DRAFT RECOMMENDATION - January 2015 Version

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 upper Piceance Creek, located in Water Division 6.

Location and Land Status. Piceance Creek originates on the east side of the Grand Hogback, approximately 20 miles northwest of Rifle. This instream flow recommendation focuses on two separate reaches. The first reach begins at the headwaters and extends downstream to unnamed tributary located immediately adjacent to State Highway 13, a distance of approximately 7.0 miles. *(Keith – Can you check this on your GIS system?)* The second reach begins at the unnamed tributary adjacent to State Highway 13 and extends downstream to the confluence with Cow Creek, a distance of approximately 3.7 miles. Within the first reach, the BLM manages approximately 0.5 miles, the U>S. Forest Service manages approximately 05. Miles, and 6.0 miles are in private ownership. Within the second reach, BLM manages 1.0 miles, while 2.75 miles are in private ownership. *(Keith – Can you check this on your GIS system?)*

Biological Summary. Piceance Creek is a cold-water, high gradient stream. The first reach flows through a broad canyon with a valley floor approximately 1000 to 3000 feet in width. The stream cuts through alluvial deposits in the narrow valley and is confined by bedrock in some locations. The second reach begins in a broad valley that is more than a mile in width, where several small tributaries converge to add significant surface and groundwater to the stream system. The second reach then enters a narrow valley approximately 1,000 feet in width. The stream generally has small-sized substrate, consisting of gravels and small cobbles, and small boulders. Fisheries surveys have revealed a self-sustaining native fish population comprised on speckled dace and mountain suckers. Intensive macro-invertebrate surveys have not been conducted, but spot samples have revealed various species of mayfly, caddisfly, and stonefly.

The riparian community is generally comprised of coyote willow, Geyer's willow, sedges and rushes. blue spruce, aspen, willow species, and alder. The riparian community is in good condition, and provides abundant shading and cover for fish habitat. The stream has a good mix of deeper pools, small riffles, and runs. While deep pool habitat is absent, the existing pools are sufficient for overwintering fish.

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

First Reach – Headwaters to State Highway 13

Cross Section Date	Discharge Rate	Top Width	Winter Flow	Summer Flow

			Recommendation (meets 2 of 3 hydraulic criteria)	Recommendation (meets 3 of 3 hydraulic criteria)
06/15/2015 #2	3.91 cfs	6.7 feet	Out of range	Out of range
06/15/2015 #3	3.73 cfs	7.0 feet	Out of range	1.62 cfs
07/072015 #2	1.98 cfs	7.4 feet	0.87 cfs	1.39 cfs
		Averages:	0.87 cfs	1.51 cfs

Second Reach – State Highway 13 to Confluence with Cow 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)
06/15/2015 #1	5.83 cfs	8.1 feet	Out of range	2.44 cfs
07/072015 #1	3.25 cfs	12.5 feet	1.70 cfs	2.65 cfs
		Averages:	1.70 cfs	2.55 cfs

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

First Reach – Headwaters to State Highway 13

1.5 cubic feet per second is recommended during the warm weather period from April 1 to October 15. This recommendation is driven by the average velocity and wetted perimeter criteria. This portion of the creek is small and habitat availability is very susceptible to even small changes in flow from diversions. It is important to protect a flow rate that makes most of this habitat available to the fish population while they are completing critical life history functions during the warm weather months.

0.65 cubic feet per second is recommended during the cold weather period from to October 16 to March 31. This recommendation is driven by limited water availability but comes close to meeting two of the three instream flow criteria. This flow rate should prevent pools from freezing, allowing the fish population to successfully overwinter. Even though the base flow in this creek is small, it is extremely consistent, allowing the fishery to persist.

Second Reach – State Highway 13 to Confluence With Cow Creek

2.5 cubic feet per second is recommended during the warm weather period from April 1 to October 15. This recommendation is driven by the wetted perimeter and velocity criteria. This creek is narrow and has limited physical habitat, so it is important to protect a flow rate that makes most of this habitat available to the fish population while they are completing critical life history functions during the warm weather months.

1.70 cubic feet per second is recommended during the cold weather period from to October 16 to March 31. This recommendation is driven by the average depth criteria. This flow rate should prevent pools from freezing, allowing the fish population to successfully overwinter. Even though the base flow in this creek is small, it is extremely consistent, allowing the fishery to persist.

Water Availability. The BLM does not recommend relying upon USGS Gage 09306200 for Piceance Creek below Ryan Gulch. This gage is heavily influenced by irrigation diversions and would not give an accurate picture of water availability higher in the watershed. Instead, BLM recommends reliance upon StreamStats. When using the Stream Stats mean flow statistics, BLM recommends use of the statistics from the northwest region, because our field experience indicates that these estimates are the most accurate. In addition, BLM recommends consultation of diversion records associated with Larson Ditch and Carson Ditch. While these ditches do not always divert throughout the irrigation season, they can provide spot checks of the minimum amount of water available in the creek.

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

Wilcoxson Ditch #1 – 0.39 cfs, absolute and 1.5 cfs conditional (1991 priority)
Wilcoxson Ditch #2 – 1.0 cfs conditional (1999 priority)
Larson Ditch – 2.5 cfs (1886 priority)
Morgan Ditch 1– 1.0 cfs (1883 priority)
Morgan Ditch 2 – 0.40 cfs (1886 priority)
Ryan S. Pond Feeder Ditch – 1.25 cfs (2001 priority)

Relationship to Land Management Plans. The BLM's management plan calls for improvement of current and historic fisheries as a means of increasing native fishes. In addition, the BLM 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. 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 2015. 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: Keith Sauter, White River Field Office
Ed Hollowed, White River Field Office
Kent Walter, White River Field Office

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piceance Creek - Upper | CROSS-SECTION NO.: 1

CROSS-SECTION LOCATION: Adjacent to Piceance Creek Road - approx. 2.5 miles down from State Highway 13

DATE: 6-15-15 | OBSERVERS: R. Smith, K. Sauder

LEGAL DESCRIPTION	¼ SECTION:	SECTION:	TOWNSHIP:	RANGE:	PM:
	NW	6	4 N/(S)	95 E/(W)	6th

COUNTY:	WATERSHED:	WATER DIVISION:	DOW WATER CODE:
Rio Blanco	White River	6	25343

MAP(S): USGS: Zone 13 243837 4402140

USFS:

SUPPLEMENTAL DATA

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

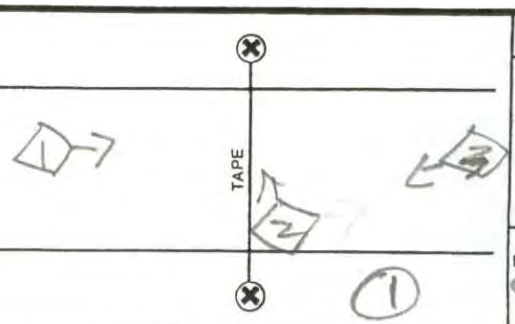
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: gravel & sand | PHOTOGRAPHS TAKEN: (YES)/NO | NUMBER OF PHOTOGRAPHS: 3

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(X) Tape @ Stake LB	0.0	surveyed
(X) Tape @ Stake RB	0.0	surveyed
(1) WS @ Tape LB/RB	0.0	5.95 / 5.95
(2) WS Upstream	5.10	5.92
(3) WS Downstream	5.00	6.03
SLOPE	0.11 / 10.10 = .01	

SKETCH



LEGEND: Stake (X); Station (1); Photo (1); Direction of Flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/(NO) | DISTANCE ELECTROFISHED: ____ft | FISH CAUGHT: YES/NO | WATER CHEMISTRY SAMPLED: YES/NO

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

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

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

COMMENTS

pH = 8.38
Temp = 17.5° C
Cond = 840
Salinity = 0.4 ppt

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piceance Creek - upper	CROSS-SECTION NO: 1	DATE: 6-15-15	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ft	TIME: 2:20 pm

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		5.04								
G	0.9		5.57								
W	1.1		5.95								
	1.4		6.35	.4				.16			
	1.7		6.6	.65				.49			
	2.0		6.6	.65				1.14			
	2.3		6.75	.80				1.51			
	2.6		6.75	.80				1.62			
	2.9		6.75	.80				1.72			
	3.2		6.85	.90				1.73			
	3.5		6.85	.90				1.81			
	3.8		6.75	.80				1.01			
	4.1		6.75	.80				1.44			
	4.4		6.75	.80				1.85			
	4.7		6.80	.85				1.64			
	5.0		6.85	.90				1.52			
	5.3		6.85	.90				1.59			
	5.6		6.85	.90				1.51			
	5.9		6.75	.80				1.35			
	6.2		6.80	.85				0.98			
	6.5		6.60	.65				0.42			
	6.8		6.25	.30				0.17			
	7.1		6.15	.20				0.00			
W	7.3		5.95								
G	9.0		5.57								
LS	10.0		5.10								
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:	Piceance Creek
XS LOCATION:	Approx 2.5 miles ds fr State Hwy 13
XS NUMBER:	1
DATE:	15-Jun-15
OBSERVERS:	R. Smith, K. Sauter
1/4 SEC:	NW
SECTION:	6
TWP:	4N
RANGE:	95W
PM:	Sixth
COUNTY:	Rio Blanco
WATERSHED:	White River
DIVISION:	6
DOW CODE:	25343
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE:	0.01

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

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

STREAM NAME: Piceance Creek
XS LOCATION: Approx 2.5 miles ds fr State Hwy 13
XS NUMBER: 1

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	RS	0.00	5.04			0.00		0.00	0.00	0.0%
1	G	0.90	5.57			0.00		0.00	0.00	0.0%
	W	1.10	5.95	0.00	0.00	0.00		0.00	0.00	0.0%
		1.40	6.35	0.40	0.16	0.50	0.40	0.12	0.02	0.3%
		1.70	6.60	0.65	0.49	0.39	0.65	0.20	0.10	1.6%
		2.00	6.60	0.65	1.14	0.30	0.65	0.20	0.22	3.8%
		2.30	6.75	0.80	1.51	0.34	0.80	0.24	0.36	6.2%
		2.60	6.75	0.80	1.62	0.30	0.80	0.24	0.39	6.7%
		2.90	6.75	0.80	1.72	0.30	0.80	0.24	0.41	7.1%
		3.20	6.85	0.90	1.73	0.32	0.90	0.27	0.47	8.0%
		3.50	6.85	0.90	1.81	0.30	0.90	0.27	0.49	8.4%
		3.80	6.75	0.80	1.01	0.32	0.80	0.24	0.24	4.2%
		4.10	6.75	0.80	1.44	0.30	0.80	0.24	0.35	5.9%
		4.40	6.75	0.80	1.85	0.30	0.80	0.24	0.44	7.6%
		4.70	6.80	0.85	1.64	0.30	0.85	0.26	0.42	7.2%
		5.00	6.85	0.90	1.52	0.30	0.90	0.27	0.41	7.0%
		5.30	6.85	0.90	1.59	0.30	0.90	0.27	0.43	7.4%
		5.60	6.85	0.90	1.51	0.30	0.90	0.27	0.41	7.0%
		5.90	6.75	0.80	1.35	0.32	0.80	0.24	0.32	5.6%
		6.20	6.80	0.85	0.98	0.30	0.85	0.26	0.25	4.3%
		6.50	6.60	0.65	0.42	0.36	0.65	0.20	0.08	1.4%
		6.80	6.25	0.30	0.17	0.46	0.30	0.09	0.02	0.3%
		7.10	6.15	0.20	0.00	0.32	0.20	0.05	0.00	0.0%
	W	7.30	5.95	0.00	0.00	0.28		0.00	0.00	0.0%
1	G	9.00	5.57			0.00		0.00	0.00	0.0%
	LS	10.00	5.10			0.00		0.00	0.00	0.0%
	TOTALS ----------					6.91	0.9 (Max.)	4.39	5.83	100.0%

Manning's n = 0.0826
Hydraulic Radius= 0.63480591

STREAM NAME: Piceance Creek
XS LOCATION: Approx 2.5 miles ds fr State Hwy 13
XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	4.39	4.39	0.0%
5.70	4.39	6.09	38.9%
5.72	4.39	5.94	35.5%
5.74	4.39	5.80	32.2%
5.76	4.39	5.65	28.9%
5.78	4.39	5.51	25.7%
5.80	4.39	5.37	22.5%
5.82	4.39	5.23	19.3%
5.84	4.39	5.10	16.2%
5.86	4.39	4.96	13.2%
5.88	4.39	4.83	10.2%
5.90	4.39	4.70	7.2%
5.91	4.39	4.64	5.7%
5.92	4.39	4.57	4.3%
5.93	4.39	4.51	2.9%
5.94	4.39	4.45	1.4%
5.95	4.39	4.39	0.0%
5.96	4.39	4.32	-1.4%
5.97	4.39	4.26	-2.8%
5.98	4.39	4.20	-4.2%
5.99	4.39	4.14	-5.6%
6.00	4.39	4.08	-7.0%
6.02	4.39	3.96	-9.8%
6.04	4.39	3.83	-12.6%
6.06	4.39	3.71	-15.3%
6.08	4.39	3.59	-18.0%
6.10	4.39	3.47	-20.8%
6.12	4.39	3.36	-23.5%
6.14	4.39	3.24	-26.1%
6.16	4.39	3.12	-28.8%
6.18	4.39	3.01	-31.4%
6.20	4.39	2.89	-34.0%

WATERLINE AT ZERO
AREA ERROR = 5.950

STREAM NAME: Piceance Creek
XS LOCATION: Approx 2.5 miles ds fr State Hwy 13
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	5.57	8.10	0.88	1.28	7.10	9.08	100.0%	0.78	10.84	1.53
	5.60	7.95	0.86	1.25	6.86	8.91	98.1%	0.77	10.37	1.51
	5.65	7.70	0.84	1.20	6.47	8.62	95.0%	0.75	9.61	1.49
	5.70	7.45	0.82	1.15	6.09	8.34	91.8%	0.73	8.89	1.46
	5.75	7.20	0.80	1.10	5.72	8.05	88.7%	0.71	8.20	1.43
	5.80	6.95	0.77	1.05	5.37	7.76	85.5%	0.69	7.56	1.41
	5.85	6.70	0.75	1.00	5.03	7.48	82.4%	0.67	6.94	1.38
	5.90	6.45	0.73	0.95	4.70	7.19	79.2%	0.65	6.37	1.35
WL	5.95	6.20	0.71	0.90	4.38	6.91	76.1%	0.63	5.83	1.33
	6.00	6.11	0.67	0.85	4.08	6.77	74.6%	0.60	5.23	1.28
	6.05	6.02	0.63	0.80	3.77	6.64	73.1%	0.57	4.66	1.23
	6.10	5.94	0.59	0.75	3.47	6.51	71.7%	0.53	4.11	1.18
	6.15	5.85	0.54	0.70	3.18	6.37	70.2%	0.50	3.60	1.13
	6.20	5.66	0.51	0.65	2.89	6.15	67.8%	0.47	3.14	1.09
	6.25	5.47	0.48	0.60	2.61	5.93	65.4%	0.44	2.72	1.04
	6.30	5.39	0.43	0.55	2.34	5.81	63.9%	0.40	2.30	0.98
	6.35	5.31	0.39	0.50	2.07	5.68	62.5%	0.37	1.91	0.92
	6.40	5.21	0.35	0.45	1.81	5.53	60.9%	0.33	1.55	0.85
	6.45	5.11	0.30	0.40	1.55	5.39	59.4%	0.29	1.22	0.78
	6.50	5.01	0.26	0.35	1.30	5.24	57.8%	0.25	0.92	0.71
	6.55	4.90	0.21	0.30	1.05	5.10	56.2%	0.21	0.66	0.63
	6.60	4.50	0.18	0.25	0.81	4.66	51.3%	0.17	0.45	0.56
	6.65	4.32	0.14	0.20	0.59	4.46	49.1%	0.13	0.28	0.47
	6.70	4.15	0.09	0.15	0.38	4.25	46.8%	0.09	0.14	0.36
	6.75	2.78	0.06	0.10	0.17	2.85	31.4%	0.06	0.05	0.28
	6.80	1.65	0.04	0.05	0.06	1.68	18.5%	0.04	0.01	0.20
	6.85	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Piceance Creek
XS LOCATION: Approx 2.5 miles ds fr State Hwy 13
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	5.83	cfs
CALCULATED FLOW (Qc)=	5.83	cfs
(Qm-Qc)/Qm * 100 =	0.0	%
MEASURED WATERLINE (WLm)=	5.95	ft
CALCULATED WATERLINE (WLc)=	5.95	ft
(WLm-WLc)/WLm * 100 =	0.0	%
MAX MEASURED DEPTH (Dm)=	0.90	ft
MAX CALCULATED DEPTH (Dc)=	0.90	ft
(Dm-Dc)/Dm * 100	0.0	%
MEAN VELOCITY=	1.33	ft/sec
MANNING'S N=	0.083	
SLOPE=	0.01	ft/ft
.4 * Qm =	2.3	cfs
2.5 * Qm=	14.6	cfs

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

FLOW (CFS)	PERIOD
___________	___________
___________	___________
___________	___________
___________	___________

RATIONALE FOR RECOMMENDATION:
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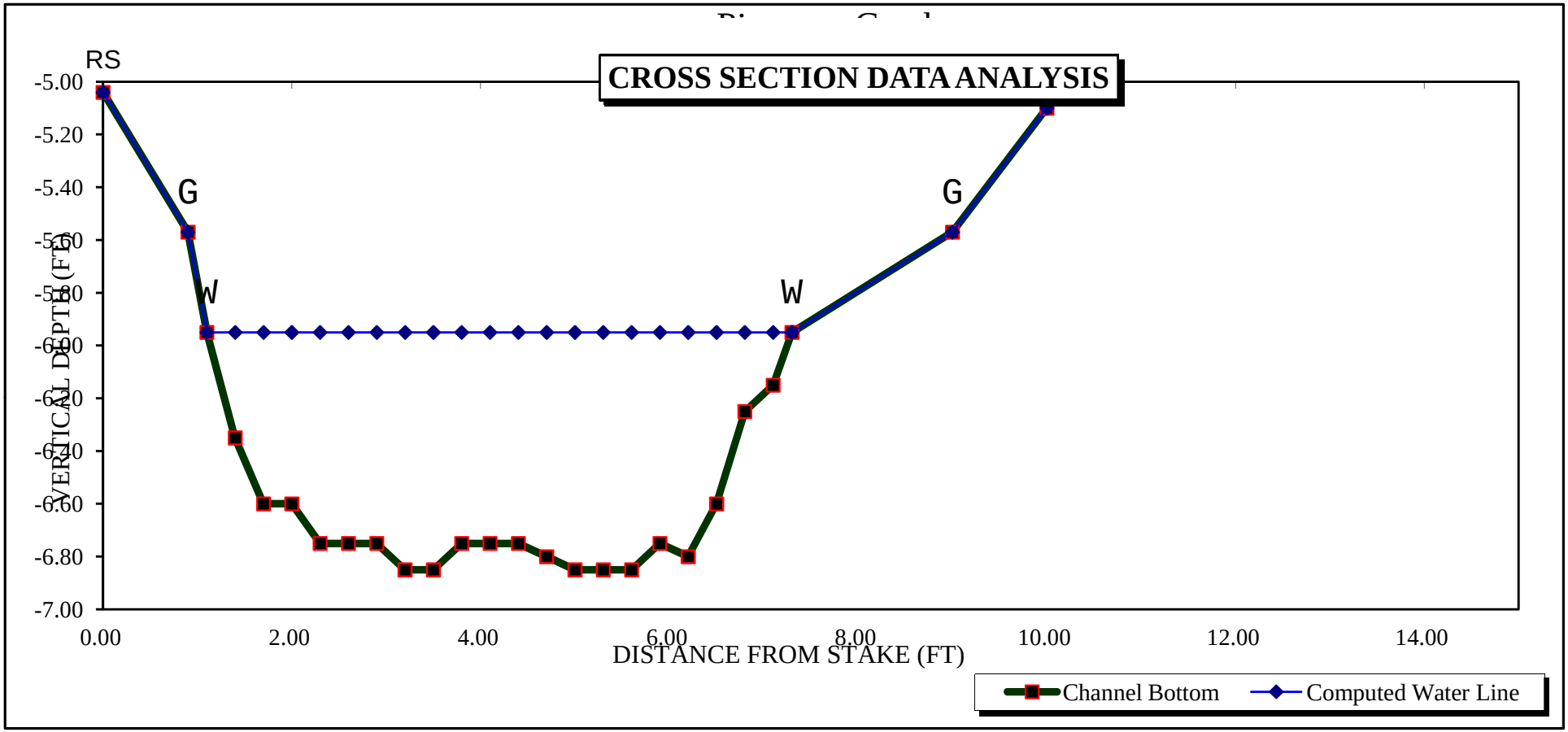
RECOMMENDATION BY: ……………………………………………… AGENCY………………………………………… DATE:……………………

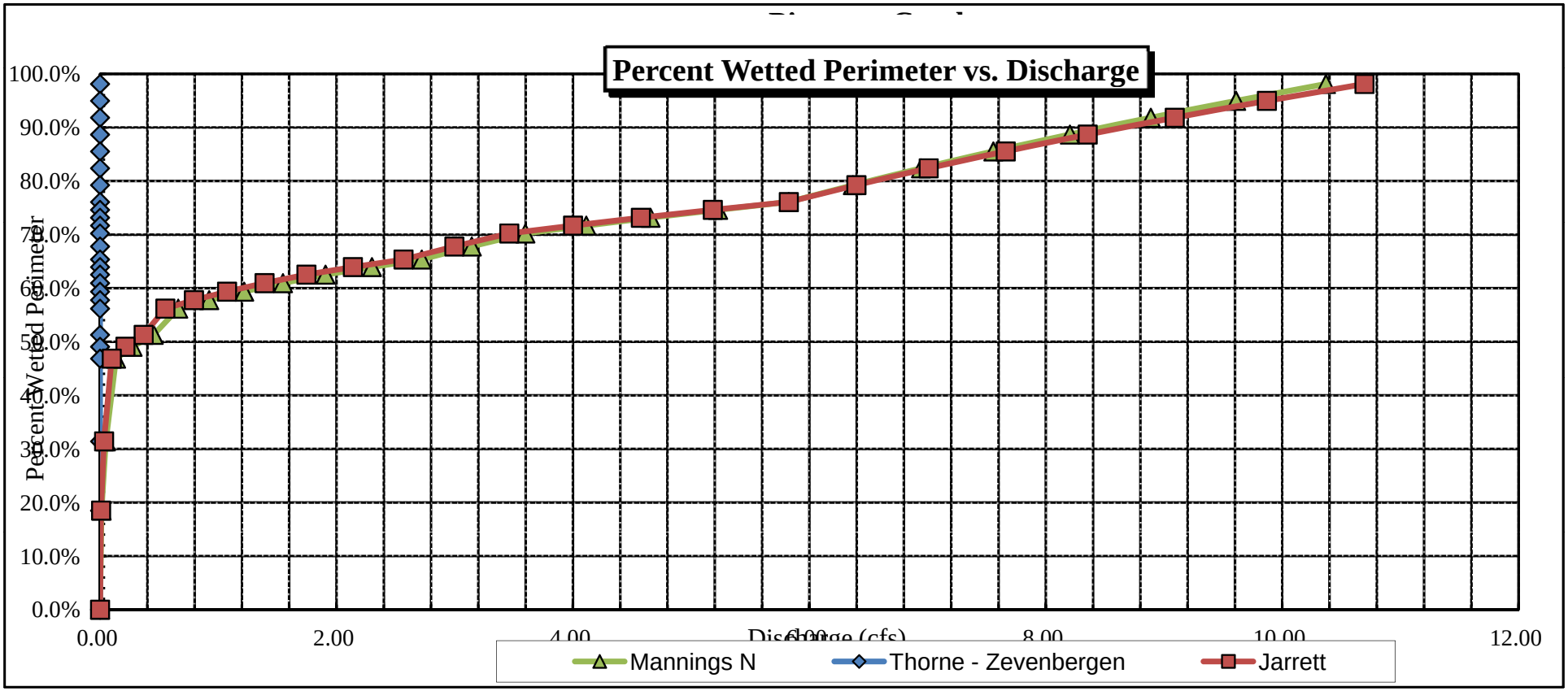
CWCB REVIEW BY: …………………………………………………………………………………………………… DATE:……………………

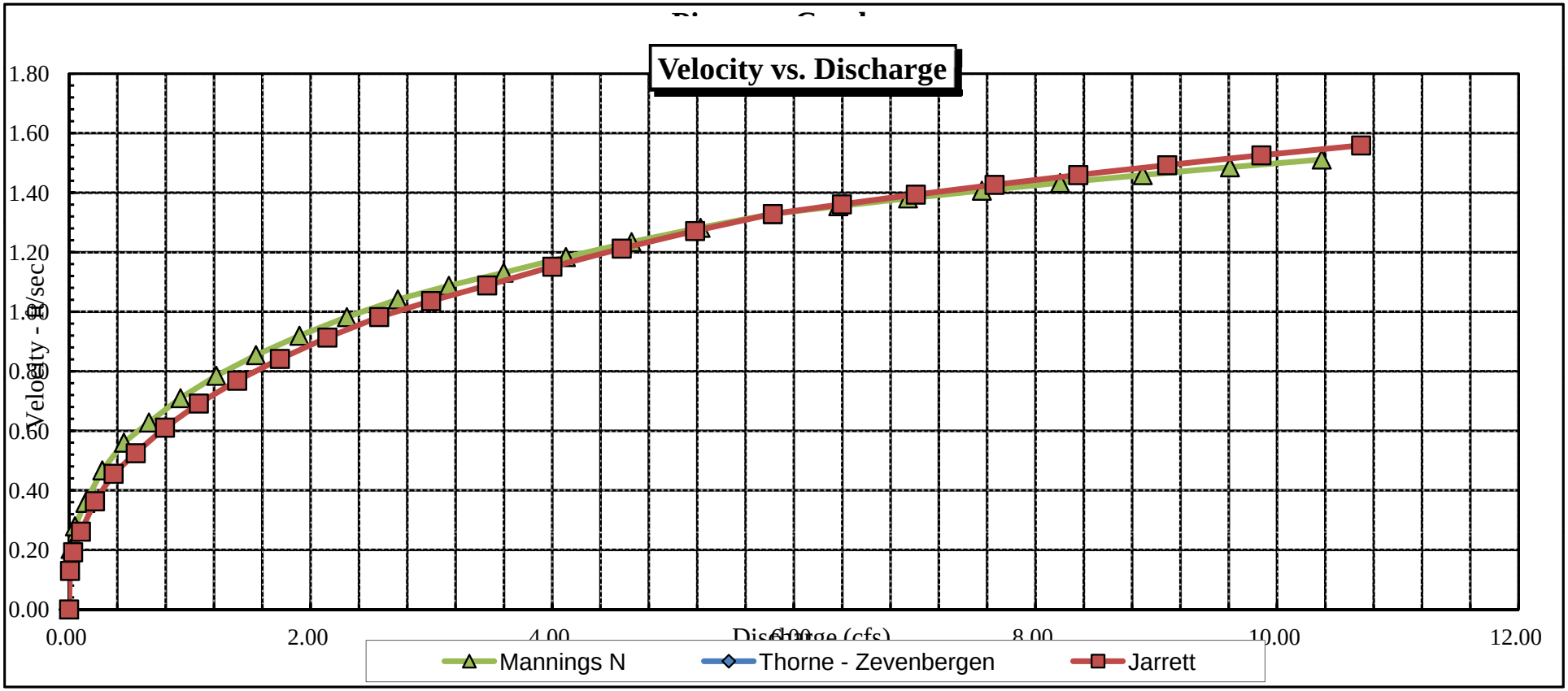
STREAM NAME: Piceance Creek
XS LOCATION: Approx 2.5 miles ds fr State Hwy 13
XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

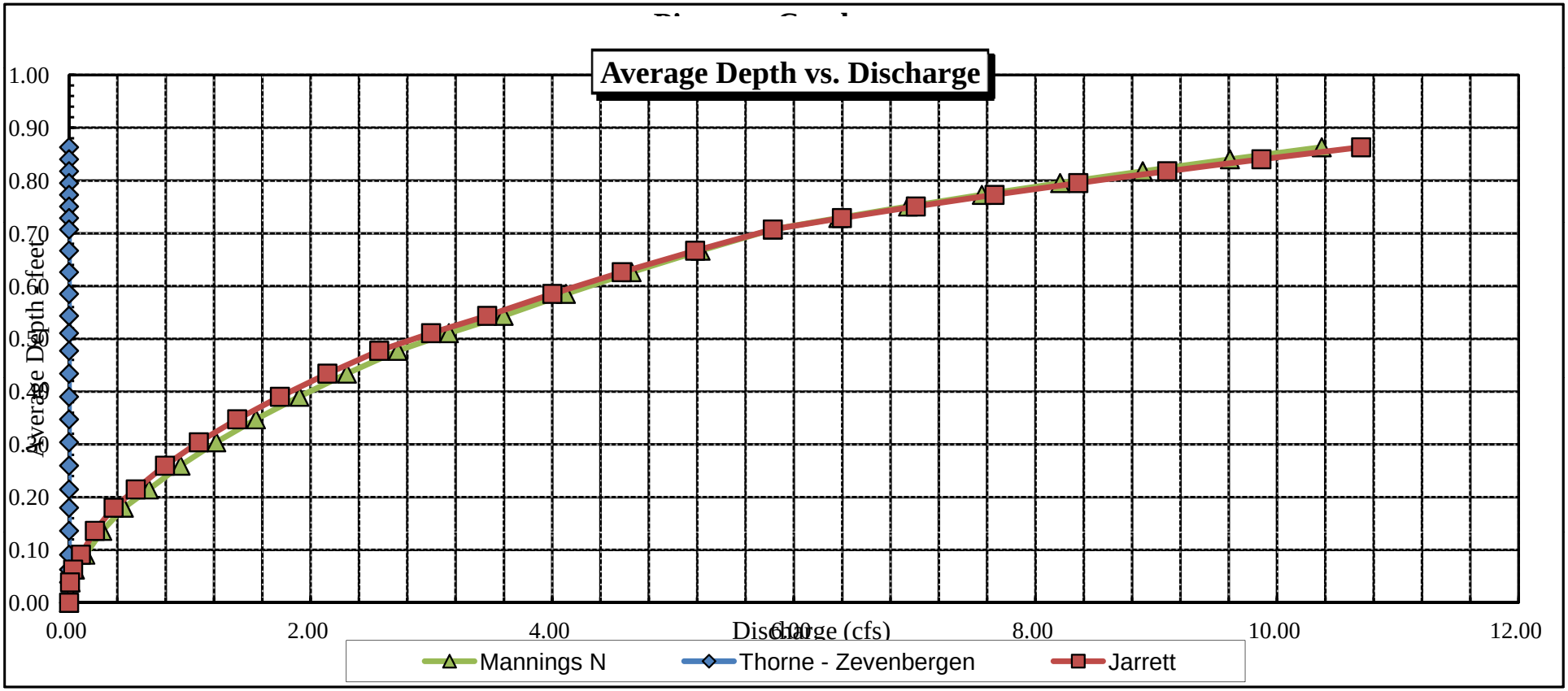
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

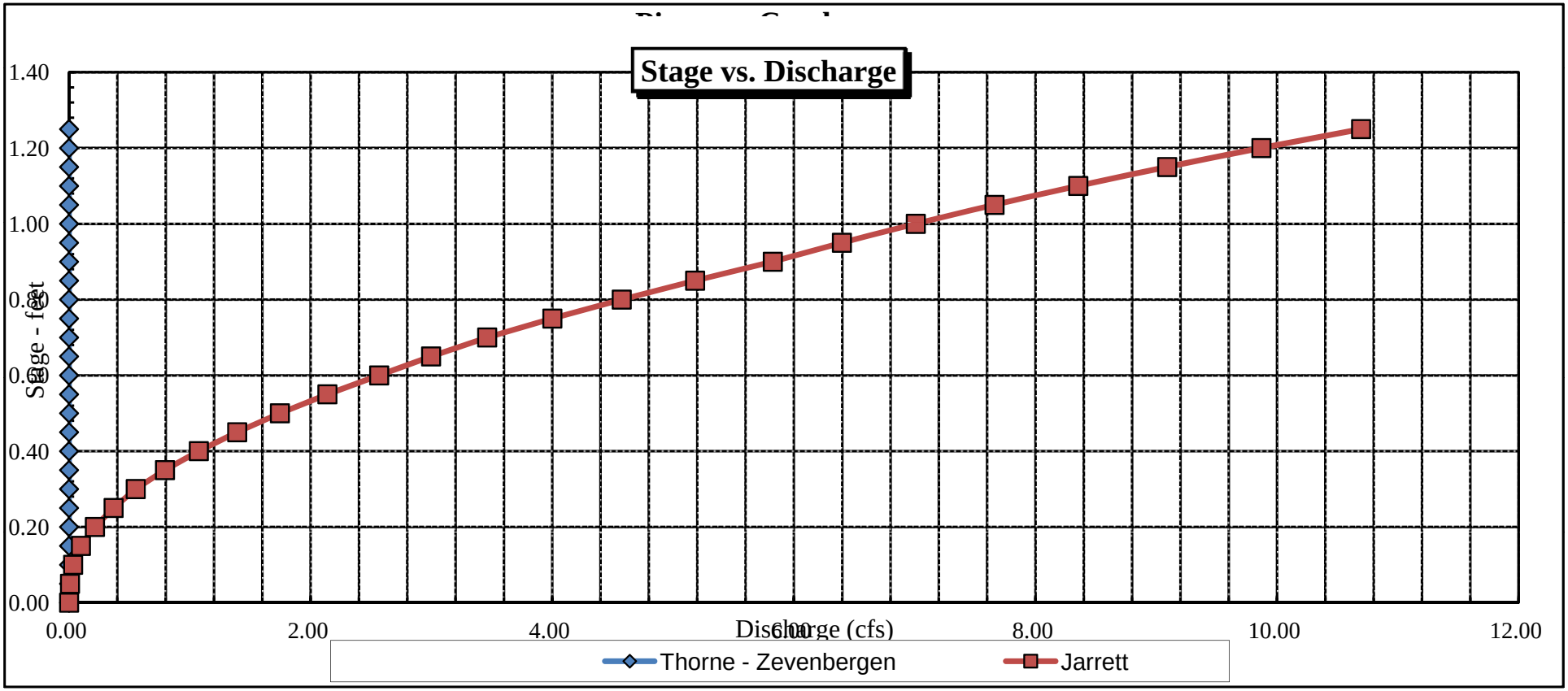
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.57	8.10	0.88	1.28	7.10	9.08	100.0%	0.78	11.21	1.58
	5.60	7.95	0.86	1.25	6.86	8.91	98.1%	0.77	10.70	1.56
	5.65	7.70	0.84	1.20	6.47	8.62	95.0%	0.75	9.87	1.53
	5.70	7.45	0.82	1.15	6.09	8.34	91.8%	0.73	9.09	1.49
	5.75	7.20	0.80	1.10	5.72	8.05	88.7%	0.71	8.35	1.46
	5.80	6.95	0.77	1.05	5.37	7.76	85.5%	0.69	7.66	1.43
	5.85	6.70	0.75	1.00	5.03	7.48	82.4%	0.67	7.01	1.39
	5.90	6.45	0.73	0.95	4.70	7.19	79.2%	0.65	6.40	1.36
WL	5.95	6.20	0.71	0.90	4.38	6.91	76.1%	0.63	5.83	1.33
	6.00	6.11	0.67	0.85	4.08	6.77	74.6%	0.60	5.18	1.27
	6.05	6.02	0.63	0.80	3.77	6.64	73.1%	0.57	4.57	1.21
	6.10	5.94	0.59	0.75	3.47	6.51	71.7%	0.53	4.00	1.15
	6.15	5.85	0.54	0.70	3.18	6.37	70.2%	0.50	3.46	1.09
	6.20	5.66	0.51	0.65	2.89	6.15	67.8%	0.47	3.00	1.04
	6.25	5.47	0.48	0.60	2.61	5.93	65.4%	0.44	2.57	0.98
	6.30	5.39	0.43	0.55	2.34	5.81	63.9%	0.40	2.14	0.91
	6.35	5.31	0.39	0.50	2.07	5.68	62.5%	0.37	1.75	0.84
	6.40	5.21	0.35	0.45	1.81	5.53	60.9%	0.33	1.39	0.77
	6.45	5.11	0.30	0.40	1.55	5.39	59.4%	0.29	1.07	0.69
	6.50	5.01	0.26	0.35	1.30	5.24	57.8%	0.25	0.79	0.61
	6.55	4.90	0.21	0.30	1.05	5.10	56.2%	0.21	0.55	0.52
	6.60	4.50	0.18	0.25	0.81	4.66	51.3%	0.17	0.37	0.46
	6.65	4.32	0.14	0.20	0.59	4.46	49.1%	0.13	0.21	0.36
	6.70	4.15	0.09	0.15	0.38	4.25	46.8%	0.09	0.10	0.26
	6.75	2.78	0.06	0.10	0.17	2.85	31.4%	0.06	0.03	0.19
	6.80	1.65	0.04	0.05	0.06	1.68	18.5%	0.04	0.01	0.13
	6.85	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!


CROSS SECTION DATA ANALYSIS
RS
G
W
W
G
-5.00
-5.20
-5.40
-5.60
-5.80
-6.00
-6.20
-6.40
-6.60
-6.80
-7.00
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
2.00
4.00
8.00
10.00
12.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
2.00
4.00
8.00
10.00
12.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth (feet)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage - feet
0.00
2.00
4.00
6.00
8.00
10.00
12.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piceance Creek – Upper						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: Approx. 3/4 mile upstream from State Hwy 13						
DATE: 6-15-15	OBSERVERS: R. Smith, K. Sauter					
LEGAL DESCRIPTION	¼ SECTION: NW	SECTION: 3	TOWNSHIP: 4 N/S	RANGE: 95 E/W	PM: 6th	
COUNTY: Garfield	WATERSHED: White River	WATER DIVISION: 6	DOW WATER CODE: 25343			
MAP(S): USGS: 248524						
USFS: 4402001						

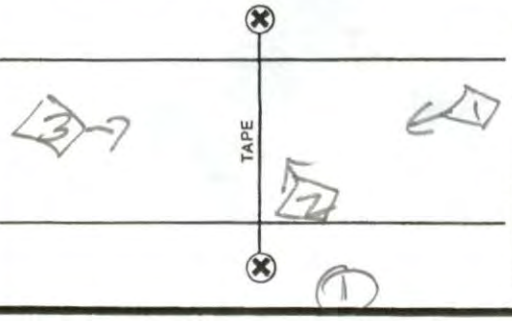
SUPPLEMENTAL DATA

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 6" 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	7.15 / 7.15
② WS Upstream	19.5	7.05
③ WS Downstream	10.0	7.23
SLOPE	0.48 / 39.5 = .012	

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:
mayfly, caddisfly, stonefly, beetles

COMMENTS

Riparian = willow, sedges, rushes

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piceance Creek – Upper | CROSS-SECTION NO: 2 | DATE: 6-15-15 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: ____ ft | TIME: 3:45 pm

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		5.60								
G	0.3		6.45								
W	1.0		7.15								
	1.3		7.65	.5				0.78			
	1.6		7.85	.7				1.01			
	1.9		8.0	.85				2.06			
	2.2		7.95	.80				2.20			
	2.5		7.85	.70				1.70			
	2.8		7.85	.70				1.78			
	3.1		7.75	.60				1.79			
	3.4		7.65	.50				1.62			
	3.7		7.70	.55				1.96			
	4.0		7.45	.30				1.79			
	4.3		7.55	.40				1.13			
	4.6		7.60	.45				1.53			
	4.9		7.50	.35				1.26			
	5.2		7.50	.35				1.01			
	5.5		7.50	.35				0.92			
	5.8		7.50	.35				0.58			
	6.1		7.40	.25				0.20			
W	6.2		7.15								
G	7.0		6.45								
LS	9.0		6.26								
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:	Piceance Creek
XS LOCATION:	Approx 0.75 mile us fr State Hwy 13
XS NUMBER:	2
DATE:	15-Jun-15
OBSERVERS:	R. Smith, K. Sauter
1/4 SEC:	NW
SECTION:	3
TWP:	4S
RANGE:	95W
PM:	Sixth
COUNTY:	Garfield
WATERSHED:	White River
DIVISION:	6
DOW CODE:	25343
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE:	0.012

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

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

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 mile us fr State Hwy 13
XS NUMBER: 2

DATA POINTS= 23

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	RS	0.00	5.60			0.00		0.00	0.00	0.0%
1	G	0.30	6.45			0.00		0.00	0.00	0.0%
	W	1.00	7.15	0.00	0.00	0.00		0.00	0.00	0.0%
		1.30	7.65	0.50	0.78	0.58	0.50	0.15	0.12	3.0%
		1.60	7.85	0.70	1.01	0.36	0.70	0.21	0.21	5.4%
		1.90	8.00	0.85	2.06	0.34	0.85	0.26	0.53	13.4%
		2.20	7.95	0.80	2.20	0.30	0.80	0.24	0.53	13.5%
		2.50	7.85	0.70	1.70	0.32	0.70	0.21	0.36	9.1%
		2.80	7.85	0.70	1.78	0.30	0.70	0.21	0.37	9.6%
		3.10	7.75	0.60	1.79	0.32	0.60	0.18	0.32	8.2%
		3.40	7.65	0.50	1.62	0.32	0.50	0.15	0.24	6.2%
		3.70	7.70	0.55	1.96	0.30	0.55	0.17	0.32	8.3%
		4.00	7.45	0.30	1.79	0.39	0.30	0.09	0.16	4.1%
		4.30	7.55	0.40	1.13	0.32	0.40	0.12	0.14	3.5%
		4.60	7.60	0.45	1.53	0.30	0.45	0.14	0.21	5.3%
		4.90	7.50	0.35	1.26	0.32	0.35	0.11	0.13	3.4%
		5.20	7.50	0.35	1.01	0.30	0.35	0.11	0.11	2.7%
		5.50	7.50	0.35	0.92	0.30	0.35	0.11	0.10	2.5%
		5.80	7.50	0.35	0.58	0.30	0.35	0.11	0.06	1.6%
		6.10	7.40	0.25	0.20	0.32	0.25	0.05	0.01	0.3%
	W	6.20	7.15	0.00	0.00	0.27		0.00	0.00	0.0%
1	G	7.00	6.45			0.00		0.00	0.00	0.0%
	LS	9.00	6.26			0.00		0.00	0.00	0.0%
	TOTALS ----------					5.95	0.85 (Max.)	2.59	3.91	100.0%

Manning's n = 0.0617
Hydraulic Radius= 0.43455514

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 mile us fr State Hwy 13
XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.59	2.59	0.0%
6.90	2.59	3.95	52.9%
6.92	2.59	3.84	48.5%
6.94	2.59	3.72	44.1%
6.96	2.59	3.61	39.7%
6.98	2.59	3.50	35.4%
7.00	2.59	3.39	31.1%
7.02	2.59	3.28	26.9%
7.04	2.59	3.17	22.6%
7.06	2.59	3.06	18.4%
7.08	2.59	2.95	14.3%
7.10	2.59	2.85	10.2%
7.11	2.59	2.79	8.1%
7.12	2.59	2.74	6.1%
7.13	2.59	2.69	4.0%
7.14	2.59	2.64	2.0%
7.15	2.59	2.59	0.0%
7.16	2.59	2.53	-2.0%
7.17	2.59	2.48	-4.0%
7.18	2.59	2.43	-6.0%
7.19	2.59	2.38	-8.0%
7.20	2.59	2.33	-10.0%
7.22	2.59	2.22	-14.0%
7.24	2.59	2.12	-17.9%
7.26	2.59	2.02	-21.9%
7.28	2.59	1.92	-25.8%
7.30	2.59	1.82	-29.7%
7.32	2.59	1.72	-33.6%
7.34	2.59	1.62	-37.5%
7.36	2.59	1.52	-41.4%
7.38	2.59	1.42	-45.2%
7.40	2.59	1.32	-49.1%

WATERLINE AT ZERO
AREA ERROR = 7.150

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 mile us fr State Hwy 13
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	6.45	6.70	1.01	1.55	6.75	8.00	100.0%	0.84	15.89	2.35
	6.45	6.70	1.01	1.55	6.75	8.00	100.0%	0.84	15.89	2.35
	6.50	6.59	0.97	1.50	6.42	7.85	98.2%	0.82	14.79	2.30
	6.55	6.49	0.94	1.45	6.09	7.71	96.3%	0.79	13.73	2.25
	6.60	6.38	0.90	1.40	5.77	7.56	94.5%	0.76	12.70	2.20
	6.65	6.27	0.87	1.35	5.45	7.42	92.7%	0.74	11.72	2.15
	6.70	6.16	0.83	1.30	5.14	7.27	90.8%	0.71	10.77	2.09
	6.75	6.06	0.80	1.25	4.84	7.12	89.0%	0.68	9.85	2.04
	6.80	5.95	0.76	1.20	4.54	6.98	87.2%	0.65	8.98	1.98
	6.85	5.84	0.73	1.15	4.24	6.83	85.3%	0.62	8.14	1.92
	6.90	5.74	0.69	1.10	3.95	6.68	83.5%	0.59	7.34	1.86
	6.95	5.63	0.65	1.05	3.67	6.54	81.7%	0.56	6.58	1.79
	7.00	5.52	0.61	1.00	3.39	6.39	79.8%	0.53	5.86	1.73
	7.05	5.41	0.58	0.95	3.12	6.24	78.0%	0.50	5.17	1.66
	7.10	5.31	0.54	0.90	2.85	6.10	76.2%	0.47	4.52	1.59
WL	7.15	5.20	0.50	0.85	2.58	5.95	74.3%	0.43	3.91	1.51
	7.20	5.15	0.45	0.80	2.33	5.84	72.9%	0.40	3.32	1.43
	7.25	5.10	0.41	0.75	2.07	5.72	71.5%	0.36	2.77	1.34
	7.30	5.05	0.36	0.70	1.82	5.61	70.1%	0.32	2.26	1.24
	7.35	5.00	0.31	0.65	1.57	5.50	68.7%	0.28	1.79	1.14
	7.40	4.95	0.27	0.60	1.32	5.39	67.3%	0.24	1.36	1.03
	7.45	4.77	0.22	0.55	1.07	5.17	64.6%	0.21	0.99	0.92
	7.50	3.48	0.24	0.50	0.84	3.82	47.7%	0.22	0.81	0.96
	7.55	3.09	0.22	0.45	0.68	3.37	42.1%	0.20	0.62	0.91
	7.60	2.55	0.21	0.40	0.54	2.77	34.6%	0.19	0.48	0.89
	7.65	2.46	0.17	0.35	0.41	2.63	32.9%	0.16	0.32	0.77
	7.70	1.87	0.16	0.30	0.31	2.00	25.0%	0.15	0.23	0.75
	7.75	1.65	0.13	0.25	0.22	1.75	21.9%	0.12	0.14	0.66
	7.80	1.42	0.10	0.20	0.14	1.50	18.8%	0.09	0.08	0.54
	7.85	0.90	0.08	0.15	0.07	0.96	11.9%	0.08	0.04	0.48
	7.90	0.65	0.06	0.10	0.04	0.69	8.6%	0.05	0.01	0.37
	7.95	0.40	0.02	0.05	0.01	0.42	5.2%	0.02	0.00	0.22

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 mile us fr State Hwy 13
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)=	3.91	cfs
CALCULATED FLOW (Qc)=	3.91	cfs
(Qm-Qc)/Qm * 100 =	0.0	%
MEASURED WATERLINE (WLm)=	7.15	ft
CALCULATED WATERLINE (WLc)=	7.15	ft
(WLm-WLc)/WLm * 100 =	0.0	%
MAX MEASURED DEPTH (Dm)=	0.85	ft
MAX CALCULATED DEPTH (Dc)=	0.85	ft
(Dm-Dc)/Dm * 100	0.0	%
MEAN VELOCITY=	1.51	ft/sec
MANNING'S N=	0.062	
SLOPE=	0.012	ft/ft
.4 * Qm =	1.6	cfs
2.5 * Qm=	9.8	cfs

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

FLOW (CFS)	PERIOD
===========	========
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________

RATIONALE FOR RECOMMENDATION:
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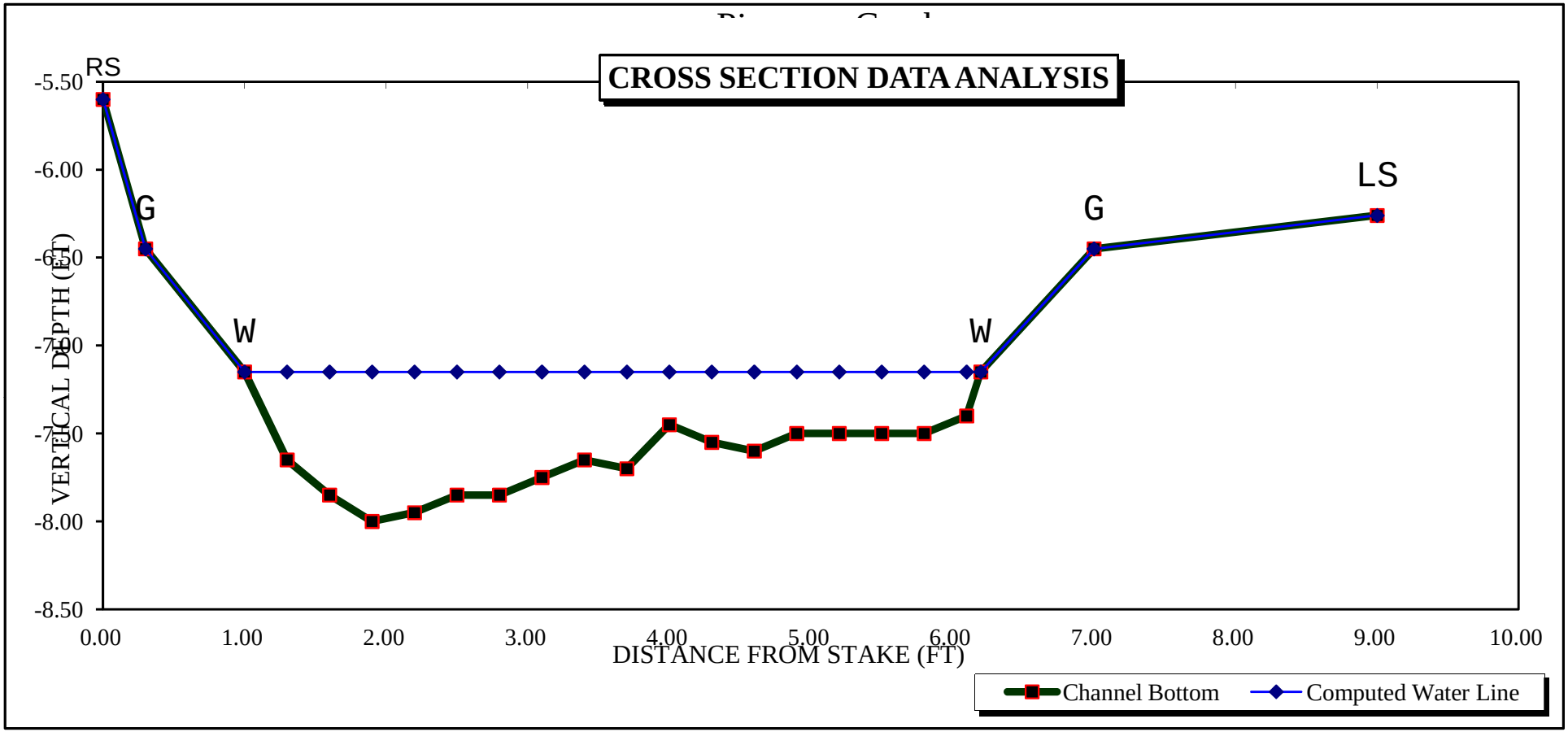
RECOMMENDATION BY: ………………...………..……............................... AGENCY...…………………….....…....…...…..…....... DATE:......…...…......……………

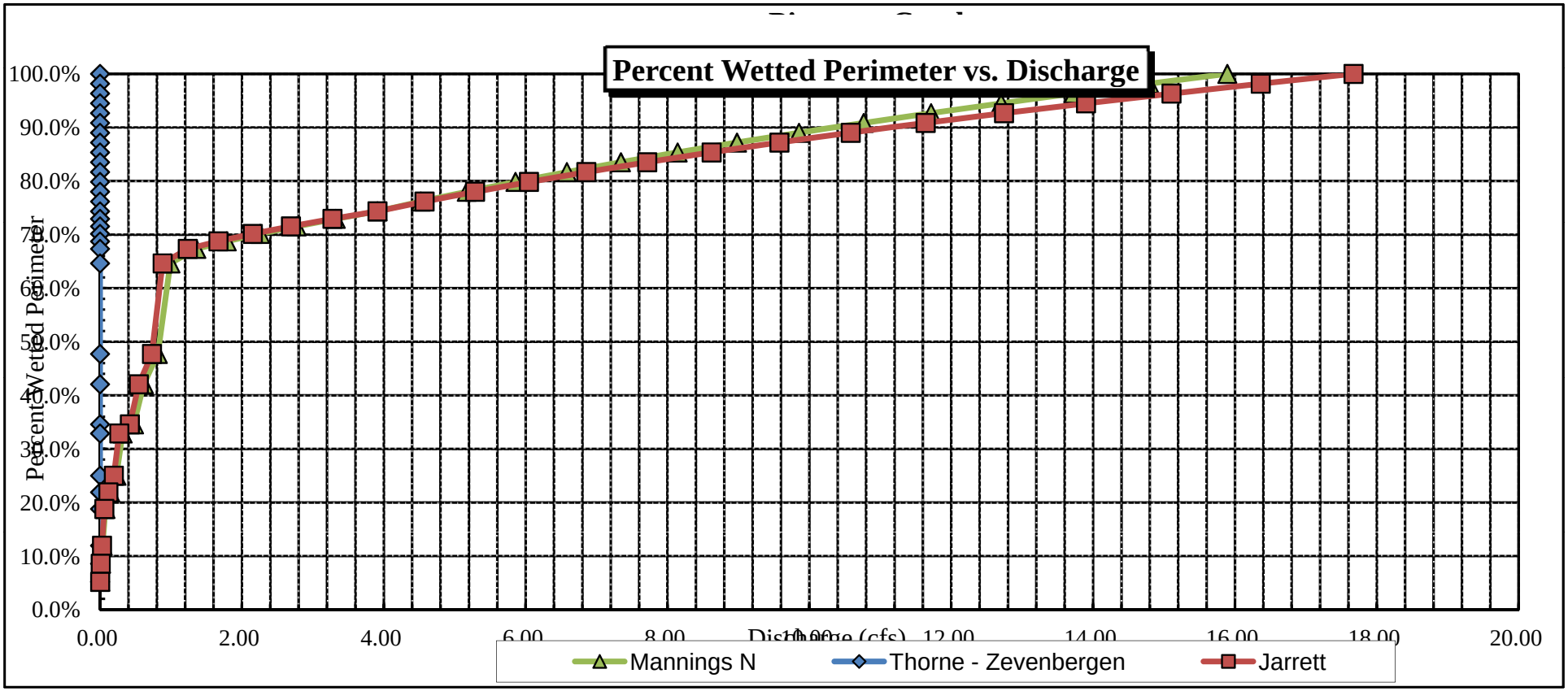
CWCB REVIEW BY: ..……………………….....…………………………………………………...…............. DATE:.................…………….....…

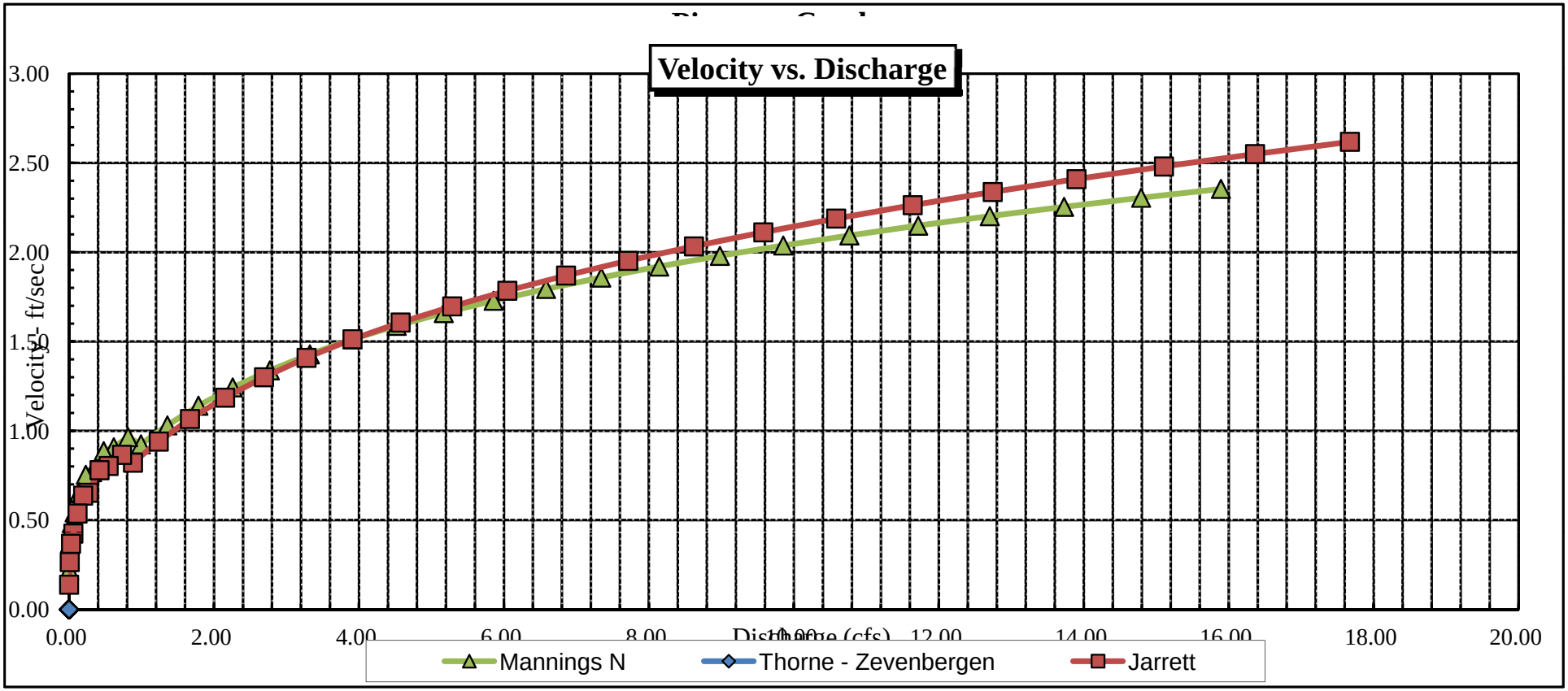
STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 mile us fr State Hwy 13
XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

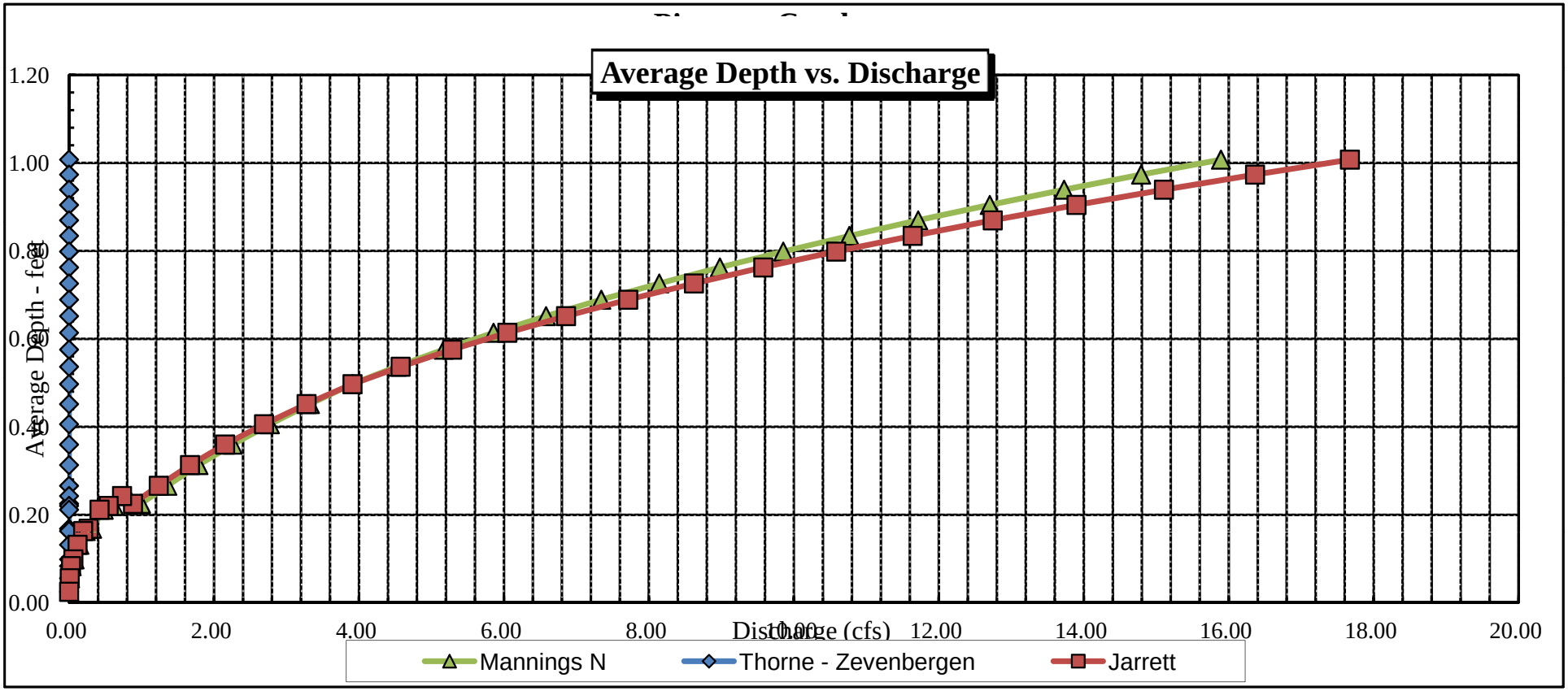
STAGING TABLE
GL = lowest Grassline elevation corrected for sag
WL = Waterline corrected for variations in field measured water surface elevations and sag

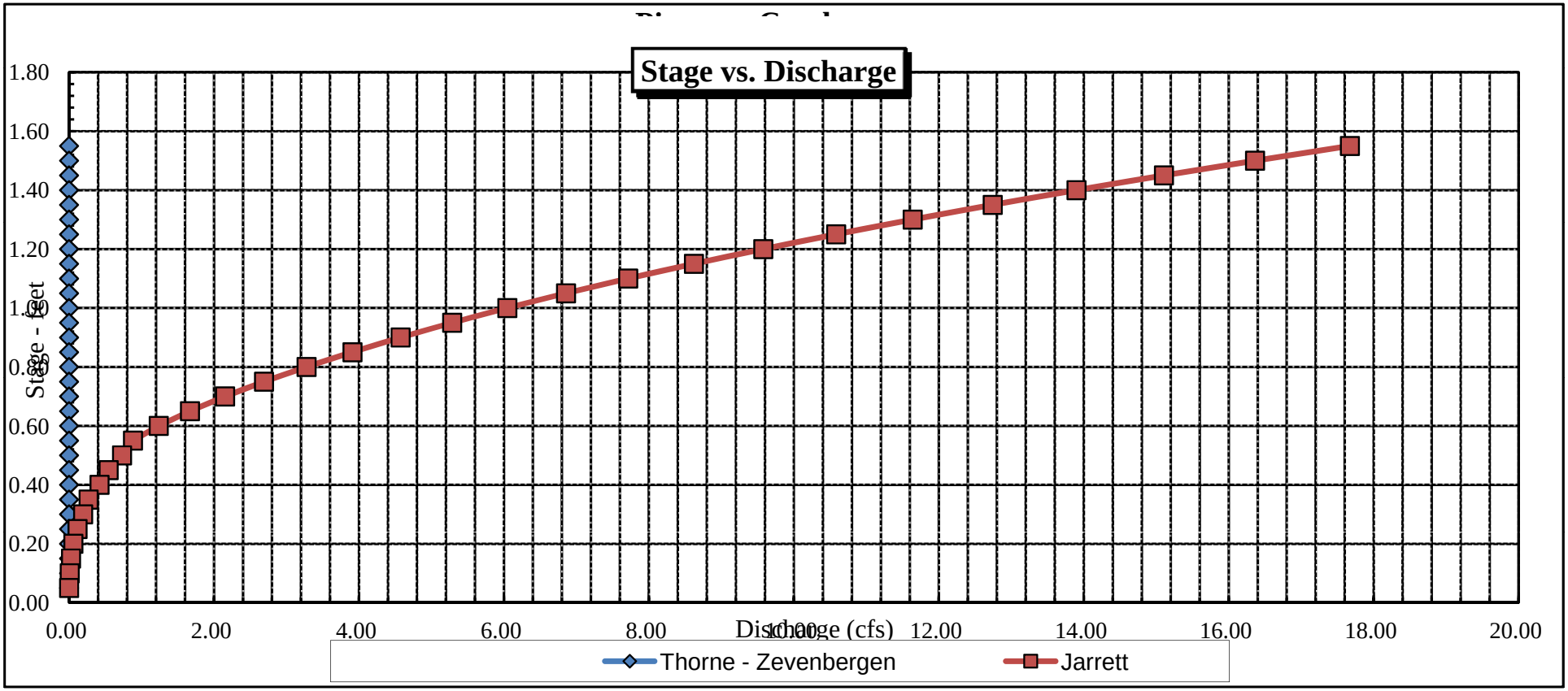
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.45	6.70	1.01	1.55	6.75	8.00	100.0%	0.84	17.67	2.62
	6.45	6.70	1.01	1.55	6.75	8.00	100.0%	0.84	17.67	2.62
	6.50	6.59	0.97	1.50	6.42	7.85	98.2%	0.82	16.36	2.55
	6.55	6.49	0.94	1.45	6.09	7.71	96.3%	0.79	15.11	2.48
	6.60	6.38	0.90	1.40	5.77	7.56	94.5%	0.76	13.90	2.41
	6.65	6.27	0.87	1.35	5.45	7.42	92.7%	0.74	12.74	2.34
	6.70	6.16	0.83	1.30	5.14	7.27	90.8%	0.71	11.64	2.26
	6.75	6.06	0.80	1.25	4.84	7.12	89.0%	0.68	10.58	2.19
	6.80	5.95	0.76	1.20	4.54	6.98	87.2%	0.65	9.58	2.11
	6.85	5.84	0.73	1.15	4.24	6.83	85.3%	0.62	8.62	2.03
	6.90	5.74	0.69	1.10	3.95	6.68	83.5%	0.59	7.71	1.95
	6.95	5.63	0.65	1.05	3.67	6.54	81.7%	0.56	6.86	1.87
	7.00	5.52	0.61	1.00	3.39	6.39	79.8%	0.53	6.05	1.78
	7.05	5.41	0.58	0.95	3.12	6.24	78.0%	0.50	5.29	1.70
	7.10	5.31	0.54	0.90	2.85	6.10	76.2%	0.47	4.57	1.61
WL	7.15	5.20	0.50	0.85	2.58	5.95	74.3%	0.43	3.91	1.51
	7.20	5.15	0.45	0.80	2.33	5.84	72.9%	0.40	3.28	1.41
	7.25	5.10	0.41	0.75	2.07	5.72	71.5%	0.36	2.69	1.30
	7.30	5.05	0.36	0.70	1.82	5.61	70.1%	0.32	2.15	1.19
	7.35	5.00	0.31	0.65	1.57	5.50	68.7%	0.28	1.67	1.07
	7.40	4.95	0.27	0.60	1.32	5.39	67.3%	0.24	1.24	0.94
	7.45	4.77	0.22	0.55	1.07	5.17	64.6%	0.21	0.88	0.82
	7.50	3.48	0.24	0.50	0.84	3.82	47.7%	0.22	0.73	0.87
	7.55	3.09	0.22	0.45	0.68	3.37	42.1%	0.20	0.55	0.80
	7.60	2.55	0.21	0.40	0.54	2.77	34.6%	0.19	0.42	0.78
	7.65	2.46	0.17	0.35	0.41	2.63	32.9%	0.16	0.27	0.65
	7.70	1.87	0.16	0.30	0.31	2.00	25.0%	0.15	0.19	0.64
	7.75	1.65	0.13	0.25	0.22	1.75	21.9%	0.12	0.12	0.54
	7.80	1.42	0.10	0.20	0.14	1.50	18.8%	0.09	0.06	0.42
	7.85	0.90	0.08	0.15	0.07	0.96	11.9%	0.08	0.03	0.37
	7.90	0.65	0.06	0.10	0.04	0.69	8.6%	0.05	0.01	0.27
	7.95	0.40	0.02	0.05	0.01	0.42	5.2%	0.02	0.00	0.14


CROSS SECTION DATA ANALYSIS
RS
G
W
W
G
LS
-5.50
-6.00
-6.50
-7.00
-7.50
-8.00
-8.50
VERTICAL DEPTH (FT)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
2.00
4.00
6.00
8.00
12.00
14.00
16.00
18.00
20.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
Velocity - ft/sec
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
2.00
4.00
6.00
8.00
12.00
14.00
16.00
18.00
20.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage - feet
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Divide Creek - Upper | CROSS-SECTION NO.: 3

CROSS-SECTION LOCATION: Approx. 3/4 mile upstream from State Hwy 13

DATE: 6-15-15 | OBSERVERS: R. Smith, K. Sauter

LEGAL DESCRIPTION	¼ SECTION:	SECTION:	TOWNSHIP:	RANGE:	PM:
	NW	3	4 N/S	95 E/W	6th

COUNTY:	WATERSHED:	WATER DIVISION:	DOW WATER CODE:
Garfield	White River	6	05343

MAP(S): USGS:

USFS:

SUPPLEMENTAL DATA

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

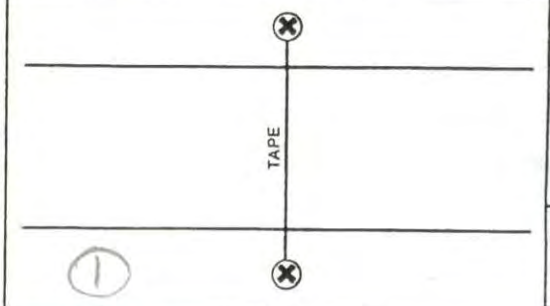
METER NUMBER: | DATE RATED: | CALIB/SPIN: _____ sec | TAPE WEIGHT: surveyed lbs/foot | TAPE TENSION: surveyed lbs

CHANNEL BED MATERIAL SIZE RANGE: gravel to 6" 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	6.30 / 6.30
② WS Upstream	11.2	6.24
③ WS Downstream	8.2	6.60
SLOPE	0.36 / 19.4 = 0.018	

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:

mayfly, caddisfly, stonefly

COMMENTS

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piceance Creek - Upper	CROSS-SECTION NO.: 3	DATE: 6-15-15	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: ____ ft	TIME: 4:15

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
G & RS	0.0		5.61								
W	0.3		6.30								
	0.6		6.65	.35				.82			
	0.9		6.6	.30				1.04			
	1.2		6.8	.50				1.02			
	1.5		6.8	.50				1.34			
	1.8		6.85	.55				0.76			
	2.1		6.85	.55				1.48			
	2.4		6.8	.50				1.55			
	2.7		6.85	.55				1.49			
	3.0		7.0	.70				1.41			
	3.3		7.0	.70				1.62			
	3.6		7.0	.70				1.72			
	3.9		7.0	.70				1.53			
	4.2		6.9	.60				1.58			
	4.5		6.9	.60				1.33			
	4.8		6.65	.35				1.35			
	5.1		6.65	.35				1.23			
	5.4		6.60	.30				1.26			
	5.7		6.55	.25				1.04			
	6.0		6.5	.20				.78			
	6.3		6.5	.20				0			
W	6.5		6.30								
G	7.0		5.55								
LS	7.3		5.40								
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:	Piceance Creek
XS LOCATION:	Approx 0.75 miles us fr State Hwy 13
XS NUMBER:	3
DATE:	15-Jun-15
OBSERVERS:	R. Smith, K. Sauter
1/4 SEC:	NW
SECTION:	3
TWP:	4S
RANGE:	95W
PM:	Sixth
COUNTY:	Garfield
WATERSHED:	White River
DIVISION:	6
DOW CODE:	25343
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE:	0.018

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

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

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 miles us fr State Hwy 13
XS NUMBER: 3

DATA POINTS= 25

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
1	G & RS	0.00	5.61			0.00		0.00	0.00	0.0%
	W	0.30	6.30	0.00	0.00	0.00		0.00	0.00	0.0%
		0.60	6.65	0.35	0.82	0.46	0.35	0.11	0.09	2.3%
		0.90	6.60	0.30	1.04	0.30	0.30	0.09	0.09	2.5%
		1.20	6.80	0.50	1.02	0.36	0.50	0.15	0.15	4.1%
		1.50	6.80	0.50	1.34	0.30	0.50	0.15	0.20	5.4%
		1.80	6.85	0.55	0.76	0.30	0.55	0.17	0.13	3.4%
		2.10	6.85	0.55	1.48	0.30	0.55	0.17	0.24	6.5%
		2.40	6.80	0.50	1.55	0.30	0.50	0.15	0.23	6.2%
		2.70	6.85	0.55	1.49	0.30	0.55	0.17	0.25	6.6%
		3.00	7.00	0.70	1.41	0.34	0.70	0.21	0.30	7.9%
		3.30	7.00	0.70	1.62	0.30	0.70	0.21	0.34	9.1%
		3.60	7.00	0.70	1.72	0.30	0.70	0.21	0.36	9.7%
		3.90	7.00	0.70	1.53	0.30	0.70	0.21	0.32	8.6%
		4.20	6.90	0.60	1.58	0.32	0.60	0.18	0.28	7.6%
		4.50	6.90	0.60	1.33	0.30	0.60	0.18	0.24	6.4%
		4.80	6.65	0.35	1.35	0.39	0.35	0.11	0.14	3.8%
		5.10	6.65	0.35	1.23	0.30	0.35	0.11	0.13	3.5%
		5.40	6.60	0.30	1.26	0.30	0.30	0.09	0.11	3.0%
		5.70	6.55	0.25	1.04	0.30	0.25	0.08	0.08	2.1%
		6.00	6.50	0.20	0.78	0.30	0.20	0.06	0.05	1.3%
		6.30	6.50	0.20	0.00	0.30	0.20	0.05	0.00	0.0%
	W	6.50	6.30	0.00	0.00	0.28		0.00	0.00	0.0%
1	G	7.00	5.55			0.00		0.00	0.00	0.0%
	LS	7.30	5.40			0.00		0.00	0.00	0.0%
	TOTALS ----------					6.68	0.7 (Max.)	2.83	3.73	100.0%

Manning's n = 0.0850
Hydraulic Radius= 0.42318976

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 miles us fr State Hwy 13
XS NUMBER: 3

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.83	2.83	0.0%
6.05	2.83	4.41	56.1%
6.07	2.83	4.28	51.5%
6.09	2.83	4.15	46.9%
6.11	2.83	4.02	42.4%
6.13	2.83	3.89	37.9%
6.15	2.83	3.77	33.4%
6.17	2.83	3.64	28.9%
6.19	2.83	3.51	24.4%
6.21	2.83	3.39	19.9%
6.23	2.83	3.26	15.5%
6.25	2.83	3.14	11.0%
6.26	2.83	3.07	8.8%
6.27	2.83	3.01	6.6%
6.28	2.83	2.95	4.4%
6.29	2.83	2.89	2.2%
6.30	2.83	2.83	0.0%
6.31	2.83	2.76	-2.2%
6.32	2.83	2.70	-4.4%
6.33	2.83	2.64	-6.6%
6.34	2.83	2.58	-8.7%
6.35	2.83	2.52	-10.9%
6.37	2.83	2.40	-15.2%
6.39	2.83	2.27	-19.5%
6.41	2.83	2.15	-23.7%
6.43	2.83	2.03	-28.0%
6.45	2.83	1.92	-32.2%
6.47	2.83	1.80	-36.4%
6.49	2.83	1.68	-40.5%
6.51	2.83	1.57	-44.5%
6.53	2.83	1.46	-48.3%
6.55	2.83	1.35	-52.1%

WATERLINE AT ZERO
AREA ERROR = 6.300

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 miles us fr State Hwy 13
XS NUMBER: 3 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	5.61	6.96	1.06	1.39	7.37	8.26	100.0%	0.89	16.00	2.17
	5.65	6.92	1.02	1.35	7.09	8.17	98.9%	0.87	15.12	2.13
	5.70	6.86	0.98	1.30	6.74	8.05	97.5%	0.84	14.05	2.08
	5.75	6.81	0.94	1.25	6.40	7.94	96.1%	0.81	13.01	2.03
	5.80	6.75	0.90	1.20	6.06	7.82	94.7%	0.78	11.99	1.98
	5.85	6.70	0.86	1.15	5.73	7.71	93.3%	0.74	11.01	1.92
	5.90	6.64	0.81	1.10	5.39	7.59	91.9%	0.71	10.07	1.87
	5.95	6.59	0.77	1.05	5.06	7.48	90.6%	0.68	9.15	1.81
	6.00	6.53	0.73	1.00	4.73	7.36	89.2%	0.64	8.27	1.75
	6.05	6.48	0.68	0.95	4.41	7.25	87.8%	0.61	7.42	1.68
	6.10	6.42	0.64	0.90	4.09	7.13	86.4%	0.57	6.61	1.62
	6.15	6.37	0.59	0.85	3.77	7.02	85.0%	0.54	5.83	1.55
	6.20	6.31	0.55	0.80	3.45	6.90	83.6%	0.50	5.09	1.48
	6.25	6.26	0.50	0.75	3.14	6.79	82.2%	0.46	4.39	1.40
WL	6.30	6.20	0.46	0.70	2.82	6.68	80.8%	0.42	3.73	1.32
	6.35	6.11	0.41	0.65	2.52	6.54	79.2%	0.38	3.12	1.24
	6.40	6.01	0.37	0.60	2.21	6.40	77.5%	0.35	2.56	1.16
	6.45	5.92	0.32	0.55	1.92	6.27	75.9%	0.31	2.04	1.06
	6.50	5.53	0.29	0.50	1.62	5.83	70.6%	0.28	1.62	1.00
	6.55	5.19	0.26	0.45	1.35	5.46	66.1%	0.25	1.25	0.93
	6.60	4.84	0.23	0.40	1.10	5.09	61.6%	0.22	0.93	0.85
	6.65	3.82	0.23	0.35	0.88	4.02	48.7%	0.22	0.75	0.85
	6.70	3.69	0.19	0.30	0.69	3.86	46.7%	0.18	0.52	0.75
	6.75	3.55	0.14	0.25	0.51	3.69	44.7%	0.14	0.32	0.63
	6.80	3.12	0.11	0.20	0.34	3.22	39.0%	0.10	0.17	0.52
	6.85	1.86	0.11	0.15	0.20	1.93	23.4%	0.11	0.11	0.52
	6.90	1.40	0.08	0.10	0.12	1.44	17.4%	0.08	0.05	0.43
	6.95	1.15	0.04	0.05	0.05	1.17	14.2%	0.04	0.01	0.29
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 miles us fr State Hwy 13
XS NUMBER: 3

SUMMARY SHEET

MEASURED FLOW (Qm)=	3.73	cfs
CALCULATED FLOW (Qc)=	3.73	cfs
(Qm-Qc)/Qm * 100 =	0.0	%
MEASURED WATERLINE (WLm)=	6.30	ft
CALCULATED WATERLINE (WLc)=	6.30	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=	1.32	ft/sec
MANNING'S N=	0.085	
SLOPE=	0.018	ft/ft
.4 * Qm =	1.5	cfs
2.5 * Qm=	9.3	cfs

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

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

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

_____
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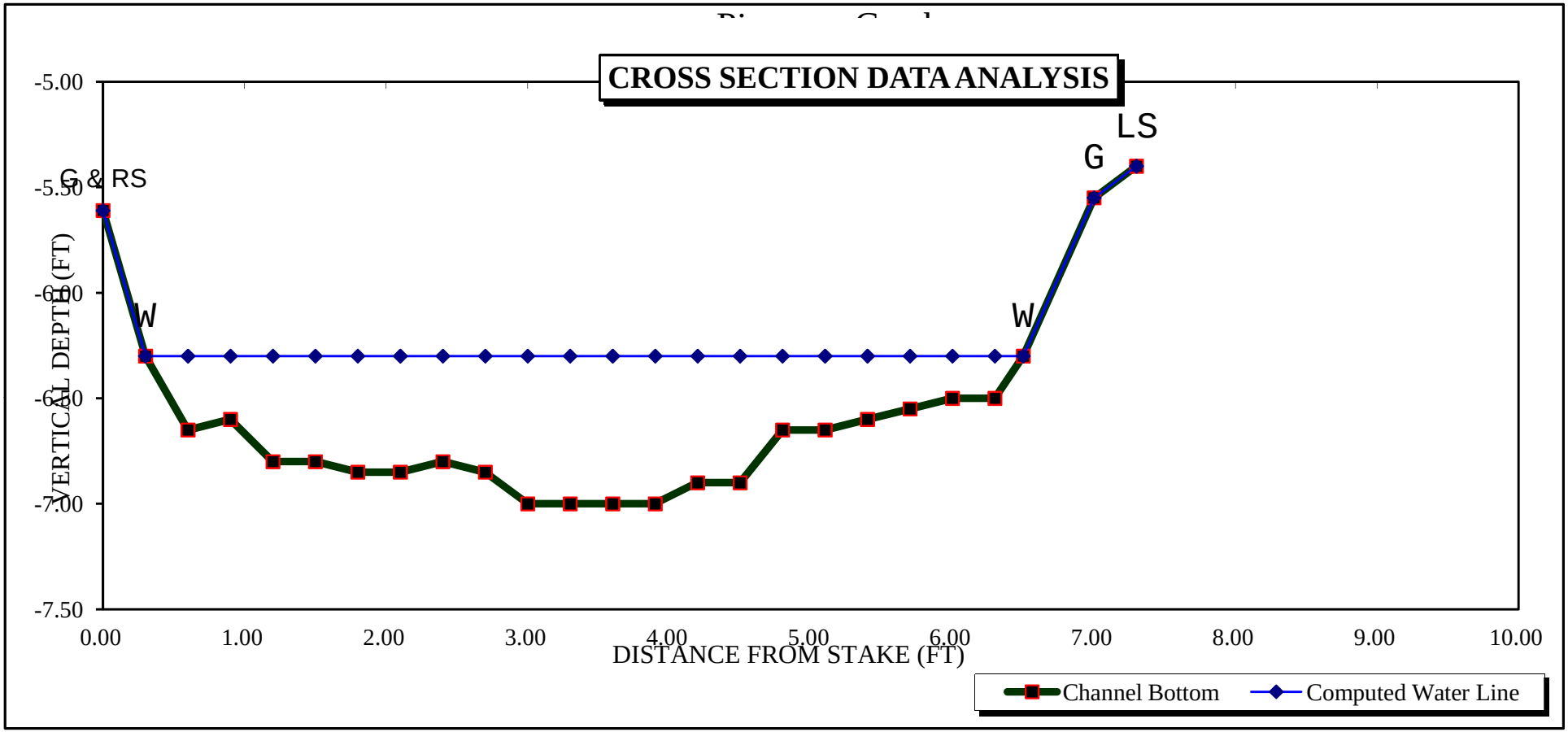
RECOMMENDATION BY: ..... AGENCY..... DATE:.....

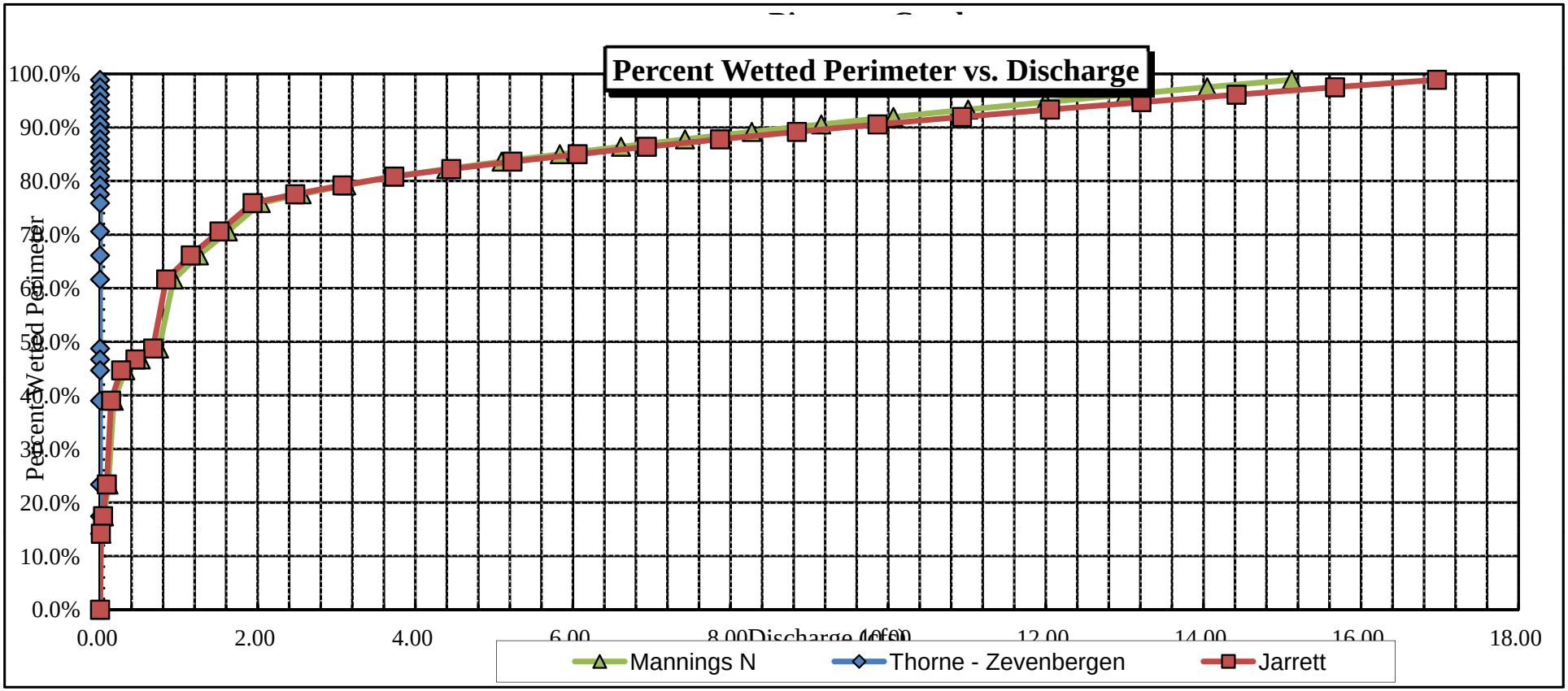
CWCB REVIEW BY: ..... DATE:.....

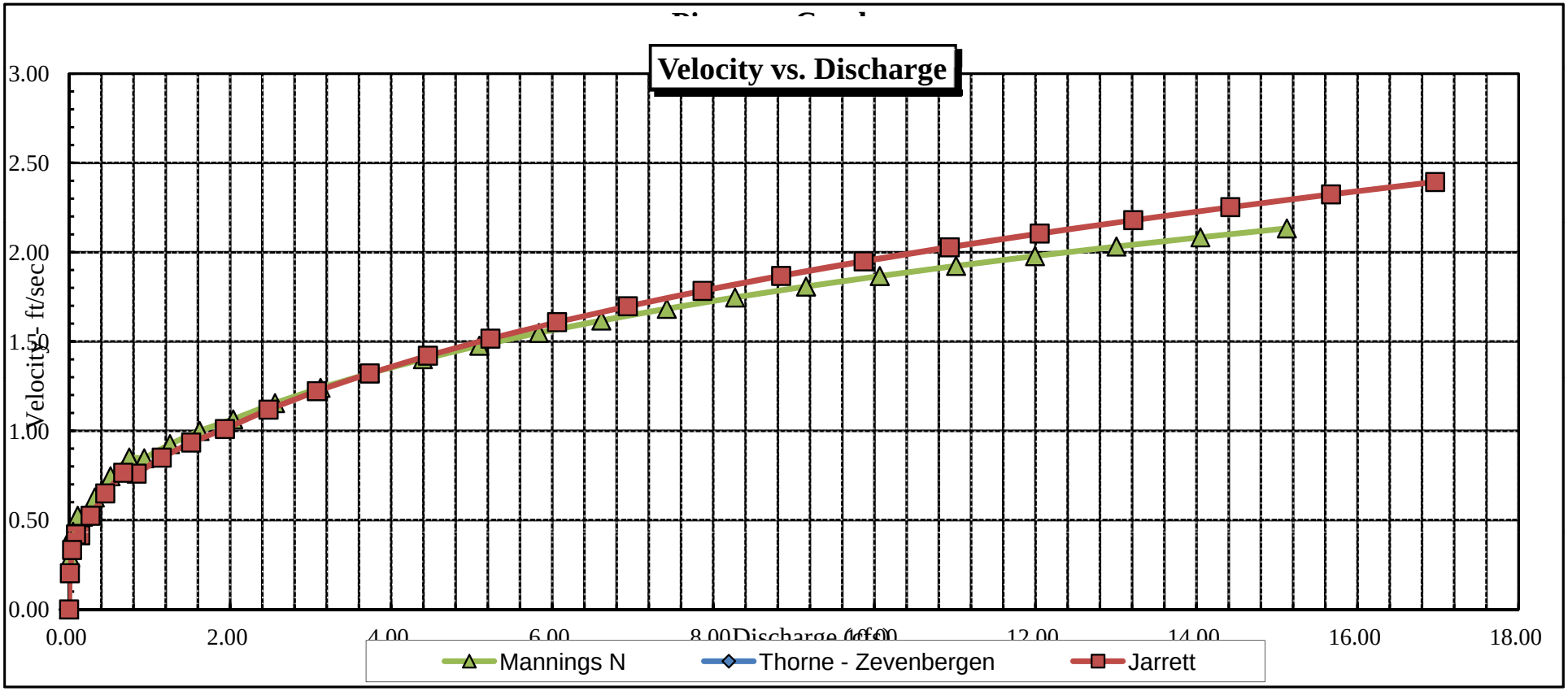
STREAM NAME: Piceance Creek
XS LOCATION: Approx 0.75 miles us fr State Hwy 13
XS NUMBER: 3 Jarrett Variable Manning's n Correction Applied

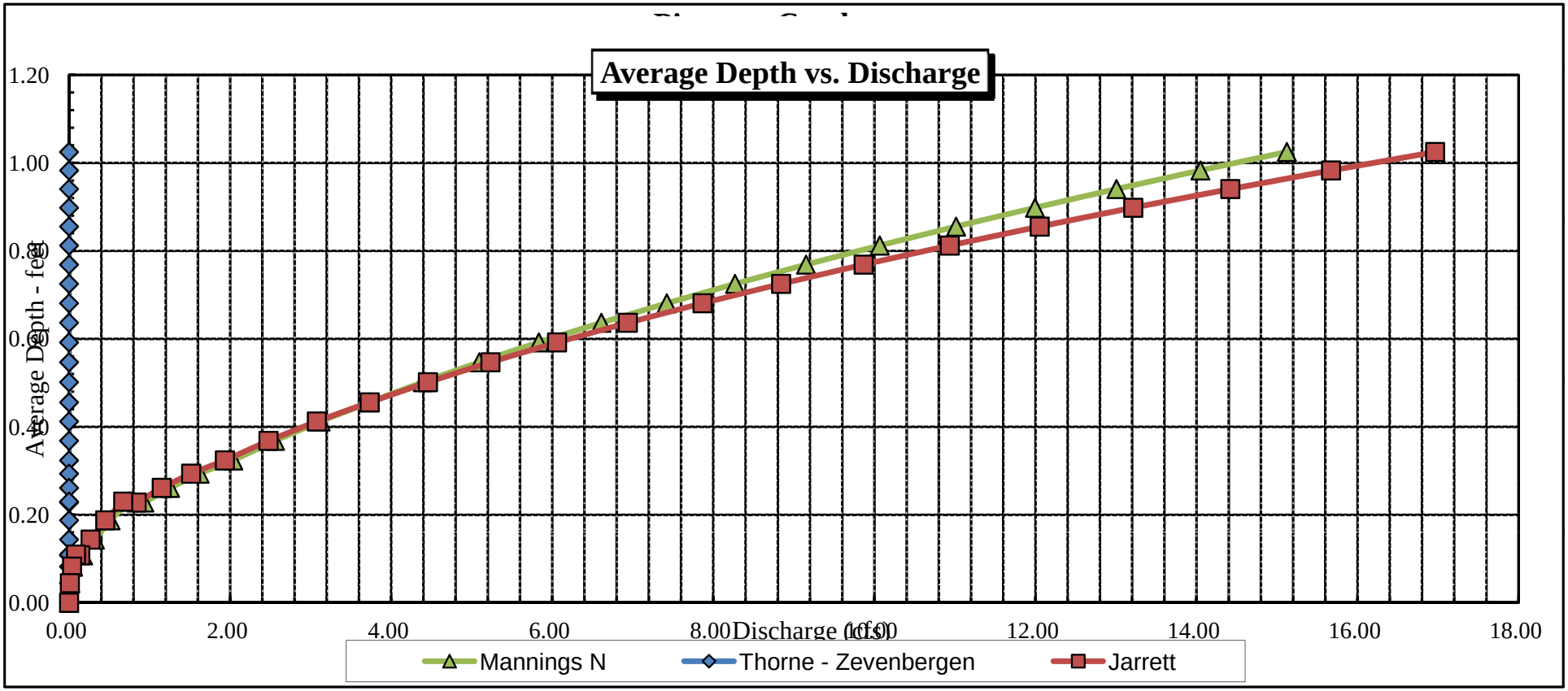
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

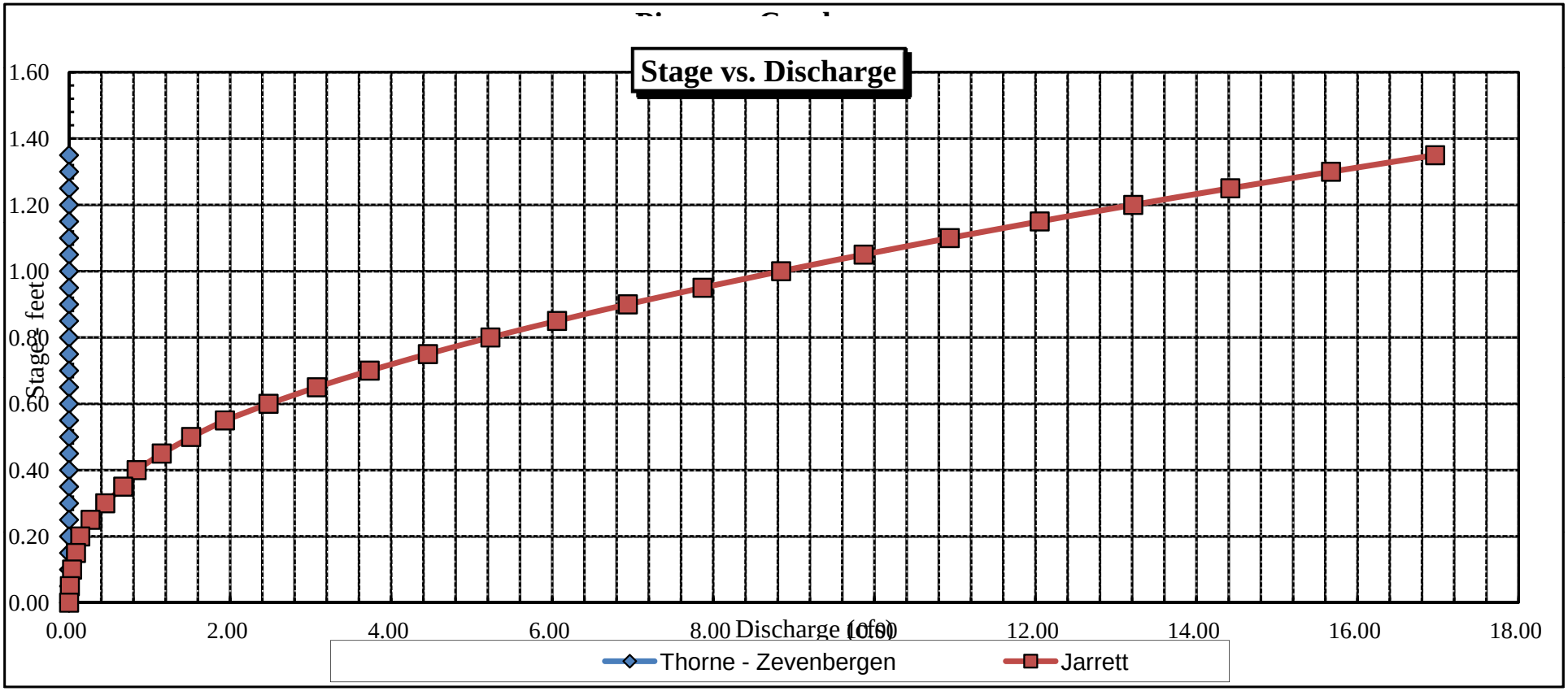
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.61	6.96	1.06	1.39	7.37	8.26	100.0%	0.89	18.03	2.45
	5.65	6.92	1.02	1.35	7.09	8.17	98.9%	0.87	16.96	2.39
	5.70	6.86	0.98	1.30	6.74	8.05	97.5%	0.84	15.67	2.32
	5.75	6.81	0.94	1.25	6.40	7.94	96.1%	0.81	14.42	2.25
	5.80	6.75	0.90	1.20	6.06	7.82	94.7%	0.78	13.21	2.18
	5.85	6.70	0.86	1.15	5.73	7.71	93.3%	0.74	12.05	2.10
	5.90	6.64	0.81	1.10	5.39	7.59	91.9%	0.71	10.94	2.03
	5.95	6.59	0.77	1.05	5.06	7.48	90.6%	0.68	9.87	1.95
	6.00	6.53	0.73	1.00	4.73	7.36	89.2%	0.64	8.84	1.87
	6.05	6.48	0.68	0.95	4.41	7.25	87.8%	0.61	7.87	1.78
	6.10	6.42	0.64	0.90	4.09	7.13	86.4%	0.57	6.94	1.70
	6.15	6.37	0.59	0.85	3.77	7.02	85.0%	0.54	6.06	1.61
	6.20	6.31	0.55	0.80	3.45	6.90	83.6%	0.50	5.23	1.52
	6.25	6.26	0.50	0.75	3.14	6.79	82.2%	0.46	4.46	1.42
WL	6.30	6.20	0.46	0.70	2.82	6.68	80.8%	0.42	3.73	1.32
	6.35	6.11	0.41	0.65	2.52	6.54	79.2%	0.38	3.08	1.22
	6.40	6.01	0.37	0.60	2.21	6.40	77.5%	0.35	2.48	1.12
	6.45	5.92	0.32	0.55	1.92	6.27	75.9%	0.31	1.94	1.01
	6.50	5.53	0.29	0.50	1.62	5.83	70.6%	0.28	1.52	0.93
	6.55	5.19	0.26	0.45	1.35	5.46	66.1%	0.25	1.15	0.85
	6.60	4.84	0.23	0.40	1.10	5.09	61.6%	0.22	0.84	0.76
	6.65	3.82	0.23	0.35	0.88	4.02	48.7%	0.22	0.67	0.77
	6.70	3.69	0.19	0.30	0.69	3.86	46.7%	0.18	0.45	0.65
	6.75	3.55	0.14	0.25	0.51	3.69	44.7%	0.14	0.27	0.52
	6.80	3.12	0.11	0.20	0.34	3.22	39.0%	0.10	0.14	0.42
	6.85	1.86	0.11	0.15	0.20	1.93	23.4%	0.11	0.09	0.42
	6.90	1.40	0.08	0.10	0.12	1.44	17.4%	0.08	0.04	0.33
	6.95	1.15	0.04	0.05	0.05	1.17	14.2%	0.04	0.01	0.20
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!


CROSS SECTION DATA ANALYSIS
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
VERTICAL DEPTH (FT)
G & RS
W
W
G
LS
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
2.00
4.00
6.00
8.00
12.00
14.00
16.00
18.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Velocity - ft/sec
0.00
2.00
4.00
6.00
8.00
12.00
14.00
16.00
18.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
Stage, feet
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
2.00
4.00
6.00
8.00
12.00
14.00
16.00
18.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piceance Creek - Upper						CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: Approx 2.5 miles downstream from State Highway 13 crossing							
DATE: 7-7-15	OBSERVERS: R. Smith, B. Logan, B. Epstein						
LEGAL DESCRIPTION	¼ SECTION: NW	SECTION: 6	TOWNSHIP: 4 N/S	RANGE: 95 E/W	PM: 6th		
COUNTY: Rio Blanco	WATERSHED: White River	WATER DIVISION: 6	DOW WATER CODE: 25343				
MAP(S): USGS:				243913			
USFS:				4402157			

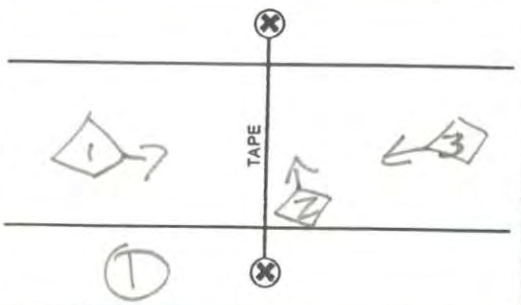
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: Flowmate			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to 3" 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	5.10 / 5.10
② WS Upstream	29.0	5.01
③ WS Downstream	10.5	5.43
SLOPE	0.42 / 39.5 = 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

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

COMMENTS

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piceance Creek-Upper	CROSS-SECTION NO.: 1	DATE: 7-7-15	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 2 pm.

Features: Stake (S), Grassline (G), Waterline (W), Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		2.96								
G	1.5		4.33								
W	2.3		5.10								
	2.5		5.30	.20				1.18			
	2.7		5.33	.23				1.76			
	2.9		5.38	.28				1.36			
	3.1		5.36	.26				1.04			
	3.3		5.33	.23				1.83			
	3.5		5.33	.23				1.69			
	3.7		5.33	.23				1.51			
	3.9		5.36	.26				1.72			
	4.1		5.40	.30				1.65			
	4.3		5.45	.35				1.41			
	4.5		5.47	.37				1.66			
	4.7		5.50	.40				1.91			
	4.9		5.53	.43				2.02			
	5.1		5.58	.48				1.92			
	5.3		5.60	.50				1.92			
	5.5		5.55	.45				1.88			
	5.7		5.50	.40				2.02			
	5.9		5.50	.40				1.59			
	6.1		5.44	.34				1.89			
	6.3		5.41	.31				1.96			
	6.5		5.36	.26				1.97			
	6.7		5.35	.25				1.95			
	6.9		5.35	.25				1.83			
	7.1		5.36	.26				1.72			
	7.3		5.34	.24				1.86			
	7.5		5.34	.24				1.79			
	7.7		5.36	.26				1.82			
	7.9		5.33	.23				1.96			
	8.1		5.36	.26				1.71			
	8.3		5.40	.30				1.88			FTQ = 3.32
	8.5		5.30	.20				ϕ			
								ϕ			
W	8.7		5.10								
	10.6		4.80								
LSFG	14.2		4.30								
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:	Piceance Creek
XS LOCATION:	2.5 mi dwnstr from State Hwy 13
XS NUMBER:	1
DATE:	7-Jul-15
OBSERVERS:	R. Smith, B. Logan, B. Epstein
1/4 SEC:	NW
SECTION:	6
TWP:	4S
RANGE:	95W
PM:	Sixth
COUNTY:	Rio Blanco
WATERSHED:	White River
DIVISION:	6
DOW CODE:	25343
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE:	0.01

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

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

STREAM NAME: Piceance Creek
XS LOCATION: 2.5 mi dwnstr from State Hwy 13
XS NUMBER: 1

DATA POINTS= 37

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
RS	0.00	2.96			0.00		0.00	0.00	0.0%
1 G	1.50	4.33			0.00		0.00	0.00	0.0%
W	2.30	5.10	0.00	0.00	0.00		0.00	0.00	0.0%
	2.50	5.30	0.20	1.18	0.28	0.20	0.04	0.05	1.5%
	2.70	5.33	0.23	1.76	0.20	0.23	0.05	0.08	2.5%
	2.90	5.38	0.28	1.36	0.21	0.28	0.06	0.08	2.3%
	3.10	5.36	0.26	1.04	0.20	0.26	0.05	0.05	1.7%
	3.30	5.33	0.23	1.83	0.20	0.23	0.05	0.08	2.6%
	3.50	5.33	0.23	1.69	0.20	0.23	0.05	0.08	2.4%
	3.70	5.33	0.23	1.51	0.20	0.23	0.05	0.07	2.1%
	3.90	5.36	0.26	1.72	0.20	0.26	0.05	0.09	2.7%
	4.10	5.40	0.30	1.65	0.20	0.30	0.06	0.10	3.0%
	4.30	5.45	0.35	1.41	0.21	0.35	0.07	0.10	3.0%
	4.50	5.47	0.37	1.66	0.20	0.37	0.07	0.12	3.8%
	4.70	5.50	0.40	1.91	0.20	0.40	0.08	0.15	4.7%
	4.90	5.53	0.43	2.02	0.20	0.43	0.09	0.17	5.3%
	5.10	5.58	0.48	1.92	0.21	0.48	0.10	0.18	5.7%
	5.30	5.60	0.50	1.92	0.20	0.50	0.10	0.19	5.9%
	5.50	5.55	0.45	1.88	0.21	0.45	0.09	0.17	5.2%
	5.70	5.50	0.40	2.02	0.21	0.40	0.08	0.16	5.0%
	5.90	5.50	0.40	1.59	0.20	0.40	0.08	0.13	3.9%
	6.10	5.44	0.34	1.89	0.21	0.34	0.07	0.13	4.0%
	6.30	5.41	0.31	1.96	0.20	0.31	0.06	0.12	3.7%
	6.50	5.36	0.26	1.97	0.21	0.26	0.05	0.10	3.1%
	6.70	5.35	0.25	1.95	0.20	0.25	0.05	0.10	3.0%
	6.90	5.35	0.25	1.83	0.20	0.25	0.05	0.09	2.8%
	7.10	5.36	0.26	1.72	0.20	0.26	0.05	0.09	2.7%
	7.30	5.34	0.24	1.86	0.20	0.24	0.05	0.09	2.7%
	7.50	5.34	0.24	1.79	0.20	0.24	0.05	0.09	2.6%
	7.70	5.36	0.26	1.82	0.20	0.26	0.05	0.09	2.9%
	7.90	5.33	0.23	1.96	0.20	0.23	0.05	0.09	2.8%
	8.10	5.36	0.26	1.71	0.20	0.26	0.05	0.09	2.7%
	8.30	5.40	0.30	1.88	0.20	0.30	0.06	0.11	3.5%
	8.50	5.30	0.20	0.00	0.22	0.20	0.04	0.00	0.0%
W	8.70	5.10	0.00	0.00	0.28		0.00	0.00	0.0%
	10.60	4.80			0.00		0.00	0.00	0.0%
1 LS & G	14.20	4.30			0.00		0.00	0.00	0.0%
TOTALS ----------					6.67	0.5 (Max.)	1.88	3.25	100.0%

Manning's n = 0.0369
Hydraulic Radius= 0.28201387

STREAM NAME: Piceance Creek
XS LOCATION: 2.5 mi dwnstr from State Hwy 13
XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.88	1.88	0.0%
4.85	1.88	3.71	97.4%
4.87	1.88	3.55	88.7%
4.89	1.88	3.39	80.1%
4.91	1.88	3.23	71.8%
4.93	1.88	3.07	63.5%
4.95	1.88	2.92	55.5%
4.97	1.88	2.77	47.6%
4.99	1.88	2.63	39.8%
5.01	1.88	2.49	32.2%
5.03	1.88	2.35	24.8%
5.05	1.88	2.21	17.5%
5.06	1.88	2.14	13.9%
5.07	1.88	2.08	10.4%
5.08	1.88	2.01	6.9%
5.09	1.88	1.94	3.4%
5.10	1.88	1.88	0.0%
5.11	1.88	1.82	-3.4%
5.12	1.88	1.75	-6.8%
5.13	1.88	1.69	-10.2%
5.14	1.88	1.63	-13.5%
5.15	1.88	1.56	-16.9%
5.17	1.88	1.44	-23.6%
5.19	1.88	1.31	-30.2%
5.21	1.88	1.19	-36.8%
5.23	1.88	1.06	-43.4%
5.25	1.88	0.94	-49.9%
5.27	1.88	0.82	-56.3%
5.29	1.88	0.70	-62.8%
5.31	1.88	0.58	-69.1%
5.33	1.88	0.46	-75.3%
5.35	1.88	0.37	-80.5%

WATERLINE AT ZERO
AREA ERROR = 5.100

STREAM NAME: Piceance Creek
XS LOCATION: 2.5 mi dwnstr from State Hwy 13
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	4.33	12.48	0.73	1.27	9.09	13.12	100.0%	0.69	28.64	3.15
	4.35	12.32	0.72	1.25	8.84	12.94	98.7%	0.68	27.60	3.12
	4.40	11.91	0.69	1.20	8.24	12.51	95.4%	0.66	25.08	3.05
	4.45	11.50	0.67	1.15	7.65	12.07	92.0%	0.63	22.71	2.97
	4.50	11.08	0.64	1.10	7.09	11.64	88.7%	0.61	20.49	2.89
	4.55	10.67	0.61	1.05	6.54	11.20	85.4%	0.58	18.40	2.81
	4.60	10.26	0.59	1.00	6.02	10.76	82.1%	0.56	16.44	2.73
	4.65	9.85	0.56	0.95	5.52	10.33	78.7%	0.53	14.61	2.65
	4.70	9.44	0.53	0.90	5.03	9.89	75.4%	0.51	12.91	2.56
	4.75	9.02	0.51	0.85	4.57	9.46	72.1%	0.48	11.33	2.48
	4.80	8.61	0.48	0.80	4.13	9.02	68.8%	0.46	9.88	2.39
	4.85	8.24	0.45	0.75	3.71	8.63	65.8%	0.43	8.51	2.29
	4.90	7.87	0.42	0.70	3.31	8.24	62.8%	0.40	7.24	2.19
	4.95	7.51	0.39	0.65	2.92	7.84	59.8%	0.37	6.09	2.08
	5.00	7.14	0.36	0.60	2.56	7.45	56.8%	0.34	5.04	1.97
	5.05	6.77	0.33	0.55	2.21	7.06	53.8%	0.31	4.10	1.85
WL	5.10	6.40	0.29	0.50	1.88	6.67	50.8%	0.28	3.25	1.73
	5.15	6.30	0.25	0.45	1.56	6.52	49.7%	0.24	2.42	1.55
	5.20	6.20	0.20	0.40	1.25	6.38	48.7%	0.20	1.70	1.36
	5.25	6.10	0.15	0.35	0.94	6.24	47.6%	0.15	1.08	1.14
	5.30	6.00	0.11	0.30	0.64	6.10	46.5%	0.10	0.57	0.90
	5.35	4.09	0.09	0.25	0.37	4.16	31.7%	0.09	0.29	0.80
	5.40	2.24	0.10	0.20	0.23	2.28	17.4%	0.10	0.19	0.86
	5.45	1.77	0.07	0.15	0.13	1.80	13.7%	0.07	0.09	0.68
	5.50	1.00	0.05	0.10	0.05	1.02	7.8%	0.05	0.03	0.55
	5.55	0.52	0.03	0.05	0.01	0.53	4.0%	0.03	0.01	0.37
	5.60	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Piceance Creek
XS LOCATION: 2.5 mi dwnstr from State Hwy 13
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	3.25	cfs
CALCULATED FLOW (Qc)=	3.25	cfs
(Qm-Qc)/Qm * 100 =	0.0	%
MEASURED WATERLINE (WLm)=	5.10	ft
CALCULATED WATERLINE (WLc)=	5.10	ft
(WLm-WLc)/WLm * 100 =	0.0	%
MAX MEASURED DEPTH (Dm)=	0.50	ft
MAX CALCULATED DEPTH (Dc)=	0.50	ft
(Dm-Dc)/Dm * 100	0.0	%
MEAN VELOCITY=	1.73	ft/sec
MANNING'S N=	0.037	
SLOPE=	0.01	ft/ft
.4 * Qm =	1.3	cfs
2.5 * Qm=	8.1	cfs

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

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

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

_____
_____
_____
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_____

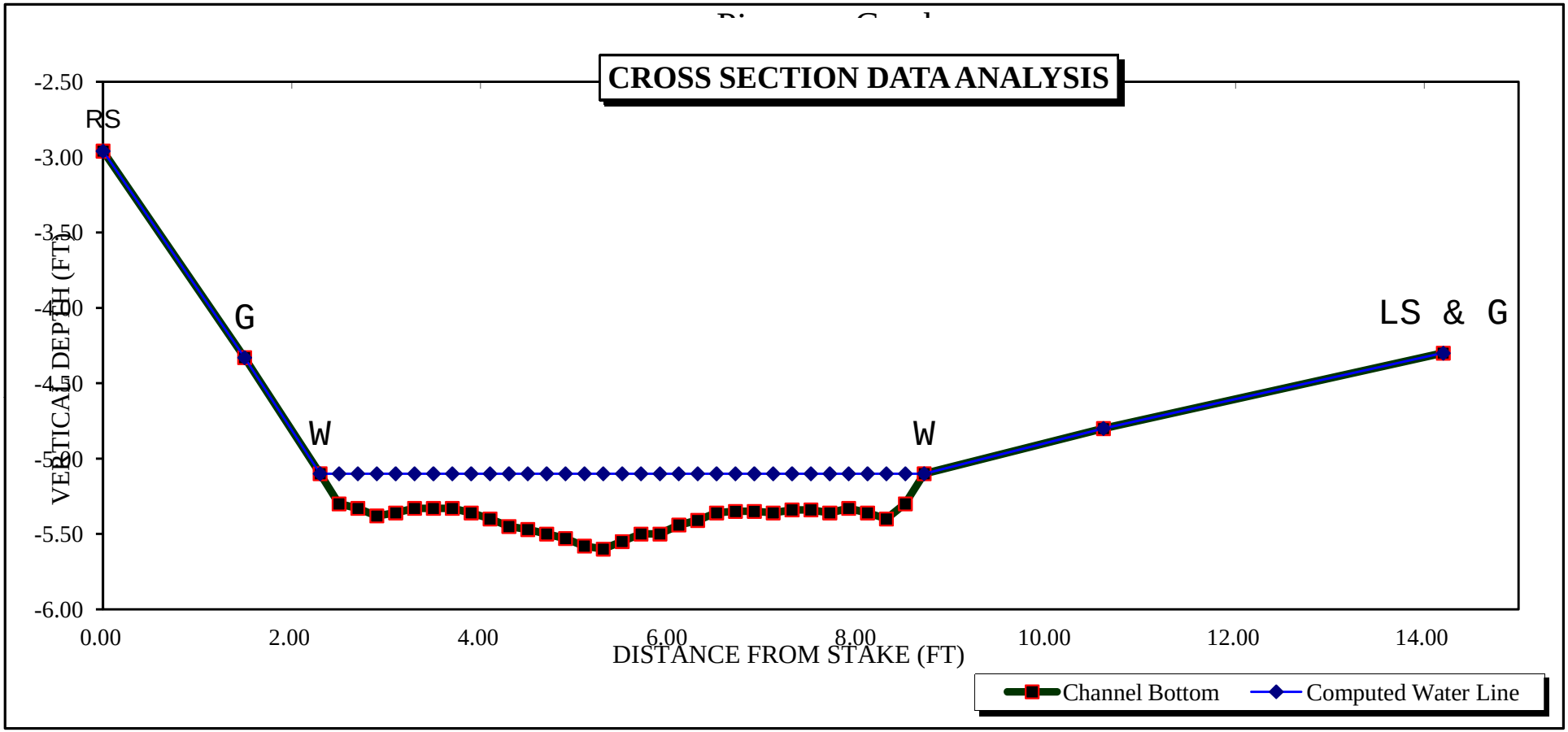
RECOMMENDATION BY: ..... AGENCY..... DATE:.....

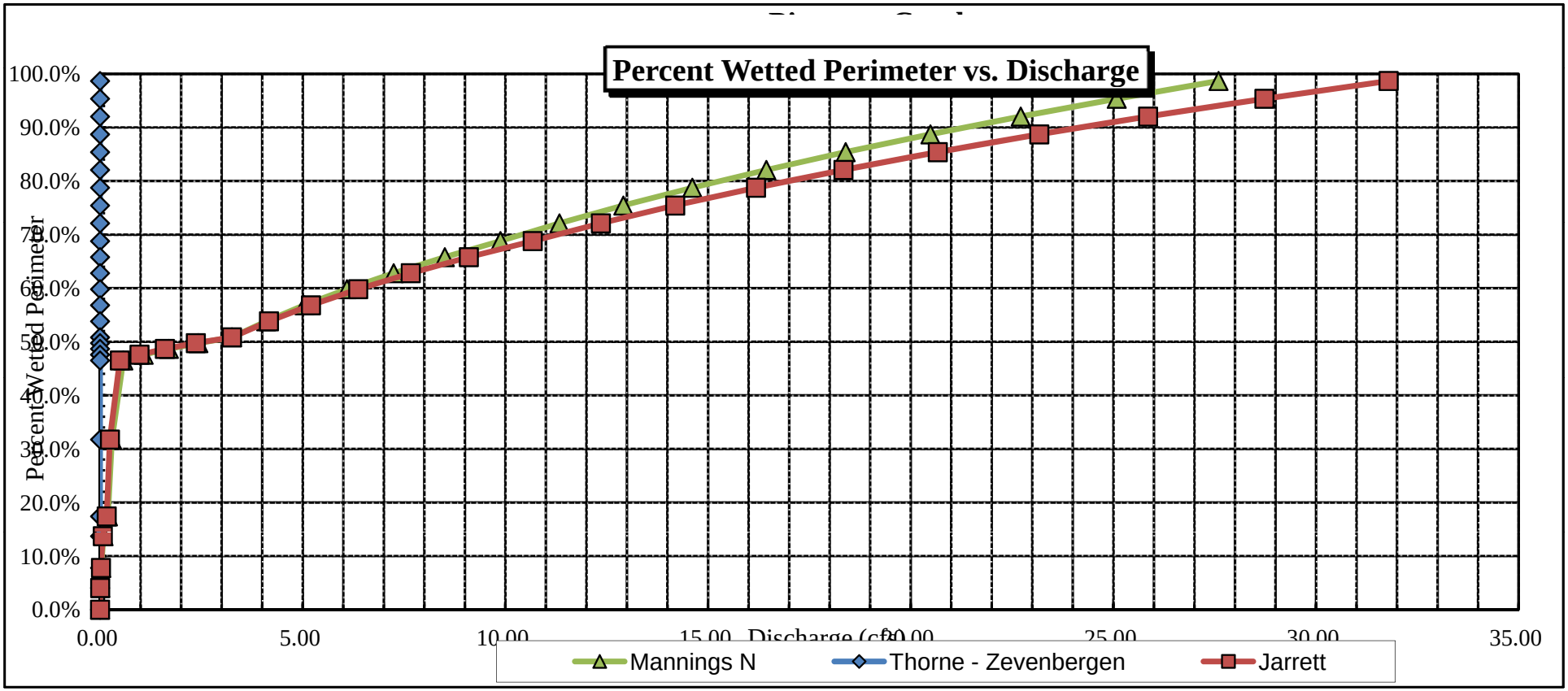
CWCB REVIEW BY: ..... DATE:.....

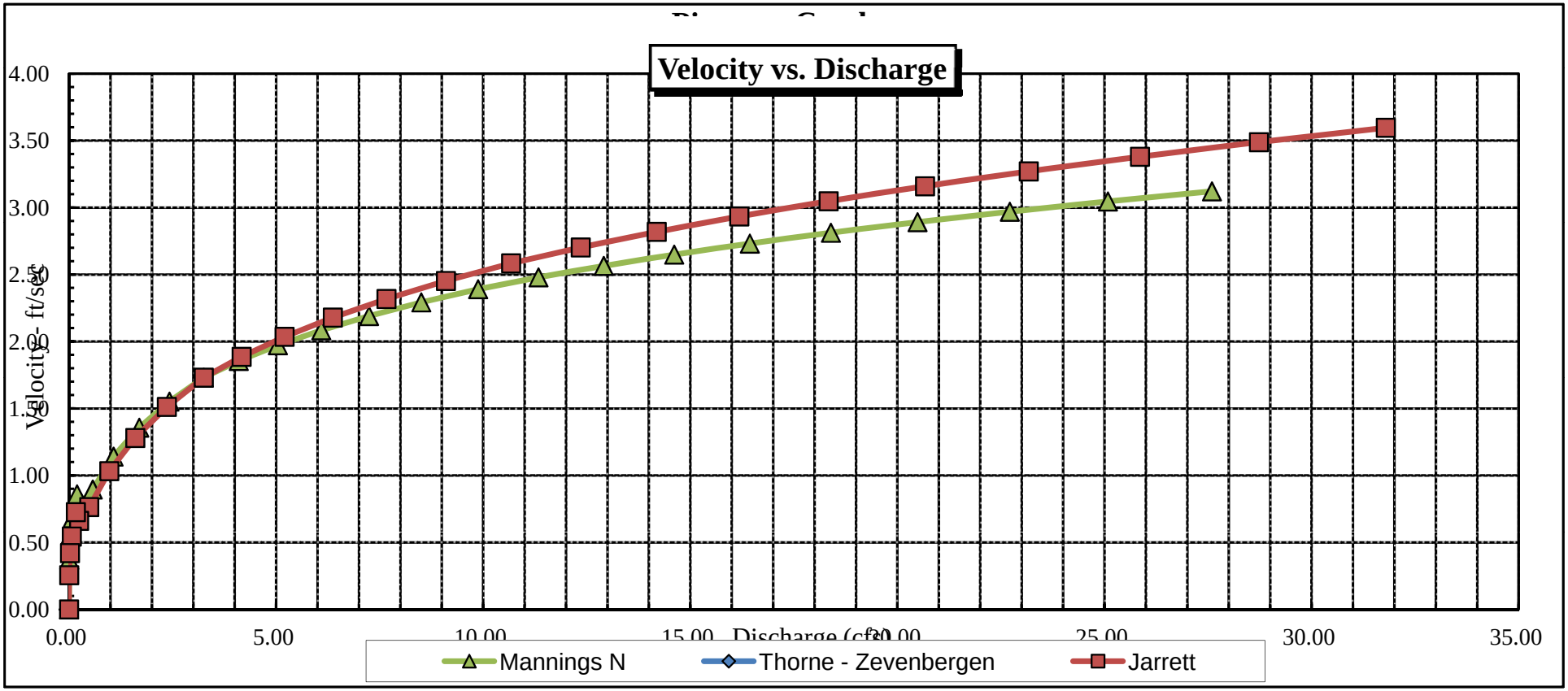
STREAM NAME: Piceance Creek
XS LOCATION: 2.5 mi dwnstr from State Hwy 13
XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

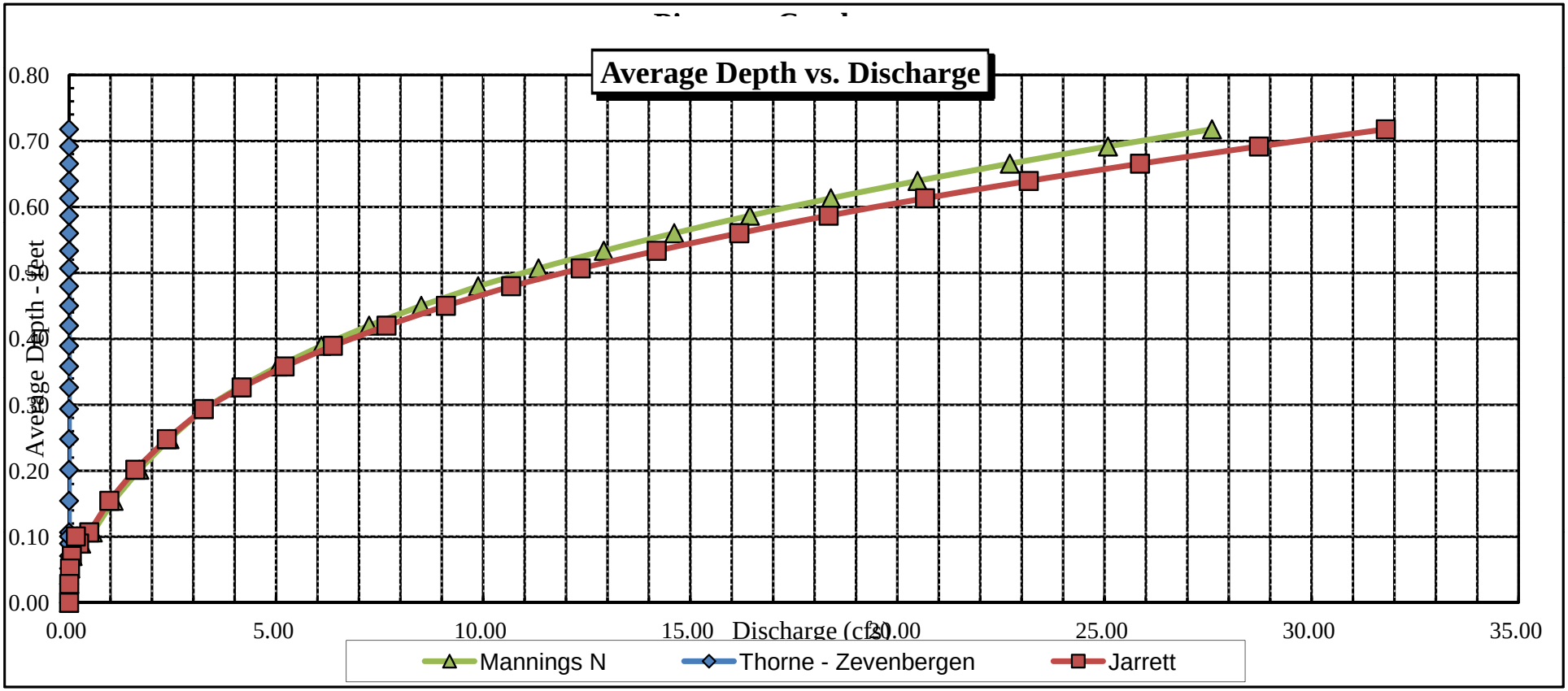
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

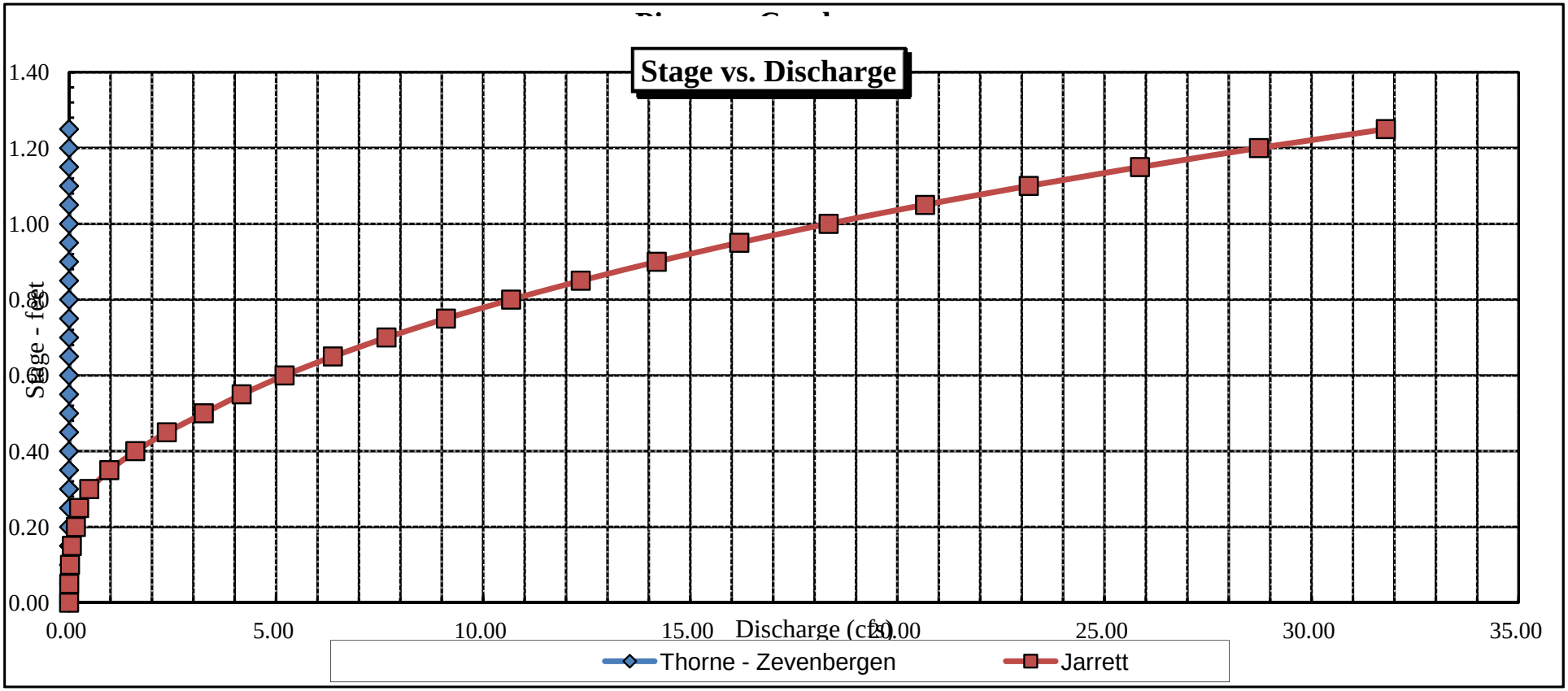
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.33	12.48	0.73	1.27	9.09	13.12	100.0%	0.69	33.07	3.64
	4.35	12.32	0.72	1.25	8.84	12.94	98.7%	0.68	31.79	3.60
	4.40	11.91	0.69	1.20	8.24	12.51	95.4%	0.66	28.73	3.49
	4.45	11.50	0.67	1.15	7.65	12.07	92.0%	0.63	25.86	3.38
	4.50	11.08	0.64	1.10	7.09	11.64	88.7%	0.61	23.17	3.27
	4.55	10.67	0.61	1.05	6.54	11.20	85.4%	0.58	20.67	3.16
	4.60	10.26	0.59	1.00	6.02	10.76	82.1%	0.56	18.34	3.05
	4.65	9.85	0.56	0.95	5.52	10.33	78.7%	0.53	16.18	2.93
	4.70	9.44	0.53	0.90	5.03	9.89	75.4%	0.51	14.19	2.82
	4.75	9.02	0.51	0.85	4.57	9.46	72.1%	0.48	12.36	2.70
	4.80	8.61	0.48	0.80	4.13	9.02	68.8%	0.46	10.67	2.58
	4.85	8.24	0.45	0.75	3.71	8.63	65.8%	0.43	9.10	2.45
	4.90	7.87	0.42	0.70	3.31	8.24	62.8%	0.40	7.66	2.32
	4.95	7.51	0.39	0.65	2.92	7.84	59.8%	0.37	6.37	2.18
	5.00	7.14	0.36	0.60	2.56	7.45	56.8%	0.34	5.20	2.04
	5.05	6.77	0.33	0.55	2.21	7.06	53.8%	0.31	4.17	1.89
WL	5.10	6.40	0.29	0.50	1.88	6.67	50.8%	0.28	3.25	1.73
	5.15	6.30	0.25	0.45	1.56	6.52	49.7%	0.24	2.36	1.51
	5.20	6.20	0.20	0.40	1.25	6.38	48.7%	0.20	1.60	1.28
	5.25	6.10	0.15	0.35	0.94	6.24	47.6%	0.15	0.97	1.03
	5.30	6.00	0.11	0.30	0.64	6.10	46.5%	0.10	0.49	0.76
	5.35	4.09	0.09	0.25	0.37	4.16	31.7%	0.09	0.24	0.66
	5.40	2.24	0.10	0.20	0.23	2.28	17.4%	0.10	0.16	0.73
	5.45	1.77	0.07	0.15	0.13	1.80	13.7%	0.07	0.07	0.54
	5.50	1.00	0.05	0.10	0.05	1.02	7.8%	0.05	0.02	0.42
	5.55	0.52	0.03	0.05	0.01	0.53	4.0%	0.03	0.00	0.26
	5.60	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!


CROSS SECTION DATA ANALYSIS
-2.50
-3.00
-3.50
-4.00
-4.50
-5.00
-5.50
-6.00
VERTICAL DEPTH (FT)
RS
G
W
W
LS & G
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
5.00
10.00
15.00
Discharge (cfs)
25.00
30.00
35.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
Velocity - ft/sec
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage - feet
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piceance Creek - Upper

CROSS-SECTION NO.: 2

CROSS-SECTION LOCATION: 200 ft. downstream from Larson #1 Ditch headgate

DATE: 7-7-15 OBSERVERS: R. Smith, B. Logan, B. Epstein

LEGAL DESCRIPTION: ¼ SECTION: NW SECTION: 3 TOWNSHIP: 4 N/S RANGE: 95 E/W PM: 6th

COUNTY: Garfield WATERSHED: White River WATER DIVISION: 6 DOW WATER CODE: 25343

MAP(S): USGS: 135 249550 7300 ft.

USFS: 4402022

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO METER TYPE: FlowMate

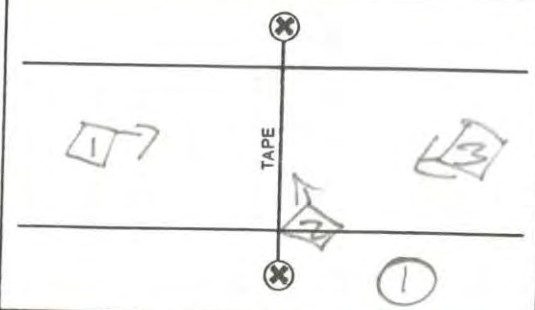
METER NUMBER: DATE RATED: CALIB/SPIN: _____ sec TAPE WEIGHT: surveyed _____ lbs/foot TAPE TENSION: surveyed _____ lbs

CHANNEL BED MATERIAL SIZE RANGE: gravel to 6" 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	7.30/7.30
② WS Upstream	6.2	7.10
③ WS Downstream	6.8	7.45
SLOPE	0.35/15.0 = 0.023	

SKETCH



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

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piceance Creek - Upper	CROSS-SECTION NO.: 2	DATE: 7-7	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 4:30 pm

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0,0		5,70								
G	1,7		6,38								
W	2,2		7,30					0			
	2,4		7,77	,47				,68			
	2,6		7,63	,33				1,11			
	2,8		7,71	,41				1,70			
	3,0		7,75	,45				1,67			
	3,2		7,69	,39				1,61			
	3,4		7,7	,40				1,67			
	3,6		7,72	,42				1,62			
	3,8		7,64	,34				2,00			
	4,0		7,64	,34				2,38			
	4,2		7,72	,42				2,23			
	4,4		7,70	,40				1,91			
	4,6		7,61	,31				2,61			
	4,8		7,62	,32				2,50			
	5,0		7,58	,28				0,91			
	5,2		7,60	,30				1,45			
	5,4		7,56	,26				0,92			
	5,6		7,50	,20				0,13			
	5,8		7,48	,18				0,08			
	6,0		7,41	,11				0			
W	6,2		7,30					0			FTQ = 1,975
	6,4		7,24								
	8,8		6,91								
G	9,1		6,45								
LS	11,0		5,74								
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:	Piceance Creek
XS LOCATION:	200 ft dwnstr fr Larson #1 Ditch hdgt
XS NUMBER:	2
DATE:	7-Jul-15
OBSERVERS:	R. Smith, B. Logan, B. Epstein
1/4 SEC:	NW
SECTION:	3
TWP:	4S
RANGE:	95W
PM:	Sixth
COUNTY:	Garfield
WATERSHED:	White River
DIVISION:	6
DOW CODE:	25343
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE:	0.023

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

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

STREAM NAME: Piceance Creek
XS LOCATION: 200 ft dwnstr fr Larson #1 Ditch hdgt
XS NUMBER: 2

DATA POINTS= 27

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	RS	0.00	5.70			0.00		0.00	0.00	0.0%
1	G	1.70	6.38			0.00		0.00	0.00	0.0%
	W	2.20	7.30	0.00	0.00	0.00		0.00	0.00	0.0%
		2.40	7.77	0.47	0.68	0.51	0.47	0.09	0.06	3.2%
		2.60	7.63	0.33	1.11	0.24	0.33	0.07	0.07	3.7%
		2.80	7.71	0.41	1.70	0.22	0.41	0.08	0.14	7.1%
		3.00	7.75	0.45	1.67	0.20	0.45	0.09	0.15	7.6%
		3.20	7.69	0.39	1.61	0.21	0.39	0.08	0.13	6.4%
		3.40	7.70	0.40	1.67	0.20	0.40	0.08	0.13	6.8%
		3.60	7.72	0.42	1.62	0.20	0.42	0.08	0.14	6.9%
		3.80	7.64	0.34	2.00	0.22	0.34	0.07	0.14	6.9%
		4.00	7.64	0.34	2.38	0.20	0.34	0.07	0.16	8.2%
		4.20	7.72	0.42	2.23	0.22	0.42	0.08	0.19	9.5%
		4.40	7.70	0.40	1.91	0.20	0.40	0.08	0.15	7.7%
		4.60	7.61	0.31	2.61	0.22	0.31	0.06	0.16	8.2%
		4.80	7.62	0.32	2.50	0.20	0.32	0.06	0.16	8.1%
		5.00	7.58	0.28	0.91	0.20	0.28	0.06	0.05	2.6%
		5.20	7.60	0.30	1.45	0.20	0.30	0.06	0.09	4.4%
		5.40	7.56	0.26	0.92	0.20	0.26	0.05	0.05	2.4%
		5.60	7.50	0.20	0.13	0.21	0.20	0.04	0.01	0.3%
		5.80	7.48	0.18	0.08	0.20	0.18	0.04	0.00	0.1%
		6.00	7.41	0.11	0.00	0.21	0.11	0.02	0.00	0.0%
	W	6.20	7.30	0.00	0.00	0.23		0.00	0.00	0.0%
		6.40	7.24			0.00		0.00	0.00	0.0%
		8.80	6.91			0.00		0.00	0.00	0.0%
1	G	9.10	6.45			0.00		0.00	0.00	0.0%
	LS	11.00	5.74			0.00		0.00	0.00	0.0%
	TOTALS ----------					4.49	0.47	1.27	1.98	100.0%
							(Max.)			

Manning's n = 0.0620
Hydraulic Radius= 0.28167218

STREAM NAME: Piceance Creek
XS LOCATION: 200 ft dwnstr fr Larson #1 Ditch hdgt
XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.27	1.27	0.0%
7.05	1.27	2.46	94.2%
7.07	1.27	2.35	85.3%
7.09	1.27	2.24	76.6%
7.11	1.27	2.13	68.2%
7.13	1.27	2.03	60.0%
7.15	1.27	1.93	52.1%
7.17	1.27	1.83	44.4%
7.19	1.27	1.73	37.0%
7.21	1.27	1.64	29.8%
7.23	1.27	1.56	22.9%
7.25	1.27	1.47	16.2%
7.26	1.27	1.43	12.9%
7.27	1.27	1.39	9.6%
7.28	1.27	1.35	6.4%
7.29	1.27	1.31	3.2%
7.30	1.27	1.27	0.0%
7.31	1.27	1.23	-3.2%
7.32	1.27	1.19	-6.3%
7.33	1.27	1.15	-9.4%
7.34	1.27	1.11	-12.5%
7.35	1.27	1.07	-15.6%
7.37	1.27	0.99	-21.7%
7.39	1.27	0.92	-27.7%
7.41	1.27	0.84	-33.7%
7.43	1.27	0.77	-39.6%
7.45	1.27	0.69	-45.3%
7.47	1.27	0.62	-51.0%
7.49	1.27	0.55	-56.5%
7.51	1.27	0.48	-61.8%
7.53	1.27	0.42	-66.9%
7.55	1.27	0.36	-71.9%

WATERLINE AT ZERO
AREA ERROR = 7.300

STREAM NAME: Piceance Creek
XS LOCATION: 200 ft dwnstr fr Larson #1 Ditch hdgt
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	6.45	7.36	0.90	1.32	6.60	8.64	100.0%	0.76	20.00	3.03
	6.45	7.36	0.90	1.32	6.60	8.64	100.0%	0.76	20.00	3.03
	6.50	7.30	0.85	1.27	6.23	8.53	98.7%	0.73	18.35	2.95
	6.55	7.24	0.81	1.22	5.87	8.41	97.3%	0.70	16.75	2.86
	6.60	7.18	0.77	1.17	5.50	8.29	96.0%	0.66	15.21	2.76
	6.65	7.12	0.72	1.12	5.15	8.18	94.6%	0.63	13.73	2.67
	6.70	7.06	0.68	1.07	4.79	8.06	93.3%	0.59	12.31	2.57
	6.75	7.00	0.63	1.02	4.44	7.94	91.9%	0.56	10.95	2.46
	6.80	6.94	0.59	0.97	4.09	7.83	90.6%	0.52	9.65	2.36
	6.85	6.88	0.54	0.92	3.75	7.71	89.2%	0.49	8.41	2.24
	6.90	6.82	0.50	0.87	3.40	7.59	87.9%	0.45	7.24	2.13
	6.95	6.50	0.47	0.82	3.07	7.23	83.7%	0.42	6.30	2.05
	7.00	6.11	0.45	0.77	2.75	6.81	78.8%	0.40	5.47	1.99
	7.05	5.72	0.43	0.72	2.46	6.38	73.9%	0.39	4.73	1.92
	7.10	5.33	0.41	0.67	2.18	5.96	68.9%	0.37	4.06	1.86
	7.15	4.94	0.39	0.62	1.93	5.53	64.0%	0.35	3.46	1.80
	7.20	4.55	0.37	0.57	1.69	5.11	59.1%	0.33	2.93	1.74
	7.25	4.19	0.35	0.52	1.47	4.73	54.7%	0.31	2.45	1.67
WL	7.30	4.00	0.32	0.47	1.27	4.49	52.0%	0.28	1.98	1.56
	7.35	3.89	0.27	0.42	1.07	4.34	50.2%	0.25	1.53	1.43
	7.40	3.78	0.23	0.37	0.88	4.18	48.3%	0.21	1.13	1.28
	7.45	3.62	0.19	0.32	0.69	3.98	46.1%	0.17	0.78	1.13
	7.50	3.31	0.16	0.27	0.52	3.64	42.1%	0.14	0.51	0.99
	7.55	3.13	0.11	0.22	0.36	3.41	39.4%	0.10	0.29	0.80
	7.60	2.57	0.08	0.17	0.21	2.81	32.5%	0.07	0.13	0.64
	7.65	1.83	0.05	0.12	0.10	2.02	23.3%	0.05	0.05	0.48
	7.70	1.02	0.02	0.07	0.02	1.11	12.9%	0.02	0.00	0.25
	7.75	0.04	0.01	0.02	0.00	0.06	0.7%	0.01	0.00	0.13

STREAM NAME: Piceance Creek
XS LOCATION: 200 ft dwnstr fr Larson #1 Ditch hdgt
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)=	1.98	cfs
CALCULATED FLOW (Qc)=	1.98	cfs
(Qm-Qc)/Qm * 100 =	0.0	%
MEASURED WATERLINE (WLm)=	7.30	ft
CALCULATED WATERLINE (WLc)=	7.30	ft
(WLm-WLc)/WLm * 100 =	0.0	%
MAX MEASURED DEPTH (Dm)=	0.47	ft
MAX CALCULATED DEPTH (Dc)=	0.47	ft
(Dm-Dc)/Dm * 100	0.0	%
MEAN VELOCITY=	1.56	ft/sec
MANNING'S N=	0.062	
SLOPE=	0.023	ft/ft
.4 * Qm =	0.8	cfs
2.5 * Qm=	4.9	cfs

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

FLOW (CFS)	PERIOD
___________	________
___________	________
___________	________
___________	________

RATIONALE FOR RECOMMENDATION:
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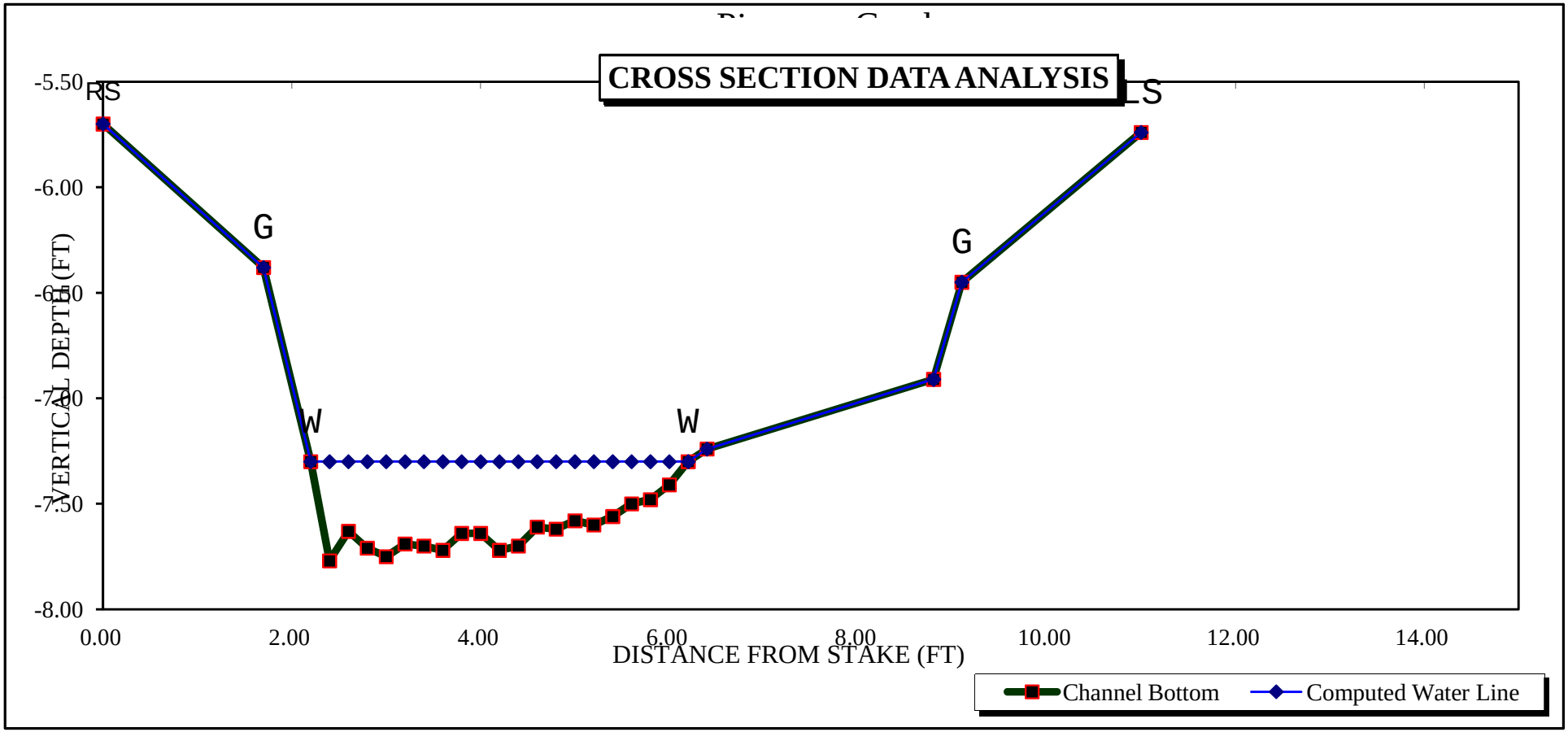
RECOMMENDATION BY: ……………………………………………… AGENCY……………………………………………… DATE:………………………………

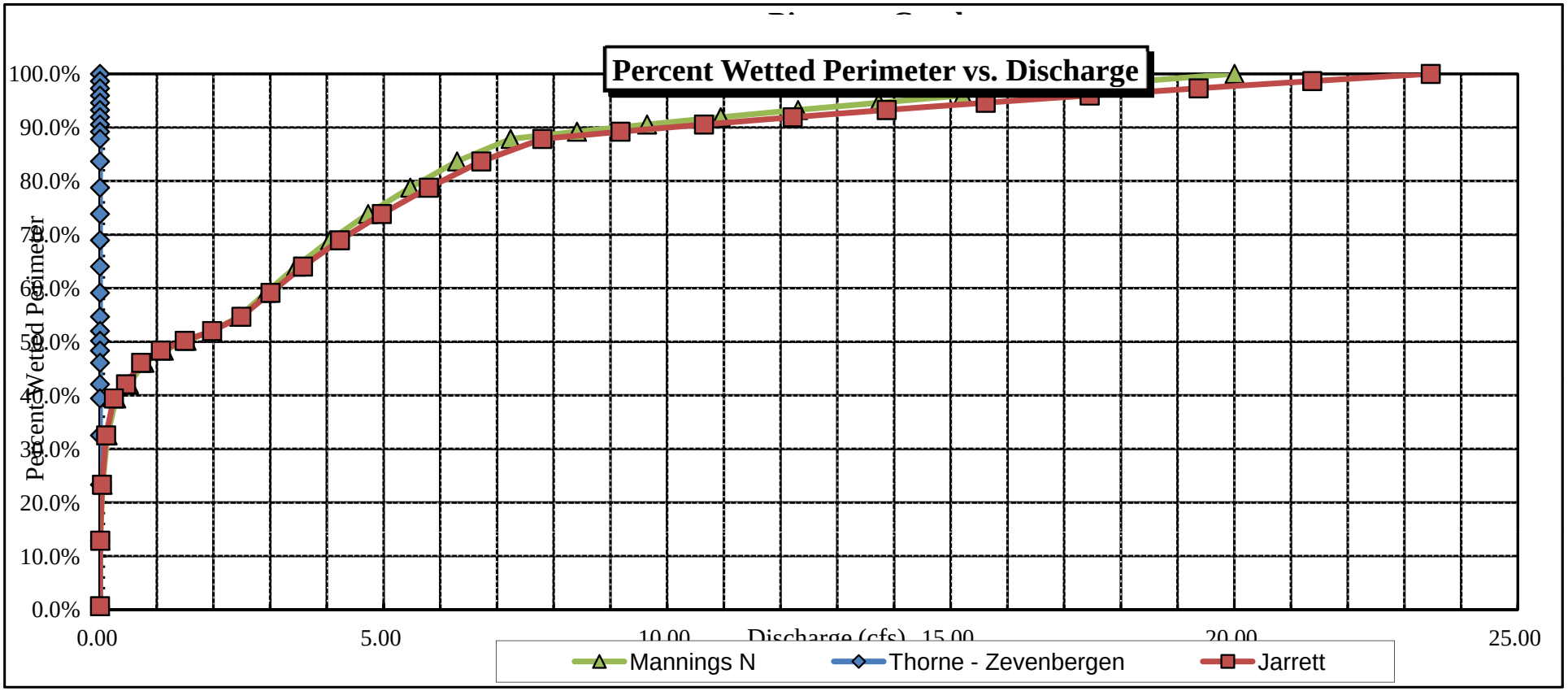
CWCB REVIEW BY: …………………………………………………………………………………………………… DATE:………………………………

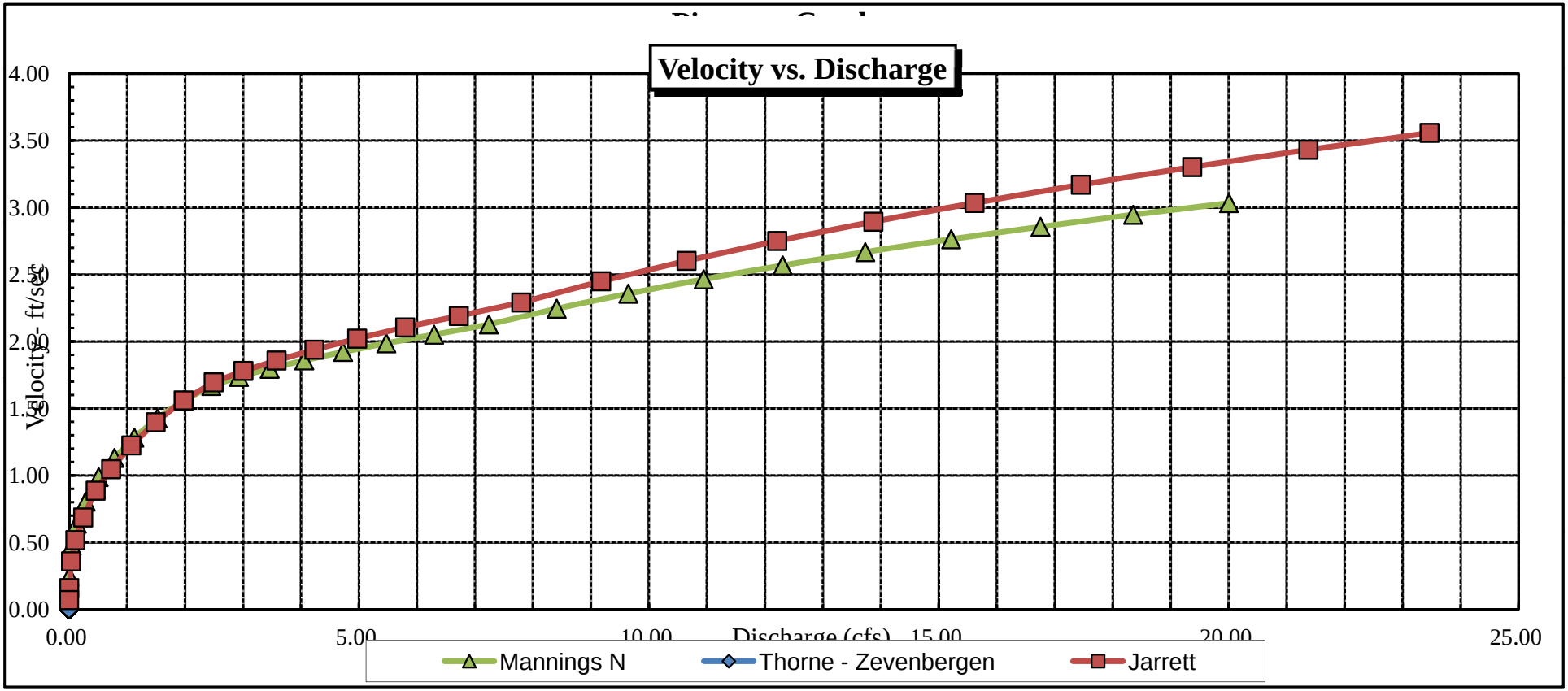
STREAM NAME: Piceance Creek
XS LOCATION: 200 ft dwnstr fr Larson #1 Ditch hdgt
XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

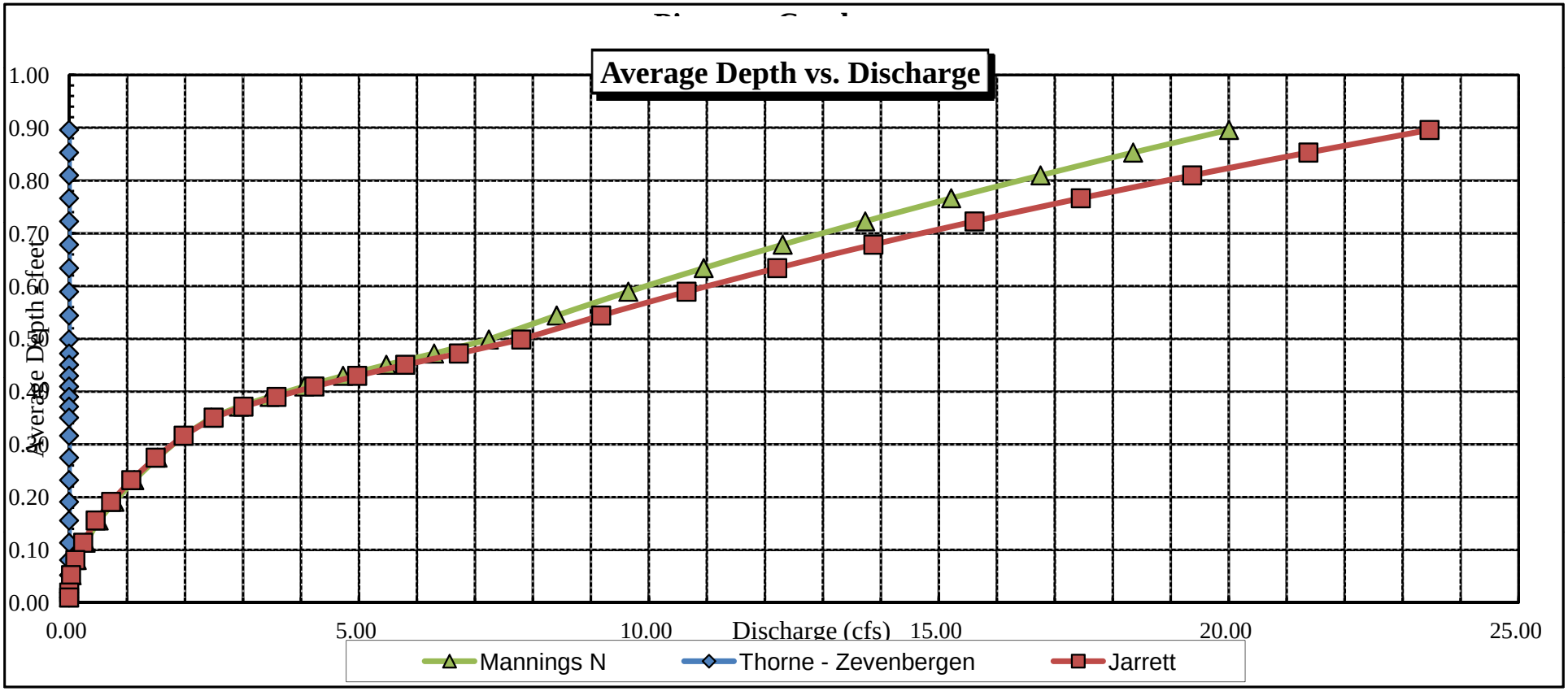
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

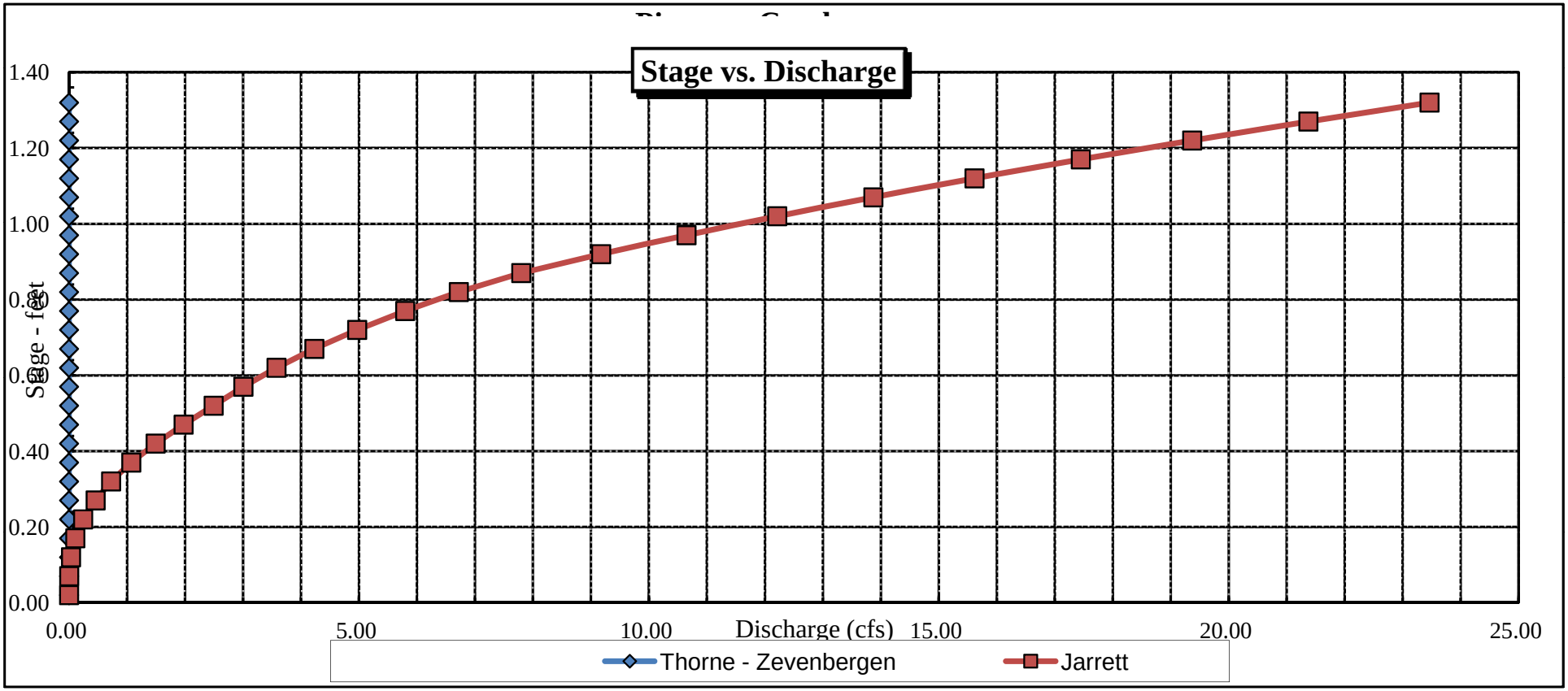
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.45	7.36	0.90	1.32	6.60	8.64	100.0%	0.76	23.46	3.56
	6.45	7.36	0.90	1.32	6.60	8.64	100.0%	0.76	23.46	3.56
	6.50	7.30	0.85	1.27	6.23	8.53	98.7%	0.73	21.37	3.43
	6.55	7.24	0.81	1.22	5.87	8.41	97.3%	0.70	19.37	3.30
	6.60	7.18	0.77	1.17	5.50	8.29	96.0%	0.66	17.45	3.17
	6.65	7.12	0.72	1.12	5.15	8.18	94.6%	0.63	15.62	3.03
	6.70	7.06	0.68	1.07	4.79	8.06	93.3%	0.59	13.87	2.89
	6.75	7.00	0.63	1.02	4.44	7.94	91.9%	0.56	12.21	2.75
	6.80	6.94	0.59	0.97	4.09	7.83	90.6%	0.52	10.65	2.60
	6.85	6.88	0.54	0.92	3.75	7.71	89.2%	0.49	9.18	2.45
	6.90	6.82	0.50	0.87	3.40	7.59	87.9%	0.45	7.80	2.29
	6.95	6.50	0.47	0.82	3.07	7.23	83.7%	0.42	6.72	2.19
	7.00	6.11	0.45	0.77	2.75	6.81	78.8%	0.40	5.80	2.11
	7.05	5.72	0.43	0.72	2.46	6.38	73.9%	0.39	4.97	2.02
	7.10	5.33	0.41	0.67	2.18	5.96	68.9%	0.37	4.23	1.94
	7.15	4.94	0.39	0.62	1.93	5.53	64.0%	0.35	3.58	1.86
	7.20	4.55	0.37	0.57	1.69	5.11	59.1%	0.33	3.01	1.78
	7.25	4.19	0.35	0.52	1.47	4.73	54.7%	0.31	2.49	1.69
WL	7.30	4.00	0.32	0.47	1.27	4.49	52.0%	0.28	1.98	1.56
	7.35	3.89	0.27	0.42	1.07	4.34	50.2%	0.25	1.49	1.40
	7.40	3.78	0.23	0.37	0.88	4.18	48.3%	0.21	1.07	1.22
	7.45	3.62	0.19	0.32	0.69	3.98	46.1%	0.17	0.72	1.05
	7.50	3.31	0.16	0.27	0.52	3.64	42.1%	0.14	0.46	0.89
	7.55	3.13	0.11	0.22	0.36	3.41	39.4%	0.10	0.24	0.69
	7.60	2.57	0.08	0.17	0.21	2.81	32.5%	0.07	0.11	0.52
	7.65	1.83	0.05	0.12	0.10	2.02	23.3%	0.05	0.03	0.36
	7.70	1.02	0.02	0.07	0.02	1.11	12.9%	0.02	0.00	0.16
	7.75	0.04	0.01	0.02	0.00	0.06	0.7%	0.01	0.00	0.07


CROSS SECTION DATA ANALYSIS
RS
LS
G
G
W
W
-5.50
-6.00
-6.50
-7.00
-7.50
-8.00
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
5.00
10.00
15.00
20.00
25.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
Velocity - ft/sec
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
5.00
10.00
Discharge (cfs)
15.00
20.00
25.00
Mannings N
Thorne - Zevenbergen
Jarrett

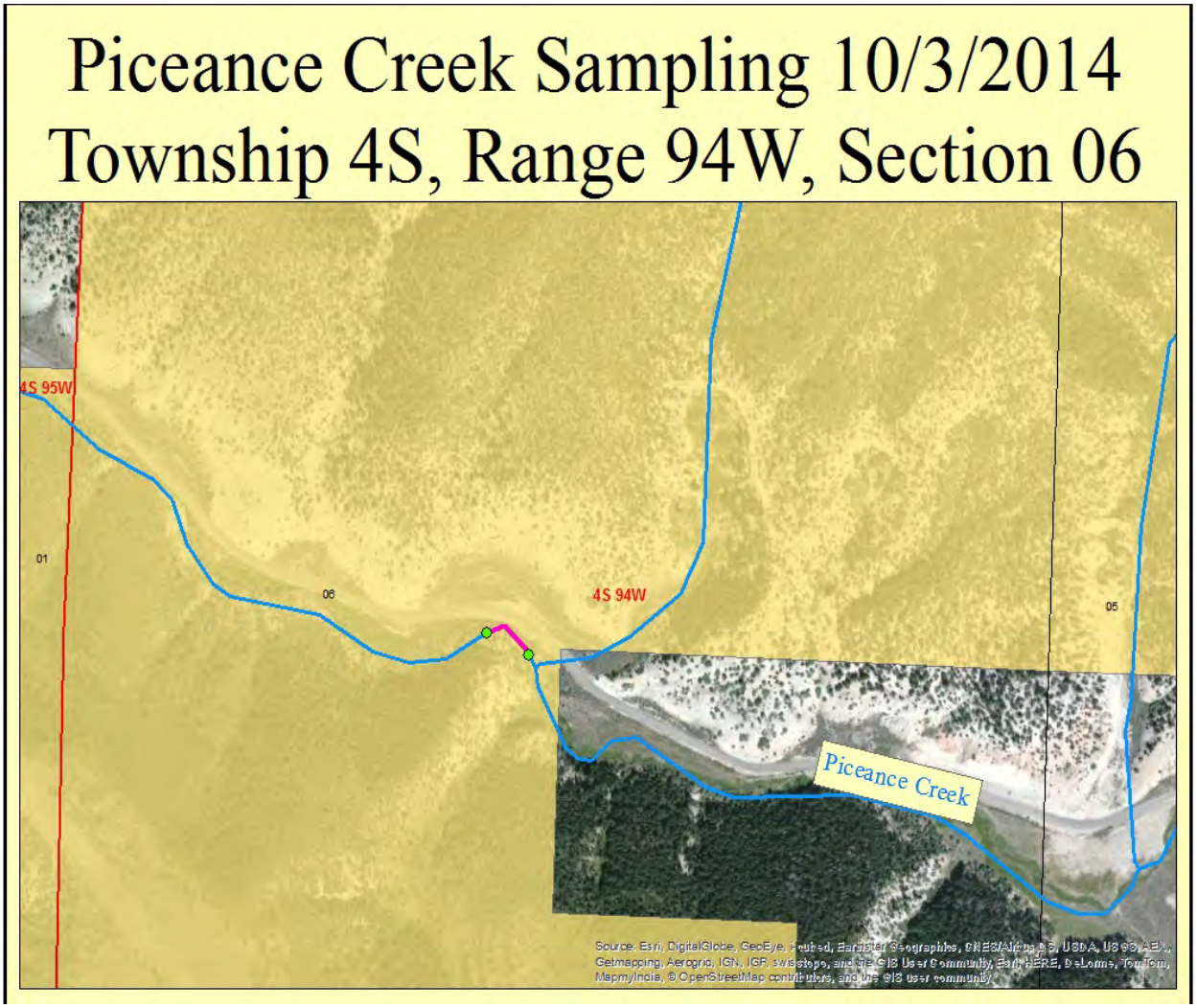

Average Depth vs. Discharge
Average Depth (feet)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
5.00
10.00
Discharge (cfs)
15.00
20.00
25.00
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage - feet
0.00
5.00
10.00
Discharge (cfs)
15.00
20.00
25.00
Thorne - Zevenbergen
Jarrett

White River Field Office Stream Surveys
October 2014

Piceance Creek (Upper Site) - Water Code: 25343

Piceance Creek, located on BLM lands managed by the White River Field Office, was sampled on October 3, 2014. Piceance Creek is tributary to the White River. A two-pass removal method was used to determine species presence as well as estimate population size. The stream was sampled using one backpack electroshocker. Mountain sucker (*Catostomas platyrhynchus*, MOS) and speckled dace (*Rhinichthys osculus*, SPD) were the only species seen or collected. Personnel present included Lisa Belmonte, Heather Stewart, Tom Fresques, and Kristen Doyle, BLM.



Mountain sucker

Piceance Creek within the sample reach

STREAM SURVEY FISH SAMPLING FORM 2014									
WATER: Piceance Creek				**DATE: 10/3/14**			**GEAR: 1 BPE**		
Crew: Belmonte, Stewart, Fresques, Doyle					**Location: Adjacent to CR-5 above Cow Creek Confluence**				
#	**Pass**	**Species**	**Length**	**Weight**	**#**	**Pass**	**Species**	**Length**	**Weight**
1	1	SPD	79	4.8	76	1	MOS	96	9.1
2	1	SPD	65	1.6	77	1	SPD	27	
3	1	SPD	69	1.8	78	1	SPD	94	10.8
4	1	SPD	69	1.9	79	1	MOS	117	15.3
5	1	SPD	71	1.9	80	1	MOS	97	10.4
6	1	SPD	92	5.2	81	1	MOS	107	13.2
7	1	MOS	134	18.2	82	1	SPD	81	6.7
8	1	SPD	104	12.4	83	1	MOS	114	13.2
9	1	MOS	111	12.7	84	1	MOS	126	19.5
10	1	SPD	77	3.7	85	1	MOS	107	11.8
11	1	MOS	105	11.7	86	1	SPD	71	6.1
12	1	MOS	116	15.6	87	1	MOS	99	11.2
13	1	MOS	104	11.1	88	1	MOS	107	13.2
14	1	MOS	149	31.5	89	1	MOS	89	7.1
15	1	MOS	143	28.7	90	1	MOS	87	10.1
16	1	SPD	87	7.1	91	1	SPD	71	5.3
17	1	MOS	112	15.4	92	1	SPD	63	2.9
18	1	SPD	104	12.4	93	1	SPD	93	8.8
19	1	SPD	72	3.8	94	1	SPD	72	3.1
20	1	MOS	124	17.2	95	1	SPD	77	3.7
21	1	MOS	129	21.7	96	1	MOS	107	13
22	1	MOS	109	13.7	97	1	MOS	85	6.4
23	1	MOS	106	11.5	98	1	MOS	92	8.3
24	1	MOS	113	13.2	99	1	SPD	67	5.5
25	1	MOS	116	14.2	100	1	MOS	92	12
26	1	MOS	136	25.4	101	1	MOS	90	11.8
27	1	MOS	122	16.7	102	1	MOS	111	12.9
28	1	MOS	109	12.7	103	1	MOS	102	9.6
29	1	MOS	101	12.7	104	1	MOS	93	7.5
30	1	MOS	115	13.5	105	1	MOS	82	4.2
31	1	SPD	59	1.9	106	1	MOS	86	5.4
32	1	MOS	99	10.8	107	1	MOS	101	10.2
33	1	MOS	117	15.6	108	1	MOS	99	10.1
34	1	MOS	138	26.2	109	1	MOS	59	3.1
35	1	MOS	112	16.3	110	1	MOS	86	8.2
36	1	MOS	95	8	111	1	MOS	97	10.9
37	1	MOS	95	8.2	112	1	MOS	31	-
38	1	MOS	101	9.7	113	1	MOS	87	6.7
39	1	MOS	103	10.2	114	1	MOS	93	7.4
40	1	MOS	116	14.5	115	1	MOS	95	10

41	1	MOS	109	11.7	116	1	MOS	39	-
42	1	MOS	115	15.9	117	1	MOS	33	-
43	1	MOS	106	11.5	118	1	MOS	39	-
44	1	MOS	113	15.1	119	2	MOS	143	26.1
45	1	MOS	97	8.1	120	2	MOS	129	20.2
46	1	MOS	83	4.9	121	2	MOS	118	16.7
47	1	SPD	86	7.7	122	2	MOS	122	18.6
48	1	MOS	124	20.8	123	2	MOS	101	9.5
49	1	MOS	89	7.8	124	2	MOS	98	8.3
50	1	MOS	107	12.4	125	2	MOS	90	6.2
51	1	MOS	105	10.2	126	2	MOS	87	6.2
52	1	MOS	109	11.1	127	2	MOS	98	8.9
53	1	MOS	115	17.1	128	2	MOS	102	10.1
54	1	MOS	99	13.1	129	2	MOS	97	9.7
55	1	SPD	107	16.1	130	2	MOS	99	9.1
56	1	MOS	107	16	131	2	MOS	94	7.6
57	1	SPD	73	8	132	2	MOS	97	9.7
58	1	MOS	93	7.4	133	2	MOS	99	9.1
59	1	MOS	92	7.4	134	2	MOS	109	13.2
60	1	MOS	87	6.6	135	2	MOS	112	13.2
61	1	SPD	64	2.4	136	2	MOS	97	8.8
62	1	SPD	95	6.8	137	2	MOS	96	8.1
63	1	SPD	50	1.5	138	2	MOS	92	7.8
64	1	MOS	93	10	139	2	MOS	93	8.4
65	1	MOS	129	18.5	140	2	MOS	93	8.6
66	1	MOS	90	7.1	141				
67	1	MOS	95	8.7	142				
68	1	SPD	71	8.5	143				
69	1	SPD	69	2.5	144				
70	1	MOS	80	6.2	145				
71	1	MOS	98	9	146				
72	1	MOS	99	10.7	147				
73	1	SPD	83	9.8	148				
74	1	SPD	80	7.9	149				
75	1	MS	112	13.6	150				

GPS Coordinates:

H2O Temp: 45.3°F	**Reach Length**: 300’	**Stream**	1.
Conductivity: 923µs	**Shocker Settings**: 135 volts	**Widths**:	2.
Habitat (Riparian): Coyote willow – dominant. Sedge, Geyer’s willow, Baltic rush, canary reed grass (dominant), some Canada thistle			3.
			4.
			5.
			Avg: 3’

Habitat (Stream): Freshwater shrimp, freshwater snails, dragonfly larvae, good mix of riffles and runs, two pools about 3’ deep.

Discussion:
This site was sampled to monitor the known mountain sucker population. Habitat at the site was in good condition with a good mix of small riffles, larger runs, and deeper pools. Riparian vegetation was dense and robust and completely shaded the stream in most areas. Riparian vegetation consisted primarily of coyote willow, Geyer's willow, sedge, rush, canary reed grass, and some Canada thistle.

A two-pass population estimate was completed at the site. Based on the sample, the presumed adult population (fish $\geq$ to 100 mm) is 55 + or - 4 fish at the 95% confidence interval within the 300 foot sample reach, and extrapolated is 976 + or - 65 fish per mile at the 95% confidence interval. This is a robust population but probably somewhat misleading with regard to exptrapolation at the fish per mile scale as habitat both upstream and downstream for some distance on private lands is degraded with poor vegetative stream cover, overwidened channel, reduced depth, and reduced pool habitat.

Recommendations:

- Periodically monitor aquatic species and stream and riparian habitats


13293