

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 Fourth of July Creek, located in Water Division 4.

Location and Land Status. Fourth of July Creek originates near Powderhorn Lakes within the Powderhorn Wilderness Area, approximately 23 miles south of Blue Mesa Reservoir. This reach begins at the headwaters of the creek and extends downstream to the headgate of the Carris Thompson Ditch, a distance of approximately 5.8 miles. The BLM manages approximately 4.6 miles of this reach, while 1.2 miles are in private ownership.

Biological Summary. Fourth of July Creek is a cold-water, high gradient stream. It flows through a canyon with a valley floor approximately one-eighth mile in width. The stream cuts through alluvial deposits in the narrow valley and is confined by bedrock in many locations. The stream generally has small-sized substrate, consisting of gravels and small cobbles, and small boulders. The stream has a good mix of pools, small riffles, and runs. While deep pool habitat is absent, the existing pools are sufficient for overwintering fish.

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.

The riparian community is generally comprised of blue spruce, aspen, willow species, and alder. The riparian community is in very good condition, and provides abundant shading and cover for fish habitat.

R2Cross Analysis. The BLM collected the following R2Cross data from Fourth of July 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)
07/18/2013 #1	0.42 cfs	8.56 feet	Out of range	0.79 cfs
07/18/2013 #2	0.37 cfs	6.00 feet	0.40 cfs	Out of range
07/25/2014 #1	0.40 cfs	10.14 feet	0.65 cfs	Out of range
07/25/2014 #2	0.39 cfs	9.00 feet	0.81 cfs	Out of range

Averages: 0.62 cfs 0.79 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.

0.8 cubic feet per second is recommended during the snowmelt runoff period from April 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 during the warm weather months.

0.6 cubic feet per second is recommended from July 1 to March 31. This recommendation is driven by the average velocity 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 recommends relying upon three sources of data for water availability analysis. USGS Gage 09122000 (Cebolla Creek at Powderhorn, CO) measures flow from the next watershed to the east of Fourth of July Creek. Elevation and precipitation patterns for the Cebolla Creek watershed are very similar to the Fourth of July Creek watershed. A basin apportionment analysis could be performed to derive flow rates for Fourth of July Creek. In addition, Streamstats should be consulted. The Streamstats model produces similar estimates of baseflow as basin apportionment calculation, but BLM believes the Streamstats model may overestimate snowmelt runoff flows. Finally, diversion records for the Carris Thompson Ditch can be consulted to help confirm the duration of the snowmelt runoff period.

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

Fourth of July Feeder Pipeline – 2.0 cfs
Fourth of July Pond – 1.8 acre feet

The feeder pipeline maintains the off-channel pond at full capacity and maintains the water quality within the pond. The pond appears to be operated on an inflow equals outflow basis, so any water that is not consumed by pond evaporation is immediately returned to Fourth of July Creek.

Relationship to Land Management Plans. The headwaters of this creek are located within the Powderhorn Wilderness Area. BLM manages the wilderness area to maintain stream habitats in a pristine and unimpaired condition. In addition, the portion of the creek within the wilderness area has been determined to be an "Outstanding Water of The State of Colorado" because of its excellent water quality. Establishing an instream flow water right would assist in meeting these objectives. Appropriation of an instream flow water right would also assist BLM in long-term management of riparian values and important fishery values.

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,

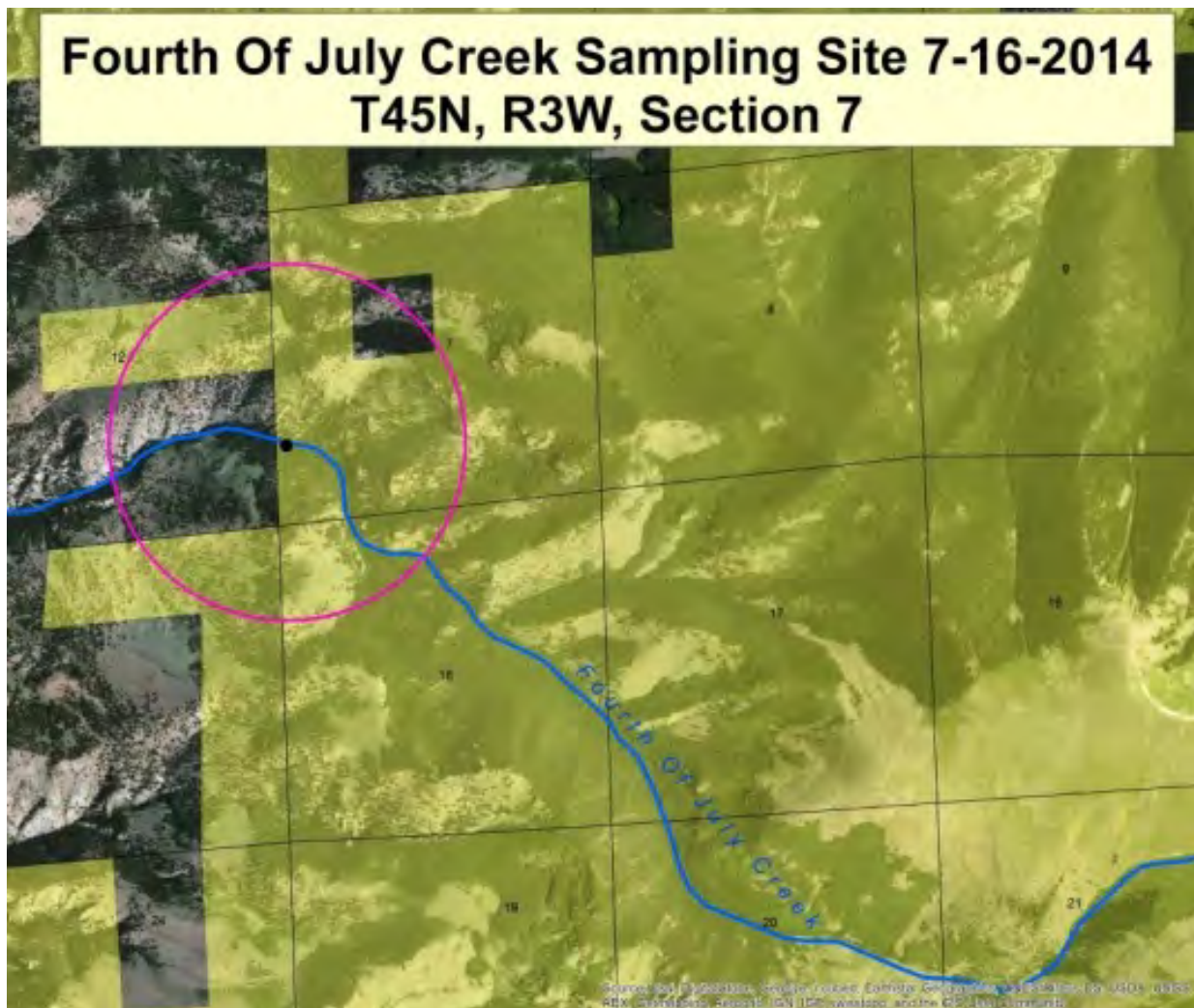
Brian St. George
Deputy State Director
Resources and Fire

Cc: Field Office Manager, Gunnison Field Office
Lori Armstrong, Southwest District Office
Andrew Breibart, Gunnison Field Office

Gunnison Field Office Stream Surveys July 2014

Fourth of July Creek – Water Code: #45351

Fourth of July Creek, located on BLM lands administered by the Gunnison Field Office, was sampled on July 16, 2014. Fourth of July Creek is tributary to the Lake Fork Gunnison River. Sampling was done to determine species composition and obtain a population estimate. A two-pass removal population estimate was completed. The stream was sampled using one backpack electroshocking unit. Brook trout (*Salvelinus fontinalis*), was the only species seen or collected. Personnel present included Dan Brauch (CPW), Gregor Dekleva, Tom Fresques, and Kristen Doyle (BLM).





Fourth of July Creek



Fourth of July Creek

STREAM SURVEY FISH SAMPLING FORM 2014									
WATER: 4 th of July					DATE: 7/16/14		GEAR: BPE-1		
Crew: Braugh, Dekleva, Fresques, Doyle					Location:				
#	Pass	Species	Length	Weight	#	Pass	Species	Length	Weight
1	1	BRK	148	36	26	2	BRK	137	28
2	1	BRK	139	25	27	2	BRK	130	20
3	1	BRK	118	20	28	2	BRK	88	6.5
4	1	BRK	116	19	29	2	BRK	131	24.9
5	1	BRK	154	42	30	2	BRK	176	68.8
6	1	BRK	172	58	31	2	BRK	138	24.2
7	1	BRK	127	20	32	2	BRK	88	6.3
8	1	BRK	164	54	33				
9	1	BRK	184	67	34				
10	1	BRK	132	28	35				
11	1	BRK	139	36	36				
12	1	BRK	142	33	37				
13	1	BRK	174	54	38				
14	1	BRK	128	22	39				
15	1	BRK	93	8	40				
16	1	BRK	92	5	41				
17	1	BRK	138	27	42				
18	1	BRK	136	25	43				
19	1	BRK	128	23	44				
20	1	BRK	164	48	45				
21	1	BRK	90	8	46				
22	1	BRK	122	18	47				
23	1	BRK	91	7	48				
24	1	BRK	84	8	49				
25	1	BRK	33	1	50				
GPS Coordinates: Start: 13S 301467, 4226150 End: 13S 301519, 4226516									
H2O Temp: 55°F				Reach Length: 300'			Stream	1.4.4'	
Conductivity: 83µs				Shocker Settings: 385			Widths:	2.3.9'	
Habitat (Riparian): Diverse, dense, lush vegetation. Spruce, ponderosa pine, rocky mountain juniper, aspen, alder, willow, sedge								3.2'	
								4.8.2'	
								5.6.2'	
								Avg:	
Habitat (Stream): Channel type A, lots of woody debris, some good pools about 1.5 deep. Gravel, cobble, and rock substrate.									

Discussion:

This small stream contained a good mix of small pools, riffles and runs. Large deep pools were absent but existing pools are sufficient to overwinter and oversummer resident brook trout. Abundant woody debris helps to form and maintain some of the better pools. Substrate consists of some gravels and cobbles with rock. Riparian habitat is dense and lush consisting of blue spruce, ponderosa pine, rocky mountain juniper, aspen, alder, willow, and sedges. The stream is steep gradient and appears to be a Rosgen A/B channel type.

Sampling on this stream was conducted to determine species composition and obtain a population estimate. In addition, an Instream Flow recommendation may be pursued on this stream. Based on the sampling, the site specific population estimate of fish ≥ 120 mm Total Length within the sample reach (300 feet) is 24 fish + or – 5 at the 95% confidence interval. The extrapolated population estimate of fish ≥ 120 mm Total Length is 417 fish + or – 96 fish per mile at the 95% confidence interval.

Recommendations:

- Consider sampling further up the drainage to determine upstream distribution limits and look for upstream movement barriers – the stream, although small, could be a candidate for future cutthroat trout reclamation
- Periodically monitor stream and riparian habitats
- Consider instream flow recommendation for this stream

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

LOCATION INFORMATION

STREAM NAME: Fourth of July Creek
XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
XS NUMBER: 2

DATE: 18-Jul-13
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SE
SECTION: 12
TWP: 45N
RANGE: 4W
PM: New Mexico

COUNTY: Gunnison
WATERSHED: Lake Fork Gunnison River
DIVISION: 4
DOW CODE: 45351

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: 0.088

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 XS NUMBER: 2

DATA POINTS= 23

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	5.36		
1 G	1.10	5.83		
W	2.00	6.90	0.00	0.00
	2.20	7.10	0.20	0.51
	2.50	7.10	0.20	0.34
	2.80	7.15	0.25	0.05
	3.10	7.00	0.10	0.43
	3.40	7.00	0.10	0.30
	3.70	7.00	0.10	0.00
	4.00	7.00	0.10	0.03
	4.30	7.10	0.20	0.22
	4.60	7.10	0.20	0.48
	4.90	7.10	0.20	0.63
	5.20	7.15	0.25	1.05
	5.50	7.15	0.25	0.78
	5.80	7.15	0.25	0.33
	6.10	7.10	0.20	0.35
	6.40	7.20	0.30	0.28
	6.70	7.25	0.35	0.08
W	6.80	6.90	0.00	0.00
1 G	7.10	5.83		
	7.60	5.24		
RS	8.80	5.23		

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%
0.28	0.20	0.05	0.03	7.0%
0.30	0.20	0.06	0.02	5.6%
0.30	0.25	0.08	0.00	1.0%
0.34	0.10	0.03	0.01	3.5%
0.30	0.10	0.03	0.01	2.5%
0.30	0.10	0.03	0.00	0.0%
0.30	0.10	0.03	0.00	0.2%
0.32	0.20	0.06	0.01	3.6%
0.30	0.20	0.06	0.03	7.9%
0.30	0.20	0.06	0.04	10.3%
0.30	0.25	0.08	0.08	21.5%
0.30	0.25	0.08	0.06	16.0%
0.30	0.25	0.08	0.02	6.8%
0.30	0.20	0.06	0.02	5.7%
0.32	0.30	0.09	0.03	6.9%
0.30	0.35	0.07	0.01	1.5%
0.36		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 -----

5.23	0.35	0.93	0.37	100.0%
(Max.)				

Manning's n = 0.3541
 Hydraulic Radius= 0.17777722

STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.93	0.93	0.0%
6.65	0.93	2.17	132.8%
6.67	0.93	2.06	121.9%
6.69	0.93	1.96	111.0%
6.71	0.93	1.86	100.2%
6.73	0.93	1.76	89.5%
6.75	0.93	1.66	78.8%
6.77	0.93	1.56	68.1%
6.79	0.93	1.46	57.5%
6.81	0.93	1.37	46.9%
6.83	0.93	1.27	36.4%
6.85	0.93	1.17	26.0%
6.86	0.93	1.12	20.7%
6.87	0.93	1.07	15.5%
6.88	0.93	1.03	10.3%
6.89	0.93	0.98	5.2%
6.90	0.93	0.93	0.0%
6.91	0.93	0.88	-5.2%
6.92	0.93	0.83	-10.3%
6.93	0.93	0.79	-15.4%
6.94	0.93	0.74	-20.5%
6.95	0.93	0.69	-25.6%
6.97	0.93	0.60	-35.8%
6.99	0.93	0.50	-45.9%
7.01	0.93	0.42	-54.9%
7.03	0.93	0.35	-62.8%
7.05	0.93	0.28	-70.4%
7.07	0.93	0.21	-77.7%
7.09	0.93	0.14	-84.7%
7.11	0.93	0.09	-90.4%
7.13	0.93	0.05	-94.2%
7.15	0.93	0.03	-97.0%

WATERLINE AT ZERO

AREA ERROR = 6.900

STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 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	5.83	6.00	1.12	1.42	6.71	7.74	100.0%	0.87	7.59	1.13
	5.90	5.92	1.06	1.35	6.29	7.58	97.9%	0.83	6.92	1.10
	5.95	5.87	1.02	1.30	6.00	7.46	96.4%	0.80	6.45	1.08
	6.00	5.81	0.98	1.25	5.70	7.34	94.8%	0.78	6.00	1.05
	6.05	5.75	0.94	1.20	5.42	7.22	93.3%	0.75	5.56	1.03
	6.10	5.70	0.90	1.15	5.13	7.11	91.8%	0.72	5.14	1.00
	6.15	5.64	0.86	1.10	4.85	6.99	90.3%	0.69	4.72	0.98
	6.20	5.59	0.82	1.05	4.56	6.87	88.8%	0.66	4.33	0.95
	6.25	5.53	0.78	1.00	4.29	6.76	87.3%	0.63	3.94	0.92
	6.30	5.47	0.73	0.95	4.01	6.64	85.8%	0.60	3.57	0.89
	6.35	5.42	0.69	0.90	3.74	6.52	84.2%	0.57	3.21	0.86
	6.40	5.36	0.65	0.85	3.47	6.40	82.7%	0.54	2.87	0.83
	6.45	5.30	0.60	0.80	3.20	6.29	81.2%	0.51	2.54	0.79
	6.50	5.25	0.56	0.75	2.94	6.17	79.7%	0.48	2.23	0.76
	6.55	5.19	0.52	0.70	2.68	6.05	78.2%	0.44	1.94	0.72
	6.60	5.14	0.47	0.65	2.42	5.93	76.7%	0.41	1.66	0.68
	6.65	5.08	0.43	0.60	2.17	5.82	75.2%	0.37	1.39	0.64
	6.70	5.02	0.38	0.55	1.91	5.70	73.6%	0.34	1.15	0.60
	6.75	4.97	0.33	0.50	1.66	5.58	72.1%	0.30	0.92	0.56
	6.80	4.91	0.29	0.45	1.42	5.47	70.6%	0.26	0.72	0.51
	6.85	4.86	0.24	0.40	1.17	5.35	69.1%	0.22	0.53	0.45
WL	6.90	4.80	0.19	0.35	0.93	5.23	67.6%	0.18	0.37	0.39
	6.95	4.74	0.15	0.30	0.69	5.11	66.0%	0.14	0.23	0.33
	7.00	3.77	0.12	0.25	0.46	4.09	52.8%	0.11	0.13	0.29
	7.05	3.46	0.08	0.20	0.28	3.69	47.7%	0.07	0.06	0.22
	7.10	2.24	0.05	0.15	0.11	2.40	31.0%	0.05	0.02	0.16
	7.15	0.48	0.06	0.10	0.03	0.57	7.3%	0.05	0.00	0.17
	7.20	0.31	0.02	0.05	0.01	0.36	4.6%	0.02	0.00	0.10

STREAM NAME: Fourth of July Creek
XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)=	0.37 cfs
CALCULATED FLOW (Qc)=	0.37 cfs
(Qm-Qc)/Qm * 100 =	0.0 %
MEASURED WATERLINE (WLm)=	6.90 ft
CALCULATED WATERLINE (WLc)=	6.90 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=	0.39 ft/sec
MANNING'S N=	0.354
SLOPE=	0.088 ft/ft
.4 * Qm =	0.1 cfs
2.5 * Qm=	0.9 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
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[illegible]

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

CWCB REVIEW BY: DATE:

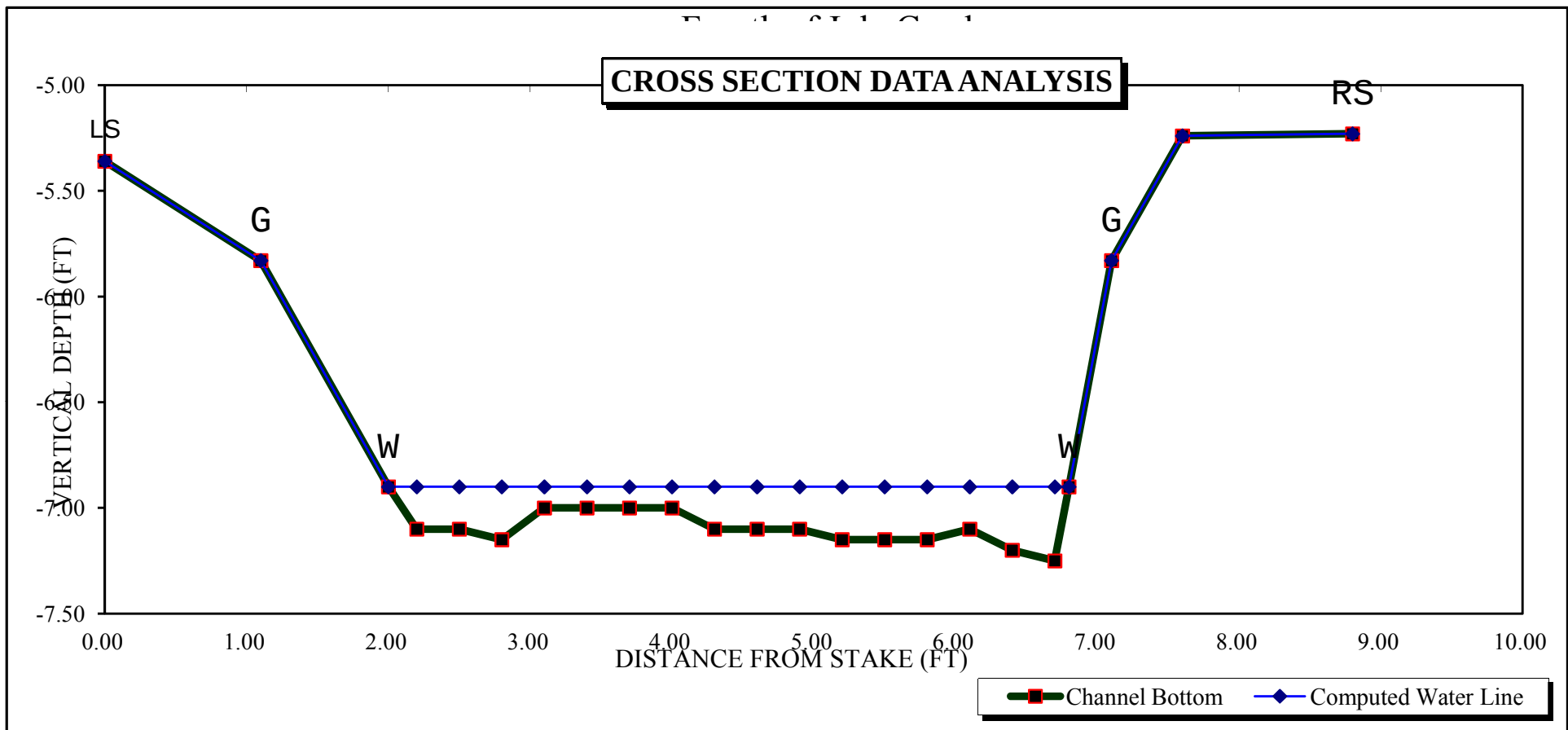
STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

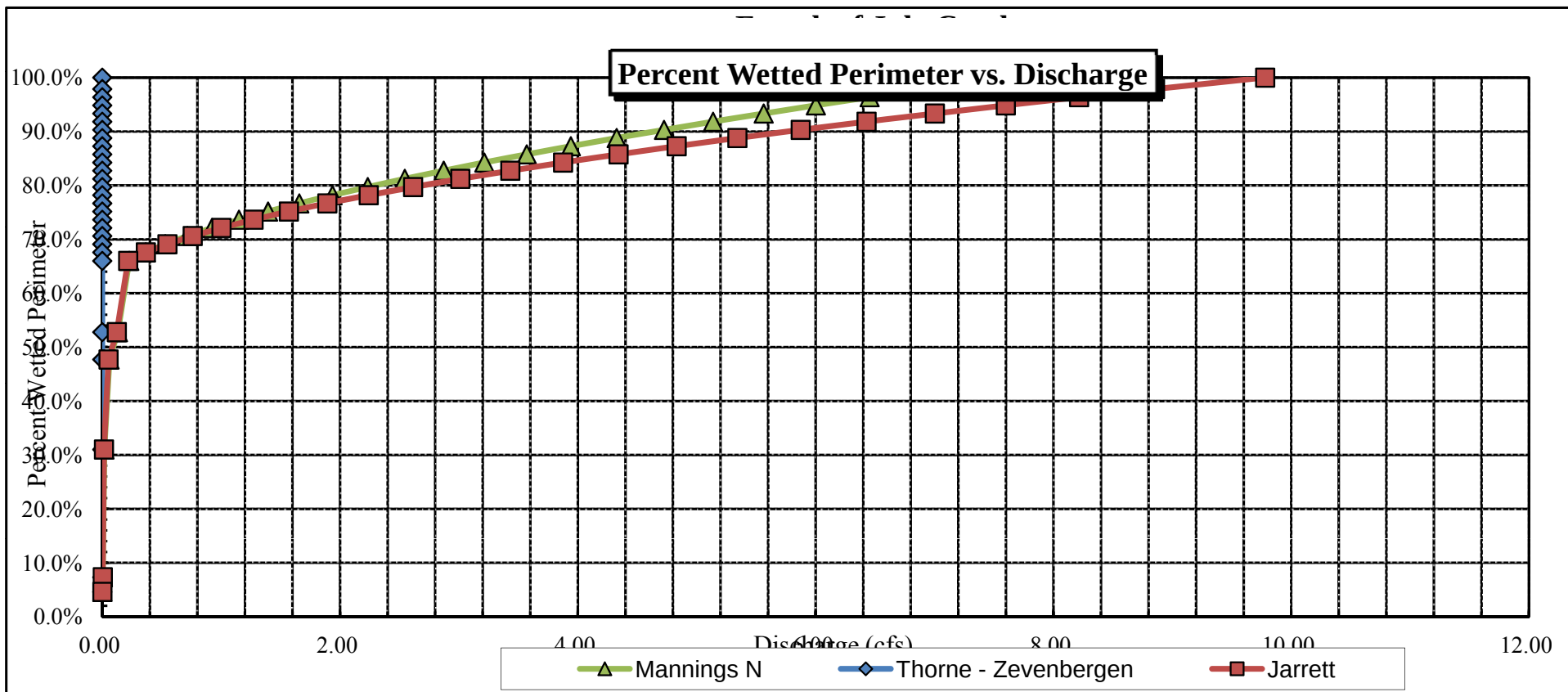
GL = lowest Grassline elevation corrected for sag

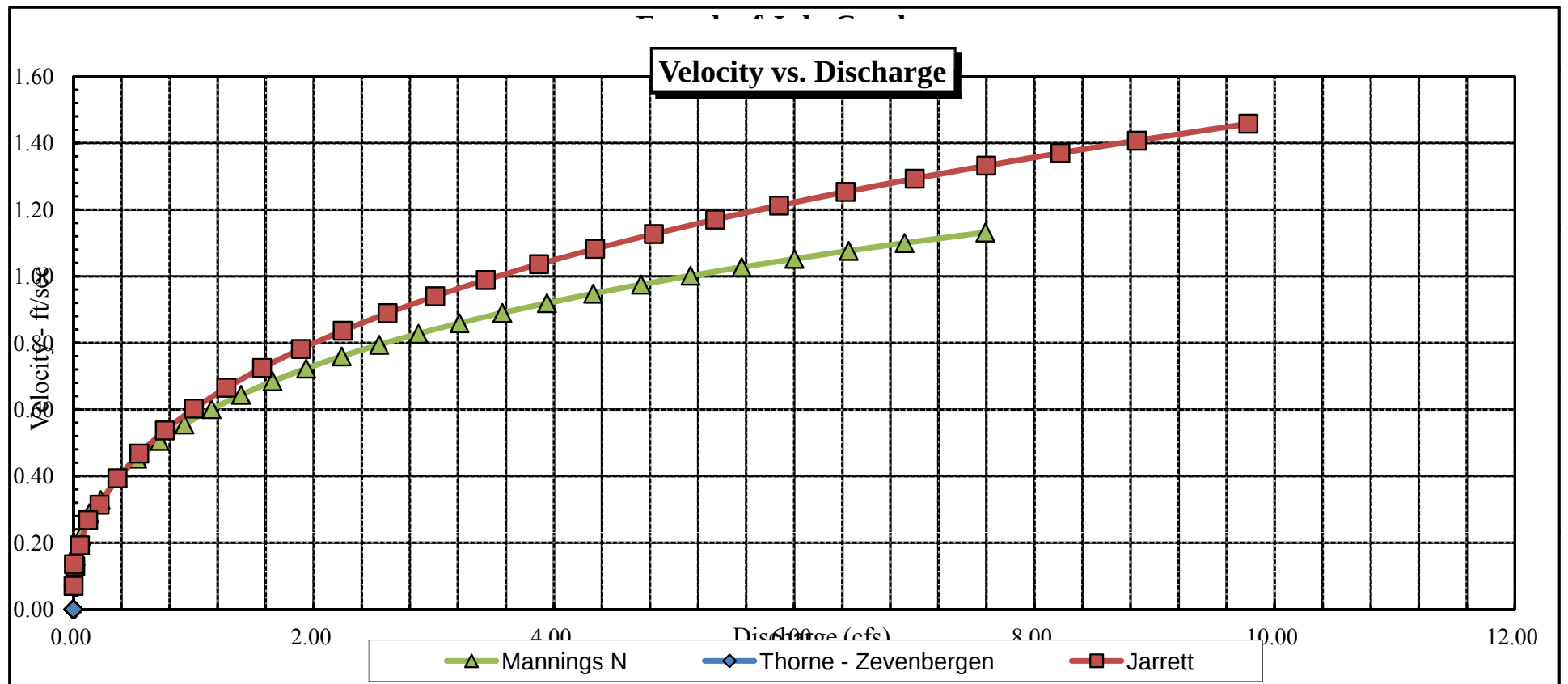
STAGING TABLE

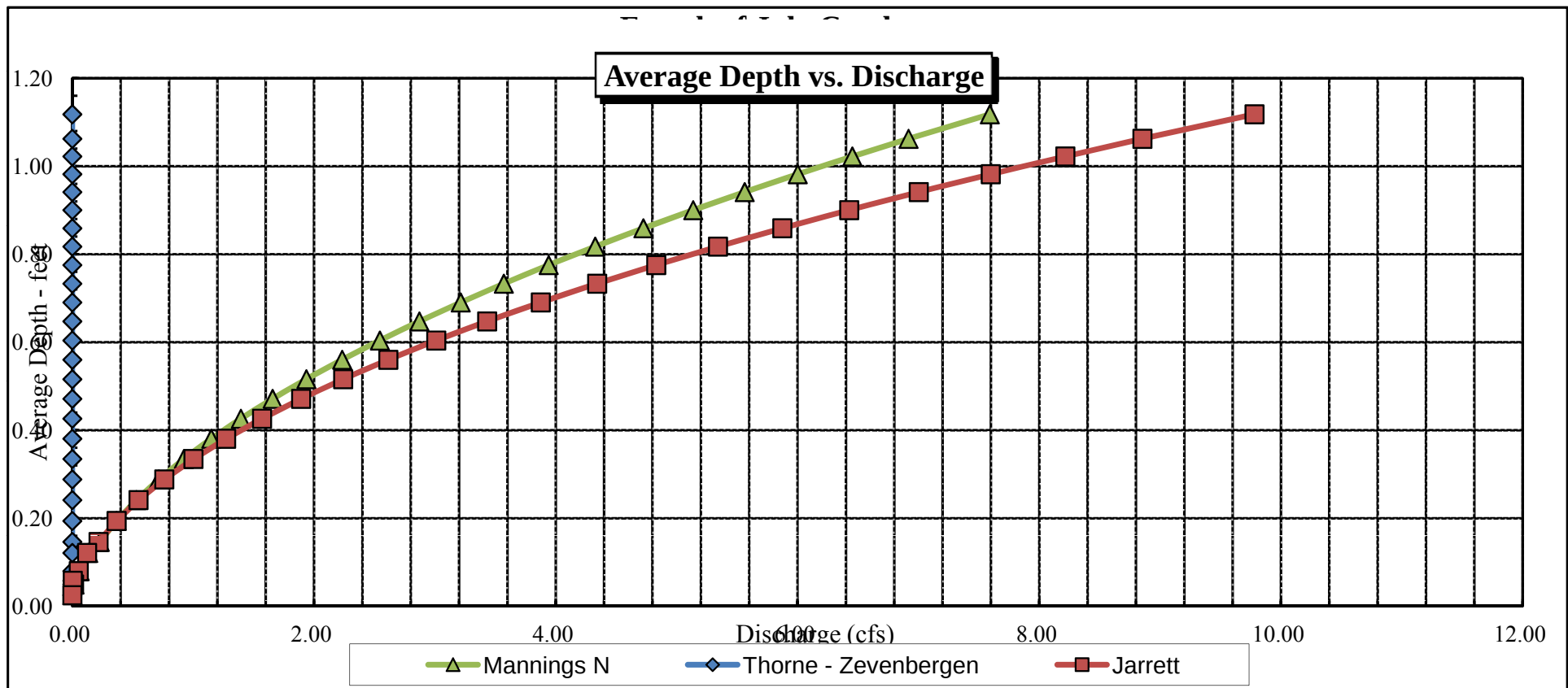
WL = Waterline corrected for variations in field measured water surface elevations and sag

	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	5.83	6.00	1.12	1.42	6.71	7.74	100.0%	0.87	9.78	1.46
	5.90	5.92	1.06	1.35	6.29	7.58	97.9%	0.83	8.85	1.41
	5.95	5.87	1.02	1.30	6.00	7.46	96.4%	0.80	8.22	1.37
	6.00	5.81	0.98	1.25	5.70	7.34	94.8%	0.78	7.60	1.33
	6.05	5.75	0.94	1.20	5.42	7.22	93.3%	0.75	7.00	1.29
	6.10	5.70	0.90	1.15	5.13	7.11	91.8%	0.72	6.43	1.25
	6.15	5.64	0.86	1.10	4.85	6.99	90.3%	0.69	5.87	1.21
	6.20	5.59	0.82	1.05	4.56	6.87	88.8%	0.66	5.34	1.17
	6.25	5.53	0.78	1.00	4.29	6.76	87.3%	0.63	4.83	1.13
	6.30	5.47	0.73	0.95	4.01	6.64	85.8%	0.60	4.34	1.08
	6.35	5.42	0.69	0.90	3.74	6.52	84.2%	0.57	3.88	1.04
	6.40	5.36	0.65	0.85	3.47	6.40	82.7%	0.54	3.43	0.99
	6.45	5.30	0.60	0.80	3.20	6.29	81.2%	0.51	3.01	0.94
	6.50	5.25	0.56	0.75	2.94	6.17	79.7%	0.48	2.61	0.89
	6.55	5.19	0.52	0.70	2.68	6.05	78.2%	0.44	2.24	0.84
	6.60	5.14	0.47	0.65	2.42	5.93	76.7%	0.41	1.89	0.78
	6.65	5.08	0.43	0.60	2.17	5.82	75.2%	0.37	1.57	0.72
	6.70	5.02	0.38	0.55	1.91	5.70	73.6%	0.34	1.27	0.67
	6.75	4.97	0.33	0.50	1.66	5.58	72.1%	0.30	1.00	0.60
	6.80	4.91	0.29	0.45	1.42	5.47	70.6%	0.26	0.76	0.54
	6.85	4.86	0.24	0.40	1.17	5.35	69.1%	0.22	0.55	0.47
WL	6.90	4.80	0.19	0.35	0.93	5.23	67.6%	0.18	0.37	0.39
	6.95	4.74	0.15	0.30	0.69	5.11	66.0%	0.14	0.22	0.31
	7.00	3.77	0.12	0.25	0.46	4.09	52.8%	0.11	0.12	0.27
	7.05	3.46	0.08	0.20	0.28	3.69	47.7%	0.07	0.05	0.19
	7.10	2.24	0.05	0.15	0.11	2.40	31.0%	0.05	0.01	0.13
	7.15	0.48	0.06	0.10	0.03	0.57	7.3%	0.05	0.00	0.14
	7.20	0.31	0.02	0.05	0.01	0.36	4.6%	0.02	0.00	0.07

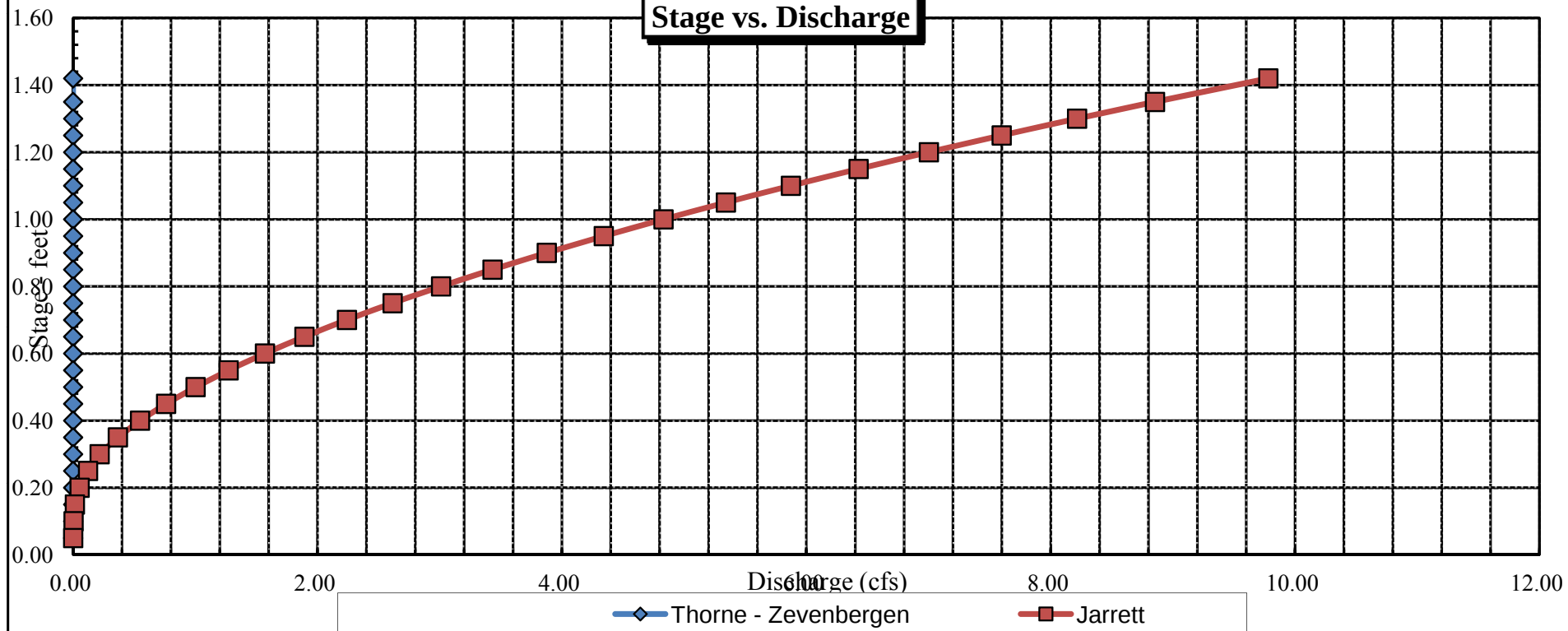








Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Fourth of July Creek
XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
XS NUMBER: 1

DATE: 18-Jul-13
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SE
SECTION: 12
TWP: 45N
RANGE: 4W
PM: New Mexico

COUNTY: Gunnison
WATERSHED: Lake Fork Gunnison River
DIVISION: 4
DOW CODE: 45351

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: 0.076

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 XS NUMBER: 1

DATA POINTS= 21

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
1 RS & G	6.00	5.10		
	6.90	5.76		
W	7.90	6.20	0.00	0.00
	8.50	6.30	0.10	0.07
	8.80	6.30	0.10	0.51
	9.10	6.30	0.10	0.99
	9.40	6.40	0.20	1.04
	9.70	6.40	0.20	0.90
	10.00	6.40	0.20	0.61
	10.30	6.35	0.15	0.69
	10.60	6.40	0.20	0.44
	10.90	6.40	0.20	0.17
	11.20	6.40	0.20	1.03
	11.50	6.40	0.20	0.99
	11.80	6.40	0.20	0.51
W	12.10	6.20	0.00	0.00
	12.60	5.84		
	13.40	5.50		
	14.00	5.28		
1 G	14.60	5.13		
LS	18.00	4.32		

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%
0.61	0.10	0.05	0.00	0.7%
0.30	0.10	0.03	0.02	3.6%
0.30	0.10	0.03	0.03	7.1%
0.32	0.20	0.06	0.06	14.8%
0.30	0.20	0.06	0.05	12.8%
0.30	0.20	0.06	0.04	8.7%
0.30	0.15	0.05	0.03	7.4%
0.30	0.20	0.06	0.03	6.3%
0.30	0.20	0.06	0.01	2.4%
0.30	0.20	0.06	0.06	14.7%
0.30	0.20	0.06	0.06	14.1%
0.30	0.20	0.06	0.03	7.3%
0.36		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

4.29	0.2	0.63	0.42	100.0%
(Max.)				

Manning's n = 0.1707
 Hydraulic Radius= 0.14673906

STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.63	0.63	0.0%
5.95	0.63	1.79	184.8%
5.97	0.63	1.69	168.7%
5.99	0.63	1.59	152.8%
6.01	0.63	1.49	137.2%
6.03	0.63	1.40	121.7%
6.05	0.63	1.30	106.5%
6.07	0.63	1.21	91.6%
6.09	0.63	1.11	76.8%
6.11	0.63	1.02	62.4%
6.13	0.63	0.93	48.1%
6.15	0.63	0.84	34.1%
6.16	0.63	0.80	27.1%
6.17	0.63	0.76	20.3%
6.18	0.63	0.71	13.4%
6.19	0.63	0.67	6.7%
6.20	0.63	0.63	0.0%
6.21	0.63	0.59	-6.6%
6.22	0.63	0.55	-13.1%
6.23	0.63	0.51	-19.5%
6.24	0.63	0.47	-25.7%
6.25	0.63	0.43	-31.8%
6.27	0.63	0.35	-43.7%
6.29	0.63	0.28	-55.2%
6.31	0.63	0.22	-65.2%
6.33	0.63	0.16	-74.0%
6.35	0.63	0.11	-82.4%
6.37	0.63	0.06	-90.2%
6.39	0.63	0.02	-97.0%
6.41	0.63	0.00	-100.0%
6.43	0.63	0.00	-100.0%
6.45	0.63	0.00	-100.0%

WATERLINE AT ZERO

AREA ERROR = 6.200

STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 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	5.13	8.56	0.86	1.27	7.32	9.19	100.0%	0.80	15.10	2.06
	5.20	8.18	0.82	1.20	6.74	8.79	95.6%	0.77	13.54	2.01
	5.25	7.92	0.80	1.15	6.33	8.50	92.4%	0.75	12.50	1.97
	5.30	7.67	0.77	1.10	5.94	8.23	89.5%	0.72	11.49	1.93
	5.35	7.47	0.75	1.05	5.57	8.00	87.0%	0.70	10.49	1.88
	5.40	7.26	0.72	1.00	5.20	7.77	84.5%	0.67	9.54	1.84
	5.45	7.06	0.69	0.95	4.84	7.54	82.0%	0.64	8.64	1.79
	5.50	6.85	0.66	0.90	4.49	7.31	79.5%	0.61	7.79	1.73
	5.55	6.67	0.62	0.85	4.15	7.10	77.2%	0.59	6.97	1.68
	5.60	6.48	0.59	0.80	3.83	6.89	74.9%	0.56	6.20	1.62
	5.65	6.30	0.56	0.75	3.51	6.67	72.6%	0.53	5.48	1.56
	5.70	6.11	0.52	0.70	3.20	6.46	70.3%	0.49	4.80	1.50
	5.75	5.93	0.49	0.65	2.89	6.25	68.0%	0.46	4.16	1.44
	5.80	5.70	0.46	0.60	2.60	6.00	65.3%	0.43	3.58	1.37
	5.85	5.48	0.42	0.55	2.32	5.76	62.7%	0.40	3.05	1.31
	5.90	5.30	0.39	0.50	2.05	5.55	60.4%	0.37	2.54	1.24
	5.95	5.12	0.35	0.45	1.79	5.34	58.1%	0.34	2.08	1.16
	6.00	4.93	0.31	0.40	1.54	5.13	55.8%	0.30	1.66	1.08
	6.05	4.75	0.27	0.35	1.30	4.92	53.5%	0.26	1.29	0.99
	6.10	4.57	0.23	0.30	1.07	4.71	51.3%	0.23	0.95	0.89
	6.15	4.38	0.19	0.25	0.84	4.50	49.0%	0.19	0.66	0.79
WL	6.20	4.20	0.15	0.20	0.63	4.29	46.7%	0.15	0.42	0.67
	6.25	3.82	0.11	0.15	0.43	3.90	42.4%	0.11	0.24	0.55
	6.30	2.85	0.09	0.10	0.25	2.90	31.6%	0.09	0.12	0.46
	6.35	2.63	0.04	0.05	0.11	2.66	28.9%	0.04	0.03	0.29
	6.40	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Fourth of July Creek
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XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	0.42 cfs
CALCULATED FLOW (Qc)=	0.42 cfs
(Qm-Qc)/Qm * 100 =	0.0 %
MEASURED WATERLINE (WLm)=	6.20 ft
CALCULATED WATERLINE (WLc)=	6.20 ft
(WLm-WLc)/WLm * 100 =	0.0 %
MAX MEASURED DEPTH (Dm)=	0.20 ft
MAX CALCULATED DEPTH (Dc)=	0.20 ft
(Dm-Dc)/Dm * 100	0.0 %
MEAN VELOCITY=	0.67 ft/sec
MANNING'S N=	0.171
SLOPE=	0.076 ft/ft
.4 * Qm =	0.2 cfs
2.5 * Qm=	1.1 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
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[illegible]

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

CWCB REVIEW BY: DATE:

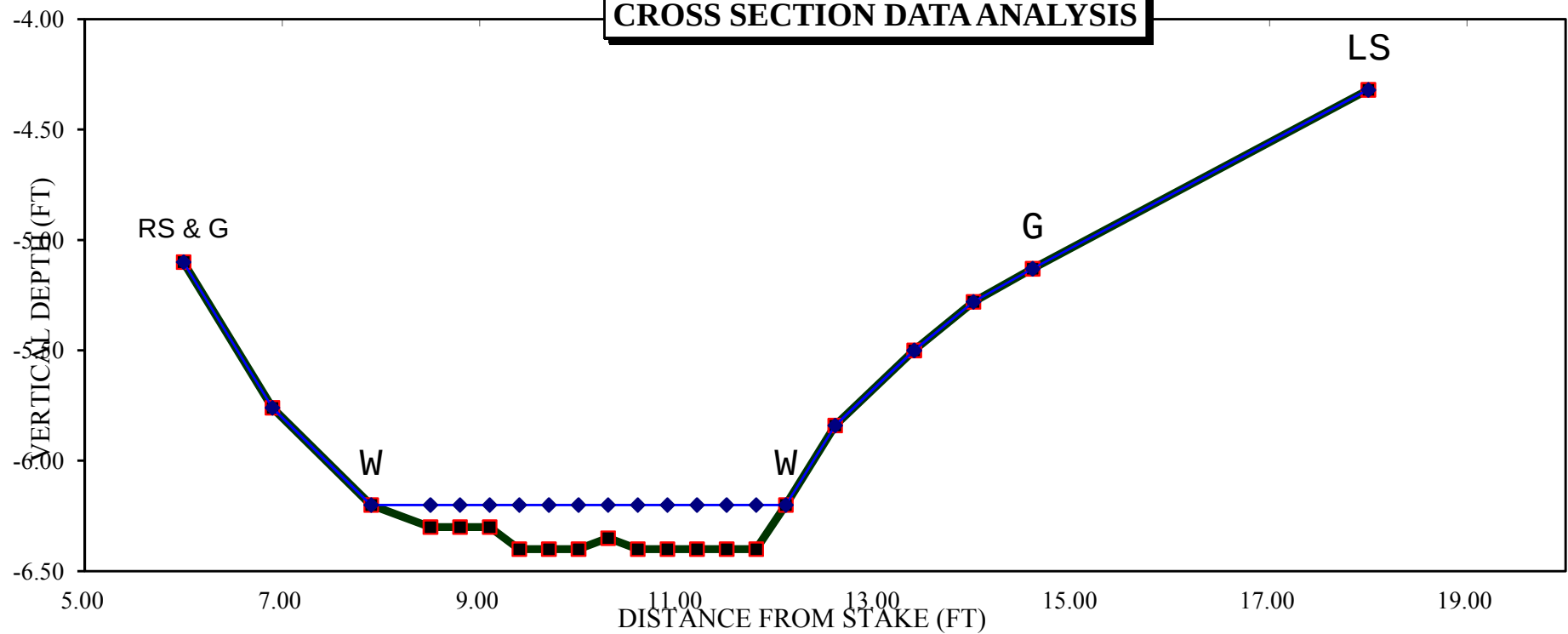
STREAM NAME: Fourth of July Creek
 XS LOCATION: Approx. 1 mile upst. From Lake Fork Gunnison
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

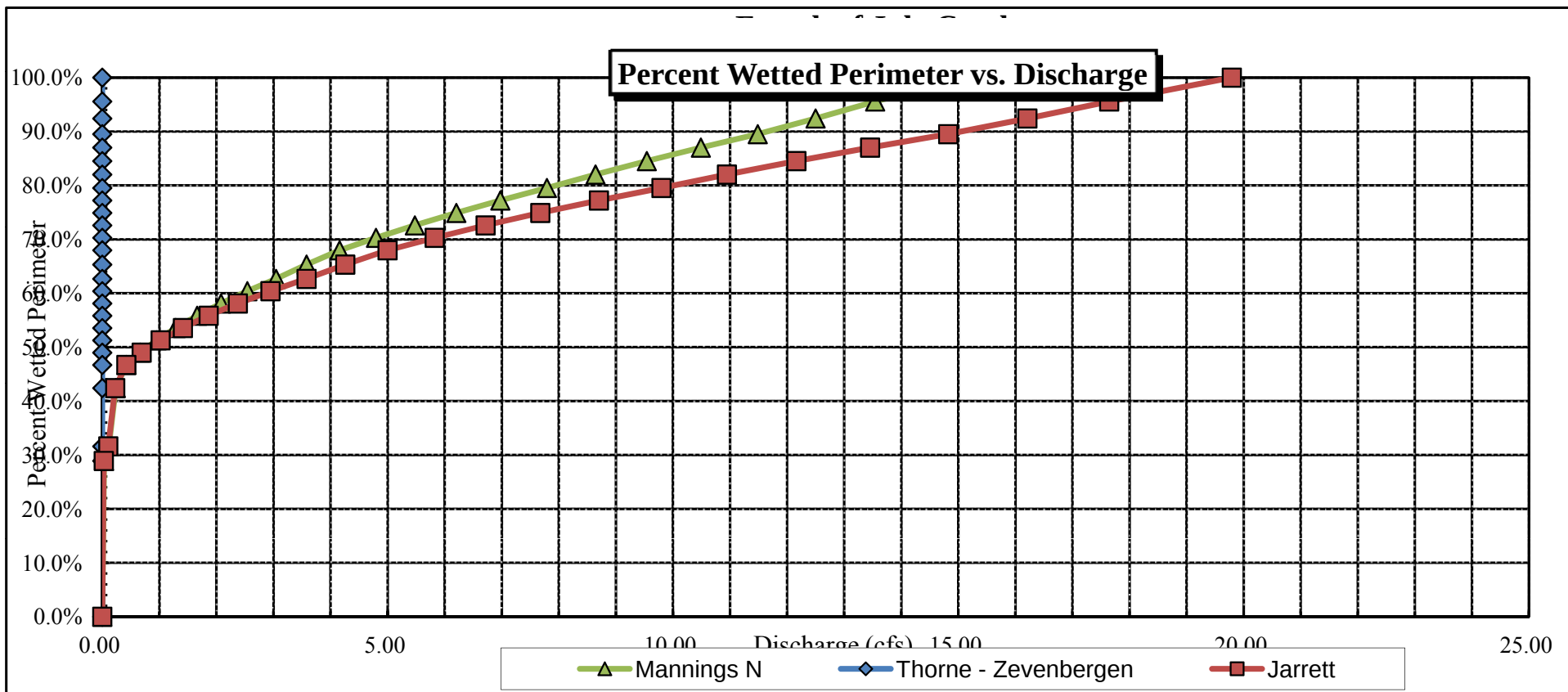
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

	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	5.13	8.56	0.86	1.27	7.32	9.19	100.0%	0.80	19.79	2.70
	5.20	8.18	0.82	1.20	6.74	8.79	95.6%	0.77	17.64	2.62
	5.25	7.92	0.80	1.15	6.33	8.50	92.4%	0.75	16.21	2.56
	5.30	7.67	0.77	1.10	5.94	8.23	89.5%	0.72	14.82	2.49
	5.35	7.47	0.75	1.05	5.57	8.00	87.0%	0.70	13.45	2.42
	5.40	7.26	0.72	1.00	5.20	7.77	84.5%	0.67	12.16	2.34
	5.45	7.06	0.69	0.95	4.84	7.54	82.0%	0.64	10.94	2.26
	5.50	6.85	0.66	0.90	4.49	7.31	79.5%	0.61	9.80	2.18
	5.55	6.67	0.62	0.85	4.15	7.10	77.2%	0.59	8.70	2.09
	5.60	6.48	0.59	0.80	3.83	6.89	74.9%	0.56	7.68	2.01
	5.65	6.30	0.56	0.75	3.51	6.67	72.6%	0.53	6.72	1.92
	5.70	6.11	0.52	0.70	3.20	6.46	70.3%	0.49	5.82	1.82
	5.75	5.93	0.49	0.65	2.89	6.25	68.0%	0.46	5.00	1.73
	5.80	5.70	0.46	0.60	2.60	6.00	65.3%	0.43	4.26	1.64
	5.85	5.48	0.42	0.55	2.32	5.76	62.7%	0.40	3.58	1.54
	5.90	5.30	0.39	0.50	2.05	5.55	60.4%	0.37	2.95	1.43
	5.95	5.12	0.35	0.45	1.79	5.34	58.1%	0.34	2.38	1.32
	6.00	4.93	0.31	0.40	1.54	5.13	55.8%	0.30	1.86	1.21
	6.05	4.75	0.27	0.35	1.30	4.92	53.5%	0.26	1.41	1.09
	6.10	4.57	0.23	0.30	1.07	4.71	51.3%	0.23	1.02	0.96
	6.15	4.38	0.19	0.25	0.84	4.50	49.0%	0.19	0.69	0.82
WL	6.20	4.20	0.15	0.20	0.63	4.29	46.7%	0.15	0.42	0.67
	6.25	3.82	0.11	0.15	0.43	3.90	42.4%	0.11	0.23	0.53
	6.30	2.85	0.09	0.10	0.25	2.90	31.6%	0.09	0.11	0.43
	6.35	2.63	0.04	0.05	0.11	2.66	28.9%	0.04	0.03	0.24
	6.40	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

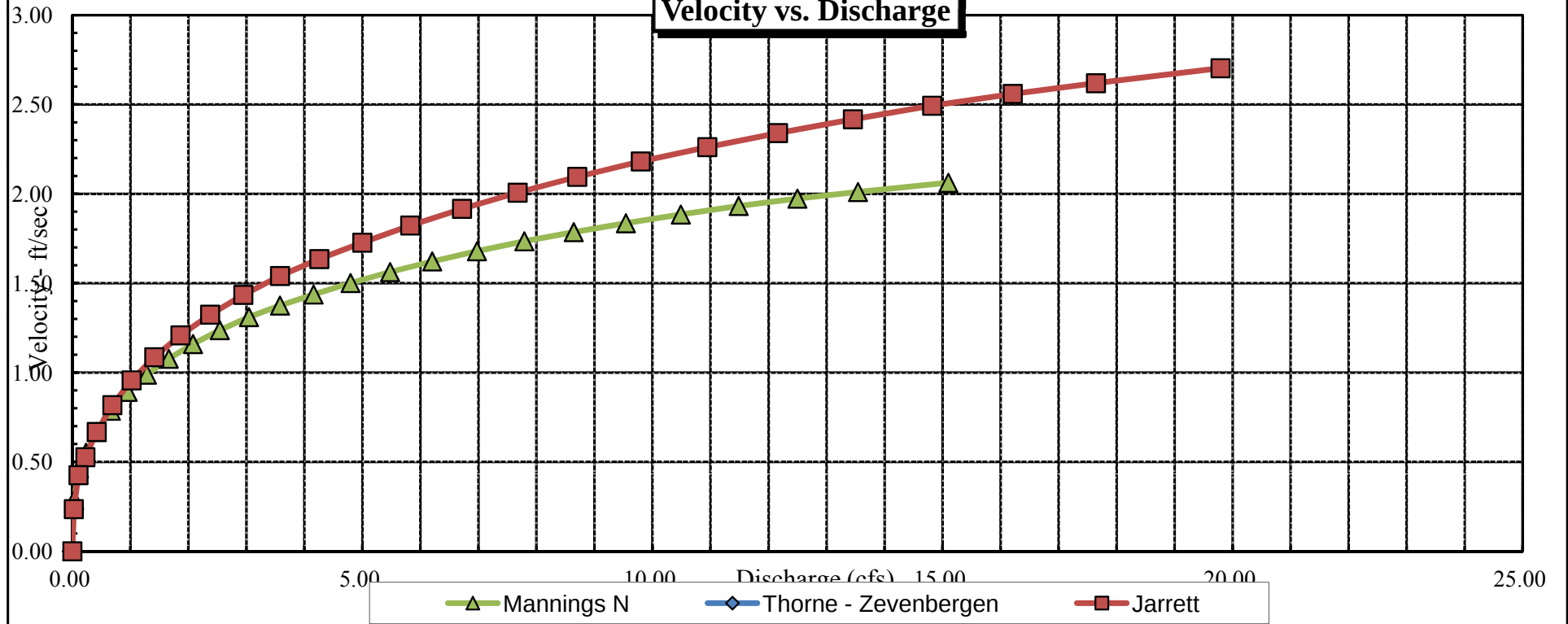
CROSS SECTION DATA ANALYSIS

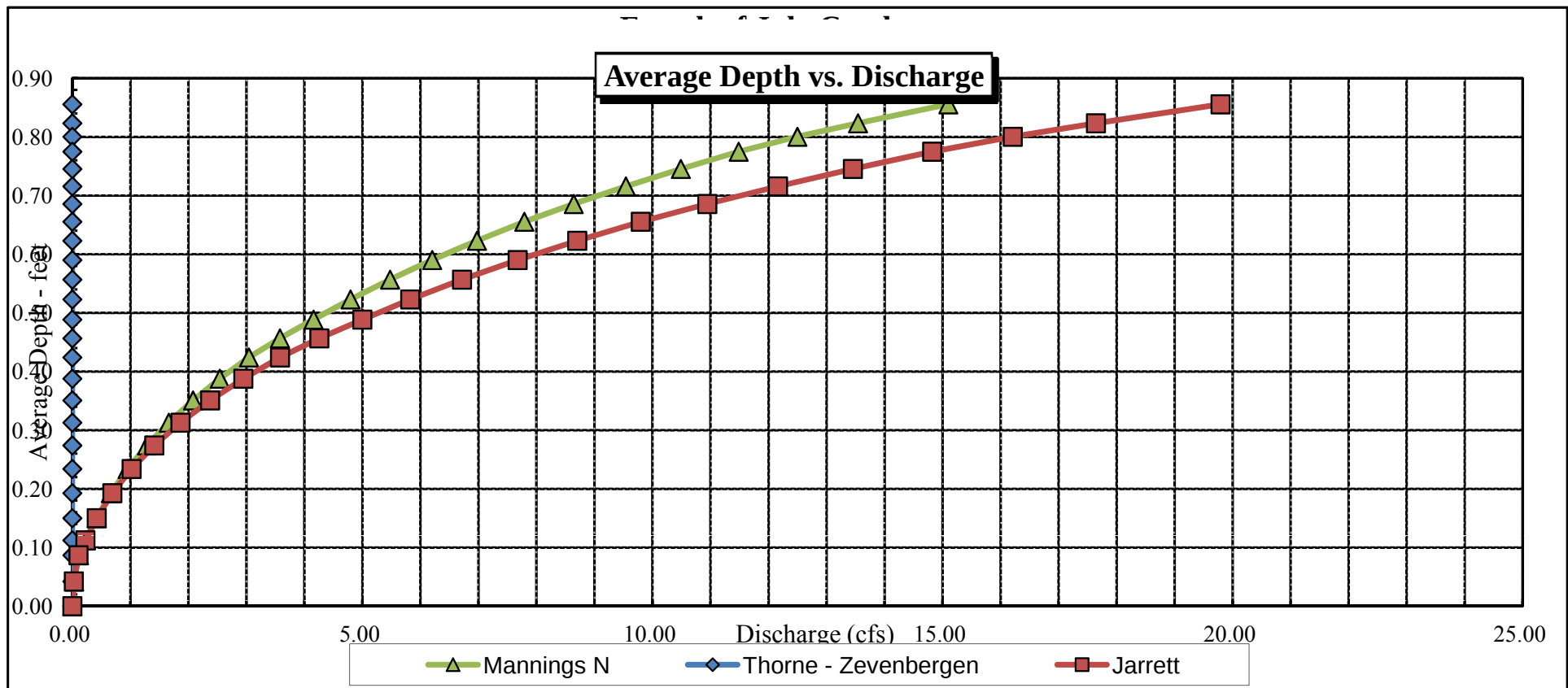


Channel Bottom Computed Water Line

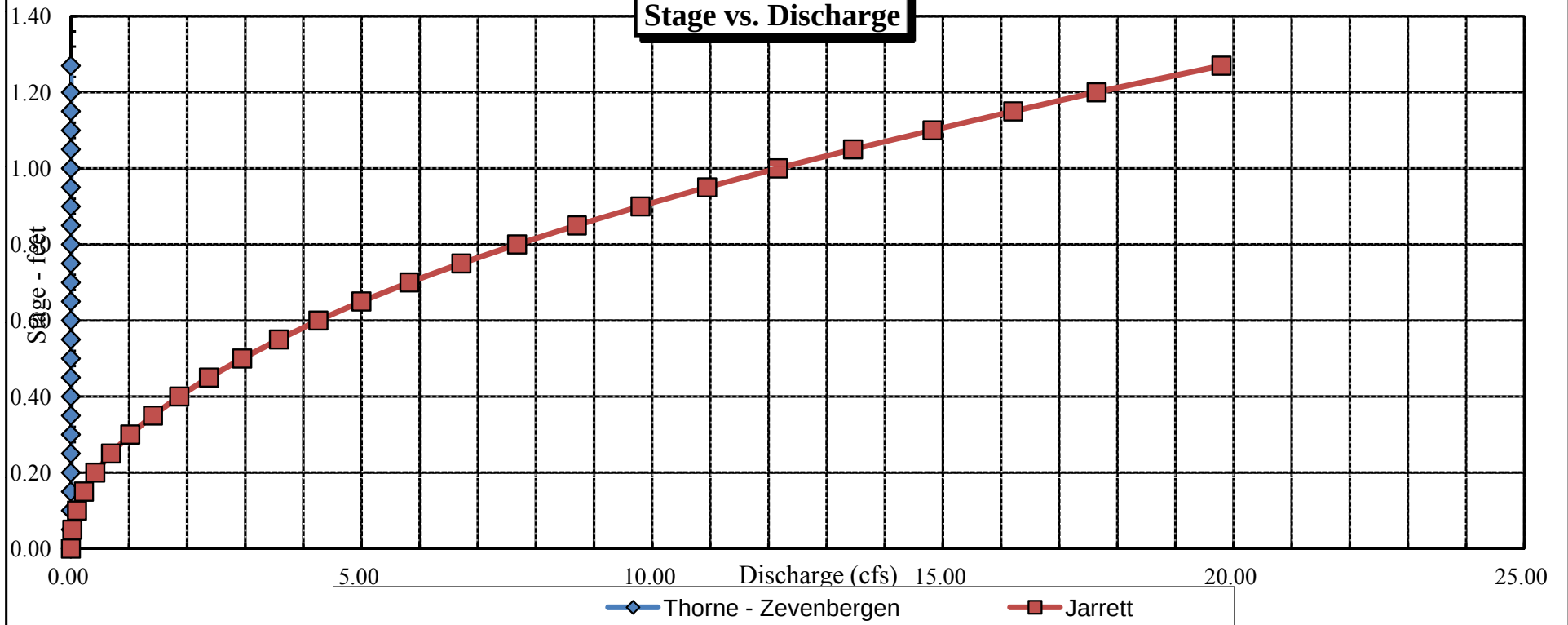


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Fourth of July Creek
XS LOCATION: 170' upst fr Powderhorn Wild boundary
XS NUMBER: 2

DATE: 25-Jul-14
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 13
TWP: 45N
RANGE: 4W
PM: NM

COUNTY: Gunnison
WATERSHED: Lake Fork Gunnison River
DIVISION: 4
DOW CODE: 45351

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: 0.095

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Fourth of July Creek
 XS LOCATION: 170' upst fr Powderhorn Wild boundary
 XS NUMBER: 2

DATA POINTS= 22

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	5.03		
1 G	0.80	6.48		
	2.10	7.24		
	3.80	7.75	0.00	0.00
W	4.40	7.85	0.10	0.01
	4.70	7.85	0.10	0.23
	5.00	7.90	0.15	0.53
	5.30	7.90	0.15	0.84
	5.60	7.85	0.10	0.82
	5.90	7.90	0.15	0.83
	6.20	7.95	0.20	0.62
	6.50	7.95	0.20	0.84
	6.80	7.90	0.15	1.23
	7.10	7.95	0.20	0.96
	7.40	7.95	0.20	1.03
	7.70	7.90	0.15	0.00
	8.00	7.85	0.10	0.00
	8.30	7.85	0.10	0.00
W	8.50	7.75	0.00	0.00
	9.00	7.10		
1 G	9.90	6.54		
RS	11.80	4.87		

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%
0.61	0.10	0.05	0.00	0.1%
0.30	0.10	0.03	0.01	1.8%
0.30	0.15	0.05	0.02	6.1%
0.30	0.15	0.05	0.04	9.6%
0.30	0.10	0.03	0.02	6.3%
0.30	0.15	0.05	0.04	9.5%
0.30	0.20	0.06	0.04	9.5%
0.30	0.20	0.06	0.05	12.8%
0.30	0.15	0.05	0.06	14.1%
0.30	0.20	0.06	0.06	14.6%
0.30	0.20	0.06	0.06	15.7%
0.30	0.15	0.05	0.00	0.0%
0.30	0.10	0.03	0.00	0.0%
0.30	0.10	0.03	0.00	0.0%
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%

4.76 0.2 0.63 0.39 100.0%
 (Max.)

Manning's n = 0.1879
 Hydraulic Radius= 0.13116507

STREAM NAME: Fourth of July Creek
 XS LOCATION: 170' upst fr Powderhorn Wild boundary
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.63	0.63	0.0%
7.50	0.63	1.93	208.5%
7.52	0.63	1.81	190.3%
7.54	0.63	1.70	172.4%
7.56	0.63	1.59	154.7%
7.58	0.63	1.48	137.3%
7.60	0.63	1.38	120.2%
7.62	0.63	1.27	103.3%
7.64	0.63	1.17	86.7%
7.66	0.63	1.06	70.3%
7.68	0.63	0.96	54.2%
7.70	0.63	0.87	38.4%
7.71	0.63	0.82	30.6%
7.72	0.63	0.77	22.9%
7.73	0.63	0.72	15.2%
7.74	0.63	0.67	7.6%
7.75	0.63	0.63	0.0%
7.76	0.63	0.58	-7.5%
7.77	0.63	0.53	-14.8%
7.78	0.63	0.49	-22.0%
7.79	0.63	0.44	-29.1%
7.80	0.63	0.40	-36.0%
7.82	0.63	0.32	-49.5%
7.84	0.63	0.23	-62.5%
7.86	0.63	0.16	-73.9%
7.88	0.63	0.11	-82.9%
7.90	0.63	0.06	-90.4%
7.92	0.63	0.03	-95.4%
7.94	0.63	0.01	-98.8%
7.96	0.63	0.00	-100.0%
7.98	0.63	0.00	-100.0%
8.00	0.63	0.00	-100.0%

WATERLINE AT ZERO

AREA ERROR = 7.750

STREAM NAME: Fourth of July Creek
 XS LOCATION: 170' upst fr Powderhorn Wild boundary
 XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.54	9.00	1.01	1.41	9.05	9.81	100.0%	0.92	20.91	2.31
	6.75	8.30	0.87	1.20	7.23	8.99	91.7%	0.80	15.25	2.11
	6.80	8.13	0.84	1.15	6.82	8.80	89.7%	0.78	14.03	2.06
	6.85	7.97	0.81	1.10	6.42	8.61	87.8%	0.75	12.87	2.01
	6.90	7.80	0.77	1.05	6.03	8.41	85.8%	0.72	11.76	1.95
	6.95	7.64	0.74	1.00	5.64	8.22	83.8%	0.69	10.69	1.90
	7.00	7.47	0.70	0.95	5.26	8.02	81.8%	0.66	9.68	1.84
	7.05	7.31	0.67	0.90	4.89	7.83	79.9%	0.62	8.71	1.78
	7.10	7.14	0.63	0.85	4.53	7.64	77.9%	0.59	7.80	1.72
	7.15	7.02	0.60	0.80	4.18	7.48	76.2%	0.56	6.91	1.65
	7.20	6.89	0.56	0.75	3.83	7.31	74.6%	0.52	6.06	1.58
	7.25	6.75	0.52	0.70	3.49	7.14	72.8%	0.49	5.28	1.51
	7.30	6.55	0.48	0.65	3.16	6.90	70.3%	0.46	4.57	1.45
	7.35	6.34	0.45	0.60	2.83	6.66	67.9%	0.43	3.91	1.38
	7.40	6.14	0.41	0.55	2.52	6.42	65.5%	0.39	3.29	1.31
	7.45	5.93	0.37	0.50	2.22	6.19	63.1%	0.36	2.73	1.23
	7.50	5.73	0.34	0.45	1.93	5.95	60.7%	0.32	2.22	1.15
	7.55	5.52	0.30	0.40	1.65	5.71	58.3%	0.29	1.75	1.06
	7.60	5.32	0.26	0.35	1.38	5.48	55.8%	0.25	1.34	0.97
	7.65	5.11	0.22	0.30	1.12	5.24	53.4%	0.21	0.97	0.87
	7.70	4.91	0.18	0.25	0.87	5.00	51.0%	0.17	0.65	0.76
WL	7.75	4.70	0.13	0.20	0.62	4.76	48.6%	0.13	0.39	0.63
	7.80	4.30	0.09	0.15	0.40	4.35	44.3%	0.09	0.20	0.50
	7.85	3.30	0.06	0.10	0.20	3.33	34.0%	0.06	0.07	0.37
	7.90	1.80	0.03	0.05	0.06	1.82	18.5%	0.03	0.02	0.25
	7.95	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Fourth of July Creek
XS LOCATION: 170' upst fr Powderhorn Wild boundary
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.39 cfs
CALCULATED FLOW (Qc)= 0.39 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 7.75 ft
CALCULATED WATERLINE (WLc)= 7.75 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.20 ft
MAX CALCULATED DEPTH (Dc)= 0.20 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.63 ft/sec
MANNING'S N= 0.188
SLOPE= 0.095 ft/ft

.4 * Qm = 0.2 cfs
2.5 * Qm= 1.0 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

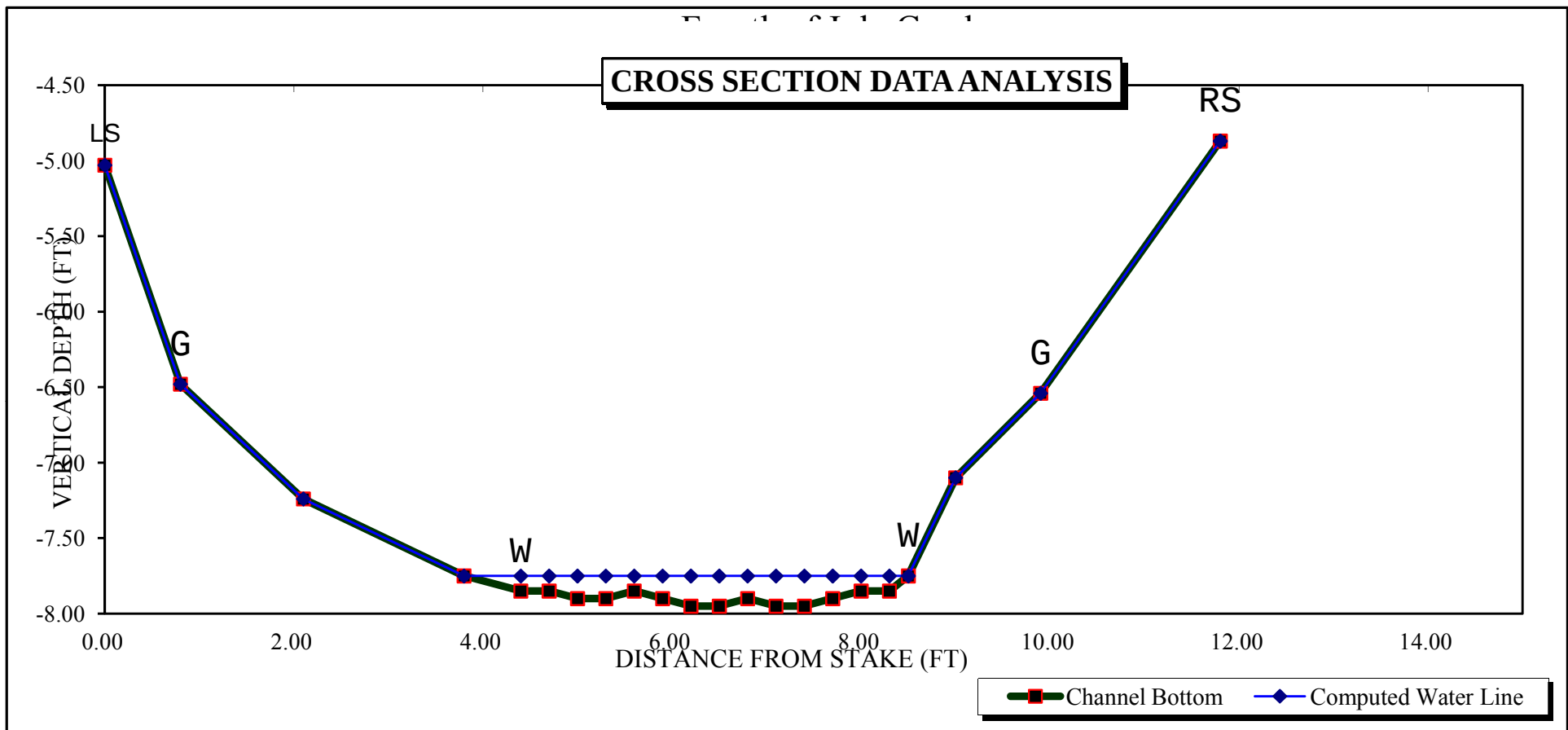
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

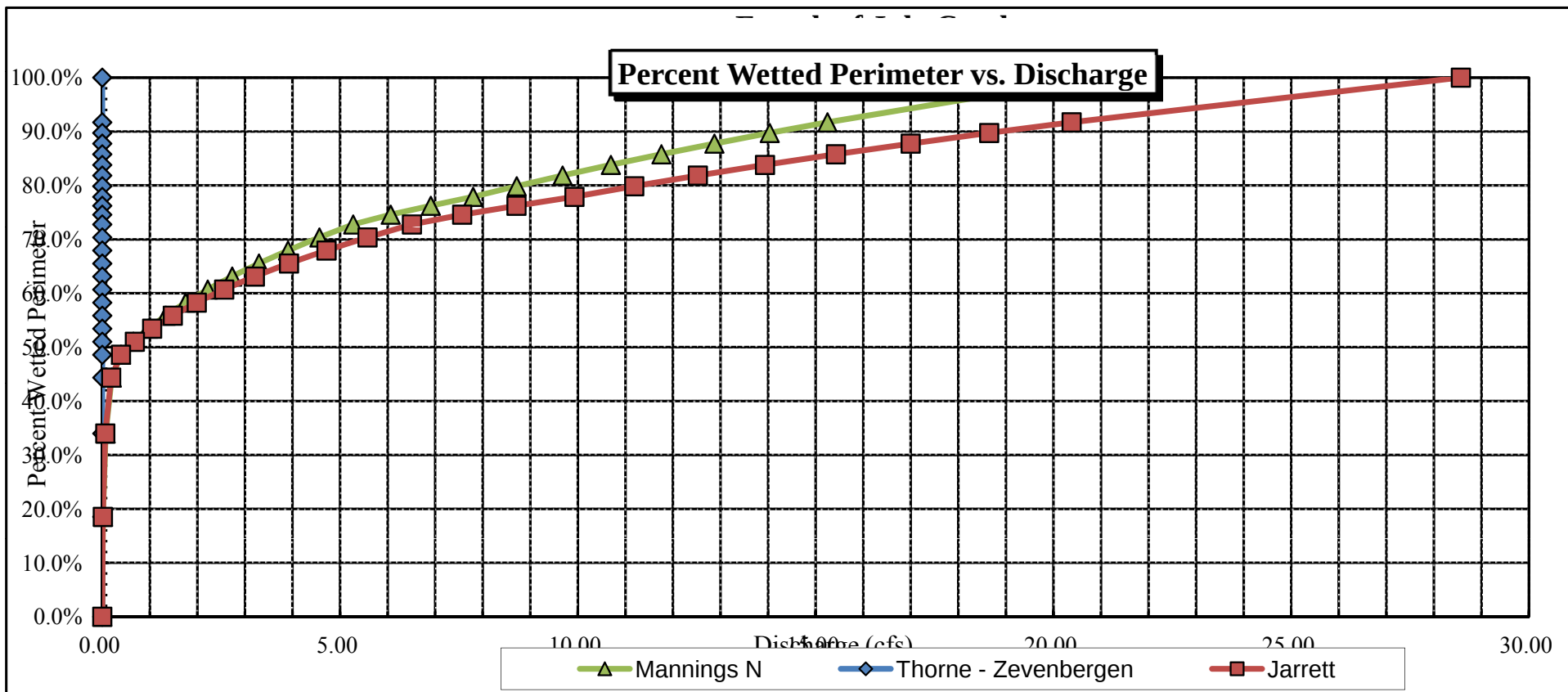
STREAM NAME: Fourth of July Creek
 XS LOCATION: 170' upst fr Powderhorn Wild boundary
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

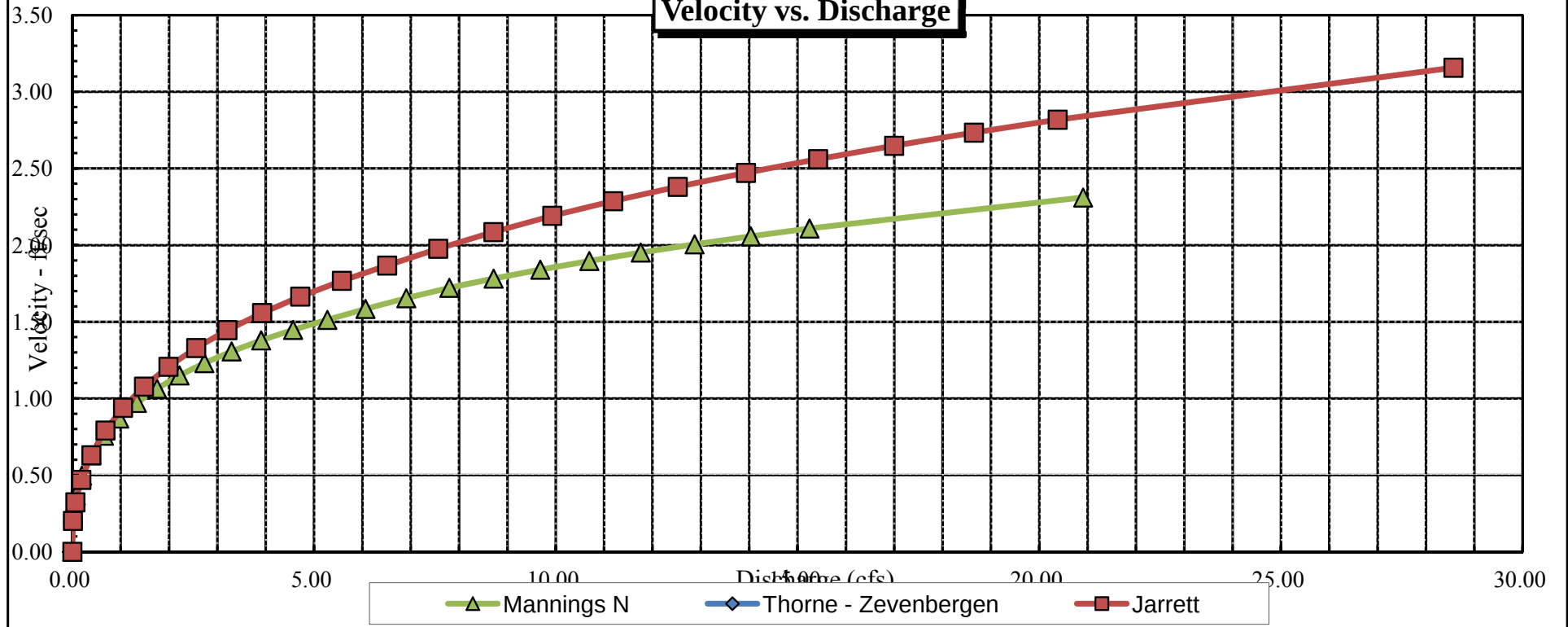
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

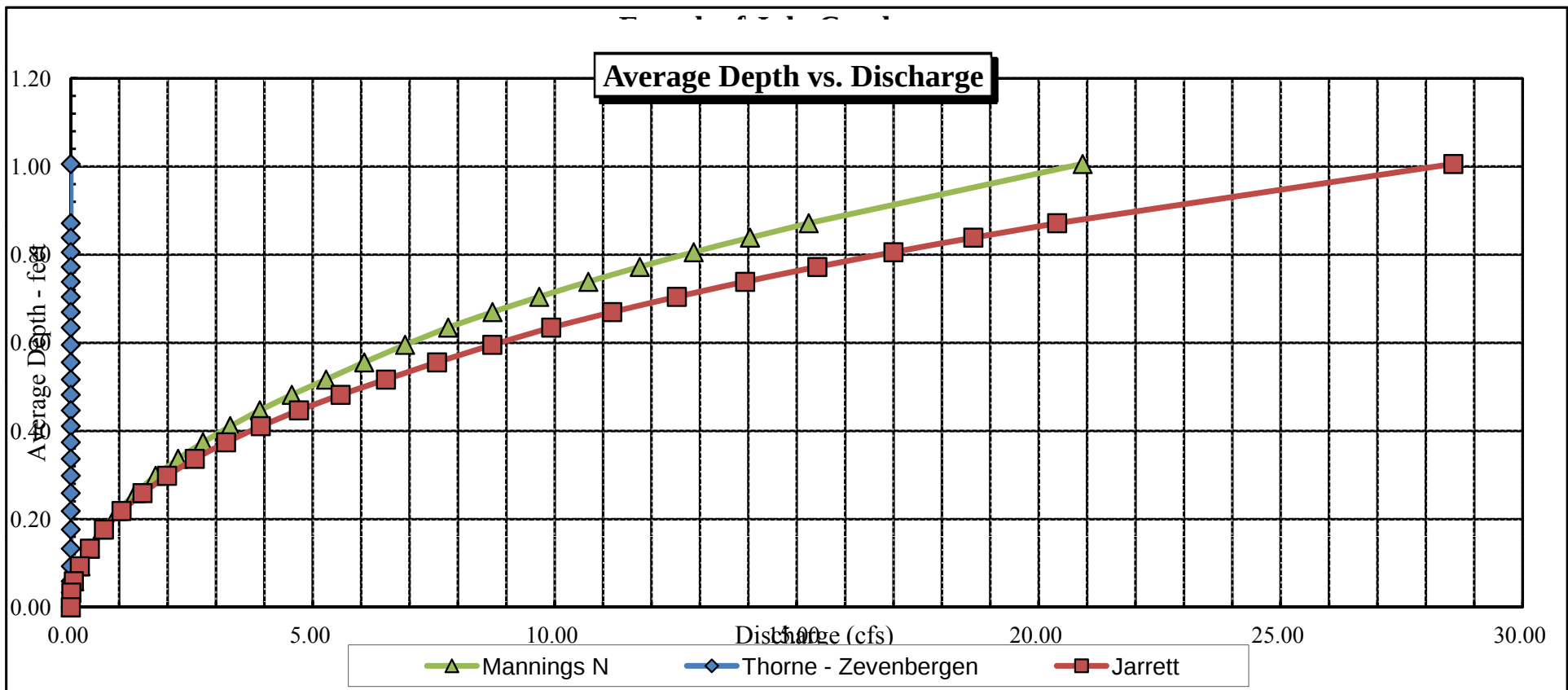
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.54	9.00	1.01	1.41	9.05	9.81	100.0%	0.92	28.57	3.16
	6.75	8.30	0.87	1.20	7.23	8.99	91.7%	0.80	20.38	2.82
	6.80	8.13	0.84	1.15	6.82	8.80	89.7%	0.78	18.65	2.73
	6.85	7.97	0.81	1.10	6.42	8.61	87.8%	0.75	17.00	2.65
	6.90	7.80	0.77	1.05	6.03	8.41	85.8%	0.72	15.43	2.56
	6.95	7.64	0.74	1.00	5.64	8.22	83.8%	0.69	13.94	2.47
	7.00	7.47	0.70	0.95	5.26	8.02	81.8%	0.66	12.52	2.38
	7.05	7.31	0.67	0.90	4.89	7.83	79.9%	0.62	11.19	2.29
	7.10	7.14	0.63	0.85	4.53	7.64	77.9%	0.59	9.93	2.19
	7.15	7.02	0.60	0.80	4.18	7.48	76.2%	0.56	8.71	2.09
	7.20	6.89	0.56	0.75	3.83	7.31	74.6%	0.52	7.57	1.98
	7.25	6.75	0.52	0.70	3.49	7.14	72.8%	0.49	6.51	1.87
	7.30	6.55	0.48	0.65	3.16	6.90	70.3%	0.46	5.58	1.77
	7.35	6.34	0.45	0.60	2.83	6.66	67.9%	0.43	4.71	1.66
	7.40	6.14	0.41	0.55	2.52	6.42	65.5%	0.39	3.93	1.56
	7.45	5.93	0.37	0.50	2.22	6.19	63.1%	0.36	3.21	1.45
	7.50	5.73	0.34	0.45	1.93	5.95	60.7%	0.32	2.56	1.33
	7.55	5.52	0.30	0.40	1.65	5.71	58.3%	0.29	1.99	1.21
	7.60	5.32	0.26	0.35	1.38	5.48	55.8%	0.25	1.48	1.08
	7.65	5.11	0.22	0.30	1.12	5.24	53.4%	0.21	1.05	0.94
	7.70	4.91	0.18	0.25	0.87	5.00	51.0%	0.17	0.68	0.79
WL	7.75	4.70	0.13	0.20	0.62	4.76	48.6%	0.13	0.39	0.63
	7.80	4.30	0.09	0.15	0.40	4.35	44.3%	0.09	0.19	0.47
	7.85	3.30	0.06	0.10	0.20	3.33	34.0%	0.06	0.06	0.32
	7.90	1.80	0.03	0.05	0.06	1.82	18.5%	0.03	0.01	0.20
	7.95	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



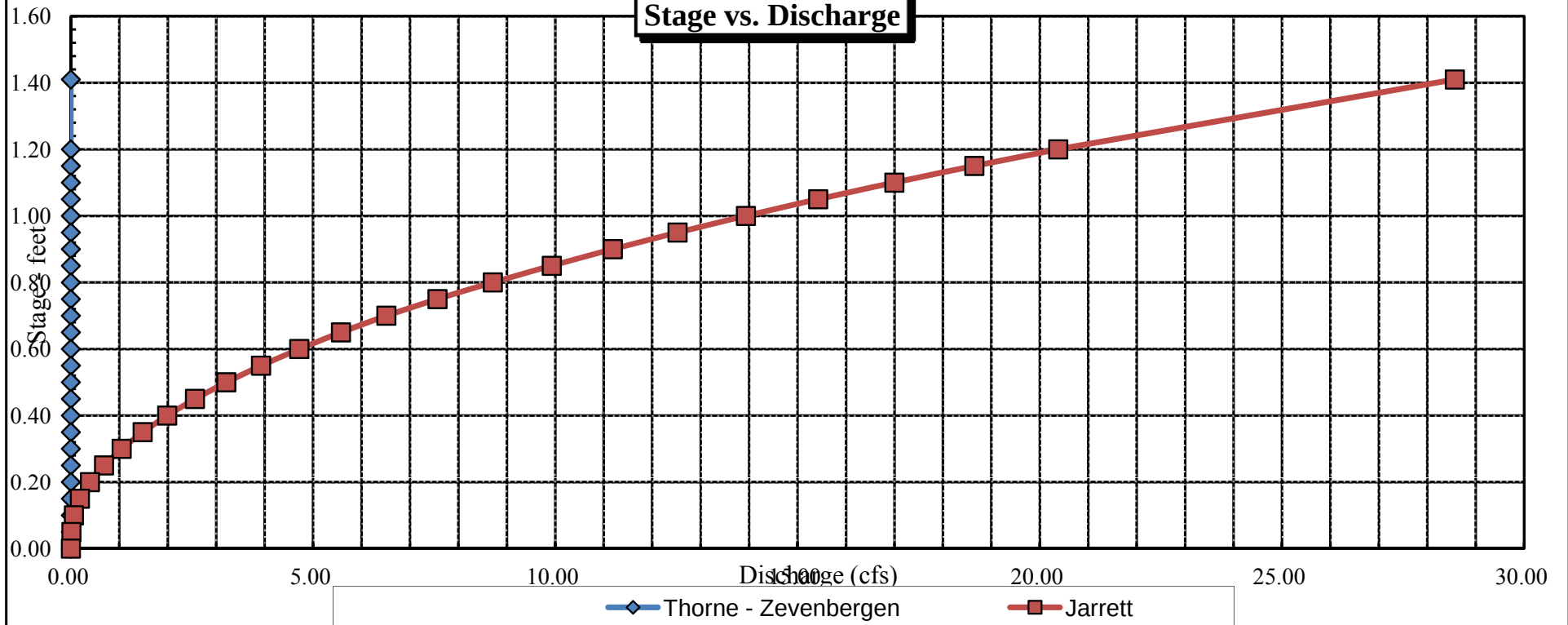


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Fourth of July Creek
XS LOCATION: 200 ft upstr fr Powderhorn Wilderness bndry
XS NUMBER: 1

DATE: 25-Jul-14
OBSERVERS: R. Smith, A. Breibart

1/4 SEC: SW
SECTION: 13
TWP: 45N
RANGE: 4W
PM: NM

COUNTY: Gunnison
WATERSHED: Lake Fork Gunnison River
DIVISION: 4
DOW CODE: 45351

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: 0.092

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Fourth of July Creek
 XS LOCATION: 200 ft upstr fr Powderhorn Wilderness bndry
 XS NUMBER: 1

DATA POINTS= 21

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	1.26		
1 G	3.30	3.33		
	4.30	4.29		
W	5.40	4.60	0.00	0.00
	5.70	4.70	0.10	0.56
	6.00	4.85	0.25	0.88
	6.30	4.80	0.20	0.40
	6.60	4.70	0.10	0.43
	6.90	4.80	0.20	0.52
	7.20	4.80	0.20	0.73
	7.50	4.90	0.30	0.40
	7.80	4.85	0.25	0.91
	8.10	4.80	0.20	0.46
	8.40	4.90	0.30	0.19
	8.70	4.85	0.25	0.66
	9.00	4.70	0.10	0.19
	9.30	4.65	0.05	0.15
W	9.50	4.60		
	13.50	4.35		
1 G	13.60	3.48		
RS	14.80	3.00		

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%
0.32	0.10	0.03	0.02	4.2%
0.34	0.25	0.08	0.07	16.5%
0.30	0.20	0.06	0.02	6.0%
0.32	0.10	0.03	0.01	3.2%
0.32	0.20	0.06	0.03	7.8%
0.30	0.20	0.06	0.04	10.9%
0.32	0.30	0.09	0.04	9.0%
0.30	0.25	0.08	0.07	17.0%
0.30	0.20	0.06	0.03	6.9%
0.32	0.30	0.09	0.02	4.3%
0.30	0.25	0.08	0.05	12.4%
0.34	0.10	0.03	0.01	1.4%
0.30	0.05	0.01	0.00	0.5%
0.21		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%

4.28	0.3	0.75	0.40	100.0%
(Max.)				

Manning's n = 0.2627
 Hydraulic Radius= 0.1746983

STREAM NAME: Fourth of July Creek
 XS LOCATION: 200 ft upstr fr Powderhorn Wilderness bndry
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.75	0.75	0.0%
4.35	0.75	2.38	218.8%
4.37	0.75	2.21	195.3%
4.39	0.75	2.04	172.8%
4.41	0.75	1.88	151.4%
4.43	0.75	1.73	131.0%
4.45	0.75	1.58	111.7%
4.47	0.75	1.45	93.4%
4.49	0.75	1.32	76.2%
4.51	0.75	1.20	60.0%
4.53	0.75	1.08	44.8%
4.55	0.75	0.98	30.7%
4.56	0.75	0.93	24.0%
4.57	0.75	0.88	17.6%
4.58	0.75	0.83	11.5%
4.59	0.75	0.79	5.6%
4.60	0.75	0.75	0.0%
4.61	0.75	0.71	-5.4%
4.62	0.75	0.67	-10.8%
4.63	0.75	0.63	-16.0%
4.64	0.75	0.59	-21.2%
4.65	0.75	0.55	-26.3%
4.67	0.75	0.48	-36.0%
4.69	0.75	0.41	-45.4%
4.71	0.75	0.34	-54.2%
4.73	0.75	0.28	-62.5%
4.75	0.75	0.22	-70.2%
4.77	0.75	0.17	-77.5%
4.79	0.75	0.12	-84.1%
4.81	0.75	0.08	-89.8%
4.83	0.75	0.04	-94.0%
4.85	0.75	0.02	-97.0%

WATERLINE AT ZERO

AREA ERROR = 4.600

STREAM NAME: Fourth of July Creek
 XS LOCATION: 200 ft upstr fr Powderhorn Wilderness bndry
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.48	10.14	1.06	1.42	10.77	11.47	100.0%	0.94	17.70	1.64
	3.60	10.00	0.96	1.30	9.56	11.18	97.4%	0.85	14.77	1.55
	3.65	9.95	0.91	1.25	9.06	11.06	96.4%	0.82	13.61	1.50
	3.70	9.89	0.87	1.20	8.56	10.94	95.3%	0.78	12.48	1.46
	3.75	9.83	0.82	1.15	8.07	10.81	94.2%	0.75	11.39	1.41
	3.80	9.77	0.78	1.10	7.58	10.69	93.2%	0.71	10.34	1.36
	3.85	9.72	0.73	1.05	7.09	10.57	92.1%	0.67	9.33	1.31
	3.90	9.66	0.68	1.00	6.61	10.45	91.0%	0.63	8.35	1.26
	3.95	9.60	0.64	0.95	6.13	10.32	90.0%	0.59	7.42	1.21
	4.00	9.54	0.59	0.90	5.65	10.20	88.9%	0.55	6.53	1.16
	4.05	9.48	0.55	0.85	5.17	10.08	87.8%	0.51	5.69	1.10
	4.10	9.43	0.50	0.80	4.70	9.96	86.8%	0.47	4.89	1.04
	4.15	9.37	0.45	0.75	4.23	9.83	85.7%	0.43	4.13	0.98
	4.20	9.31	0.40	0.70	3.76	9.71	84.6%	0.39	3.43	0.91
	4.25	9.25	0.36	0.65	3.30	9.59	83.6%	0.34	2.78	0.84
	4.30	9.17	0.31	0.60	2.84	9.44	82.3%	0.30	2.18	0.77
	4.35	8.99	0.27	0.55	2.38	9.21	80.2%	0.26	1.66	0.70
	4.40	8.01	0.24	0.50	1.96	8.22	71.7%	0.24	1.29	0.66
	4.45	7.03	0.23	0.45	1.58	7.24	63.1%	0.22	0.99	0.62
	4.50	6.05	0.21	0.40	1.26	6.25	54.5%	0.20	0.74	0.59
	4.55	5.08	0.19	0.35	0.98	5.26	45.9%	0.19	0.55	0.56
WL	4.60	4.10	0.18	0.30	0.75	4.28	37.3%	0.17	0.40	0.54
	4.65	3.75	0.15	0.25	0.55	3.91	34.1%	0.14	0.26	0.46
	4.70	3.30	0.11	0.20	0.38	3.45	30.1%	0.11	0.15	0.39
	4.75	2.80	0.08	0.15	0.22	2.91	25.4%	0.08	0.07	0.31
	4.80	2.00	0.05	0.10	0.10	2.07	18.1%	0.05	0.02	0.22
	4.85	0.90	0.03	0.05	0.02	0.92	8.1%	0.02	0.00	0.14
	4.90	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Fourth of July Creek
XS LOCATION: 200 ft upstr fr Powderhorn Wilderness bndry
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	0.40 cfs
CALCULATED FLOW (Qc)=	0.40 cfs
(Qm-Qc)/Qm * 100 =	0.0 %
MEASURED WATERLINE (WLm)=	4.60 ft
CALCULATED WATERLINE (WLc)=	4.60 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=	0.54 ft/sec
MANNING'S N=	0.263
SLOPE=	0.092 ft/ft
.4 * Qm =	0.2 cfs
2.5 * Qm=	1.0 cfs

RECOMMENDED INSTREAM FLOW:

FLOW (CFS)

PERIOD

RATIONALE FOR RECOMMENDATION:

=====

[illegible]

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

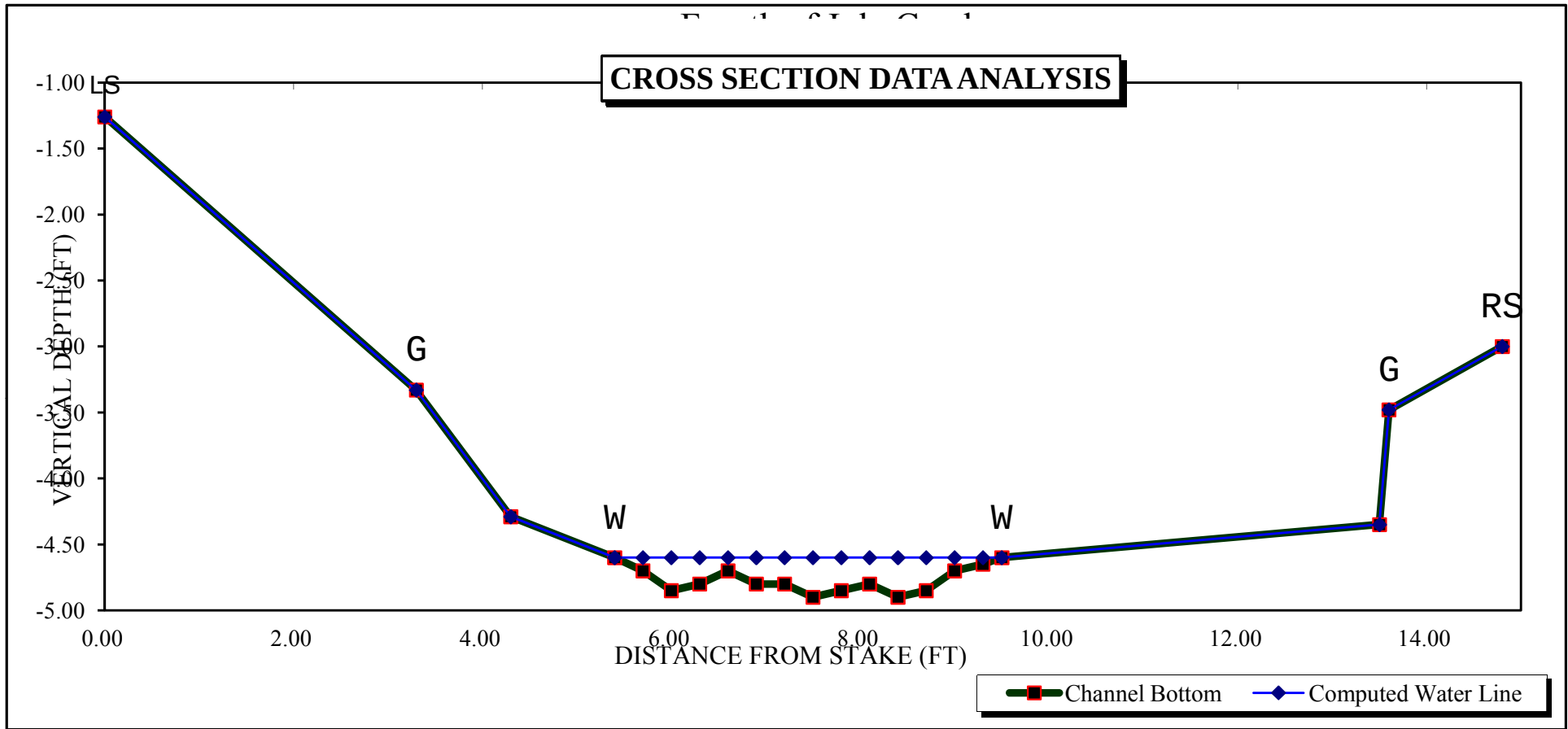
CWCB REVIEW BY: DATE:.....

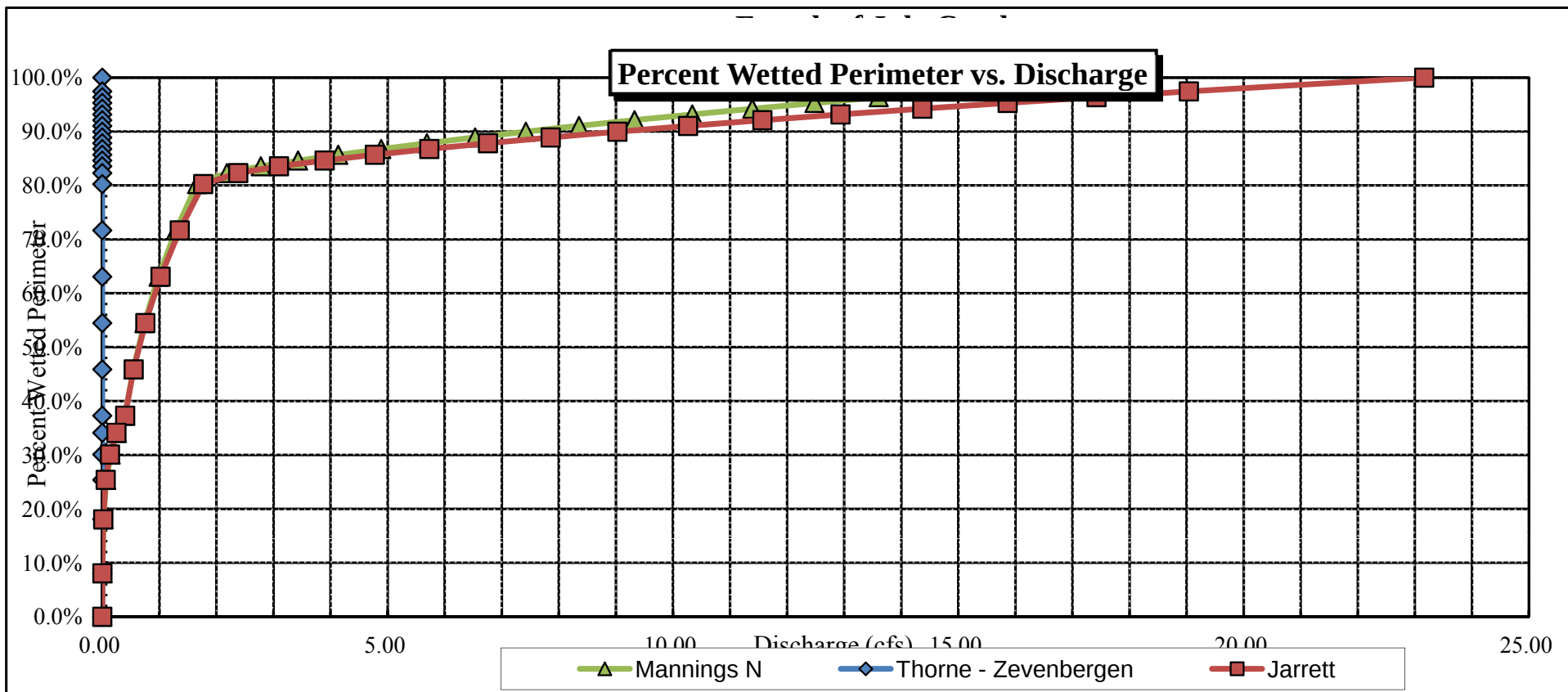
STREAM NAME: Fourth of July Creek
 XS LOCATION: 200 ft upstr fr Powderhorn Wilderness bndry
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

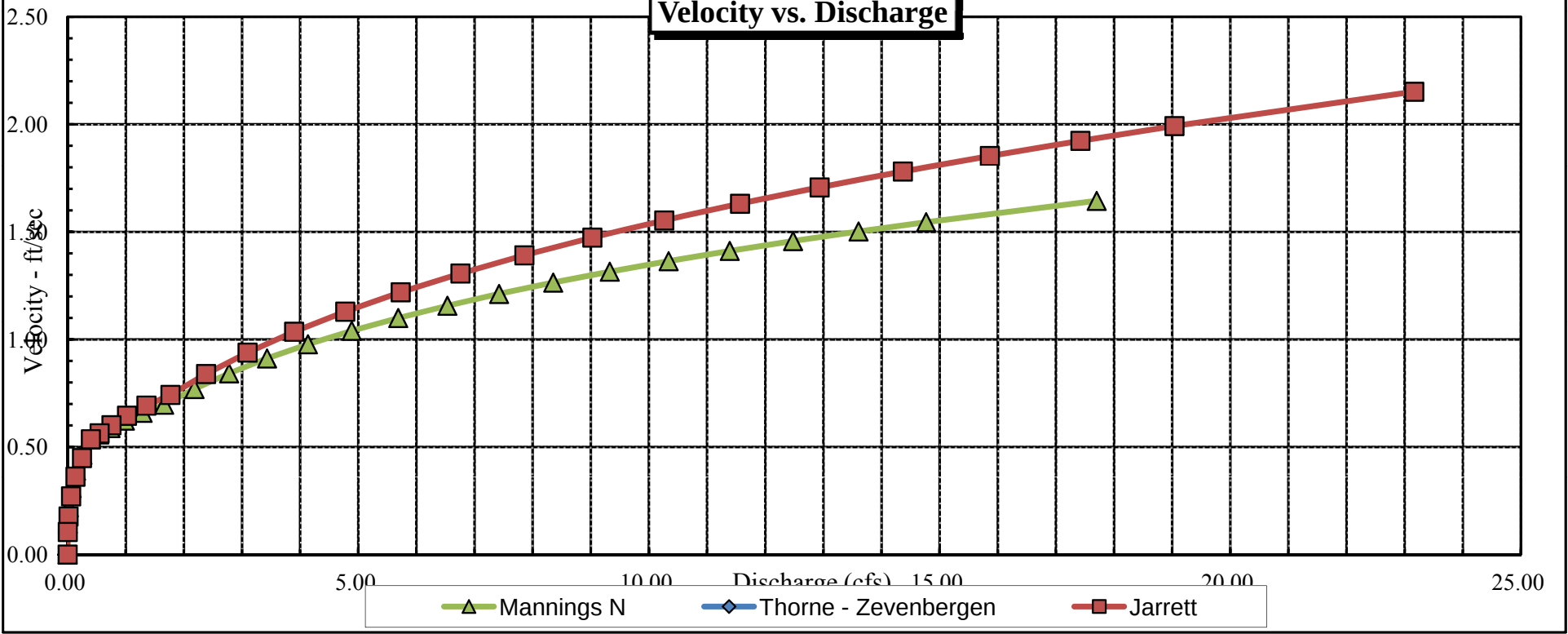
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

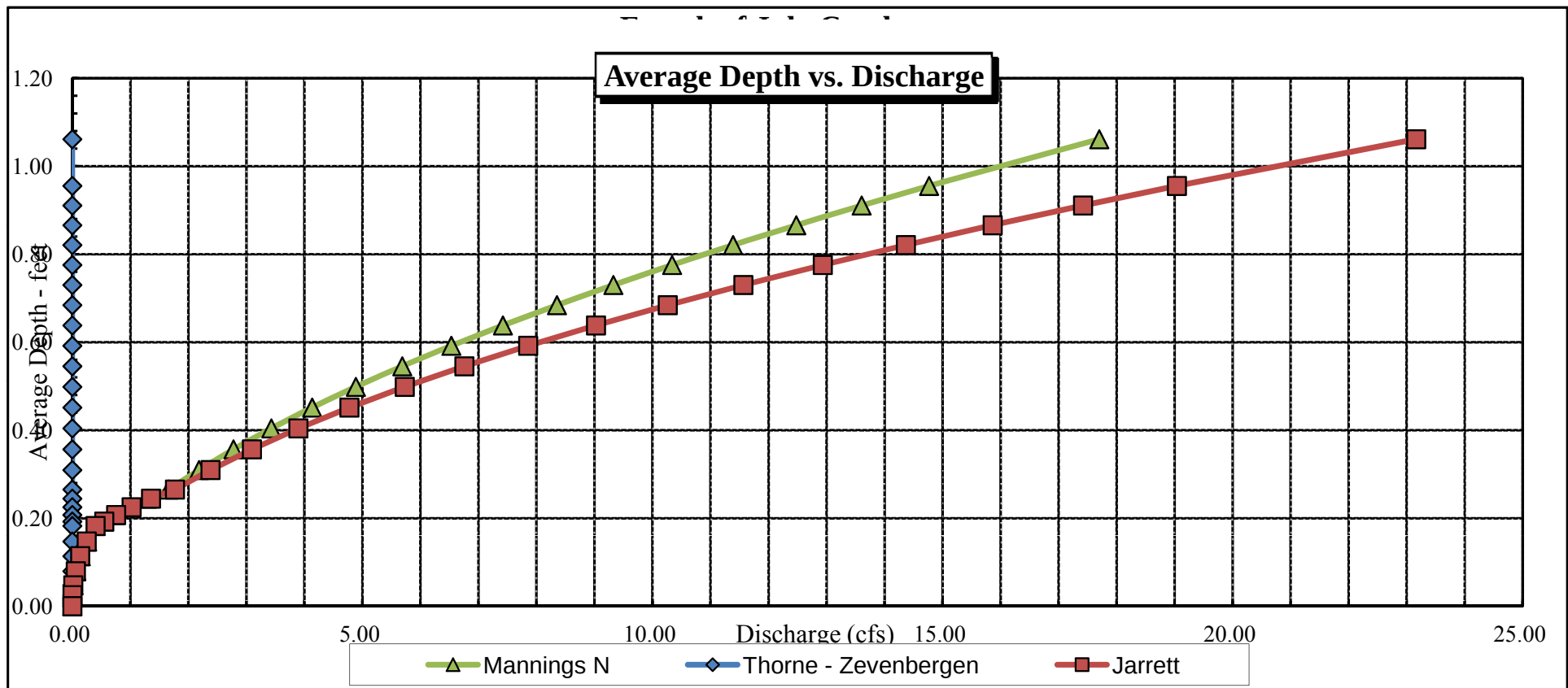
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.48	10.14	1.06	1.42	10.77	11.47	100.0%	0.94	23.16	2.15
	3.60	10.00	0.96	1.30	9.56	11.18	97.4%	0.85	19.04	1.99
	3.65	9.95	0.91	1.25	9.06	11.06	96.4%	0.82	17.42	1.92
	3.70	9.89	0.87	1.20	8.56	10.94	95.3%	0.78	15.86	1.85
	3.75	9.83	0.82	1.15	8.07	10.81	94.2%	0.75	14.37	1.78
	3.80	9.77	0.78	1.10	7.58	10.69	93.2%	0.71	12.94	1.71
	3.85	9.72	0.73	1.05	7.09	10.57	92.1%	0.67	11.57	1.63
	3.90	9.66	0.68	1.00	6.61	10.45	91.0%	0.63	10.26	1.55
	3.95	9.60	0.64	0.95	6.13	10.32	90.0%	0.59	9.03	1.47
	4.00	9.54	0.59	0.90	5.65	10.20	88.9%	0.55	7.86	1.39
	4.05	9.48	0.55	0.85	5.17	10.08	87.8%	0.51	6.76	1.31
	4.10	9.43	0.50	0.80	4.70	9.96	86.8%	0.47	5.73	1.22
	4.15	9.37	0.45	0.75	4.23	9.83	85.7%	0.43	4.78	1.13
	4.20	9.31	0.40	0.70	3.76	9.71	84.6%	0.39	3.90	1.04
	4.25	9.25	0.36	0.65	3.30	9.59	83.6%	0.34	3.10	0.94
	4.30	9.17	0.31	0.60	2.84	9.44	82.3%	0.30	2.38	0.84
	4.35	8.99	0.27	0.55	2.38	9.21	80.2%	0.26	1.77	0.74
	4.40	8.01	0.24	0.50	1.96	8.22	71.7%	0.24	1.36	0.69
	4.45	7.03	0.23	0.45	1.58	7.24	63.1%	0.22	1.02	0.65
	4.50	6.05	0.21	0.40	1.26	6.25	54.5%	0.20	0.76	0.60
	4.55	5.08	0.19	0.35	0.98	5.26	45.9%	0.19	0.55	0.56
WL	4.60	4.10	0.18	0.30	0.75	4.28	37.3%	0.17	0.40	0.54
	4.65	3.75	0.15	0.25	0.55	3.91	34.1%	0.14	0.25	0.45
	4.70	3.30	0.11	0.20	0.38	3.45	30.1%	0.11	0.14	0.36
	4.75	2.80	0.08	0.15	0.22	2.91	25.4%	0.08	0.06	0.27
	4.80	2.00	0.05	0.10	0.10	2.07	18.1%	0.05	0.02	0.18
	4.85	0.90	0.03	0.05	0.02	0.92	8.1%	0.02	0.00	0.11
	4.90	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



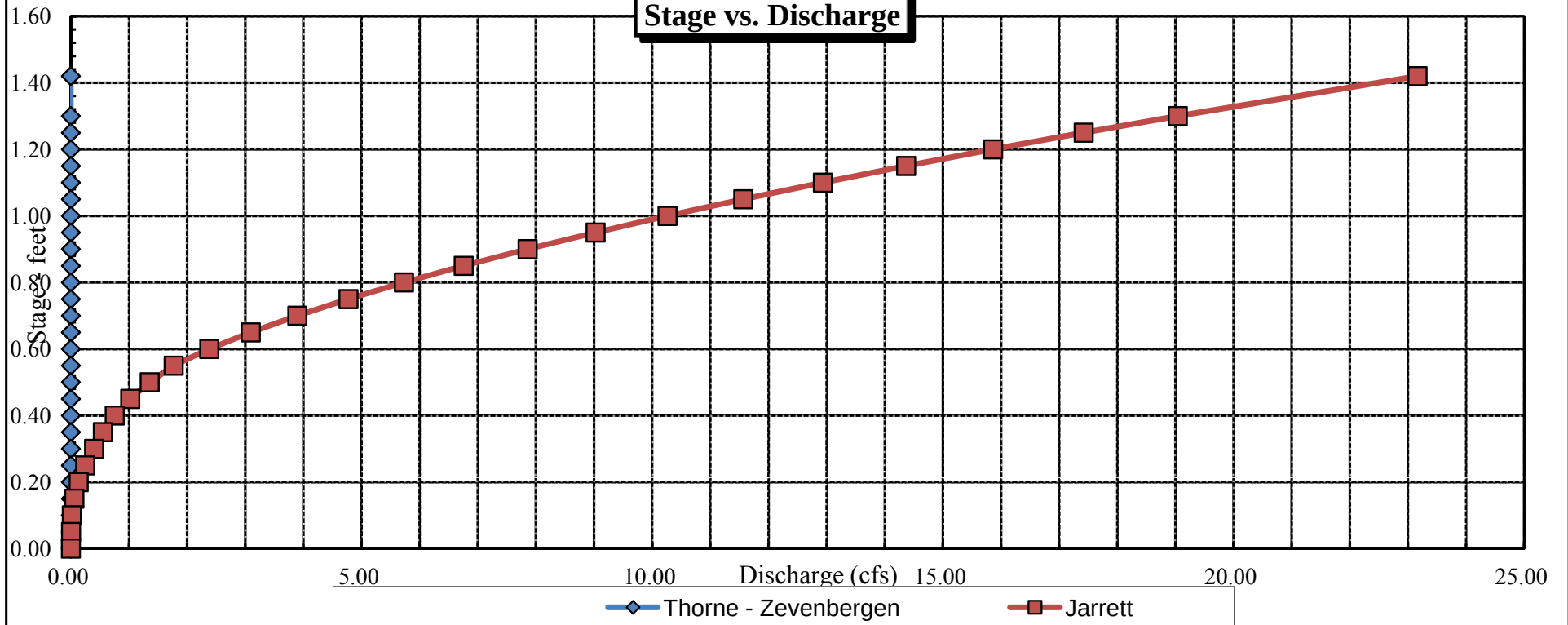


Velocity vs. Discharge





Stage vs. Discharge





FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

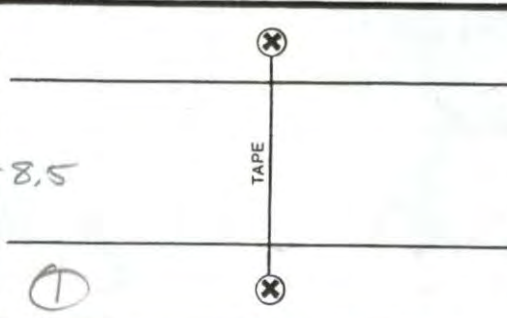
LOCATION INFORMATION

STREAM NAME: Fourth of July Creek		CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: Approx. 170 ft. upstream from Powderhorn Wilderness boundary		
DATE: 7-25-14	OBSERVERS: R. Smith, A. Freibart	
LEGAL DESCRIPTION	1/4 SECTION: SW	SECTION: 13
	TOWNSHIP: 45N/S	RANGE: 4 E/W
COUNTY: Gunnison	WATERSHED: Lake Fk Gunnison	PM: NM
	WATER DIVISION: 4	DOW WATER CODE: 45351
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 2-foot boulders		PHOTOGRAPHS TAKEN: YES/NO	NUMBER OF PHOTOGRAPHS: 2	

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)	SKETCH 	LEGEND: Stake (X) Station (1) Photo (diamond with arrow) Direction of Flow (arrows)
(X) Tape @ Stake LB	0.0	surveyed		
(X) Tape @ Stake RB	0.0	surveyed		
(1) WS @ Tape LB/RB	0.0 3.8	7.75 / 7.75		
(2) WS Upstream	13.5'	6.40		
(3) WS Downstream	16.0'	9.20		
SLOPE	2.80 / 29.5' = .095			

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

DISCHARGE/CROSS SECTION NOTES

[illegible]



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: Fourth of July Creek		CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: Approx. 200 ft upstream from Powderhorn Wilderness boundary			
DATE: 7-25-14	OBSERVERS: R. Smith, A. Breibart		
LEGAL DESCRIPTION	1/4 SECTION: SW	SECTION: 13	TOWNSHIP: 45 N/S
			RANGE: 4 E/W
COUNTY: Gunnison	WATERSHED: Lake Fork Gunnison	WATER DIVISION: 4	PM: NM
MAP(S):	USGS: Zone 13	301561	4226153
	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
CHANNEL BED MATERIAL SIZE RANGE: gravel to 2-foot boulders	PHOTOGRAPHS TAKEN: YES/NO	TAPE TENSION: surveyed lbs
		NUMBER OF PHOTOGRAPHS: 3

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
① Tape @ Stake LB	0.0	surveyed
② Tape @ Stake RB	0.0	surveyed
③ WS @ Tape LB/RB	5.4	4.60 / 4.60
④ WS Upstream	14.7	3.20
⑤ WS Downstream	16.7	6.08
SLOPE	2.88 / 31.4 = .092	

SKETCH

79.5

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

DISCHARGE/CROSS SECTION NOTES

[illegible]



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>Fourth of July Creek</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>Approx. 1.0 miles upstream from confluence with Lake Fork Gunnison River</u>		
DATE: <u>7-18-13</u>	OBSERVERS: <u>K. Smith, A. Breitbart</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>SE</u>	SECTION: <u>12</u>
	TOWNSHIP: <u>45 N</u>	RANGE: <u>4 E</u>
COUNTY: <u>Gunnison</u>	WATERSHED: <u>Lake Fork Gunnison</u>	WATER DIVISION: <u>4</u>
		DOW WATER CODE: <u>45351</u>
MAP(S):	USGS:	
	USFS:	

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 8" cobbles</u>	PHOTOGRAPHS TAKEN: <u>YES/NO</u>
	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>6.90 / 6.90</u>
② WS Upstream	<u>39.0</u>	<u>3.15</u>
③ WS Downstream	<u>10.5'</u>	<u>7.60</u>
SLOPE	<u>4.45 / 50.5' = .088</u>	

SKETCH

Sketch of channel profile showing tape line, stakes, and water level measurements. Includes a north arrow and a scale bar.

LEGEND:

Stake ⊗

Station ①

Photo ①

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>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:																	
<u>mayfly, caddisfly, stonefly</u>																	

COMMENTS

DISCHARGE/CROSS SECTION NOTES

[illegible]



LOCATION INFORMATION

STREAM NAME:		Fourth of July Creek				CROSS-SECTION NO.:		1	
CROSS-SECTION LOCATION:		Approx. 1 mile upstream from confluence with Lake Fork Gunnison							
DATE:		7-18-13		OBSERVERS:		R. Smith, A. Breitbart			
LEGAL DESCRIPTION		% SECTION:		SECTION:		TOWNSHIP:		RANGE:	
		SE		12		45N/5		4 E (W) PM: 6th	
COUNTY:		Gunnison		WATERSHED:		Lake Fork Gunnison		WATER DIVISION:	
						4		DOW WATER CODE:	
								45351	
MAP(S):		USGS:		GPS Zone 13 301145					
		USFS:		4226263					

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: _____ sec
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 4" cobbles</u>		TAPE WEIGHT: <u>surveyed</u> lbs/foot	TAPE TENSION: <u>surveyed</u> lbs
PHOTOGRAPHS TAKEN: <u>(YES/NO)</u>		NUMBER OF PHOTOGRAPHS: <u>3</u>	

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	6.20/ 6.20
② WS Upstream	12.5'	6.02
③ WS Downstream	39.0'	7.95
SLOPE	3.93/ 51.5' = .076	

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:

mayfly, stonefly

COMMENTS

pH = 7.77 Air Temp = 68.4° F Alder - Willow
 Temp = 10.5° C Riparian
 Cond = 71.3
 DO = 7.69 mg/l 93.6 saturation

DISCHARGE/CROSS SECTION NOTES

[illegible]







































