

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 Morgan Gulch, located in Water Division 5.

Location and Land Status. Morgan Gulch originates on the Arapahoe National Forest approximately seven miles southeast of Williams Fork Reservoir. This reach begins at the headwaters of the creek and extends downstream to the confluence with the Williams Fork River, a distance of approximately 4.0 miles. The BLM manages approximately 1.2 miles of this reach, the U.S. Forest Service manages 2.5 miles, and 0.2 miles are in private ownership.

Biological Summary. Morgan Gulch is a cold-water, high gradient stream. It flows through a narrow valley floor slightly less than one-fourth 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. 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.

The riparian community is generally comprised of douglas fir, subalpine fir, 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 Morgan Gulch Creek:

Cross Section Date	Discharge Rate	Top Width	Winter Flow Recommendation (meets 2 of 3 hydraulic criteria)	Summer Flow Recommendation (meets 3 of 3 hydraulic criteria)
06/30/2014 #1	0.93 cfs	10.09 feet	0.84 feet	2.05 cfs
06/30/2014 #2	1.15 cfs	12.67 feet	1.48 cfs	Out of range
06/05/2013 #1	5.01 cfs	9.20 feet	Out of range	2.29 cfs
06/05/2013 #2	5.01 cfs	12.06 feet	Out of range	2.01 cfs
Averages:			1.16 cfs	2.12 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.

2.1 cubic feet per second is recommended during the snowmelt runoff period from May 1 to July 31. This recommendation is driven by the average depth 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.

0.8 cubic feet per second is recommended during late summer, from August 1 to September 30. This recommendation is driven by limited water availability. This flow rate exceeds the wetted perimeter and average velocity criteria in most cross sections that were surveyed, and it meets the average depth criteria in some, but not all locations, that were surveyed.

0.3 cubic feet per second is recommended from October 1 to April 30. This recommendation is driven by limited water availability. 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 09037200 (Skylark Creek near Parshall, CO), and USGS Gage 09036500 (Keyser Creek near Leal, CO) measure flow from watersheds that are close to Morgan Gulch and share similar watershed characteristics. A basin apportionment analysis could be performed to derive flow rates for Morgan Gulch. In addition, Streamstats should be consulted. The Streamstats model produces similar estimates of base flow as basin apportionment calculations.

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

Relationship to Land Management Plans. BLM's land use plan calls for Morgan Gulch to be managed to maintain, restore, or improve riparian conditions, such that proper functioning conditions are achieved. It also specifies that instream flow appropriations will be pursued on fishery streams to ensure sufficient flow rates for fisheries protection. Appropriation of an instream flow water right would assist BLM in long-term management of outstanding 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,

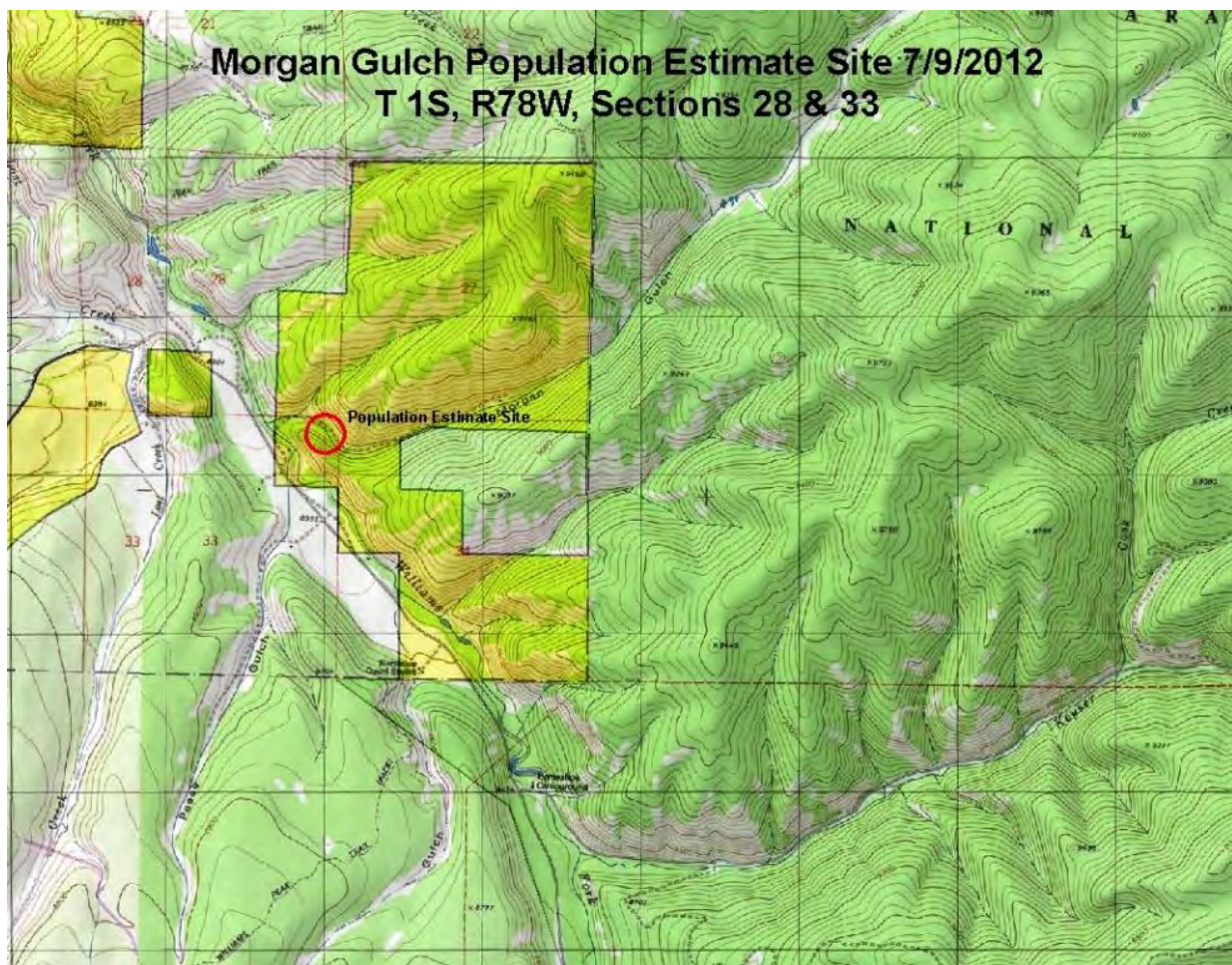
Brian St. George
Deputy State Director
Resources and Fire

Cc: Stephanie Odell, Kremmling Field Office
Joseph Meyer, Northwest District Office
Paula Belcher, Kremmling Field Office

Kremmling Field Office Stream Surveys July 2012

Morgan Gulch - Water Code # 23680

Morgan Gulch, located south of Hot Sulphur Springs, Colorado on BLM lands managed by the Kremmling Field Office, was sampled on July 9, 2012. Sampling was conducted to determine fish species composition and to assist with an instream flow recommendation. The stream was sampled with one backpack shocker and a two-pass removal population estimate was conducted. Brook trout were the only species seen or collected. Personnel present were Gregor Dekleva, and Andrea Sponseller, BLM.





Morgan Gulch



Morgan Gulch



Brook trout

Discussion:

Morgan Gulch is a small stream and given the drought conditions had limited flow. Despite the low flows, the stream contains good habitat diversity with riffles, runs, and some decent pools. The stream appeared to have blown out in 2011 under high spring flows as evidenced by bed material and debris above the bank. Riparian vegetation was dense and lush and consisted of willows, alder, sedges, marestail, and lodgepole pine – most of which was dead or dying. The stream contains a healthy brook trout fishery with good age-class diversity. Aquatic insect production appeared good.

Recommendations:

- Determine brook trout distribution limits in the stream
- Pursue instream flow recommendation
- Consider reclamation potential for cutthroat in relation to other priority streams
- Periodically monitor fish population and stream habitats

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

LOCATION INFORMATION

STREAM NAME: Morgan Gulch
XS LOCATION: 1/4 mile u/s fr. Conf. w/ Williams Fork
XS NUMBER: 2

DATE: 5-Jun-13
OBSERVERS: R. Smith, B. Logan, B. Epstein

1/4 SEC: NE
SECTION: 33
TWP: 1S
RANGE: 84W
PM: Sixth

COUNTY: Grand
WATERSHED: Williams Fork River
DIVISION: 5
DOW CODE: 23680

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: 0.0314

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Morgan Gulch
 XS LOCATION: 1/4 mile u/s fr. Conf. w/ Williams Fork
 XS NUMBER: 2

DATA POINTS= 25

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	4.52		
1 G	2.70	4.86		
W	2.90	6.00	0.00	0.00
	3.50	6.32	0.32	0.97
	3.90	6.31	0.31	1.72
	4.30	6.42	0.42	2.02
	4.70	6.40	0.40	2.60
	5.10	6.47	0.47	2.69
	5.50	6.49	0.49	2.30
	5.90	6.43	0.43	2.46
	6.30	6.40	0.40	2.80
	6.70	6.46	0.46	2.30
	7.10	6.39	0.39	2.19
	7.50	6.31	0.31	2.22
	7.90	6.30	0.30	1.96
	8.30	6.30	0.30	1.04
	8.70	6.30	0.30	1.60
	9.10	6.23	0.23	1.14
	9.50	6.25	0.25	1.12
	9.90	6.32	0.32	1.12
	10.30	6.21	0.21	1.27
W	10.70	6.00	0.00	0.00
	11.10	5.66		
	13.30	5.46		
1 RS/G	15.00	4.76		

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%
0.68	0.32	0.16	0.16	3.1%
0.40	0.31	0.12	0.21	4.3%
0.41	0.42	0.17	0.34	6.8%
0.40	0.40	0.16	0.42	8.3%
0.41	0.47	0.19	0.51	10.1%
0.40	0.49	0.20	0.45	9.0%
0.40	0.43	0.17	0.42	8.4%
0.40	0.40	0.16	0.45	8.9%
0.40	0.46	0.18	0.42	8.4%
0.41	0.39	0.16	0.34	6.8%
0.41	0.31	0.12	0.28	5.5%
0.40	0.30	0.12	0.24	4.7%
0.40	0.30	0.12	0.12	2.5%
0.40	0.30	0.12	0.19	3.8%
0.41	0.23	0.09	0.10	2.1%
0.40	0.25	0.10	0.11	2.2%
0.41	0.32	0.13	0.14	2.9%
0.41	0.21	0.08	0.11	2.1%
0.45		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 -----

8.01	0.49	2.56	5.01	100.0%
(Max.)				

Manning's n = 0.0627
 Hydraulic Radius= 0.31927921

STREAM NAME: Morgan Gulch
 XS LOCATION: 1/4 mile u/s fr. Conf. w/ Williams Fork
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.56	2.56	0.0%
5.75	2.56	4.55	77.9%
5.77	2.56	4.39	71.6%
5.79	2.56	4.22	65.3%
5.81	2.56	4.06	58.9%
5.83	2.56	3.90	52.6%
5.85	2.56	3.74	46.4%
5.87	2.56	3.58	40.1%
5.89	2.56	3.42	33.9%
5.91	2.56	3.26	27.7%
5.93	2.56	3.11	21.5%
5.95	2.56	2.95	15.3%
5.96	2.56	2.87	12.2%
5.97	2.56	2.79	9.2%
5.98	2.56	2.71	6.1%
5.99	2.56	2.63	3.1%
6.00	2.56	2.56	0.0%
6.01	2.56	2.48	-3.0%
6.02	2.56	2.40	-6.1%
6.03	2.56	2.32	-9.1%
6.04	2.56	2.25	-12.1%
6.05	2.56	2.17	-15.1%
6.07	2.56	2.02	-21.0%
6.09	2.56	1.87	-26.9%
6.11	2.56	1.72	-32.7%
6.13	2.56	1.57	-38.4%
6.15	2.56	1.43	-44.1%
6.17	2.56	1.28	-49.7%
6.19	2.56	1.14	-55.3%
6.21	2.56	1.00	-60.8%
6.23	2.56	0.86	-66.3%
6.25	2.56	0.73	-71.4%

WATERLINE AT ZERO

AREA ERROR = 6.000

STREAM NAME: Morgan Gulch
 XS LOCATION: 1/4 mile u/s fr. Conf. w/ Williams Fork
 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	4.86	12.06	1.16	1.63	13.93	13.47	100.0%	1.03	59.75	4.29
	5.00	11.69	1.05	1.49	12.26	12.96	96.2%	0.95	49.60	4.04
	5.05	11.56	1.01	1.44	11.68	12.78	94.9%	0.91	46.18	3.95
	5.10	11.43	0.97	1.39	11.11	12.60	93.5%	0.88	42.86	3.86
	5.15	11.30	0.93	1.34	10.54	12.42	92.2%	0.85	39.65	3.76
	5.20	11.17	0.89	1.29	9.98	12.23	90.8%	0.82	36.55	3.66
	5.25	11.04	0.85	1.24	9.42	12.05	89.5%	0.78	33.56	3.56
	5.30	10.91	0.81	1.19	8.87	11.87	88.1%	0.75	30.67	3.46
	5.35	10.78	0.77	1.14	8.33	11.69	86.8%	0.71	27.90	3.35
	5.40	10.65	0.73	1.09	7.80	11.51	85.4%	0.68	25.24	3.24
	5.45	10.52	0.69	1.04	7.27	11.32	84.1%	0.64	22.69	3.12
	5.50	10.05	0.67	0.99	6.75	10.81	80.2%	0.62	20.70	3.07
	5.55	9.49	0.66	0.94	6.26	10.20	75.7%	0.61	18.98	3.03
	5.60	8.93	0.65	0.89	5.80	9.60	71.2%	0.60	17.40	3.00
	5.65	8.37	0.64	0.84	5.37	9.00	66.8%	0.60	15.97	2.97
	5.70	8.21	0.60	0.79	4.96	8.77	65.1%	0.56	14.22	2.87
	5.75	8.14	0.56	0.74	4.55	8.65	64.2%	0.53	12.44	2.73
	5.80	8.07	0.51	0.69	4.14	8.52	63.2%	0.49	10.75	2.60
	5.85	8.00	0.47	0.64	3.74	8.39	62.3%	0.45	9.16	2.45
	5.90	7.94	0.42	0.59	3.34	8.26	61.3%	0.40	7.67	2.30
	5.95	7.87	0.37	0.54	2.95	8.13	60.4%	0.36	6.29	2.13
WL	6.00	7.80	0.33	0.49	2.56	8.01	59.4%	0.32	5.01	1.96
	6.05	7.61	0.29	0.44	2.17	7.79	57.8%	0.28	3.89	1.79
	6.10	7.42	0.24	0.39	1.79	7.58	56.2%	0.24	2.88	1.61
	6.15	7.23	0.20	0.34	1.43	7.36	54.7%	0.19	2.01	1.41
	6.20	7.04	0.15	0.29	1.07	7.15	53.1%	0.15	1.27	1.18
	6.25	6.27	0.12	0.24	0.73	6.36	47.2%	0.11	0.72	0.99
	6.30	4.62	0.09	0.19	0.44	4.68	34.7%	0.09	0.38	0.87
	6.35	3.25	0.08	0.14	0.25	3.29	24.4%	0.08	0.19	0.76
	6.40	2.82	0.04	0.09	0.10	2.84	21.1%	0.04	0.05	0.46
	6.45	0.90	0.02	0.04	0.02	0.91	6.8%	0.02	0.01	0.32

STREAM NAME: Morgan Gulch
XS LOCATION: 1/4 mile u/s fr. Conf. w/ Williams Fork
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 5.01 cfs
CALCULATED FLOW (Qc)= 5.01 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 6.00 ft
CALCULATED WATERLINE (WLc)= 6.00 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.49 ft
MAX CALCULATED DEPTH (Dc)= 0.49 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 1.96 ft/sec
MANNING'S N= 0.063
SLOPE= 0.0314 ft/ft

.4 * Qm = 2.0 cfs
2.5 * Qm= 12.5 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

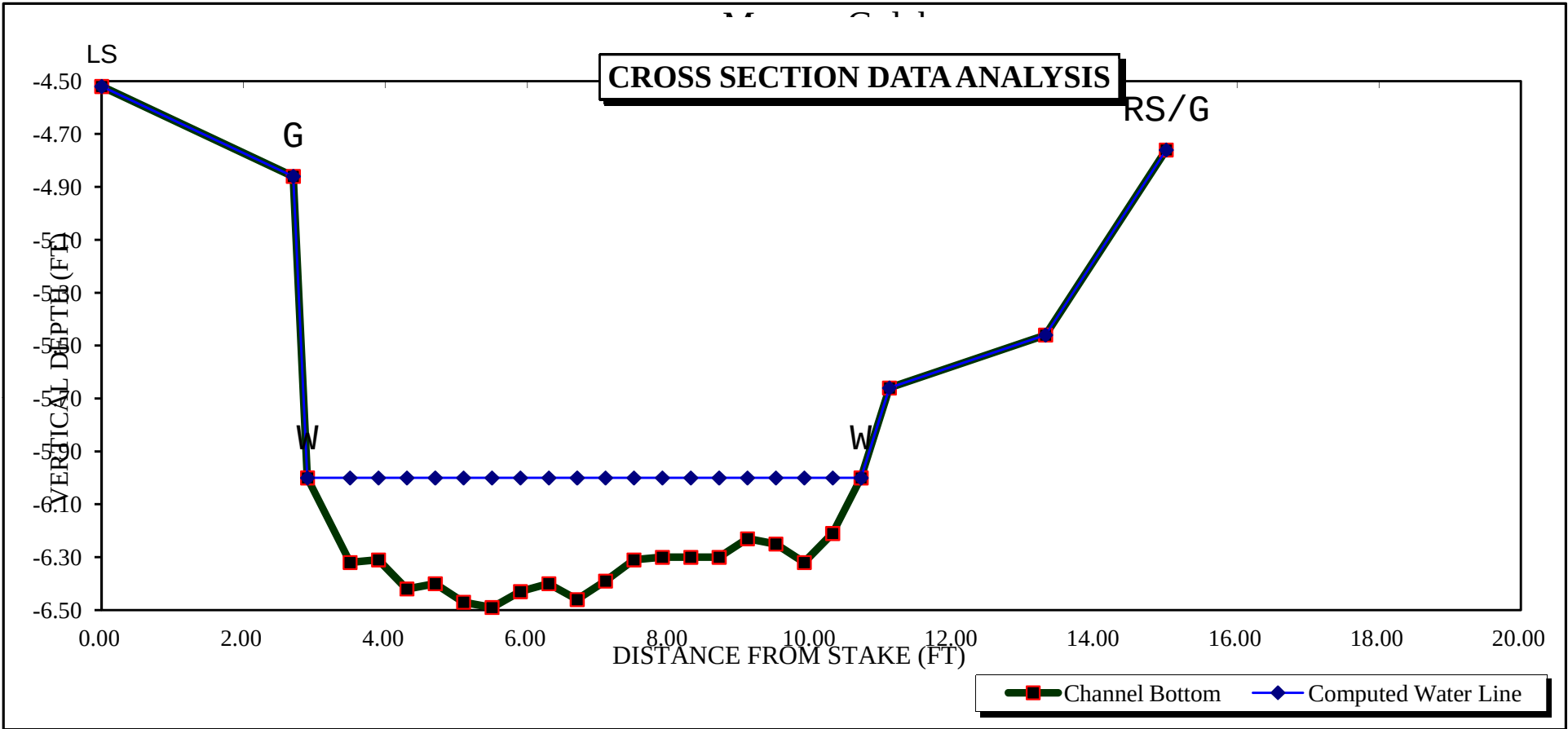
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

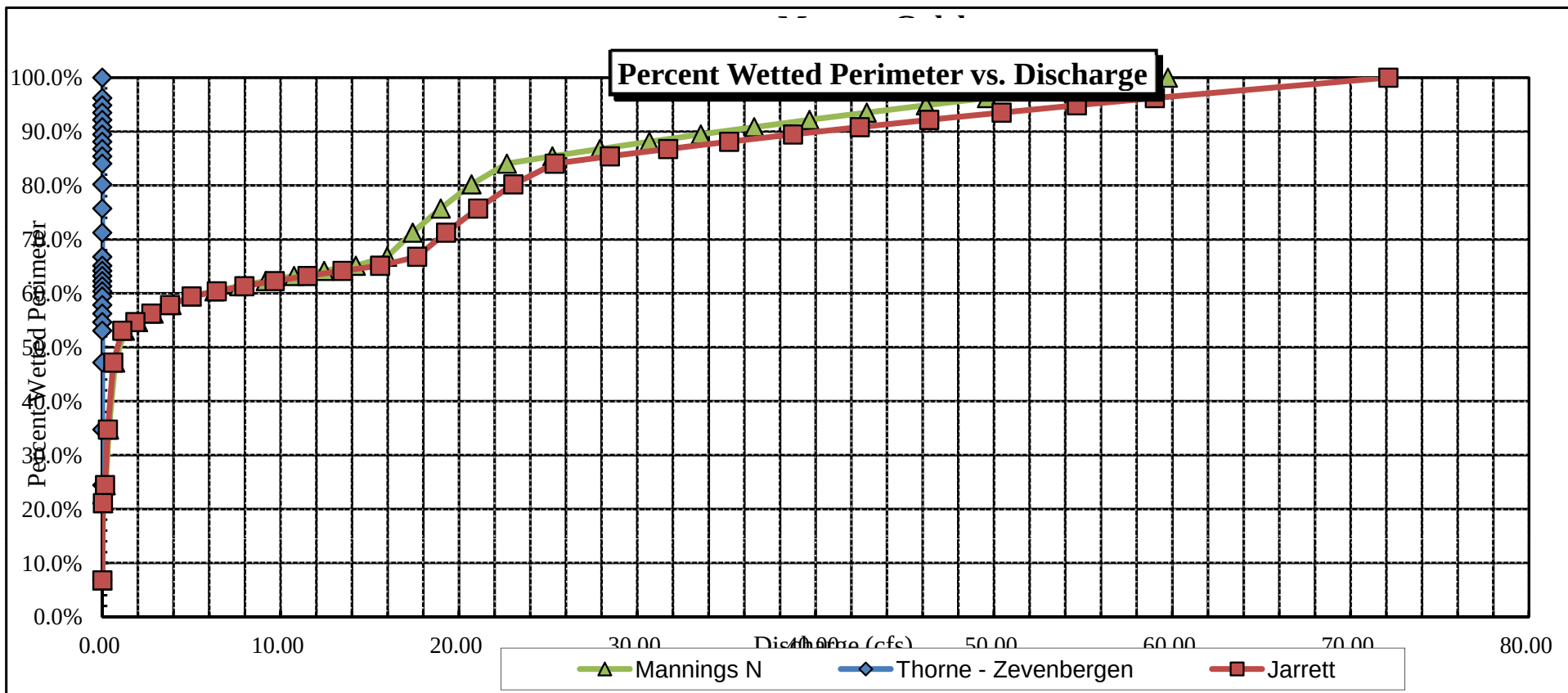
STREAM NAME: Morgan Gulch
 XS LOCATION: 1/4 mile u/s fr. Conf. w/ Williams Fork
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

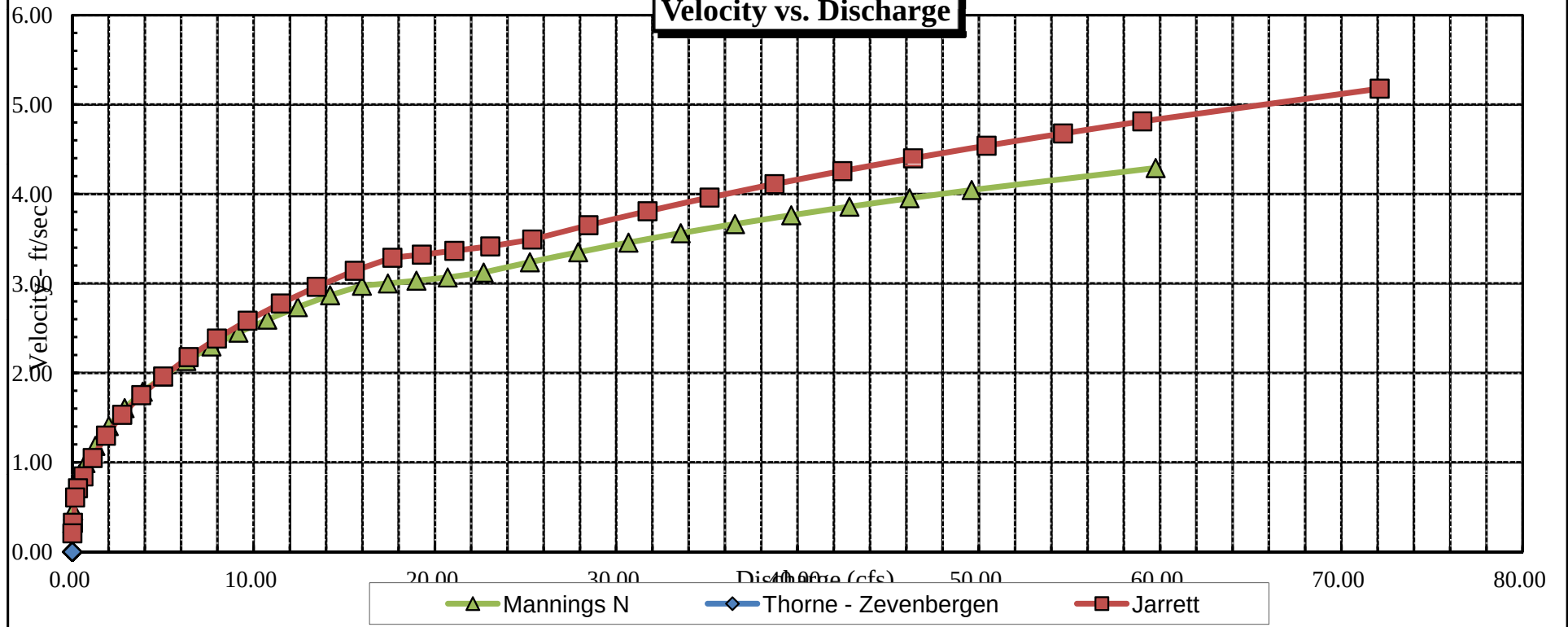
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

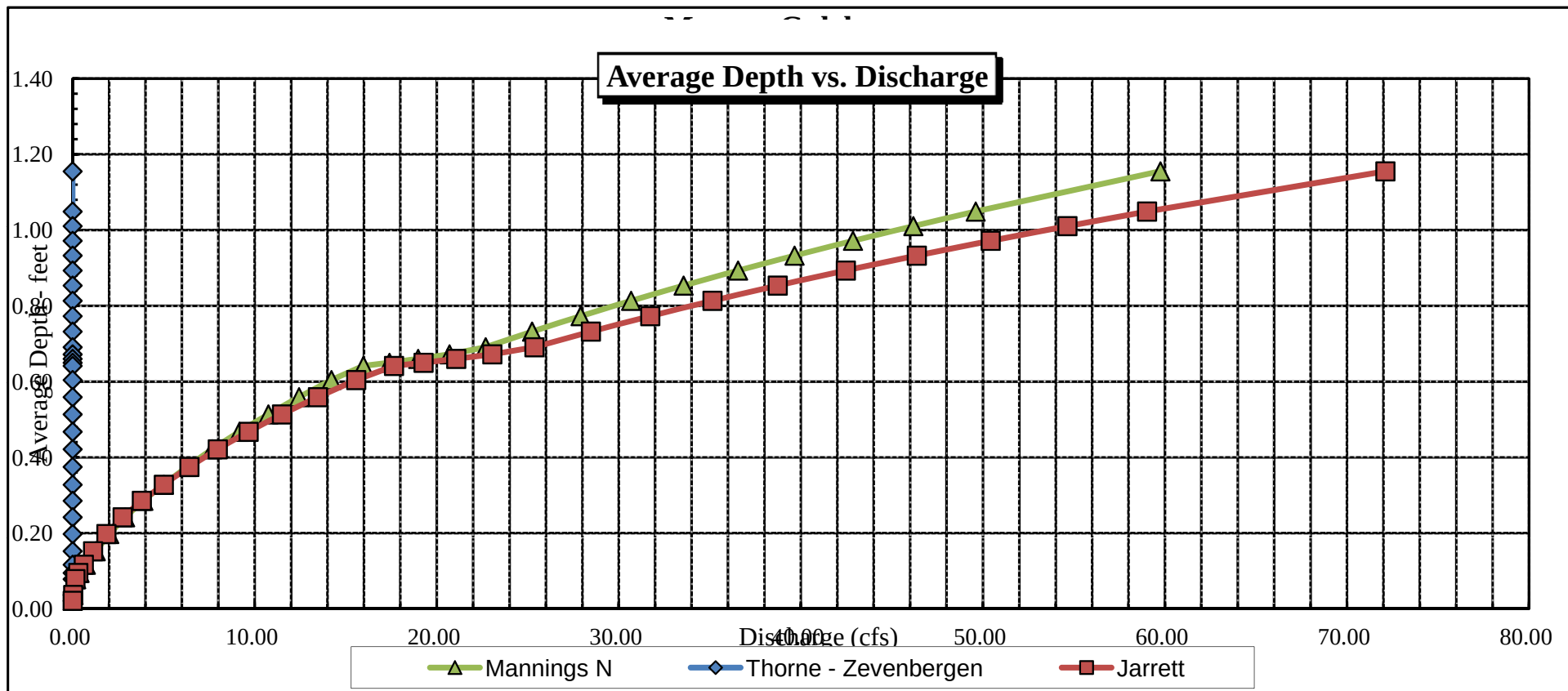
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.86	12.06	1.16	1.63	13.93	13.47	100.0%	1.03	72.11	5.18
	5.00	11.69	1.05	1.49	12.26	12.96	96.2%	0.95	59.02	4.81
	5.05	11.56	1.01	1.44	11.68	12.78	94.9%	0.91	54.64	4.68
	5.10	11.43	0.97	1.39	11.11	12.60	93.5%	0.88	50.43	4.54
	5.15	11.30	0.93	1.34	10.54	12.42	92.2%	0.85	46.37	4.40
	5.20	11.17	0.89	1.29	9.98	12.23	90.8%	0.82	42.47	4.26
	5.25	11.04	0.85	1.24	9.42	12.05	89.5%	0.78	38.73	4.11
	5.30	10.91	0.81	1.19	8.87	11.87	88.1%	0.75	35.15	3.96
	5.35	10.78	0.77	1.14	8.33	11.69	86.8%	0.71	31.73	3.81
	5.40	10.65	0.73	1.09	7.80	11.51	85.4%	0.68	28.47	3.65
	5.45	10.52	0.69	1.04	7.27	11.32	84.1%	0.64	25.37	3.49
	5.50	10.05	0.67	0.99	6.75	10.81	80.2%	0.62	23.05	3.41
	5.55	9.49	0.66	0.94	6.26	10.20	75.7%	0.61	21.07	3.37
	5.60	8.93	0.65	0.89	5.80	9.60	71.2%	0.60	19.28	3.32
	5.65	8.37	0.64	0.84	5.37	9.00	66.8%	0.60	17.65	3.29
	5.70	8.21	0.60	0.79	4.96	8.77	65.1%	0.56	15.58	3.14
	5.75	8.14	0.56	0.74	4.55	8.65	64.2%	0.53	13.47	2.96
	5.80	8.07	0.51	0.69	4.14	8.52	63.2%	0.49	11.50	2.78
	5.85	8.00	0.47	0.64	3.74	8.39	62.3%	0.45	9.67	2.58
	5.90	7.94	0.42	0.59	3.34	8.26	61.3%	0.40	7.97	2.38
	5.95	7.87	0.37	0.54	2.95	8.13	60.4%	0.36	6.42	2.18
WL	6.00	7.80	0.33	0.49	2.56	8.01	59.4%	0.32	5.01	1.96
	6.05	7.61	0.29	0.44	2.17	7.79	57.8%	0.28	3.80	1.75
	6.10	7.42	0.24	0.39	1.79	7.58	56.2%	0.24	2.75	1.53
	6.15	7.23	0.20	0.34	1.43	7.36	54.7%	0.19	1.85	1.30
	6.20	7.04	0.15	0.29	1.07	7.15	53.1%	0.15	1.12	1.05
	6.25	6.27	0.12	0.24	0.73	6.36	47.2%	0.11	0.62	0.84
	6.30	4.62	0.09	0.19	0.44	4.68	34.7%	0.09	0.31	0.71
	6.35	3.25	0.08	0.14	0.25	3.29	24.4%	0.08	0.15	0.61
	6.40	2.82	0.04	0.09	0.10	2.84	21.1%	0.04	0.03	0.32
	6.45	0.90	0.02	0.04	0.02	0.91	6.8%	0.02	0.00	0.21



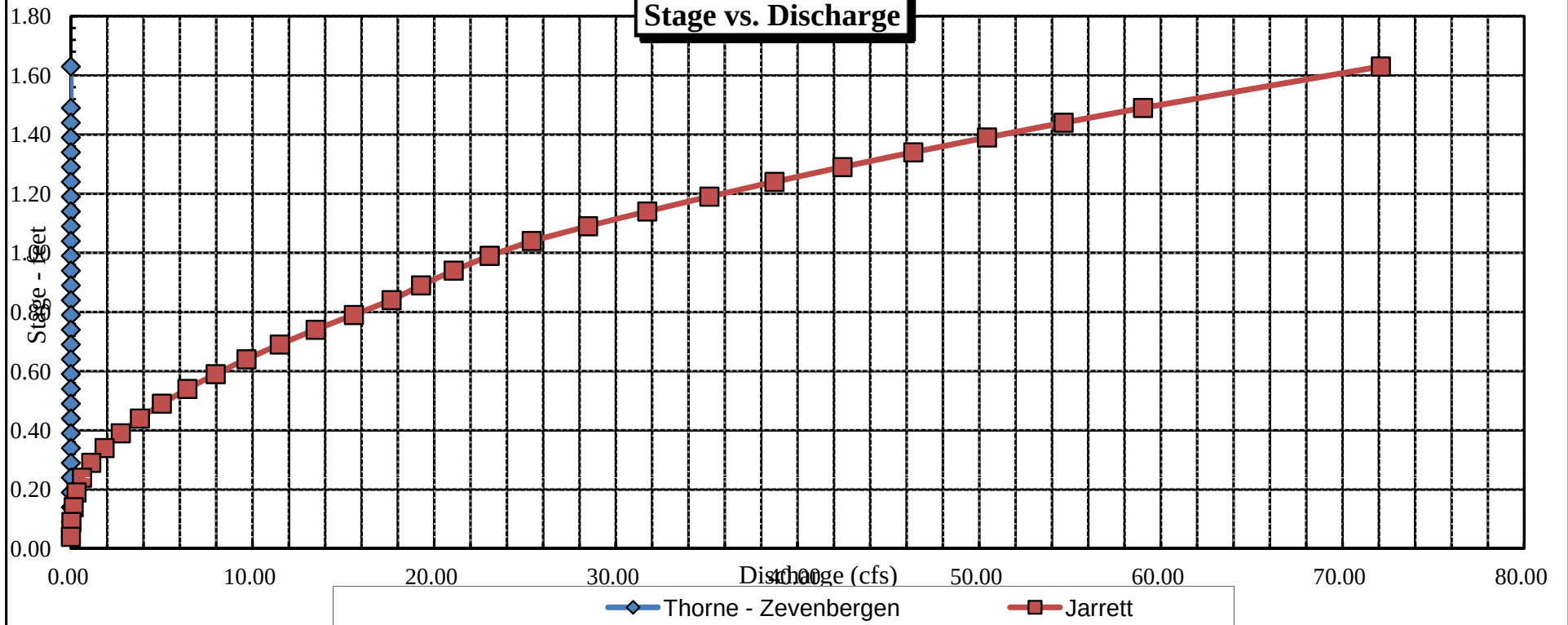


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Morgan Gulch
XS LOCATION: 1/3 mile u/s fr conf. w/ Sheephorn Creek
XS NUMBER: 1

DATE: 5-Jun-13
OBSERVERS: R. Smith, B. Logan, B. Epstein

1/4 SEC: NW
SECTION: 34
TWP: 1S
RANGE: 78W
PM: Sixth

COUNTY: Grand
WATERSHED: Williams Fork
DIVISION: 5
DOW CODE: 23680

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: 0.0153

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Morgan Gulch
 XS LOCATION: 1/3 mile u/s fr conf. w/ Sheephorn Creek
 XS NUMBER: 1

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER		WETTED	WATER	AREA	Q	% Q	
		DIST	DEPTH	DEPTH	VEL	PERIM.	DEPTH	(Am)	(Qm)	CELL
1	LS	0.00	4.24			0.00		0.00	0.00	0.0%
	G	2.90	4.96			0.00		0.00	0.00	0.0%
		3.30	5.80			0.00		0.00	0.00	0.0%
1	W	3.90	6.55	0.00	0.00	0.00		0.00	0.00	0.0%
		4.30	6.65	0.10	0.00	0.41	0.10	0.04	0.00	0.0%
		4.70	6.82	0.27	0.65	0.43	0.27	0.11	0.07	1.4%
		5.10	6.86	0.31	1.51	0.40	0.31	0.12	0.19	3.7%
		5.50	6.85	0.30	2.10	0.40	0.30	0.12	0.25	5.0%
		5.90	6.88	0.33	1.79	0.40	0.33	0.13	0.24	4.7%
		6.30	6.90	0.35	2.50	0.40	0.35	0.14	0.35	7.0%
		6.70	6.95	0.40	2.50	0.40	0.40	0.16	0.40	8.0%
		7.10	6.91	0.36	2.58	0.40	0.36	0.14	0.37	7.4%
		7.50	6.86	0.31	2.64	0.40	0.31	0.12	0.33	6.5%
		7.90	6.95	0.40	2.21	0.41	0.40	0.16	0.35	7.1%
		8.30	6.83	0.28	2.22	0.42	0.28	0.11	0.25	5.0%
		8.70	6.91	0.36	2.08	0.41	0.36	0.14	0.30	6.0%
		9.10	6.98	0.43	2.28	0.41	0.43	0.17	0.39	7.8%
		9.50	7.00	0.45	2.21	0.40	0.45	0.18	0.40	7.9%
		9.90	6.94	0.39	2.91	0.40	0.39	0.16	0.45	9.1%
		10.30	6.83	0.28	3.11	0.41	0.28	0.11	0.35	7.0%
		10.70	6.83	0.28	2.86	0.40	0.28	0.11	0.32	6.4%
		11.10	6.70	0.15	0.00	0.42	0.15	0.05	0.00	0.0%
	1	W	11.40	6.55	0.00	0.00	0.34		0.00	0.00
		11.70	5.96			0.00		0.00	0.00	0.0%
G		12.30	5.38			0.00		0.00	0.00	0.0%
	RS	15.00	4.32			0.00		0.00	0.00	0.0%
TOTALS -----					7.68	0.45	2.29	5.01	100.0%	
					(Max.)					
					Manning's n = 0.0376					
					Hydraulic Radius= 0.29864483					

STREAM NAME: Morgan Gulch
 XS LOCATION: 1/3 mile u/s fr conf. w/ Sheephorn Creek
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.29	2.29	0.0%
6.30	2.29	4.21	83.6%
6.32	2.29	4.05	76.8%
6.34	2.29	3.90	70.0%
6.36	2.29	3.74	63.2%
6.38	2.29	3.59	56.4%
6.40	2.29	3.43	49.7%
6.42	2.29	3.28	43.0%
6.44	2.29	3.13	36.3%
6.46	2.29	2.97	29.7%
6.48	2.29	2.82	23.0%
6.50	2.29	2.67	16.4%
6.51	2.29	2.59	13.1%
6.52	2.29	2.52	9.8%
6.53	2.29	2.44	6.6%
6.54	2.29	2.37	3.3%
6.55	2.29	2.29	0.0%
6.56	2.29	2.22	-3.3%
6.57	2.29	2.14	-6.5%
6.58	2.29	2.07	-9.7%
6.59	2.29	2.00	-12.9%
6.60	2.29	1.93	-16.0%
6.62	2.29	1.78	-22.3%
6.64	2.29	1.64	-28.4%
6.66	2.29	1.50	-34.4%
6.68	2.29	1.37	-40.4%
6.70	2.29	1.23	-46.2%
6.72	2.29	1.10	-52.0%
6.74	2.29	0.97	-57.7%
6.76	2.29	0.84	-63.3%
6.78	2.29	0.72	-68.8%
6.80	2.29	0.59	-74.2%

WATERLINE AT ZERO

AREA ERROR = 6.550

STREAM NAME: Morgan Gulch
 XS LOCATION: 1/3 mile u/s fr conf. w/ Sheephorn Creek
 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	5.38	9.20	1.31	1.62	12.02	10.60	100.0%	1.13	63.96	5.32
	5.55	8.94	1.17	1.45	10.48	10.17	95.9%	1.03	52.31	4.99
	5.60	8.87	1.13	1.40	10.04	10.04	94.7%	1.00	49.07	4.89
	5.65	8.79	1.09	1.35	9.59	9.91	93.5%	0.97	45.91	4.79
	5.70	8.72	1.05	1.30	9.16	9.78	92.3%	0.94	42.84	4.68
	5.75	8.64	1.01	1.25	8.72	9.66	91.1%	0.90	39.86	4.57
	5.80	8.57	0.97	1.20	8.29	9.53	89.9%	0.87	36.96	4.46
	5.85	8.47	0.93	1.15	7.87	9.39	88.6%	0.84	34.18	4.35
	5.90	8.38	0.89	1.10	7.44	9.26	87.3%	0.80	31.49	4.23
	5.95	8.29	0.85	1.05	7.03	9.12	86.1%	0.77	28.89	4.11
	6.00	8.22	0.80	1.00	6.62	9.00	84.9%	0.74	26.35	3.98
	6.05	8.15	0.76	0.95	6.21	8.88	83.8%	0.70	23.91	3.85
	6.10	8.09	0.72	0.90	5.80	8.76	82.6%	0.66	21.55	3.72
	6.15	8.02	0.67	0.85	5.40	8.64	81.5%	0.62	19.29	3.57
	6.20	7.96	0.63	0.80	5.00	8.52	80.4%	0.59	17.13	3.43
	6.25	7.89	0.58	0.75	4.60	8.40	79.2%	0.55	15.07	3.27
	6.30	7.83	0.54	0.70	4.21	8.28	78.1%	0.51	13.11	3.12
	6.35	7.76	0.49	0.65	3.82	8.16	77.0%	0.47	11.26	2.95
	6.40	7.70	0.45	0.60	3.43	8.04	75.8%	0.43	9.52	2.77
	6.45	7.63	0.40	0.55	3.05	7.92	74.7%	0.39	7.89	2.59
	6.50	7.57	0.35	0.50	2.67	7.80	73.6%	0.34	6.39	2.39
WL	6.55	7.50	0.31	0.45	2.29	7.68	72.4%	0.30	5.01	2.18
	6.60	7.20	0.27	0.40	1.93	7.36	69.4%	0.26	3.85	2.00
	6.65	6.90	0.23	0.35	1.57	7.04	66.4%	0.22	2.83	1.80
	6.70	6.68	0.18	0.30	1.23	6.80	64.2%	0.18	1.93	1.57
	6.75	6.41	0.14	0.25	0.91	6.51	61.4%	0.14	1.19	1.31
	6.80	6.14	0.10	0.20	0.59	6.22	58.7%	0.10	0.60	1.02
	6.85	5.06	0.06	0.15	0.30	5.12	48.4%	0.06	0.23	0.75
	6.90	2.66	0.04	0.10	0.12	2.70	25.5%	0.04	0.07	0.60
	6.95	0.90	0.03	0.05	0.03	0.91	8.6%	0.03	0.01	0.47
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Morgan Gulch
XS LOCATION: 1/3 mile u/s fr conf. w/ Sheephorn Creek
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 5.01 cfs
CALCULATED FLOW (Qc)= 5.01 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 6.55 ft
CALCULATED WATERLINE (WLc)= 6.55 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.45 ft
MAX CALCULATED DEPTH (Dc)= 0.45 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 2.18 ft/sec
MANNING'S N= 0.038
SLOPE= 0.0153 ft/ft

.4 * Qm = 2.0 cfs
2.5 * Qm= 12.5 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

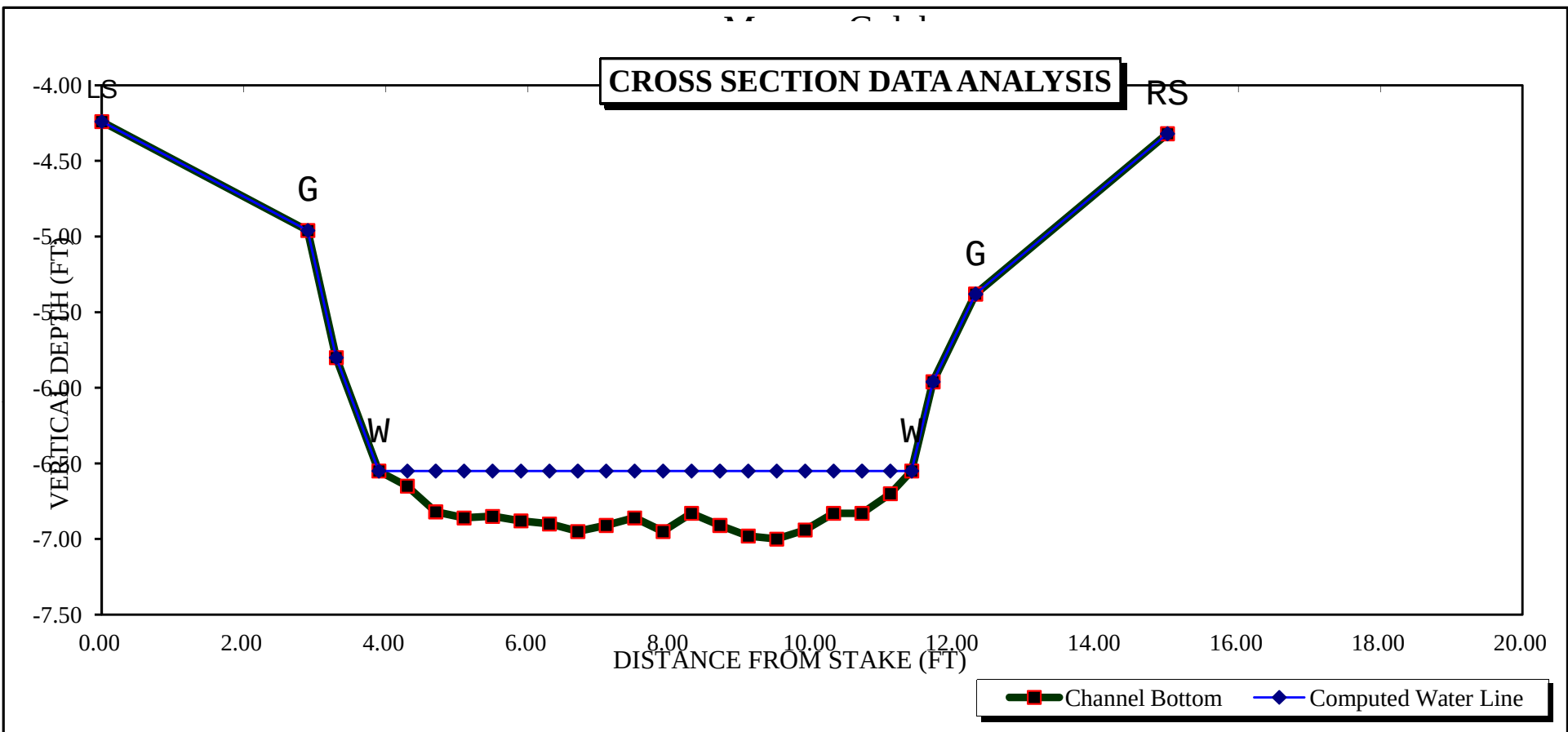
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

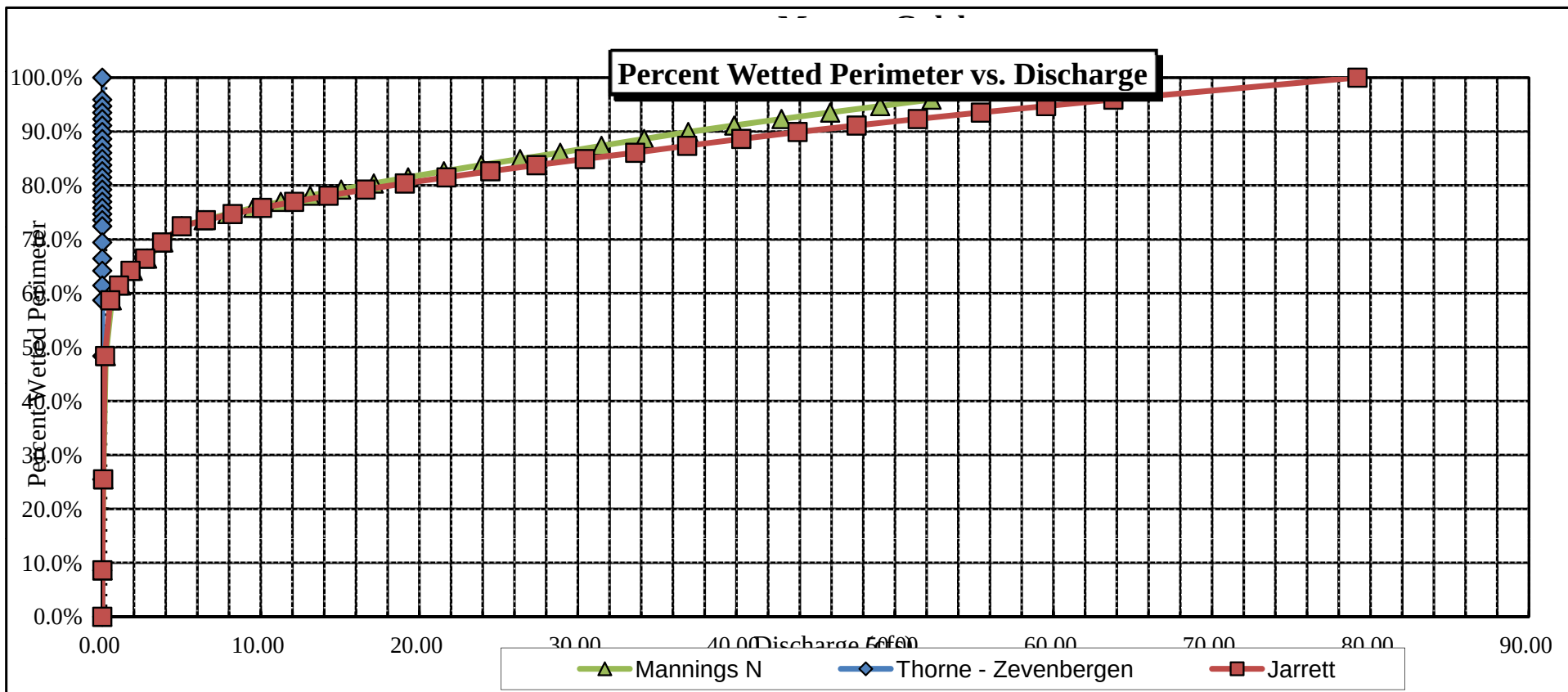
STREAM NAME: Morgan Gulch
 XS LOCATION: 1/3 mile u/s fr conf. w/ Sheephorn Creek
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

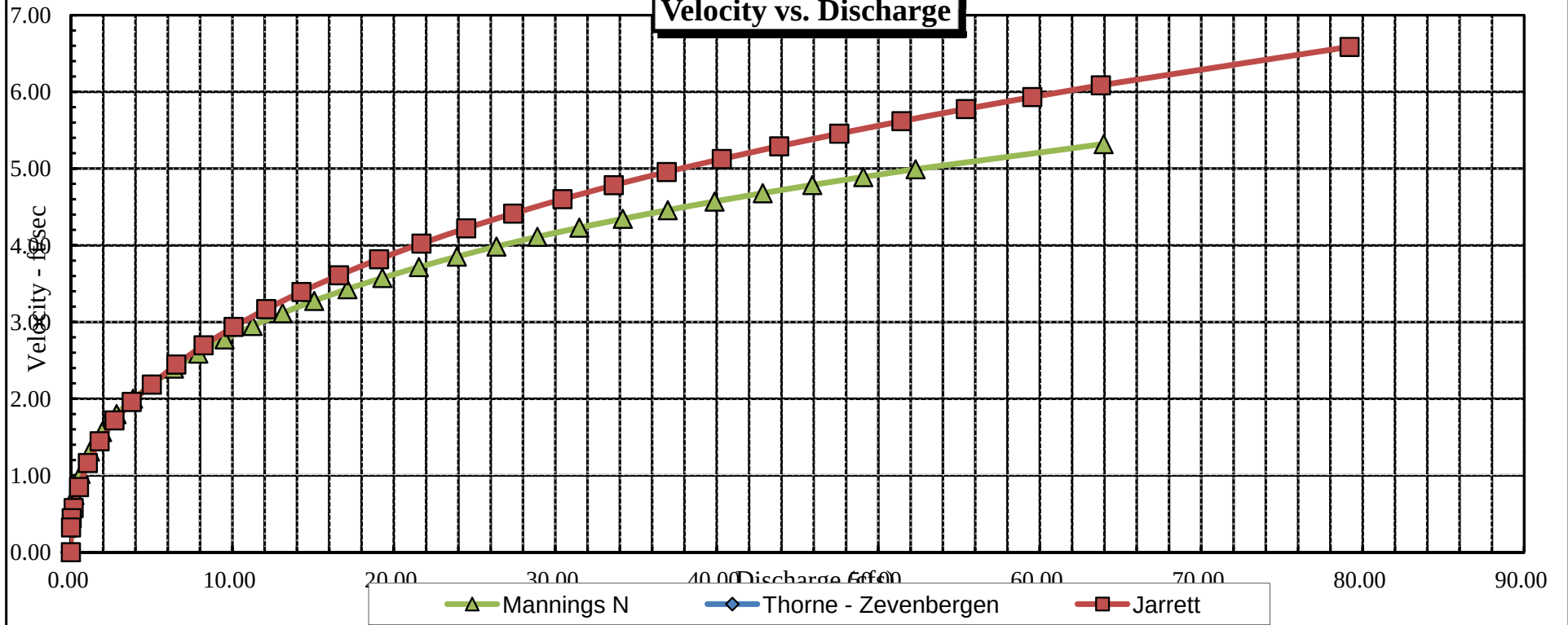
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

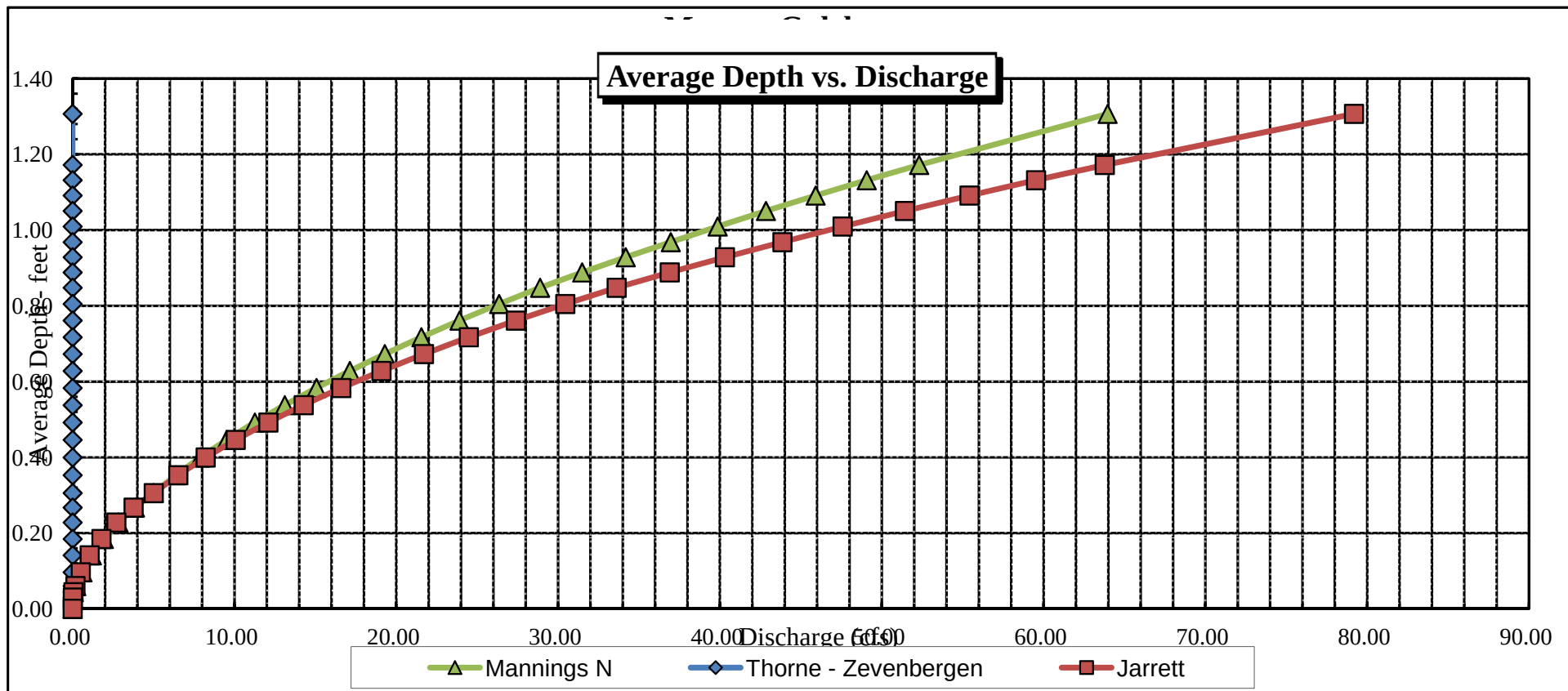
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.38	9.20	1.31	1.62	12.02	10.60	100.0%	1.13	79.18	6.59
	5.55	8.94	1.17	1.45	10.48	10.17	95.9%	1.03	63.78	6.09
	5.60	8.87	1.13	1.40	10.04	10.04	94.7%	1.00	59.53	5.93
	5.65	8.79	1.09	1.35	9.59	9.91	93.5%	0.97	55.42	5.78
	5.70	8.72	1.05	1.30	9.16	9.78	92.3%	0.94	51.43	5.62
	5.75	8.64	1.01	1.25	8.72	9.66	91.1%	0.90	47.58	5.46
	5.80	8.57	0.97	1.20	8.29	9.53	89.9%	0.87	43.86	5.29
	5.85	8.47	0.93	1.15	7.87	9.39	88.6%	0.84	40.31	5.12
	5.90	8.38	0.89	1.10	7.44	9.26	87.3%	0.80	36.89	4.96
	5.95	8.29	0.85	1.05	7.03	9.12	86.1%	0.77	33.62	4.78
	6.00	8.22	0.80	1.00	6.62	9.00	84.9%	0.74	30.44	4.60
	6.05	8.15	0.76	0.95	6.21	8.88	83.8%	0.70	27.39	4.41
	6.10	8.09	0.72	0.90	5.80	8.76	82.6%	0.66	24.48	4.22
	6.15	8.02	0.67	0.85	5.40	8.64	81.5%	0.62	21.71	4.02
	6.20	7.96	0.63	0.80	5.00	8.52	80.4%	0.59	19.08	3.82
	6.25	7.89	0.58	0.75	4.60	8.40	79.2%	0.55	16.61	3.61
	6.30	7.83	0.54	0.70	4.21	8.28	78.1%	0.51	14.28	3.39
	6.35	7.76	0.49	0.65	3.82	8.16	77.0%	0.47	12.10	3.17
	6.40	7.70	0.45	0.60	3.43	8.04	75.8%	0.43	10.08	2.94
	6.45	7.63	0.40	0.55	3.05	7.92	74.7%	0.39	8.22	2.70
	6.50	7.57	0.35	0.50	2.67	7.80	73.6%	0.34	6.53	2.45
WL	6.55	7.50	0.31	0.45	2.29	7.68	72.4%	0.30	5.01	2.18
	6.60	7.20	0.27	0.40	1.93	7.36	69.4%	0.26	3.77	1.96
	6.65	6.90	0.23	0.35	1.57	7.04	66.4%	0.22	2.70	1.72
	6.70	6.68	0.18	0.30	1.23	6.80	64.2%	0.18	1.78	1.45
	6.75	6.41	0.14	0.25	0.91	6.51	61.4%	0.14	1.05	1.16
	6.80	6.14	0.10	0.20	0.59	6.22	58.7%	0.10	0.50	0.85
	6.85	5.06	0.06	0.15	0.30	5.12	48.4%	0.06	0.18	0.58
	6.90	2.66	0.04	0.10	0.12	2.70	25.5%	0.04	0.05	0.44
	6.95	0.90	0.03	0.05	0.03	0.91	8.6%	0.03	0.01	0.32
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



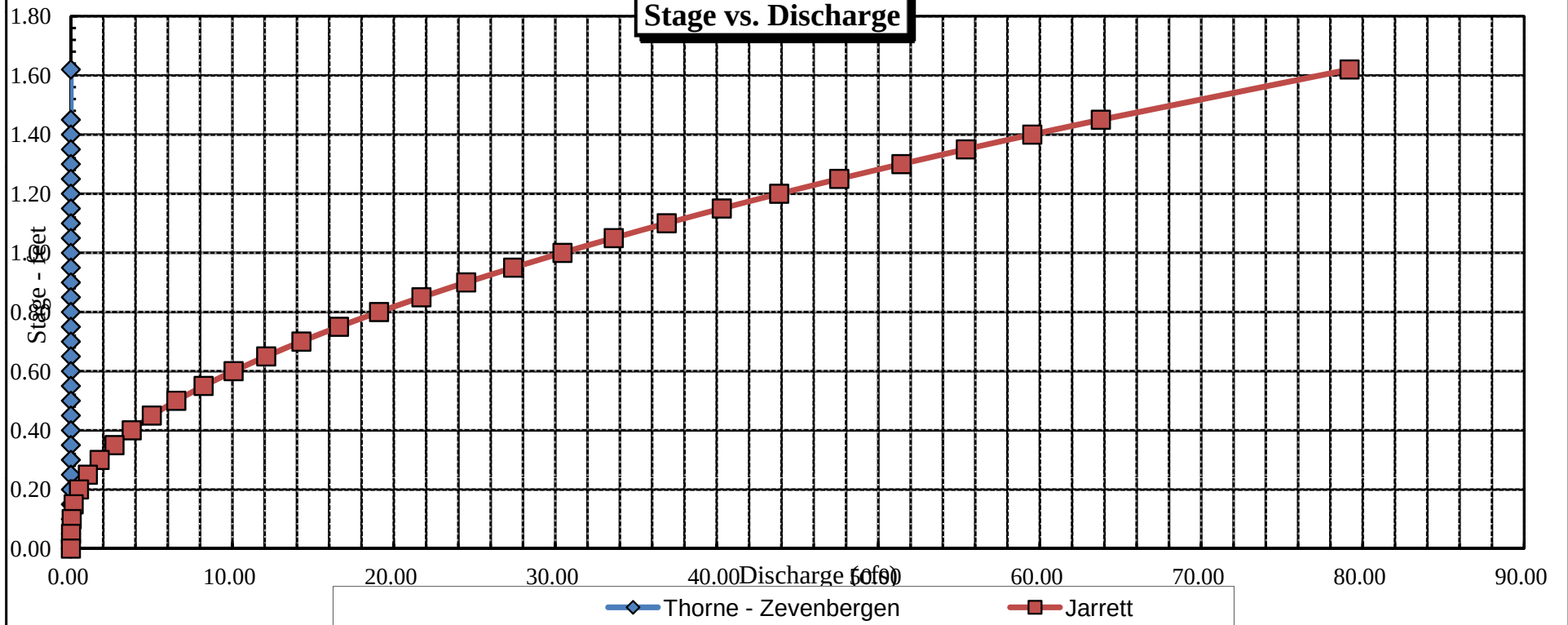


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Morgan Gulch
XS LOCATION: 0.25 mi upstr fr conf w Williams Fork
XS NUMBER: 2

DATE: 30-Jun-14
OBSERVERS: R. Smith, P. Belcher

1/4 SEC: NE
SECTION: 33
TWP: 1S
RANGE: 78W
PM: Sixth

COUNTY: Grand
WATERSHED: Williams Fork
DIVISION: 5
DOW CODE: 23680

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: 0.028

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Morgan Gulch
 XS LOCATION: 0.25 mi upstr fr conf w Williams Fork
 XS NUMBER: 2

DATA POINTS= 24

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	4.93		
1 G	1.80	5.16		
	2.40	6.52		
W	3.60	6.70	0.00	0.00
	3.90	6.80	0.10	0.71
	4.20	6.80	0.10	1.01
	4.50	6.75	0.05	0.97
	4.80	6.95	0.25	1.03
	5.10	6.90	0.20	1.13
	5.40	6.90	0.20	1.13
	5.70	6.90	0.20	1.25
	6.00	6.95	0.25	1.40
	6.30	7.00	0.30	1.73
	6.60	6.90	0.20	2.21
	6.90	6.90	0.20	1.33
	7.20	6.90	0.20	1.00
	7.50	7.00	0.30	1.70
	7.80	6.90	0.20	1.32
	8.10	6.80	0.10	1.28
W	8.30	6.70	0.00	0.00
	10.40	6.20		
	12.00	5.64		
1 G	14.50	5.23		
RS	15.00	5.04		

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	1.9%
0.30	0.10	0.03	0.03	2.6%
0.30	0.05	0.02	0.01	1.3%
0.36	0.25	0.08	0.08	6.7%
0.30	0.20	0.06	0.07	5.9%
0.30	0.20	0.06	0.07	5.9%
0.30	0.20	0.06	0.08	6.5%
0.30	0.25	0.08	0.11	9.1%
0.30	0.30	0.09	0.16	13.5%
0.32	0.20	0.06	0.13	11.5%
0.30	0.20	0.06	0.08	6.9%
0.30	0.20	0.06	0.06	5.2%
0.32	0.30	0.09	0.15	13.3%
0.32	0.20	0.06	0.08	6.9%
0.32	0.10	0.03	0.03	2.8%
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%
0.00		0.00	0.00	0.0%

4.88 0.3 0.85 1.15 100.0%
 (Max.)

Manning's n = 0.0572
 Hydraulic Radius= 0.17411421

STREAM NAME: Morgan Gulch
 XS LOCATION: 0.25 mi upstr fr conf w Williams Fork
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.85	0.85	0.0%
6.45	0.85	2.35	176.4%
6.47	0.85	2.21	160.1%
6.49	0.85	2.07	144.0%
6.51	0.85	1.94	128.1%
6.53	0.85	1.81	112.5%
6.55	0.85	1.68	97.3%
6.57	0.85	1.55	82.7%
6.59	0.85	1.43	68.6%
6.61	0.85	1.32	54.9%
6.63	0.85	1.21	41.8%
6.65	0.85	1.10	29.2%
6.66	0.85	1.05	23.1%
6.67	0.85	1.00	17.2%
6.68	0.85	0.95	11.3%
6.69	0.85	0.90	5.6%
6.70	0.85	0.85	0.0%
6.71	0.85	0.80	-5.5%
6.72	0.85	0.76	-10.9%
6.73	0.85	0.71	-16.3%
6.74	0.85	0.67	-21.6%
6.75	0.85	0.62	-26.9%
6.77	0.85	0.53	-37.1%
6.79	0.85	0.45	-46.7%
6.81	0.85	0.38	-55.4%
6.83	0.85	0.31	-63.5%
6.85	0.85	0.24	-71.3%
6.87	0.85	0.18	-79.0%
6.89	0.85	0.12	-86.4%
6.91	0.85	0.07	-92.1%
6.93	0.85	0.04	-95.5%
6.95	0.85	0.02	-97.8%

WATERLINE AT ZERO

AREA ERROR = 6.700

STREAM NAME: Morgan Gulch
 XS LOCATION: 0.25 mi upstr fr conf w Williams Fork
 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	5.23	12.67	1.10	1.77	13.96	13.89	100.0%	1.00	60.85	4.36
	5.70	9.79	0.89	1.30	8.72	10.66	76.8%	0.82	33.14	3.80
	5.75	9.63	0.86	1.25	8.24	10.46	75.3%	0.79	30.52	3.71
	5.80	9.46	0.82	1.20	7.76	10.25	73.8%	0.76	28.00	3.61
	5.85	9.30	0.78	1.15	7.29	10.05	72.3%	0.73	25.58	3.51
	5.90	9.13	0.75	1.10	6.83	9.84	70.8%	0.69	23.26	3.41
	5.95	8.97	0.71	1.05	6.38	9.63	69.3%	0.66	21.05	3.30
	6.00	8.80	0.67	1.00	5.93	9.43	67.9%	0.63	18.93	3.19
	6.05	8.64	0.64	0.95	5.50	9.22	66.4%	0.60	16.92	3.08
	6.10	8.47	0.60	0.90	5.07	9.02	64.9%	0.56	15.01	2.96
	6.15	8.31	0.56	0.85	4.65	8.81	63.4%	0.53	13.20	2.84
	6.20	8.14	0.52	0.80	4.24	8.60	61.9%	0.49	11.49	2.71
	6.25	7.91	0.49	0.75	3.84	8.33	60.0%	0.46	9.94	2.59
	6.30	7.68	0.45	0.70	3.45	8.06	58.0%	0.43	8.50	2.47
	6.35	7.44	0.41	0.65	3.07	7.79	56.1%	0.39	7.17	2.33
	6.40	7.21	0.37	0.60	2.70	7.52	54.1%	0.36	5.94	2.20
	6.45	6.98	0.34	0.55	2.35	7.25	52.2%	0.32	4.81	2.05
	6.50	6.75	0.30	0.50	2.01	6.98	50.2%	0.29	3.79	1.89
	6.55	6.53	0.26	0.45	1.68	6.54	47.1%	0.26	2.94	1.75
	6.60	6.33	0.24	0.40	1.37	5.99	43.1%	0.23	2.24	1.63
	6.65	6.14	0.21	0.35	1.10	5.43	39.1%	0.20	1.64	1.50
WL	6.70	4.70	0.18	0.30	0.85	4.88	35.1%	0.17	1.15	1.35
	6.75	4.45	0.14	0.25	0.62	4.61	33.2%	0.13	0.71	1.14
	6.80	3.53	0.12	0.20	0.41	3.65	26.3%	0.11	0.42	1.02
	6.85	3.30	0.07	0.15	0.24	3.40	24.5%	0.07	0.18	0.75
	6.90	1.88	0.05	0.10	0.08	1.95	14.0%	0.04	0.05	0.54
	6.95	0.75	0.03	0.05	0.02	0.78	5.6%	0.02	0.01	0.36
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Morgan Gulch
XS LOCATION: 0.25 mi upstr fr conf w Williams Fork
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 1.15 cfs
CALCULATED FLOW (Qc)= 1.15 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= 1.35 ft/sec
MANNING'S N= 0.057
SLOPE= 0.028 ft/ft

.4 * Qm = 0.5 cfs
2.5 * Qm= 2.9 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

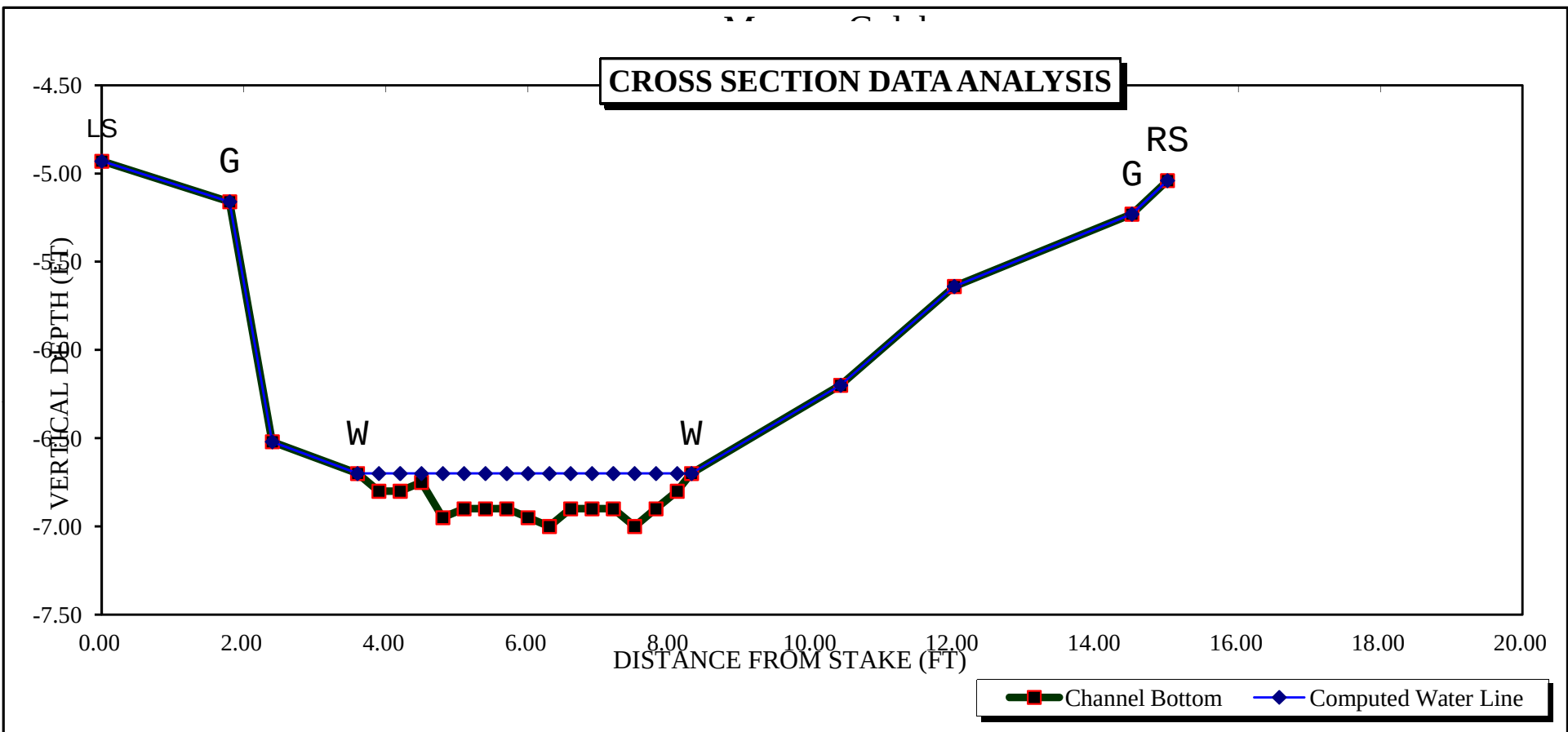
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

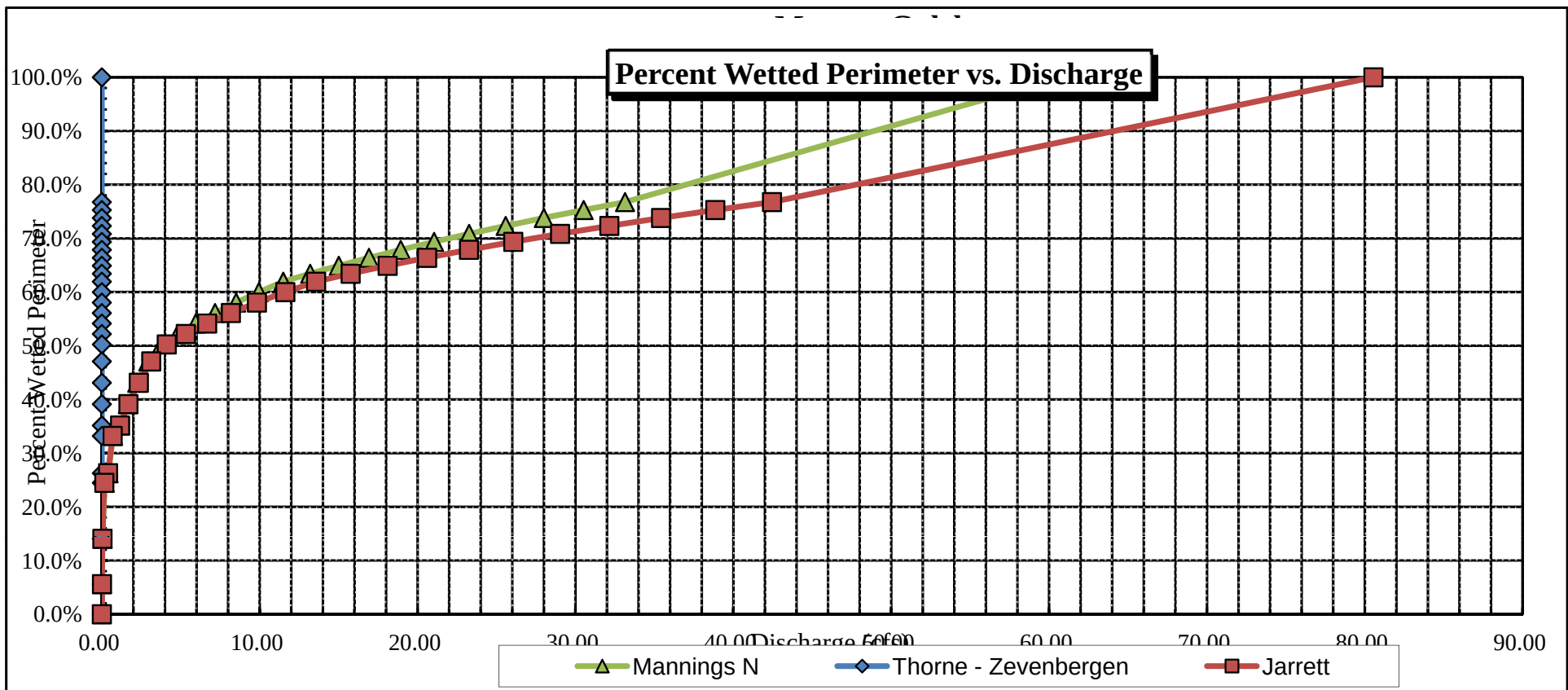
STREAM NAME: Morgan Gulch
 XS LOCATION: 0.25 mi upstr fr conf w Williams Fork
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

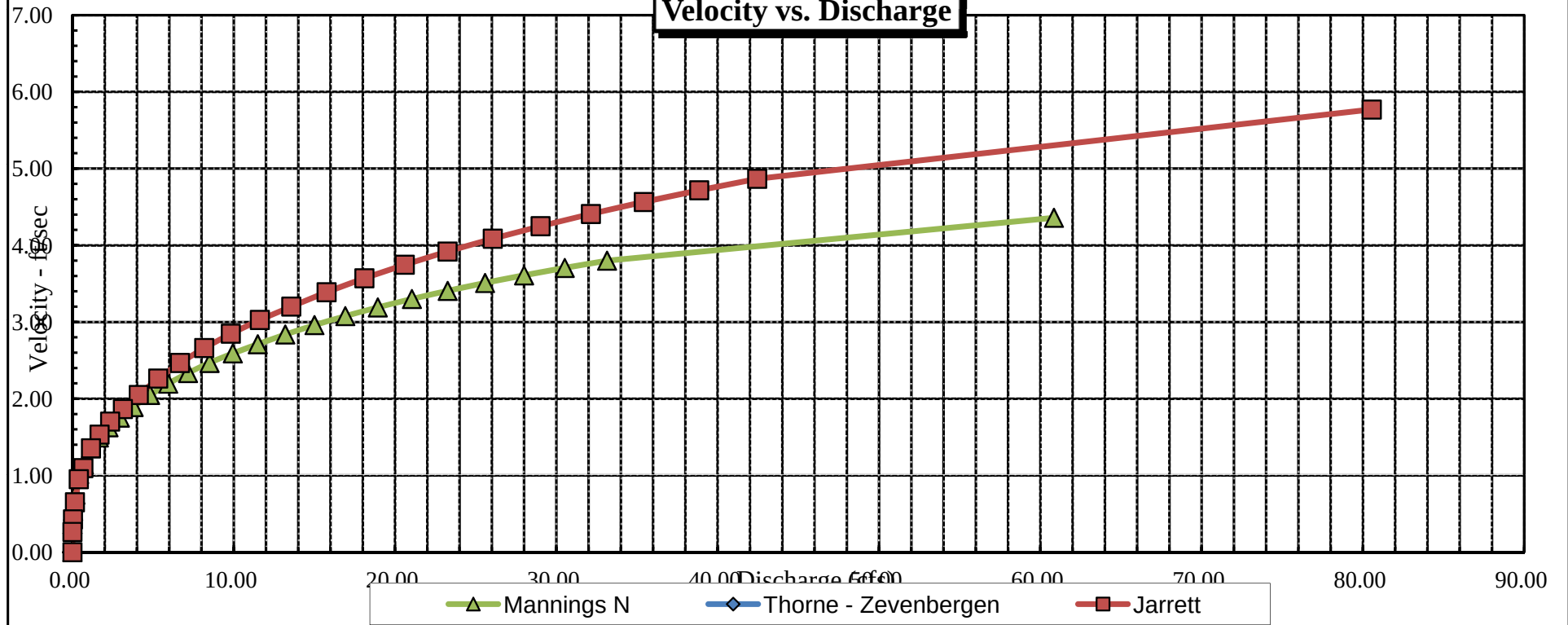
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

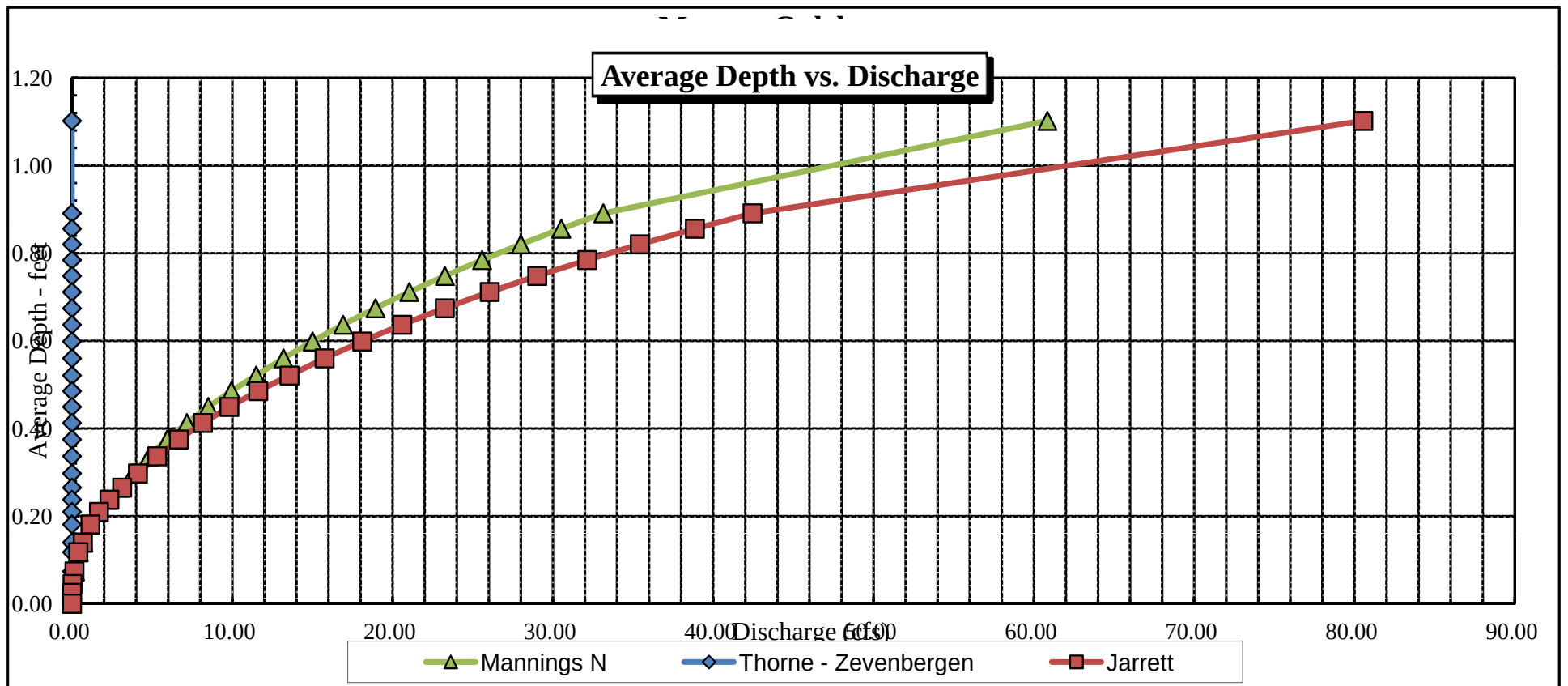
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.23	12.67	1.10	1.77	13.96	13.89	100.0%	1.00	80.54	5.77
	5.70	9.79	0.89	1.30	8.72	10.66	76.8%	0.82	42.45	4.87
	5.75	9.63	0.86	1.25	8.24	10.46	75.3%	0.79	38.85	4.72
	5.80	9.46	0.82	1.20	7.76	10.25	73.8%	0.76	35.42	4.56
	5.85	9.30	0.78	1.15	7.29	10.05	72.3%	0.73	32.14	4.41
	5.90	9.13	0.75	1.10	6.83	9.84	70.8%	0.69	29.02	4.25
	5.95	8.97	0.71	1.05	6.38	9.63	69.3%	0.66	26.06	4.09
	6.00	8.80	0.67	1.00	5.93	9.43	67.9%	0.63	23.25	3.92
	6.05	8.64	0.64	0.95	5.50	9.22	66.4%	0.60	20.60	3.75
	6.10	8.47	0.60	0.90	5.07	9.02	64.9%	0.56	18.10	3.57
	6.15	8.31	0.56	0.85	4.65	8.81	63.4%	0.53	15.76	3.39
	6.20	8.14	0.52	0.80	4.24	8.60	61.9%	0.49	13.57	3.20
	6.25	7.91	0.49	0.75	3.84	8.33	60.0%	0.46	11.62	3.03
	6.30	7.68	0.45	0.70	3.45	8.06	58.0%	0.43	9.82	2.85
	6.35	7.44	0.41	0.65	3.07	7.79	56.1%	0.39	8.17	2.66
	6.40	7.21	0.37	0.60	2.70	7.52	54.1%	0.36	6.67	2.47
	6.45	6.98	0.34	0.55	2.35	7.25	52.2%	0.32	5.32	2.26
	6.50	6.75	0.30	0.50	2.01	6.98	50.2%	0.29	4.11	2.05
	6.55	6.33	0.26	0.45	1.68	6.54	47.1%	0.26	3.13	1.87
	6.60	5.79	0.24	0.40	1.37	5.99	43.1%	0.23	2.34	1.70
	6.65	5.24	0.21	0.35	1.10	5.43	39.1%	0.20	1.68	1.53
WL	6.70	4.70	0.18	0.30	0.85	4.88	35.1%	0.17	1.15	1.35
	6.75	4.45	0.14	0.25	0.62	4.61	33.2%	0.13	0.68	1.10
	6.80	3.53	0.12	0.20	0.41	3.65	26.3%	0.11	0.39	0.95
	6.85	3.30	0.07	0.15	0.24	3.40	24.5%	0.07	0.16	0.65
	6.90	1.88	0.05	0.10	0.08	1.95	14.0%	0.04	0.04	0.43
	6.95	0.75	0.03	0.05	0.02	0.78	5.6%	0.02	0.00	0.26
	7.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



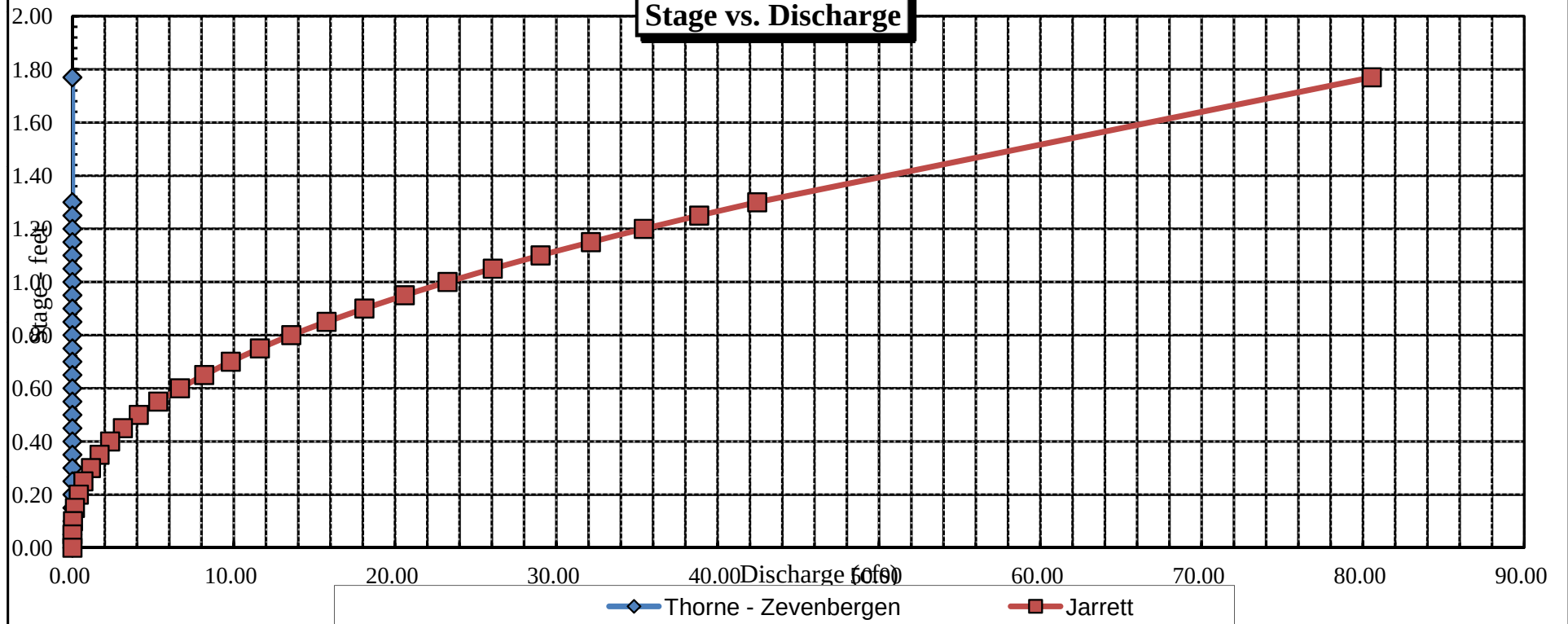


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Morgan Gulch
XS LOCATION: 0.33 mi fr conf w Williams Fork
XS NUMBER: 1

DATE: 30-Jun-14
OBSERVERS: R. Smith, P. Belcher

1/4 SEC: NW
SECTION: 34
TWP: 1S
RANGE: 78W
PM: Sixth

COUNTY: Grand
WATERSHED: Williams Fork
DIVISION: 5
DOW CODE: 23680

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: Morgan Gulch
 XS LOCATION: 0.33 mi fr conf w Williams Fork
 XS NUMBER: 1

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	5.90		
1 G	0.10	5.95		
	1.40	6.19		
	2.00	6.45		
W	2.50	6.85	0.00	0.00
	2.70	7.05	0.20	0.23
	3.00	7.25	0.40	0.47
	3.30	7.10	0.25	0.94
	3.60	7.20	0.35	1.09
	3.90	7.20	0.35	1.06
	4.20	7.20	0.35	1.18
	4.50	7.10	0.25	1.02
	4.80	7.10	0.25	0.43
	5.10	7.10	0.25	1.09
	5.40	7.05	0.20	0.38
	5.70	7.05	0.20	0.48
	6.00	7.05	0.20	0.82
	6.30	7.05	0.20	0.62
	6.60	7.05	0.20	0.52
	6.90	7.05	0.20	0.78
	7.20	6.95	0.10	0.59
	7.50	6.95	0.10	0.31
	7.80	6.90	0.05	0.28
W	8.30	6.85	0.00	0.00
1 G	10.40	5.85		
LS	10.90	5.25		

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%
0.28	0.20	0.05	0.01	1.2%
0.36	0.40	0.12	0.06	6.1%
0.34	0.25	0.08	0.07	7.6%
0.32	0.35	0.11	0.11	12.3%
0.30	0.35	0.11	0.11	12.0%
0.30	0.35	0.11	0.12	13.4%
0.32	0.25	0.08	0.08	8.3%
0.30	0.25	0.08	0.03	3.5%
0.30	0.25	0.08	0.08	8.8%
0.30	0.20	0.06	0.02	2.5%
0.30	0.20	0.06	0.03	3.1%
0.30	0.20	0.06	0.05	5.3%
0.30	0.20	0.06	0.04	4.0%
0.30	0.20	0.06	0.03	3.4%
0.30	0.20	0.06	0.05	5.0%
0.32	0.10	0.03	0.02	1.9%
0.30	0.10	0.03	0.01	1.0%
0.30	0.05	0.02	0.01	0.6%
0.50		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

6.04 0.4 1.23 0.93 100.0%
 (Max.)

Manning's n = 0.0711
 Hydraulic Radius= 0.20287297

STREAM NAME: Morgan Gulch
 XS LOCATION: 0.33 mi fr conf w Williams Fork
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.23	1.23	0.0%
6.60	1.23	2.78	126.9%
6.62	1.23	2.65	116.1%
6.64	1.23	2.52	105.5%
6.66	1.23	2.39	94.9%
6.68	1.23	2.26	84.4%
6.70	1.23	2.13	74.1%
6.72	1.23	2.01	63.9%
6.74	1.23	1.88	53.7%
6.76	1.23	1.76	43.7%
6.78	1.23	1.64	33.8%
6.80	1.23	1.52	24.0%
6.81	1.23	1.46	19.2%
6.82	1.23	1.40	14.3%
6.83	1.23	1.34	9.5%
6.84	1.23	1.28	4.7%
6.85	1.23	1.23	0.0%
6.86	1.23	1.17	-4.7%
6.87	1.23	1.11	-9.3%
6.88	1.23	1.06	-13.8%
6.89	1.23	1.00	-18.2%
6.90	1.23	0.95	-22.6%
6.92	1.23	0.85	-31.0%
6.94	1.23	0.74	-39.2%
6.96	1.23	0.65	-47.0%
6.98	1.23	0.56	-54.4%
7.00	1.23	0.47	-61.6%
7.02	1.23	0.38	-68.8%
7.04	1.23	0.30	-75.7%
7.06	1.23	0.23	-81.4%
7.08	1.23	0.18	-85.5%
7.10	1.23	0.13	-89.4%

WATERLINE AT ZERO

AREA ERROR = 6.850

STREAM NAME: Morgan Gulch
 XS LOCATION: 0.33 mi fr conf w Williams Fork
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.95	10.09	0.80	1.30	8.02	10.75	100.0%	0.75	14.47	1.80
	5.95	10.09	0.80	1.30	8.02	10.75	100.0%	0.75	14.47	1.80
	6.00	9.71	0.77	1.25	7.53	10.36	96.4%	0.73	13.34	1.77
	6.05	9.34	0.76	1.20	7.05	9.96	92.7%	0.71	12.28	1.74
	6.10	8.96	0.74	1.15	6.59	9.57	89.1%	0.69	11.28	1.71
	6.15	8.59	0.72	1.10	6.16	9.18	85.4%	0.67	10.34	1.68
	6.20	8.24	0.70	1.05	5.74	8.82	82.1%	0.65	9.44	1.65
	6.25	8.02	0.66	1.00	5.33	8.58	79.8%	0.62	8.51	1.60
	6.30	7.80	0.63	0.95	4.93	8.34	77.6%	0.59	7.62	1.55
	6.35	7.58	0.60	0.90	4.55	8.09	75.3%	0.56	6.79	1.49
	6.40	7.36	0.57	0.85	4.18	7.85	73.0%	0.53	6.01	1.44
	6.45	7.14	0.53	0.80	3.81	7.61	70.8%	0.50	5.27	1.38
	6.50	6.97	0.50	0.75	3.46	7.41	69.0%	0.47	4.56	1.32
	6.55	6.80	0.46	0.70	3.12	7.22	67.1%	0.43	3.90	1.25
	6.60	6.64	0.42	0.65	2.78	7.02	65.3%	0.40	3.29	1.18
	6.65	6.47	0.38	0.60	2.45	6.82	63.5%	0.36	2.72	1.11
	6.70	6.30	0.34	0.55	2.13	6.63	61.7%	0.32	2.20	1.03
	6.75	6.13	0.30	0.50	1.82	6.43	59.8%	0.28	1.72	0.95
	6.80	5.97	0.25	0.45	1.52	6.23	58.0%	0.24	1.30	0.86
WL	6.85	5.80	0.21	0.40	1.22	6.04	56.2%	0.20	0.93	0.76
	6.90	5.25	0.18	0.35	0.95	5.47	50.8%	0.17	0.65	0.68
	6.95	4.60	0.15	0.30	0.70	4.79	44.6%	0.15	0.42	0.61
	7.00	4.40	0.11	0.25	0.47	4.56	42.4%	0.10	0.23	0.48
	7.05	2.70	0.09	0.20	0.26	2.83	26.4%	0.09	0.11	0.44
	7.10	1.72	0.08	0.15	0.13	1.84	17.1%	0.07	0.05	0.37
	7.15	1.25	0.04	0.10	0.05	1.32	12.3%	0.04	0.01	0.26
	7.20	0.17	0.02	0.05	0.00	0.20	1.9%	0.02	0.00	0.17

STREAM NAME: Morgan Gulch
XS LOCATION: 0.33 mi fr conf w Williams Fork
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.93 cfs
CALCULATED FLOW (Qc)= 0.93 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 6.85 ft
CALCULATED WATERLINE (WLc)= 6.85 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.40 ft
MAX CALCULATED DEPTH (Dc)= 0.40 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.76 ft/sec
MANNING'S N= 0.071
SLOPE= 0.011 ft/ft

.4 * Qm = 0.4 cfs
2.5 * Qm= 2.3 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: Morgan Gulch
 XS LOCATION: 0.33 mi fr conf w Williams Fork
 XS NUMBER: 1

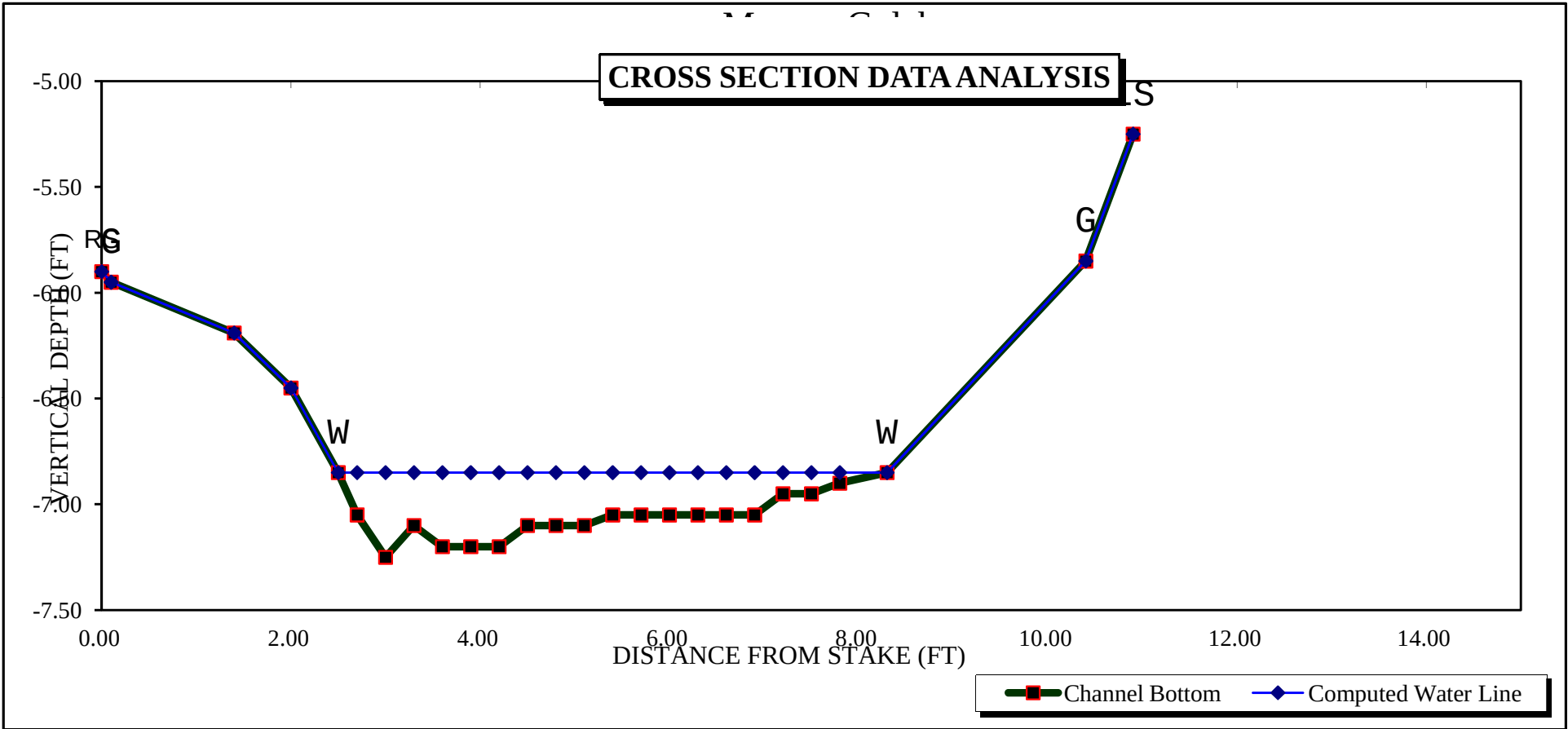
Jarrett Variable Manning's n Correction Applied

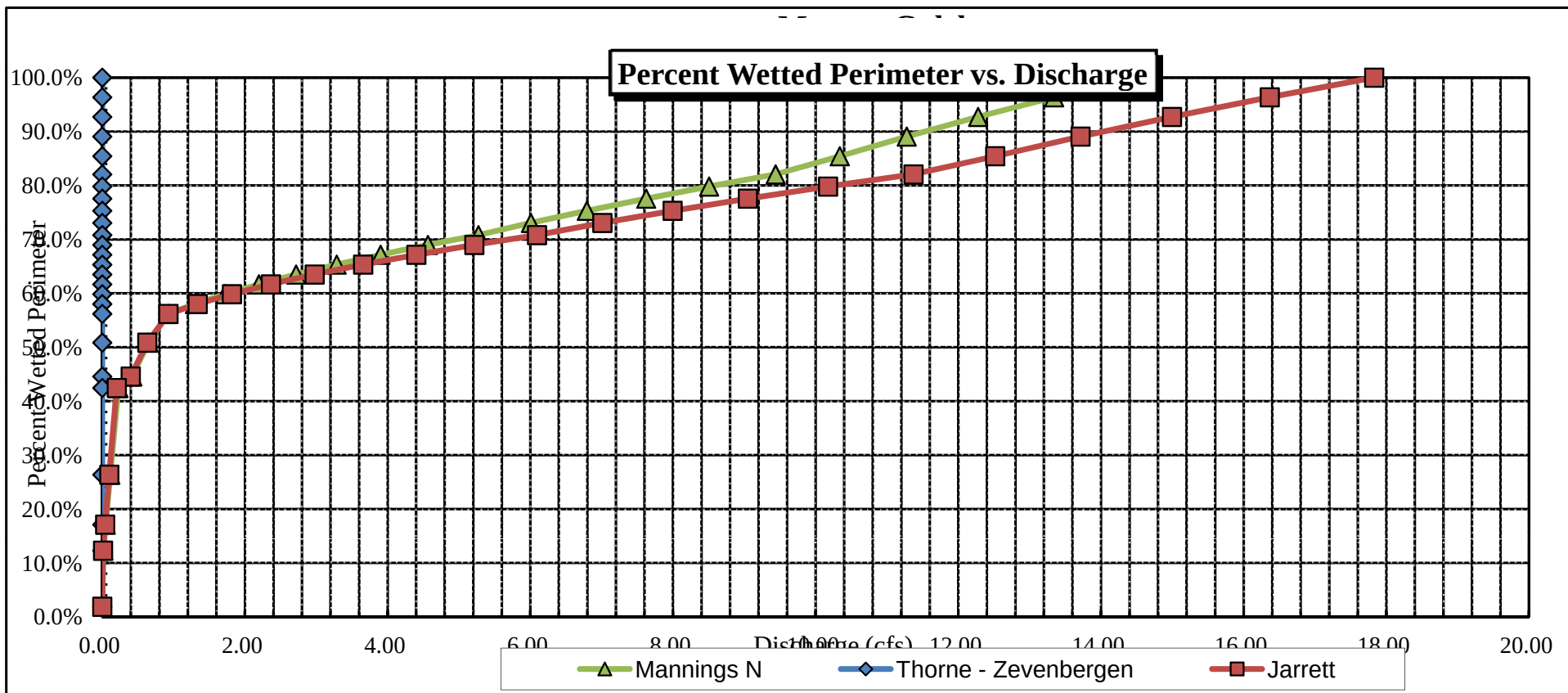
GL = lowest Grassline elevation corrected for sag

STAGING TABLE

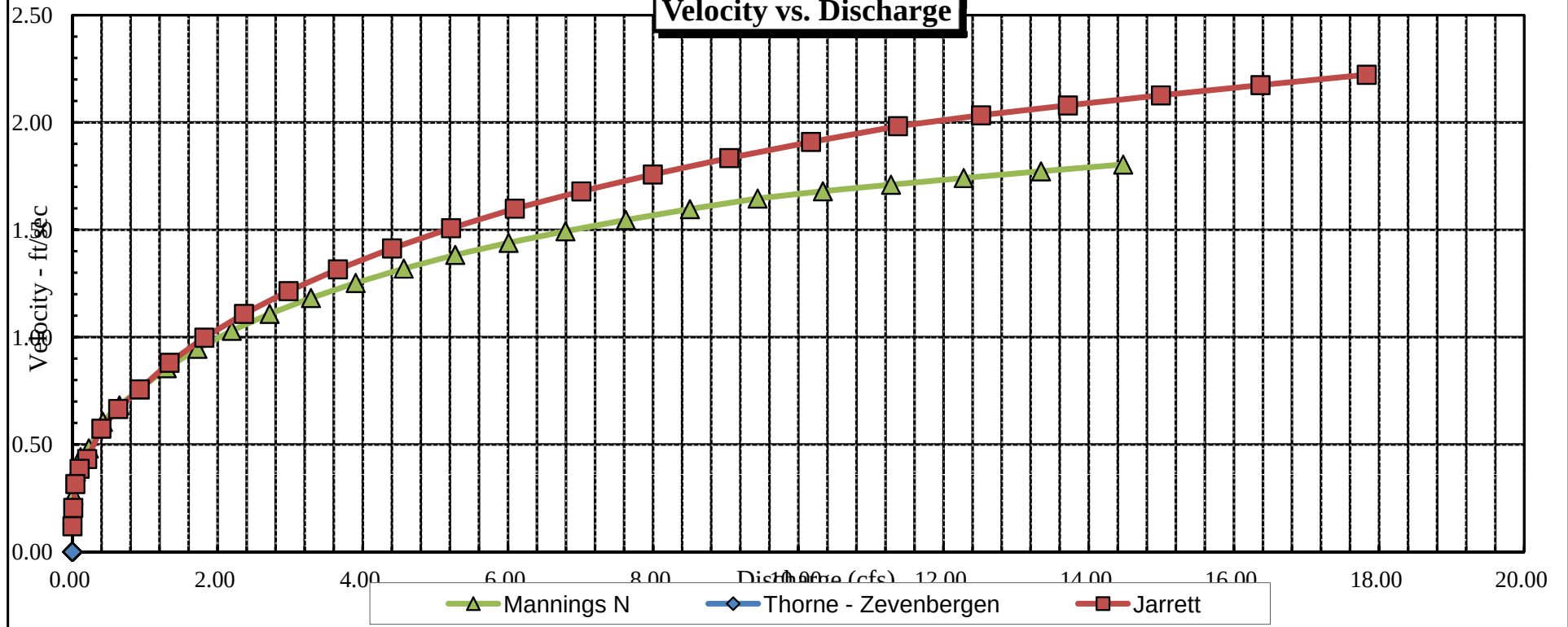
WL = Waterline corrected for variations in field measured water surface elevations and sag

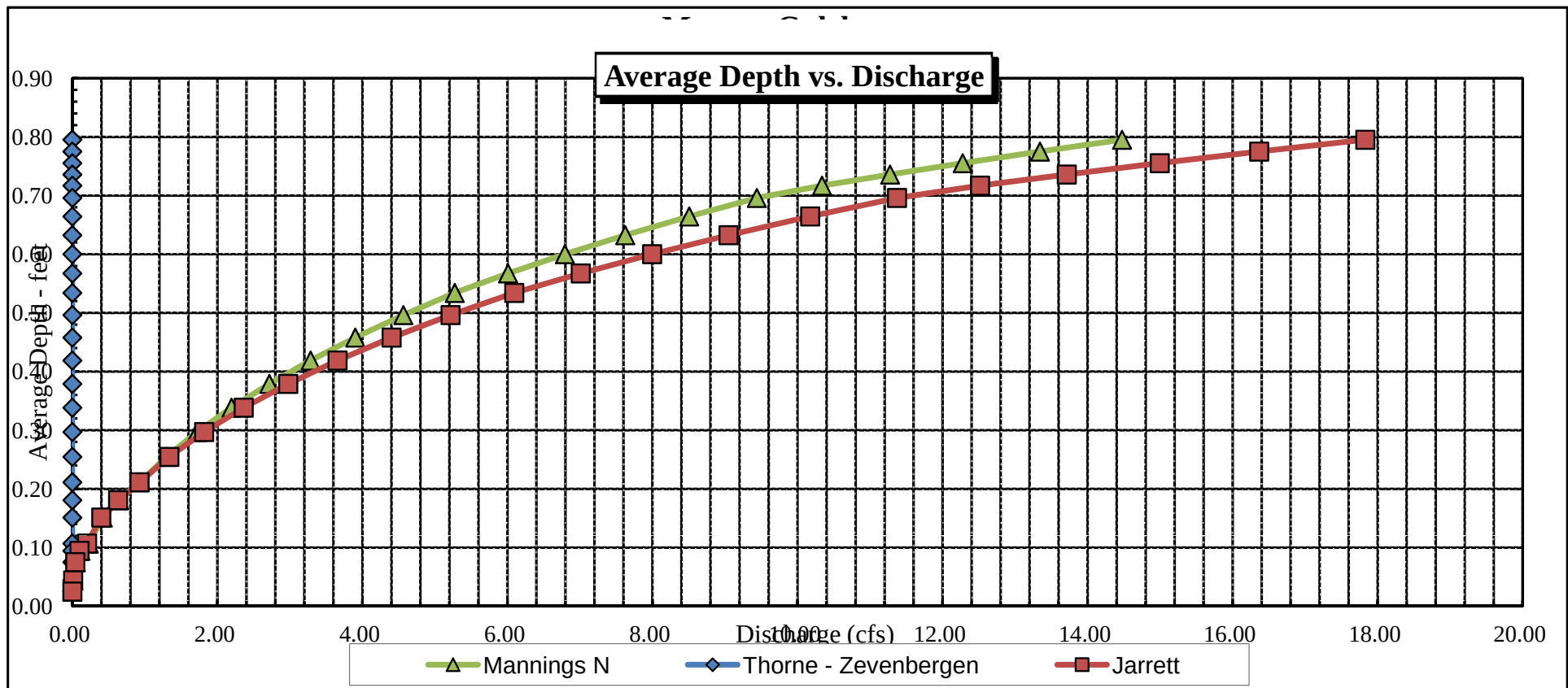
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.95	10.09	0.80	1.30	8.02	10.75	100.0%	0.75	17.83	2.22
	5.95	10.09	0.80	1.30	8.02	10.75	100.0%	0.75	17.83	2.22
	6.00	9.71	0.77	1.25	7.53	10.36	96.4%	0.73	16.37	2.17
	6.05	9.34	0.76	1.20	7.05	9.96	92.7%	0.71	14.99	2.13
	6.10	8.96	0.74	1.15	6.59	9.57	89.1%	0.69	13.71	2.08
	6.15	8.59	0.72	1.10	6.16	9.18	85.4%	0.67	12.52	2.03
	6.20	8.24	0.70	1.05	5.74	8.82	82.1%	0.65	11.37	1.98
	6.25	8.02	0.66	1.00	5.33	8.58	79.8%	0.62	10.17	1.91
	6.30	7.80	0.63	0.95	4.93	8.34	77.6%	0.59	9.05	1.83
	6.35	7.58	0.60	0.90	4.55	8.09	75.3%	0.56	7.99	1.76
	6.40	7.36	0.57	0.85	4.18	7.85	73.0%	0.53	7.01	1.68
	6.45	7.14	0.53	0.80	3.81	7.61	70.8%	0.50	6.09	1.60
	6.50	6.97	0.50	0.75	3.46	7.41	69.0%	0.47	5.22	1.51
	6.55	6.80	0.46	0.70	3.12	7.22	67.1%	0.43	4.40	1.41
	6.60	6.64	0.42	0.65	2.78	7.02	65.3%	0.40	3.66	1.32
	6.65	6.47	0.38	0.60	2.45	6.82	63.5%	0.36	2.98	1.21
	6.70	6.30	0.34	0.55	2.13	6.63	61.7%	0.32	2.36	1.11
	6.75	6.13	0.30	0.50	1.82	6.43	59.8%	0.28	1.82	1.00
	6.80	5.97	0.25	0.45	1.52	6.23	58.0%	0.24	1.34	0.88
WL	6.85	5.80	0.21	0.40	1.22	6.04	56.2%	0.20	0.93	0.76
	6.90	5.25	0.18	0.35	0.95	5.47	50.8%	0.17	0.63	0.67
	6.95	4.60	0.15	0.30	0.70	4.79	44.6%	0.15	0.40	0.57
	7.00	4.40	0.11	0.25	0.47	4.56	42.4%	0.10	0.20	0.43
	7.05	2.70	0.09	0.20	0.26	2.83	26.4%	0.09	0.10	0.39
	7.10	1.72	0.08	0.15	0.13	1.84	17.1%	0.07	0.04	0.32
	7.15	1.25	0.04	0.10	0.05	1.32	12.3%	0.04	0.01	0.20
	7.20	0.17	0.02	0.05	0.00	0.20	1.9%	0.02	0.00	0.12



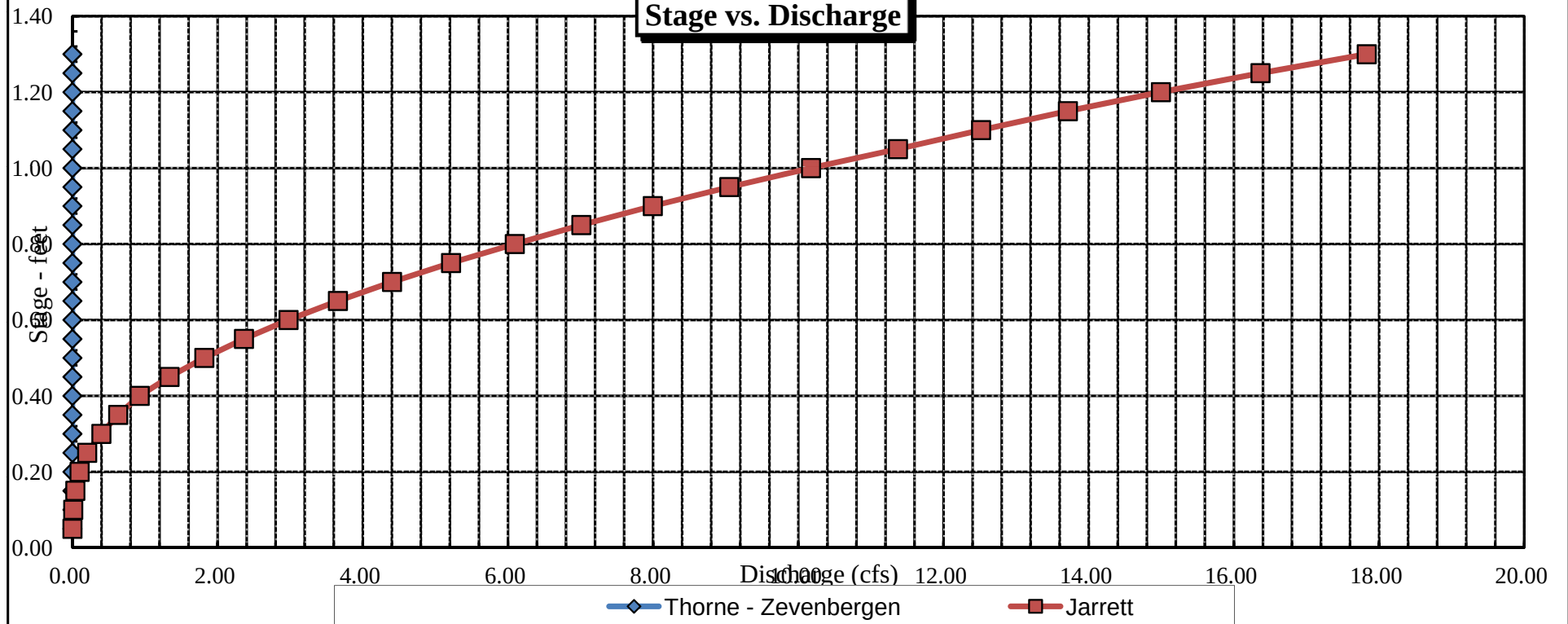


Velocity vs. Discharge





Stage vs. Discharge





COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>Morgan Gulch</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>Approx. 1/4 mile upstream from confluence with Williams Fork</u>		
DATE: <u>6-30-14</u>	OBSERVERS: <u>R. Smith, P. Belcher</u>	
LEGAL DESCRIPTION:	1/4 SECTION: <u>NE</u>	SECTION: <u>33</u>
TOWNSHIP: <u>1 N/S</u>	RANGE: <u>78 E/W</u>	PM: <u>6:45</u>
COUNTY: <u>Grand</u>	WATERSHED: <u>Williams Fk.</u>	WATER DIVISION: <u>5</u>
DOW WATER CODE: <u>23680</u>		
MAP(S):	USGS: <u>615 39° 55' 14.18"</u>	USFS: <u>106° 06' 44.97"</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: _____ sec	TAPE WEIGHT: <u>surveyed</u> lbs/foot
TAPE TENSION: <u>surveyed</u> lbs	
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 6" 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)
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>6.73/6.69</u>
④ WS Upstream	<u>33.8'</u>	<u>5.95</u>
⑤ WS Downstream	<u>41.5'</u>	<u>8.08</u>
SLOPE	<u>0.13 / 75.3 = .028</u>	

SKETCH

LEGEND:

Stake (X)

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>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:																	

COMMENTS

DISCHARGE/CROSS SECTION NOTES

[illegible]



COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>Morgan Gulch</u>				CROSS-SECTION NO.: <u>1</u>	
CROSS-SECTION LOCATION: <u>Approx. 1/3 mile upstream from confluence</u> <u>w/ Williams Fork</u>					
DATE: <u>6-30-14</u> OBSERVERS: <u>R. Smith, P. Belcher</u>					
LEGAL DESCRIPTION	1/4 SECTION: <u>NW</u>	SECTION: <u>34</u>	TOWNSHIP: <u>1 N/S</u>	RANGE: <u>78 E/W</u>	PM: <u>6:12</u>
COUNTY: <u>Grand</u>	WATERSHED: <u>Williams F.</u>	WATER DIVISION: <u>5</u>	DOW WATER CODE: <u>23680</u>		
MAP(S):	USGS: <u>GPS 405260</u> <u>4419342</u>				
USFS:					

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION:	YES/NO: <u>(X) NO</u>	METER TYPE: <u>M-M</u>			
METER NUMBER:	DATE RATED:	CALIB/SPIN: <u>sec</u>	TAPE WEIGHT: <u>surveyed</u> <u>surveyed</u>	TAPES TENSION: <u>lbs</u>	
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 6" cobbles</u>			PHOTOGRAPHS TAKEN: <u>(X) YES</u>	NUMBER OF PHOTOGRAPHS: <u>3</u>	

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)	SKETCH	LEGEND:
(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>6.80/6.77</u>		
(2) WS Upstream	<u>39.7</u>	<u>6.52"</u>		
(3) WS Downstream	<u>4.5</u>	<u>7.04</u>		
SLOPE	<u>0.52/49.2 = .011</u>			

TAPE

(1) (X)

Stake (X)

Station (1)

Photo (1)

Direction of Flow

AQUATIC SAMPLING SUMMARY

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

COMMENTS

DISCHARGE/CROSS SECTION NOTES

[illegible]



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>Morgan Gulch</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>Approx. 1/4 mile upstream from confluence with Williams Fork</u>		
DATE: <u>6-5-13</u>	OBSERVERS: <u>R. Smith, B. Logan, B. Epstein</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>NE</u>	SECTION: <u>33</u>
COUNTY: <u>Grand</u>	WATERSHED: <u>Williams Fk</u>	TOWNSHIP: <u>1 N S</u>
RANGE: <u>78 E W</u>		PM: <u>Sixth</u>
WATER DIVISION: <u>S</u>		DOW WATER CODE: <u>23680</u>
GPS: <u>39° 55' 14.18"</u>		
MAP(S): USGS: <u>106 06 44.97"</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	NUMBER OF PHOTOGRAPHS: <u>3</u>
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 6" cobbles</u>	
PHOTOGRAPHS TAKEN: ☒ YES ☐ NO	

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>6.00 / 6.00</u>
(2) WS Upstream	<u>17.6</u>	<u>5.98</u>
(3) WS Downstream	<u>23.5</u>	<u>7.24</u>
SLOPE	<u>1.26 / 40.1 = .031</u>	

SKETCH

LEGEND:

Stake (X)

Station (1)

Photo (1)

Direction of Flow (arrow)

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</u>																		

COMMENTS

DISCHARGE/CROSS SECTION NOTES

[illegible]



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

COLORADO WATER CONSERVATION BOARD		LOCATION INFORMATION		CROSS-SECTION NO.: 1	
STREAM NAME: Morgan Gulch					
CROSS-SECTION LOCATION: Approx. 1/3 mile upstream from confluence with Williams Fork					
DATE: 6-5-13	OBSERVERS: R. Smith, B. Logan, B. Epstein				
LEGAL DESCRIPTION	1/4 SECTION: NW	SECTION: 34	TOWNSHIP: 1 N S	RANGE: 78 E W	PM: Sixth
COUNTY: Grand	WATERSHED: Williams F.	WATER DIVISION: 5		DOW WATER CODE: 23680	
MAP(S):	USGS: GPS 405260				
	USFS: 4419342				

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION:		YES / NO	METER TYPE: M-M					
METER NUMBER:		DATE RATED:		GALIB/SPIN: _____ sec	TAPES WEIGHT: <u>surveyed</u> lbs/foot		TAPES TENSION: <u>surveyed</u> lbs	
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 6" cobbles</u>					PHOTOGRAPHS TAKEN: YES/NO <u>(O)</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	6.56 / 6.58
②	WS Upstream	12.2	6.44
③	WS Downstream	20.4	6.694
SLOPE	0.50 / 32.6 = 0.0153		

SKETCH

LEGEND:

Stake ⊗

Station ①

Photo ① →

Direction of Flow →

AQUATIC SAMPLING SUMMARY

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

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

mayfly, stonefly

COMMENTS

TDS = 60
Temp = 8.2°C
Salinity = 0

Riparian = Spruce / Alder

[illegible]

End of Measurement

Time

Gage Reading

19

CALCULATIONS PERFORMED BY

CALCULATIONS CHECKED BY _____















































