| LEGAL DESCRIPTION | ¼ SECTION: NE NW | SECTION: 17 | TOWNSHIP: 20 N/S | RANGE: 85 E/W | PM: 6th | |
| COUNTY: Routt | WATERSHED: Yampa R. | WATER DIVISION: | DOW WATER CODE: 22676 | | | |
| MAP(S): USGS: | Zone 13 333772 4446171 | | | | | |
| USFS: | | | | | | |

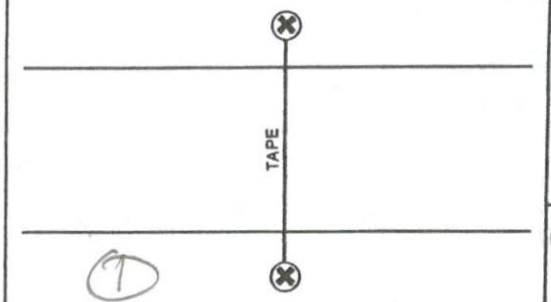
## SUPPLEMENTAL DATA

| | | | | | |
|---|---|---|---|---|---|
| GAG 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: gravels to 4" cobbles | PHOTOGRAPHS TAKEN: YES/NO | NUMBER OF PHOTOGRAPHS: 3 | | | |

## CHANNEL PROFILE DATA

| STATION | DISTANCE FROM TAPE (ft) | ROD READING (ft) |
|---|---|---|
| ⊗ Tape @ Stake LB | 0.0 | surveyed |
| ⊗ Tape @ Stake RB | 0.0 | surveyed |
| ① WS @ Tape LB/RB | 0.0 | 7.75 / 7.75 |
| ② WS Upstream | 13.0 | 7.60 |
| ③ WS Downstream | 8.8 | 7.78 |
| SLOPE | 0.18 / 21.8 = .008 | |

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

Willow - sedge - rush riparian.

Ph =
Temp =
Cond =

# DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Watson Creek | CROSS-SECTION NO.: 1 | DATE: 8-2-17 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading: _____ ft | TIME: 10:00 am

| Stake (S) Grassline (G) Waterline (W) Rock (R) | Distance From Initial Point (ft) | Width (ft) | Total Vertical Depth From Tape/Inst (ft) | Water Depth (ft) | Depth of Obser-vation (ft) | Revolutions | Time (sec) | Velocity (ft/sec) At Point | Velocity (ft/sec) Mean in Vertical | Area ($ft^2$) | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LS | 2.0 | | 5.19 | | | | | | | | |
| G | 3.0 | | 5.95 | | | | | | | | |
| | 4.3 | | 7.52 | | | | | | | | |
| | 6.0 | | 7.78 | | | | | | | | |
| | 8.2 | | 7.72 | | | | | | | | |
| LW | 9.7 | | 7.75 | | | | | | | | |
| | 10.0 | | 7.85 | 0.10 | | | | Ø | | | |
| | 10.3 | | 7.95 | 0.20 | | | | Ø | | | |
| | 10.6 | | 8.05 | 0.30 | | | | 0.45 | | | |
| | 10.9 | | 8.05 | 0.30 | | | | 0.96 | | | |
| | 11.2 | | 8.05 | 0.30 | | | | 1.30 | | | |
| | 11.5 | | 8.05 | 0.30 | | | | 1.37 | | | |
| | 11.7 | | 8.10 | 0.35 | | | | 1.26 | | | |
| | 11.9 | | 8.10 | 0.35 | | | | 1.80 | | | |
| | 12.1 | | 8.10 | 0.35 | | | | 1.89 | | | |
| | 12.3 | | 8.15 | 0.40 | | | | 2.09 | | | |
| | 12.5 | | 8.20 | 0.45 | | | | 2.08 | | | |
| | 12.7 | | 8.25 | 0.50 | | | | 2.46 | | | |
| | 12.9 | | 8.25 | 0.50 | | | | 2.28 | | | |
| | 13.1 | | 8.25 | 0.50 | | | | 2.31 | | | |
| | 13.3 | | 8.30 | 0.55 | | | | 1.98 | | | |
| | 13.5 | | 8.25 | 0.50 | | | | 1.49 | | | |
| | 13.7 | | 8.25 | 0.50 | | | | 1.10 | | | |
| | 13.9 | | 8.20 | 0.45 | | | | 0.90 | | | |
| | 14.1 | | 8.15 | 0.4 | | | | 0.62 | | | |
| | 14.3 | | 8.15 | 0.4 | | | | 0.54 | | | |
| | 14.5 | | 8.15 | 0.4 | | | | 0.59 | | | |
| | 14.7 | | 8.15 | 0.4 | | | | 0.53 | | | |
| | 14.9 | | 8.05 | 0.3 | | | | 0.39 | | | |
| | 15.1 | | 7.85 | 0.1 | | | | 0.09 | | | |
| RW | 15.3 | | 7.75 | | | | | | | | |
| G | 15.8 | | 5.85 | | | | | | | | |
| RS | 16.3 | | 4.60 | | | | | | | | |
| TOTALS: | | | | | | | | | | | |

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

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

LOCATION INFORMATION

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-Private Boundary |
| XS NUMBER: | 1 |
| DATE: | 2-Aug-17 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | 0 |
| USFS MAP: | 0 |

SUPPLEMENTAL DATA

*** NOTE ***
Leave TAPE WT and TENSION
at defaults for data collected
with a survey level and rod

| | |
|---|---|
| TAPE WT: | 0.0106 |
| TENSION: | 99999 |

CHANNEL PROFILE DATA

| | |
|---|---|
| SLOPE: | 0.008 |

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: ….....……..…….....DATE.....

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

# DATA POINTS= 33

VALUES COMPUTED FROM RAW FIELD DATA

| | FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | WETTED PERIM. | WATER DEPTH | AREA (Am) | Q (Qm) | % Q CELL |
|---|---|---|---|---|---|---|---|---|---|---|
| | LS | 2.00 | 5.19 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| 1 | G | 3.00 | 5.95 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 4.30 | 7.52 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 6.00 | 7.78 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 8.20 | 7.72 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | LW | 9.70 | 7.75 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.0% |
| | | 10.00 | 7.85 | 0.10 | 0.00 | 0.32 | 0.10 | 0.03 | 0.00 | 0.0% |
| | | 10.30 | 7.95 | 0.20 | 0.00 | 0.32 | 0.20 | 0.06 | 0.00 | 0.0% |
| | | 10.60 | 8.05 | 0.30 | 0.45 | 0.32 | 0.30 | 0.09 | 0.04 | 1.6% |
| | | 10.90 | 8.05 | 0.30 | 0.96 | 0.30 | 0.30 | 0.09 | 0.09 | 3.4% |
| | | 11.20 | 8.05 | 0.30 | 1.30 | 0.30 | 0.30 | 0.09 | 0.12 | 4.6% |
| | | 11.50 | 8.05 | 0.30 | 1.37 | 0.30 | 0.30 | 0.08 | 0.10 | 4.1% |
| | | 11.70 | 8.10 | 0.35 | 1.26 | 0.21 | 0.35 | 0.07 | 0.09 | 3.5% |
| | | 11.90 | 8.10 | 0.35 | 1.80 | 0.20 | 0.35 | 0.07 | 0.13 | 5.0% |
| | | 12.10 | 8.10 | 0.35 | 1.89 | 0.20 | 0.35 | 0.07 | 0.13 | 5.3% |
| | | 12.30 | 8.15 | 0.40 | 2.09 | 0.21 | 0.40 | 0.08 | 0.17 | 6.6% |
| | | 12.50 | 8.20 | 0.45 | 2.08 | 0.21 | 0.45 | 0.09 | 0.19 | 7.4% |
| | | 12.70 | 8.25 | 0.50 | 2.46 | 0.21 | 0.50 | 0.10 | 0.25 | 9.8% |
| | | 12.90 | 8.25 | 0.50 | 2.28 | 0.20 | 0.50 | 0.10 | 0.23 | 9.1% |
| | | 13.10 | 8.25 | 0.50 | 2.31 | 0.20 | 0.50 | 0.10 | 0.23 | 9.2% |
| | | 13.30 | 8.30 | 0.55 | 1.98 | 0.21 | 0.55 | 0.11 | 0.22 | 8.6% |
| | | 13.50 | 8.25 | 0.50 | 1.49 | 0.21 | 0.50 | 0.10 | 0.15 | 5.9% |
| | | 13.70 | 8.25 | 0.50 | 1.10 | 0.20 | 0.50 | 0.10 | 0.11 | 4.4% |
| | | 13.90 | 8.20 | 0.45 | 0.90 | 0.21 | 0.45 | 0.09 | 0.08 | 3.2% |
| | | 14.10 | 8.15 | 0.40 | 0.62 | 0.21 | 0.40 | 0.08 | 0.05 | 2.0% |
| | | 14.30 | 8.15 | 0.40 | 0.54 | 0.20 | 0.40 | 0.08 | 0.04 | 1.7% |
| | | 14.50 | 8.15 | 0.40 | 0.59 | 0.20 | 0.40 | 0.08 | 0.05 | 1.9% |
| | | 14.70 | 8.15 | 0.40 | 0.53 | 0.20 | 0.40 | 0.08 | 0.04 | 1.7% |
| | | 14.90 | 8.05 | 0.30 | 0.39 | 0.22 | 0.30 | 0.06 | 0.02 | 0.9% |
| | | 15.10 | 7.85 | 0.10 | 0.09 | 0.28 | 0.10 | 0.02 | 0.00 | 0.1% |
| | RW | 15.30 | 7.75 | 0.00 | 0.00 | 0.22 | | 0.00 | 0.00 | 0.0% |
| 1 | G | 15.80 | 5.85 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | RS | 16.30 | 4.60 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | TOTALS ---------- | | | | | 5.83 | 0.55 (Max.) | 1.92 | 2.52 | 100.0% |

Manning's n = 0.0481
Hydraulic Radius= 0.32858716

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

WATER LINE COMPARISON TABLE

| WATER LINE | MEAS AREA | COMP AREA | AREA ERROR |
|---|---|---|---|
| | 1.92 | 1.93 | 1.0% |
| 7.50 | 1.92 | 4.48 | 134.0% |
| 7.52 | 1.92 | 4.26 | 122.4% |
| 7.54 | 1.92 | 4.04 | 110.9% |
| 7.56 | 1.92 | 3.82 | 99.6% |
| 7.58 | 1.92 | 3.61 | 88.4% |
| 7.60 | 1.92 | 3.40 | 77.4% |
| 7.62 | 1.92 | 3.19 | 66.4% |
| 7.64 | 1.92 | 2.98 | 55.7% |
| 7.66 | 1.92 | 2.78 | 45.0% |
| 7.68 | 1.92 | 2.58 | 34.6% |
| 7.70 | 1.92 | 2.38 | 24.2% |
| 7.71 | 1.92 | 2.28 | 19.1% |
| 7.72 | 1.92 | 2.18 | 14.0% |
| 7.73 | 1.92 | 2.09 | 9.2% |
| 7.74 | 1.92 | 2.01 | 4.9% |
| 7.75 | 1.92 | 1.93 | 1.0% |
| 7.76 | 1.92 | 1.87 | -2.5% |
| 7.77 | 1.92 | 1.81 | -5.7% |
| 7.78 | 1.92 | 1.75 | -8.7% |
| 7.79 | 1.92 | 1.70 | -11.5% |
| 7.80 | 1.92 | 1.64 | -14.3% |
| 7.82 | 1.92 | 1.54 | -19.8% |
| 7.84 | 1.92 | 1.43 | -25.3% |
| 7.86 | 1.92 | 1.33 | -30.6% |
| 7.88 | 1.92 | 1.23 | -35.8% |
| 7.90 | 1.92 | 1.13 | -41.0% |
| 7.92 | 1.92 | 1.03 | -46.1% |
| 7.94 | 1.92 | 0.94 | -51.1% |
| 7.96 | 1.92 | 0.84 | -56.0% |
| 7.98 | 1.92 | 0.75 | -60.8% |
| 8.00 | 1.92 | 0.66 | -65.5% |

WATERLINE AT ZERO
AREA ERROR = 7.753

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

Constant Manning's n

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

| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 5.95 | 12.77 | 1.80 | 2.35 | 22.97 | 15.15 | 100.0% | 1.52 | 83.71 | 3.64 |
| | 6.75 | 11.90 | 1.10 | 1.55 | 13.06 | 13.28 | 87.6% | 0.98 | 35.69 | 2.73 |
| | 6.80 | 11.84 | 1.05 | 1.50 | 12.47 | 13.16 | 86.9% | 0.95 | 33.23 | 2.66 |
| | 6.85 | 11.79 | 1.01 | 1.45 | 11.88 | 13.04 | 86.1% | 0.91 | 30.83 | 2.59 |
| | 6.90 | 11.73 | 0.96 | 1.40 | 11.29 | 12.93 | 85.3% | 0.87 | 28.50 | 2.52 |
| | 6.95 | 11.68 | 0.92 | 1.35 | 10.71 | 12.81 | 84.6% | 0.84 | 26.24 | 2.45 |
| | 7.00 | 11.62 | 0.87 | 1.30 | 10.12 | 12.69 | 83.8% | 0.80 | 24.05 | 2.38 |
| | 7.05 | 11.57 | 0.82 | 1.25 | 9.54 | 12.58 | 83.0% | 0.76 | 21.93 | 2.30 |
| | 7.10 | 11.52 | 0.78 | 1.20 | 8.97 | 12.46 | 82.2% | 0.72 | 19.89 | 2.22 |
| | 7.15 | 11.46 | 0.73 | 1.15 | 8.39 | 12.34 | 81.5% | 0.68 | 17.92 | 2.14 |
| | 7.20 | 11.41 | 0.69 | 1.10 | 7.82 | 12.23 | 80.7% | 0.64 | 16.03 | 2.05 |
| | 7.25 | 11.35 | 0.64 | 1.05 | 7.25 | 12.11 | 79.9% | 0.60 | 14.23 | 1.96 |
| | 7.30 | 11.30 | 0.59 | 1.00 | 6.69 | 11.99 | 79.2% | 0.56 | 12.51 | 1.87 |
| | 7.35 | 11.24 | 0.54 | 0.95 | 6.12 | 11.88 | 78.4% | 0.52 | 10.87 | 1.78 |
| | 7.40 | 11.19 | 0.50 | 0.90 | 5.56 | 11.76 | 77.6% | 0.47 | 9.32 | 1.68 |
| | 7.45 | 11.13 | 0.45 | 0.85 | 5.00 | 11.64 | 76.9% | 0.43 | 7.87 | 1.57 |
| | 7.50 | 11.08 | 0.40 | 0.80 | 4.45 | 11.53 | 76.1% | 0.39 | 6.51 | 1.46 |
| | 7.55 | 10.84 | 0.36 | 0.75 | 3.90 | 11.23 | 74.2% | 0.35 | 5.32 | 1.36 |
| | 7.60 | 10.50 | 0.32 | 0.70 | 3.37 | 10.85 | 71.6% | 0.31 | 4.26 | 1.27 |
| | 7.65 | 10.16 | 0.28 | 0.65 | 2.85 | 10.47 | 69.1% | 0.27 | 3.30 | 1.16 |
| | 7.70 | 9.82 | 0.24 | 0.60 | 2.35 | 10.09 | 66.6% | 0.23 | 2.46 | 1.05 |
| *WL* | 7.75 | 6.76 | 0.28 | 0.55 | 1.91 | 6.98 | 46.1% | 0.27 | 2.23 | 1.17 |
| | 7.80 | 5.34 | 0.30 | 0.50 | 1.63 | 5.54 | 36.6% | 0.29 | 1.98 | 1.22 |
| | 7.85 | 5.09 | 0.27 | 0.45 | 1.37 | 5.27 | 34.8% | 0.26 | 1.53 | 1.12 |
| | 7.90 | 4.89 | 0.23 | 0.40 | 1.12 | 5.05 | 33.3% | 0.22 | 1.13 | 1.01 |
| | 7.95 | 4.69 | 0.19 | 0.35 | 0.88 | 4.82 | 31.8% | 0.18 | 0.78 | 0.89 |
| | 8.00 | 4.49 | 0.14 | 0.30 | 0.65 | 4.59 | 30.3% | 0.14 | 0.48 | 0.75 |
| | 8.05 | 3.38 | 0.13 | 0.25 | 0.43 | 3.45 | 22.8% | 0.12 | 0.30 | 0.69 |
| | 8.10 | 2.68 | 0.10 | 0.20 | 0.27 | 2.74 | 18.1% | 0.10 | 0.16 | 0.59 |
| | 8.15 | 1.78 | 0.08 | 0.15 | 0.14 | 1.81 | 12.0% | 0.08 | 0.07 | 0.51 |
| | 8.20 | 1.38 | 0.05 | 0.10 | 0.07 | 1.40 | 9.2% | 0.05 | 0.02 | 0.36 |
| | 8.25 | 0.38 | 0.02 | 0.05 | 0.01 | 0.39 | 2.6% | 0.02 | 0.00 | 0.22 |

STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

SUMMARY SHEET

| | | |
|---|---|---|
| MEASURED FLOW (Qm)= | 2.52 | cfs |
| CALCULATED FLOW (Qc)= | 2.23 | cfs |
| (Qm-Qc)/Qm * 100 = | 11.4 | % |
| MEASURED WATERLINE (WLm)= | 7.75 | ft |
| CALCULATED WATERLINE (WLc)= | 7.75 | ft |
| (WLm-WLc)/WLm * 100 = | 0.0 | % |
| MAX MEASURED DEPTH (Dm)= | 0.55 | ft |
| MAX CALCULATED DEPTH (Dc)= | 0.55 | ft |
| (Dm-Dc)/Dm * 100 | 0.5 | % |
| MEAN VELOCITY= | 1.17 | ft/sec |
| MANNING'S N= | 0.048 | |
| SLOPE= | 0.008 | ft/ft |
| .4 * Qm = | 1.0 | cfs |
| 2.5 * Qm= | 6.3 | cfs |

RECOMMENDED INSTREAM FLOW:
==========

| FLOW (CFS) | PERIOD |
|---|---|
| ========== | ======== |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

RATIONALE FOR RECOMMENDATION:
==========

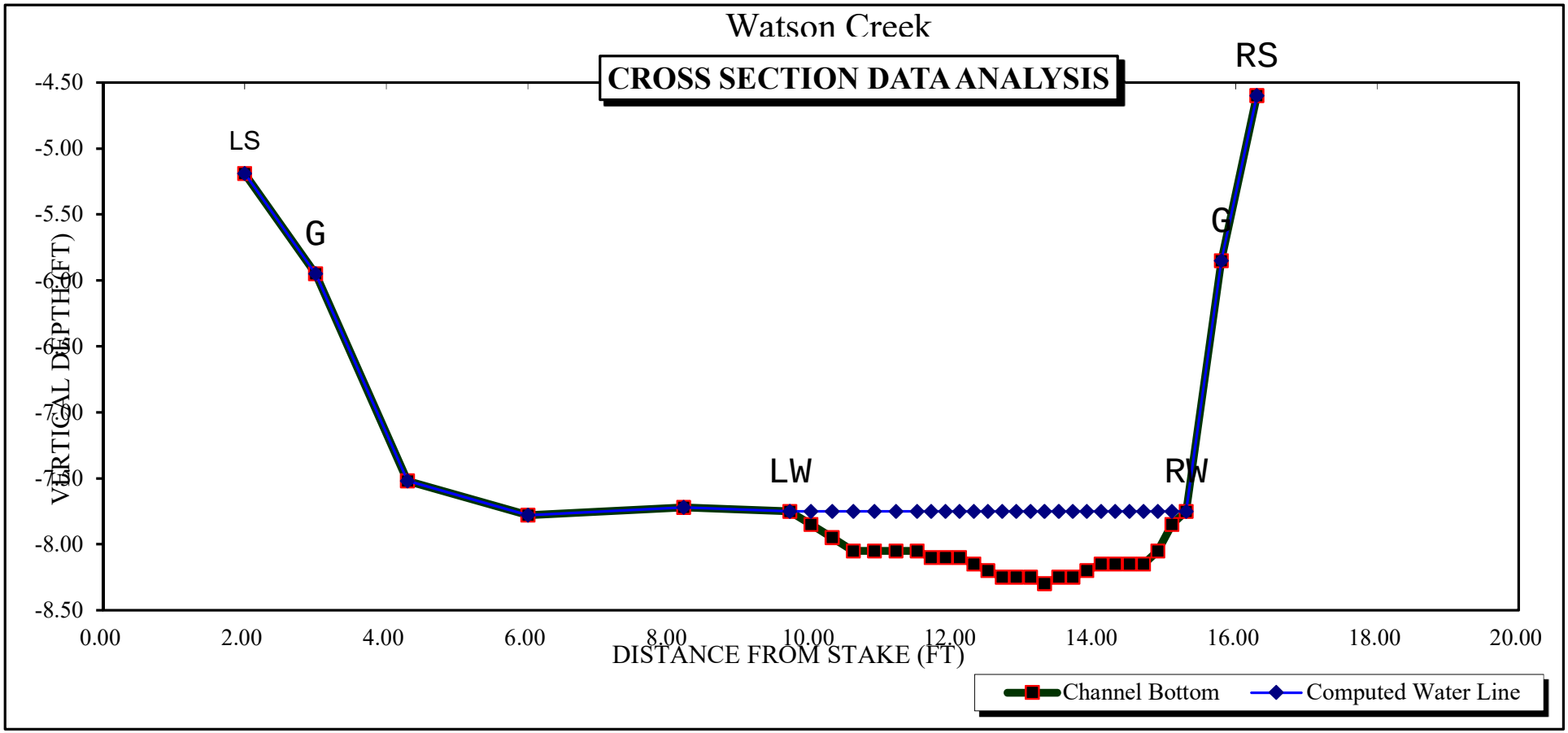
RECOMMENDATION BY: …….. AGENCY…….. DATE:……

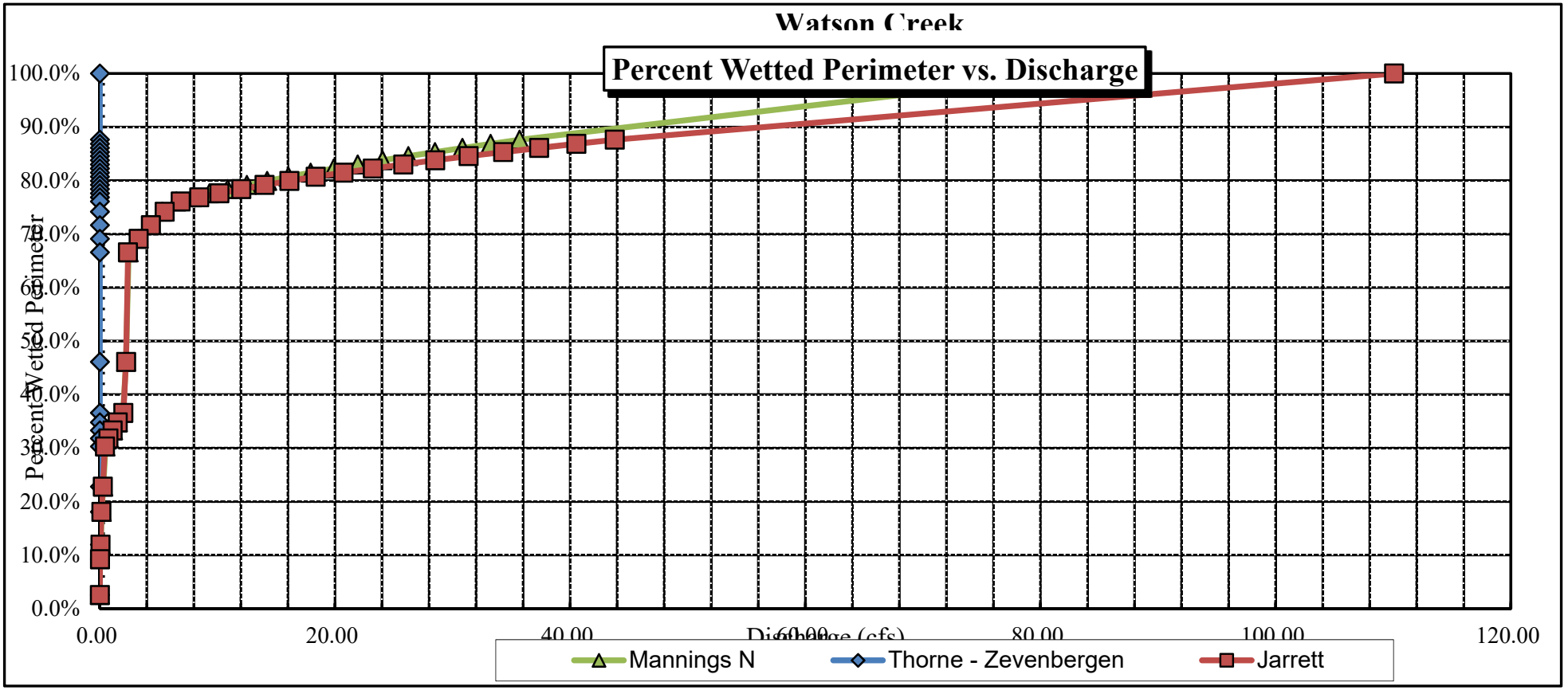
CWCB REVIEW BY: …….. DATE:……

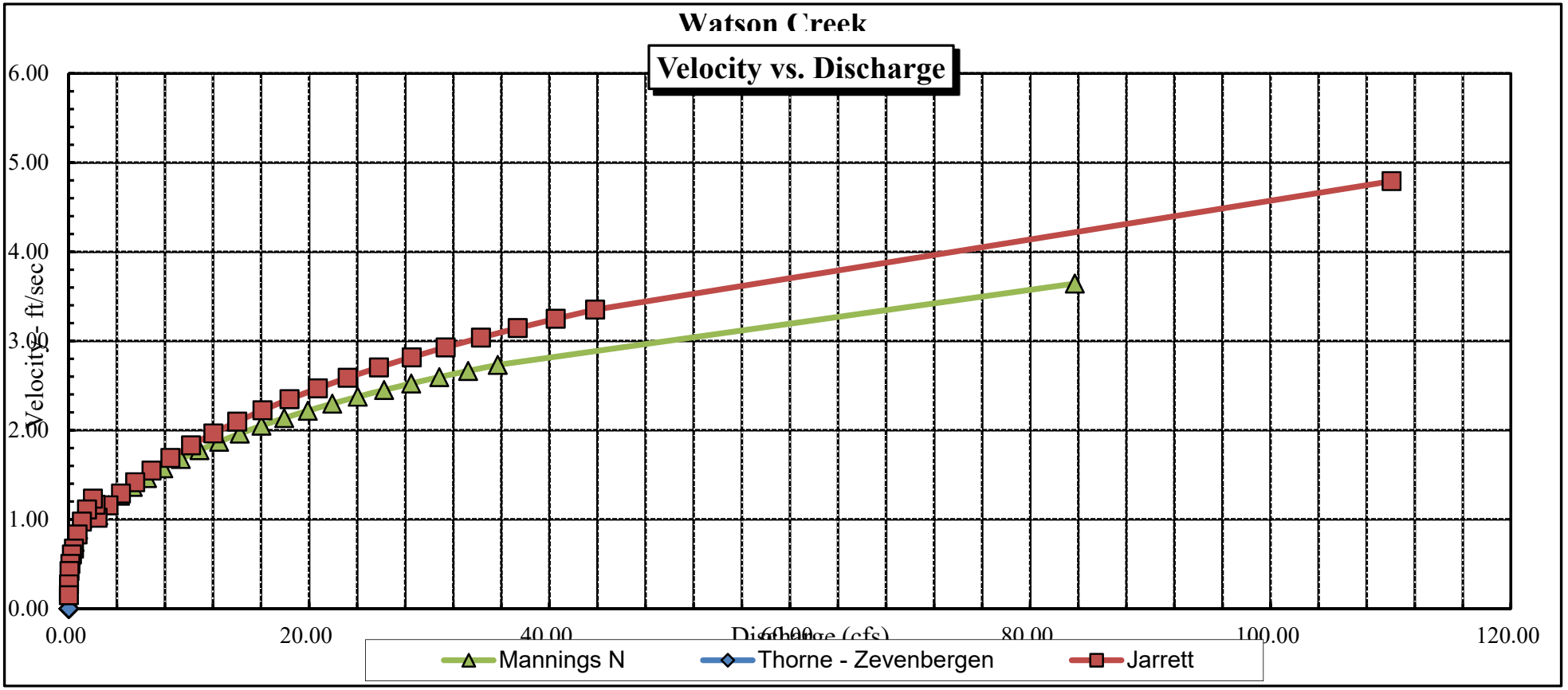
STREAM NAME: Watson Creek
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

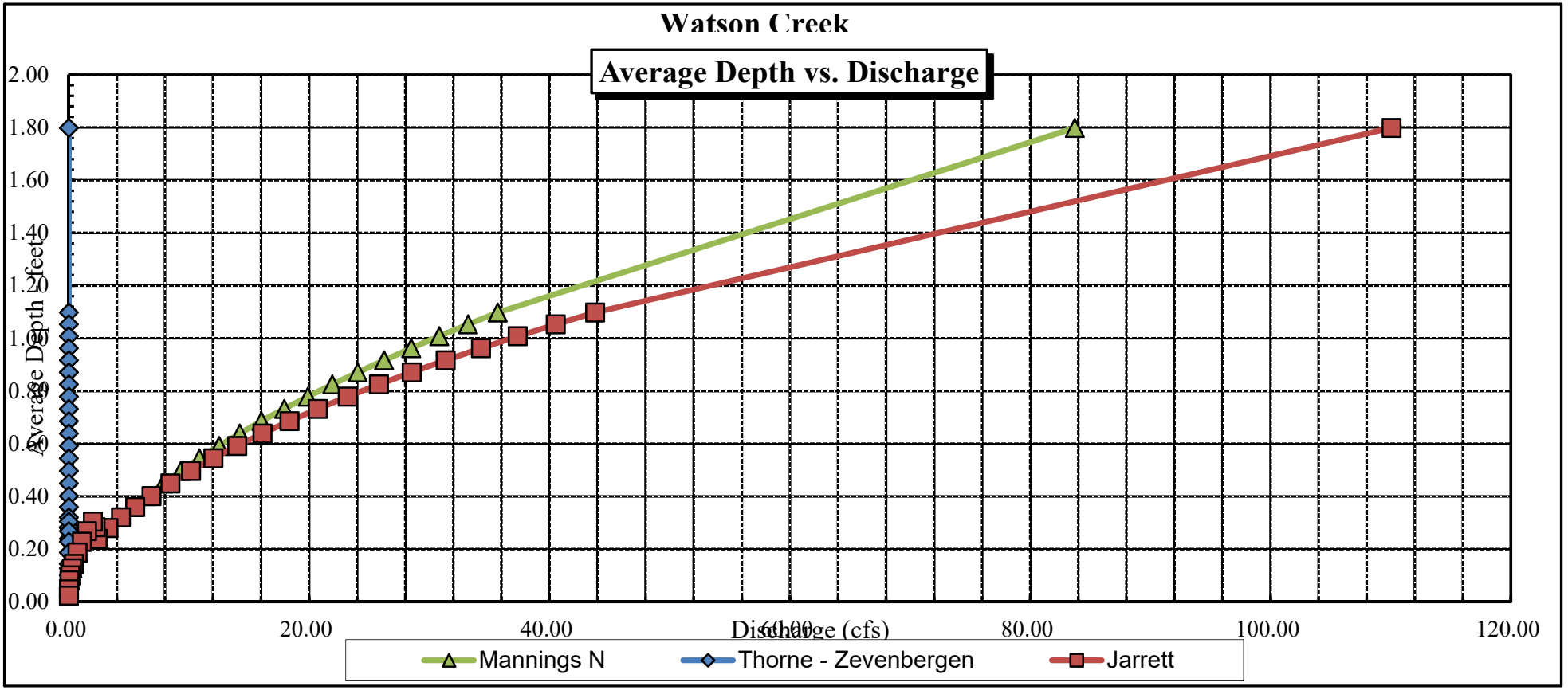
*GL* = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

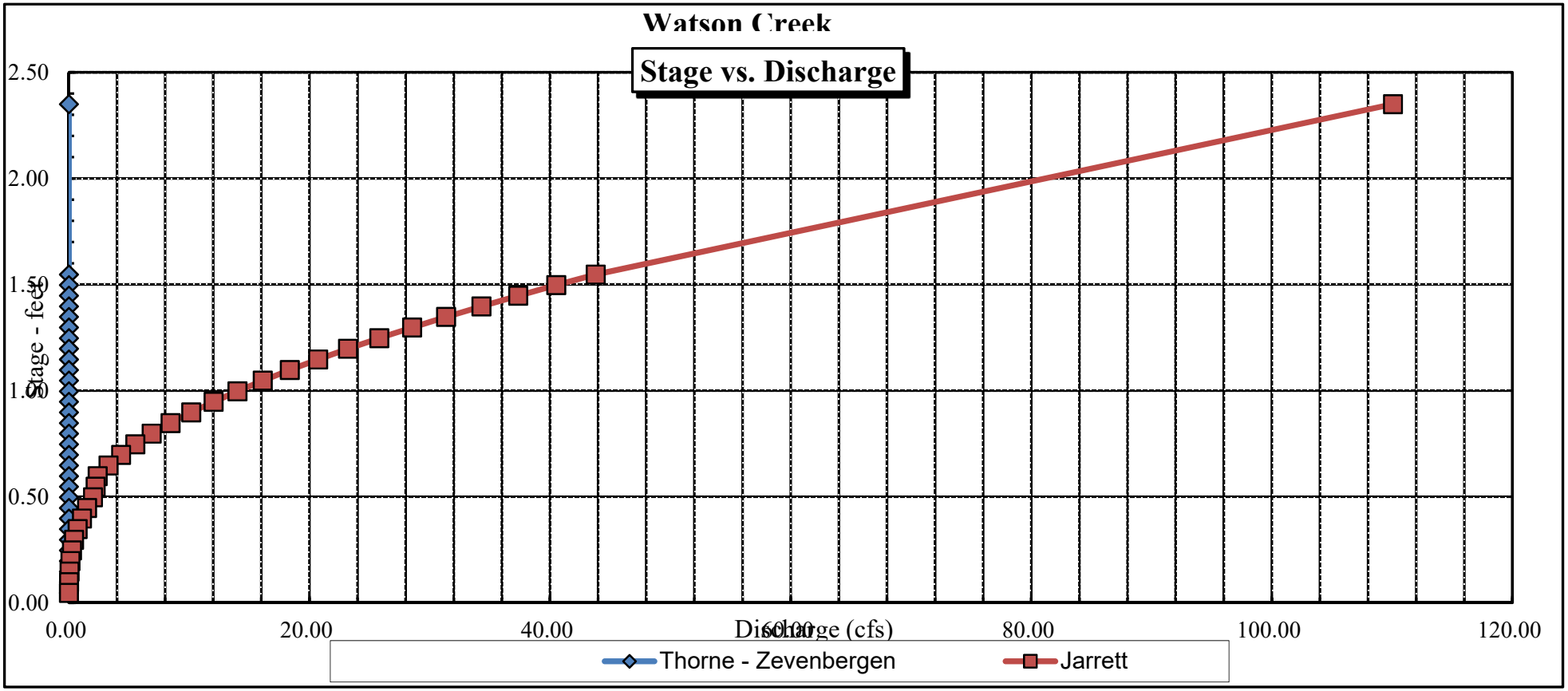
| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 5.95 | 12.77 | 1.80 | 2.35 | 22.97 | 15.15 | 100.0% | 1.52 | 110.07 | 4.79 |
| | 6.75 | 11.90 | 1.10 | 1.55 | 13.06 | 13.28 | 87.6% | 0.98 | 43.79 | 3.35 |
| | 6.80 | 11.84 | 1.05 | 1.50 | 12.47 | 13.16 | 86.9% | 0.95 | 40.52 | 3.25 |
| | 6.85 | 11.79 | 1.01 | 1.45 | 11.88 | 13.04 | 86.1% | 0.91 | 37.36 | 3.14 |
| | 6.90 | 11.73 | 0.96 | 1.40 | 11.29 | 12.93 | 85.3% | 0.87 | 34.30 | 3.04 |
| | 6.95 | 11.68 | 0.92 | 1.35 | 10.71 | 12.81 | 84.6% | 0.84 | 31.36 | 2.93 |
| | 7.00 | 11.62 | 0.87 | 1.30 | 10.12 | 12.69 | 83.8% | 0.80 | 28.53 | 2.82 |
| | 7.05 | 11.57 | 0.82 | 1.25 | 9.54 | 12.58 | 83.0% | 0.76 | 25.81 | 2.70 |
| | 7.10 | 11.52 | 0.78 | 1.20 | 8.97 | 12.46 | 82.2% | 0.72 | 23.21 | 2.59 |
| | 7.15 | 11.46 | 0.73 | 1.15 | 8.39 | 12.34 | 81.5% | 0.68 | 20.73 | 2.47 |
| | 7.20 | 11.41 | 0.69 | 1.10 | 7.82 | 12.23 | 80.7% | 0.64 | 18.36 | 2.35 |
| | 7.25 | 11.35 | 0.64 | 1.05 | 7.25 | 12.11 | 79.9% | 0.60 | 16.12 | 2.22 |
| | 7.30 | 11.30 | 0.59 | 1.00 | 6.69 | 11.99 | 79.2% | 0.56 | 14.01 | 2.10 |
| | 7.35 | 11.24 | 0.54 | 0.95 | 6.12 | 11.88 | 78.4% | 0.52 | 12.03 | 1.96 |
| | 7.40 | 11.19 | 0.50 | 0.90 | 5.56 | 11.76 | 77.6% | 0.47 | 10.17 | 1.83 |
| | 7.45 | 11.13 | 0.45 | 0.85 | 5.00 | 11.64 | 76.9% | 0.43 | 8.46 | 1.69 |
| | 7.50 | 11.08 | 0.40 | 0.80 | 4.45 | 11.53 | 76.1% | 0.39 | 6.88 | 1.55 |
| | 7.55 | 10.84 | 0.36 | 0.75 | 3.90 | 11.23 | 74.2% | 0.35 | 5.52 | 1.42 |
| | 7.60 | 10.50 | 0.32 | 0.70 | 3.37 | 10.85 | 71.6% | 0.31 | 4.34 | 1.29 |
| | 7.65 | 10.16 | 0.28 | 0.65 | 2.85 | 10.47 | 69.1% | 0.27 | 3.30 | 1.16 |
| | 7.70 | 9.82 | 0.24 | 0.60 | 2.35 | 10.09 | 66.6% | 0.23 | 2.39 | 1.02 |
| *WL* | 7.75 | 6.76 | 0.28 | 0.55 | 1.91 | 6.98 | 46.1% | 0.27 | 2.23 | 1.17 |
| | 7.80 | 5.34 | 0.30 | 0.50 | 1.63 | 5.54 | 36.6% | 0.29 | 2.00 | 1.23 |
| | 7.85 | 5.09 | 0.27 | 0.45 | 1.37 | 5.27 | 34.8% | 0.26 | 1.52 | 1.11 |
| | 7.90 | 4.89 | 0.23 | 0.40 | 1.12 | 5.05 | 33.3% | 0.22 | 1.09 | 0.98 |
| | 7.95 | 4.69 | 0.19 | 0.35 | 0.88 | 4.82 | 31.8% | 0.18 | 0.73 | 0.83 |
| | 8.00 | 4.49 | 0.14 | 0.30 | 0.65 | 4.59 | 30.3% | 0.14 | 0.44 | 0.67 |
| | 8.05 | 3.38 | 0.13 | 0.25 | 0.43 | 3.45 | 22.8% | 0.12 | 0.26 | 0.61 |
| | 8.10 | 2.68 | 0.10 | 0.20 | 0.27 | 2.74 | 18.1% | 0.10 | 0.13 | 0.50 |
| | 8.15 | 1.78 | 0.08 | 0.15 | 0.14 | 1.81 | 12.0% | 0.08 | 0.06 | 0.42 |
| | 8.20 | 1.38 | 0.05 | 0.10 | 0.07 | 1.40 | 9.2% | 0.05 | 0.02 | 0.27 |
| | 8.25 | 0.38 | 0.02 | 0.05 | 0.01 | 0.39 | 2.6% | 0.02 | 0.00 | 0.15 |


Watson Creek
CROSS SECTION DATA ANALYSIS
LS
G
LW
RW
G
RS
-4.50
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
-8.00
-8.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Watson Creek
Percent Wetted Perimeter vs. Discharge
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percent Wetted Perimeter
0.00
20.00
40.00
80.00
100.00
120.00
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Velocity vs. Discharge
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Velocity- ft/sec
0.00
20.00
40.00
80.00
100.00
120.00
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Average Depth vs. Discharge
Average Depth (feet)
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
20.00
40.00
60.00
80.00
100.00
120.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Stage vs. Discharge
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
20.00
40.00
60.00
80.00
100.00
120.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

## Data Input & Proofing

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-Private Boundary |
| XS NUMBER: | 1 |
| DATE: | 8/2/2017 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | |
| USFS MAP: | |
| | Level and Rod Survey |
| TAPE WT: | 0.0106 lbs / ft |
| TENSION: | 99999 lbs |
| SLOPE: | 0.008 ft / ft |

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

| GL=1 | FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | A | Q | Tape to Water |
|---|---|---|---|---|---|---|---|---|
| | | | Total Data Points = 33 | | | | | |
| | LS | 2.00 | 5.19 | | | 0.00 | 0.00 | 0.00 |
| 1 | G | 3.00 | 5.95 | | | 0.00 | 0.00 | 0.00 |
| | | 4.30 | 7.52 | | | 0.00 | 0.00 | 0.00 |
| | | 6.00 | 7.78 | | | 0.00 | 0.00 | 0.00 |
| | | 8.20 | 7.72 | | | 0.00 | 0.00 | 0.00 |
| | LW | 9.70 | 7.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 10.00 | 7.85 | 0.10 | 0.00 | 0.03 | 0.00 | 7.75 |
| | | 10.30 | 7.95 | 0.20 | 0.00 | 0.06 | 0.00 | 7.75 |
| | | 10.60 | 8.05 | 0.30 | 0.45 | 0.09 | 0.04 | 7.75 |
| | | 10.90 | 8.05 | 0.30 | 0.96 | 0.09 | 0.09 | 7.75 |
| | | 11.20 | 8.05 | 0.30 | 1.30 | 0.09 | 0.12 | 7.75 |
| | | 11.50 | 8.05 | 0.30 | 1.37 | 0.08 | 0.10 | 7.75 |
| | | 11.70 | 8.10 | 0.35 | 1.26 | 0.07 | 0.09 | 7.75 |
| | | 11.90 | 8.10 | 0.35 | 1.80 | 0.07 | 0.13 | 7.75 |
| | | 12.10 | 8.10 | 0.35 | 1.89 | 0.07 | 0.13 | 7.75 |
| | | 12.30 | 8.15 | 0.40 | 2.09 | 0.08 | 0.17 | 7.75 |
| | | 12.50 | 8.20 | 0.45 | 2.08 | 0.09 | 0.19 | 7.75 |
| | | 12.70 | 8.25 | 0.50 | 2.46 | 0.10 | 0.25 | 7.75 |
| | | 12.90 | 8.25 | 0.50 | 2.28 | 0.10 | 0.23 | 7.75 |
| | | 13.10 | 8.25 | 0.50 | 2.31 | 0.10 | 0.23 | 7.75 |
| | | 13.30 | 8.30 | 0.55 | 1.98 | 0.11 | 0.22 | 7.75 |
| | | 13.50 | 8.25 | 0.50 | 1.49 | 0.10 | 0.15 | 7.75 |
| | | 13.70 | 8.25 | 0.50 | 1.10 | 0.10 | 0.11 | 7.75 |
| | | 13.90 | 8.20 | 0.45 | 0.90 | 0.09 | 0.08 | 7.75 |
| | | 14.10 | 8.15 | 0.40 | 0.62 | 0.08 | 0.05 | 7.75 |
| | | 14.30 | 8.15 | 0.40 | 0.54 | 0.08 | 0.04 | 7.75 |
| | | 14.50 | 8.15 | 0.40 | 0.59 | 0.08 | 0.05 | 7.75 |
| | | 14.70 | 8.15 | 0.40 | 0.53 | 0.08 | 0.04 | 7.75 |
| | | 14.90 | 8.05 | 0.30 | 0.39 | 0.06 | 0.02 | 7.75 |
| | | 15.10 | 7.85 | 0.10 | 0.09 | 0.02 | 0.00 | 7.75 |
| | RW | 15.30 | 7.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | G | 15.80 | 5.85 | | | 0.00 | 0.00 | 0.00 |
| | RS | 16.30 | 4.60 | | | 0.00 | 0.00 | 0.00 |
| | | | | | Totals | 1.92 | 2.52 | |

COLORADO WATER CONSERVATION BOARD

# FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

## LOCATION INFORMATION

STREAM NAME: Watson Creek | CROSS-SECTION NO.: 2

CROSS-SECTION LOCATION: At BLM - Private boundary

DATE: 8-2-17 | OBSERVERS: R. Smith, E. Scherff

LEGAL DESCRIPTION | ¼ SECTION: NE NW | SECTION: 17 | TOWNSHIP: 2 N/S | RANGE: 85 E/W | PM: 6th

COUNTY: Routt | WATERSHED: Yampa R. | WATER DIVISION: 6 | DOW WATER CODE: 22676

MAP(S): USGS: | USFS:

## SUPPLEMENTAL DATA

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

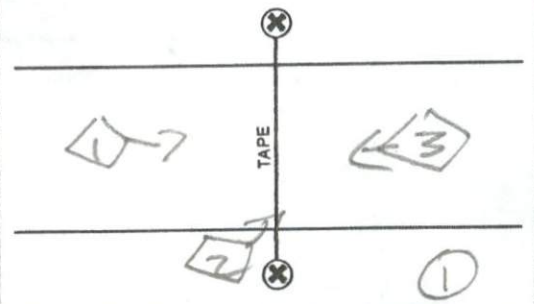
METER NUMBER: | DATE RATED: | CALIB/SPIN: ____ sec | TAPE WEIGHT: surveyed ____ lbs/foot | TAPE TENSION: surveyed ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: gravel to 4" cobbles | PHOTOGRAPHS TAKEN: YES/NO | NUMBER OF PHOTOGRAPHS: 3

## CHANNEL PROFILE DATA

| STATION | DISTANCE FROM TAPE (ft) | ROD READING (ft) |
|---|---|---|
| ⊗ Tape @ Stake LB | 0.0 | surveyed |
| ⊗ Tape @ Stake RB | 0.0 | surveyed |
| ① WS @ Tape LB/RB | 0.0 | 7.90/7.90 |
| ② WS Upstream | 11.0 | 7.77 |
| ③ WS Downstream | 6.0 | 7.95 |
| SLOPE | 0.18/17.0 = .01 | |

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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| caddisflies, amelids, mayflies, | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

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

## COMMENTS

pH 7.69

Temp Water 14.7 °C

SC 228 µS/cm

# DISCHARGE/CROSS SECTION NOTES

| STREAM NAME: Watson Creek | CROSS-SECTION NO: 2 | DATE: 8-2-17 | SHEET ___ OF ___ |
|---|---|---|---|
| BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: _____ ft | TIME: 10:40 am |

| Stake (S) Grassline (G) Waterline (W) Rock (R) | Distance From Initial Point (ft) | Width (ft) | Total Vertical Depth From Tape/Inst (ft) | Water Depth (ft) | Depth of Observation (ft) | Revolutions | Time (sec) | Velocity (ft/sec) | | Area ($ft^2$) | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | At Point | Mean in Vertical | | |
| RS | 2.3 | | 4.70 | | | | | | | | |
| G | 3.8 | | 6.26 | | | | | | | | |
| | 5.3 | | 6.62 | | | | | | | | |
| | 6.0 | | 6.95 | | | | | | | | |
| RW | 6.9 | | 7.90 | | | | | | | | |
| | 7.2 | | 8.0 | 0.10 | | | | 0.04 | | | |
| | 7.5 | | 8.05 | 0.15 | | | | 0.37 | | | |
| | 7.8 | | 8.1 | 0.20 | | | | 0.56 | | | |
| | 8.1 | | 8.1 | 0.20 | | | | 0.74 | | | |
| | 8.4 | | 8.1 | 0.20 | | | | 0.89 | | | |
| | 8.7 | | 8.1 | 0.20 | | | | 1.26 | | | |
| | 9.0 | | 8.15 | 0.25 | | | | 1.44 | | | |
| | 9.2 | | 8.2 | 0.30 | | | | 1.64 | | | |
| | 9.4 | | 8.2 | 0.30 | | | | 1.76 | | | |
| | 9.6 | | 8.25 | 0.35 | | | | 2.05 | | | |
| | 9.8 | | 8.25 | 0.35 | | | | 2.18 | | | |
| | 10.0 | | 8.25 | 0.35 | | | | 2.20 | | | |
| | 10.2 | | 8.25 | 0.35 | | | | 1.89 | | | |
| | 10.4 | | 8.3 | 0.40 | | | | 1.93 | | | |
| | 10.6 | | 8.3 | 0.40 | | | | 2.12 | | | |
| | 10.8 | | 8.25 | 0.35 | | | | 2.23 | | | |
| | 11.0 | | 8.2 | 0.30 | | | | 2.29 | | | |
| | 11.2 | | 8.2 | 0.30 | | | | 2.22 | | | |
| | 11.4 | | 8.2 | 0.30 | | | | 2.17 | | | |
| | 11.6 | | 8.2 | 0.30 | | | | 1.86 | | | |
| | 11.8 | | 8.2 | 0.30 | | | | 1.53 | | | |
| | 12.0 | | 8.2 | 0.30 | | | | 1.15 | | | |
| | 12.2 | | 8.2 | 0.30 | | | | 0.66 | | | |
| | 12.4 | | 8.2 | 0.30 | | | | 0.60 | | | |
| | 12.6 | | 8.2 | 0.30 | | | | 0.70 | | | |
| | 12.8 | | 8.2 | 0.30 | | | | 0.84 | | | |
| | 13.1 | | 8.25 | 0.35 | | | | 0.72 | | | |
| | 13.4 | | 8.2 | 0.30 | | | | 0.63 | | | |
| | 13.7 | | 7.95 | 0.05 | | | | 0.07 | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| RW | 13.8 | | 7.90 | | | | | | | | |
| G | 14.0 | | 6.20 | | | | | | | | |
| | 14.4 | | 5.36 | | | | | | | | |
| RS | 15.7 | | 4.96 | | | | | | | | |
| | | | | | | | | | | | |
| TOTALS: | | | | | | | | | | | |

| End of Measurement | Time: 10:53 | Gage Reading: _____ ft | CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY: |
|---|---|---|---|---|

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

LOCATION INFORMATION

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-private boundary |
| XS NUMBER: | 2 |
| DATE: | 2-Aug-17 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | 0 |
| USFS MAP: | 0 |

SUPPLEMENTAL DATA

| | | |
|---|---|---|
| | | *** NOTE *** |
| | | Leave TAPE WT and TENSION |
| | | at defaults for data collected |
| TAPE WT: | 0.0106 | with a survey level and rod |
| TENSION: | 99999 | |

CHANNEL PROFILE DATA

| | |
|---|---|
| SLOPE: | 0.01 |

INPUT DATA CHECKED BY: .....DATE.....

ASSIGNED TO: ….....……..…….....DATE.....

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

# DATA POINTS= 38

VALUES COMPUTED FROM RAW FIELD DATA

| FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | WETTED PERIM. | WATER DEPTH | AREA (Am) | Q (Qm) | % Q CELL |
|---|---|---|---|---|---|---|---|---|---|
| RS | 2.30 | 4.70 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| 1 G | 3.80 | 6.26 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 5.30 | 6.62 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 6.00 | 6.95 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| RW | 6.90 | 7.90 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 7.20 | 8.00 | 0.10 | 0.04 | 0.32 | 0.10 | 0.03 | 0.00 | 0.0% |
| | 7.50 | 8.05 | 0.15 | 0.37 | 0.30 | 0.15 | 0.05 | 0.02 | 0.6% |
| | 7.80 | 8.10 | 0.20 | 0.56 | 0.30 | 0.20 | 0.06 | 0.03 | 1.3% |
| | 8.10 | 8.10 | 0.20 | 0.74 | 0.30 | 0.20 | 0.06 | 0.04 | 1.7% |
| | 8.40 | 8.10 | 0.20 | 0.89 | 0.30 | 0.20 | 0.06 | 0.05 | 2.1% |
| | 8.70 | 8.10 | 0.20 | 1.26 | 0.30 | 0.20 | 0.06 | 0.08 | 2.9% |
| | 9.00 | 8.15 | 0.25 | 1.44 | 0.30 | 0.25 | 0.06 | 0.09 | 3.5% |
| | 9.20 | 8.20 | 0.30 | 1.64 | 0.21 | 0.30 | 0.06 | 0.10 | 3.8% |
| | 9.40 | 8.20 | 0.30 | 1.76 | 0.20 | 0.30 | 0.06 | 0.11 | 4.1% |
| | 9.60 | 8.25 | 0.35 | 2.05 | 0.21 | 0.35 | 0.07 | 0.14 | 5.6% |
| | 9.80 | 8.25 | 0.35 | 2.18 | 0.20 | 0.35 | 0.07 | 0.15 | 5.9% |
| | 10.00 | 8.25 | 0.35 | 2.20 | 0.20 | 0.35 | 0.07 | 0.15 | 6.0% |
| | 10.20 | 8.25 | 0.35 | 1.89 | 0.20 | 0.35 | 0.07 | 0.13 | 5.2% |
| | 10.40 | 8.30 | 0.40 | 1.93 | 0.21 | 0.40 | 0.08 | 0.15 | 6.0% |
| | 10.60 | 8.30 | 0.40 | 2.12 | 0.20 | 0.40 | 0.08 | 0.17 | 6.6% |
| | 10.80 | 8.25 | 0.35 | 2.23 | 0.21 | 0.35 | 0.07 | 0.16 | 6.1% |
| | 11.00 | 8.20 | 0.30 | 2.29 | 0.21 | 0.30 | 0.06 | 0.14 | 5.4% |
| | 11.20 | 8.20 | 0.30 | 2.22 | 0.20 | 0.30 | 0.06 | 0.13 | 5.2% |
| | 11.40 | 8.20 | 0.30 | 2.17 | 0.20 | 0.30 | 0.06 | 0.13 | 5.1% |
| | 11.60 | 8.20 | 0.30 | 1.86 | 0.20 | 0.30 | 0.06 | 0.11 | 4.3% |
| | 11.80 | 8.20 | 0.30 | 1.53 | 0.20 | 0.30 | 0.06 | 0.09 | 3.6% |
| | 12.00 | 8.20 | 0.30 | 1.15 | 0.20 | 0.30 | 0.06 | 0.07 | 2.7% |
| | 12.20 | 8.20 | 0.30 | 0.66 | 0.20 | 0.30 | 0.06 | 0.04 | 1.5% |
| | 12.40 | 8.20 | 0.30 | 0.60 | 0.20 | 0.30 | 0.06 | 0.04 | 1.4% |
| | 12.60 | 8.20 | 0.30 | 0.70 | 0.20 | 0.30 | 0.06 | 0.04 | 1.6% |
| | 12.80 | 8.20 | 0.30 | 0.84 | 0.20 | 0.30 | 0.08 | 0.06 | 2.5% |
| | 13.10 | 8.25 | 0.35 | 0.72 | 0.30 | 0.35 | 0.11 | 0.08 | 2.9% |
| | 13.40 | 8.20 | 0.30 | 0.63 | 0.30 | 0.30 | 0.09 | 0.06 | 2.2% |
| | 13.70 | 7.95 | 0.05 | 0.07 | 0.39 | 0.05 | 0.01 | 0.00 | 0.0% |
| LW | 13.80 | 7.90 | 0.00 | 0.00 | 0.11 | | 0.00 | 0.00 | 0.0% |
| 1 G | 14.00 | 6.20 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| | 14.40 | 5.36 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| LS | 15.70 | 4.96 | | | 0.00 | | 0.00 | 0.00 | 0.0% |
| TOTALS ---------- | | | | | 7.07 | 0.4 (Max.) | 1.83 | 2.57 | 100.0% |

Manning's n = 0.0429
Hydraulic Radius= 0.25848617

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

WATER LINE COMPARISON TABLE

| WATER LINE | MEAS AREA | COMP AREA | AREA ERROR |
|---|---|---|---|
| | 1.83 | 1.83 | 0.0% |
| 7.65 | 1.83 | 3.59 | 96.2% |
| 7.67 | 1.83 | 3.44 | 88.4% |
| 7.69 | 1.83 | 3.30 | 80.6% |
| 7.71 | 1.83 | 3.16 | 72.8% |
| 7.73 | 1.83 | 3.02 | 65.0% |
| 7.75 | 1.83 | 2.87 | 57.3% |
| 7.77 | 1.83 | 2.73 | 49.6% |
| 7.79 | 1.83 | 2.59 | 41.9% |
| 7.81 | 1.83 | 2.45 | 34.2% |
| 7.83 | 1.83 | 2.31 | 26.6% |
| 7.85 | 1.83 | 2.17 | 19.0% |
| 7.86 | 1.83 | 2.10 | 15.1% |
| 7.87 | 1.83 | 2.03 | 11.4% |
| 7.88 | 1.83 | 1.97 | 7.6% |
| 7.89 | 1.83 | 1.90 | 3.8% |
| 7.90 | 1.83 | 1.83 | 0.0% |
| 7.91 | 1.83 | 1.76 | -3.8% |
| 7.92 | 1.83 | 1.69 | -7.5% |
| 7.93 | 1.83 | 1.62 | -11.2% |
| 7.94 | 1.83 | 1.56 | -14.9% |
| 7.95 | 1.83 | 1.49 | -18.5% |
| 7.97 | 1.83 | 1.36 | -25.8% |
| 7.99 | 1.83 | 1.23 | -32.9% |
| 8.01 | 1.83 | 1.10 | -39.9% |
| 8.03 | 1.83 | 0.97 | -46.8% |
| 8.05 | 1.83 | 0.85 | -53.6% |
| 8.07 | 1.83 | 0.73 | -60.1% |
| 8.09 | 1.83 | 0.61 | -66.6% |
| 8.11 | 1.83 | 0.51 | -72.3% |
| 8.13 | 1.83 | 0.41 | -77.4% |
| 8.15 | 1.83 | 0.32 | -82.4% |

WATERLINE AT ZERO
AREA ERROR = 7.900

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

Constant Manning's n

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

| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 6.26 | 10.19 | 1.47 | 2.04 | 14.99 | 12.35 | 100.0% | 1.21 | 59.07 | 3.94 |
| | 6.90 | 8.02 | 1.15 | 1.40 | 9.26 | 9.50 | 77.0% | 0.97 | 31.53 | 3.40 |
| | 6.95 | 7.91 | 1.12 | 1.35 | 8.86 | 9.34 | 75.6% | 0.95 | 29.65 | 3.35 |
| | 7.00 | 7.86 | 1.08 | 1.30 | 8.47 | 9.22 | 74.6% | 0.92 | 27.72 | 3.27 |
| | 7.05 | 7.81 | 1.03 | 1.25 | 8.08 | 9.10 | 73.7% | 0.89 | 25.84 | 3.20 |
| | 7.10 | 7.75 | 0.99 | 1.20 | 7.69 | 8.98 | 72.7% | 0.86 | 24.01 | 3.12 |
| | 7.15 | 7.70 | 0.95 | 1.15 | 7.30 | 8.86 | 71.7% | 0.82 | 22.23 | 3.04 |
| | 7.20 | 7.65 | 0.90 | 1.10 | 6.92 | 8.74 | 70.8% | 0.79 | 20.50 | 2.96 |
| | 7.25 | 7.59 | 0.86 | 1.05 | 6.54 | 8.62 | 69.8% | 0.76 | 18.83 | 2.88 |
| | 7.30 | 7.54 | 0.82 | 1.00 | 6.16 | 8.50 | 68.9% | 0.72 | 17.21 | 2.79 |
| | 7.35 | 7.49 | 0.77 | 0.95 | 5.78 | 8.38 | 67.9% | 0.69 | 15.64 | 2.70 |
| | 7.40 | 7.43 | 0.73 | 0.90 | 5.41 | 8.26 | 66.9% | 0.65 | 14.13 | 2.61 |
| | 7.45 | 7.38 | 0.68 | 0.85 | 5.04 | 8.14 | 66.0% | 0.62 | 12.68 | 2.52 |
| | 7.50 | 7.33 | 0.64 | 0.80 | 4.67 | 8.02 | 65.0% | 0.58 | 11.29 | 2.42 |
| | 7.55 | 7.27 | 0.59 | 0.75 | 4.31 | 7.90 | 64.0% | 0.54 | 9.95 | 2.31 |
| | 7.60 | 7.22 | 0.55 | 0.70 | 3.95 | 7.79 | 63.1% | 0.51 | 8.69 | 2.20 |
| | 7.65 | 7.17 | 0.50 | 0.65 | 3.59 | 7.67 | 62.1% | 0.47 | 7.48 | 2.09 |
| | 7.70 | 7.11 | 0.45 | 0.60 | 3.23 | 7.55 | 61.1% | 0.43 | 6.35 | 1.97 |
| | 7.75 | 7.06 | 0.41 | 0.55 | 2.87 | 7.43 | 60.2% | 0.39 | 5.29 | 1.84 |
| | 7.80 | 7.01 | 0.36 | 0.50 | 2.52 | 7.31 | 59.2% | 0.35 | 4.30 | 1.70 |
| | 7.85 | 6.95 | 0.31 | 0.45 | 2.17 | 7.19 | 58.2% | 0.30 | 3.39 | 1.56 |
| *WL* | 7.90 | 6.90 | 0.26 | 0.40 | 1.83 | 7.07 | 57.3% | 0.26 | 2.57 | 1.41 |
| | 7.95 | 6.65 | 0.22 | 0.35 | 1.49 | 6.80 | 55.1% | 0.22 | 1.87 | 1.26 |
| | 8.00 | 6.44 | 0.18 | 0.30 | 1.16 | 6.56 | 53.2% | 0.18 | 1.27 | 1.09 |
| | 8.05 | 6.08 | 0.14 | 0.25 | 0.85 | 6.18 | 50.1% | 0.14 | 0.78 | 0.92 |
| | 8.10 | 4.82 | 0.11 | 0.20 | 0.55 | 4.90 | 39.7% | 0.11 | 0.45 | 0.81 |
| | 8.15 | 4.46 | 0.07 | 0.15 | 0.32 | 4.52 | 36.6% | 0.07 | 0.19 | 0.59 |
| | 8.20 | 2.20 | 0.05 | 0.10 | 0.11 | 2.23 | 18.1% | 0.05 | 0.05 | 0.45 |
| | 8.25 | 0.60 | 0.03 | 0.05 | 0.02 | 0.61 | 5.0% | 0.03 | 0.01 | 0.35 |
| | 8.30 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.0% | #DIV/0! | #DIV/0! | #DIV/0! |

STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2

SUMMARY SHEET

| | | |
|---|---|---|
| MEASURED FLOW (Qm)= | 2.57 | cfs |
| CALCULATED FLOW (Qc)= | 2.57 | cfs |
| (Qm-Qc)/Qm * 100 = | 0.0 | % |
| MEASURED WATERLINE (WLm)= | 7.90 | ft |
| CALCULATED WATERLINE (WLc)= | 7.90 | ft |
| (WLm-WLc)/WLm * 100 = | 0.0 | % |
| MAX MEASURED DEPTH (Dm)= | 0.40 | ft |
| MAX CALCULATED DEPTH (Dc)= | 0.40 | ft |
| (Dm-Dc)/Dm * 100 | 0.0 | % |
| MEAN VELOCITY= | 1.41 | ft/sec |
| MANNING'S N= | 0.043 | |
| SLOPE= | 0.01 | ft/ft |
| .4 * Qm = | 1.0 | cfs |
| 2.5 * Qm= | 6.4 | cfs |

RECOMMENDED INSTREAM FLOW:
==========

| FLOW (CFS) | PERIOD |
|---|---|
| ========== | ======== |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

RATIONALE FOR RECOMMENDATION:
==========

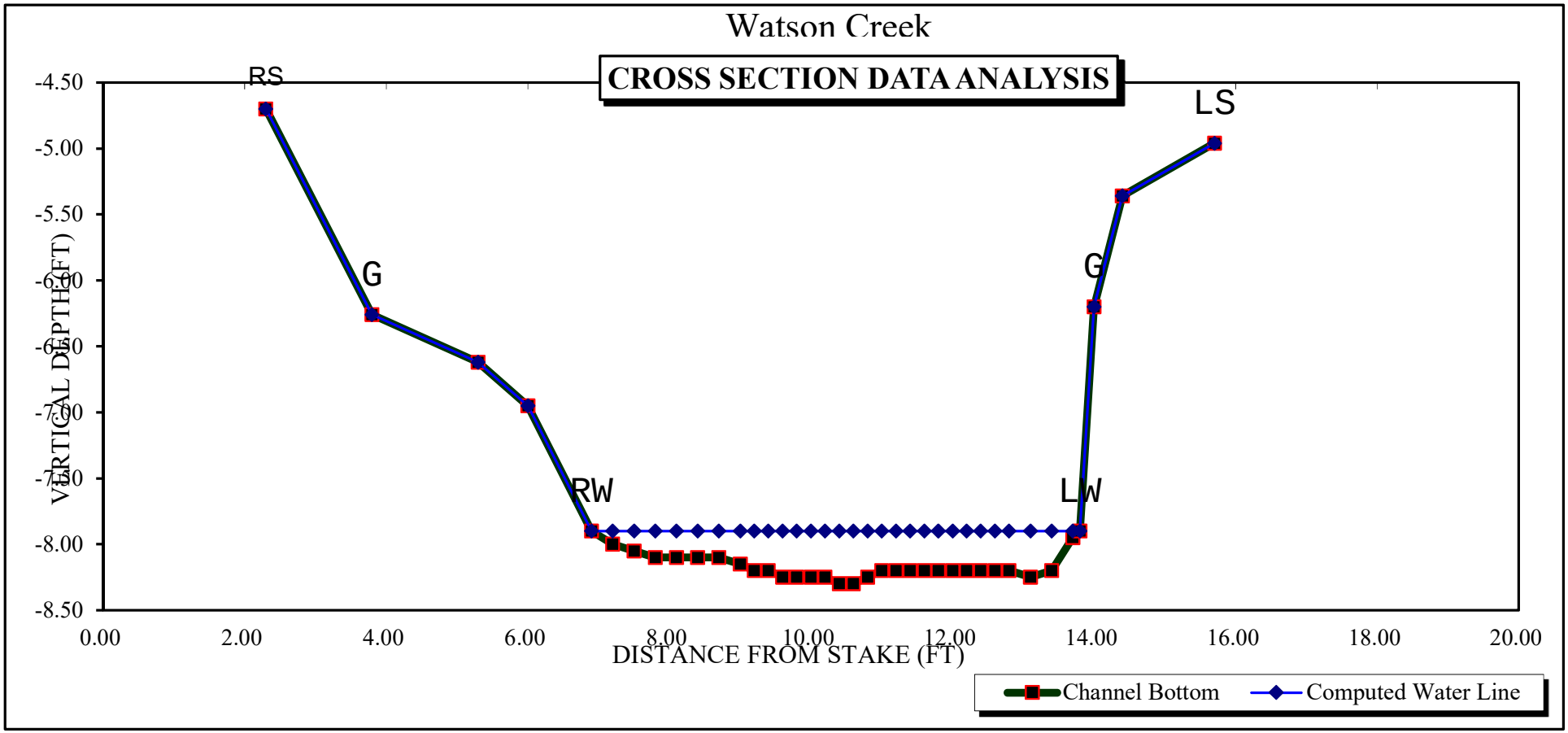
RECOMMENDATION BY: …… AGENCY…… DATE:……

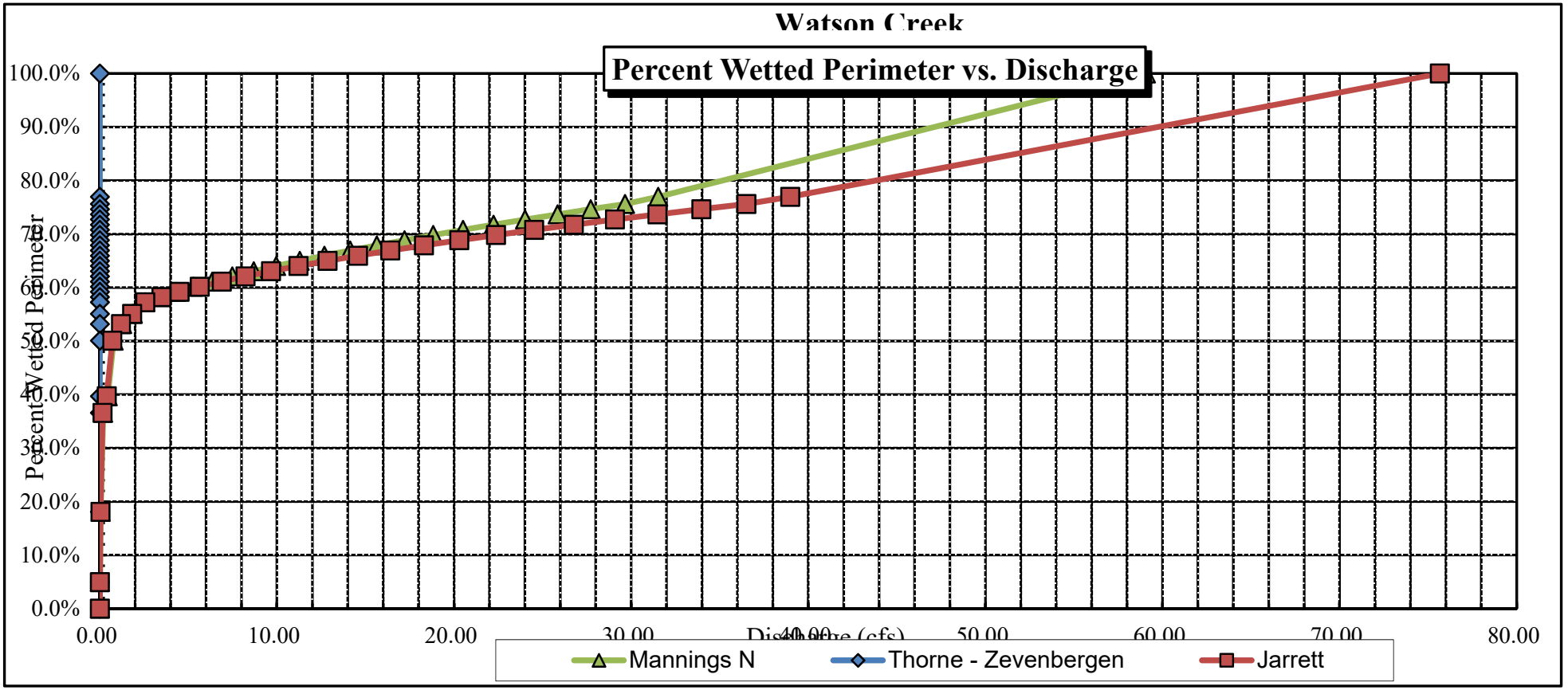
CWCB REVIEW BY: …… DATE:……

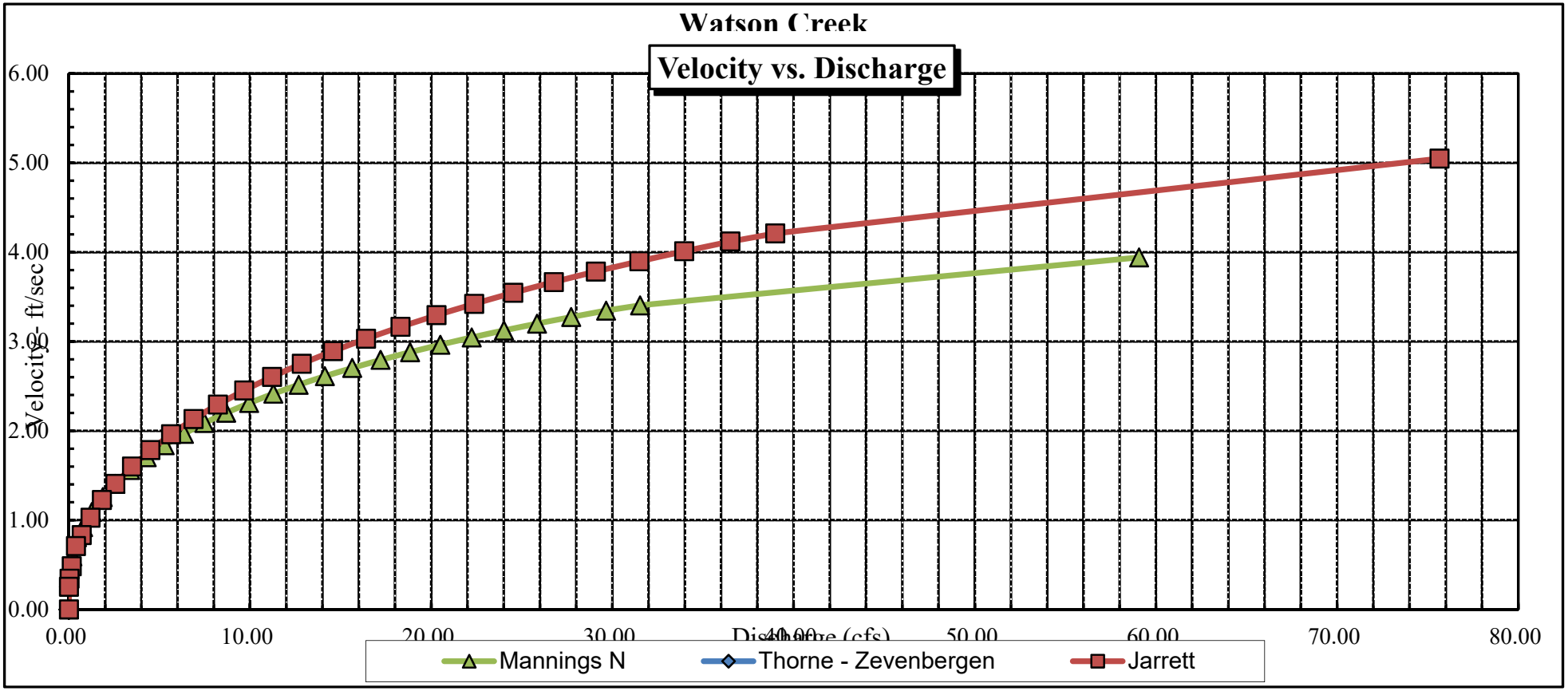
STREAM NAME: Watson Creek
XS LOCATION: At BLM-private boundary
XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

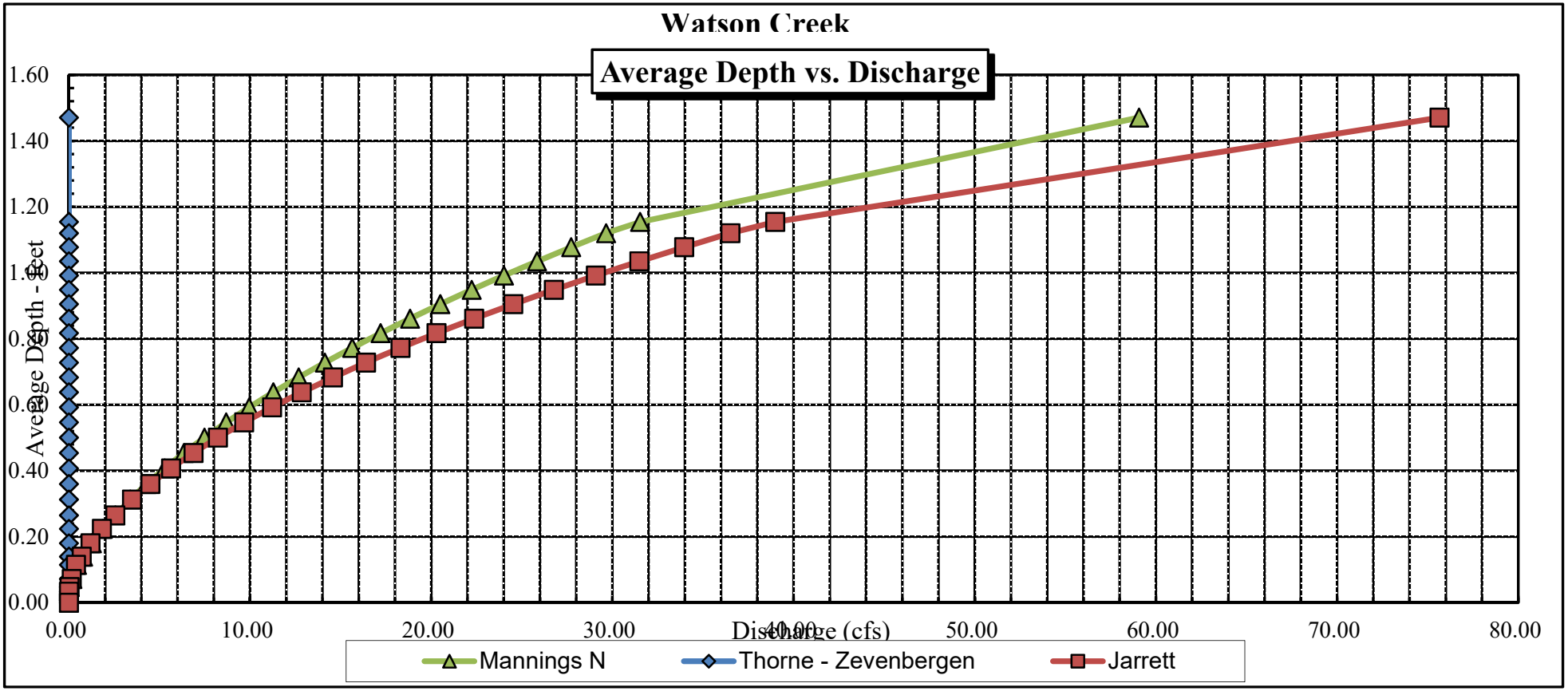
*GL* = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

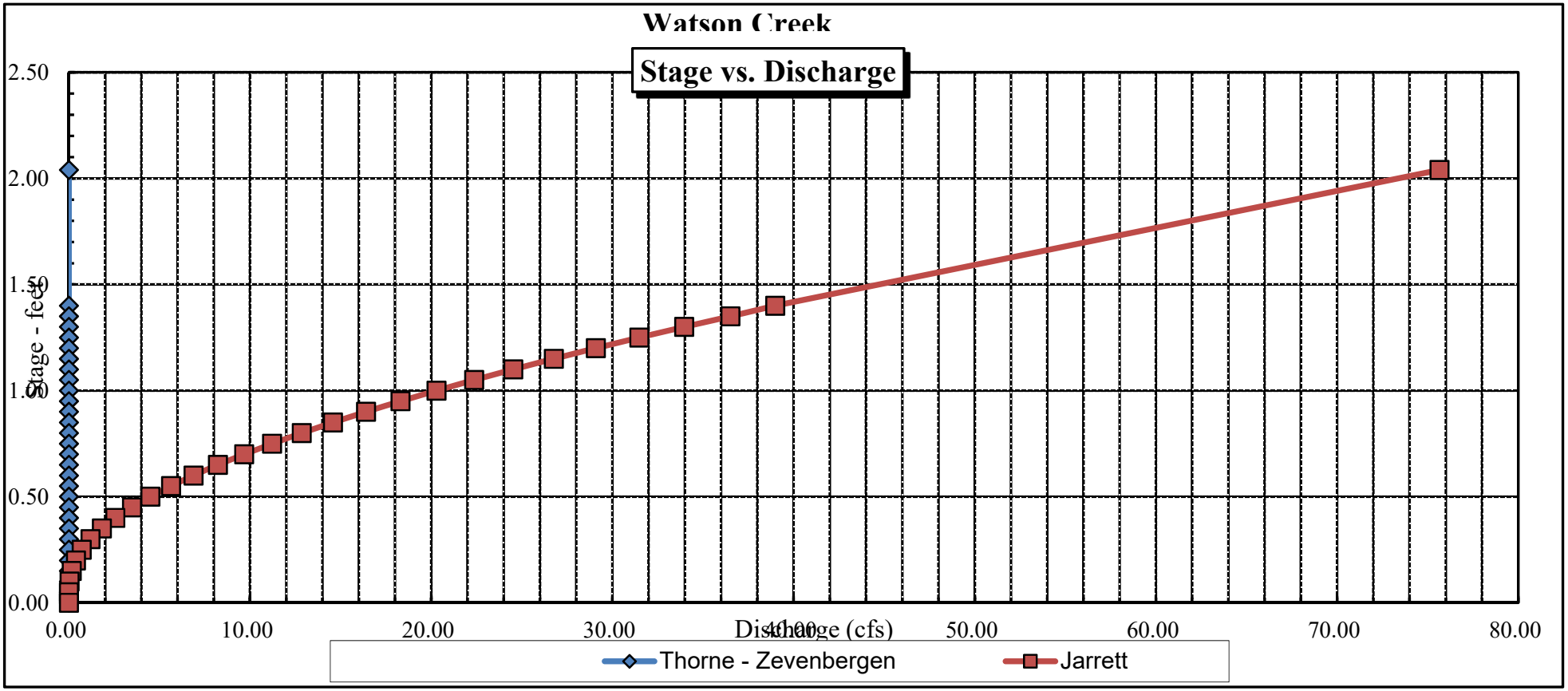
| | DIST TO WATER (FT) | TOP WIDTH (FT) | AVG. DEPTH (FT) | MAX. DEPTH (FT) | AREA (SQ FT) | WETTED PERIM. (FT) | PERCENT WET PERIM (%) | HYDR RADIUS (FT) | FLOW (CFS) | AVG. VELOCITY (FT/SEC) |
|---|---|---|---|---|---|---|---|---|---|---|
| *GL* | 6.26 | 10.19 | 1.47 | 2.04 | 14.99 | 12.35 | 100.0% | 1.21 | 75.66 | 5.05 |
| | 6.90 | 8.02 | 1.15 | 1.40 | 9.26 | 9.50 | 77.0% | 0.97 | 38.99 | 4.21 |
| | 6.95 | 7.91 | 1.12 | 1.35 | 8.86 | 9.34 | 75.6% | 0.95 | 36.51 | 4.12 |
| | 7.00 | 7.86 | 1.08 | 1.30 | 8.47 | 9.22 | 74.6% | 0.92 | 33.96 | 4.01 |
| | 7.05 | 7.81 | 1.03 | 1.25 | 8.08 | 9.10 | 73.7% | 0.89 | 31.48 | 3.90 |
| | 7.10 | 7.75 | 0.99 | 1.20 | 7.69 | 8.98 | 72.7% | 0.86 | 29.09 | 3.78 |
| | 7.15 | 7.70 | 0.95 | 1.15 | 7.30 | 8.86 | 71.7% | 0.82 | 26.77 | 3.67 |
| | 7.20 | 7.65 | 0.90 | 1.10 | 6.92 | 8.74 | 70.8% | 0.79 | 24.53 | 3.55 |
| | 7.25 | 7.59 | 0.86 | 1.05 | 6.54 | 8.62 | 69.8% | 0.76 | 22.37 | 3.42 |
| | 7.30 | 7.54 | 0.82 | 1.00 | 6.16 | 8.50 | 68.9% | 0.72 | 20.29 | 3.29 |
| | 7.35 | 7.49 | 0.77 | 0.95 | 5.78 | 8.38 | 67.9% | 0.69 | 18.30 | 3.16 |
| | 7.40 | 7.43 | 0.73 | 0.90 | 5.41 | 8.26 | 66.9% | 0.65 | 16.40 | 3.03 |
| | 7.45 | 7.38 | 0.68 | 0.85 | 5.04 | 8.14 | 66.0% | 0.62 | 14.58 | 2.89 |
| | 7.50 | 7.33 | 0.64 | 0.80 | 4.67 | 8.02 | 65.0% | 0.58 | 12.85 | 2.75 |
| | 7.55 | 7.27 | 0.59 | 0.75 | 4.31 | 7.90 | 64.0% | 0.54 | 11.22 | 2.60 |
| | 7.60 | 7.22 | 0.55 | 0.70 | 3.95 | 7.79 | 63.1% | 0.51 | 9.67 | 2.45 |
| | 7.65 | 7.17 | 0.50 | 0.65 | 3.59 | 7.67 | 62.1% | 0.47 | 8.23 | 2.29 |
| | 7.70 | 7.11 | 0.45 | 0.60 | 3.23 | 7.55 | 61.1% | 0.43 | 6.88 | 2.13 |
| | 7.75 | 7.06 | 0.41 | 0.55 | 2.87 | 7.43 | 60.2% | 0.39 | 5.64 | 1.96 |
| | 7.80 | 7.01 | 0.36 | 0.50 | 2.52 | 7.31 | 59.2% | 0.35 | 4.50 | 1.78 |
| | 7.85 | 6.95 | 0.31 | 0.45 | 2.17 | 7.19 | 58.2% | 0.30 | 3.48 | 1.60 |
| *WL* | 7.90 | 6.90 | 0.26 | 0.40 | 1.83 | 7.07 | 57.3% | 0.26 | 2.57 | 1.41 |
| | 7.95 | 6.65 | 0.22 | 0.35 | 1.49 | 6.80 | 55.1% | 0.22 | 1.82 | 1.22 |
| | 8.00 | 6.44 | 0.18 | 0.30 | 1.16 | 6.56 | 53.2% | 0.18 | 1.19 | 1.03 |
| | 8.05 | 6.08 | 0.14 | 0.25 | 0.85 | 6.18 | 50.1% | 0.14 | 0.71 | 0.83 |
| | 8.10 | 4.82 | 0.11 | 0.20 | 0.55 | 4.90 | 39.7% | 0.11 | 0.39 | 0.71 |
| | 8.15 | 4.46 | 0.07 | 0.15 | 0.32 | 4.52 | 36.6% | 0.07 | 0.16 | 0.48 |
| | 8.20 | 2.20 | 0.05 | 0.10 | 0.11 | 2.23 | 18.1% | 0.05 | 0.04 | 0.34 |
| | 8.25 | 0.60 | 0.03 | 0.05 | 0.02 | 0.61 | 5.0% | 0.03 | 0.01 | 0.25 |
| | 8.30 | 0.00 | #DIV/0! | 0.00 | 0.00 | 0.00 | 0.0% | #DIV/0! | #DIV/0! | #DIV/0! |


Watson Creek
CROSS SECTION DATA ANALYSIS
RS
G
RW
LW
G
LS
-4.50
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
-8.00
-8.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Watson Creek
Percent Wetted Perimeter vs. Discharge
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percent Wetted Perimeter
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Velocity vs. Discharge
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Velocity - ft/sec
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Average Depth vs. Discharge
Average Depth - Feet
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Watson Creek
Stage vs. Discharge
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

## Data Input & Proofing

| | |
|---|---|
| STREAM NAME: | Watson Creek |
| XS LOCATION: | At BLM-private boundary |
| XS NUMBER: | 2 |
| DATE: | 8/2/2017 |
| OBSERVERS: | R. Smith, E. Scherff |
| 1/4 SEC: | NE NW |
| SECTION: | 17 |
| TWP: | 2N |
| RANGE: | 85W |
| PM: | Sixth |
| COUNTY: | Routt |
| WATERSHED: | Yampa River |
| DIVISION: | 6 |
| DOW CODE: | 22676 |
| USGS MAP: | |
| USFS MAP: | |
| | Level and Rod Survey |
| TAPE WT: | 0.0106 lbs / ft |
| TENSION: | 99999 lbs |
| SLOPE: | 0.01 ft / ft |

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

| GL=1 | FEATURE | DIST | VERT DEPTH | WATER DEPTH | VEL | A | Q | Tape to Water |
|---|---|---|---|---|---|---|---|---|
| | | | Total Data Points = 38 | | | | | |
| | RS | 2.30 | 4.70 | | | 0.00 | 0.00 | 0.00 |
| 1 | G | 3.80 | 6.26 | | | 0.00 | 0.00 | 0.00 |
| | | 5.30 | 6.62 | | | 0.00 | 0.00 | 0.00 |
| | | 6.00 | 6.95 | | | 0.00 | 0.00 | 0.00 |
| | RW | 6.90 | 7.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | 7.20 | 8.00 | 0.10 | 0.04 | 0.03 | 0.00 | 7.90 |
| | | 7.50 | 8.05 | 0.15 | 0.37 | 0.05 | 0.02 | 7.90 |
| | | 7.80 | 8.10 | 0.20 | 0.56 | 0.06 | 0.03 | 7.90 |
| | | 8.10 | 8.10 | 0.20 | 0.74 | 0.06 | 0.04 | 7.90 |
| | | 8.40 | 8.10 | 0.20 | 0.89 | 0.06 | 0.05 | 7.90 |
| | | 8.70 | 8.10 | 0.20 | 1.26 | 0.06 | 0.08 | 7.90 |
| | | 9.00 | 8.15 | 0.25 | 1.44 | 0.06 | 0.09 | 7.90 |
| | | 9.20 | 8.20 | 0.30 | 1.64 | 0.06 | 0.10 | 7.90 |
| | | 9.40 | 8.20 | 0.30 | 1.76 | 0.06 | 0.11 | 7.90 |
| | | 9.60 | 8.25 | 0.35 | 2.05 | 0.07 | 0.14 | 7.90 |
| | | 9.80 | 8.25 | 0.35 | 2.18 | 0.07 | 0.15 | 7.90 |
| | | 10.00 | 8.25 | 0.35 | 2.20 | 0.07 | 0.15 | 7.90 |
| | | 10.20 | 8.25 | 0.35 | 1.89 | 0.07 | 0.13 | 7.90 |
| | | 10.40 | 8.30 | 0.40 | 1.93 | 0.08 | 0.15 | 7.90 |
| | | 10.60 | 8.30 | 0.40 | 2.12 | 0.08 | 0.17 | 7.90 |
| | | 10.80 | 8.25 | 0.35 | 2.23 | 0.07 | 0.16 | 7.90 |
| | | 11.00 | 8.20 | 0.30 | 2.29 | 0.06 | 0.14 | 7.90 |
| | | 11.20 | 8.20 | 0.30 | 2.22 | 0.06 | 0.13 | 7.90 |
| | | 11.40 | 8.20 | 0.30 | 2.17 | 0.06 | 0.13 | 7.90 |
| | | 11.60 | 8.20 | 0.30 | 1.86 | 0.06 | 0.11 | 7.90 |
| | | 11.80 | 8.20 | 0.30 | 1.53 | 0.06 | 0.09 | 7.90 |
| | | 12.00 | 8.20 | 0.30 | 1.15 | 0.06 | 0.07 | 7.90 |
| | | 12.20 | 8.20 | 0.30 | 0.66 | 0.06 | 0.04 | 7.90 |
| | | 12.40 | 8.20 | 0.30 | 0.60 | 0.06 | 0.04 | 7.90 |
| | | 12.60 | 8.20 | 0.30 | 0.70 | 0.06 | 0.04 | 7.90 |
| | | 12.80 | 8.20 | 0.30 | 0.84 | 0.08 | 0.06 | 7.90 |
| | | 13.10 | 8.25 | 0.35 | 0.72 | 0.11 | 0.08 | 7.90 |
| | | 13.40 | 8.20 | 0.30 | 0.63 | 0.09 | 0.06 | 7.90 |
| | | 13.70 | 7.95 | 0.05 | 0.07 | 0.01 | 0.00 | 7.90 |
| | LW | 13.80 | 7.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | G | 14.00 | 6.20 | | | 0.00 | 0.00 | 0.00 |
| | | 14.40 | 5.36 | | | 0.00 | 0.00 | 0.00 |
| | LS | 15.70 | 4.96 | | | 0.00 | 0.00 | 0.00 |
| | | | | | Totals | 1.83 | 2.57 | |