

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 instream flow water right on East Fork Little Cimarron River, located in Water Division 4.

Location and Land Status. East Fork Little Cimarron River originates near the north boundary of the Uncompahgre Wilderness, approximately six miles east of Silver Jack Reservoir. This reach begins at the headwaters of the creek and extends downstream to the confluence with the Little Cimarron River, a distance of approximately 6.4 stream miles. The BLM manages approximately 1.33 miles of this reach, the U.S. Forest Service manages approximately 2.9 miles, and approximately 2.21 miles are in private ownership.

Biological Summary. East Fork Little Cimarron River is a cold-water, high gradient stream. It flows through a canyon with a valley floor averaging one-eighth mile in width. In the upper four miles, the stream flows through several meadows with alluvial deposits. In the lower two miles, the flows through a narrow valley and is confined by bedrock. The stream generally has medium to large-sized substrate, consisting of gravels, small cobbles, and small boulders. The stream has a good mix of pools, small riffles, and runs.

Fisheries surveys have revealed a self-sustaining population of brook trout. Intensive macro-invertebrate surveys have not been conducted, but spot samples have revealed various species of mayfly, caddisfly, and stonefly.

In open meadow areas, the riparian community is generally comprised of willows, grasses, and sedges. In more confined reaches, the riparian community is generally comprised of blue spruce, aspen, willow species, and alder. The riparian community is in very good condition, and provides shading and cover for fish habitat.

R2Cross Analysis. The BLM collected the following R2Cross data from East Fork Little Cimarron River:

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)
07/28/2015 #1	0.45 cfs	11.50 feet	0.59 cfs	Out of range
07/28/2015 #2	0.49 cfs	11.35 feet	0.82 cfs	Out of range
07/12/2016 #1	0.64 cfs	11.30 feet	1.13 cfs	Out of range
07/12/2016 #2	0.58 cfs	10.45 feet	0.65 cfs	Out of range

06/28/2017 #1	1.76 cfs	23.59 feet	Out of range	2.40 cfs
06/28/2017 #2	2.21 cfs	12.50 feet	1.63 cfs	2.84 cfs
		Averages:	0.96 cfs	2.62 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.

2.60 cubic feet per second is recommended during the snowmelt runoff period from May 1 to June 30. This recommendation is driven by the average 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.

1.0 cubic feet per second is recommended from July 1 to April 30. This recommendation is driven by the depth and wetted perimeter criteria. As mentioned above, this creek is narrow and has very limited physical habitat. This flow rate will allow passage between pools for full usage of the limited habitat. 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 recommends relying upon Streamstats for water availability analysis because this stream has not historically been gaged. BLM does not recommend relying upon stream gages located along the Cimarron River. The data collected by those gages is heavily influenced by reservoir releases, irrigation diversions, and irrigation returns flows. These gages would not accurately reflect the hydrology of the East Fork Little Cimarron River watershed, which has not been developed for agricultural purposes.

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

Relationship to Land Management Plans. The BLM land use plan calls for managing this creek to support fishery, riparian, and wildlife values and to continue meeting land health standards. 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: Elijah Waters, Gunnison Field Office
Andrew Breibart, Gunnison Field Office
Southwest District Manager

BLM Gunnison Field Office Stream Surveys

June 2017

East Fork Little Cimarron River – Water Code 44892

Introduction:

The East Fork of the Little Cimarron River is a small mountain stream located to the west of Gunnison. It is a tributary to the Little Cimarron River, which is a part of the Gunnison River watershed. The river itself is mostly on private and the only access is by a private road that ends at a private cabin (figures 1 and 2). Survey records for this stream are unknown.

Methods:

The stream was surveyed using one backpack shocker and one netter. Only a presence/absence survey was performed in conjunction with a survey completed by hydrologists to gain instream flows on BLM for the Colorado Waterboard. The survey reach was 475 ft in length. Personnel present for the survey was Russ Japuntich Fish Biologist and Josh Ryan Fisheries Technician.

Analysis:

A total of 35 brook trout (*Salvelinus fontinalis*) were captured during the survey (table 1). Brook trout lengths ranged from 83-220 mm and weights ranged from 3-114g (figures 3 and 4).

Discussion:

Efficiency was good, with several fish captured in a short stretch. The stream was narrow with some decent pool habitat and undercut banks. The fish seemed fairly healthy and proportionately sized for the stream. An awesome stream that could be a potential candidate for cutthroat reintroduction.

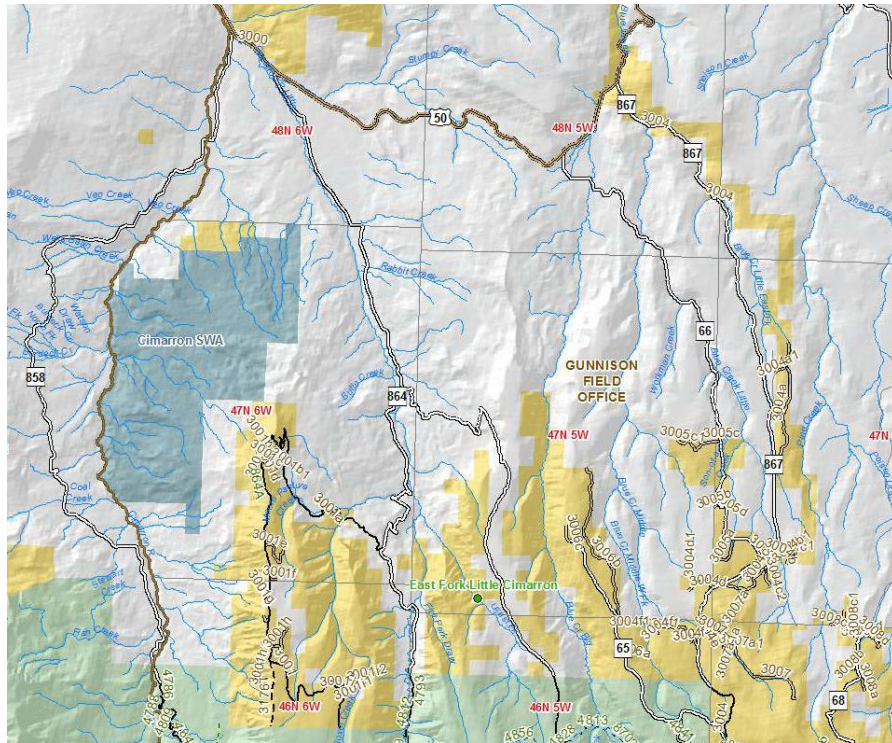


Figure 1. Mapped location of the survey site on the East Fork of the Little Cimarron.

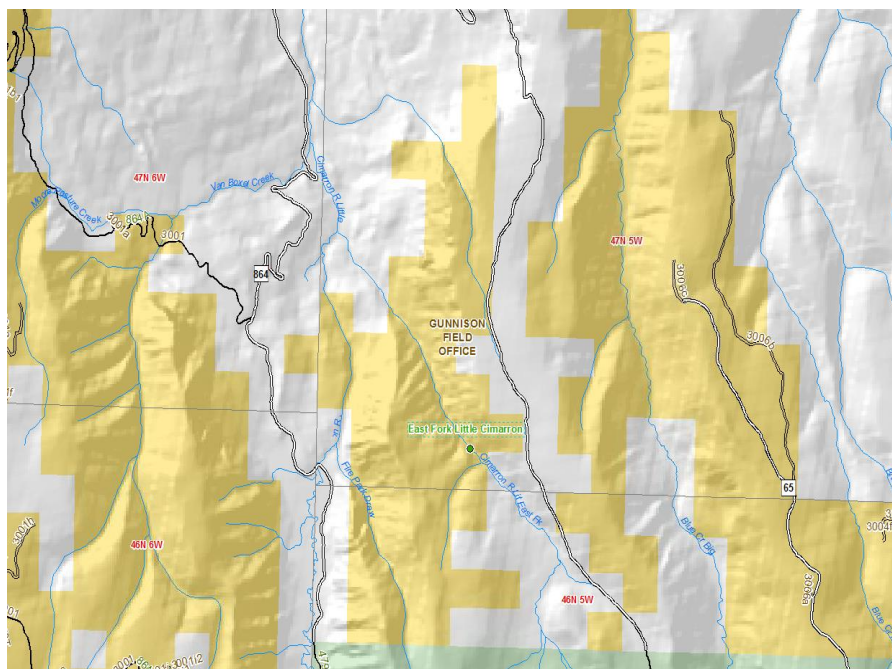


Figure 2. Zoomed in mapped location of the survey location.

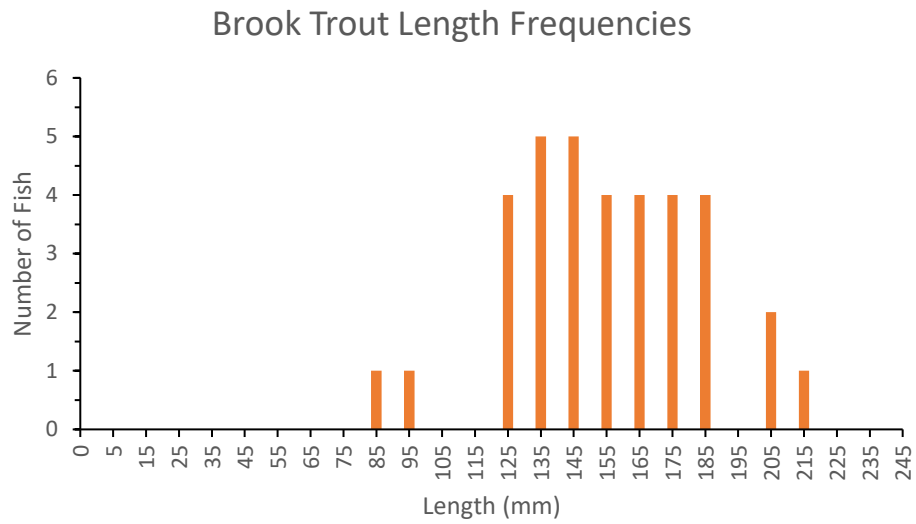


Figure 3. Length frequencies for brook trout.

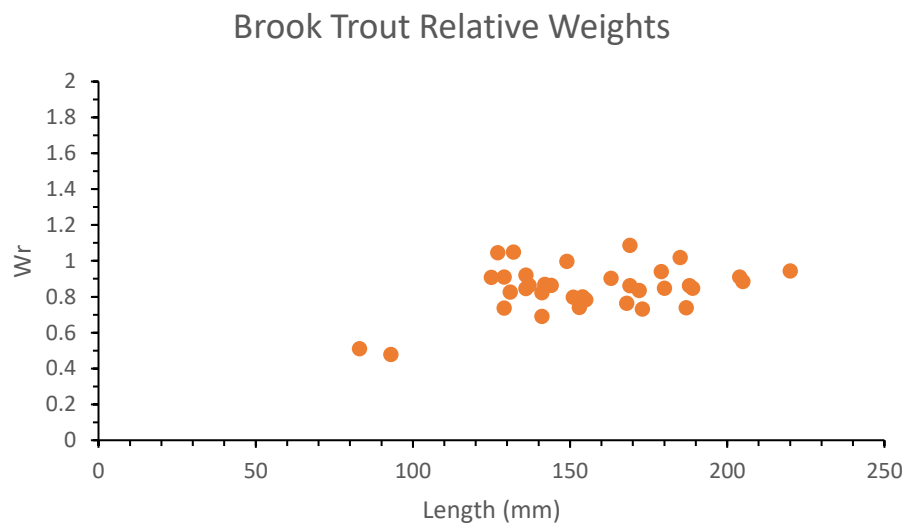


Figure 4. Relative weights for brook trout.

Table 1. Datasheet showing species, length (mm), and weight (g).

#	Species	Length (mm)	Weight (g)	#	Species	Length (mm)	Weight (g)
1	BRK	149	36	19	BRK	83	3
2	BRK	204	87	20	BRK	141	21
3	BRK	185	72	21	BRK	173	42
4	BRK	169	58	22	BRK	131	20
5	BRK	155	32	23	BRK	144	28
6	BRK	93	4	24	BRK	179	60
7	BRK	189	64	25	BRK	127	23
8	BRK	163	43	26	BRK	172	47
9	BRK	188	64	27	BRK	137	24
10	BRK	205	86	28	BRK	180	55
11	BRK	220	114	29	BRK	136	25
12	BRK	153	29	30	BRK	129	21
13	BRK	125	19	31	BRK	129	17
14	BRK	187	54	32	BRK	141	25
15	BRK	151	30	33	BRK	132	26
16	BRK	142	27	34	BRK	136	23
17	BRK	169	46	35	BRK	154	32
18	BRK	168	40				



Photo Left: Reach start.



Photo Right: Reach end.



Photo Left: Narrow stretch of the creek.
reach.

Photo Right: Decent pool in the middle of the



Photos of brook trout captured during the survey.



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>East Fork Little Cimarron River</u>		CROSS-SECTION NO.: <u>1</u>
CROSS-SECTION LOCATION: <u>At BLN-private boundary</u>		
DATE: <u>6-28-17</u>	OBSERVERS: <u>R. Smith, A. Breitbart</u>	
LEGAL DESCRIPTION:	% SECTION: <u>SW</u>	SECTION: <u>33</u>
TOWNSHIP: <u>47 N/S</u>	RANGE: <u>5 E/W</u>	PM: <u>NM</u>
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Gunnison</u>	WATER DIVISION: <u>4</u>
DOW WATER CODE: <u>44892</u>		
USGS: <u>UTM Zone 13S 286542</u>		
USFS: <u>4239043</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: <u>surveyed</u> lbs/foot	TAPE TENSION: <u>surveyed</u> lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 1-foot boulder</u>	PHOTOGRAPHS TAKEN: <u>0</u> YES/NO	NUMBER OF PHOTOGRAPHS: <u>3</u>		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(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>20.0</u>	<u>7.35/7.35</u>
(2) WS Upstream	<u>14.0</u>	<u>7.25</u>
(3) WS Downstream	<u>2.9</u>	<u>7.38</u>
SLOPE	<u>0.13/16.9' = .0076</u>	

SKETCH

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

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: <u>YES/NO</u>	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
<u>see separate survey results</u>																	
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	

COMMENTS

<u>Cond = 55</u>
<u>Temp = 15°C</u>

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

LOCATION INFORMATION

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

DATE: 28-Jun-17
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 33
TWP: 47N
RANGE: 5W
PM: N.M.

COUNTY: Gunnison
WATERSHED: Gunnison
DIVISION: 4
DOW CODE: 44892

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: 0.0076

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 1

DATA POINTS= 34

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
1 RS & G	0.00	6.02			0.00		0.00	0.00	0.0%
	3.00	6.84			0.00		0.00	0.00	0.0%
	5.00	7.38			0.00		0.00	0.00	0.0%
RW	9.50	7.35	0.00	0.00	0.00		0.00	0.00	0.0%
	11.60	7.59	0.24	0.27	2.11	0.24	0.29	0.08	4.4%
	11.90	7.53	0.18	0.47	0.31	0.18	0.05	0.03	1.4%
	12.20	7.57	0.22	0.30	0.30	0.22	0.07	0.02	1.1%
	12.50	7.59	0.24	0.09	0.30	0.24	0.07	0.01	0.4%
	12.80	7.61	0.26	0.04	0.30	0.26	0.08	0.00	0.2%
	13.10	7.62	0.27	0.03	0.30	0.27	0.08	0.00	0.1%
	13.40	7.52	0.17	0.28	0.32	0.17	0.05	0.01	0.8%
	13.70	7.54	0.19	0.33	0.30	0.19	0.06	0.02	1.1%
	14.00	7.70	0.35	0.56	0.34	0.35	0.11	0.06	3.3%
	14.30	7.69	0.34	0.51	0.30	0.34	0.10	0.05	3.0%
	14.60	7.71	0.36	0.31	0.30	0.36	0.11	0.03	1.9%
	14.90	7.49	0.14	1.03	0.37	0.14	0.04	0.04	2.5%
	15.20	7.49	0.14	1.16	0.30	0.14	0.04	0.05	2.8%
	15.50	7.83	0.48	0.75	0.45	0.48	0.14	0.11	6.1%
	15.80	7.83	0.48	0.65	0.30	0.48	0.14	0.09	5.3%
	16.10	7.82	0.47	1.14	0.30	0.47	0.14	0.16	9.1%
	16.40	7.72	0.37	1.36	0.32	0.37	0.11	0.15	8.6%
	16.70	7.78	0.43	1.02	0.31	0.43	0.13	0.13	7.5%
	17.00	7.73	0.38	1.50	0.30	0.38	0.11	0.17	9.7%
	17.30	7.56	0.21	1.12	0.34	0.21	0.06	0.07	4.0%
	17.60	7.57	0.22	1.43	0.30	0.22	0.08	0.11	6.2%
	18.00	7.68	0.33	1.44	0.41	0.33	0.12	0.17	9.4%
	18.30	7.83	0.48	0.05	0.34	0.48	0.14	0.01	0.4%
	18.60	7.67	0.32	0.43	0.34	0.32	0.10	0.04	2.3%
	18.90	7.61	0.26	0.46	0.31	0.26	0.12	0.05	3.1%
	19.50	7.58	0.23	0.74	0.60	0.23	0.13	0.09	5.3%
LW	20.00	7.35	0.00	0.00	0.55		0.00	0.00	0.0%
	22.00	7.02			0.00		0.00	0.00	0.0%
1 G	23.70	6.05			0.00		0.00	0.00	0.0%
LS	24.70	5.60			0.00		0.00	0.00	0.0%

TOTALS -----

11.03	0.48	2.67	1.76	100.0%
(Max.)				

Manning's n = 0.0761
 Hydraulic Radius= 0.24197974

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.67	2.74	2.6%
7.10	2.67	6.82	155.6%
7.12	2.67	6.47	142.5%
7.14	2.67	6.13	129.6%
7.16	2.67	5.78	116.8%
7.18	2.67	5.45	104.2%
7.20	2.67	5.11	91.7%
7.22	2.67	4.78	79.3%
7.24	2.67	4.46	67.1%
7.26	2.67	4.14	55.0%
7.28	2.67	3.82	43.1%
7.30	2.67	3.50	31.4%
7.31	2.67	3.35	25.5%
7.32	2.67	3.19	19.7%
7.33	2.67	3.04	14.0%
7.34	2.67	2.89	8.3%
7.35	2.67	2.74	2.6%
7.36	2.67	2.59	-2.8%
7.37	2.67	2.47	-7.5%
7.38	2.67	2.36	-11.6%
7.39	2.67	2.26	-15.4%
7.40	2.67	2.16	-19.2%
7.42	2.67	1.96	-26.5%
7.44	2.67	1.77	-33.8%
7.46	2.67	1.58	-40.8%
7.48	2.67	1.40	-47.7%
7.50	2.67	1.22	-54.3%
7.52	2.67	1.05	-60.6%
7.54	2.67	0.89	-66.6%
7.56	2.67	0.75	-72.0%
7.58	2.67	0.62	-76.7%
7.60	2.67	0.52	-80.7%

WATERLINE AT ZERO

AREA ERROR = 7.355

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.05	23.59	1.21	1.78	28.59	24.58	100.0%	1.16	53.82	1.88
	6.35	21.94	0.99	1.48	21.65	22.81	92.8%	0.95	35.59	1.64
	6.40	21.67	0.95	1.43	20.56	22.52	91.6%	0.91	32.94	1.60
	6.45	21.40	0.91	1.38	19.48	22.23	90.4%	0.88	30.38	1.56
	6.50	21.13	0.87	1.33	18.42	21.94	89.2%	0.84	27.91	1.51
	6.55	20.86	0.83	1.28	17.37	21.64	88.1%	0.80	25.53	1.47
	6.60	20.59	0.79	1.23	16.34	21.35	86.9%	0.76	23.25	1.42
	6.65	20.32	0.75	1.18	15.31	21.06	85.7%	0.73	21.07	1.38
	6.70	20.05	0.71	1.13	14.30	20.77	84.5%	0.69	18.98	1.33
	6.75	19.78	0.67	1.08	13.31	20.48	83.3%	0.65	16.99	1.28
	6.80	19.51	0.63	1.03	12.33	20.19	82.2%	0.61	15.10	1.22
	6.85	19.23	0.59	0.98	11.36	19.90	81.0%	0.57	13.30	1.17
	6.90	18.96	0.55	0.93	10.40	19.61	79.8%	0.53	11.60	1.12
	6.95	18.69	0.51	0.88	9.46	19.32	78.6%	0.49	10.01	1.06
	7.00	18.42	0.46	0.83	8.53	19.02	77.4%	0.45	8.51	1.00
	7.05	17.99	0.42	0.78	7.62	18.59	75.6%	0.41	7.16	0.94
	7.10	17.50	0.38	0.73	6.74	18.09	73.6%	0.37	5.93	0.88
	7.15	17.02	0.35	0.68	5.87	17.59	71.6%	0.33	4.81	0.82
	7.20	16.53	0.30	0.63	5.03	17.09	69.5%	0.29	3.79	0.75
	7.25	16.04	0.26	0.58	4.22	16.59	67.5%	0.25	2.88	0.68
	7.30	15.55	0.22	0.53	3.43	16.09	65.5%	0.21	2.08	0.61
WL	7.35	14.31	0.19	0.48	2.67	14.84	60.4%	0.18	1.44	0.54
	7.40	9.90	0.21	0.43	2.11	10.41	42.4%	0.20	1.24	0.59
	7.45	9.35	0.17	0.38	1.63	9.85	40.1%	0.17	0.83	0.51
	7.50	8.48	0.14	0.33	1.18	8.95	36.4%	0.13	0.52	0.44
	7.55	7.07	0.11	0.28	0.78	7.48	30.4%	0.10	0.30	0.38
	7.60	4.54	0.11	0.23	0.49	4.86	19.8%	0.10	0.18	0.37
	7.65	3.31	0.09	0.18	0.31	3.55	14.4%	0.09	0.10	0.33
	7.70	2.22	0.07	0.13	0.16	2.38	9.7%	0.07	0.04	0.28
	7.75	1.43	0.05	0.08	0.07	1.52	6.2%	0.04	0.01	0.21
	7.80	0.77	0.02	0.03	0.02	0.79	3.2%	0.02	0.00	0.12

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	1.76 cfs
CALCULATED FLOW (Qc)=	1.44 cfs
(Qm-Qc)/Qm * 100 =	18.1 %
MEASURED WATERLINE (WLm)=	7.35 ft
CALCULATED WATERLINE (WLc)=	7.35 ft
(WLm-WLc)/WLm * 100 =	-0.1 %
MAX MEASURED DEPTH (Dm)=	0.48 ft
MAX CALCULATED DEPTH (Dc)=	0.48 ft
(Dm-Dc)/Dm * 100	1.0 %
MEAN VELOCITY=	0.54 ft/sec
MANNING'S N=	0.076
SLOPE=	0.0076 ft/ft
.4 * Qm =	0.7 cfs
2.5 * Qm=	4.4 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

[illegible]

RECOMMENDATION BY: AGENCY DATE:

CWCB REVIEW BY: DATE:

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 1

Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

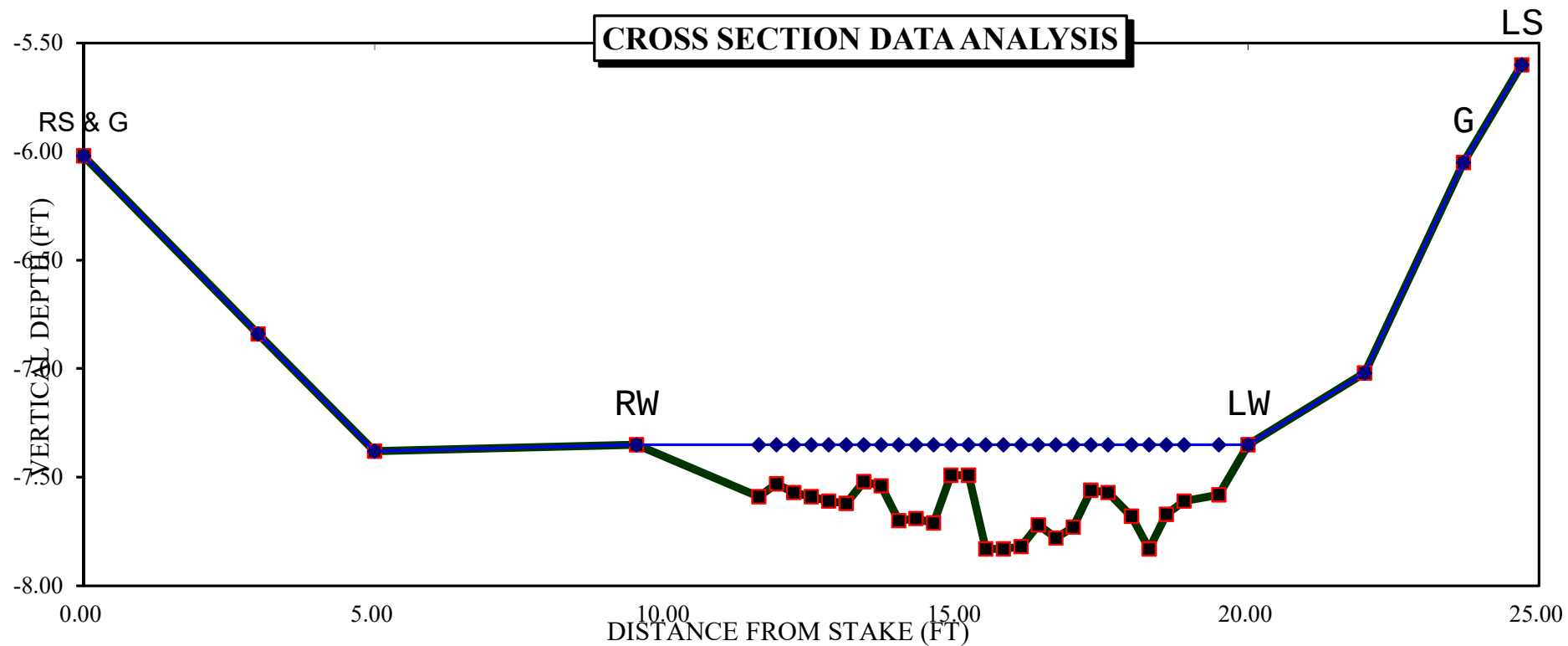
STAGING TABLE

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

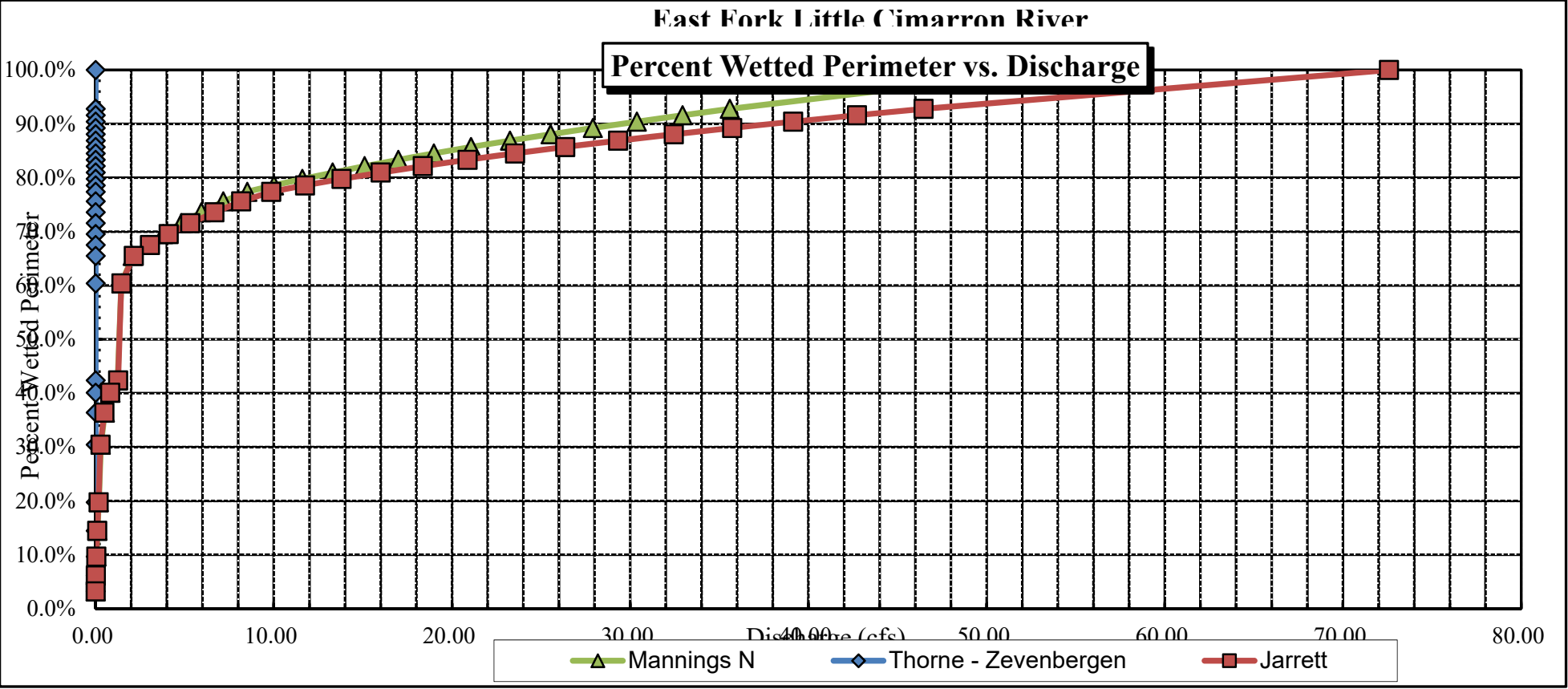
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.05	23.59	1.21	1.78	28.59	24.58	100.0%	1.16	72.57	2.54
	6.35	21.94	0.99	1.48	21.65	22.81	92.8%	0.95	46.46	2.15
	6.40	21.67	0.95	1.43	20.56	22.52	91.6%	0.91	42.73	2.08
	6.45	21.40	0.91	1.38	19.48	22.23	90.4%	0.88	39.14	2.01
	6.50	21.13	0.87	1.33	18.42	21.94	89.2%	0.84	35.72	1.94
	6.55	20.86	0.83	1.28	17.37	21.64	88.1%	0.80	32.44	1.87
	6.60	20.59	0.79	1.23	16.34	21.35	86.9%	0.76	29.32	1.79
	6.65	20.32	0.75	1.18	15.31	21.06	85.7%	0.73	26.35	1.72
	6.70	20.05	0.71	1.13	14.30	20.77	84.5%	0.69	23.54	1.65
	6.75	19.78	0.67	1.08	13.31	20.48	83.3%	0.65	20.87	1.57
	6.80	19.51	0.63	1.03	12.33	20.19	82.2%	0.61	18.36	1.49
	6.85	19.23	0.59	0.98	11.36	19.90	81.0%	0.57	16.00	1.41
	6.90	18.96	0.55	0.93	10.40	19.61	79.8%	0.53	13.80	1.33
	6.95	18.69	0.51	0.88	9.46	19.32	78.6%	0.49	11.75	1.24
	7.00	18.42	0.46	0.83	8.53	19.02	77.4%	0.45	9.85	1.15
	7.05	17.99	0.42	0.78	7.62	18.59	75.6%	0.41	8.17	1.07
	7.10	17.50	0.38	0.73	6.74	18.09	73.6%	0.37	6.67	0.99
	7.15	17.02	0.35	0.68	5.87	17.59	71.6%	0.33	5.31	0.90
	7.20	16.53	0.30	0.63	5.03	17.09	69.5%	0.29	4.10	0.82
	7.25	16.04	0.26	0.58	4.22	16.59	67.5%	0.25	3.05	0.72
	7.30	15.55	0.22	0.53	3.43	16.09	65.5%	0.21	2.14	0.62
WL	7.35	14.31	0.19	0.48	2.67	14.84	60.4%	0.18	1.44	0.54
	7.40	9.90	0.21	0.43	2.11	10.41	42.4%	0.20	1.26	0.60
	7.45	9.35	0.17	0.38	1.63	9.85	40.1%	0.17	0.82	0.51
	7.50	8.48	0.14	0.33	1.18	8.95	36.4%	0.13	0.49	0.42
	7.55	7.07	0.11	0.28	0.78	7.48	30.4%	0.10	0.27	0.35
	7.60	4.54	0.11	0.23	0.49	4.86	19.8%	0.10	0.17	0.34
	7.65	3.31	0.09	0.18	0.31	3.55	14.4%	0.09	0.09	0.29
	7.70	2.22	0.07	0.13	0.16	2.38	9.7%	0.07	0.04	0.24
	7.75	1.43	0.05	0.08	0.07	1.52	6.2%	0.04	0.01	0.17
	7.80	0.77	0.02	0.03	0.02	0.79	3.2%	0.02	0.00	0.09

Fast Fork Little Cimarron River

CROSS SECTION DATA ANALYSIS

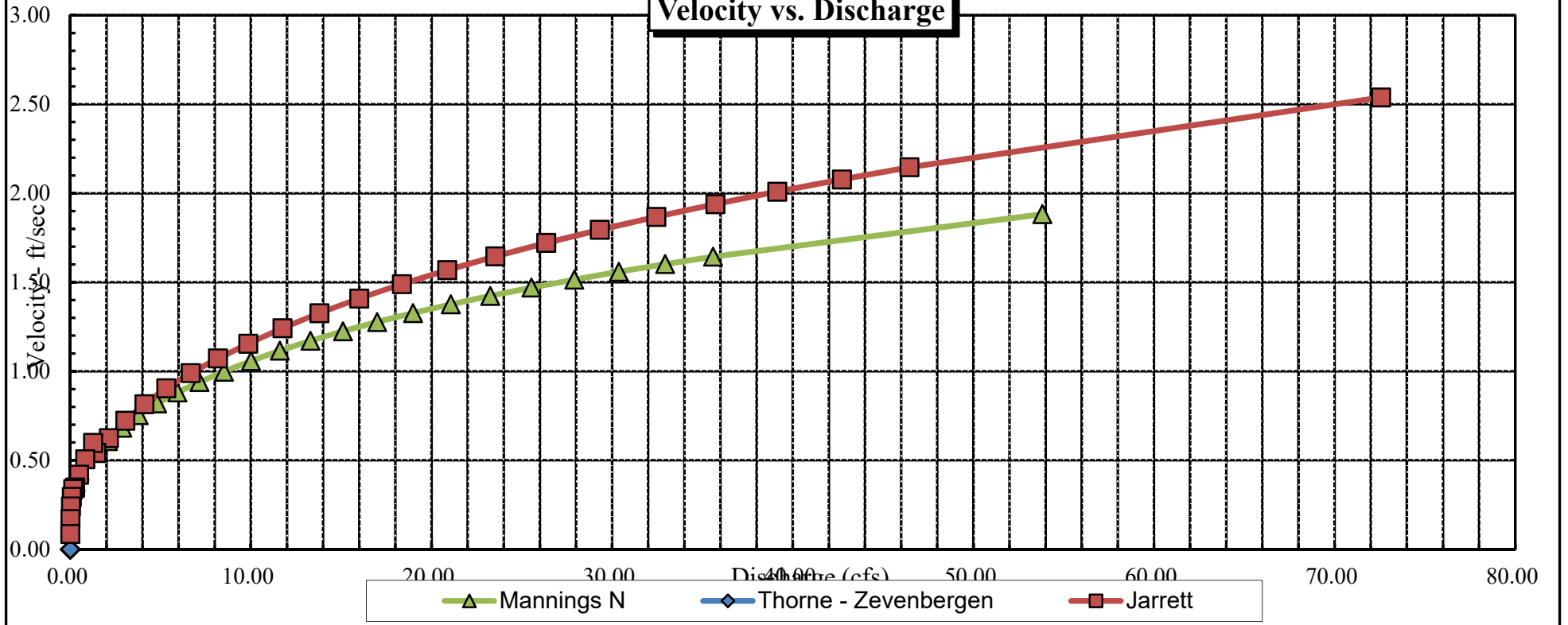


Channel Bottom Computed Water Line



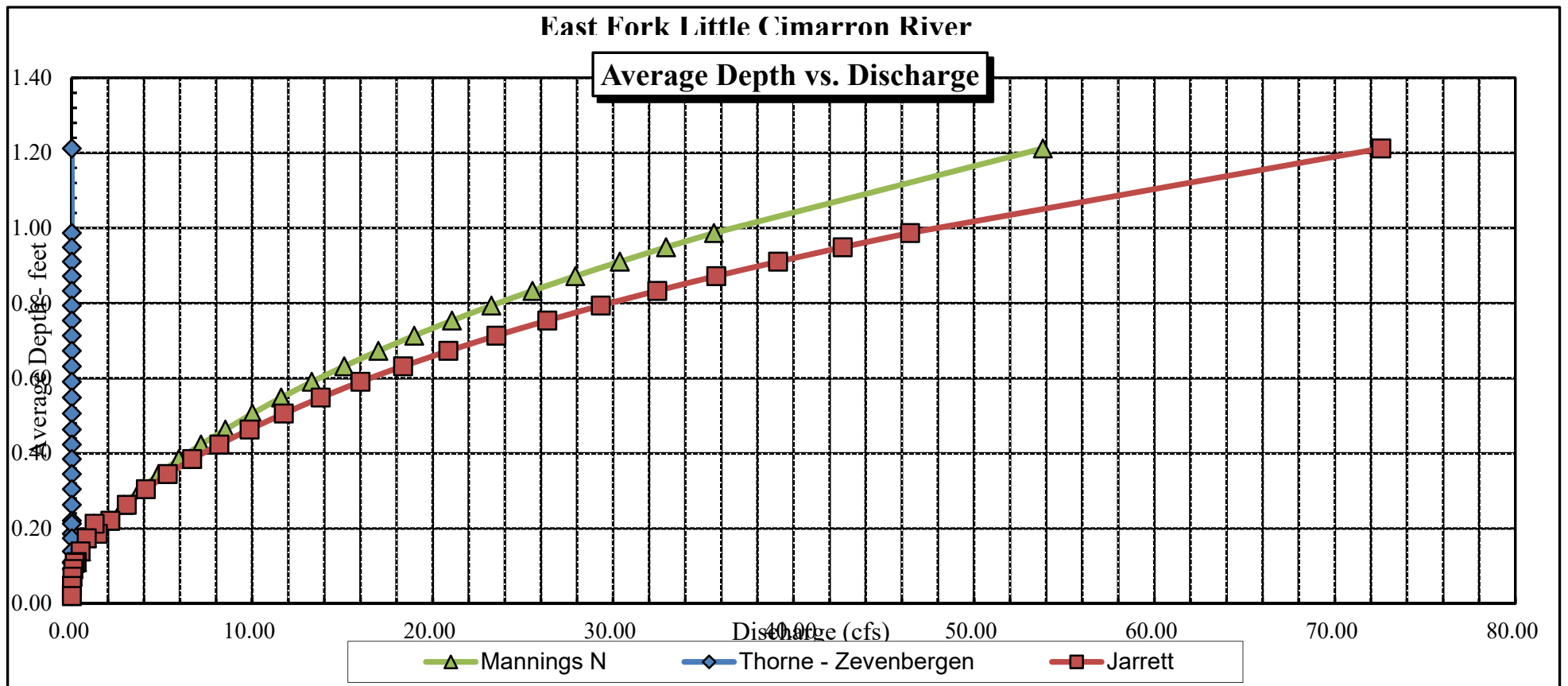
East Fork Little Cimarron River

Velocity vs. Discharge



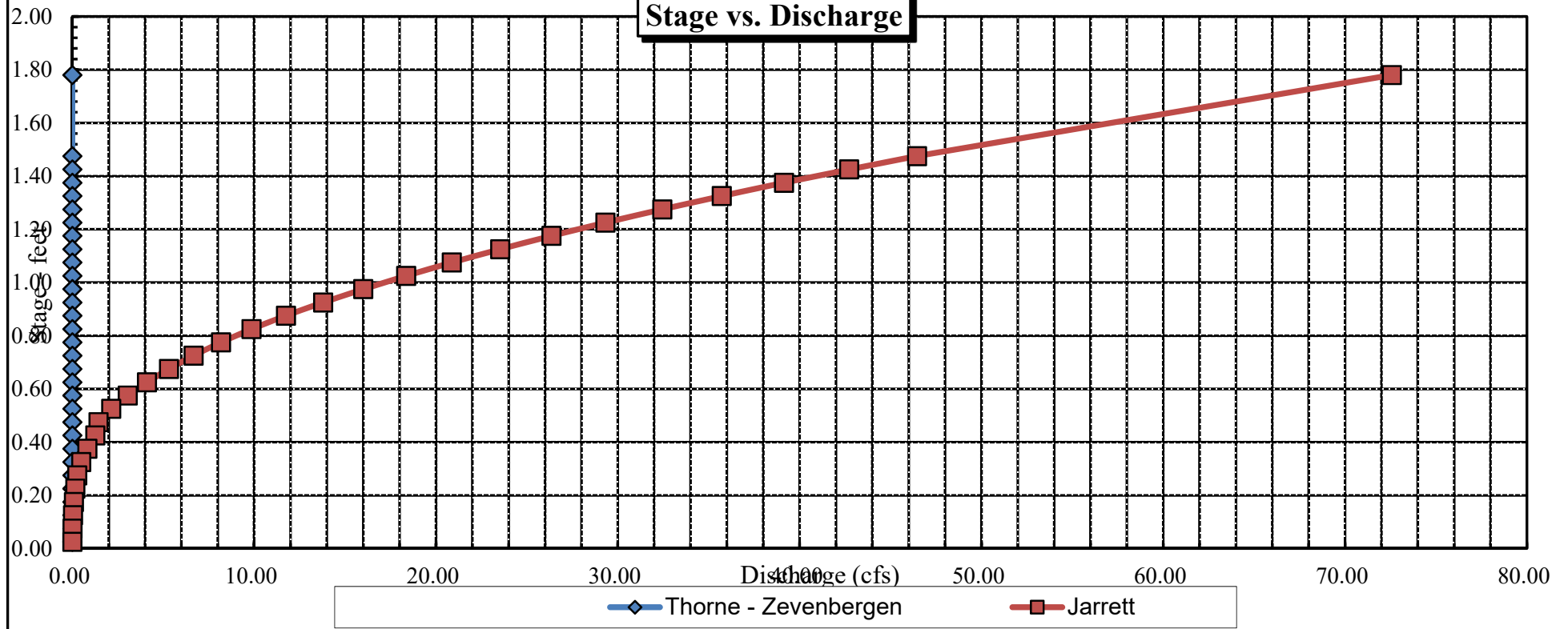
East Fork Little Cimarron River

Average Depth vs. Discharge



East Fork Little Cimarron River

Stage vs. Discharge



Data Input & Proofing

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 1
 DATE: 6/28/2017
 OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
 SECTION: 33
 TWP: 47N
 RANGE: 5W
 PM: N.M.

COUNTY: Gunnison
 WATERSHED: Gunnison
 DIVISION: 4
 DOW CODE: 44892
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.0076 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 = 34								
1	RS & G	0.00	6.02			0.00	0.00	0.00
		3.00	6.84			0.00	0.00	0.00
		5.00	7.38			0.00	0.00	0.00
		9.50	7.35	0.00	0.00	0.00	0.00	0.00
		11.60	7.59	0.24	0.27	0.29	0.08	7.35
		11.90	7.53	0.18	0.47	0.05	0.03	7.35
		12.20	7.57	0.22	0.30	0.07	0.02	7.35
		12.50	7.59	0.24	0.09	0.07	0.01	7.35
		12.80	7.61	0.26	0.04	0.08	0.00	7.35
		13.10	7.62	0.27	0.03	0.08	0.00	7.35
		13.40	7.52	0.17	0.28	0.05	0.01	7.35
		13.70	7.54	0.19	0.33	0.06	0.02	7.35
		14.00	7.70	0.35	0.56	0.11	0.06	7.35
		14.30	7.69	0.34	0.51	0.10	0.05	7.35
		14.60	7.71	0.36	0.31	0.11	0.03	7.35
		14.90	7.49	0.14	1.03	0.04	0.04	7.35
		15.20	7.49	0.14	1.16	0.04	0.05	7.35
		15.50	7.83	0.48	0.75	0.14	0.11	7.35
		15.80	7.83	0.48	0.65	0.14	0.09	7.35
		16.10	7.82	0.47	1.14	0.14	0.16	7.35
		16.40	7.72	0.37	1.36	0.11	0.15	7.35
		16.70	7.78	0.43	1.02	0.13	0.13	7.35
		17.00	7.73	0.38	1.50	0.11	0.17	7.35
		17.30	7.56	0.21	1.12	0.06	0.07	7.35
		17.60	7.57	0.22	1.43	0.08	0.11	7.35
1	LW	18.00	7.68	0.33	1.44	0.12	0.17	7.35
		18.30	7.83	0.48	0.05	0.14	0.01	7.35
		18.60	7.67	0.32	0.43	0.10	0.04	7.35
		18.90	7.61	0.26	0.46	0.12	0.05	7.35
		19.50	7.58	0.23	0.74	0.13	0.09	7.35
		20.00	7.35	0.00	0.00	0.00	0.00	0.00
		22.00	7.02			0.00	0.00	0.00
		23.70	6.05			0.00	0.00	0.00
	LS	24.70	5.60			0.00	0.00	0.00

Totals	2.67	1.76
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COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>East Fork Little Cimarron River</u>							CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>At BLM-private boundary</u>							
DATE: <u>6-28-17</u>	OBSERVERS: <u>R. Smith, A. Breibart</u>						
LEGAL DESCRIPTION	% SECTION: <u>SW</u>	SECTION: <u>33</u>	TOWNSHIP: <u>47N/S</u>	RANGE: <u>5E/W</u>	PM: <u>NM</u>		
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Gunnison R.</u>		WATER DIVISION: <u>4</u>	DOW WATER CODE: <u>44892</u>			
MAP(S):	USGS: <u>UTM Zone 286549</u>						
	USFS: <u>13 4238979</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: <u>surveyed</u> lbs/foot	TAPE TENSION: <u>surveyed</u> lbs			
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 1-foot boulder</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 (arrows)
(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>4.75 / 4.75</u>			
(2) WS Upstream	<u>10.0</u>	<u>4.62</u>			
(3) WS Downstream	<u>10.7</u>	<u>4.85</u>			
SLOPE: <u>0.23 ÷ 20.7 = .011</u>					

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
<u>see separate survey results</u>																	
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	

COMMENTS

Cond. = 55
Temp = 15°C

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: East Fork Little Cimarron River
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 2

DATE: 28-Jun-17
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 33
TWP: 47N
RANGE: 5W
PM: N.M.

COUNTY: Gunnison
WATERSHED: Gunnison
DIVISION: 4
DOW CODE: 44892

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: 0.011

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

DATA POINTS= 30

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	3.38		
1 G	3.20	3.95		
	3.60	4.00		
	6.00	4.54		
RW	6.50	4.75	0.00	0.00
	6.70	4.75	0.00	0.00
	7.30	5.12	0.37	0.10
	7.70	5.13	0.38	0.35
	8.10	5.23	0.48	0.24
	8.30	5.21	0.46	0.49
	8.60	5.22	0.47	0.32
	8.90	5.17	0.42	0.36
	9.20	5.31	0.56	0.30
	9.50	5.35	0.60	0.66
	9.80	5.40	0.65	0.70
	10.10	5.29	0.54	1.23
	10.40	5.28	0.53	2.21
	10.70	5.24	0.49	1.96
	11.00	5.05	0.30	2.35
	11.30	5.01	0.26	1.96
	11.60	4.97	0.22	2.43
	11.90	4.95	0.20	2.30
	12.20	4.94	0.19	1.98
	12.50	4.94	0.19	0.47
	12.80	4.92	0.17	0.22
LW	13.30	4.75	0.00	0.00
	15.00	4.45		
1 G	15.70	3.95		
	16.90	3.60		
LS	18.50	3.26		

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%
0.70	0.37	0.19	0.02	0.8%
0.40	0.38	0.15	0.05	2.4%
0.41	0.48	0.14	0.03	1.6%
0.20	0.46	0.12	0.06	2.5%
0.30	0.47	0.14	0.05	2.0%
0.30	0.42	0.13	0.05	2.0%
0.33	0.56	0.17	0.05	2.3%
0.30	0.60	0.18	0.12	5.4%
0.30	0.65	0.20	0.14	6.2%
0.32	0.54	0.16	0.20	9.0%
0.30	0.53	0.16	0.35	15.9%
0.30	0.49	0.15	0.29	13.0%
0.36	0.30	0.09	0.21	9.5%
0.30	0.26	0.08	0.15	6.9%
0.30	0.22	0.07	0.16	7.2%
0.30	0.20	0.06	0.14	6.2%
0.30	0.19	0.06	0.11	5.1%
0.30	0.19	0.06	0.03	1.2%
0.30	0.17	0.07	0.01	0.7%
0.53		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 -----

6.87 0.65 2.35 2.21 100.0%
 (Max.)

Manning's n = 0.0809
 Hydraulic Radius= 0.34192375

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.35	2.35	0.0%
4.50	2.35	4.30	83.1%
4.52	2.35	4.13	75.6%
4.54	2.35	3.96	68.3%
4.56	2.35	3.79	61.2%
4.58	2.35	3.62	54.1%
4.60	2.35	3.46	47.3%
4.62	2.35	3.30	40.5%
4.64	2.35	3.15	33.9%
4.66	2.35	2.99	27.4%
4.68	2.35	2.85	21.1%
4.70	2.35	2.70	14.9%
4.71	2.35	2.63	11.8%
4.72	2.35	2.56	8.8%
4.73	2.35	2.49	5.9%
4.74	2.35	2.42	2.9%
4.75	2.35	2.35	0.0%
4.76	2.35	2.28	-2.8%
4.77	2.35	2.22	-5.6%
4.78	2.35	2.15	-8.3%
4.79	2.35	2.09	-11.1%
4.80	2.35	2.03	-13.8%
4.82	2.35	1.90	-19.2%
4.84	2.35	1.77	-24.5%
4.86	2.35	1.65	-29.7%
4.88	2.35	1.53	-34.9%
4.90	2.35	1.41	-39.9%
4.92	2.35	1.29	-44.9%
4.94	2.35	1.18	-49.8%
4.96	2.35	1.08	-53.9%
4.98	2.35	0.99	-57.8%
5.00	2.35	0.90	-61.5%

WATERLINE AT ZERO

AREA ERROR = 4.750

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.95	12.50	0.82	1.45	10.20	13.06	100.0%	0.78	16.66	1.63
	3.95	12.50	0.82	1.45	10.20	13.06	100.0%	0.78	16.66	1.63
	4.00	12.03	0.80	1.40	9.58	12.58	96.3%	0.76	15.41	1.61
	4.05	11.74	0.77	1.35	8.99	12.26	93.9%	0.73	14.08	1.57
	4.10	11.45	0.73	1.30	8.41	11.95	91.5%	0.70	12.82	1.53
	4.15	11.15	0.70	1.25	7.84	11.63	89.1%	0.67	11.62	1.48
	4.20	10.86	0.67	1.20	7.29	11.32	86.6%	0.64	10.49	1.44
	4.25	10.57	0.64	1.15	6.76	11.01	84.2%	0.61	9.41	1.39
	4.30	10.28	0.61	1.10	6.24	10.69	81.8%	0.58	8.39	1.35
	4.35	9.98	0.57	1.05	5.73	10.38	79.4%	0.55	7.43	1.30
	4.40	9.69	0.54	1.00	5.24	10.07	77.0%	0.52	6.53	1.25
	4.45	9.40	0.51	0.95	4.76	9.75	74.6%	0.49	5.69	1.20
	4.50	8.89	0.48	0.90	4.30	9.24	70.7%	0.47	4.98	1.16
	4.55	8.41	0.46	0.85	3.87	8.74	66.9%	0.44	4.34	1.12
	4.60	8.01	0.43	0.80	3.46	8.32	63.7%	0.42	3.72	1.07
	4.65	7.60	0.40	0.75	3.07	7.91	60.5%	0.39	3.15	1.03
	4.70	7.20	0.37	0.70	2.70	7.49	57.3%	0.36	2.64	0.98
WL	4.75	6.60	0.36	0.65	2.35	6.87	52.6%	0.34	2.21	0.94
	4.80	6.37	0.32	0.60	2.03	6.62	50.7%	0.31	1.77	0.88
	4.85	6.14	0.28	0.55	1.71	6.37	48.8%	0.27	1.38	0.80
	4.90	5.92	0.24	0.50	1.41	6.12	46.9%	0.23	1.02	0.72
	4.95	4.88	0.23	0.45	1.13	5.06	38.8%	0.22	0.80	0.71
	5.00	4.27	0.21	0.40	0.90	4.44	34.0%	0.20	0.60	0.67
	5.05	3.81	0.18	0.35	0.70	3.97	30.4%	0.18	0.43	0.61
	5.10	3.65	0.14	0.30	0.52	3.78	28.9%	0.14	0.26	0.51
	5.15	3.06	0.11	0.25	0.35	3.16	24.2%	0.11	0.15	0.44
	5.20	2.54	0.08	0.20	0.20	2.61	20.0%	0.08	0.07	0.35
	5.25	1.55	0.07	0.15	0.11	1.60	12.2%	0.07	0.03	0.32
	5.30	0.89	0.05	0.10	0.05	0.92	7.0%	0.05	0.01	0.26
	5.35	0.44	0.03	0.05	0.01	0.45	3.4%	0.02	0.00	0.16
	5.40	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 2.21 cfs
CALCULATED FLOW (Qc)= 2.21 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 4.75 ft
CALCULATED WATERLINE (WLc)= 4.75 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.65 ft
MAX CALCULATED DEPTH (Dc)= 0.65 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.94 ft/sec
MANNING'S N= 0.081
SLOPE= 0.011 ft/ft

.4 * Qm = 0.9 cfs
2.5 * Qm= 5.5 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

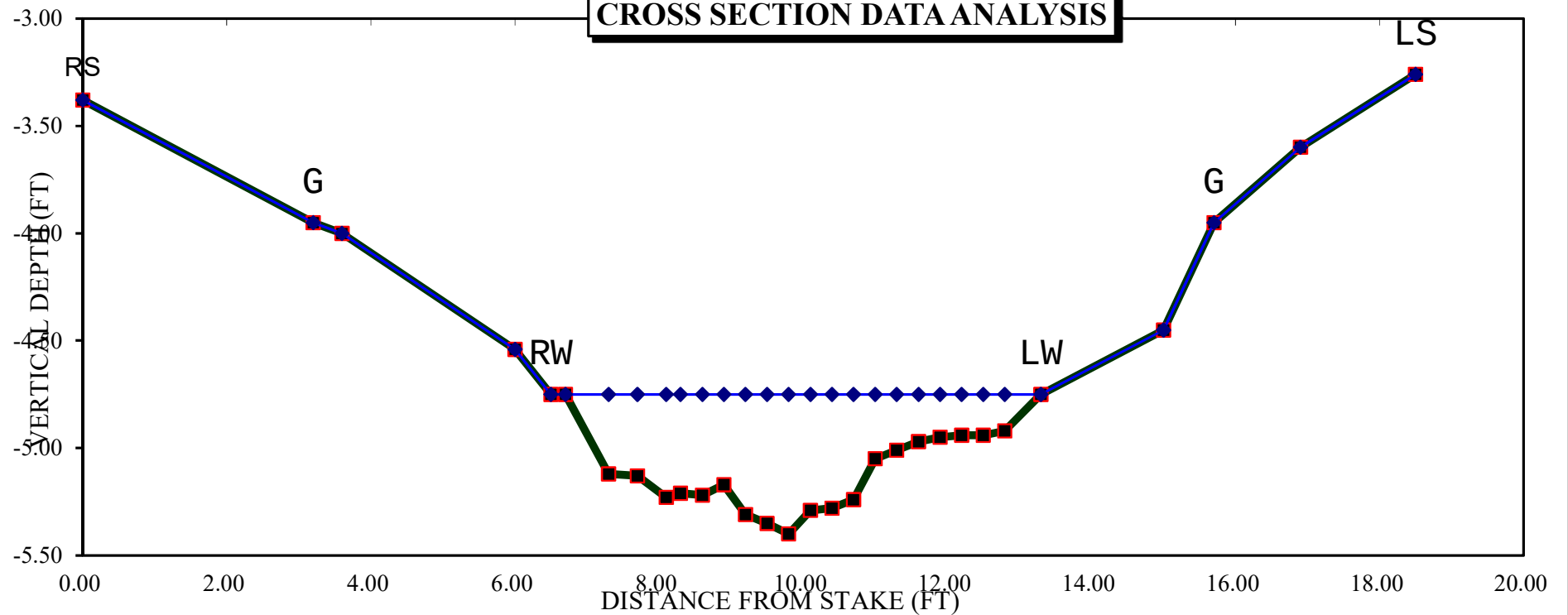
STAGING TABLE

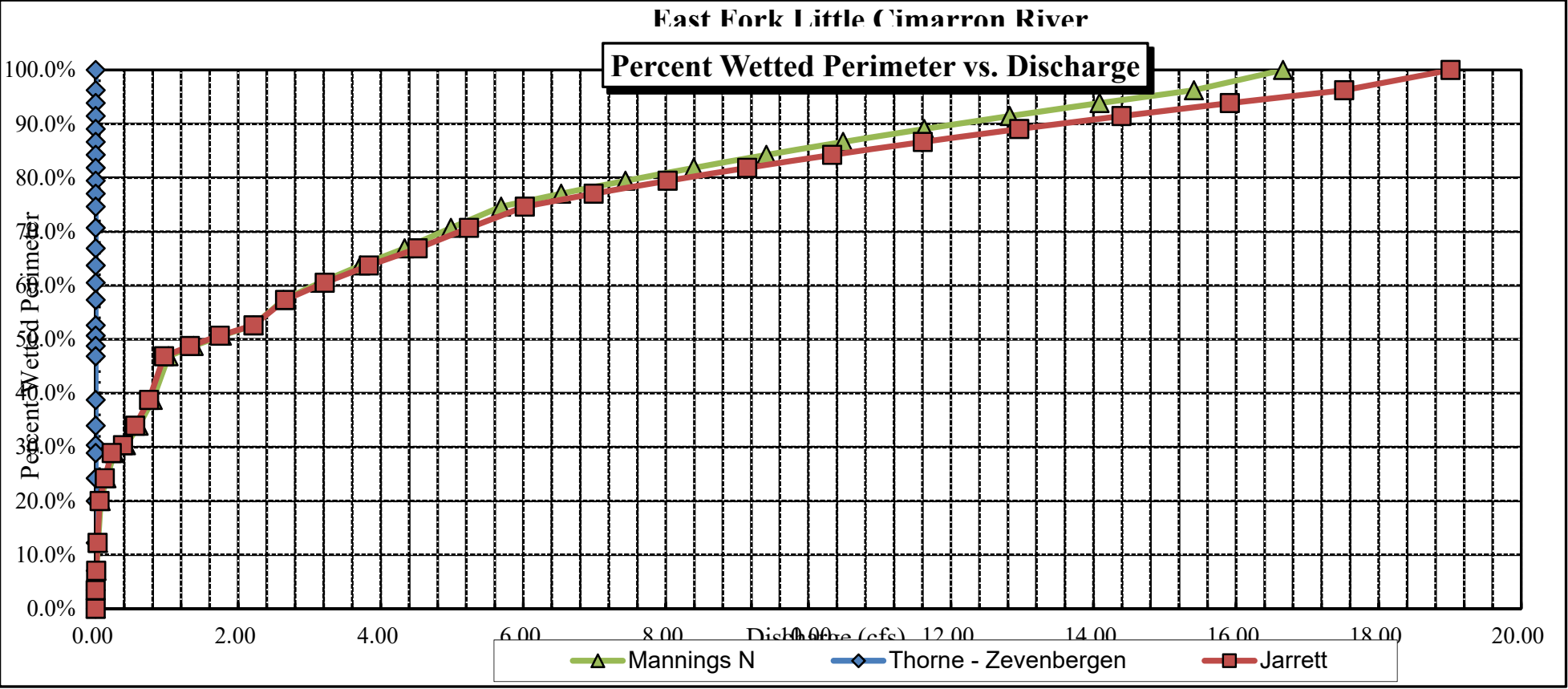
WL = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.95	12.50	0.82	1.45	10.20	13.06	100.0%	0.78	19.01	1.86
	3.95	12.50	0.82	1.45	10.20	13.06	100.0%	0.78	19.01	1.86
	4.00	12.03	0.80	1.40	9.58	12.58	96.3%	0.76	17.52	1.83
	4.05	11.74	0.77	1.35	8.99	12.26	93.9%	0.73	15.91	1.77
	4.10	11.45	0.73	1.30	8.41	11.95	91.5%	0.70	14.39	1.71
	4.15	11.15	0.70	1.25	7.84	11.63	89.1%	0.67	12.96	1.65
	4.20	10.86	0.67	1.20	7.29	11.32	86.6%	0.64	11.61	1.59
	4.25	10.57	0.64	1.15	6.76	11.01	84.2%	0.61	10.33	1.53
	4.30	10.28	0.61	1.10	6.24	10.69	81.8%	0.58	9.14	1.47
	4.35	9.98	0.57	1.05	5.73	10.38	79.4%	0.55	8.02	1.40
	4.40	9.69	0.54	1.00	5.24	10.07	77.0%	0.52	6.99	1.33
	4.45	9.40	0.51	0.95	4.76	9.75	74.6%	0.49	6.02	1.27
	4.50	8.89	0.48	0.90	4.30	9.24	70.7%	0.47	5.24	1.22
	4.55	8.41	0.46	0.85	3.87	8.74	66.9%	0.44	4.52	1.17
	4.60	8.01	0.43	0.80	3.46	8.32	63.7%	0.42	3.83	1.11
	4.65	7.60	0.40	0.75	3.07	7.91	60.5%	0.39	3.21	1.05
	4.70	7.20	0.37	0.70	2.70	7.49	57.3%	0.36	2.66	0.98
WL	4.75	6.60	0.36	0.65	2.35	6.87	52.6%	0.34	2.21	0.94
	4.80	6.37	0.32	0.60	2.03	6.62	50.7%	0.31	1.74	0.86
	4.85	6.14	0.28	0.55	1.71	6.37	48.8%	0.27	1.32	0.77
	4.90	5.92	0.24	0.50	1.41	6.12	46.9%	0.23	0.96	0.68
	4.95	4.88	0.23	0.45	1.13	5.06	38.8%	0.22	0.75	0.66
	5.00	4.27	0.21	0.40	0.90	4.44	34.0%	0.20	0.56	0.61
	5.05	3.81	0.18	0.35	0.70	3.97	30.4%	0.18	0.38	0.55
	5.10	3.65	0.14	0.30	0.52	3.78	28.9%	0.14	0.23	0.44
	5.15	3.06	0.11	0.25	0.35	3.16	24.2%	0.11	0.13	0.37
	5.20	2.54	0.08	0.20	0.20	2.61	20.0%	0.08	0.06	0.28
	5.25	1.55	0.07	0.15	0.11	1.60	12.2%	0.07	0.03	0.25
	5.30	0.89	0.05	0.10	0.05	0.92	7.0%	0.05	0.01	0.19
	5.35	0.44	0.03	0.05	0.01	0.45	3.4%	0.02	0.00	0.11
	5.40	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

Fast Fork Little Cimarron River

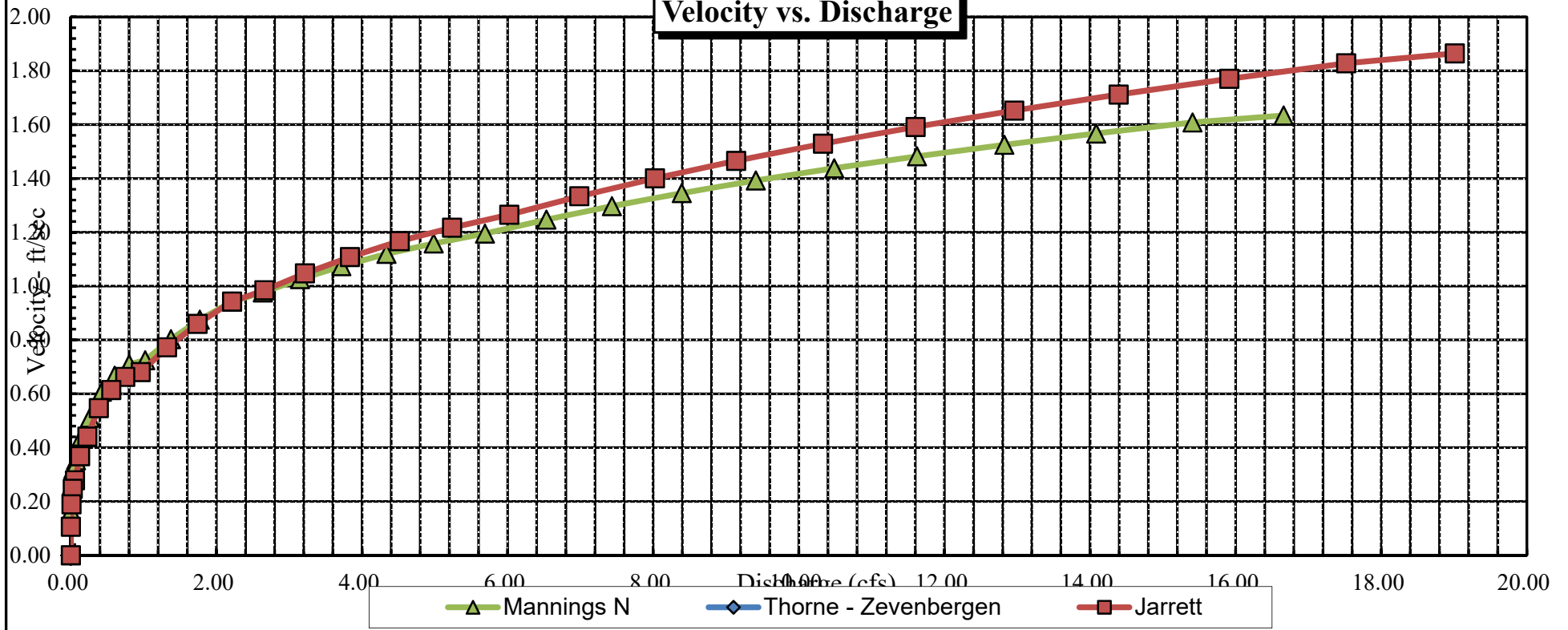
CROSS SECTION DATA ANALYSIS





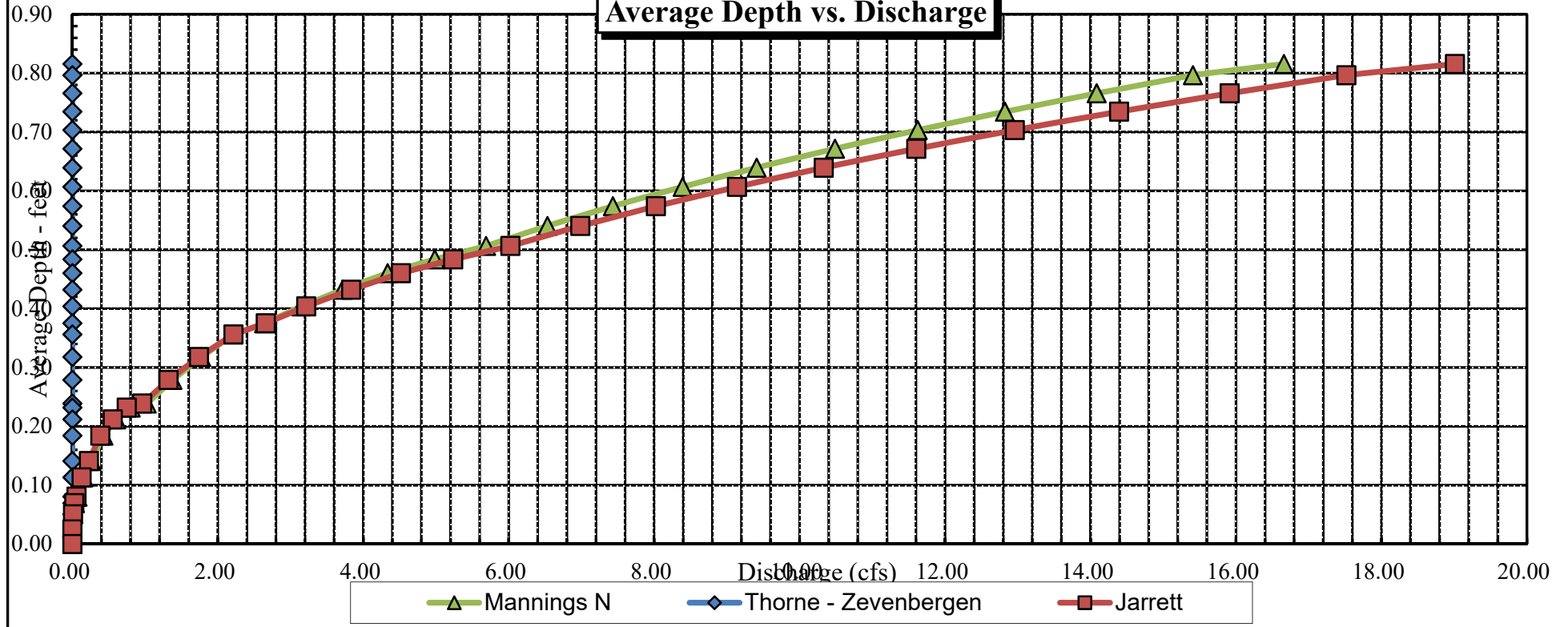
East Fork Little Cimarron River

Velocity vs. Discharge



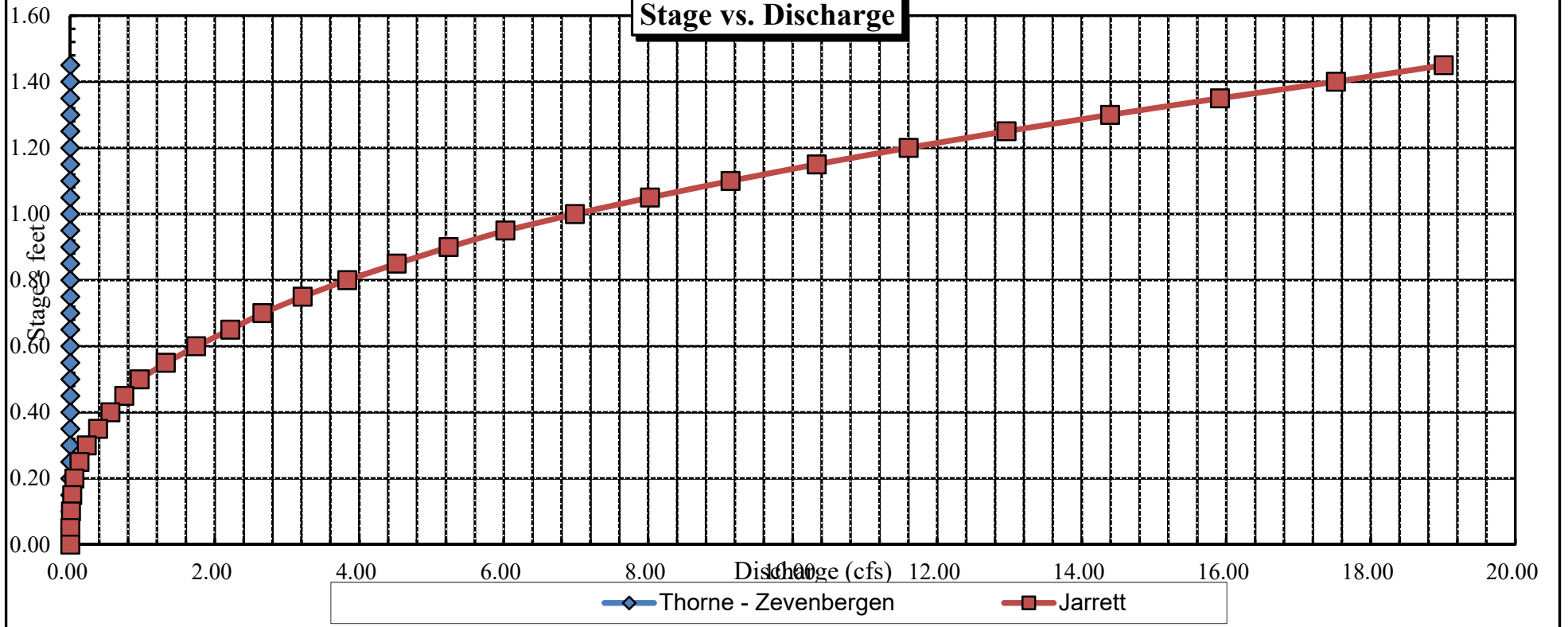
East Fork Little Cimarron River

Average Depth vs. Discharge



East Fork Little Cimarron River

Stage vs. Discharge



Data Input & Proofing

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2
 DATE: 6/28/2017
 OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
 SECTION: 33
 TWP: 47N
 RANGE: 5W
 PM: N.M.

COUNTY: Gunnison
 WATERSHED: Gunnison
 DIVISION: 4
 DOW CODE: 44892
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.011 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 = 30								
1	RS	0.00	3.38			0.00	0.00	0.00
	G	3.20	3.95			0.00	0.00	0.00
		3.60	4.00			0.00	0.00	0.00
		6.00	4.54			0.00	0.00	0.00
	RW	6.50	4.75	0.00	0.00	0.00	0.00	0.00
		6.70	4.75	0.00	0.00	0.00	0.00	0.00
		7.30	5.12	0.37	0.10	0.19	0.02	4.75
		7.70	5.13	0.38	0.35	0.15	0.05	4.75
		8.10	5.23	0.48	0.24	0.14	0.03	4.75
		8.30	5.21	0.46	0.49	0.12	0.06	4.75
		8.60	5.22	0.47	0.32	0.14	0.05	4.75
		8.90	5.17	0.42	0.36	0.13	0.05	4.75
		9.20	5.31	0.56	0.30	0.17	0.05	4.75
		9.50	5.35	0.60	0.66	0.18	0.12	4.75
		9.80	5.40	0.65	0.70	0.20	0.14	4.75
		10.10	5.29	0.54	1.23	0.16	0.20	4.75
		10.40	5.28	0.53	2.21	0.16	0.35	4.75
		10.70	5.24	0.49	1.96	0.15	0.29	4.75
		11.00	5.05	0.30	2.35	0.09	0.21	4.75
		11.30	5.01	0.26	1.96	0.08	0.15	4.75
		11.60	4.97	0.22	2.43	0.07	0.16	4.75
		11.90	4.95	0.20	2.30	0.06	0.14	4.75
		12.20	4.94	0.19	1.98	0.06	0.11	4.75
		12.50	4.94	0.19	0.47	0.06	0.03	4.75
		12.80	4.92	0.17	0.22	0.07	0.01	4.75
	LW	13.30	4.75	0.00	0.00	0.00	0.00	0.00
		15.00	4.45			0.00	0.00	0.00
	G	15.70	3.95			0.00	0.00	0.00
		16.90	3.60			0.00	0.00	0.00

Totals	2.35	2.21
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FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>East Fork Little Cimarron River</u>		CROSS-SECTION NO.: <u>1</u>
CROSS-SECTION LOCATION: <u>At BLM-Private boundary</u>		
DATE: <u>7-12-16</u>	OBSERVERS: <u>R. Smith, A. Breibart</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>SW</u>	SECTION: <u>33</u>
	TOWNSHIP: <u>47N/S</u>	RANGE: <u>5E/W</u>
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Cimarron R.</u>	WATER DIVISION: <u>4</u>
		DOW WATER CODE: <u>44892</u>
MAP(S):	USGS:	
	USFS:	

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: <u>YES</u> NO	METER TYPE: <u>1111</u>			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: <u>surveyed</u> lbs/foot	TAPE TENSION: <u>surveyed</u> lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 2-foot boulders</u>		PHOTOGRAPHS TAKEN: <u>YES</u> NO	NUMBER OF PHOTOGRAPHS: <u>3</u>	

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
① Tape @ Stake LB	0.0	<u>surveyed</u>
② Tape @ Stake RB	0.0	<u>surveyed</u>
③ WS @ Tape LB/RB	0.0	<u>10.8-5.75/5.75-5.8</u>
④ WS Upstream	<u>6.8</u>	<u>5.54</u>
⑤ WS Downstream	<u>5.0</u>	<u>5.77</u>
SLOPE	<u>0.23/11.8 = 0.019</u>	

SKETCH

Sketch showing a cross-section of a channel. A vertical line represents the tape. Stakes are marked with 'X' at the top and bottom. Water surface elevation points are marked with circles and numbers. A horizontal line indicates the water surface at the top. A horizontal line indicates the channel bed at the bottom. The distance from the tape to the water surface is marked as 5.8.

LEGEND:

Stake (X)

Station (1)

Photo (1)

Direction of Flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: <u>YES</u> NO	DISTANCE ELECTROFISHED: _____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: <u>YES</u> 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

<u>pH = 6.22</u>
<u>Temp = 10.9°C</u>
<u>Cond = 51</u>
<u>Salinity = 0.0</u>

[illegible]

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

LOCATION INFORMATION

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-Private boundary
XS NUMBER: 1

DATE: 12-Jul-16
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 33
TWP: 47N
RANGE: 5W
PM: New Mexico

COUNTY: Gunnison
WATERSHED: Cimarron River
DIVISION: 4
DOW CODE: 44892

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: 0.019

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private boundary
 XS NUMBER: 1

DATA POINTS= 28

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	4.35		
1 G	2.60	4.90		
	3.30	5.05		
	4.00	5.27		
	4.50	5.51		
	5.00	5.50		
W	5.50	5.62		
	5.80	5.75	0.00	0.00
	6.00	5.90	0.15	0.04
	6.30	6.00	0.25	0.27
	6.60	6.03	0.28	0.34
	6.90	5.92	0.17	0.19
	7.20	5.97	0.22	0.53
	7.50	5.95	0.20	0.51
	7.80	6.03	0.28	0.30
	8.10	6.01	0.26	0.47
	8.40	6.02	0.27	0.69
	8.70	6.19	0.44	0.18
	9.00	6.05	0.30	1.16
	9.30	6.11	0.36	0.81
	9.60	5.93	0.18	0.90
	9.90	6.00	0.25	0.51
	10.20	5.84	0.09	2.37
	10.80	5.75	0.00	0.00
	12.20	5.40	0.00	0.00
	12.80	5.38	0.00	0.00
1 G	13.60	5.08	0.00	0.00
	13.90	4.90	0.00	0.00

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%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.25	0.15	0.04	0.00	0.2%
0.32	0.25	0.08	0.02	3.2%
0.30	0.28	0.08	0.03	4.4%
0.32	0.17	0.05	0.01	1.5%
0.30	0.22	0.07	0.03	5.5%
0.30	0.20	0.06	0.03	4.8%
0.31	0.28	0.08	0.03	3.9%
0.30	0.26	0.08	0.04	5.7%
0.30	0.27	0.08	0.06	8.7%
0.34	0.44	0.13	0.02	3.7%
0.33	0.30	0.09	0.10	16.3%
0.31	0.36	0.11	0.09	13.6%
0.35	0.18	0.05	0.05	7.6%
0.31	0.25	0.08	0.04	6.0%
0.34	0.09	0.04	0.10	15.0%
0.61		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 -----

5.29	0.44	1.12	0.64	100.0%
(Max.)				
Manning's n =		0.1262		
Hydraulic Radius=		0.21097119		

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private boundary
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.12	1.12	0.0%
5.50	1.12	2.58	131.1%
5.52	1.12	2.44	118.8%
5.54	1.12	2.31	107.1%
5.56	1.12	2.18	95.6%
5.58	1.12	2.06	84.5%
5.60	1.12	1.94	73.6%
5.62	1.12	1.82	63.0%
5.64	1.12	1.70	52.7%
5.66	1.12	1.59	42.6%
5.68	1.12	1.48	32.7%
5.70	1.12	1.37	23.1%
5.71	1.12	1.32	18.4%
5.72	1.12	1.27	13.7%
5.73	1.12	1.22	9.1%
5.74	1.12	1.17	4.5%
5.75	1.12	1.12	0.0%
5.76	1.12	1.07	-4.4%
5.77	1.12	1.02	-8.8%
5.78	1.12	0.97	-13.1%
5.79	1.12	0.92	-17.3%
5.80	1.12	0.88	-21.5%
5.82	1.12	0.79	-29.6%
5.84	1.12	0.70	-37.4%
5.86	1.12	0.61	-45.0%
5.88	1.12	0.53	-52.5%
5.90	1.12	0.45	-59.9%
5.92	1.12	0.37	-67.2%
5.94	1.12	0.29	-74.0%
5.96	1.12	0.22	-80.2%
5.98	1.12	0.17	-85.1%
6.00	1.12	0.12	-89.3%

WATERLINE AT ZERO

AREA ERROR = 5.750

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private boundary
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.90	11.30	0.73	1.29	8.24	11.88	100.0%	0.69	10.48	1.27
	4.90	11.30	0.73	1.29	8.24	11.88	100.0%	0.69	10.48	1.27
	4.95	10.98	0.70	1.24	7.69	11.55	97.2%	0.67	9.51	1.24
	5.00	10.67	0.67	1.19	7.15	11.21	94.3%	0.64	8.59	1.20
	5.05	10.35	0.64	1.14	6.62	10.88	91.5%	0.61	7.72	1.17
	5.10	10.09	0.61	1.09	6.11	10.59	89.1%	0.58	6.87	1.12
	5.15	9.80	0.57	1.04	5.61	10.28	86.5%	0.55	6.08	1.08
	5.20	9.50	0.54	0.99	5.13	9.98	83.9%	0.51	5.34	1.04
	5.25	9.21	0.51	0.94	4.66	9.67	81.3%	0.48	4.65	1.00
	5.30	8.95	0.47	0.89	4.21	9.39	79.0%	0.45	4.00	0.95
	5.35	8.71	0.43	0.84	3.77	9.13	76.8%	0.41	3.39	0.90
	5.40	7.93	0.42	0.79	3.34	8.33	70.1%	0.40	2.95	0.88
	5.45	7.62	0.39	0.74	2.95	8.01	67.4%	0.37	2.46	0.83
	5.50	7.32	0.35	0.69	2.58	7.68	64.7%	0.34	2.02	0.78
	5.55	6.39	0.35	0.64	2.25	6.74	56.7%	0.33	1.75	0.78
	5.60	5.98	0.32	0.59	1.94	6.32	53.2%	0.31	1.43	0.74
	5.65	5.63	0.29	0.54	1.65	5.95	50.1%	0.28	1.14	0.69
	5.70	5.32	0.26	0.49	1.37	5.62	47.3%	0.24	0.87	0.63
WL	5.75	5.00	0.22	0.44	1.12	5.29	44.5%	0.21	0.64	0.58
	5.80	4.60	0.19	0.39	0.88	4.87	41.0%	0.18	0.45	0.52
	5.85	4.25	0.15	0.34	0.66	4.50	37.8%	0.15	0.29	0.45
	5.90	4.09	0.11	0.29	0.45	4.31	36.2%	0.10	0.16	0.36
	5.95	3.46	0.07	0.24	0.25	3.64	30.7%	0.07	0.07	0.27
	6.00	2.18	0.05	0.19	0.12	2.30	19.4%	0.05	0.03	0.23
	6.05	0.95	0.05	0.14	0.05	1.04	8.7%	0.05	0.01	0.22
	6.10	0.42	0.04	0.09	0.02	0.47	3.9%	0.03	0.00	0.17
	6.15	0.16	0.02	0.04	0.00	0.18	1.5%	0.02	0.00	0.11

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-Private boundary
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.64 cfs
CALCULATED FLOW (Qc)= 0.64 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 5.75 ft
CALCULATED WATERLINE (WLc)= 5.75 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.44 ft
MAX CALCULATED DEPTH (Dc)= 0.44 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.58 ft/sec
MANNING'S N= 0.126
SLOPE= 0.019 ft/ft

.4 * Qm = 0.3 cfs
2.5 * Qm= 1.6 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private boundary
 XS NUMBER: 1

Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

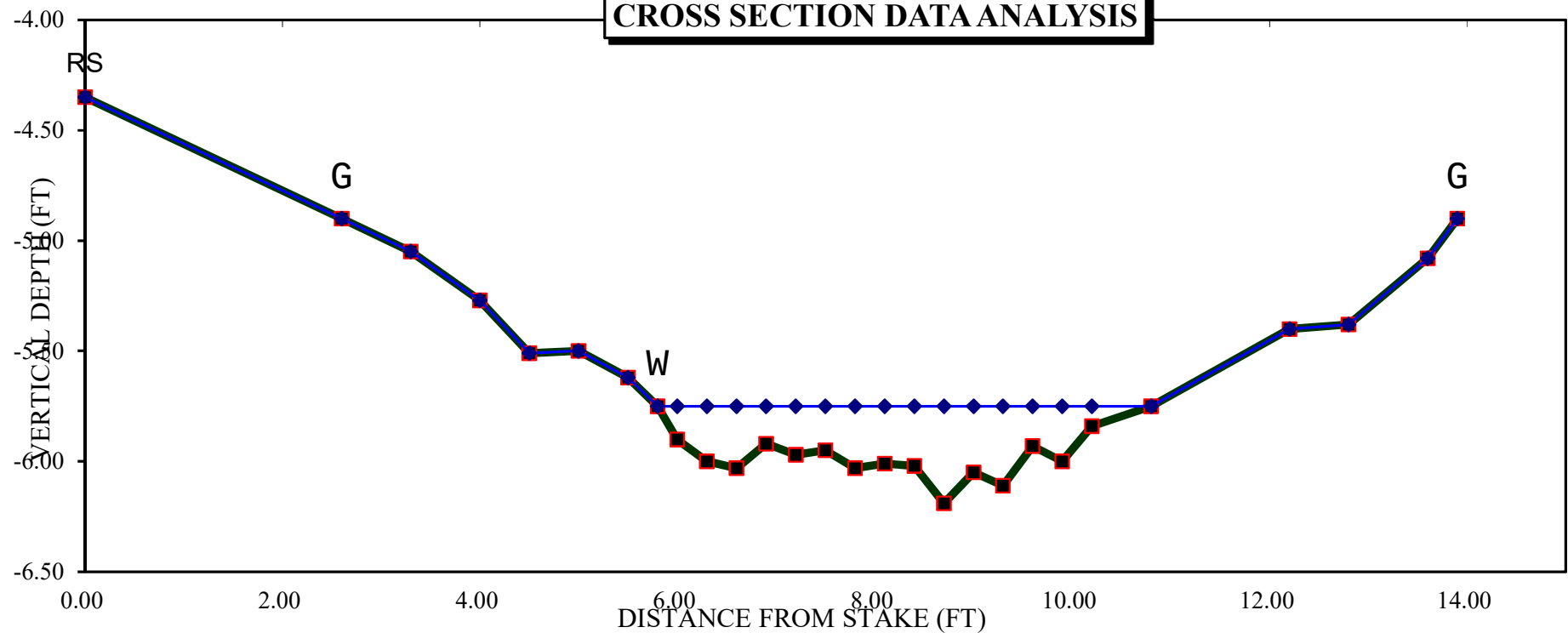
STAGING TABLE

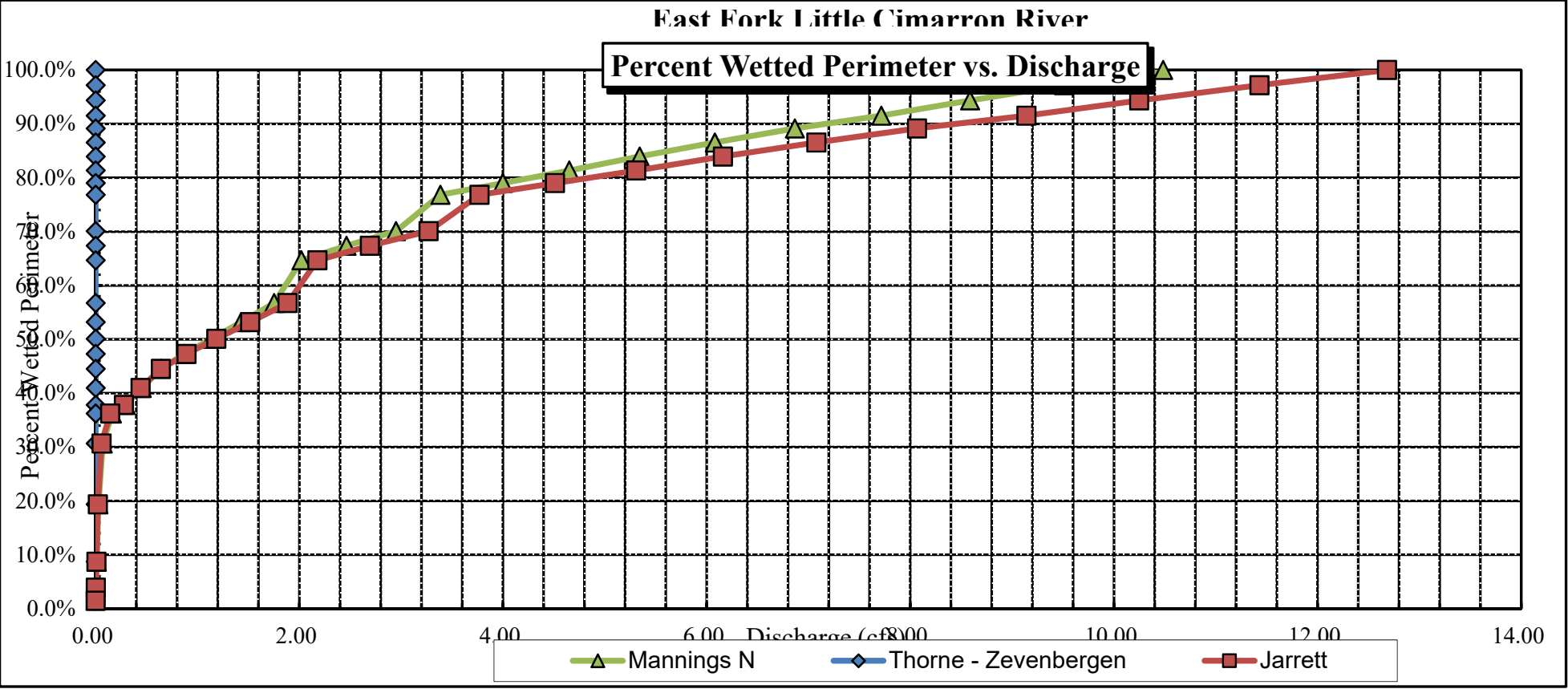
WL = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.90	11.30	0.73	1.29	8.24	11.88	100.0%	0.69	12.68	1.54
	4.90	11.30	0.73	1.29	8.24	11.88	100.0%	0.69	12.68	1.54
	4.95	10.98	0.70	1.24	7.69	11.55	97.2%	0.67	11.43	1.49
	5.00	10.67	0.67	1.19	7.15	11.21	94.3%	0.64	10.25	1.43
	5.05	10.35	0.64	1.14	6.62	10.88	91.5%	0.61	9.14	1.38
	5.10	10.09	0.61	1.09	6.11	10.59	89.1%	0.58	8.07	1.32
	5.15	9.80	0.57	1.04	5.61	10.28	86.5%	0.55	7.08	1.26
	5.20	9.50	0.54	0.99	5.13	9.98	83.9%	0.51	6.16	1.20
	5.25	9.21	0.51	0.94	4.66	9.67	81.3%	0.48	5.31	1.14
	5.30	8.95	0.47	0.89	4.21	9.39	79.0%	0.45	4.51	1.07
	5.35	8.71	0.43	0.84	3.77	9.13	76.8%	0.41	3.77	1.00
	5.40	7.93	0.42	0.79	3.34	8.33	70.1%	0.40	3.27	0.98
	5.45	7.62	0.39	0.74	2.95	8.01	67.4%	0.37	2.69	0.91
	5.50	7.32	0.35	0.69	2.58	7.68	64.7%	0.34	2.18	0.84
	5.55	6.39	0.35	0.64	2.25	6.74	56.7%	0.33	1.89	0.84
	5.60	5.98	0.32	0.59	1.94	6.32	53.2%	0.31	1.52	0.78
	5.65	5.63	0.29	0.54	1.65	5.95	50.1%	0.28	1.19	0.72
	5.70	5.32	0.26	0.49	1.37	5.62	47.3%	0.24	0.89	0.65
WL	5.75	5.00	0.22	0.44	1.12	5.29	44.5%	0.21	0.64	0.58
	5.80	4.60	0.19	0.39	0.88	4.87	41.0%	0.18	0.44	0.50
	5.85	4.25	0.15	0.34	0.66	4.50	37.8%	0.15	0.28	0.42
	5.90	4.09	0.11	0.29	0.45	4.31	36.2%	0.10	0.14	0.32
	5.95	3.46	0.07	0.24	0.25	3.64	30.7%	0.07	0.06	0.23
	6.00	2.18	0.05	0.19	0.12	2.30	19.4%	0.05	0.02	0.18
	6.05	0.95	0.05	0.14	0.05	1.04	8.7%	0.05	0.01	0.17
	6.10	0.42	0.04	0.09	0.02	0.47	3.9%	0.03	0.00	0.13
	6.15	0.16	0.02	0.04	0.00	0.18	1.5%	0.02	0.00	0.07

Fast Fork Little Cimarron River

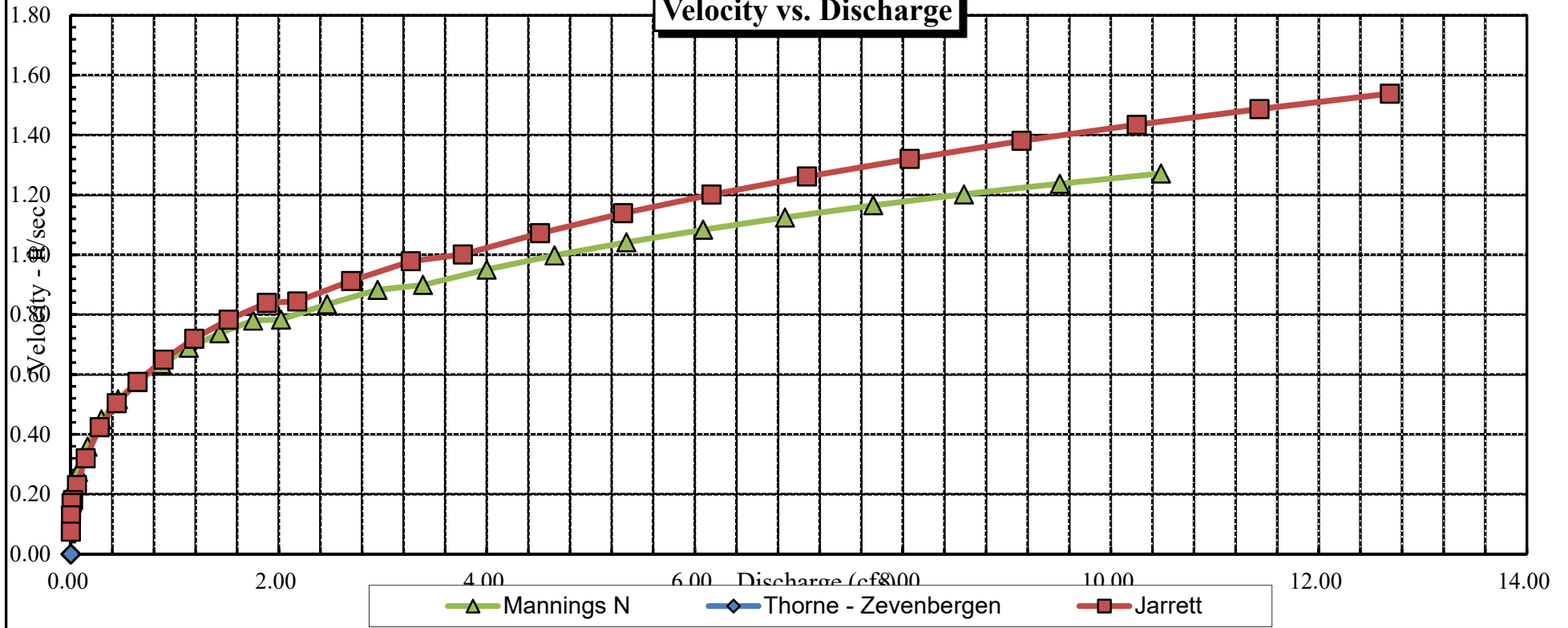
CROSS SECTION DATA ANALYSIS





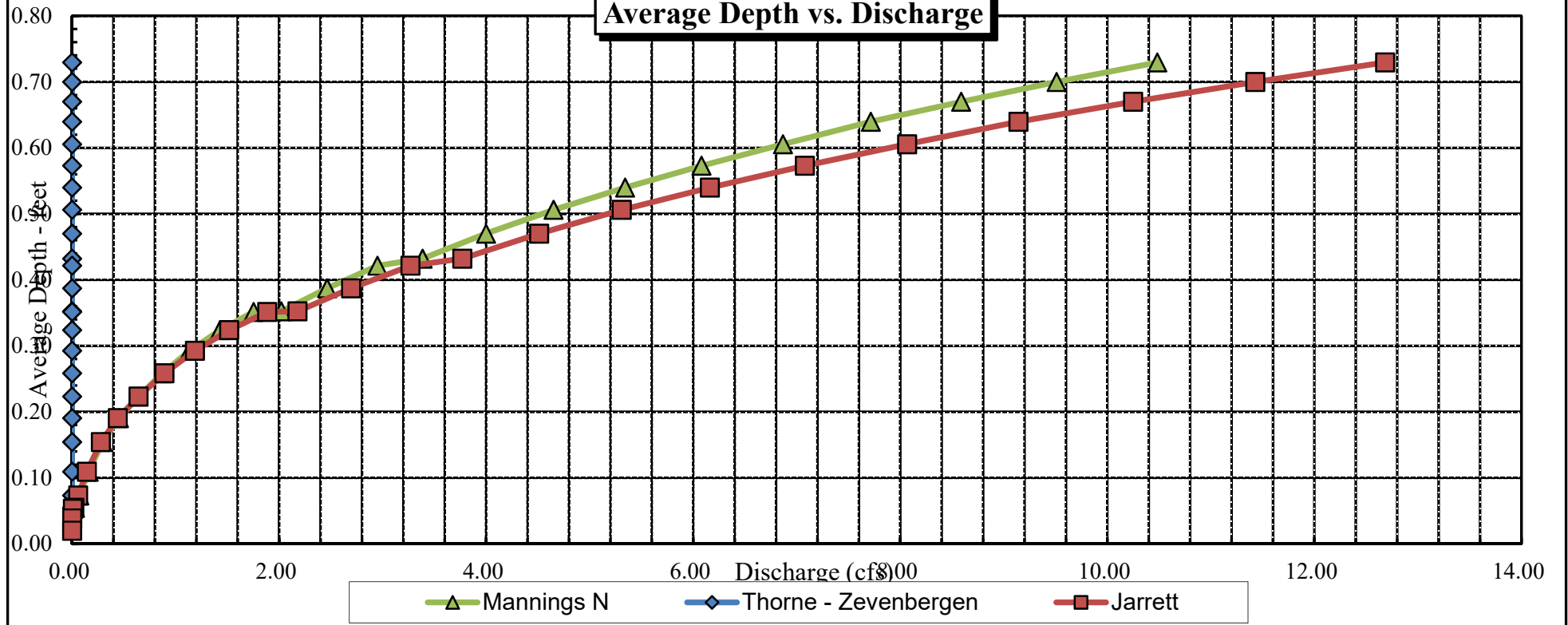
East Fork Little Cimarron River

Velocity vs. Discharge



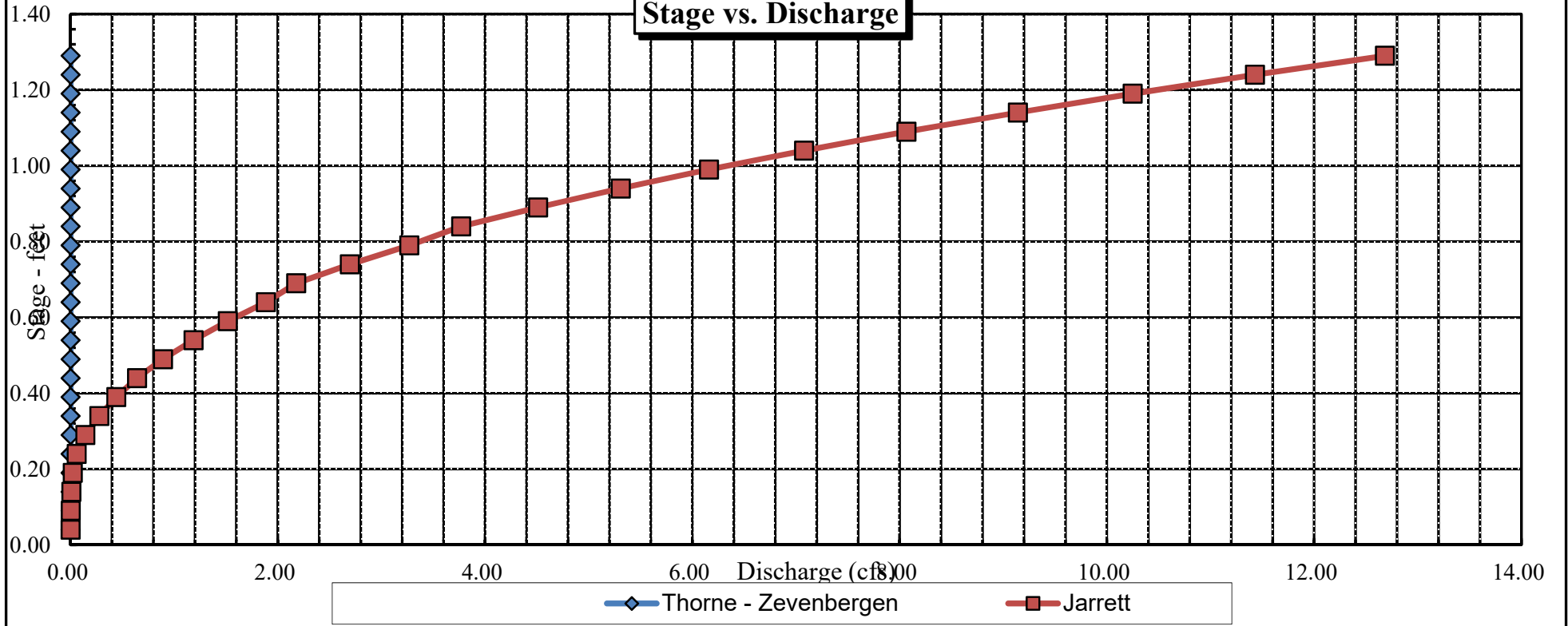
East Fork Little Cimarron River

Average Depth vs. Discharge



East Fork Little Cimarron River

Stage vs. Discharge



Data Input & Proofing

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private boundary
 XS NUMBER: 1
 DATE: 7/12/2016
 OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
 SECTION: 33
 TWP: 47N
 RANGE: 5W
 PM: New Mexico

COUNTY: Gunnison
 WATERSHED: Cimarron River
 DIVISION: 4
 DOW CODE: 44892
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.019 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 = 28								
1	RS	0.00	4.35			0.00	0.00	0.00
	G	2.60	4.90			0.00	0.00	0.00
		3.30	5.05			0.00	0.00	0.00
		4.00	5.27			0.00	0.00	0.00
		4.50	5.51			0.00	0.00	0.00
		5.00	5.50			0.00	0.00	0.00
		5.50	5.62			0.00	0.00	0.00
	W	5.80	5.75	0.00	0.00	0.00	0.00	0.00
		6.00	5.90	0.15	0.04	0.04	0.00	5.75
		6.30	6.00	0.25	0.27	0.08	0.02	5.75
		6.60	6.03	0.28	0.34	0.08	0.03	5.75
		6.90	5.92	0.17	0.19	0.05	0.01	5.75
		7.20	5.97	0.22	0.53	0.07	0.03	5.75
		7.50	5.95	0.20	0.51	0.06	0.03	5.75
		7.80	6.03	0.28	0.30	0.08	0.03	5.75
		8.10	6.01	0.26	0.47	0.08	0.04	5.75
		8.40	6.02	0.27	0.69	0.08	0.06	5.75
		8.70	6.19	0.44	0.18	0.13	0.02	5.75
		9.00	6.05	0.30	1.16	0.09	0.10	5.75
		9.30	6.11	0.36	0.81	0.11	0.09	5.75
		9.60	5.93	0.18	0.90	0.05	0.05	5.75
		9.90	6.00	0.25	0.51	0.08	0.04	5.75
		10.20	5.84	0.09	2.37	0.04	0.10	5.75
		10.80	5.75	0.00	0.00	0.00	0.00	0.00
		12.20	5.40	0.00	0.00	0.00	0.00	0.00
		12.80	5.38	0.00	0.00	0.00	0.00	0.00
		13.60	5.08	0.00	0.00	0.00	0.00	0.00
	G	13.90	4.90	0.00	0.00	0.00	0.00	0.00
	LS	16.20	4.14	0.00	0.00			

Totals	1.12	0.64
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FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>East Fork Little Cimarron River</u>		CROSS-SECTION NO.: <u>2</u>	
CROSS-SECTION LOCATION: <u>At BLM-private boundary</u>			
DATE: <u>7-12-16</u>	OBSERVERS: <u>R. Smith, A. Breibart</u>		
LEGAL DESCRIPTION:	1/4 SECTION: <u>SW</u>	SECTION: <u>33</u>	TOWNSHIP: <u>47 N/S</u>
		RANGE: <u>5 E/W</u>	PM: <u>NM</u>
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Cimarron R.</u>	WATER DIVISION: <u>4</u>	DOW WATER CODE: <u>44892</u>
MAP(S):	USGS: <u>13S 286557</u>	USFS: <u>4239043</u>	

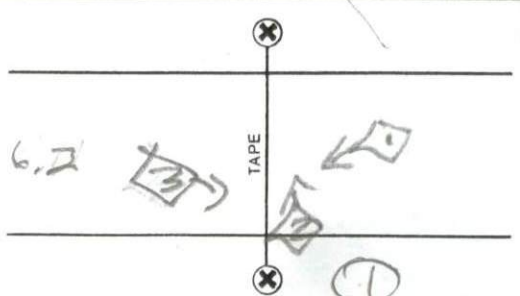
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: ☒ YES ☐ NO	METER TYPE: <u>M-M</u>			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: <u>surveyed</u> lbs/foot	TAPE TENSION: <u>surveyed</u> lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 2-foot cobbles</u>	PHOTOGRAPHS TAKEN: ☒ YES ☐ NO	NUMBER OF PHOTOGRAPHS: <u>3</u>		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
☒ Tape @ Stake LB	0.0	<u>surveyed</u>
☒ Tape @ Stake RB	0.0	<u>surveyed</u>
☐ WS @ Tape LB/RB	0.0	<u>12.1-5.95/5.95</u>
☐ WS Upstream	<u>8.0</u>	<u>5.75</u>
☐ WS Downstream	<u>7.2</u>	<u>6.33</u>
SLOPE	<u>0.58/15.2 = 0.038</u>	

SKETCH



LEGEND:
Stake ☒ X
Station ☐ 1
Photo ☐ diamond with arrow
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:																	
<u>mayfly, stonefly, caddisfly</u>																	

COMMENTS

<u>Abundant brook trout sighted. Spruce Willow Sparrow</u>

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: East Fork Little Cimarron River
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 2

DATE: 12-Jul-16
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 33
TWP: T47N
RANGE: R5W
PM: New Mexico

COUNTY: Gunnison
WATERSHED: Cimarron River
DIVISION: 4
DOW CODE: 44892

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: 0.038

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

DATA POINTS= 29

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	3.33		
1 G	3.80	5.00		
	4.50	5.11		
	5.00	5.21		
	5.50	5.27		
	6.00	5.68		
W	6.20	5.95	0.00	0.00
	6.80	6.15	0.20	0.49
	7.10	6.15	0.20	0.64
	7.40	6.25	0.30	0.63
	7.70	6.25	0.30	0.72
	8.00	6.25	0.30	0.57
	8.30	6.20	0.25	0.61
	8.60	6.15	0.20	0.58
	8.90	6.15	0.20	0.50
	9.20	6.15	0.20	0.51
	9.50	6.25	0.30	0.71
	9.80	6.15	0.20	0.52
	10.10	6.15	0.20	0.58
	10.40	6.10	0.15	0.46
	10.70	6.10	0.15	0.18
	11.00	6.10	0.15	0.06
	11.30	6.05	0.10	0.28
	11.60	6.05	0.10	0.36
	11.90	6.05	0.10	0.15
W	12.10	5.95	0.00	0.00
	12.50	5.30		
	13.50	5.06		
1 G	14.50	5.04		

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%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.63	0.20	0.09	0.04	7.6%
0.30	0.20	0.06	0.04	6.6%
0.32	0.30	0.09	0.06	9.8%
0.30	0.30	0.09	0.06	11.2%
0.30	0.30	0.09	0.05	8.8%
0.30	0.25	0.08	0.05	7.9%
0.30	0.20	0.06	0.03	6.0%
0.30	0.20	0.06	0.03	5.2%
0.30	0.20	0.06	0.03	5.3%
0.32	0.30	0.09	0.06	11.0%
0.32	0.20	0.06	0.03	5.4%
0.30	0.20	0.06	0.03	6.0%
0.30	0.15	0.05	0.02	3.6%
0.30	0.15	0.05	0.01	1.4%
0.30	0.15	0.05	0.00	0.5%
0.30	0.10	0.03	0.01	1.4%
0.30	0.10	0.03	0.01	1.9%
0.30	0.10	0.03	0.00	0.6%
0.22		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 -----

6.02 0.3 1.11 0.58 100.0%
 (Max.)

Manning's n = 0.1780
 Hydraulic Radius= 0.18351524

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.11	1.11	0.0%
5.70	1.11	2.62	137.3%
5.72	1.11	2.50	126.1%
5.74	1.11	2.37	114.8%
5.76	1.11	2.25	103.7%
5.78	1.11	2.13	92.5%
5.80	1.11	2.01	81.5%
5.82	1.11	1.88	70.4%
5.84	1.11	1.76	59.5%
5.86	1.11	1.64	48.6%
5.88	1.11	1.52	37.7%
5.90	1.11	1.40	26.9%
5.91	1.11	1.34	21.5%
5.92	1.11	1.28	16.1%
5.93	1.11	1.22	10.7%
5.94	1.11	1.16	5.3%
5.95	1.11	1.11	0.0%
5.96	1.11	1.05	-5.3%
5.97	1.11	0.99	-10.6%
5.98	1.11	0.93	-15.8%
5.99	1.11	0.87	-21.0%
6.00	1.11	0.82	-26.1%
6.02	1.11	0.70	-36.3%
6.04	1.11	0.59	-46.2%
6.06	1.11	0.49	-55.4%
6.08	1.11	0.40	-63.8%
6.10	1.11	0.31	-71.8%
6.12	1.11	0.24	-78.5%
6.14	1.11	0.17	-84.8%
6.16	1.11	0.11	-89.6%
6.18	1.11	0.08	-92.9%
6.20	1.11	0.05	-95.6%

WATERLINE AT ZERO

AREA ERROR = 5.950

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.04	10.45	0.71	1.21	7.41	11.26	100.0%	0.66	9.12	1.23
	5.05	9.88	0.74	1.20	7.30	10.70	95.0%	0.68	9.22	1.26
	5.10	8.90	0.77	1.15	6.84	9.70	86.2%	0.71	8.83	1.29
	5.15	8.42	0.76	1.10	6.41	9.22	81.9%	0.70	8.19	1.28
	5.20	7.97	0.75	1.05	6.00	8.75	77.7%	0.69	7.60	1.27
	5.25	7.37	0.76	1.00	5.62	8.15	72.4%	0.69	7.13	1.27
	5.30	6.96	0.76	0.95	5.26	7.72	68.6%	0.68	6.63	1.26
	5.35	6.87	0.72	0.90	4.92	7.58	67.3%	0.65	5.99	1.22
	5.40	6.78	0.67	0.85	4.57	7.44	66.1%	0.61	5.38	1.18
	5.45	6.69	0.63	0.80	4.24	7.31	64.9%	0.58	4.80	1.13
	5.50	6.60	0.59	0.75	3.91	7.17	63.7%	0.54	4.24	1.09
	5.55	6.50	0.55	0.70	3.58	7.03	62.5%	0.51	3.71	1.04
	5.60	6.41	0.51	0.65	3.25	6.89	61.2%	0.47	3.21	0.99
	5.65	6.32	0.46	0.60	2.94	6.76	60.0%	0.43	2.74	0.93
	5.70	6.24	0.42	0.55	2.62	6.63	58.8%	0.40	2.30	0.88
	5.75	6.17	0.37	0.50	2.31	6.51	57.8%	0.36	1.89	0.82
	5.80	6.10	0.33	0.45	2.01	6.38	56.7%	0.31	1.51	0.75
	5.85	6.04	0.28	0.40	1.70	6.26	55.6%	0.27	1.16	0.68
	5.90	5.97	0.23	0.35	1.40	6.14	54.5%	0.23	0.85	0.61
WL	5.95	5.90	0.19	0.30	1.10	6.02	53.5%	0.18	0.58	0.53
	6.00	5.65	0.14	0.25	0.82	5.75	51.1%	0.14	0.36	0.44
	6.05	4.80	0.11	0.20	0.54	4.88	43.4%	0.11	0.20	0.38
	6.10	3.75	0.08	0.15	0.31	3.82	33.9%	0.08	0.10	0.31
	6.15	2.10	0.06	0.10	0.14	2.16	19.2%	0.06	0.03	0.26
	6.20	1.35	0.04	0.05	0.05	1.38	12.2%	0.04	0.01	0.18
	6.25	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-Private Boundary
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.58 cfs
CALCULATED FLOW (Qc)= 0.58 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)= 0.30 ft
MAX CALCULATED DEPTH (Dc)= 0.30 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.53 ft/sec
MANNING'S N= 0.178
SLOPE= 0.038 ft/ft

.4 * Qm = 0.2 cfs
2.5 * Qm= 1.5 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2

Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

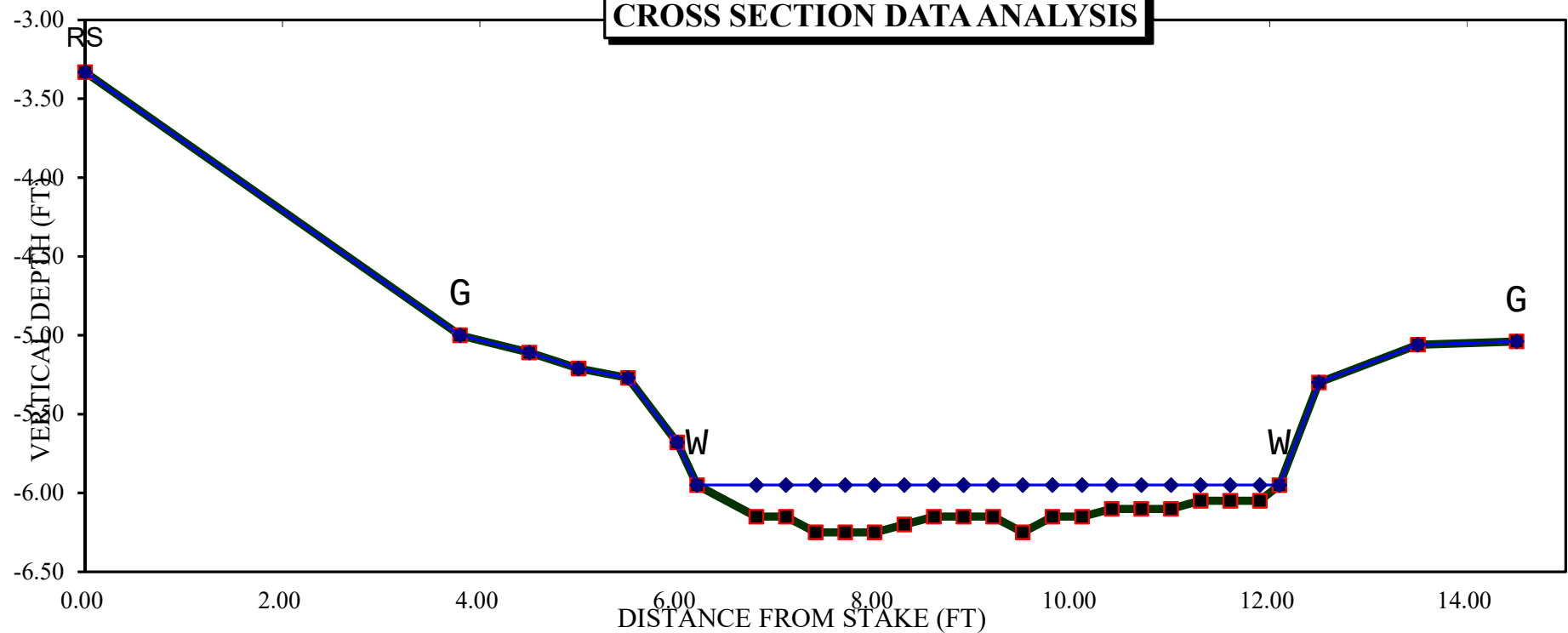
STAGING TABLE

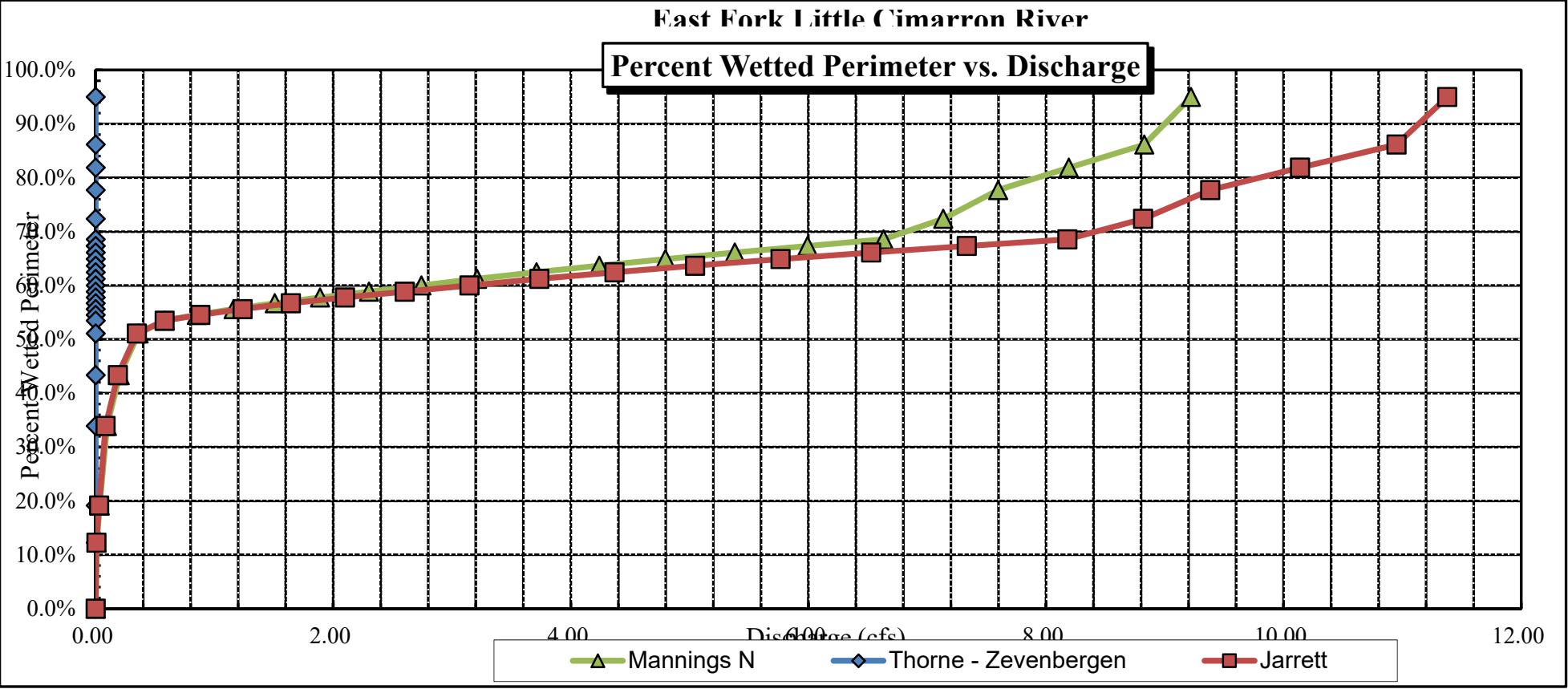
WL = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.04	10.45	0.71	1.21	7.41	11.26	100.0%	0.66	11.18	1.51
	5.05	9.88	0.74	1.20	7.30	10.70	95.0%	0.68	11.38	1.56
	5.10	8.90	0.77	1.15	6.84	9.70	86.2%	0.71	10.95	1.60
	5.15	8.42	0.76	1.10	6.41	9.22	81.9%	0.70	10.14	1.58
	5.20	7.97	0.75	1.05	6.00	8.75	77.7%	0.69	9.38	1.56
	5.25	7.37	0.76	1.00	5.62	8.15	72.4%	0.69	8.82	1.57
	5.30	6.96	0.76	0.95	5.26	7.72	68.6%	0.68	8.18	1.55
	5.35	6.87	0.72	0.90	4.92	7.58	67.3%	0.65	7.33	1.49
	5.40	6.78	0.67	0.85	4.57	7.44	66.1%	0.61	6.53	1.43
	5.45	6.69	0.63	0.80	4.24	7.31	64.9%	0.58	5.77	1.36
	5.50	6.60	0.59	0.75	3.91	7.17	63.7%	0.54	5.05	1.29
	5.55	6.50	0.55	0.70	3.58	7.03	62.5%	0.51	4.37	1.22
	5.60	6.41	0.51	0.65	3.25	6.89	61.2%	0.47	3.74	1.15
	5.65	6.32	0.46	0.60	2.94	6.76	60.0%	0.43	3.15	1.07
	5.70	6.24	0.42	0.55	2.62	6.63	58.8%	0.40	2.60	0.99
	5.75	6.17	0.37	0.50	2.31	6.51	57.8%	0.36	2.10	0.91
	5.80	6.10	0.33	0.45	2.01	6.38	56.7%	0.31	1.64	0.82
	5.85	6.04	0.28	0.40	1.70	6.26	55.6%	0.27	1.24	0.73
	5.90	5.97	0.23	0.35	1.40	6.14	54.5%	0.23	0.88	0.63
WL	5.95	5.90	0.19	0.30	1.10	6.02	53.5%	0.18	0.58	0.53
	6.00	5.65	0.14	0.25	0.82	5.75	51.1%	0.14	0.35	0.42
	6.05	4.80	0.11	0.20	0.54	4.88	43.4%	0.11	0.19	0.35
	6.10	3.75	0.08	0.15	0.31	3.82	33.9%	0.08	0.08	0.27
	6.15	2.10	0.06	0.10	0.14	2.16	19.2%	0.06	0.03	0.22
	6.20	1.35	0.04	0.05	0.05	1.38	12.2%	0.04	0.01	0.13
	6.25	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

Fast Fork Little Cimarron River

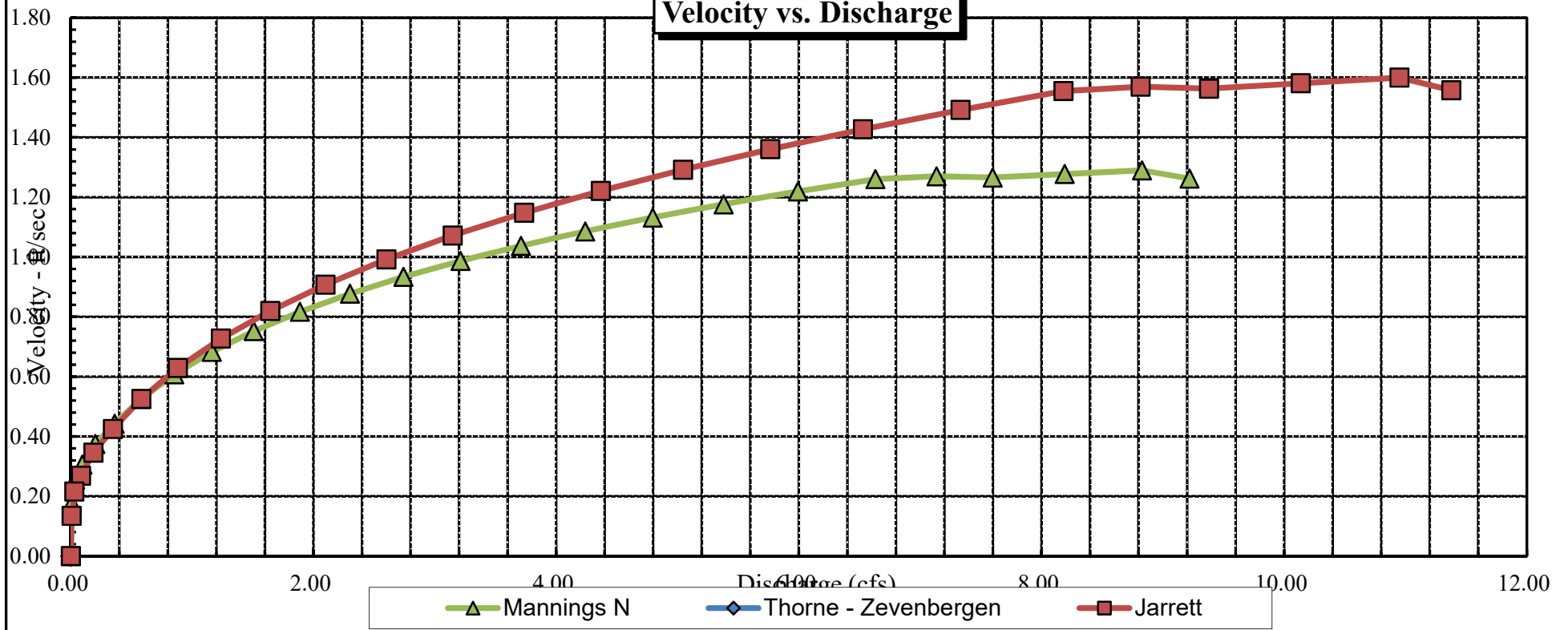
CROSS SECTION DATA ANALYSIS





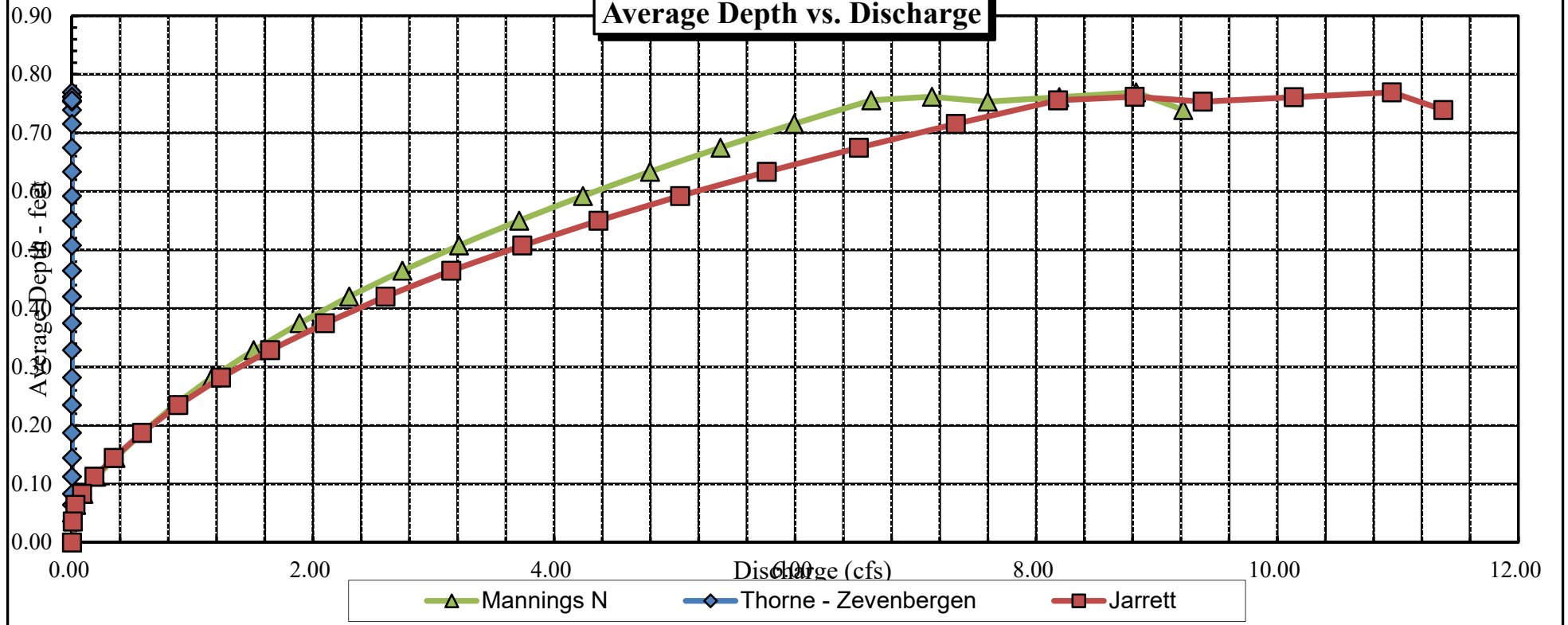
East Fork Little Cimarron River

Velocity vs. Discharge



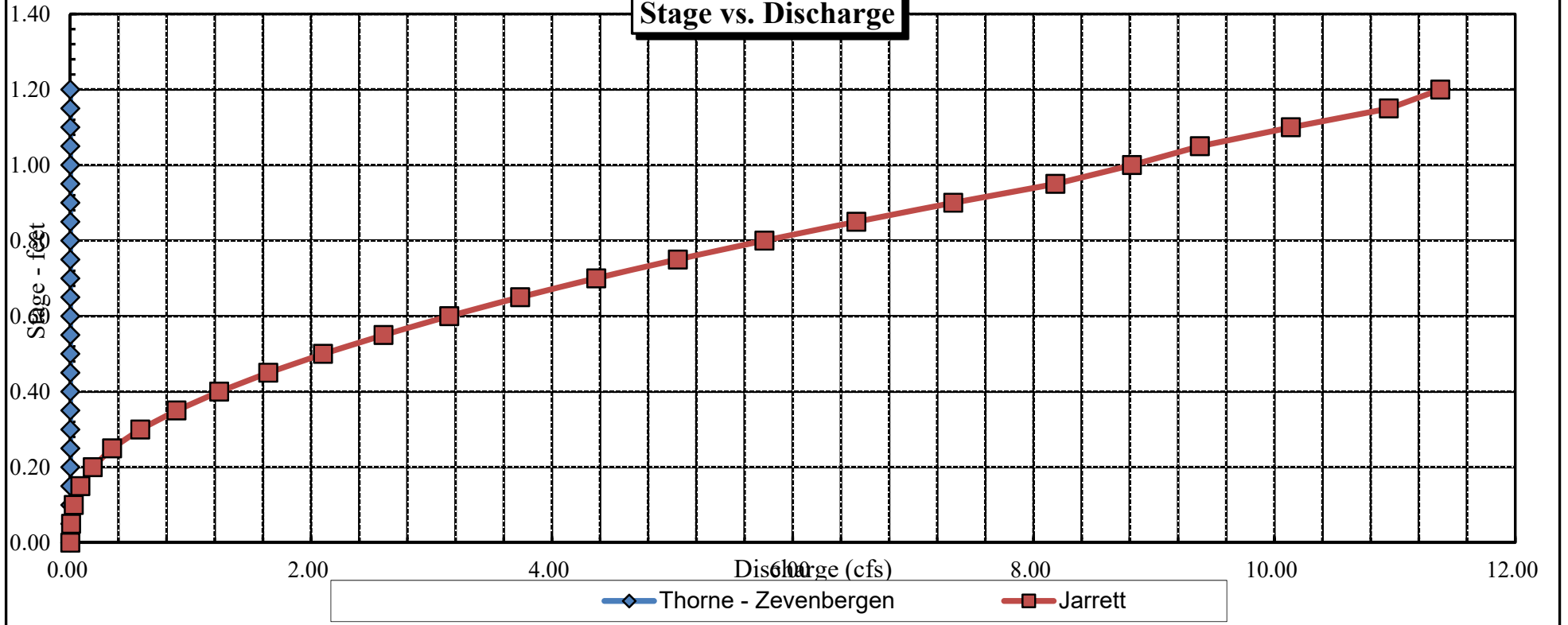
East Fork Little Cimarron River

Average Depth vs. Discharge



East Fork Little Cimarron River

Stage vs. Discharge



Data Input & Proofing

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-Private Boundary
 XS NUMBER: 2
 DATE: 7/12/2016
 OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
 SECTION: 33
 TWP: T47N
 RANGE: R5W
 PM: New Mexico

COUNTY: Gunnison
 WATERSHED: Cimarron River
 DIVISION: 4
 DOW CODE: 44892
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.038 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 = 29								
1	RS	0.00	3.33			0.00	0.00	0.00
	G	3.80	5.00			0.00	0.00	0.00
		4.50	5.11			0.00	0.00	0.00
		5.00	5.21			0.00	0.00	0.00
		5.50	5.27			0.00	0.00	0.00
		6.00	5.68			0.00	0.00	0.00
	W	6.20	5.95	0.00	0.00	0.00	0.00	0.00
		6.80	6.15	0.20	0.49	0.09	0.04	5.95
		7.10	6.15	0.20	0.64	0.06	0.04	5.95
		7.40	6.25	0.30	0.63	0.09	0.06	5.95
		7.70	6.25	0.30	0.72	0.09	0.06	5.95
		8.00	6.25	0.30	0.57	0.09	0.05	5.95
		8.30	6.20	0.25	0.61	0.08	0.05	5.95
		8.60	6.15	0.20	0.58	0.06	0.03	5.95
1		8.90	6.15	0.20	0.50	0.06	0.03	5.95
		9.20	6.15	0.20	0.51	0.06	0.03	5.95
		9.50	6.25	0.30	0.71	0.09	0.06	5.95
		9.80	6.15	0.20	0.52	0.06	0.03	5.95
		10.10	6.15	0.20	0.58	0.06	0.03	5.95
		10.40	6.10	0.15	0.46	0.05	0.02	5.95
		10.70	6.10	0.15	0.18	0.05	0.01	5.95
		11.00	6.10	0.15	0.06	0.05	0.00	5.95
		11.30	6.05	0.10	0.28	0.03	0.01	5.95
		11.60	6.05	0.10	0.36	0.03	0.01	5.95
		11.90	6.05	0.10	0.15	0.03	0.00	5.95
	W	12.10	5.95	0.00	0.00	0.00	0.00	0.00
		12.50	5.30			0.00	0.00	0.00
		13.50	5.06			0.00	0.00	0.00
	G	14.50	5.04			0.00	0.00	0.00
Totals						1.11	0.58	



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>East Fork Little Cimarron River</u>		CROSS-SECTION NO.: <u>1</u>
CROSS-SECTION LOCATION: <u>At BLM-private boundary</u>		
DATE: <u>7-28-15</u>	OBSERVERS: <u>R. Smith, A. Breibart</u>	
LEGAL DESCRIPTION:	1/4 SECTION: <u>SW</u>	SECTION: <u>33</u>
	TOWNSHIP: <u>47N</u>	RANGE: <u>5E</u>
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Gunnison R.</u>	WATER DIVISION: <u>4</u>
		DOW WATER CODE: <u>44892</u>
MAP(S):	USGS: <u>13S 286557</u>	USFS: <u>9790 ft. 4239043</u>

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: <u>YES/NO</u>	METER TYPE: <u>M-M</u>
METER NUMBER:	DATE RATED:
	CALIB/SPIN: <u>sec</u>
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 1-foot boulder</u>	TAPE WEIGHT: <u>surveyed</u> lbs/foot
	TAPE TENSION: <u>surveyed</u> lbs
PHOTOGRAPHS TAKEN: <u>YES/NO</u>	NUMBER OF PHOTOGRAPHS: <u>2</u>

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	<u>surveyed</u>
⊗ Tape @ Stake RB	0.0	<u>surveyed</u>
① WS @ Tape LB/RB	0.0	<u>5.20/5.20</u>
② WS Upstream	<u>14.3</u>	<u>4.66</u>
③ WS Downstream	<u>26.9</u>	<u>6.34</u>
SLOPE	<u>1.68/41.2 = .041</u>	

SKETCH

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO <u>NO</u>	DISTANCE ELECTROFISHED: _____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO <u>YES</u>														
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

<u>Raparian =</u>	<u>PH = 7.44</u>
<u>spice</u>	<u>Cond = 55</u>
<u>willow</u>	<u>Temp = 13°C</u>
	<u>Salinity = 0 ppt</u>

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: East Fork Little Cimarron River
XS LOCATION: At BLM-private boundary
XS NUMBER: 1

DATE: 28-Jul-15
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 33
TWP: 47N
RANGE: 5W
PM: NM

COUNTY: Gunnison
WATERSHED: Gunnison R.
DIVISION: 4
DOW CODE: 44892

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: 0.041

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-private boundary
 XS NUMBER: 1

DATA POINTS= 33

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
LS	0.00	4.00			0.00		0.00	0.00	0.0%
	3.00	4.07			0.00		0.00	0.00	0.0%
1 G	3.80	4.25			0.00		0.00	0.00	0.0%
	5.90	4.55			0.00		0.00	0.00	0.0%
W	6.20	5.20	0.00	0.00	0.00		0.00	0.00	0.0%
	6.50	5.30	0.10	0.00	0.32	0.10	0.03	0.00	0.0%
	6.80	5.30	0.10	0.11	0.30	0.10	0.03	0.00	0.7%
	7.10	5.35	0.15	0.00	0.30	0.15	0.05	0.00	0.0%
	7.40	5.30	0.10	0.00	0.30	0.10	0.03	0.00	0.0%
	7.70	5.35	0.15	0.49	0.30	0.15	0.05	0.02	4.9%
	8.00	5.40	0.20	0.09	0.30	0.20	0.06	0.01	1.2%
	8.30	5.40	0.20	0.60	0.30	0.20	0.06	0.04	7.9%
	8.60	5.40	0.20	1.21	0.30	0.20	0.06	0.07	16.0%
	8.90	5.40	0.20	0.67	0.30	0.20	0.06	0.04	8.9%
	9.20	5.40	0.20	0.88	0.30	0.20	0.06	0.05	11.7%
	9.50	5.40	0.20	0.77	0.30	0.20	0.06	0.05	10.2%
	9.80	5.30	0.10	0.44	0.32	0.10	0.03	0.01	2.9%
	10.10	5.30	0.10	0.25	0.30	0.10	0.03	0.01	1.7%
	10.40	5.30	0.10	0.37	0.30	0.10	0.03	0.01	2.4%
	10.70	5.35	0.15	0.42	0.30	0.15	0.05	0.02	4.2%
	11.00	5.30	0.10	0.48	0.30	0.10	0.03	0.01	3.2%
	11.30	5.40	0.20	0.45	0.32	0.20	0.06	0.03	6.0%
	11.60	5.40	0.20	0.73	0.30	0.20	0.06	0.04	9.7%
	11.90	5.50	0.30	0.30	0.32	0.30	0.09	0.03	6.0%
	12.20	5.55	0.35	0.06	0.30	0.35	0.11	0.01	1.4%
	12.50	5.50	0.30	0.06	0.30	0.30	0.09	0.01	1.2%
	12.80	5.40	0.20	0.00	0.32	0.20	0.06	0.00	0.0%
	13.10	5.40	0.20	0.00	0.30	0.20	0.06	0.00	0.0%
	13.40	5.40	0.20	0.00	0.30	0.20	0.07	0.00	0.0%
W	13.80	5.20	0.00	0.00	0.45		0.00	0.00	0.0%
	14.10	4.96			0.00		0.00	0.00	0.0%
1 G	15.30	4.25			0.00		0.00	0.00	0.0%
RS	17.00	3.10			0.00		0.00	0.00	0.0%

TOTALS -----

7.76 0.35 1.30 0.45 100.0%
 (Max.)

Manning's n = 0.2623
 Hydraulic Radius= 0.16749432

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-private boundary
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.30	1.30	0.0%
4.95	1.30	3.25	150.3%
4.97	1.30	3.09	137.9%
4.99	1.30	2.93	125.7%
5.01	1.30	2.77	113.5%
5.03	1.30	2.62	101.3%
5.05	1.30	2.46	89.2%
5.07	1.30	2.30	77.1%
5.09	1.30	2.15	65.1%
5.11	1.30	1.99	53.1%
5.13	1.30	1.84	41.2%
5.15	1.30	1.68	29.4%
5.16	1.30	1.61	23.5%
5.17	1.30	1.53	17.6%
5.18	1.30	1.45	11.7%
5.19	1.30	1.38	5.9%
5.20	1.30	1.30	0.0%
5.21	1.30	1.22	-5.8%
5.22	1.30	1.15	-11.6%
5.23	1.30	1.07	-17.4%
5.24	1.30	1.00	-23.1%
5.25	1.30	0.93	-28.7%
5.27	1.30	0.78	-40.0%
5.29	1.30	0.64	-51.1%
5.31	1.30	0.50	-61.2%
5.33	1.30	0.40	-69.5%
5.35	1.30	0.30	-76.7%
5.37	1.30	0.22	-83.1%
5.39	1.30	0.14	-89.1%
5.41	1.30	0.09	-92.8%
5.43	1.30	0.07	-94.5%
5.45	1.30	0.05	-96.0%

WATERLINE AT ZERO

AREA ERROR = 5.200

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-private boundary
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.25	11.50	0.84	1.30	9.70	12.38	100.0%	0.78	9.46	0.98
	4.25	11.50	0.84	1.30	9.70	12.38	100.0%	0.78	9.46	0.98
	4.30	11.07	0.83	1.25	9.13	11.93	96.4%	0.77	8.77	0.96
	4.35	10.63	0.81	1.20	8.59	11.47	92.7%	0.75	8.13	0.95
	4.40	10.20	0.79	1.15	8.07	11.02	89.1%	0.73	7.52	0.93
	4.45	9.76	0.78	1.10	7.57	10.57	85.4%	0.72	6.95	0.92
	4.50	9.33	0.76	1.05	7.09	10.12	81.8%	0.70	6.42	0.91
	4.55	8.89	0.75	1.00	6.64	9.67	78.1%	0.69	5.93	0.89
	4.60	8.79	0.71	0.95	6.20	9.51	76.9%	0.65	5.34	0.86
	4.65	8.68	0.66	0.90	5.76	9.36	75.6%	0.62	4.78	0.83
	4.70	8.57	0.62	0.85	5.33	9.21	74.4%	0.58	4.25	0.80
	4.75	8.46	0.58	0.80	4.90	9.05	73.1%	0.54	3.74	0.76
	4.80	8.36	0.54	0.75	4.48	8.90	71.9%	0.50	3.26	0.73
	4.85	8.25	0.49	0.70	4.07	8.75	70.7%	0.47	2.80	0.69
	4.90	8.14	0.45	0.65	3.66	8.59	69.4%	0.43	2.37	0.65
	4.95	8.03	0.41	0.60	3.25	8.44	68.2%	0.39	1.98	0.61
	5.00	7.94	0.36	0.55	2.85	8.30	67.1%	0.34	1.61	0.56
	5.05	7.86	0.31	0.50	2.46	8.17	66.0%	0.30	1.27	0.52
	5.10	7.77	0.27	0.45	2.07	8.03	64.9%	0.26	0.96	0.46
	5.15	7.69	0.22	0.40	1.68	7.90	63.8%	0.21	0.69	0.41
WL	5.20	7.60	0.17	0.35	1.30	7.76	62.7%	0.17	0.45	0.35
	5.25	7.35	0.13	0.30	0.93	7.49	60.5%	0.12	0.26	0.28
	5.30	6.20	0.09	0.25	0.57	6.32	51.1%	0.09	0.13	0.23
	5.35	4.30	0.07	0.20	0.30	4.37	35.3%	0.07	0.06	0.19
	5.40	1.20	0.09	0.15	0.11	1.24	10.0%	0.08	0.02	0.22
	5.45	0.90	0.06	0.10	0.05	0.92	7.5%	0.06	0.01	0.17
	5.50	0.60	0.02	0.05	0.01	0.61	4.9%	0.02	0.00	0.10

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM-private boundary
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.45 cfs
CALCULATED FLOW (Qc)= 0.45 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 5.20 ft
CALCULATED WATERLINE (WLc)= 5.20 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.35 ft
MAX CALCULATED DEPTH (Dc)= 0.35 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.35 ft/sec
MANNING'S N= 0.262
SLOPE= 0.041 ft/ft

.4 * Qm = 0.2 cfs
2.5 * Qm= 1.1 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-private boundary
 XS NUMBER: 1

Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

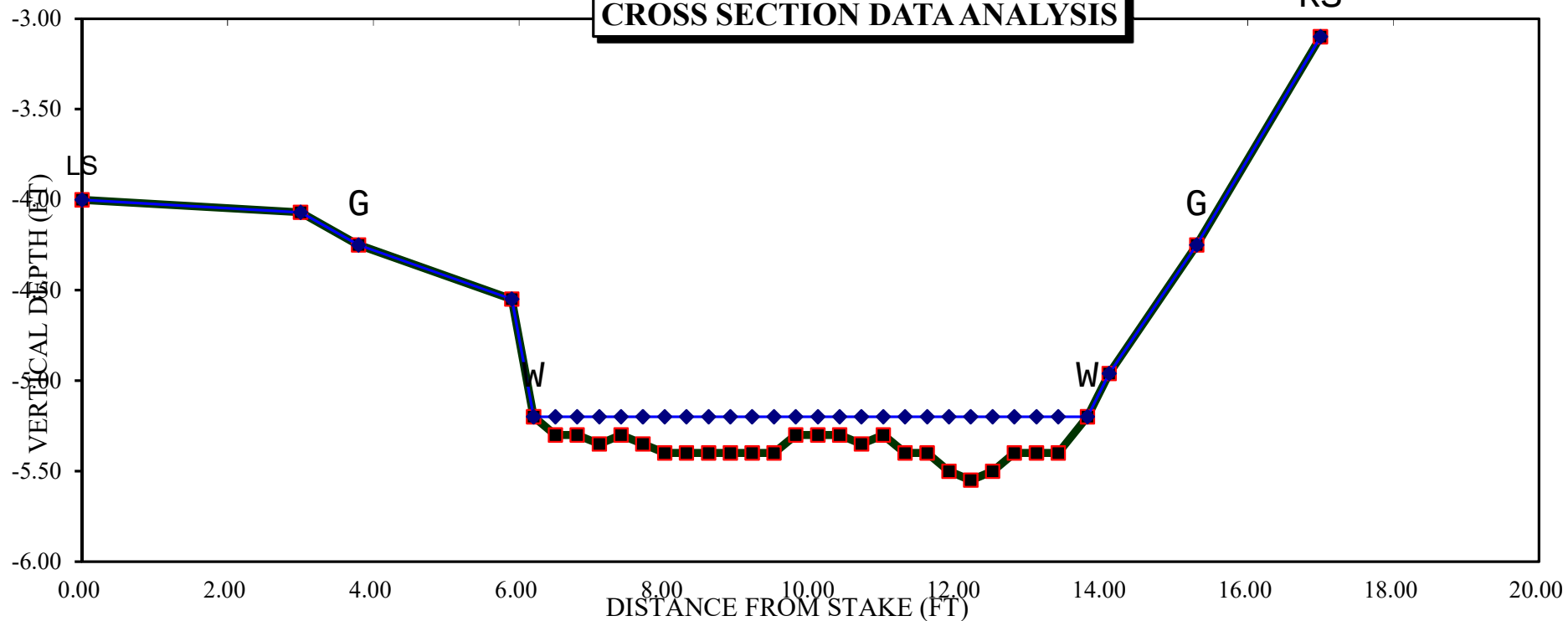
STAGING TABLE

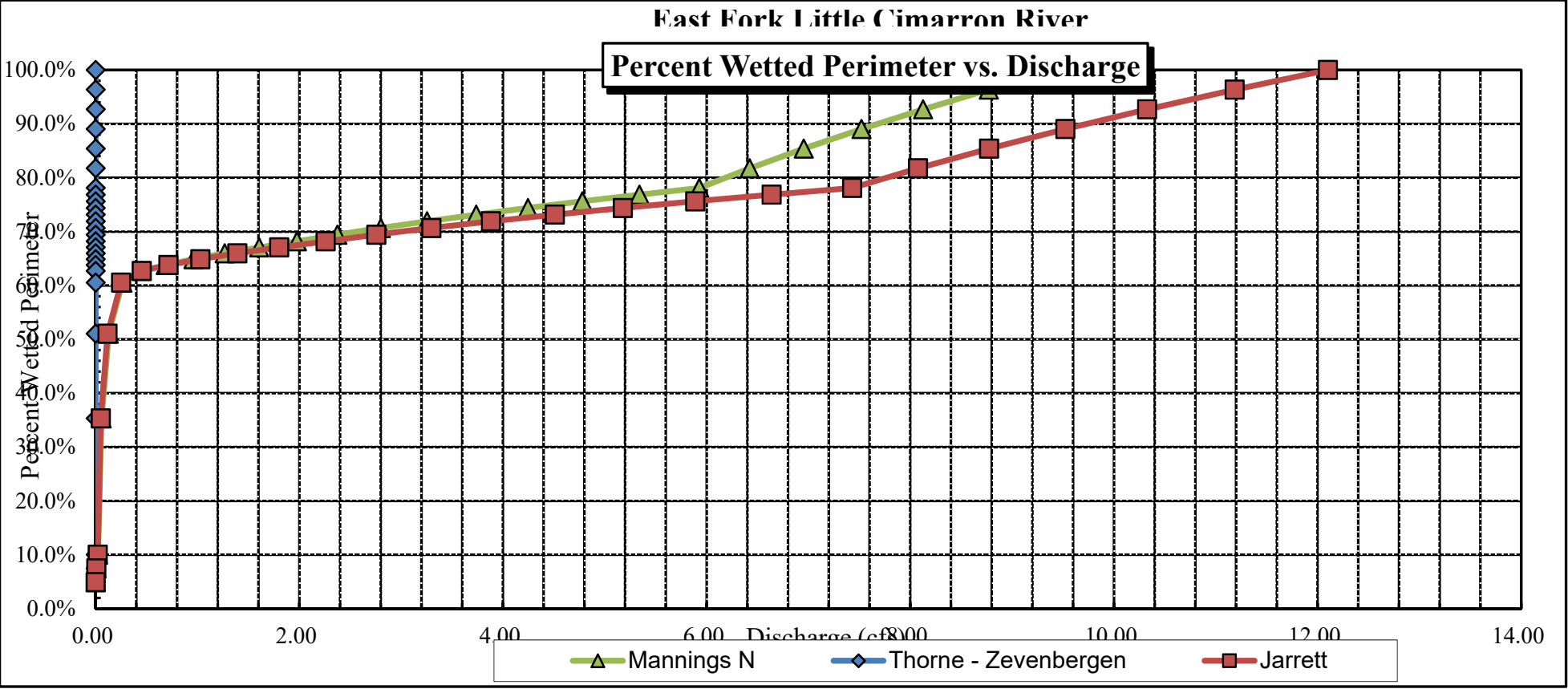
WL = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.25	11.50	0.84	1.30	9.70	12.38	100.0%	0.78	12.10	1.25
	4.25	11.50	0.84	1.30	9.70	12.38	100.0%	0.78	12.10	1.25
	4.30	11.07	0.83	1.25	9.13	11.93	96.4%	0.77	11.19	1.22
	4.35	10.63	0.81	1.20	8.59	11.47	92.7%	0.75	10.33	1.20
	4.40	10.20	0.79	1.15	8.07	11.02	89.1%	0.73	9.52	1.18
	4.45	9.76	0.78	1.10	7.57	10.57	85.4%	0.72	8.77	1.16
	4.50	9.33	0.76	1.05	7.09	10.12	81.8%	0.70	8.08	1.14
	4.55	8.89	0.75	1.00	6.64	9.67	78.1%	0.69	7.43	1.12
	4.60	8.79	0.71	0.95	6.20	9.51	76.9%	0.65	6.64	1.07
	4.65	8.68	0.66	0.90	5.76	9.36	75.6%	0.62	5.89	1.02
	4.70	8.57	0.62	0.85	5.33	9.21	74.4%	0.58	5.18	0.97
	4.75	8.46	0.58	0.80	4.90	9.05	73.1%	0.54	4.51	0.92
	4.80	8.36	0.54	0.75	4.48	8.90	71.9%	0.50	3.88	0.87
	4.85	8.25	0.49	0.70	4.07	8.75	70.7%	0.47	3.30	0.81
	4.90	8.14	0.45	0.65	3.66	8.59	69.4%	0.43	2.76	0.75
	4.95	8.03	0.41	0.60	3.25	8.44	68.2%	0.39	2.26	0.69
	5.00	7.94	0.36	0.55	2.85	8.30	67.1%	0.34	1.80	0.63
	5.05	7.86	0.31	0.50	2.46	8.17	66.0%	0.30	1.39	0.57
	5.10	7.77	0.27	0.45	2.07	8.03	64.9%	0.26	1.03	0.50
	5.15	7.69	0.22	0.40	1.68	7.90	63.8%	0.21	0.72	0.43
WL	5.20	7.60	0.17	0.35	1.30	7.76	62.7%	0.17	0.45	0.35
	5.25	7.35	0.13	0.30	0.93	7.49	60.5%	0.12	0.25	0.27
	5.30	6.20	0.09	0.25	0.57	6.32	51.1%	0.09	0.12	0.21
	5.35	4.30	0.07	0.20	0.30	4.37	35.3%	0.07	0.05	0.17
	5.40	1.20	0.09	0.15	0.11	1.24	10.0%	0.08	0.02	0.20
	5.45	0.90	0.06	0.10	0.05	0.92	7.5%	0.06	0.01	0.14
	5.50	0.60	0.02	0.05	0.01	0.61	4.9%	0.02	0.00	0.07

Fast Fork Little Cimarron River

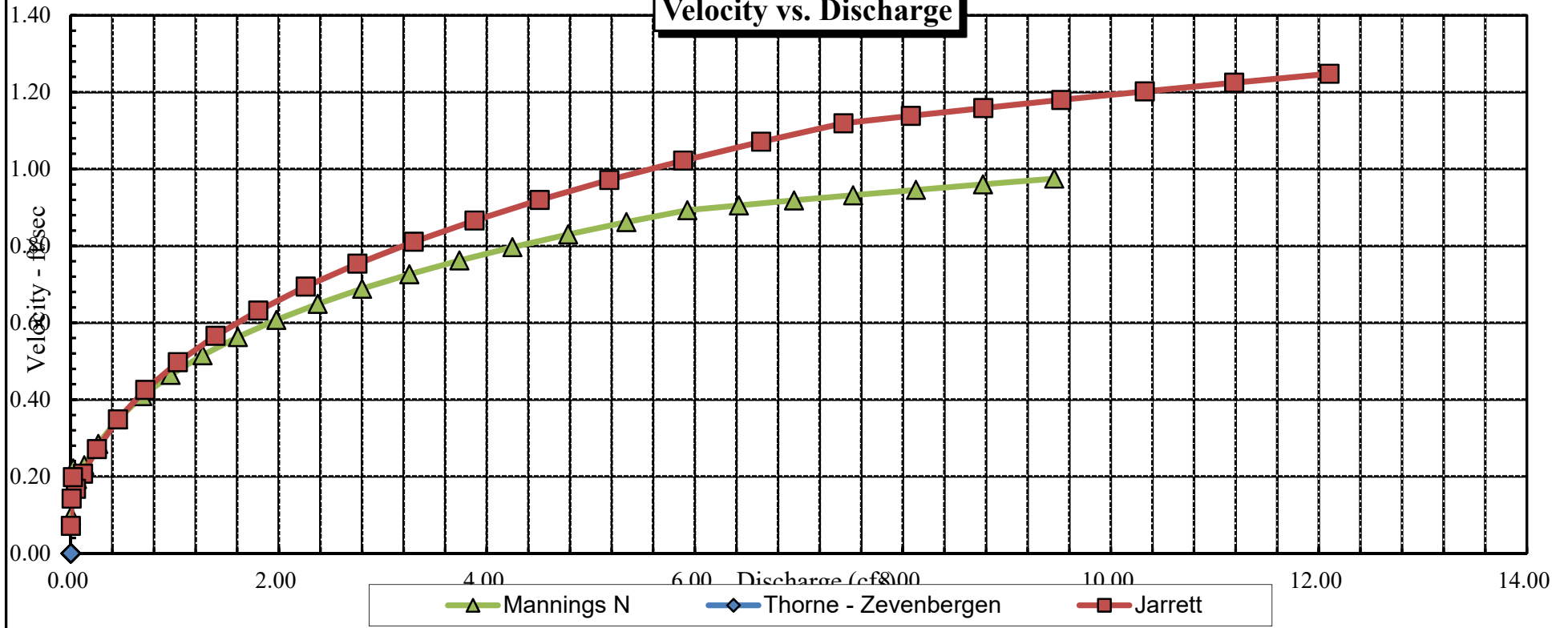
CROSS SECTION DATA ANALYSIS





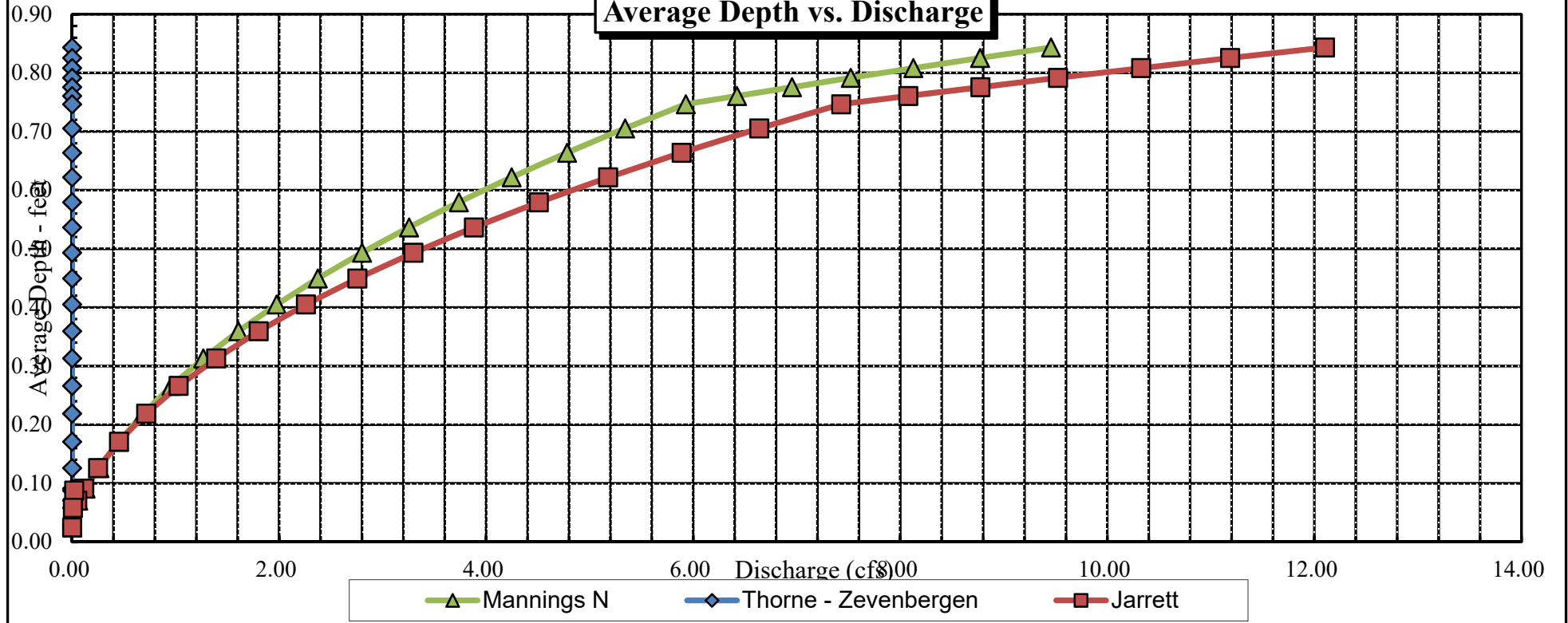
East Fork Little Cimarron River

Velocity vs. Discharge



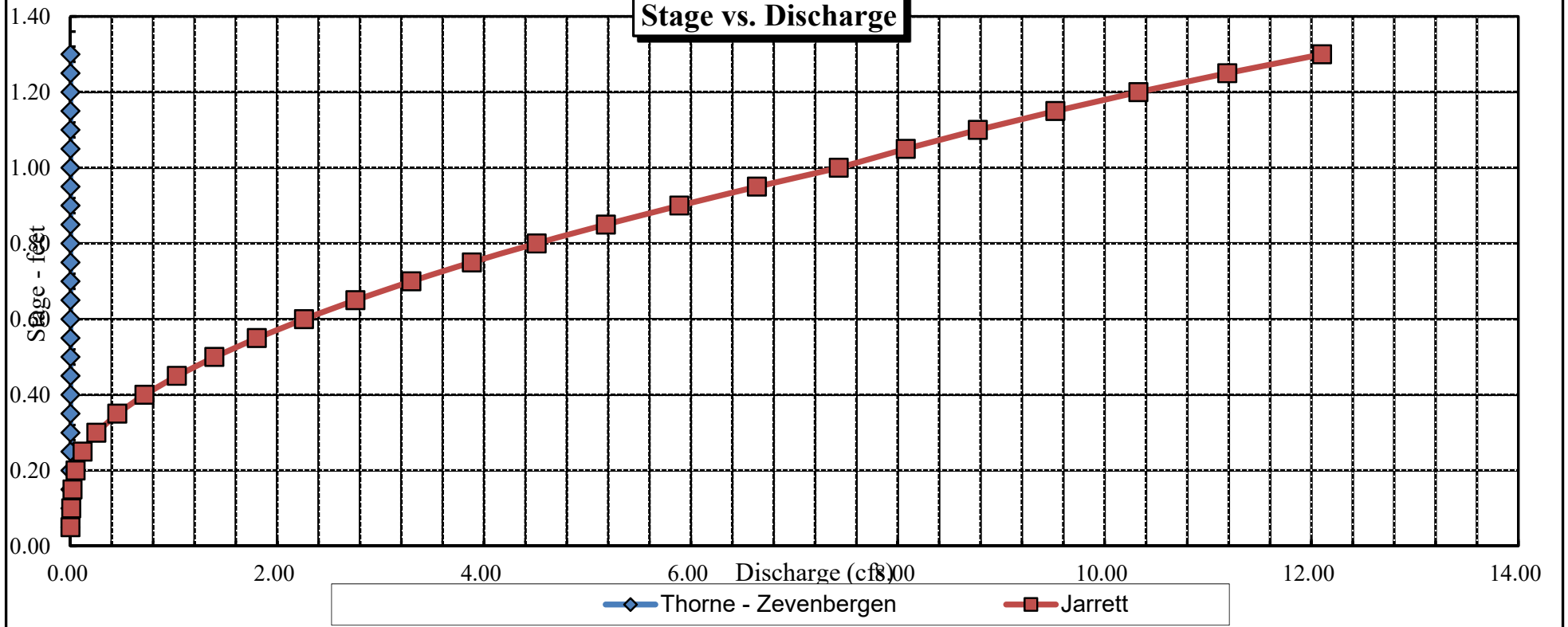
East Fork Little Cimarron River

Average Depth vs. Discharge



East Fork Little Cimarron River

Stage vs. Discharge



Data Input & Proofing

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM-private boundary
 XS NUMBER: 1
 DATE: 7/28/2015
 OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
 SECTION: 33
 TWP: 47N
 RANGE: 5W
 PM: NM

COUNTY: Gunnison
 WATERSHED: Gunnison R.
 DIVISION: 4
 DOW CODE: 44892
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs

SLOPE: 0.041 ft / ft

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

ASSIGNED TO:DATE.....

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
Total Data Points = 33								
1	LS	0.00	4.00			0.00	0.00	0.00
		3.00	4.07			0.00	0.00	0.00
	G	3.80	4.25			0.00	0.00	0.00
		5.90	4.55			0.00	0.00	0.00
	W	6.20	5.20	0.00	0.00	0.00	0.00	0.00
		6.50	5.30	0.10	0.00	0.03	0.00	5.20
		6.80	5.30	0.10	0.11	0.03	0.00	5.20
		7.10	5.35	0.15	0.00	0.05	0.00	5.20
		7.40	5.30	0.10	0.00	0.03	0.00	5.20
		7.70	5.35	0.15	0.49	0.05	0.02	5.20
		8.00	5.40	0.20	0.09	0.06	0.01	5.20
		8.30	5.40	0.20	0.60	0.06	0.04	5.20
		8.60	5.40	0.20	1.21	0.06	0.07	5.20
		8.90	5.40	0.20	0.67	0.06	0.04	5.20
		9.20	5.40	0.20	0.88	0.06	0.05	5.20
		9.50	5.40	0.20	0.77	0.06	0.05	5.20
		9.80	5.30	0.10	0.44	0.03	0.01	5.20
		10.10	5.30	0.10	0.25	0.03	0.01	5.20
		10.40	5.30	0.10	0.37	0.03	0.01	5.20
		10.70	5.35	0.15	0.42	0.05	0.02	5.20
1		11.00	5.30	0.10	0.48	0.03	0.01	5.20
		11.30	5.40	0.20	0.45	0.06	0.03	5.20
		11.60	5.40	0.20	0.73	0.06	0.04	5.20
		11.90	5.50	0.30	0.30	0.09	0.03	5.20
		12.20	5.55	0.35	0.06	0.11	0.01	5.20
		12.50	5.50	0.30	0.06	0.09	0.01	5.20
		12.80	5.40	0.20	0.00	0.06	0.00	5.20
		13.10	5.40	0.20	0.00	0.06	0.00	5.20
1	W	13.40	5.40	0.20	0.00	0.07	0.00	5.20
		13.80	5.20	0.00	0.00	0.00	0.00	0.00
		14.10	4.96			0.00	0.00	0.00
	G	15.30	4.25			0.00	0.00	0.00
	RS	17.00	3.10			0.00	0.00	0.00

Totals	1.30	0.45
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FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>East Fork Little Cimarron River</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>At BLM-private boundary</u>		
DATE: <u>7-28-15</u>	OBSERVERS: <u>R. Smith, A. Breibart</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>SW</u>	SECTION: <u>33</u>
	TOWNSHIP: <u>47N</u>	RANGE: <u>5E</u>
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Gunnison R.</u>	WATER DIVISION: <u>4</u>
		DOW WATER CODE: <u>44892</u>
MAP(S):	USGS: <u>280542</u>	USFS: <u>9,900 ft. 4238973</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: <u>surveyed</u> lbs/foot	TAPE TENSION: <u>surveyed</u> lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 1-foot boulders</u>	PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: <u>3</u>		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	<u>surveyed</u>
⊗ Tape @ Stake RB	0.0	<u>surveyed</u>
① WS @ Tape LB/RB	0.0	<u>6.70 / 6.70</u>
② WS Upstream	<u>20.7</u>	<u>6.28</u>
③ WS Downstream	<u>19.0</u>	<u>7.30</u>
SLOPE	<u>1.02 / 39.7 / = .026</u>	

SKETCH

TAPE

LEGEND:

Stake ⊗

Station ①

Photo ◇

Direction of Flow →

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO <u>NO</u>	DISTANCE ELECTROFISHED: _____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO <u>NO</u>														
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, stonefly</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: East Fork Little Cimarron River
XS LOCATION: At BLM - Private Boundary
XS NUMBER: 2

DATE: 28-Jul-15
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 33
TWP: 47N
RANGE: 5W
PM: NM

COUNTY: Gunnison
WATERSHED: Gunnison R.
DIVISION: 4
DOW CODE: 44892

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: 0.026

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM - Private Boundary
 XS NUMBER: 2

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	5.40		
1 G	1.70	5.75		
	3.00	5.99		
	4.30	6.56		
W	4.60	6.70	0.00	0.00
	4.90	6.80	0.10	0.00
	5.20	6.80	0.10	0.16
	5.50	6.90	0.20	0.27
	5.80	6.90	0.20	0.21
	6.10	6.95	0.25	0.40
	6.40	6.90	0.20	0.32
	6.70	7.00	0.30	0.71
	7.00	7.00	0.30	0.77
	7.30	7.00	0.30	1.21
	7.60	6.90	0.20	0.98
	7.90	6.95	0.25	0.47
	8.20	6.90	0.20	0.48
	8.50	6.90	0.20	0.12
	8.80	6.80	0.10	0.38
	9.10	6.80	0.10	0.80
	9.40	6.80	0.10	0.00
W	9.80	6.70	0.00	0.00
	12.00	6.34		
	13.00	5.76		
1 G	13.40	5.68		
LS	16.60	4.95		

TOTALS -----

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%
0.32	0.10	0.03	0.00	0.0%
0.30	0.10	0.03	0.00	1.0%
0.32	0.20	0.06	0.02	3.3%
0.30	0.20	0.06	0.01	2.6%
0.30	0.25	0.08	0.03	6.1%
0.30	0.20	0.06	0.02	3.9%
0.32	0.30	0.09	0.06	13.0%
0.30	0.30	0.09	0.07	14.1%
0.30	0.30	0.09	0.11	22.2%
0.32	0.20	0.06	0.06	12.0%
0.30	0.25	0.08	0.04	7.2%
0.30	0.20	0.06	0.03	5.9%
0.30	0.20	0.06	0.01	1.5%
0.32	0.10	0.03	0.01	2.3%
0.30	0.10	0.03	0.02	4.9%
0.30	0.10	0.04	0.00	0.0%
0.41		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%

5.31 0.3 0.94 0.49 100.0%
 (Max.)

Manning's n = 0.1435
 Hydraulic Radius= 0.1760828

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM - Private Boundary
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.94	0.94	0.0%
6.45	0.94	2.49	166.7%
6.47	0.94	2.35	151.3%
6.49	0.94	2.21	136.3%
6.51	0.94	2.07	121.6%
6.53	0.94	1.94	107.3%
6.55	0.94	1.81	93.4%
6.57	0.94	1.68	79.8%
6.59	0.94	1.56	66.5%
6.61	0.94	1.44	53.6%
6.63	0.94	1.32	41.1%
6.65	0.94	1.21	28.9%
6.66	0.94	1.15	23.0%
6.67	0.94	1.09	17.1%
6.68	0.94	1.04	11.3%
6.69	0.94	0.99	5.6%
6.70	0.94	0.94	0.0%
6.71	0.94	0.88	-5.5%
6.72	0.94	0.83	-11.0%
6.73	0.94	0.78	-16.3%
6.74	0.94	0.73	-21.6%
6.75	0.94	0.68	-26.9%
6.77	0.94	0.59	-37.1%
6.79	0.94	0.50	-47.0%
6.81	0.94	0.41	-55.7%
6.83	0.94	0.34	-63.1%
6.85	0.94	0.28	-70.3%
6.87	0.94	0.21	-77.3%
6.89	0.94	0.15	-83.9%
6.91	0.94	0.10	-89.6%
6.93	0.94	0.06	-93.4%
6.95	0.94	0.04	-96.0%

WATERLINE AT ZERO

AREA ERROR = 6.700

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM - Private Boundary
 XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.75	11.35	0.79	1.25	8.97	11.82	100.0%	0.76	12.46	1.39
	5.75	11.35	0.79	1.25	8.97	11.82	100.0%	0.76	12.46	1.39
	5.80	10.96	0.77	1.20	8.41	11.41	96.6%	0.74	11.46	1.36
	5.85	10.60	0.74	1.15	7.88	11.04	93.4%	0.71	10.50	1.33
	5.90	10.25	0.72	1.10	7.35	10.66	90.2%	0.69	9.58	1.30
	5.95	9.89	0.69	1.05	6.85	10.29	87.0%	0.67	8.72	1.27
	6.00	9.56	0.67	1.00	6.37	9.94	84.1%	0.64	7.89	1.24
	6.05	9.36	0.63	0.95	5.89	9.72	82.2%	0.61	7.05	1.20
	6.10	9.16	0.59	0.90	5.43	9.49	80.3%	0.57	6.24	1.15
	6.15	8.96	0.56	0.85	4.98	9.27	78.4%	0.54	5.49	1.10
	6.20	8.76	0.52	0.80	4.53	9.05	76.5%	0.50	4.77	1.05
	6.25	8.56	0.48	0.75	4.10	8.82	74.6%	0.46	4.11	1.00
	6.30	8.36	0.44	0.70	3.68	8.60	72.7%	0.43	3.48	0.95
	6.35	8.12	0.40	0.65	3.26	8.33	70.5%	0.39	2.92	0.89
	6.40	7.70	0.37	0.60	2.87	7.90	66.8%	0.36	2.44	0.85
	6.45	7.28	0.34	0.55	2.49	7.46	63.1%	0.33	2.00	0.80
	6.50	6.86	0.31	0.50	2.14	7.03	59.5%	0.30	1.62	0.76
	6.55	6.44	0.28	0.45	1.81	6.59	55.8%	0.27	1.27	0.70
	6.60	6.03	0.25	0.40	1.50	6.17	52.2%	0.24	0.97	0.65
	6.65	5.61	0.21	0.35	1.21	5.74	48.5%	0.21	0.71	0.59
WL	6.70	5.20	0.18	0.30	0.93	5.31	44.9%	0.18	0.49	0.52
	6.75	4.85	0.14	0.25	0.68	4.95	41.8%	0.14	0.31	0.45
	6.80	3.60	0.13	0.20	0.45	3.68	31.1%	0.12	0.19	0.41
	6.85	3.30	0.08	0.15	0.28	3.37	28.5%	0.08	0.09	0.32
	6.90	2.40	0.05	0.10	0.12	2.45	20.7%	0.05	0.03	0.22
	6.95	0.90	0.04	0.05	0.04	0.92	7.8%	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!

STREAM NAME: East Fork Little Cimarron River
XS LOCATION: At BLM - Private Boundary
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.49 cfs
CALCULATED FLOW (Qc)= 0.49 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 6.70 ft
CALCULATED WATERLINE (WLc)= 6.70 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.30 ft
MAX CALCULATED DEPTH (Dc)= 0.30 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.52 ft/sec
MANNING'S N= 0.144
SLOPE= 0.026 ft/ft

.4 * Qm = 0.2 cfs
2.5 * Qm= 1.2 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM - Private Boundary
 XS NUMBER: 2

Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

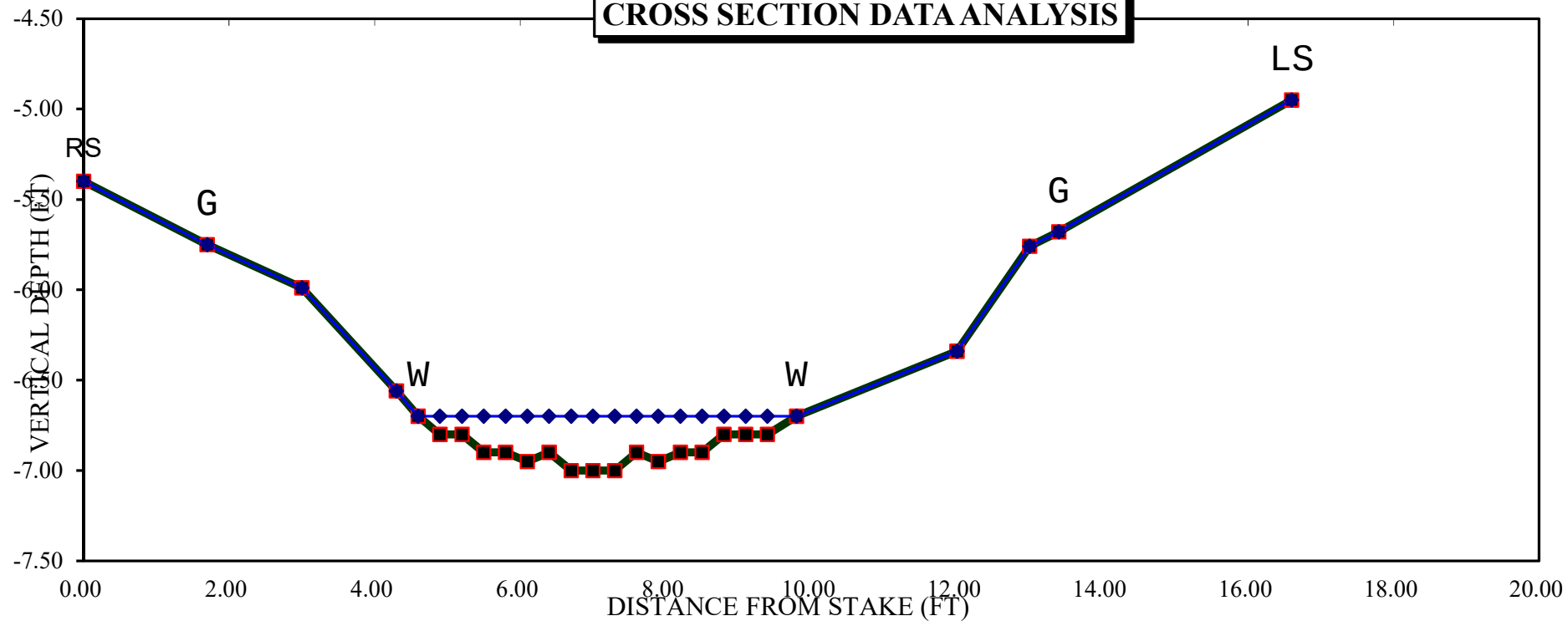
STAGING TABLE

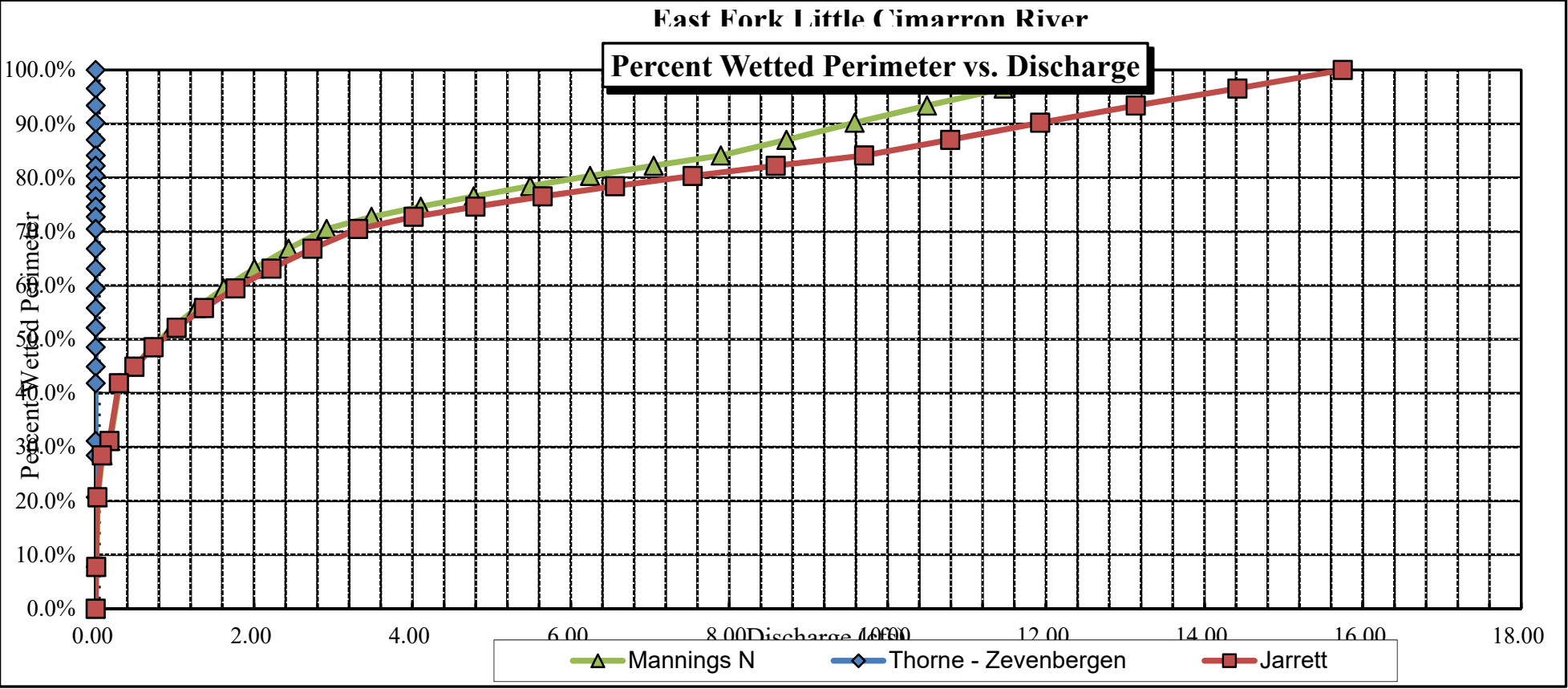
WL = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.75	11.35	0.79	1.25	8.97	11.82	100.0%	0.76	15.75	1.76
	5.75	11.35	0.79	1.25	8.97	11.82	100.0%	0.76	15.75	1.76
	5.80	10.96	0.77	1.20	8.41	11.41	96.6%	0.74	14.42	1.71
	5.85	10.60	0.74	1.15	7.88	11.04	93.4%	0.71	13.13	1.67
	5.90	10.25	0.72	1.10	7.35	10.66	90.2%	0.69	11.92	1.62
	5.95	9.89	0.69	1.05	6.85	10.29	87.0%	0.67	10.79	1.58
	6.00	9.56	0.67	1.00	6.37	9.94	84.1%	0.64	9.70	1.52
	6.05	9.36	0.63	0.95	5.89	9.72	82.2%	0.61	8.59	1.46
	6.10	9.16	0.59	0.90	5.43	9.49	80.3%	0.57	7.54	1.39
	6.15	8.96	0.56	0.85	4.98	9.27	78.4%	0.54	6.56	1.32
	6.20	8.76	0.52	0.80	4.53	9.05	76.5%	0.50	5.64	1.25
	6.25	8.56	0.48	0.75	4.10	8.82	74.6%	0.46	4.80	1.17
	6.30	8.36	0.44	0.70	3.68	8.60	72.7%	0.43	4.02	1.09
	6.35	8.12	0.40	0.65	3.26	8.33	70.5%	0.39	3.31	1.02
	6.40	7.70	0.37	0.60	2.87	7.90	66.8%	0.36	2.74	0.95
	6.45	7.28	0.34	0.55	2.49	7.46	63.1%	0.33	2.22	0.89
	6.50	6.86	0.31	0.50	2.14	7.03	59.5%	0.30	1.77	0.82
	6.55	6.44	0.28	0.45	1.81	6.59	55.8%	0.27	1.37	0.76
	6.60	6.03	0.25	0.40	1.50	6.17	52.2%	0.24	1.02	0.68
	6.65	5.61	0.21	0.35	1.21	5.74	48.5%	0.21	0.73	0.61
WL	6.70	5.20	0.18	0.30	0.93	5.31	44.9%	0.18	0.49	0.52
	6.75	4.85	0.14	0.25	0.68	4.95	41.8%	0.14	0.29	0.43
	6.80	3.60	0.13	0.20	0.45	3.68	31.1%	0.12	0.17	0.39
	6.85	3.30	0.08	0.15	0.28	3.37	28.5%	0.08	0.08	0.28
	6.90	2.40	0.05	0.10	0.12	2.45	20.7%	0.05	0.02	0.18
	6.95	0.90	0.04	0.05	0.04	0.92	7.8%	0.04	0.01	0.16
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

Fast Fork Little Cimarron River

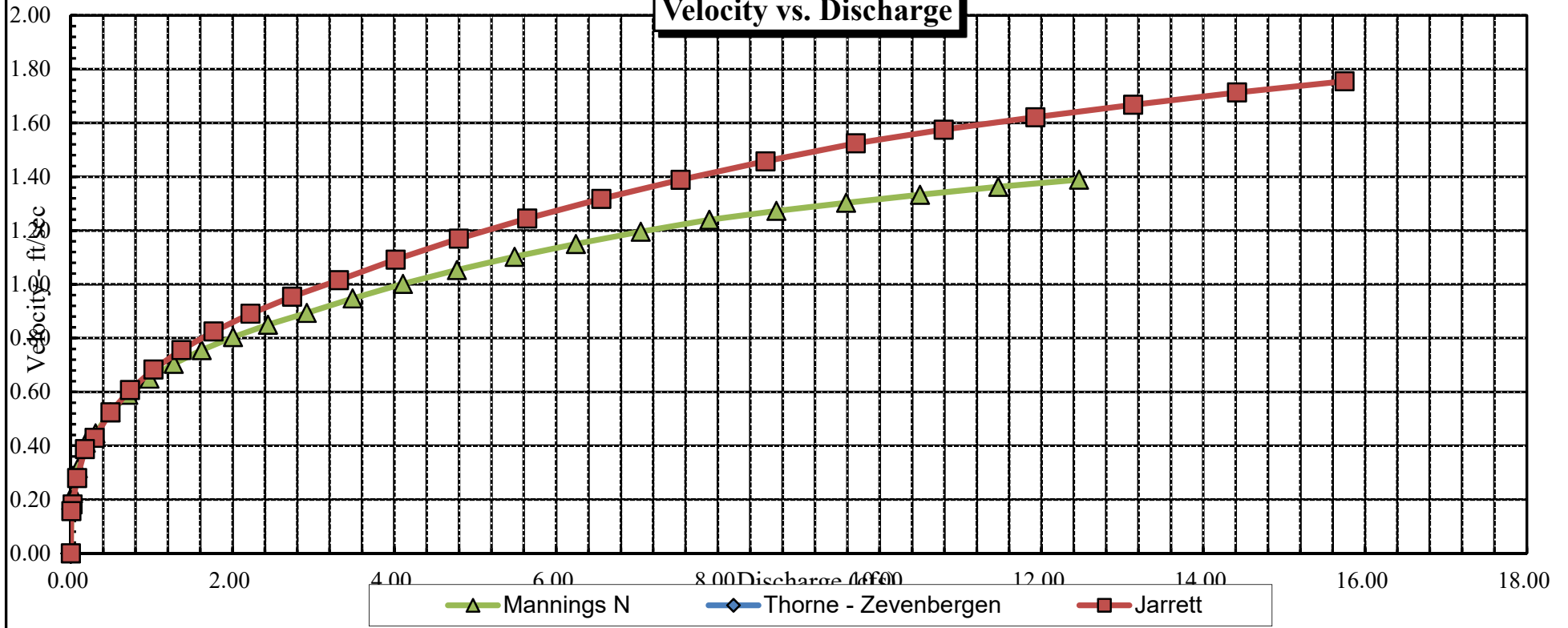
CROSS SECTION DATA ANALYSIS





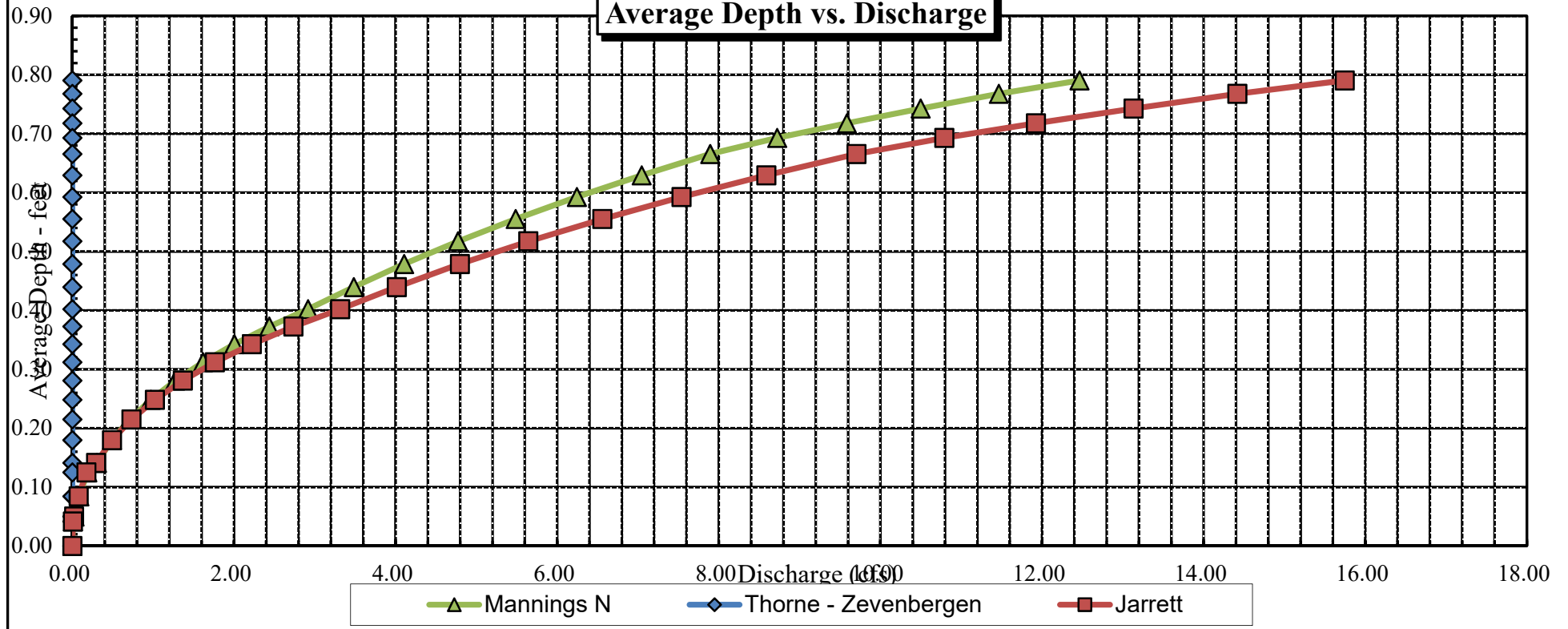
East Fork Little Cimarron River

Velocity vs. Discharge



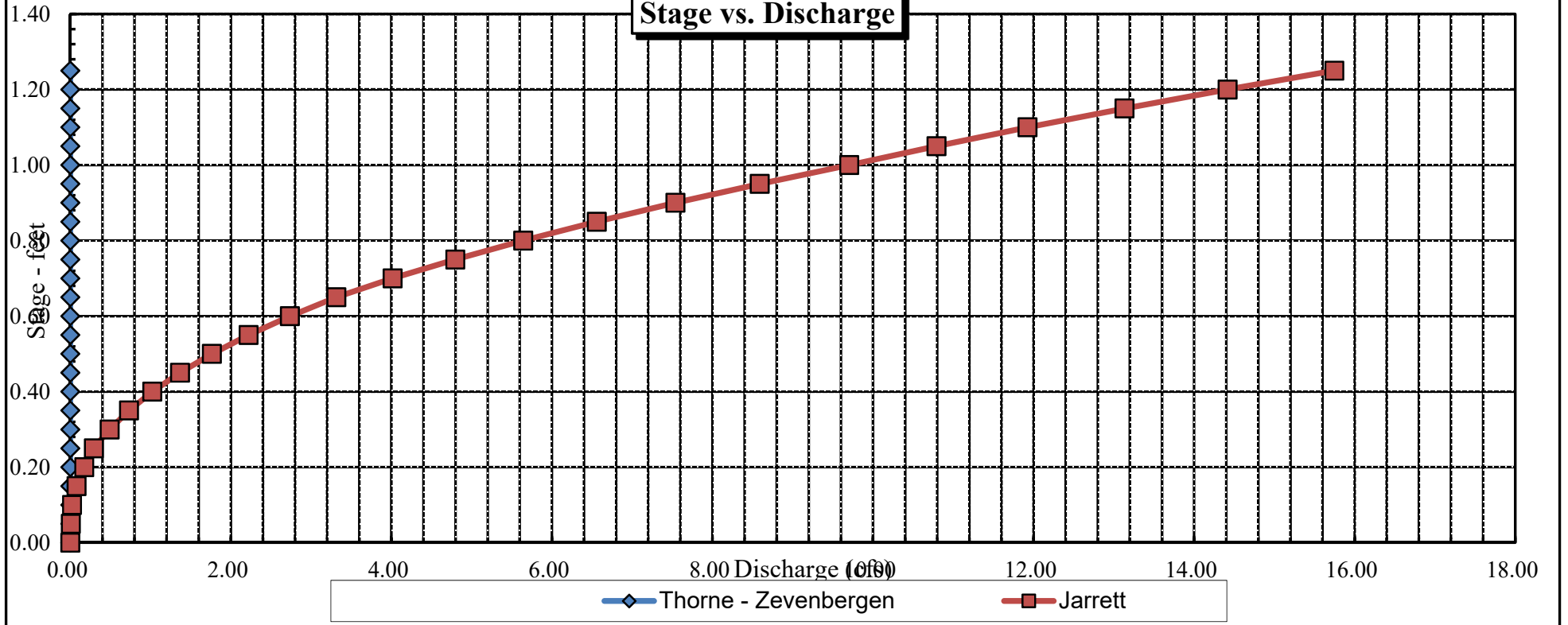
East Fork Little Cimarron River

Average Depth vs. Discharge



East Fork Little Cimarron River

Stage vs. Discharge



Data Input & Proofing

STREAM NAME: East Fork Little Cimarron River
 XS LOCATION: At BLM - Private Boundary
 XS NUMBER: 2
 DATE: 7/28/2015
 OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
 SECTION: 33
 TWP: 47N
 RANGE: 5W
 PM: NM

COUNTY: Gunnison
 WATERSHED: Gunnison R.
 DIVISION: 4
 DOW CODE: 44892
 USGS MAP:
 USFS MAP:

TAPE WT: 0.0106 lbs / ft
 TENSION: 99999 lbs
 SLOPE: 0.026 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 = 26								
1	RS	0.00	5.40			0.00	0.00	0.00
	G	1.70	5.75			0.00	0.00	0.00
		3.00	5.99			0.00	0.00	0.00
		4.30	6.56			0.00	0.00	0.00
	W	4.60	6.70	0.00	0.00	0.00	0.00	0.00
		4.90	6.80	0.10	0.00	0.03	0.00	6.70
		5.20	6.80	0.10	0.16	0.03	0.00	6.70
		5.50	6.90	0.20	0.27	0.06	0.02	6.70
		5.80	6.90	0.20	0.21	0.06	0.01	6.70
		6.10	6.95	0.25	0.40	0.08	0.03	6.70
		6.40	6.90	0.20	0.32	0.06	0.02	6.70
		6.70	7.00	0.30	0.71	0.09	0.06	6.70
		7.00	7.00	0.30	0.77	0.09	0.07	6.70
		7.30	7.00	0.30	1.21	0.09	0.11	6.70
		7.60	6.90	0.20	0.98	0.06	0.06	6.70
		7.90	6.95	0.25	0.47	0.08	0.04	6.70
1		8.20	6.90	0.20	0.48	0.06	0.03	6.70
		8.50	6.90	0.20	0.12	0.06	0.01	6.70
		8.80	6.80	0.10	0.38	0.03	0.01	6.70
		9.10	6.80	0.10	0.80	0.03	0.02	6.70
		9.40	6.80	0.10	0.00	0.04	0.00	6.70
	W	9.80	6.70	0.00	0.00	0.00	0.00	0.00
		12.00	6.34			0.00	0.00	0.00
		13.00	5.76			0.00	0.00	0.00
	G	13.40	5.68			0.00	0.00	0.00
	LS	16.60	4.95			0.00	0.00	0.00

Totals	0.94	0.49
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