

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 Trout Creek, located in Water Division 6.

Location and Land Status. Trout Creek originates in the Flattops Wilderness Area, approximately 11.0 miles southwest of the community of Yampa. Trout Creek flows into the Yampa River at the town of Milner. This recommendation addresses only the portion of Trout Creek that starts at the confluence with an unnamed tributary near the Forest Service boundary (at 40.23148 degrees North and 107.100 degrees east) and ending at the confluence with Little Trout Creek, a distance of approximately 8.0 miles. The BLM manages 0.8 miles of this reach, while approximately 7.2 miles are in private ownership.

Existing Instream Flow Water Rights. In 1977, the Colorado Water Conservation Board appropriated an instream flow water right on Trout Creek that begins at the outlet of Sheriff Reservoir and ends at the confluence with Middle Creek. The protected flow rate is 5.0 cfs, year round.

Biological Summary. Trout Creek is a cold water, moderate gradient stream. The reach that is the subject of this recommendation flows through valley that ranges from 1/8 to 1/2 mile in width. The upper part of the reach flows through agricultural lands used for livestock grazing, while the lower part of the reach flows through a confined canyon that is in largely natural condition. Substrate is generally from medium to large size, ranging from 4-inch cobbles to small boulders. Water quality is good for supporting salmonid fish species, but during July and August, temperatures can approach the maximum temperatures that can be tolerated by trout.

Fish surveys indicate a diverse and self-sustaining fish community. Trout Creek provides habitat for brook trout, brown trout, cutthroat trout, mottled sculpin, speckled dace, and mountain sucker. Spot surveys have indicated abundant populations of stonefly and caddisfly.

The creek also supports a vigorous riparian community comprised of alder, dogwood, and narrowleaf cottonwood. When the creek flows through confined canyons, the riparian community provides good cover and shading for the creek, and contributes substantially to bank stability.

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

Cross Section Date	Discharge Rate	Top Width	Winter Flow Recommendation (meets 2 of 3	Summer Flow Recommendation (meets 3 of 3

			hydraulic criteria)	hydraulic criteria)
08/12/2017 #1	9.43 cfs	39.42 feet	9.27 cfs	13.28 cfs
08/12/2017 #2	8.58 cfs	35.17 feet	5.79 cfs	12.80 cfs
Averages:			7.53 cfs	13.04 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.

13.00 cubic feet per second is recommended during the snowmelt runoff period and early summer, from April 1 to July 31. This recommendation is driven by the average depth criteria. In many locations, the Trout Creek channel is wide with large substrate, so meeting the depth criteria is important for passage between rocks and between pools. Implementing this recommendation would require an increase of 8.0 cfs over the current instream flow water right.

7.50 cubic feet per second is recommended during the remainder of the year, from August 1 through March 31. This recommendation is driven by the wetted perimeter criteria and the velocity criteria. 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. This flow rate should also prevent complete icing of the numerous pools in this reach, allowing the fish population to overwinter. Implementing this recommendation would require an increase of 2.5 cfs over the current instream flow water right.

Rationale for Instream Flow Increase. BLM believes an instream flow increase for Trout Creek is warranted because of physical habitat characteristics. The R2Cross data summarized below clearly indicates that the current instream flow water right does not provide sufficient physical habitat during the warm weather portions of the year when the fish populations are feeding, growing, and spawning. When the existing instream flow rights are applied to the cross sections that were collected, the stream would exhibit 40 percent to 66 percent wetted perimeter. However, this habitat is not highly usable by the fish population, because 5.0 cfs constrains the habitat to an average depth of 0.22 to 0.26 feet. An average habitat depth of 0.22 to 0.26 feet is not sufficient in a stream that averages 35 to 40 feet in top width. During the warm weather season, the fish populations need to have access to as much of the stream channel as possible for feeding, resting, and spawning if they are to survive the pronounced cold winters in this canyon. The increase in flow rates during winter is warranted because the average depths associated with 5.0 cfs make much of the physical habitat in the stream channel susceptible to freezing.

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 reservoir storage and for irrigation diversions. Two nearby gages may also provide an estimate of natural hydrology, because they are located on watersheds with similar characteristics. USGS Gage 0923800, 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. USGG Gage 09248500, on the East Fork of the Williams Fork near Willow

Creek, is on a larger watershed, but this watershed has very similar altitude and aspect to the Trout Creek watershed. Neither of these gages is currently collecting data, but the period of record should be sufficient to help establish water availability for this recommendation. Finally, if reservoir storage and release records are available for Sheriff Reservoir, located upstream from the recommended reach, those records would assist in evaluating the impact of storage operations on stream flows.

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

Koll Ditch – 13.22 cfs
Alex Ditch – 1.28 cfs
Orno Ditch – 8.31 cfs

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

Slough Ditch – 3.98 cfs
Knott Ditch – 2.00 cfs
Pine Grove Ditch – 3.98 cfs
David Chapman Ditch – 2.41 cfs
Male Move Ditch – 12.62 cfs
Last Chance Ditch – 19.29 cfs
Rich Ditch – 19.32 cfs
Sheriff Reservoir – 986.5 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

<u>WaterCode</u>	<u>WaterName</u>	<u>StationCode</u>	<u>StationLocation</u>	<u>SampleDate</u>	<u>SurveyID</u>	<u>Protocol</u>	<u>CommonName</u>	<u>Numfish</u>	<u>FishLength</u>
23533	Trout Creek #2	YP0085	ABV CO RD 29	8-Sep-1993	21041	PRESENCE/ABSENCE	MOTTLED SCULPIN	8	70
23533	Trout Creek #2	YP0085	ABV CO RD 29	8-Sep-1993	21041	PRESENCE/ABSENCE	MOTTLED SCULPIN	2	30
23533	Trout Creek #2	YP0085	ABV CO RD 29	8-Sep-1993	21041	PRESENCE/ABSENCE	MOTTLED SCULPIN	2	90
23533	Trout Creek #2	YP0085	ABV CO RD 29	8-Sep-1993	21041	PRESENCE/ABSENCE	BROOK TROUT	1	130
23533	Trout Creek #2	YP0085	ABV CO RD 29	8-Sep-1993	21041	PRESENCE/ABSENCE	BROOK TROUT	1	30
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	121
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	51
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	151
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	51
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	53
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	59
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	59
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	58
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	66
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	52
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	61
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	59
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	152
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	46
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	65
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	50
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	57
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	59
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	192
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	58
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	62
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	77
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	59
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	55
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	58
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	52
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	49
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	57
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	57
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROOK TROUT	1	51

[illegible]

<u>WaterCode</u>	<u>WaterName</u>	<u>StationCode</u>	<u>StationLocation</u>	<u>SampleDate</u>	<u>SurveyID</u>	<u>Protocol</u>	<u>CommonName</u>	<u>Numfish</u>	<u>FishLength</u>
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	LONGNOSE DACE	1	86
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	LONGNOSE DACE	1	105
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	LONGNOSE DACE	1	89
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	322
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	404
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	75
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23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	344
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	59
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	329
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	62
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	55
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	55
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	61
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	66
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	266
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	170
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	235
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	373
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	265
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	64
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	326
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	71
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	55
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	57
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	51
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	122
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	228
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	145
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	134
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	302
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	405
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	219
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	136
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	215
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	131

WaterCode	WaterName	StationCode	StationLocation	SampleDate	SurveyID	Protocol	CommonName	Numfish	FishLength
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	318
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	131
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	169
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	223
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	246
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	BROWN TROUT	1	382
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	160
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	138
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	107
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	125
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	112
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	88
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	102
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	86
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	96
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	167
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOUNTAIN SUCKER	1	172
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	79
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	54
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	51
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	46
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	44
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	52
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	86
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	91
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	96
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	41
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	74
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	106
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	48
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	50
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	80
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	55
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	68
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	96
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	49
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	101
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	94
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	86

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[illegible]

[illegible]

<u>WaterCode</u>	<u>WaterName</u>	<u>StationCode</u>	<u>StationLocation</u>	<u>SampleDate</u>	<u>SurveyID</u>	<u>Protocol</u>	<u>CommonName</u>	<u>Numfish</u>	<u>FishLength</u>
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	70
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	67
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	53
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	54
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	48
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	56
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	46
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	44
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	51
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	70
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	88
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	89
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	84
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	136
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	67
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	97
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	86
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	62
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	90
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	95
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	64
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	85
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	68
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	MOTTLED SCULPIN	1	75
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	CUTTHROAT TROUT (S.S.U.)	1	412
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	CUTTHROAT TROUT (S.S.U.)	1	80
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	CUTTHROAT TROUT (S.S.U.)	1	196
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	CUTTHROAT TROUT (S.S.U.)	1	208
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	RAINBOW TROUT	1	267
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	RAINBOW TROUT	1	249
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	RAINBOW X CUTTHROAT	1	277
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	83
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	84
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	101
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	86
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	69
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	81
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	67
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	90

<u>WaterCode</u>	<u>WaterName</u>	<u>StationCode</u>	<u>StationLocation</u>	<u>SampleDate</u>	<u>SurveyID</u>	<u>Protocol</u>	<u>CommonName</u>	<u>Numfish</u>	<u>FishLength</u>
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	87
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	74
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	85
23533	Trout Creek #2	YP1965	4.5 Km BLW CO RD 29	19-Jul-2007	23350	THREE-PASS REMOVAL	SPECKLED DACE	1	84



COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>Sinking Gulch</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>4 miles upstream from CO Hwy 13 adjacent to State Land Board</u>		
DATE: <u>8-1-17</u>	OBSERVERS: <u>R. Smith, E. Scherff</u>	
LEGAL DESCRIPTION:	1/4 SECTION: <u>NE NE</u>	SECTION: <u>35</u>
	TOWNSHIP: <u>4 N/S</u>	RANGE: <u>92 E/W</u>
COUNTY: <u>Moffat</u>	WATERSHED: <u>Milk Cr / Yampa R</u>	PM: <u>646</u>
	WATER DIVISION: <u>6</u>	DOW WATER CODE: <u>28262</u>
MAP(S):	USGS:	<u>Zone 13 272854</u>
	USFS:	<u>4462454</u>

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: ☒ YES ☐ NO		METER TYPE: <u>M-M</u>
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec
		TAPE WEIGHT: _____ lbs/foot
		TAPE TENSION: _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to silt</u>		PHOTOGRAPHS TAKEN: ☒ YES ☐ NO
		NUMBER OF PHOTOGRAPHS: <u>3</u>

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)	S K E T C H	LEGEND: Stake (X) Station (1) Photo (1) → Direction of Flow ← →
(X) Tape @ Stake LB	0.0	<u>surveyed</u>		
(X) Tape @ Stake RB	0.0	<u>surveyed</u>		
(1) WS @ Tape LB/RB	0.0	<u>9.45/9.45</u>		
(2) WS Upstream	<u>5.4</u>	<u>9.40</u>		
(3) WS Downstream	<u>5.3</u>	<u>9.52</u>		
SLOPE: <u>0.12/10.7 = .011</u>				

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO ☒ YES ☐ NO	DISTANCE ELECTROFISHED: _____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO ☒ 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:																	
<u>mayfly, caddisfly</u>																	

COMMENTS

DISCHARGE/CROSS SECTION NOTES

[illegible]

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

LOCATION INFORMATION

STREAM NAME: Trout Creek
XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
XS NUMBER: 1

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

1/4 SEC: SW NW
SECTION: 23
TWP: 4N
RANGE: 86W
PM: Sixth

COUNTY: Routt
WATERSHED: Yampa River
DIVISION: 6
DOW CODE: 23533

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: 0.013

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
 XS NUMBER: 1

DATA POINTS= 40

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	1.30	3.92		
1 G	3.70	3.83		
	4.60	4.71		
W	6.70	5.05	0.00	0.00
	8.00	5.25	0.20	0.45
	9.00	5.20	0.15	0.67
	10.00	5.45	0.40	1.22
	10.50	5.40	0.35	1.67
	11.00	5.50	0.45	1.65
	11.50	5.45	0.40	2.20
	12.00	5.45	0.40	1.98
	12.50	5.45	0.40	1.72
	13.00	5.50	0.45	1.95
	13.50	5.50	0.45	1.61
	14.00	5.55	0.50	1.24
	14.50	5.55	0.50	1.48
	15.00	5.45	0.40	1.40
	15.50	5.50	0.45	1.76
	16.00	5.50	0.45	1.61
	16.50	5.55	0.50	2.01
	17.00	5.45	0.40	2.34
	17.50	5.60	0.55	2.05
	18.00	5.65	0.60	1.63
	18.50	5.70	0.65	1.42
	19.00	5.75	0.70	1.84
	20.00	5.55	0.50	0.00
	21.00	5.45	0.40	0.49
	22.00	5.30	0.25	2.07
	23.00	5.35	0.30	1.01
	24.00	5.05	0.00	0.00
	25.00	5.15	0.10	0.28
	26.00	5.15	0.10	0.02
W	26.70	5.05	0.00	0.00
	29.60	4.90		
	33.90	4.62		
	35.60	4.42		
	39.30	4.68		
	41.60	4.20		
	42.60	4.04		
1 RS & G	43.20	3.80		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
1.32	0.20	0.23	0.10	1.1%
1.00	0.15	0.15	0.10	1.1%
1.03	0.40	0.30	0.37	3.9%
0.50	0.35	0.18	0.29	3.1%
0.51	0.45	0.23	0.37	3.9%
0.50	0.40	0.20	0.44	4.7%
0.50	0.40	0.20	0.40	4.2%
0.50	0.40	0.20	0.34	3.6%
0.50	0.45	0.23	0.44	4.7%
0.50	0.45	0.23	0.36	3.8%
0.50	0.50	0.25	0.31	3.3%
0.50	0.50	0.25	0.37	3.9%
0.51	0.40	0.20	0.28	3.0%
0.50	0.45	0.23	0.40	4.2%
0.50	0.45	0.23	0.36	3.8%
0.50	0.50	0.25	0.50	5.3%
0.51	0.40	0.20	0.47	5.0%
0.52	0.55	0.28	0.56	6.0%
0.50	0.60	0.30	0.49	5.2%
0.50	0.65	0.33	0.46	4.9%
0.50	0.70	0.53	0.97	10.2%
1.02	0.50	0.50	0.00	0.0%
1.00	0.40	0.40	0.20	2.1%
1.01	0.25	0.25	0.52	5.5%
1.00	0.30	0.30	0.30	3.2%
1.04		0.00	0.00	0.0%
1.00	0.10	0.10	0.03	0.3%
1.00	0.10	0.09	0.00	0.0%
0.71		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

20.21 0.7 6.79 9.43 100.0%
 (Max.)

Manning's n = 0.0589
 Hydraulic Radius= 0.33589187

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	6.79	6.79	0.0%
4.80	6.79	12.57	85.1%
4.82	6.79	12.05	77.5%
4.84	6.79	11.55	70.0%
4.86	6.79	11.05	62.7%
4.88	6.79	10.56	55.5%
4.90	6.79	10.08	48.4%
4.92	6.79	9.61	41.5%
4.94	6.79	9.14	34.7%
4.96	6.79	8.69	28.0%
4.98	6.79	8.25	21.5%
5.00	6.79	7.82	15.2%
5.01	6.79	7.61	12.1%
5.02	6.79	7.40	9.0%
5.03	6.79	7.20	6.0%
5.04	6.79	6.99	3.0%
5.05	6.79	6.79	0.0%
5.06	6.79	6.59	-2.9%
5.07	6.79	6.40	-5.8%
5.08	6.79	6.20	-8.7%
5.09	6.79	6.01	-11.5%
5.10	6.79	5.82	-14.2%
5.12	6.79	5.46	-19.7%
5.14	6.79	5.10	-24.9%
5.16	6.79	4.76	-29.9%
5.18	6.79	4.44	-34.6%
5.20	6.79	4.12	-39.3%
5.22	6.79	3.81	-43.9%
5.24	6.79	3.51	-48.2%
5.26	6.79	3.23	-52.4%
5.28	6.79	2.95	-56.5%
5.30	6.79	2.67	-60.6%

WATERLINE AT ZERO

AREA ERROR = 5.050

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
 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	3.83	39.42	1.19	1.92	46.80	40.16	100.0%	1.17	148.97	3.18
	4.05	38.61	0.99	1.70	38.11	39.22	97.7%	0.97	107.45	2.82
	4.10	38.25	0.95	1.65	36.19	38.83	96.7%	0.93	99.23	2.74
	4.15	37.89	0.90	1.60	34.28	38.44	95.7%	0.89	91.29	2.66
	4.20	37.52	0.86	1.55	32.40	38.05	94.8%	0.85	83.64	2.58
	4.25	37.23	0.82	1.50	30.53	37.74	94.0%	0.81	76.18	2.50
	4.30	36.94	0.78	1.45	28.67	37.42	93.2%	0.77	69.01	2.41
	4.35	36.65	0.73	1.40	26.83	37.11	92.4%	0.72	62.14	2.32
	4.40	36.36	0.69	1.35	25.01	36.79	91.6%	0.68	55.57	2.22
	4.45	35.39	0.66	1.30	23.21	35.79	89.1%	0.65	49.98	2.15
	4.50	33.96	0.63	1.25	21.48	34.33	85.5%	0.63	45.15	2.10
	4.55	32.53	0.61	1.20	19.81	32.87	81.9%	0.60	40.63	2.05
	4.60	31.10	0.59	1.15	18.22	31.42	78.2%	0.58	36.43	2.00
	4.65	29.47	0.57	1.10	16.71	29.75	74.1%	0.56	32.68	1.96
	4.70	28.08	0.54	1.05	15.27	28.34	70.6%	0.54	29.07	1.90
	4.75	27.06	0.51	1.00	13.89	27.30	68.0%	0.51	25.45	1.83
	4.80	25.98	0.48	0.95	12.57	26.22	65.3%	0.48	22.12	1.76
	4.85	24.90	0.45	0.90	11.30	25.14	62.6%	0.45	19.04	1.69
	4.90	23.83	0.42	0.85	10.08	24.06	59.9%	0.42	16.21	1.61
	4.95	22.55	0.40	0.80	8.92	22.78	56.7%	0.39	13.72	1.54
	5.00	21.28	0.37	0.75	7.82	21.50	53.5%	0.36	11.46	1.46
WL	5.05	20.00	0.34	0.70	6.79	20.21	50.3%	0.34	9.43	1.39
	5.10	18.66	0.31	0.65	5.82	18.86	46.9%	0.31	7.65	1.31
	5.15	16.32	0.30	0.60	4.92	16.50	41.1%	0.30	6.32	1.28
	5.20	15.82	0.26	0.55	4.12	15.99	39.8%	0.26	4.80	1.16
	5.25	14.13	0.24	0.50	3.37	14.28	35.6%	0.24	3.70	1.10
	5.30	13.77	0.19	0.45	2.67	13.90	34.6%	0.19	2.56	0.96
	5.35	12.07	0.17	0.40	2.03	12.19	30.3%	0.17	1.76	0.87
	5.40	11.53	0.12	0.35	1.44	11.64	29.0%	0.12	1.03	0.71
	5.45	9.25	0.10	0.30	0.89	9.34	23.3%	0.10	0.54	0.60
	5.50	5.33	0.09	0.25	0.50	5.39	13.4%	0.09	0.30	0.59
	5.55	2.67	0.11	0.20	0.29	2.70	6.7%	0.11	0.19	0.65
	5.60	2.25	0.08	0.15	0.17	2.27	5.7%	0.07	0.09	0.51
	5.65	1.50	0.05	0.10	0.08	1.51	3.8%	0.05	0.03	0.39
	5.70	0.75	0.03	0.05	0.02	0.76	1.9%	0.02	0.00	0.24
	5.75	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Trout Creek
XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 9.43 cfs
CALCULATED FLOW (Qc)= 9.43 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 5.05 ft
CALCULATED WATERLINE (WLc)= 5.05 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.70 ft
MAX CALCULATED DEPTH (Dc)= 0.70 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 1.39 ft/sec
MANNING'S N= 0.059
SLOPE= 0.013 ft/ft

.4 * Qm = 3.8 cfs
2.5 * Qm= 23.6 cfs

RECOMMENDED INSTREAM FLOW:
=====

FLOW (CFS)	PERIOD
=====	=====
_____	_____
_____	_____
_____	_____
_____	_____

RATIONALE FOR RECOMMENDATION:
=====

RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

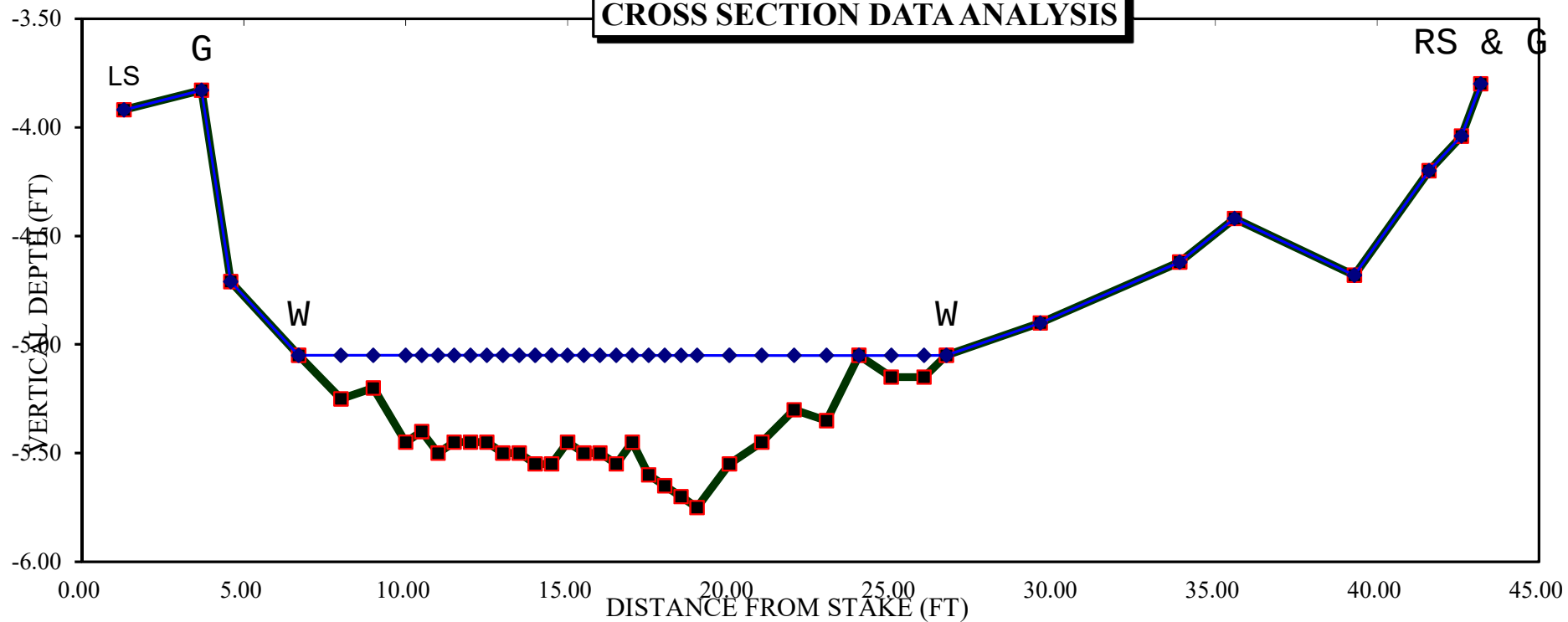
GL = lowest Grassline elevation corrected for sag

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

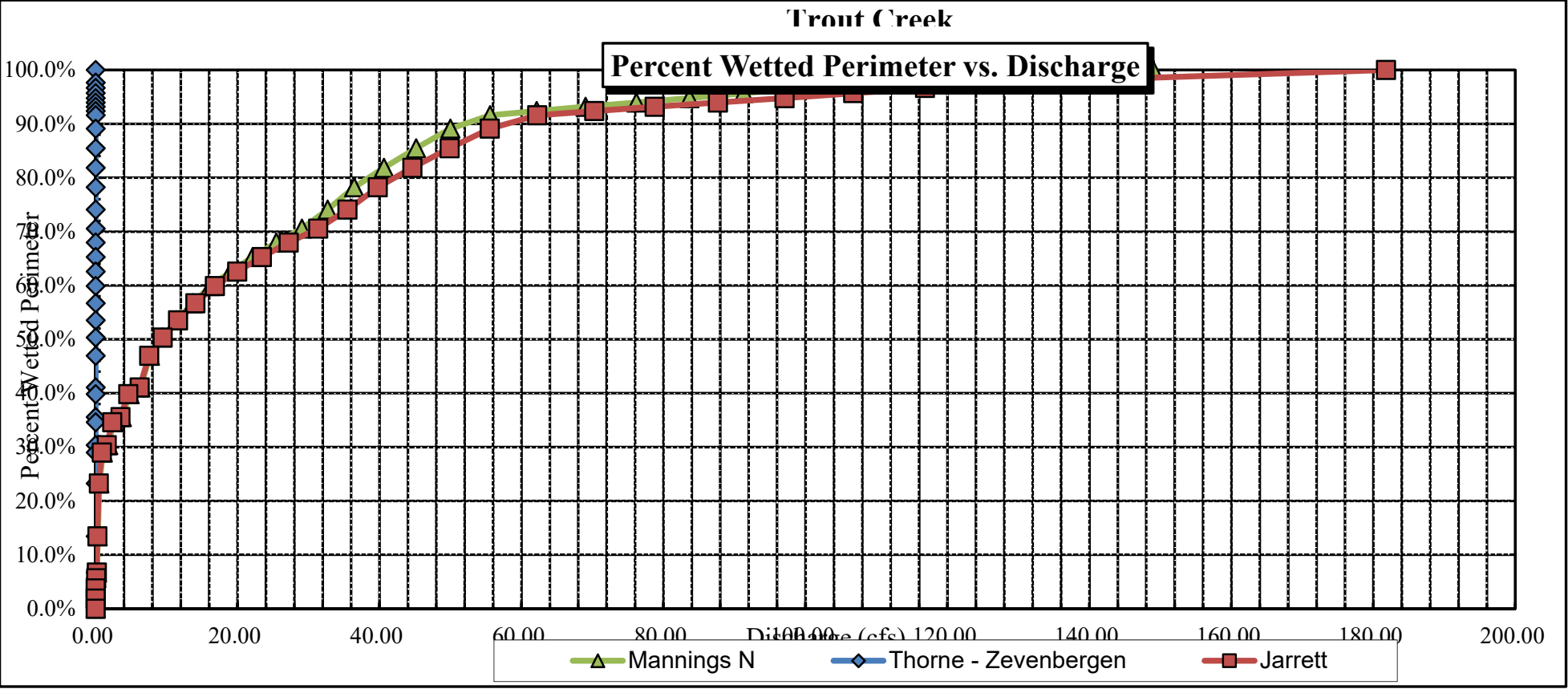
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.83	39.42	1.19	1.92	46.80	40.16	100.0%	1.17	181.78	3.88
	4.05	38.61	0.99	1.70	38.11	39.22	97.7%	0.97	127.35	3.34
	4.10	38.25	0.95	1.65	36.19	38.83	96.7%	0.93	116.82	3.23
	4.15	37.89	0.90	1.60	34.28	38.44	95.7%	0.89	106.73	3.11
	4.20	37.52	0.86	1.55	32.40	38.05	94.8%	0.85	97.06	3.00
	4.25	37.23	0.82	1.50	30.53	37.74	94.0%	0.81	87.68	2.87
	4.30	36.94	0.78	1.45	28.67	37.42	93.2%	0.77	78.74	2.75
	4.35	36.65	0.73	1.40	26.83	37.11	92.4%	0.72	70.25	2.62
	4.40	36.36	0.69	1.35	25.01	36.79	91.6%	0.68	62.21	2.49
	4.45	35.39	0.66	1.30	23.21	35.79	89.1%	0.65	55.52	2.39
	4.50	33.96	0.63	1.25	21.48	34.33	85.5%	0.63	49.87	2.32
	4.55	32.53	0.61	1.20	19.81	32.87	81.9%	0.60	44.62	2.25
	4.60	31.10	0.59	1.15	18.22	31.42	78.2%	0.58	39.75	2.18
	4.65	29.47	0.57	1.10	16.71	29.75	74.1%	0.56	35.48	2.12
	4.70	28.08	0.54	1.05	15.27	28.34	70.6%	0.54	31.35	2.05
	4.75	27.06	0.51	1.00	13.89	27.30	68.0%	0.51	27.20	1.96
	4.80	25.98	0.48	0.95	12.57	26.22	65.3%	0.48	23.42	1.86
	4.85	24.90	0.45	0.90	11.30	25.14	62.6%	0.45	19.95	1.77
	4.90	23.83	0.42	0.85	10.08	24.06	59.9%	0.42	16.80	1.67
	4.95	22.55	0.40	0.80	8.92	22.78	56.7%	0.39	14.06	1.58
	5.00	21.28	0.37	0.75	7.82	21.50	53.5%	0.36	11.61	1.48
WL	5.05	20.00	0.34	0.70	6.79	20.21	50.3%	0.34	9.43	1.39
	5.10	18.66	0.31	0.65	5.82	18.86	46.9%	0.31	7.55	1.30
	5.15	16.32	0.30	0.60	4.92	16.50	41.1%	0.30	6.20	1.26
	5.20	15.82	0.26	0.55	4.12	15.99	39.8%	0.26	4.60	1.12
	5.25	14.13	0.24	0.50	3.37	14.28	35.6%	0.24	3.50	1.04
	5.30	13.77	0.19	0.45	2.67	13.90	34.6%	0.19	2.34	0.88
	5.35	12.07	0.17	0.40	2.03	12.19	30.3%	0.17	1.58	0.78
	5.40	11.53	0.12	0.35	1.44	11.64	29.0%	0.12	0.87	0.61
	5.45	9.25	0.10	0.30	0.89	9.34	23.3%	0.10	0.44	0.49
	5.50	5.33	0.09	0.25	0.50	5.39	13.4%	0.09	0.24	0.48
	5.55	2.67	0.11	0.20	0.29	2.70	6.7%	0.11	0.16	0.54
	5.60	2.25	0.08	0.15	0.17	2.27	5.7%	0.07	0.07	0.40
	5.65	1.50	0.05	0.10	0.08	1.51	3.8%	0.05	0.02	0.29
	5.70	0.75	0.03	0.05	0.02	0.76	1.9%	0.02	0.00	0.16
	5.75	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

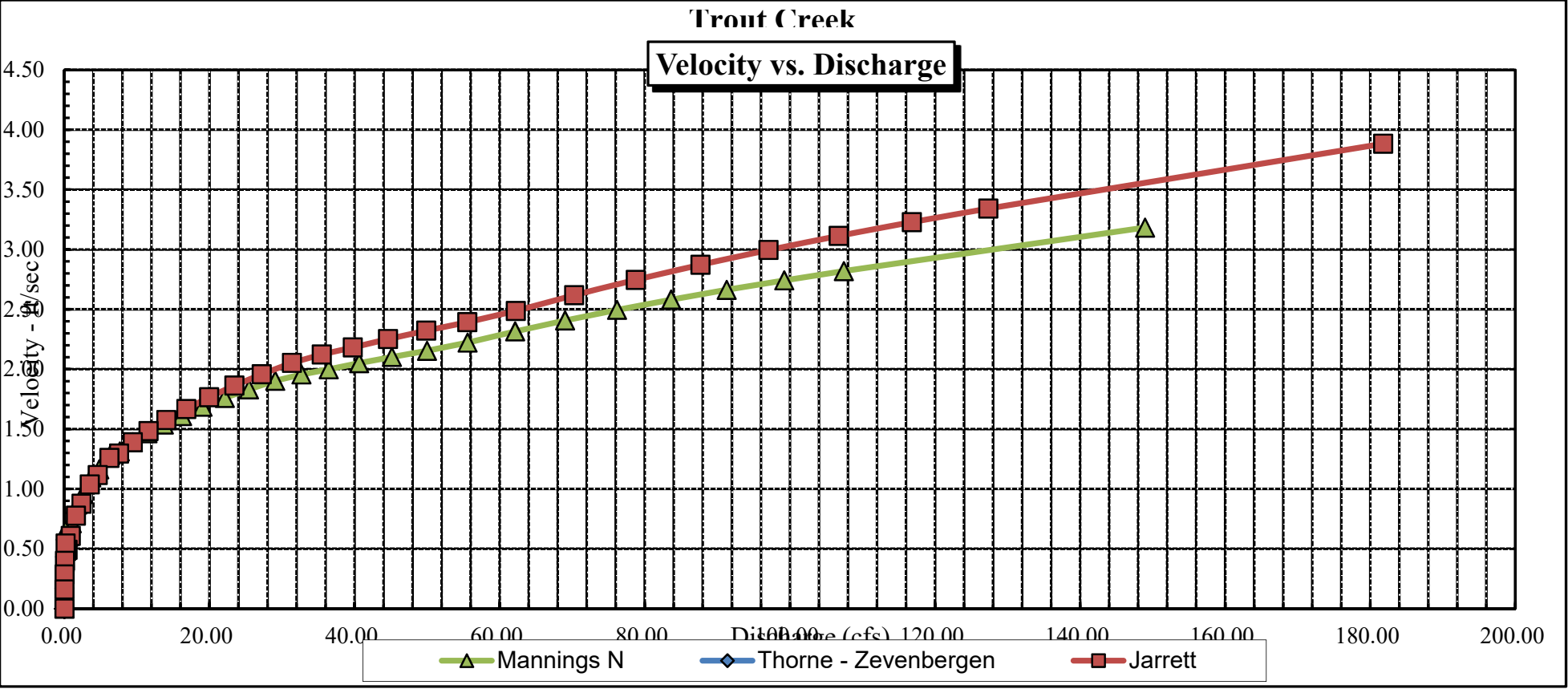
Trout Creek

CROSS SECTION DATA ANALYSIS



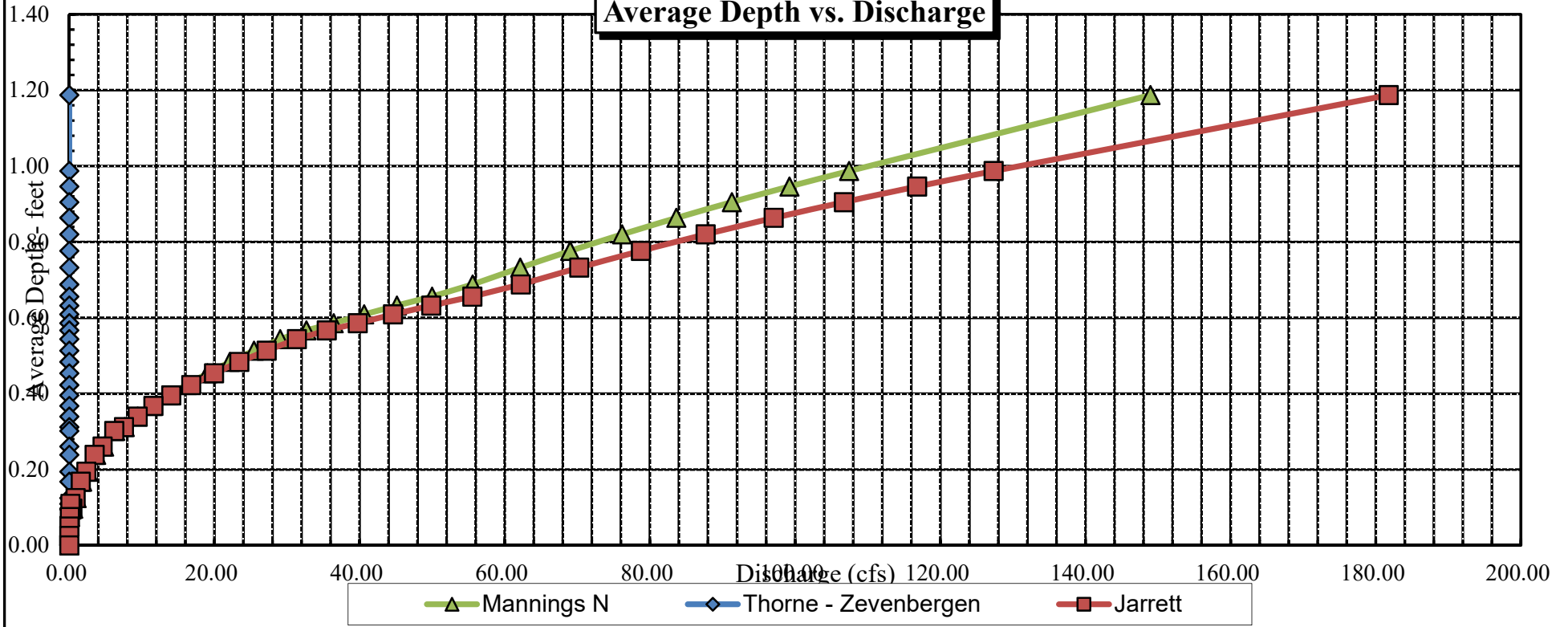
Channel Bottom Computed Water Line

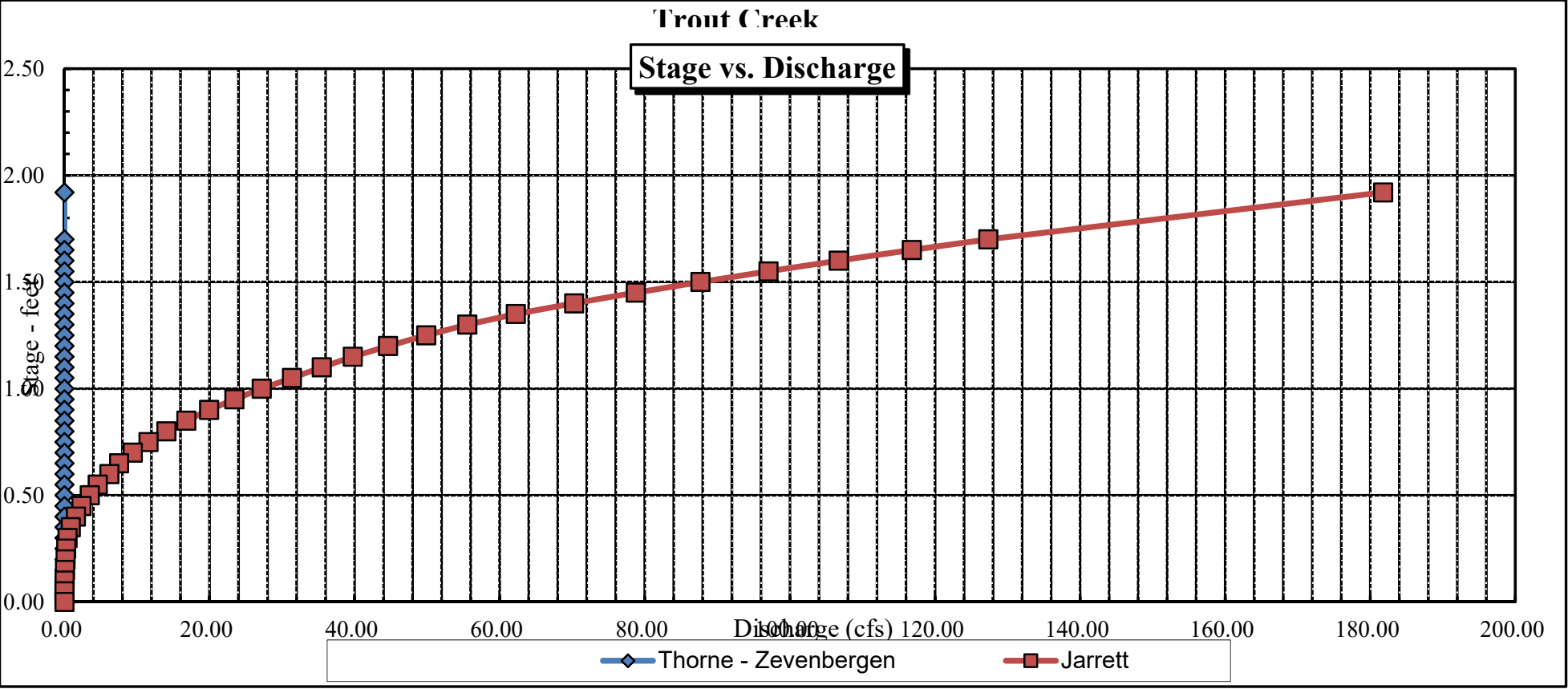




Trout Creek

Average Depth vs. Discharge





Data Input & Proofing

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upstr fr confl w Little Trout Ck.
 XS NUMBER: 1
 DATE: 8/2/2017
 OBSERVERS: R. Smith, E. Scherff

1/4 SEC: SW NW
 SECTION: 23
 TWP: 4N
 RANGE: 86W
 PM: Sixth

COUNTY: Routt
 WATERSHED: Yampa River
 DIVISION: 6
 DOW CODE: 23533
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.013 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 = 40								
1	LS	1.30	3.92			0.00	0.00	0.00
	G	3.70	3.83			0.00	0.00	0.00
W		4.60	4.71			0.00	0.00	0.00
		6.70	5.05	0.00	0.00	0.00	0.00	0.00
		8.00	5.25	0.20	0.45	0.23	0.10	5.05
		9.00	5.20	0.15	0.67	0.15	0.10	5.05
		10.00	5.45	0.40	1.22	0.30	0.37	5.05
		10.50	5.40	0.35	1.67	0.18	0.29	5.05
		11.00	5.50	0.45	1.65	0.23	0.37	5.05
		11.50	5.45	0.40	2.20	0.20	0.44	5.05
		12.00	5.45	0.40	1.98	0.20	0.40	5.05
		12.50	5.45	0.40	1.72	0.20	0.34	5.05
		13.00	5.50	0.45	1.95	0.23	0.44	5.05
		13.50	5.50	0.45	1.61	0.23	0.36	5.05
		14.00	5.55	0.50	1.24	0.25	0.31	5.05
		14.50	5.55	0.50	1.48	0.25	0.37	5.05
		15.00	5.45	0.40	1.40	0.20	0.28	5.05
		15.50	5.50	0.45	1.76	0.23	0.40	5.05
		16.00	5.50	0.45	1.61	0.23	0.36	5.05
		16.50	5.55	0.50	2.01	0.25	0.50	5.05
		17.00	5.45	0.40	2.34	0.20	0.47	5.05
		17.50	5.60	0.55	2.05	0.28	0.56	5.05
W		18.00	5.65	0.60	1.63	0.30	0.49	5.05
		18.50	5.70	0.65	1.42	0.33	0.46	5.05
		19.00	5.75	0.70	1.84	0.53	0.97	5.05
		20.00	5.55	0.50	0.00	0.50	0.00	5.05
		21.00	5.45	0.40	0.49	0.40	0.20	5.05
		22.00	5.30	0.25	2.07	0.25	0.52	5.05
		23.00	5.35	0.30	1.01	0.30	0.30	5.05
		24.00	5.05	0.00	0.00	0.00	0.00	0.00
		25.00	5.15	0.10	0.28	0.10	0.03	5.05
		26.00	5.15	0.10	0.02	0.09	0.00	5.05
RS & G		26.70	5.05	0.00	0.00	0.00	0.00	0.00
		29.60	4.90			0.00	0.00	0.00
		33.90	4.62			0.00	0.00	0.00
		35.60	4.42			0.00	0.00	0.00
		39.30	4.68			0.00	0.00	0.00
		41.60	4.20			0.00	0.00	0.00
		42.60	4.04			0.00	0.00	0.00
		43.20	3.80			0.00	0.00	0.00
Totals						6.79	9.43	



COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: Trout Creek		CROSS-SECTION NO.: 2	
CROSS-SECTION LOCATION: 0.5 mile upstream from confluence with Little Trout Creek			
DATE: 8/2/17	OBSERVERS: Roy Smith, Eric Scherff		
LEGAL DESCRIPTION	1/4 SECTION: SW NW	SECTION: 23	TOWNSHIP: 4 N/S
COUNTY: Routt	WATERSHED: Yampa R.	WATER DIVISION: 6	RANGE: 86 E/W PM: 6H
MAP(S):	USGS: Zone B 4463647 N	USFS: 328647 E	

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES/NO	METER TYPE: M-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: sec	TAPE WEIGHT: surveyed lbs/foot	TAPE TENSION: surveyed lbs
CHANNEL BED MATERIAL SIZE RANGE: 4" cobble to 18" boulders		PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: 3	

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	surveyed
⊗ Tape @ Stake RB	0.0	surveyed
① WS @ Tape LB/RB	0.0 28.9 - 4.10 / 4.10	
② WS Upstream	39.0	3.55
③ WS Downstream	88.8	5.22
SLOPE	1.67 / 127.8 = 0.013	

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
mayfly, caddisfly, stonefly																	
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	

COMMENTS

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Trout Creek				CROSS-SECTION NO.: 2		DATE: 8-2-17		SHEET 1 OF 2			
GINNING OF MEASUREMENT			EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)		LEFT / RIGHT		Gage Reading: _____ ft		TIME: 2:40 PM		
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	1.2		1.38								
	1.6		1.95								
G	1.8		2.38								
	2.4		4.04								
RW	3.9		4.10								
	5.0		4.4	0.30				0.09			
	6.0		4.6	0.50				0.70			
	7.0		4.4	0.30				1.02			
	8.0		4.5	0.40				1.59			
	9.0		4.3	0.20				0.23			
	9.5		4.65	0.55				1.41			
	10.0		4.5	0.40				1.85			
	10.5		4.5	0.40				1.09			
	11.0		4.6	0.50				0.88			
	11.5		4.45	0.35				1.39			
	12.0		4.35	0.25				1.56			
	12.5		4.35	0.25				1.94			
	13.0		4.55	0.45				1.07			
	13.5		4.5	0.40				0.94			
	14.0		4.45	0.35				1.13			
	14.5		4.15	0.05				0.60			
	15.0		4.4	0.30				0.67			
	15.5		4.55	0.45				1.09			
	16.0		4.15	0.05				0.76			
	16.5		4.35	0.25				0.23			
	17.0		4.3	0.20				0.49			
	18.0		4.4	0.30				1.55			
	19.0		4.6	0.50				1.66			
	19.5		4.65	0.55				1.56			
	20.0		4.6	0.50				1.44			
	20.5		4.5	0.40				1.99			
	21.0		4.50	0.40				1.26			
	22.0		4.35	0.25				1.67			
	23.0		4.35	0.25				1.63			
	24.0		4.35	0.25				0.71			
see continuation sheet											
LW	28.9		4.10								
	30.3		4.01								
	31.8		3.42								
	33.0		2.84								
	35.0		2.52								
LS & G	37.0		2.46								
TOTALS:											

End of Measurement

Time:

Gage Reading: _____ ft

CALCULATIONS PERFORMED BY:

CALCULATIONS CHECKED BY:

continued next page →



COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>Little Trout Creek - continuation sheet</u>		CROSS-SECTION NO: <u>2</u>			
CROSS-SECTION LOCATION:					
DATE: <u>8-2-17</u> OBSERVERS: <u>R. Smith, E. Scherff</u>					
LEGAL DESCRIPTION	1/4 SECTION:	SECTION:	TOWNSHIP: <u>N/S</u>	RANGE: <u>E/W</u>	PM:
COUNTY:	WATERSHED:	WATER DIVISION:		DOW WATER CODE:	
MAP(S):	USGS:				
	USFS:				

SUPPLEMENTAL DATA

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

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	
② WS Upstream		
③ WS Downstream		
SLOPE		

S K E T C H

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

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	DISTANCE ELECTROFISHED: _____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO														
LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)																	
SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	

COMMENTS

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:						CROSS-SECTION NO.:	DATE:	SHEET				
BEGINNING OF MEASUREMENT						EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)	LEFT / RIGHT	Gage Reading: _____ ft	TIME: _____			
Features Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)	
								At Point	Mean in Vertical			
	25.0		4.3	0.20				1.15				
	26.0		4.2	0.10				0.76				
	27.0		4.3	0.20				0.92				
	28.0		4.25	0.15				0.69				
TOTALS:												
End of Measurement						Time: 3:10 PM	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: Trout Creek
XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
XS NUMBER: 2

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

1/4 SEC: SW NW
SECTION: 23
TWP: 4N
RANGE: 86W
PM: Sixth

COUNTY: Routt
WATERSHED: Yampa River
DIVISION: 6
DOW CODE: 23533

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: 0.013

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
 XS NUMBER: 2

DATA POINTS= 45

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	1.20	1.38		
	1.60	1.95		
1 G	1.80	2.38		
	2.40	4.04		
RW	3.90	4.10	0.00	0.00
	5.00	4.40	0.30	0.09
	6.00	4.60	0.50	0.70
	7.00	4.40	0.30	1.02
	8.00	4.50	0.40	1.59
	9.00	4.30	0.20	0.23
	9.50	4.65	0.55	1.41
	10.00	4.50	0.40	1.85
	10.50	4.50	0.40	1.09
	11.00	4.60	0.50	0.88
	11.50	4.45	0.35	1.39
	12.00	4.35	0.25	1.56
	12.50	4.35	0.25	1.94
	13.00	4.55	0.45	1.07
	13.50	4.50	0.40	0.94
	14.00	4.45	0.35	1.13
	14.50	4.15	0.05	0.60
	15.00	4.40	0.30	0.67
	15.50	4.55	0.45	1.09
	16.00	4.15	0.05	0.76
	16.50	4.35	0.25	0.23
	17.00	4.30	0.20	0.49
	18.00	4.40	0.30	1.55
	19.00	4.60	0.50	1.66
	19.50	4.65	0.55	1.56
	20.00	4.60	0.50	1.44
	20.50	4.50	0.40	1.99
	21.00	4.50	0.40	1.26
	22.00	4.35	0.25	1.67
	23.00	4.35	0.25	1.63
	24.00	4.35	0.25	0.71
	25.00	4.30	0.20	1.15
	26.00	4.20	0.10	0.76
	27.00	4.30	0.20	0.92
	28.00	4.25	0.15	0.69
LW	28.90	4.10	0.00	0.00
	30.30	4.01		
	31.80	3.42		
	33.00	2.84		
	35.00	2.52		
1 LS & G	37.00	2.46		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
1.14	0.30	0.32	0.03	0.3%
1.02	0.50	0.50	0.35	4.1%
1.02	0.30	0.30	0.31	3.6%
1.00	0.40	0.40	0.64	7.4%
1.02	0.20	0.15	0.03	0.4%
0.61	0.55	0.28	0.39	4.5%
0.52	0.40	0.20	0.37	4.3%
0.50	0.40	0.20	0.22	2.5%
0.51	0.50	0.25	0.22	2.6%
0.52	0.35	0.18	0.24	2.8%
0.51	0.25	0.13	0.20	2.3%
0.50	0.25	0.13	0.24	2.8%
0.54	0.45	0.23	0.24	2.8%
0.50	0.40	0.20	0.19	2.2%
0.50	0.35	0.18	0.20	2.3%
0.58	0.05	0.03	0.02	0.2%
0.56	0.30	0.15	0.10	1.2%
0.52	0.45	0.23	0.25	2.9%
0.64	0.05	0.03	0.02	0.2%
0.54	0.25	0.13	0.03	0.3%
0.50	0.20	0.15	0.07	0.9%
1.00	0.30	0.30	0.47	5.4%
1.02	0.50	0.38	0.62	7.3%
0.50	0.55	0.28	0.43	5.0%
0.50	0.50	0.25	0.36	4.2%
0.51	0.40	0.20	0.40	4.6%
0.50	0.40	0.30	0.38	4.4%
1.01	0.25	0.25	0.42	4.9%
1.00	0.25	0.25	0.41	4.7%
1.00	0.25	0.25	0.18	2.1%
1.00	0.20	0.20	0.23	2.7%
1.00	0.10	0.10	0.08	0.9%
1.00	0.20	0.20	0.18	2.1%
1.00	0.15	0.14	0.10	1.1%
0.91		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

25.74 0.55 7.41 8.58 100.0%
 (Max.)

Manning's n = 0.0637
 Hydraulic Radius= 0.28774312

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	7.41	7.41	0.0%
3.85	7.41	14.31	93.2%
3.87	7.41	13.75	85.6%
3.89	7.41	13.18	77.9%
3.91	7.41	12.62	70.3%
3.93	7.41	12.05	62.7%
3.95	7.41	11.49	55.1%
3.97	7.41	10.93	47.5%
3.99	7.41	10.37	40.0%
4.01	7.41	9.81	32.4%
4.03	7.41	9.26	25.0%
4.05	7.41	8.71	17.6%
4.06	7.41	8.44	13.9%
4.07	7.41	8.18	10.4%
4.08	7.41	7.92	6.9%
4.09	7.41	7.66	3.4%
4.10	7.41	7.41	0.0%
4.11	7.41	7.16	-3.4%
4.12	7.41	6.91	-6.7%
4.13	7.41	6.66	-10.1%
4.14	7.41	6.42	-13.4%
4.15	7.41	6.17	-16.7%
4.17	7.41	5.68	-23.3%
4.19	7.41	5.20	-29.8%
4.21	7.41	4.73	-36.1%
4.23	7.41	4.27	-42.3%
4.25	7.41	3.83	-48.3%
4.27	7.41	3.40	-54.1%
4.29	7.41	3.00	-59.5%
4.31	7.41	2.61	-64.7%
4.33	7.41	2.25	-69.6%
4.35	7.41	1.91	-74.2%

WATERLINE AT ZERO

AREA ERROR = 4.100

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
 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	2.46	35.17	1.61	2.19	56.69	37.30	100.0%	1.52	199.26	3.51
	3.10	30.40	1.20	1.55	36.39	31.99	85.8%	1.14	105.41	2.90
	3.15	30.28	1.15	1.50	34.87	31.83	85.3%	1.10	98.53	2.83
	3.20	30.16	1.11	1.45	33.36	31.66	84.9%	1.05	91.84	2.75
	3.25	30.04	1.06	1.40	31.85	31.49	84.4%	1.01	85.34	2.68
	3.30	29.92	1.01	1.35	30.36	31.32	84.0%	0.97	79.04	2.60
	3.35	29.79	0.97	1.30	28.86	31.15	83.5%	0.93	72.93	2.53
	3.40	29.67	0.92	1.25	27.38	30.99	83.1%	0.88	67.02	2.45
	3.45	29.54	0.88	1.20	25.90	30.80	82.6%	0.84	61.32	2.37
	3.50	29.39	0.83	1.15	24.42	30.62	82.1%	0.80	55.85	2.29
	3.55	29.25	0.78	1.10	22.96	30.43	81.6%	0.75	50.58	2.20
	3.60	29.10	0.74	1.05	21.50	30.24	81.1%	0.71	45.53	2.12
	3.65	28.96	0.69	1.00	20.05	30.05	80.6%	0.67	40.69	2.03
	3.70	28.81	0.65	0.95	18.60	29.86	80.0%	0.62	36.08	1.94
	3.75	28.67	0.60	0.90	17.17	29.67	79.5%	0.58	31.69	1.85
	3.80	28.52	0.55	0.85	15.74	29.48	79.0%	0.53	27.53	1.75
	3.85	28.38	0.50	0.80	14.31	29.29	78.5%	0.49	23.61	1.65
	3.90	28.23	0.46	0.75	12.90	29.10	78.0%	0.44	19.94	1.55
	3.95	28.09	0.41	0.70	11.49	28.91	77.5%	0.40	16.51	1.44
	4.00	27.94	0.36	0.65	10.09	28.72	77.0%	0.35	13.36	1.32
	4.05	27.03	0.32	0.60	8.71	27.77	74.5%	0.31	10.68	1.23
WL	4.10	25.00	0.30	0.55	7.41	25.74	69.0%	0.29	8.58	1.16
	4.15	24.52	0.25	0.50	6.17	25.25	67.7%	0.24	6.41	1.04
	4.20	23.66	0.21	0.45	4.97	24.33	65.2%	0.20	4.58	0.92
	4.25	21.81	0.18	0.40	3.83	22.41	60.1%	0.17	3.13	0.82
	4.30	19.25	0.15	0.35	2.80	19.79	53.1%	0.14	2.02	0.72
	4.35	13.88	0.14	0.30	1.91	14.33	38.4%	0.13	1.33	0.69
	4.40	11.92	0.11	0.25	1.27	12.28	32.9%	0.10	0.74	0.58
	4.45	9.33	0.08	0.20	0.73	9.59	25.7%	0.08	0.35	0.48
	4.50	5.40	0.06	0.15	0.34	5.58	15.0%	0.06	0.14	0.41
	4.55	2.89	0.05	0.10	0.13	2.98	8.0%	0.05	0.05	0.34
	4.60	1.24	0.03	0.05	0.03	1.27	3.4%	0.02	0.01	0.22
	4.65	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Trout Creek
XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 8.58 cfs
CALCULATED FLOW (Qc)= 8.58 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 4.10 ft
CALCULATED WATERLINE (WLc)= 4.10 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 = 0.0 %

MEAN VELOCITY= 1.16 ft/sec
MANNING'S N= 0.064
SLOPE= 0.013 ft/ft

.4 * Qm = 3.4 cfs
2.5 * Qm= 21.5 cfs

RECOMMENDED INSTREAM FLOW:
=====

FLOW (CFS)	PERIOD
=====	=====
_____	_____
_____	_____
_____	_____
_____	_____

RATIONALE FOR RECOMMENDATION:
=====

RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

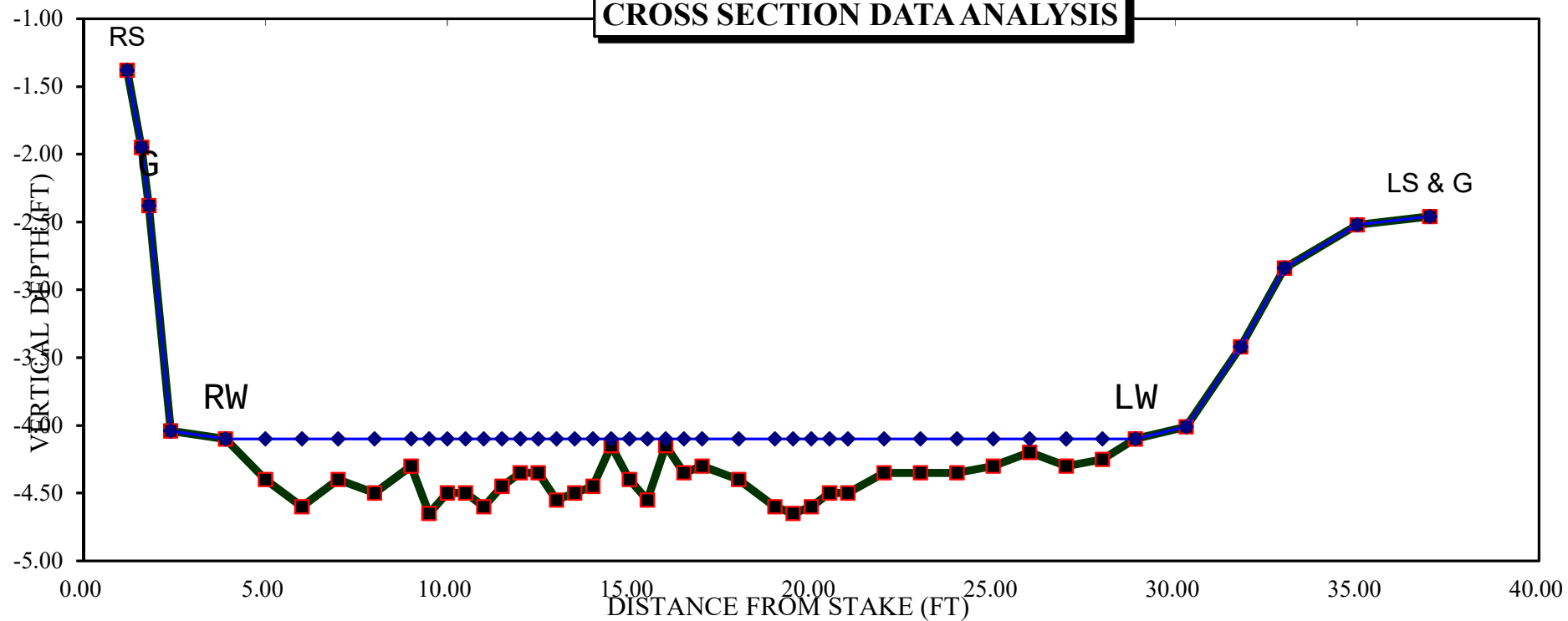
GL = lowest Grassline elevation corrected for sag

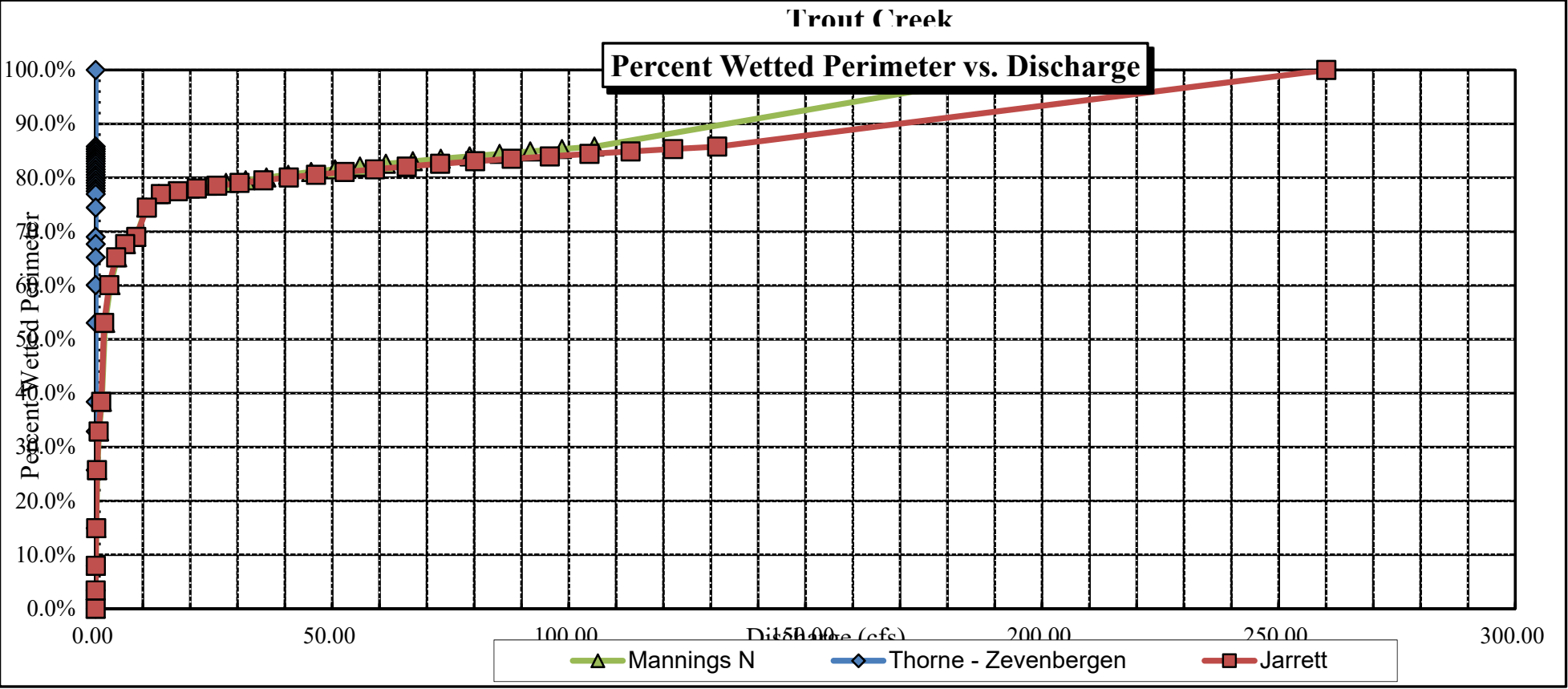
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

	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	2.46	35.17	1.61	2.19	56.69	37.30	100.0%	1.52	260.06	4.59
	3.10	30.40	1.20	1.55	36.39	31.99	85.8%	1.14	131.33	3.61
	3.15	30.28	1.15	1.50	34.87	31.83	85.3%	1.10	122.03	3.50
	3.20	30.16	1.11	1.45	33.36	31.66	84.9%	1.05	113.04	3.39
	3.25	30.04	1.06	1.40	31.85	31.49	84.4%	1.01	104.36	3.28
	3.30	29.92	1.01	1.35	30.36	31.32	84.0%	0.97	95.99	3.16
	3.35	29.79	0.97	1.30	28.86	31.15	83.5%	0.93	87.93	3.05
	3.40	29.67	0.92	1.25	27.38	30.99	83.1%	0.88	80.19	2.93
	3.45	29.54	0.88	1.20	25.90	30.80	82.6%	0.84	72.80	2.81
	3.50	29.39	0.83	1.15	24.42	30.62	82.1%	0.80	65.75	2.69
	3.55	29.25	0.78	1.10	22.96	30.43	81.6%	0.75	59.02	2.57
	3.60	29.10	0.74	1.05	21.50	30.24	81.1%	0.71	52.62	2.45
	3.65	28.96	0.69	1.00	20.05	30.05	80.6%	0.67	46.56	2.32
	3.70	28.81	0.65	0.95	18.60	29.86	80.0%	0.62	40.83	2.19
	3.75	28.67	0.60	0.90	17.17	29.67	79.5%	0.58	35.44	2.06
	3.80	28.52	0.55	0.85	15.74	29.48	79.0%	0.53	30.39	1.93
	3.85	28.38	0.50	0.80	14.31	29.29	78.5%	0.49	25.70	1.80
	3.90	28.23	0.46	0.75	12.90	29.10	78.0%	0.44	21.36	1.66
	3.95	28.09	0.41	0.70	11.49	28.91	77.5%	0.40	17.39	1.51
	4.00	27.94	0.36	0.65	10.09	28.72	77.0%	0.35	13.79	1.37
	4.05	27.03	0.32	0.60	8.71	27.77	74.5%	0.31	10.83	1.24
WL	4.10	25.00	0.30	0.55	7.41	25.74	69.0%	0.29	8.58	1.16
	4.15	24.52	0.25	0.50	6.17	25.25	67.7%	0.24	6.25	1.01
	4.20	23.66	0.21	0.45	4.97	24.33	65.2%	0.20	4.33	0.87
	4.25	21.81	0.18	0.40	3.83	22.41	60.1%	0.17	2.88	0.75
	4.30	19.25	0.15	0.35	2.80	19.79	53.1%	0.14	1.81	0.64
	4.35	13.88	0.14	0.30	1.91	14.33	38.4%	0.13	1.17	0.61
	4.40	11.92	0.11	0.25	1.27	12.28	32.9%	0.10	0.63	0.50
	4.45	9.33	0.08	0.20	0.73	9.59	25.7%	0.08	0.29	0.39
	4.50	5.40	0.06	0.15	0.34	5.58	15.0%	0.06	0.11	0.32
	4.55	2.89	0.05	0.10	0.13	2.98	8.0%	0.05	0.03	0.25
	4.60	1.24	0.03	0.05	0.03	1.27	3.4%	0.02	0.00	0.15
	4.65	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

Trout Creek

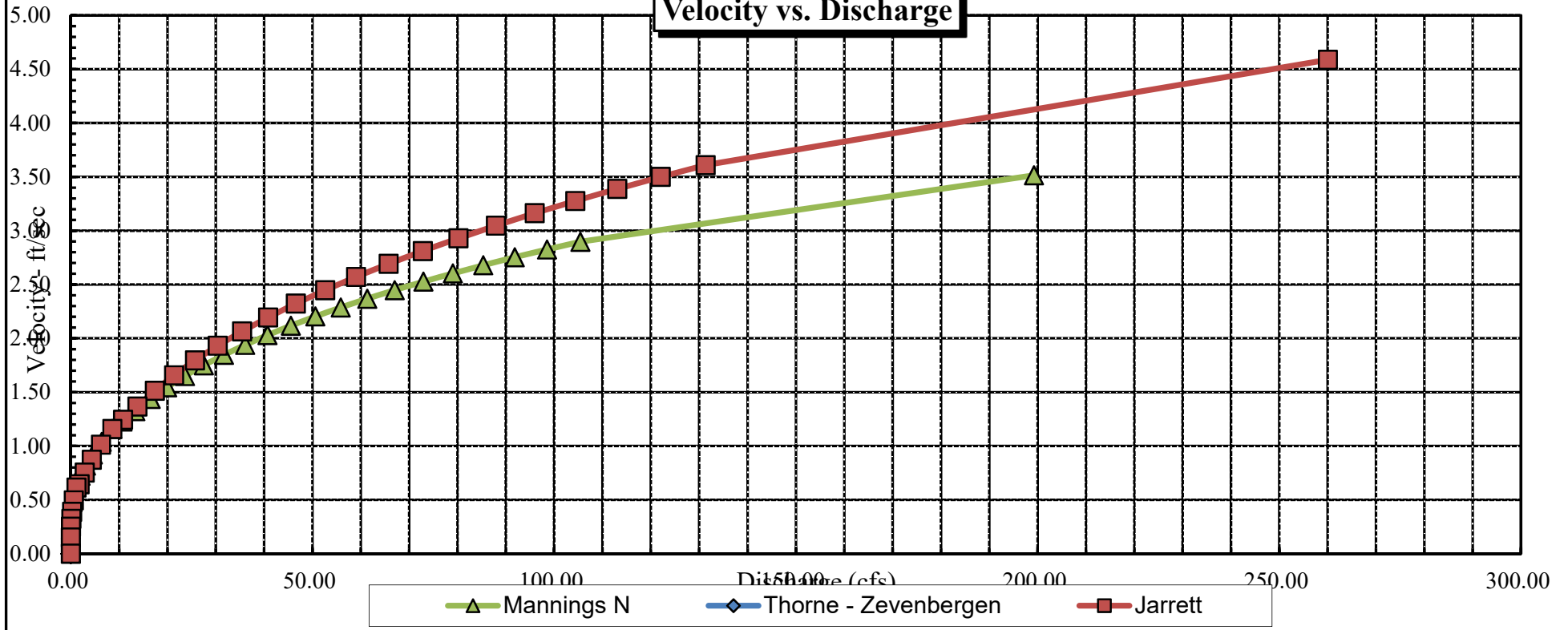
CROSS SECTION DATA ANALYSIS





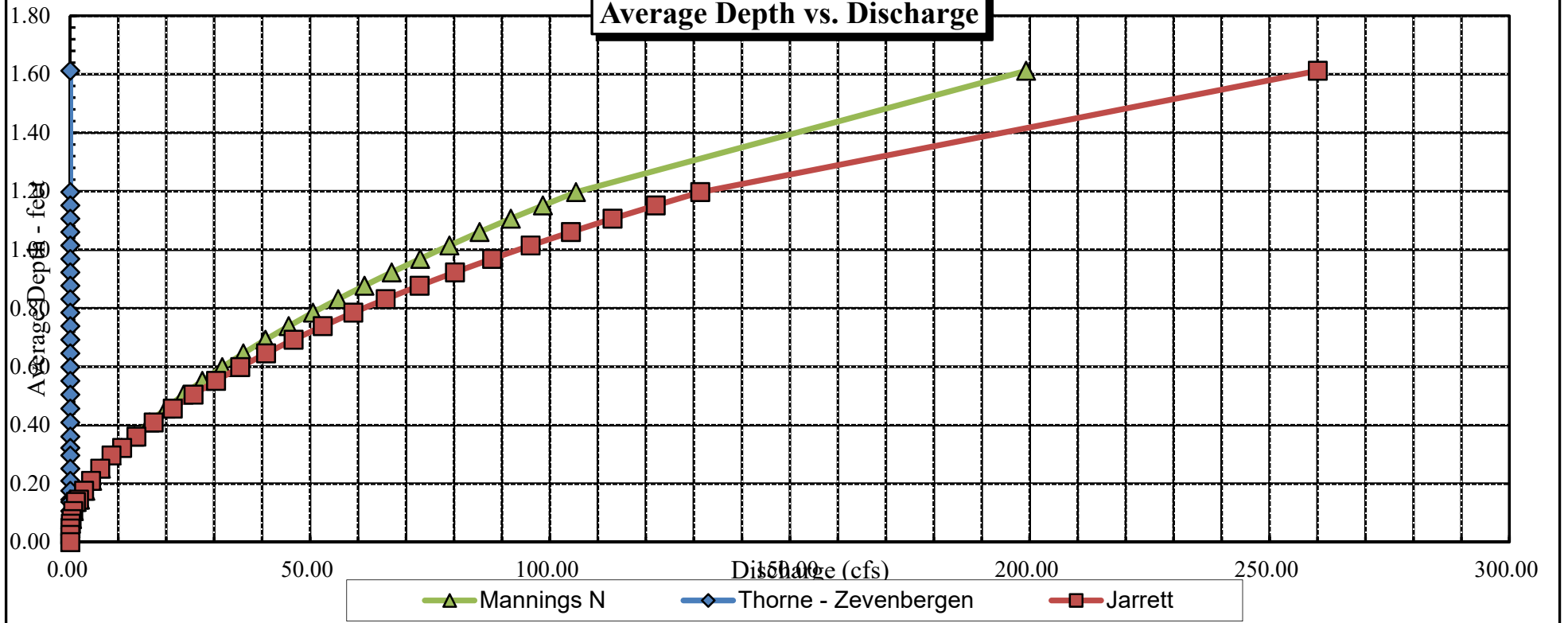
Trout Creek

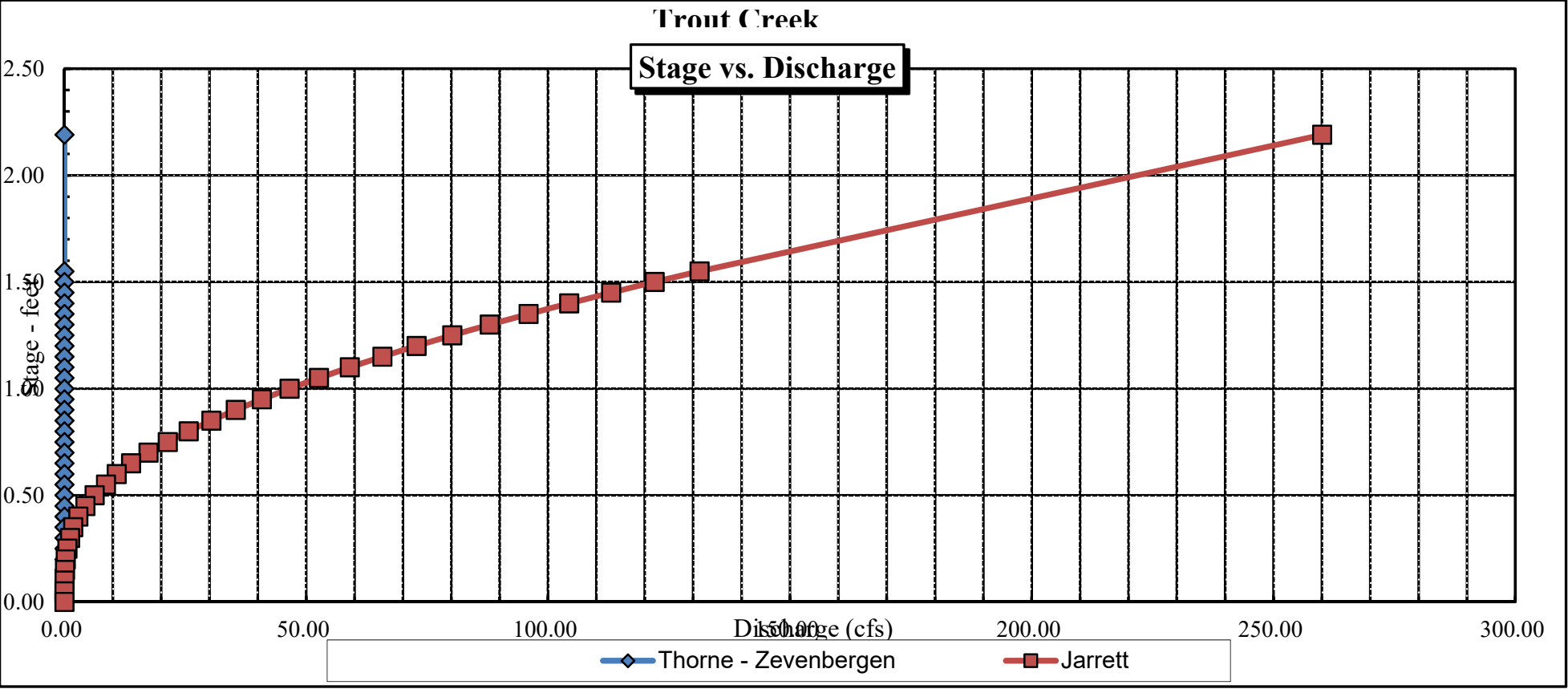
Velocity vs. Discharge



Trout Creek

Average Depth vs. Discharge





Data Input & Proofing

STREAM NAME: Trout Creek
 XS LOCATION: 0.5 mile upst fr conf w Little Trout Ck.
 XS NUMBER: 2
 DATE: 8/2/2017
 OBSERVERS: R. Smith, E. Scherff

1/4 SEC: SW NW
 SECTION: 23
 TWP: 4N
 RANGE: 86W
 PM: Sixth

COUNTY: Routt
 WATERSHED: Yampa River
 DIVISION: 6
 DOW CODE: 23533
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.013 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 = 45								
1	RS	1.20	1.38			0.00	0.00	0.00
		1.60	1.95			0.00	0.00	0.00
	G	1.80	2.38			0.00	0.00	0.00
		2.40	4.04			0.00	0.00	0.00
	RW	3.90	4.10	0.00	0.00	0.00	0.00	0.00
		5.00	4.40	0.30	0.09	0.32	0.03	4.10
		6.00	4.60	0.50	0.70	0.50	0.35	4.10
		7.00	4.40	0.30	1.02	0.30	0.31	4.10
		8.00	4.50	0.40	1.59	0.40	0.64	4.10
		9.00	4.30	0.20	0.23	0.15	0.03	4.10
		9.50	4.65	0.55	1.41	0.28	0.39	4.10
		10.00	4.50	0.40	1.85	0.20	0.37	4.10
		10.50	4.50	0.40	1.09	0.20	0.22	4.10
		11.00	4.60	0.50	0.88	0.25	0.22	4.10
		11.50	4.45	0.35	1.39	0.18	0.24	4.10
		12.00	4.35	0.25	1.56	0.13	0.20	4.10
		12.50	4.35	0.25	1.94	0.13	0.24	4.10
		13.00	4.55	0.45	1.07	0.23	0.24	4.10
		13.50	4.50	0.40	0.94	0.20	0.19	4.10
		14.00	4.45	0.35	1.13	0.18	0.20	4.10
		14.50	4.15	0.05	0.60	0.03	0.02	4.10
		15.00	4.40	0.30	0.67	0.15	0.10	4.10
		15.50	4.55	0.45	1.09	0.23	0.25	4.10
		16.00	4.15	0.05	0.76	0.03	0.02	4.10
		16.50	4.35	0.25	0.23	0.13	0.03	4.10
		17.00	4.30	0.20	0.49	0.15	0.07	4.10
		18.00	4.40	0.30	1.55	0.30	0.47	4.10
		19.00	4.60	0.50	1.66	0.38	0.62	4.10
		19.50	4.65	0.55	1.56	0.28	0.43	4.10
		20.00	4.60	0.50	1.44	0.25	0.36	4.10
		20.50	4.50	0.40	1.99	0.20	0.40	4.10
		21.00	4.50	0.40	1.26	0.30	0.38	4.10
		22.00	4.35	0.25	1.67	0.25	0.42	4.10
		23.00	4.35	0.25	1.63	0.25	0.41	4.10
		24.00	4.35	0.25	0.71	0.25	0.18	4.10
		25.00	4.30	0.20	1.15	0.20	0.23	4.10
		26.00	4.20	0.10	0.76	0.10	0.08	4.10
		27.00	4.30	0.20	0.92	0.20	0.18	4.10
		28.00	4.25	0.15	0.69	0.14	0.10	4.10
	LW	28.90	4.10	0.00	0.00	0.00	0.00	0.00
		30.30	4.01			0.00	0.00	0.00
		31.80	3.42			0.00	0.00	0.00
		33.00	2.84			0.00	0.00	0.00
		35.00	2.52			0.00	0.00	0.00
1	LS & G	37.00	2.46			0.00	0.00	0.00

Totals	7.41	8.58
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