

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 East Hawxhurst Creek, located in Water Division 5.

Location and Land Status. East Hawxhurst Creek originates on the south side of Battlement Mesa, approximately nine miles northeast of Collbran. This reach begins at the headwaters of the creek and extends downstream to the confluence with Hawxhurst Creek, a distance of approximately 4.5 miles. The BLM manages approximately 1.0 mile of this reach, while 3.0 miles are managed by the U.S. Forest Service and 0.5 mile is on private lands.

Biological Summary. East Hawxhurst Creek is a cold-water, high gradient stream. The stream is confined by bedrock in most locations. The stream generally has medium-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 native cutthroat trout and rainbow 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 very diverse and is comprised of box elder, red osier dogwood, birch, 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 East Hawxhurst 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)
10/04/2011 #1	0.69 cfs	10.89 feet	1.19 cfs	Out of range
07/22/2014 #1	1.09 cfs	14.47 feet	1.44 cfs	1.67 cfs

Averages: 1.31 cfs 1.67 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.

1.70 cubic feet per second is recommended during the snowmelt runoff period and summer, from April 1 to September 30. This recommendation is driven by the wetted perimeter criteria. This creek is very steep and has limited usable habitat, so it is important to protect a flow rate that makes a high percentage of this habitat available to the fish population while they are completing critical life history functions during the warm weather months.

0.65 cubic feet per second is recommended during the cold weather period from October 1 to March 31. 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 09097600 (Brush Creek near Collbran, CO) measures flow from another watershed within the larger Plateau Creek watershed that has roughly similar watershed characteristics. A basin apportionment analysis could be performed to derive flow rates for East Hawxhurst Creek. In addition, Streamstats should be consulted. The Streamstats model produces similar estimates of base flow as a basin apportionment calculation, but BLM believes the Streamstats model, when using the mountain region assumptions, may overestimate snowmelt runoff flows. Finally, diversion records for downstream diversions can be consulted to confirm flows available during base flow periods. These ditches include the McCurry Highline Ditch, McCurry Ditch, Hawxhurst Ditch, and Dunlap Ditch.

The BLM is aware of one water right within the proposed instream flow reach:

Hawxhurst Reservoir – 283.2 acre feet

Relationship to Land Management Plans. BLM's land use plan calls for East Hawxhurst Creek 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 flows 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

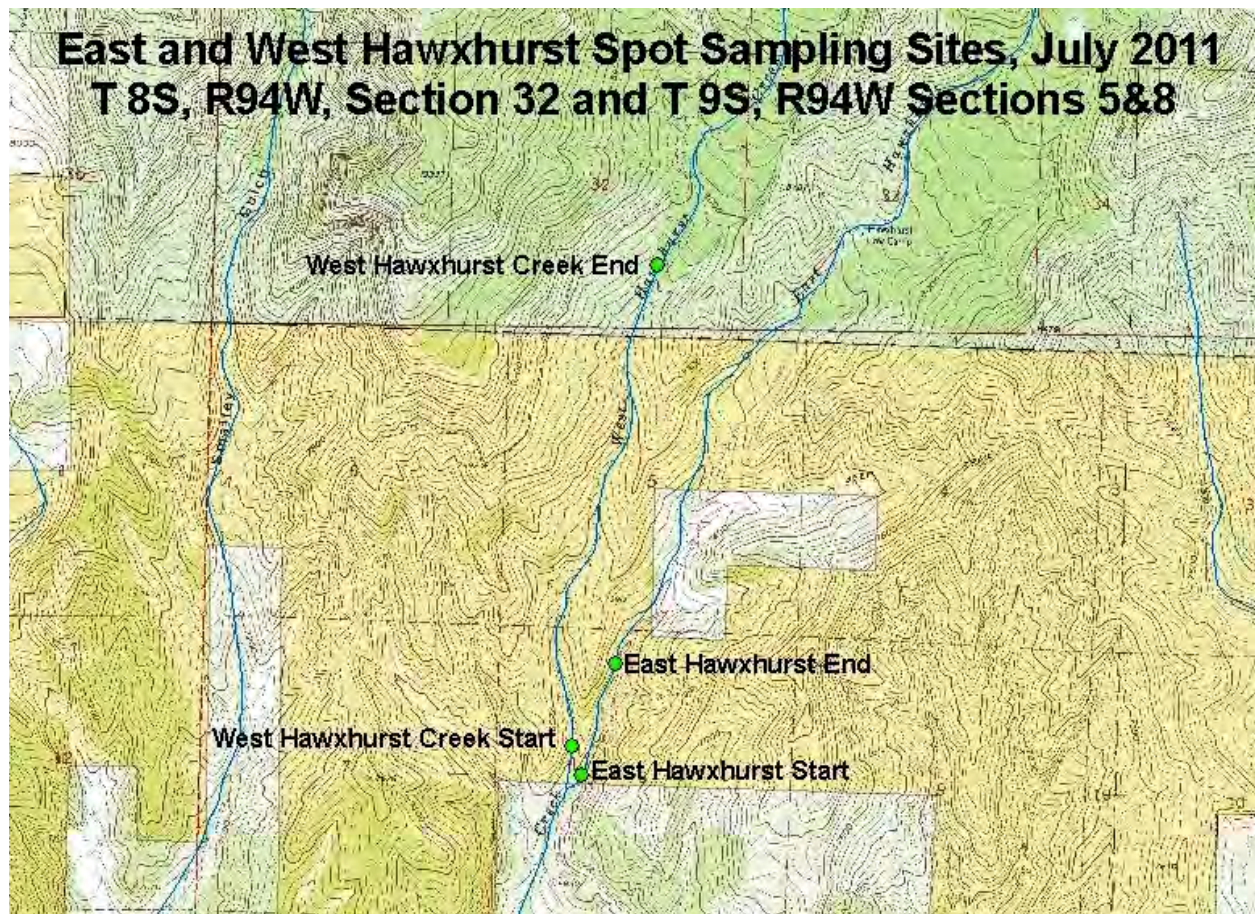
Cc:

Katie Stevens, Grand Junction Field Office
Hydrologist, Grand Junction Field Office
Joseph Meyer, Grand Junction Field Office

Grand Junction Field Office Stream Surveys July 2011

East Hawxhurst Creek - Water Code #27993

East Hawxhurst Creek, located east of Colbran, Colorado on lands managed by the BLM's Grand Junction Field Office, was sampled on July 13, 2011. East Hawxhurst is tributary to Hawxhurst Creek, Buzzard Creek, and then Plateau Creek. The stream was sampled via a single backpack electroshocker. Sampling was conducted to follow up on sampling done in 2010 to determine the extent of greenback lineage cutthroat trout and rainbow trout on BLM lands within the watershed. In addition, genetic samples were collected to determine the purity of cutthroat trout. A secondary objective was to determine if there was a barrier to prevent upstream movement of Rainbow trout. Spot sampling was conducted to collect fin clips from throughout the reach of the stream on BLM and USFS. Personnel present included Gregor Dekleva and Clay Ramey, BLM, and Danielle Tremblay, Colorado Division of Wildlife, Matt Dare and Mike Carrillo, USFS.





East Hawxhurst Creek



Electrofishing East Hawxhurst Creek



Hybridized Cutbow trout

Discussion:

The BLM segment of the stream contained a good mix of runs, riffles, and pools. Riparian habitat was in excellent condition with an overstory of large cottonwood trees and a diverse understory consisting of willow, alder, birch, red osier dogwood, boxelder, horsetail, sedges, rush, houndstongue, and thistle.

Fish collected were a mix of both cutthroat trout and rainbow trout and what appeared to be hybrids. Fish density was low as few fish were seen or collected. Fin clips were obtained from those fish collected and will be analyzed to determine the genetic status of cutthroat on BLM managed lands within the watershed.

Due to the low density of fish and the extremely dense riparian area, catch rates were low. It was decided that USFS personnel and CDOW personnel would return the following day with ATV's and sample the top end of the stream to determine if fish phenotypically appeared different than the hybridized fish down lower in the stream, which would help determine if there is a barrier within the stream.

Lori Martin, Colorado Parks & Wildlife has the specific length & weight fish data.

Recommendations:

- Await genetic results and then meet with CDOW and USFS to discuss data and future management of this watershed
- Determine barrier status within the stream

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

LOCATION INFORMATION

STREAM NAME: East Hawxhurst Creek
XS LOCATION: 400' upst fr conf w West Hawxhurst Ck.
XS NUMBER: 1

DATE: 4-Oct-11
OBSERVERS: N. Dieterich, C. Ewing

1/4 SEC: NW
SECTION: 8
TWP: 9S
RANGE: 94W
PM: Sixth

COUNTY: Mesa
WATERSHED: Buzzard Creek
DIVISION: 5
DOW CODE: 27981

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: 0.048

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 400' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 1

DATA POINTS= 25

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	7.25		
1 G	0.80	7.82		
	2.00	8.35		
	3.00	8.68		
	4.00	8.85		
	5.00	9.07		
W	5.40	9.20	0.00	0.00
	5.70	9.35	0.15	0.30
	6.00	9.37	0.17	0.79
	6.30	9.35	0.15	1.56
	6.60	9.39	0.19	1.57
	6.90	9.65	0.45	0.72
	7.20	9.43	0.23	1.89
	7.50	9.54	0.34	0.41
	7.80	9.42	0.22	0.15
	8.10	9.41	0.21	1.35
	8.40	9.47	0.27	1.37
	8.70	9.63	0.43	0.00
W	8.90	9.20	0.00	0.00
	9.10	8.83		
	10.00	8.65		
	10.50	8.50		
	11.00	8.35		
1 G	11.75	7.77		
S	12.00	7.60		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.34	0.15	0.05	0.01	2.0%
0.30	0.17	0.05	0.04	5.8%
0.30	0.15	0.05	0.07	10.2%
0.30	0.19	0.06	0.09	13.0%
0.40	0.45	0.14	0.10	14.1%
0.37	0.23	0.07	0.13	18.9%
0.32	0.34	0.10	0.04	6.1%
0.32	0.22	0.07	0.01	1.4%
0.30	0.21	0.06	0.09	12.3%
0.31	0.27	0.08	0.11	16.1%
0.34	0.43	0.11	0.00	0.0%
0.47		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 -----

4.07	0.45	0.82	0.69	100.0%
(Max.)				

Manning's n = 0.1336
 Hydraulic Radius= 0.20177374

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 400' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.82	0.82	0.0%
8.95	0.82	1.82	121.6%
8.97	0.82	1.73	110.5%
8.99	0.82	1.64	99.8%
9.01	0.82	1.55	89.2%
9.03	0.82	1.47	78.9%
9.05	0.82	1.39	68.9%
9.07	0.82	1.31	59.1%
9.09	0.82	1.23	49.5%
9.11	0.82	1.15	40.1%
9.13	0.82	1.08	30.9%
9.15	0.82	1.00	21.9%
9.16	0.82	0.96	17.4%
9.17	0.82	0.93	13.0%
9.18	0.82	0.89	8.6%
9.19	0.82	0.86	4.3%
9.20	0.82	0.82	0.0%
9.21	0.82	0.79	-4.2%
9.22	0.82	0.75	-8.5%
9.23	0.82	0.72	-12.6%
9.24	0.82	0.68	-16.8%
9.25	0.82	0.65	-20.9%
9.27	0.82	0.58	-29.1%
9.29	0.82	0.52	-37.1%
9.31	0.82	0.45	-45.0%
9.33	0.82	0.39	-52.9%
9.35	0.82	0.32	-60.5%
9.37	0.82	0.27	-67.2%
9.39	0.82	0.22	-72.8%
9.41	0.82	0.18	-78.2%
9.43	0.82	0.14	-82.7%
9.45	0.82	0.11	-86.6%

WATERLINE AT ZERO

AREA ERROR = 9.200

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 400' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.82	10.89	1.03	1.83	11.20	12.14	100.0%	0.92	25.88	2.31
	8.20	9.53	0.77	1.45	7.32	10.58	87.1%	0.69	13.97	1.91
	8.25	9.36	0.73	1.40	6.85	10.38	85.4%	0.66	12.67	1.85
	8.30	9.18	0.70	1.35	6.39	10.17	83.8%	0.63	11.42	1.79
	8.35	9.00	0.66	1.30	5.93	9.97	82.1%	0.60	10.24	1.73
	8.40	8.68	0.63	1.25	5.49	9.63	79.3%	0.57	9.21	1.68
	8.45	8.36	0.61	1.20	5.07	9.30	76.6%	0.54	8.24	1.63
	8.50	8.05	0.58	1.15	4.66	8.97	73.8%	0.52	7.33	1.57
	8.55	7.73	0.55	1.10	4.26	8.63	71.1%	0.49	6.49	1.52
	8.60	7.41	0.52	1.05	3.88	8.30	68.3%	0.47	5.71	1.47
	8.65	7.09	0.50	1.00	3.52	7.96	65.6%	0.44	4.98	1.41
	8.70	6.63	0.48	0.95	3.18	7.49	61.7%	0.42	4.37	1.38
	8.75	6.09	0.47	0.90	2.86	6.94	57.2%	0.41	3.86	1.35
	8.80	5.54	0.46	0.85	2.57	6.39	52.6%	0.40	3.41	1.33
	8.85	5.09	0.45	0.80	2.30	5.91	48.7%	0.39	2.99	1.30
	8.90	4.83	0.43	0.75	2.06	5.62	46.3%	0.37	2.56	1.25
	8.95	4.58	0.40	0.70	1.82	5.33	43.9%	0.34	2.17	1.19
	9.00	4.33	0.37	0.65	1.60	5.05	41.5%	0.32	1.81	1.13
	9.05	4.07	0.34	0.60	1.39	4.76	39.2%	0.29	1.49	1.07
	9.10	3.86	0.31	0.55	1.19	4.51	37.1%	0.26	1.19	1.00
	9.15	3.68	0.27	0.50	1.00	4.29	35.3%	0.23	0.92	0.92
WL	9.20	3.50	0.23	0.45	0.82	4.07	33.5%	0.20	0.69	0.84
	9.25	3.38	0.19	0.40	0.65	3.90	32.2%	0.17	0.48	0.74
	9.30	3.25	0.15	0.35	0.48	3.74	30.8%	0.13	0.30	0.62
	9.35	3.13	0.10	0.30	0.32	3.57	29.4%	0.09	0.16	0.49
	9.40	2.20	0.09	0.25	0.20	2.60	21.4%	0.08	0.09	0.44
	9.45	1.46	0.08	0.20	0.11	1.79	14.7%	0.06	0.04	0.38
	9.50	0.89	0.06	0.15	0.05	1.13	9.3%	0.05	0.02	0.31
	9.55	0.44	0.05	0.10	0.02	0.58	4.8%	0.03	0.01	0.26
	9.60	0.20	0.02	0.05	0.00	0.26	2.1%	0.02	0.00	0.16
	9.65	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: East Hawxhurst Creek
XS LOCATION: 400' upst fr conf w West Hawxhurst Ck.
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.69 cfs
CALCULATED FLOW (Qc)= 0.69 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 9.20 ft
CALCULATED WATERLINE (WLc)= 9.20 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= 0.84 ft/sec
MANNING'S N= 0.134
SLOPE= 0.048 ft/ft

.4 * Qm = 0.3 cfs
2.5 * Qm= 1.7 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

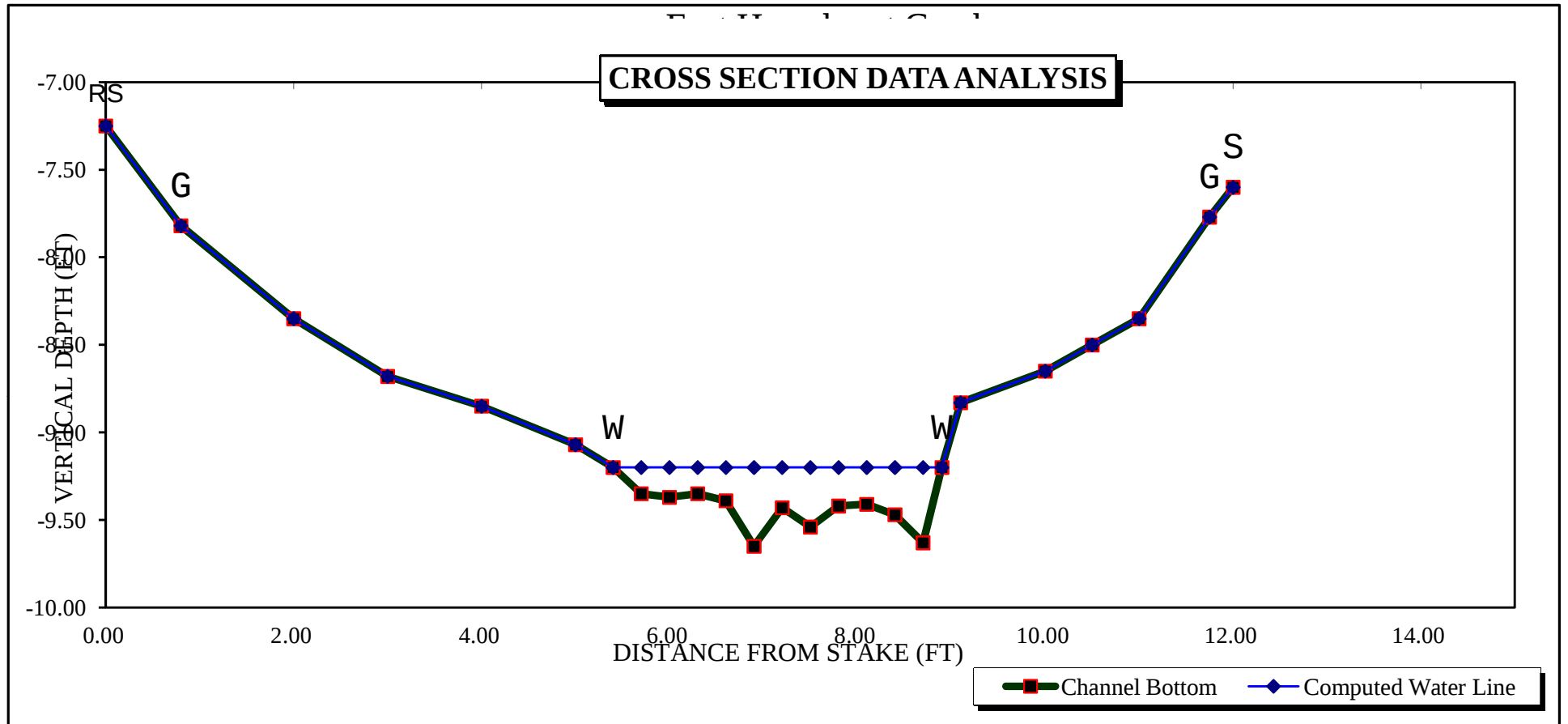
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

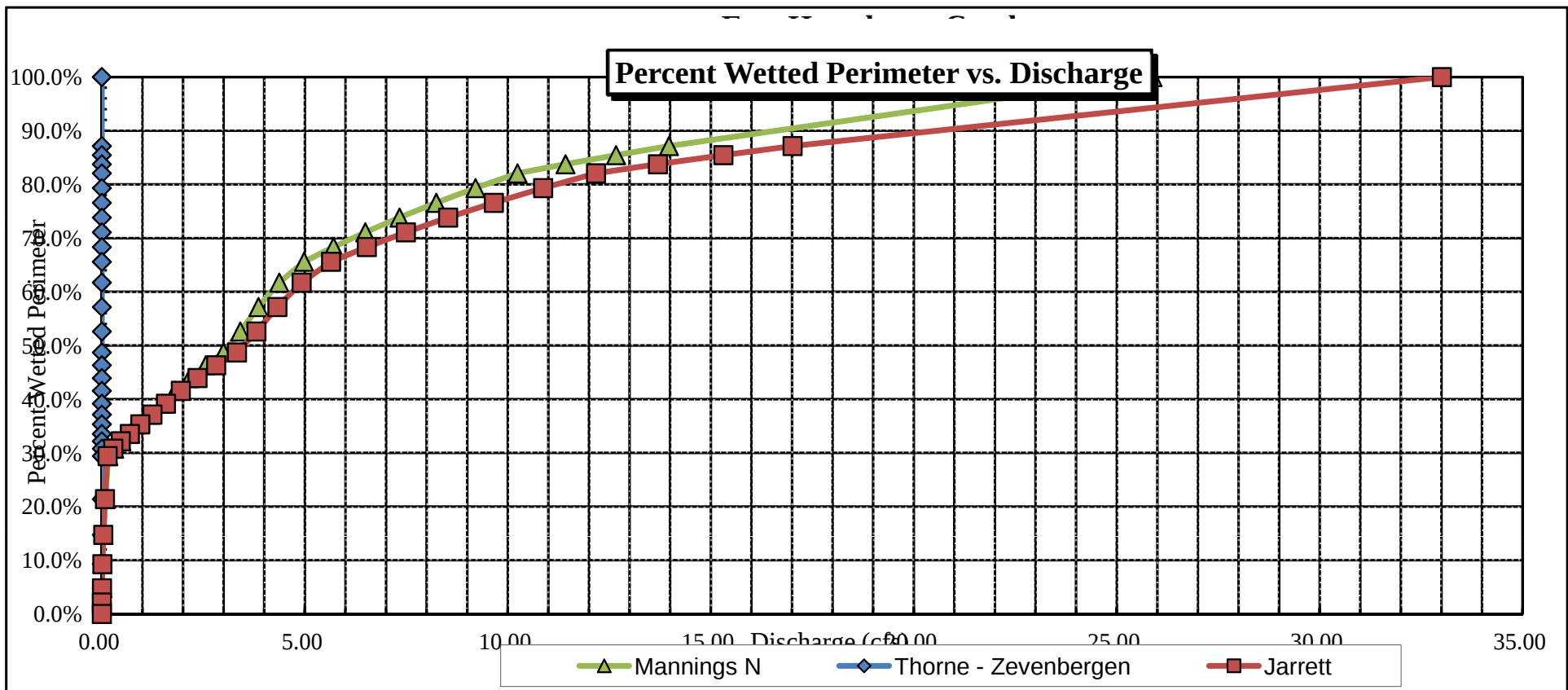
STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 400' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

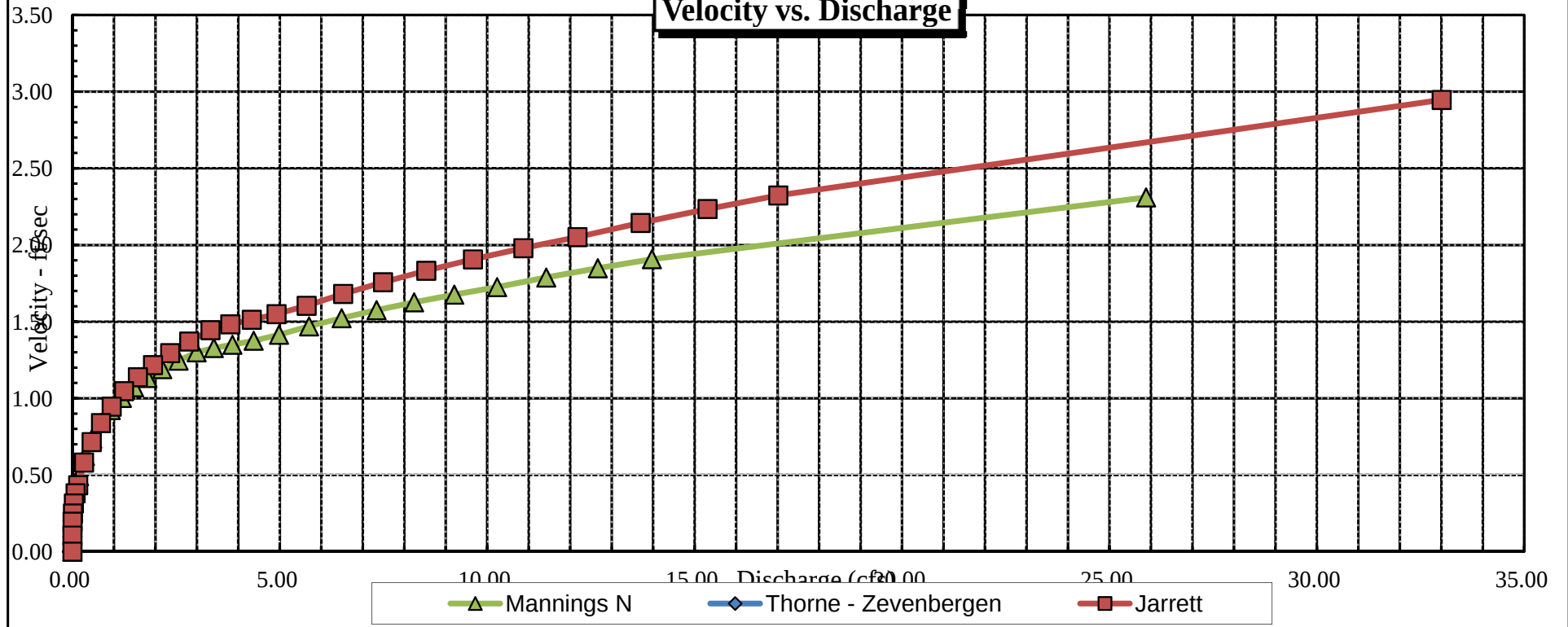
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

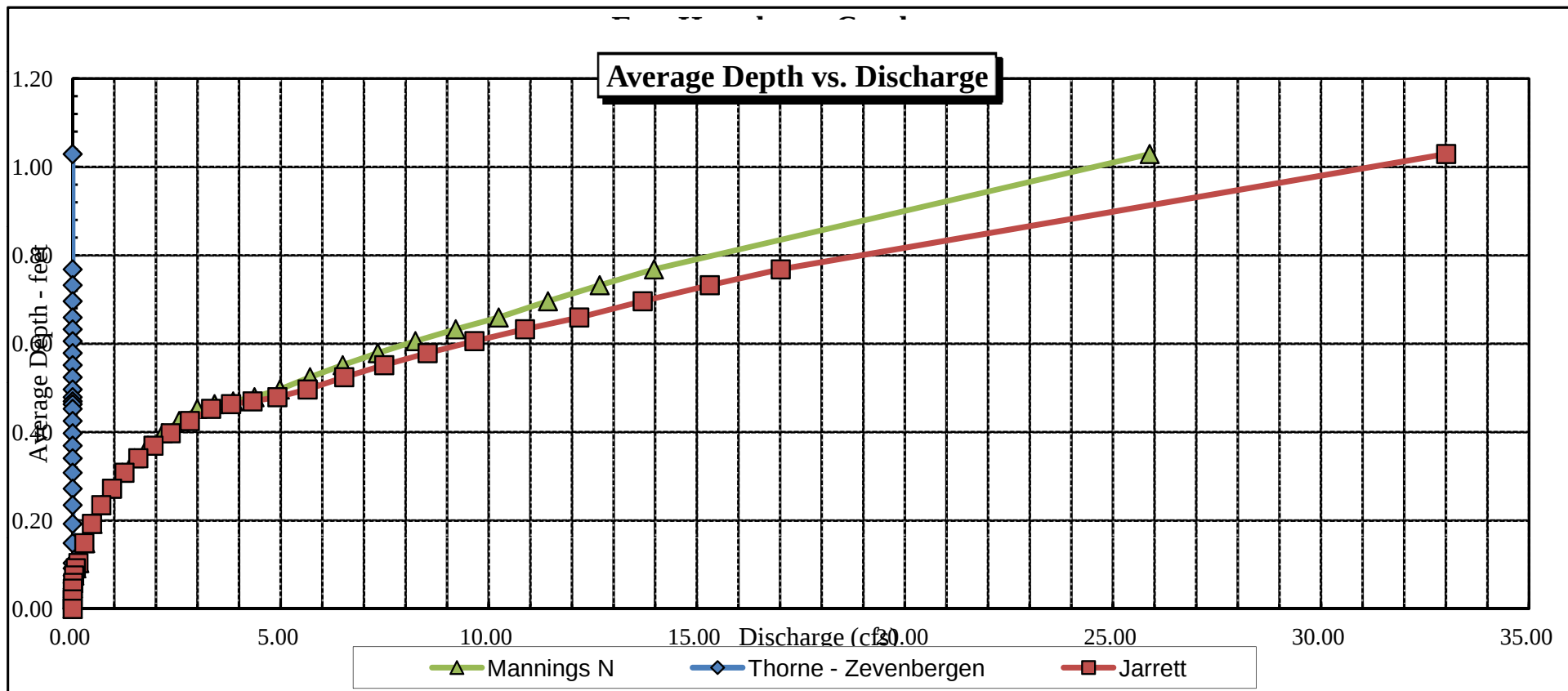
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.82	10.89	1.03	1.83	11.20	12.14	100.0%	0.92	33.01	2.95
	8.20	9.53	0.77	1.45	7.32	10.58	87.1%	0.69	17.02	2.32
	8.25	9.36	0.73	1.40	6.85	10.38	85.4%	0.66	15.31	2.23
	8.30	9.18	0.70	1.35	6.39	10.17	83.8%	0.63	13.70	2.14
	8.35	9.00	0.66	1.30	5.93	9.97	82.1%	0.60	12.17	2.05
	8.40	8.68	0.63	1.25	5.49	9.63	79.3%	0.57	10.87	1.98
	8.45	8.36	0.61	1.20	5.07	9.30	76.6%	0.54	9.66	1.91
	8.50	8.05	0.58	1.15	4.66	8.97	73.8%	0.52	8.53	1.83
	8.55	7.73	0.55	1.10	4.26	8.63	71.1%	0.49	7.49	1.76
	8.60	7.41	0.52	1.05	3.88	8.30	68.3%	0.47	6.53	1.68
	8.65	7.09	0.50	1.00	3.52	7.96	65.6%	0.44	5.65	1.60
	8.70	6.63	0.48	0.95	3.18	7.49	61.7%	0.42	4.92	1.55
	8.75	6.09	0.47	0.90	2.86	6.94	57.2%	0.41	4.32	1.51
	8.80	5.54	0.46	0.85	2.57	6.39	52.6%	0.40	3.81	1.48
	8.85	5.09	0.45	0.80	2.30	5.91	48.7%	0.39	3.33	1.44
	8.90	4.83	0.43	0.75	2.06	5.62	46.3%	0.37	2.82	1.37
	8.95	4.58	0.40	0.70	1.82	5.33	43.9%	0.34	2.36	1.29
	9.00	4.33	0.37	0.65	1.60	5.05	41.5%	0.32	1.94	1.22
	9.05	4.07	0.34	0.60	1.39	4.76	39.2%	0.29	1.58	1.14
	9.10	3.86	0.31	0.55	1.19	4.51	37.1%	0.26	1.25	1.05
	9.15	3.68	0.27	0.50	1.00	4.29	35.3%	0.23	0.95	0.95
WL	9.20	3.50	0.23	0.45	0.82	4.07	33.5%	0.20	0.69	0.84
	9.25	3.38	0.19	0.40	0.65	3.90	32.2%	0.17	0.46	0.71
	9.30	3.25	0.15	0.35	0.48	3.74	30.8%	0.13	0.28	0.58
	9.35	3.13	0.10	0.30	0.32	3.57	29.4%	0.09	0.14	0.43
	9.40	2.20	0.09	0.25	0.20	2.60	21.4%	0.08	0.08	0.38
	9.45	1.46	0.08	0.20	0.11	1.79	14.7%	0.06	0.03	0.31
	9.50	0.89	0.06	0.15	0.05	1.13	9.3%	0.05	0.01	0.25
	9.55	0.44	0.05	0.10	0.02	0.58	4.8%	0.03	0.00	0.20
	9.60	0.20	0.02	0.05	0.00	0.26	2.1%	0.02	0.00	0.10
	9.65	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



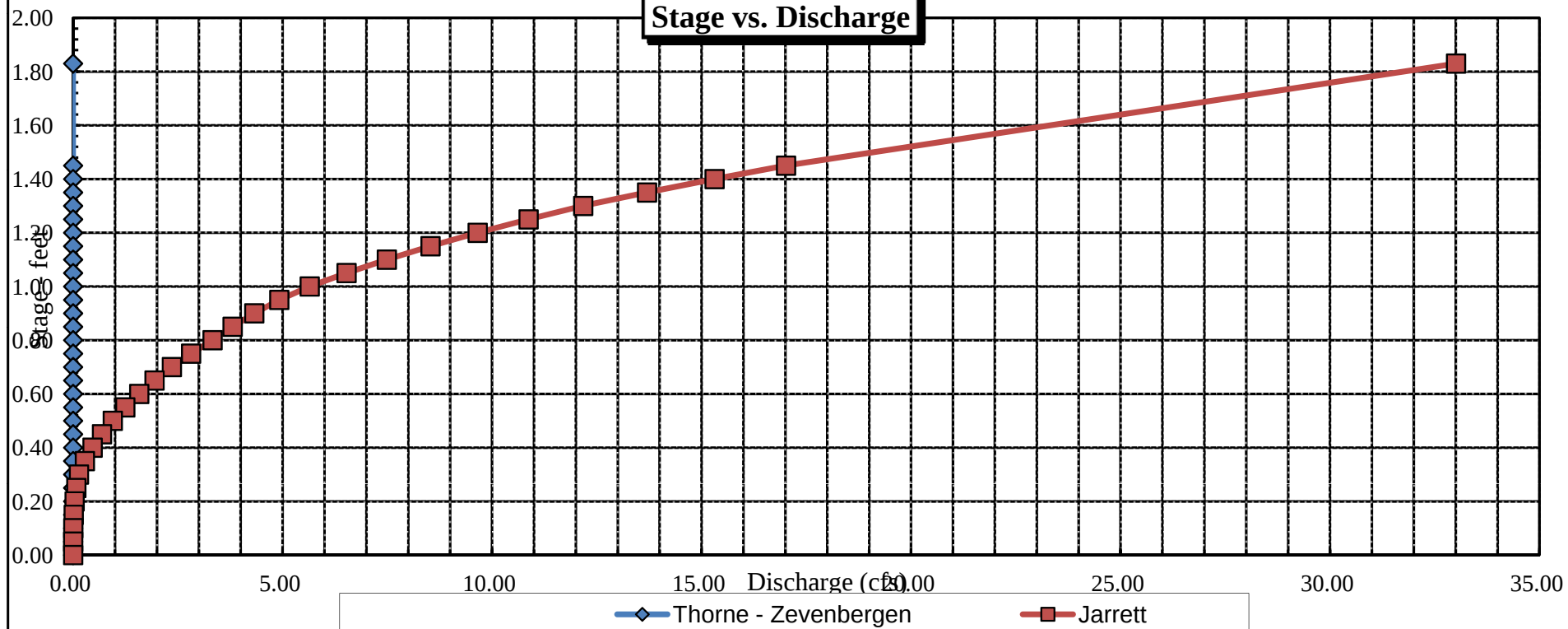


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: East Hawxhurst Creek
XS LOCATION: 500' upst fr conf w West Hawxhurst Ck.
XS NUMBER: 2

DATE: 22-Jul-14
OBSERVERS: N. Dieterich, K. Jones

1/4 SEC: NW
SECTION: 8
TWP: 9S
RANGE: 94W
PM: Sixth

COUNTY: Mesa
WATERSHED: Buzzard Creek
DIVISION: 5
DOW CODE: 27981

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: 0.052

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 2

DATA POINTS= 37

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
S	0.00	6.36		
	1.00	7.10		
1 G	1.50	7.47		
	2.00	7.82		
	3.50	8.16		
W	4.50	8.37	0.00	0.00
	4.80	8.41	0.05	0.00
	5.10	8.44	0.05	0.00
	5.40	8.50	0.10	0.00
	5.70	8.55	0.15	0.55
	6.00	8.57	0.20	0.60
	6.30	8.60	0.15	0.45
	6.60	8.72	0.35	0.67
	6.90	8.70	0.30	0.87
	7.20	8.77	0.50	0.74
	7.50	8.77	0.50	0.66
	7.80	8.80	0.50	0.71
	8.10	8.81	0.35	0.84
	8.40	8.77	0.40	0.56
	8.70	8.78	0.40	0.59
	9.00	8.80	0.40	0.63
	9.30	8.65	0.30	0.68
	9.60	8.65	0.25	0.61
	9.90	8.56	0.10	0.63
	10.20	8.41	0.10	0.50
	10.50	8.44	0.05	0.62
	10.80	8.36	0.05	0.00
W	11.10	8.37	0.00	0.00
	12.00	8.14		
	14.00	8.05		
	15.80	7.99		
	16.50	7.66		
	20.00	7.54		
	22.00	7.51		
1 G	22.65	7.47		
	24.00	7.20		
S	25.60	6.36		

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%
0.30	0.05	0.02	0.00	0.0%
0.30	0.05	0.02	0.00	0.0%
0.31	0.10	0.03	0.00	0.0%
0.30	0.15	0.05	0.02	2.5%
0.30	0.20	0.06	0.04	3.6%
0.30	0.15	0.05	0.02	2.0%
0.32	0.35	0.11	0.07	7.0%
0.30	0.30	0.09	0.08	7.8%
0.31	0.50	0.15	0.11	11.1%
0.30	0.50	0.15	0.10	9.9%
0.30	0.50	0.15	0.11	10.7%
0.30	0.35	0.11	0.09	8.8%
0.30	0.40	0.12	0.07	6.7%
0.30	0.40	0.12	0.07	7.1%
0.30	0.40	0.12	0.08	7.6%
0.34	0.30	0.09	0.06	6.1%
0.30	0.25	0.08	0.05	4.6%
0.31	0.10	0.03	0.02	1.9%
0.34	0.10	0.03	0.02	1.5%
0.30	0.05	0.02	0.01	0.9%
0.31	0.05	0.02	0.00	0.0%
0.30		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

6.75 0.5 1.58 1.00 100.0%
 (Max.)

Manning's n = 0.2027
 Hydraulic Radius= 0.23334878

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.58	1.59	0.9%
8.12	1.58	3.51	123.0%
8.14	1.58	3.33	111.7%
8.16	1.58	3.16	100.9%
8.18	1.58	3.00	90.3%
8.20	1.58	2.83	80.0%
8.22	1.58	2.67	69.8%
8.24	1.58	2.52	59.9%
8.26	1.58	2.37	50.2%
8.28	1.58	2.22	40.7%
8.30	1.58	2.07	31.4%
8.32	1.58	1.93	22.4%
8.33	1.58	1.86	18.0%
8.34	1.58	1.79	13.6%
8.35	1.58	1.72	9.3%
8.36	1.58	1.65	5.0%
8.37	1.58	1.59	0.9%
8.38	1.58	1.53	-3.1%
8.39	1.58	1.47	-6.9%
8.40	1.58	1.41	-10.7%
8.41	1.58	1.35	-14.5%
8.42	1.58	1.29	-18.1%
8.44	1.58	1.18	-24.8%
8.46	1.58	1.09	-31.1%
8.48	1.58	0.99	-37.2%
8.50	1.58	0.89	-43.2%
8.52	1.58	0.80	-49.0%
8.54	1.58	0.72	-54.5%
8.56	1.58	0.63	-59.9%
8.58	1.58	0.55	-64.8%
8.60	1.58	0.48	-69.4%
8.62	1.58	0.41	-73.7%

WATERLINE AT ZERO

AREA ERROR = 8.372

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.47	21.15	0.61	1.34	12.96	21.58	100.0%	0.60	15.43	1.19
	7.47	21.11	0.61	1.34	12.92	21.54	99.8%	0.60	15.36	1.19
	7.52	19.61	0.61	1.29	11.89	20.02	92.8%	0.59	14.04	1.18
	7.57	17.41	0.63	1.24	10.97	17.81	82.5%	0.62	13.28	1.21
	7.62	15.88	0.64	1.19	10.14	16.26	75.4%	0.62	12.37	1.22
	7.67	14.69	0.64	1.14	9.38	15.04	69.7%	0.62	11.45	1.22
	7.72	14.51	0.60	1.09	8.65	14.84	68.8%	0.58	10.09	1.17
	7.77	14.33	0.55	1.04	7.93	14.64	67.8%	0.54	8.81	1.11
	7.82	14.15	0.51	0.99	7.22	14.42	66.8%	0.50	7.61	1.05
	7.87	13.82	0.47	0.94	6.52	14.08	65.3%	0.46	6.52	1.00
	7.92	13.49	0.43	0.89	5.84	13.74	63.7%	0.42	5.51	0.94
	7.97	13.17	0.39	0.84	5.17	13.39	62.1%	0.39	4.58	0.89
	8.02	11.94	0.38	0.79	4.53	12.16	56.4%	0.37	3.93	0.87
	8.07	10.39	0.38	0.74	3.98	10.61	49.1%	0.38	3.46	0.87
	8.12	9.06	0.39	0.69	3.49	9.27	42.9%	0.38	3.05	0.87
	8.17	8.32	0.37	0.64	3.06	8.51	39.4%	0.36	2.59	0.85
	8.22	7.88	0.34	0.59	2.66	8.07	37.4%	0.33	2.12	0.80
	8.27	7.45	0.31	0.54	2.27	7.62	35.3%	0.30	1.70	0.75
	8.32	7.01	0.27	0.49	1.91	7.18	33.3%	0.27	1.32	0.69
WL	8.37	6.24	0.25	0.44	1.57	6.39	29.6%	0.25	1.04	0.66
	8.42	5.50	0.23	0.39	1.28	5.63	26.1%	0.23	0.80	0.62
	8.47	4.81	0.21	0.34	1.03	4.93	22.8%	0.21	0.60	0.59
	8.52	4.44	0.18	0.29	0.79	4.54	21.0%	0.17	0.42	0.52
	8.57	3.84	0.15	0.24	0.58	3.92	18.2%	0.15	0.27	0.47
	8.62	3.34	0.12	0.19	0.41	3.41	15.8%	0.12	0.17	0.41
	8.67	2.78	0.09	0.14	0.25	2.83	13.1%	0.09	0.09	0.34
	8.72	2.16	0.06	0.09	0.13	2.19	10.1%	0.06	0.03	0.25
	8.77	1.45	0.02	0.04	0.03	1.46	6.8%	0.02	0.00	0.11

STREAM NAME: East Hawxhurst Creek
XS LOCATION: 500' upst fr conf w West Hawxhurst Ck.
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 1.00 cfs
CALCULATED FLOW (Qc)= 1.04 cfs
(Qm-Qc)/Qm * 100 = -3.8 %

MEASURED WATERLINE (WLm)= 8.37 ft
CALCULATED WATERLINE (WLc)= 8.37 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.50 ft
MAX CALCULATED DEPTH (Dc)= 0.44 ft
(Dm-Dc)/Dm * 100 = 12.4 %

MEAN VELOCITY= 0.66 ft/sec
MANNING'S N= 0.203
SLOPE= 0.052 ft/ft

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

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w West Hawxhurst Ck.
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

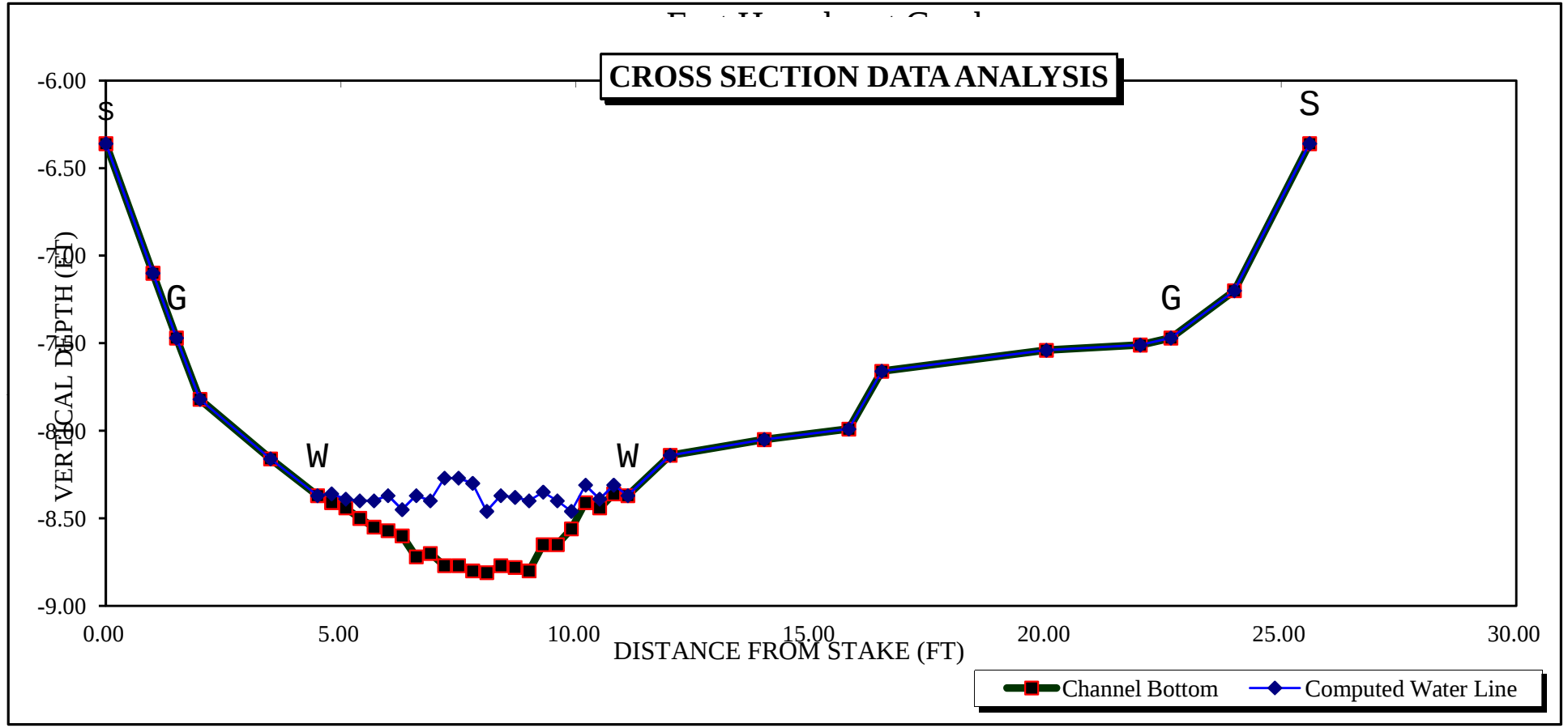
GL = lowest Grassline elevation corrected for sag

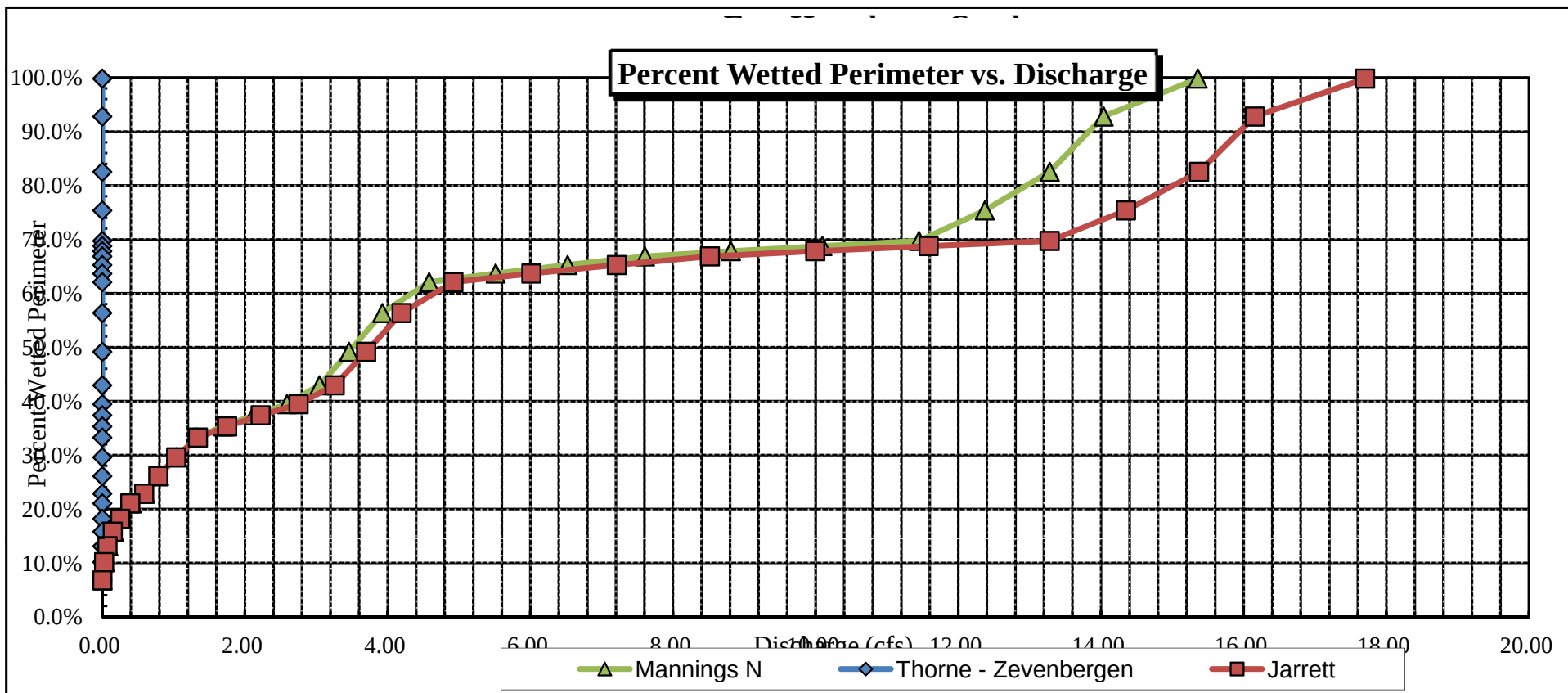
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

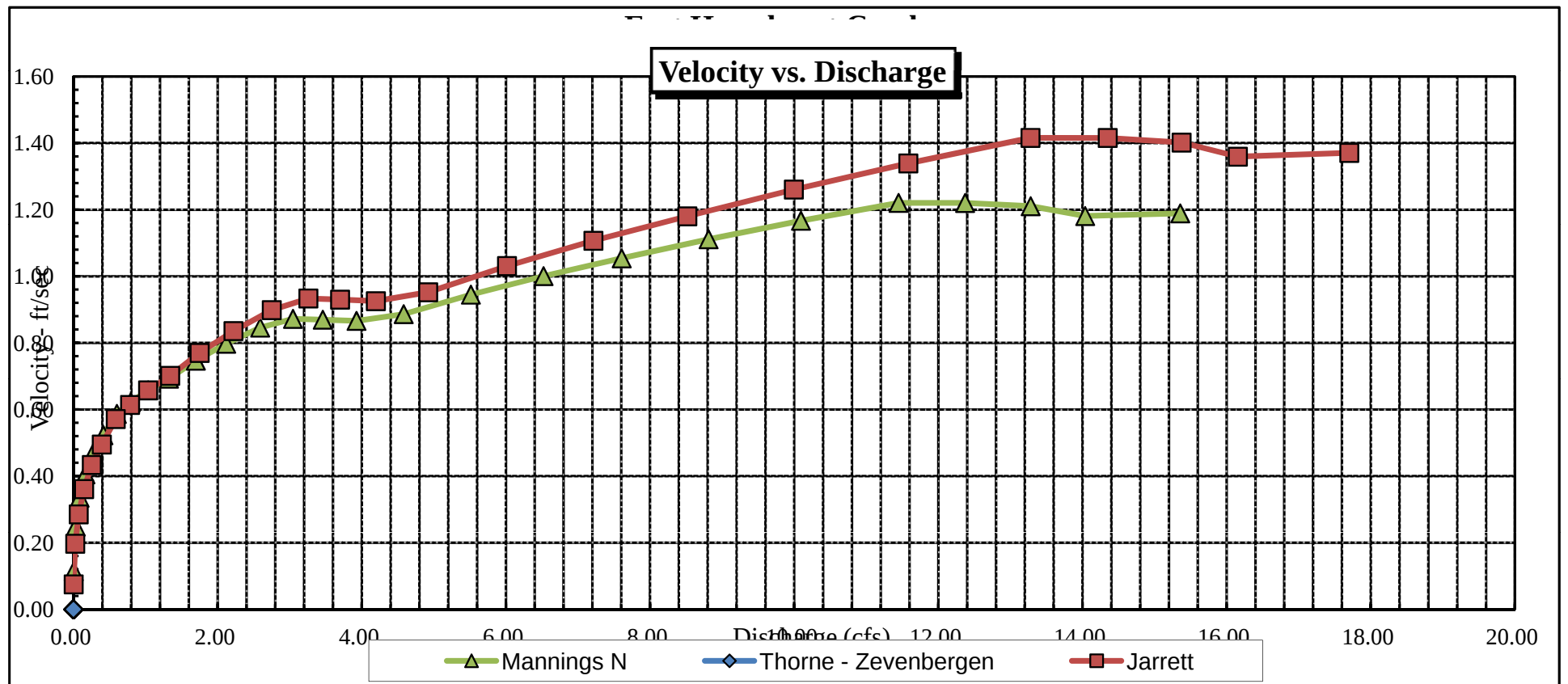
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.47	21.15	0.61	1.34	12.96	21.58	100.0%	0.60	17.79	1.37
	7.47	21.11	0.61	1.34	12.92	21.54	99.8%	0.60	17.70	1.37
	7.52	19.61	0.61	1.29	11.89	20.02	92.8%	0.59	16.16	1.36
	7.57	17.41	0.63	1.24	10.97	17.81	82.5%	0.62	15.38	1.40
	7.62	15.88	0.64	1.19	10.14	16.26	75.4%	0.62	14.35	1.42
	7.67	14.69	0.64	1.14	9.38	15.04	69.7%	0.62	13.28	1.42
	7.72	14.51	0.60	1.09	8.65	14.84	68.8%	0.58	11.58	1.34
	7.77	14.33	0.55	1.04	7.93	14.64	67.8%	0.54	9.99	1.26
	7.82	14.15	0.51	0.99	7.22	14.42	66.8%	0.50	8.52	1.18
	7.87	13.82	0.47	0.94	6.52	14.08	65.3%	0.46	7.21	1.11
	7.92	13.49	0.43	0.89	5.84	13.74	63.7%	0.42	6.02	1.03
	7.97	13.17	0.39	0.84	5.17	13.39	62.1%	0.39	4.92	0.95
	8.02	11.94	0.38	0.79	4.53	12.16	56.4%	0.37	4.20	0.93
	8.07	10.39	0.38	0.74	3.98	10.61	49.1%	0.38	3.70	0.93
	8.12	9.06	0.39	0.69	3.49	9.27	42.9%	0.38	3.26	0.93
	8.17	8.32	0.37	0.64	3.06	8.51	39.4%	0.36	2.75	0.90
	8.22	7.88	0.34	0.59	2.66	8.07	37.4%	0.33	2.22	0.84
	8.27	7.45	0.31	0.54	2.27	7.62	35.3%	0.30	1.75	0.77
	8.32	7.01	0.27	0.49	1.91	7.18	33.3%	0.27	1.34	0.70
WL	8.37	6.24	0.25	0.44	1.57	6.39	29.6%	0.25	1.04	0.66
	8.42	5.50	0.23	0.39	1.28	5.63	26.1%	0.23	0.78	0.61
	8.47	4.81	0.21	0.34	1.03	4.93	22.8%	0.21	0.59	0.57
	8.52	4.44	0.18	0.29	0.79	4.54	21.0%	0.17	0.39	0.49
	8.57	3.84	0.15	0.24	0.58	3.92	18.2%	0.15	0.25	0.43
	8.62	3.34	0.12	0.19	0.41	3.41	15.8%	0.12	0.15	0.36
	8.67	2.78	0.09	0.14	0.25	2.83	13.1%	0.09	0.07	0.29
	8.72	2.16	0.06	0.09	0.13	2.19	10.1%	0.06	0.02	0.20
	8.77	1.45	0.02	0.04	0.03	1.46	6.8%	0.02	0.00	0.07

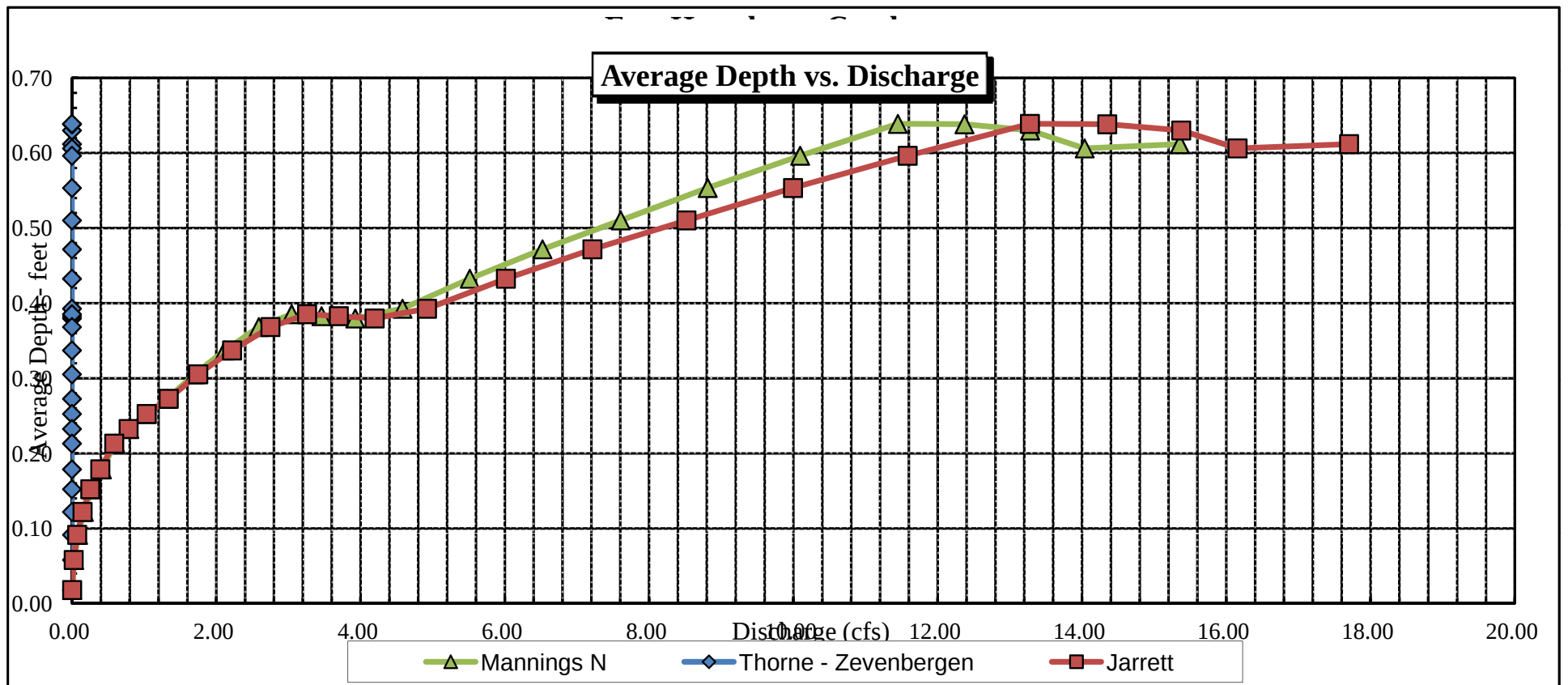
Channel Cross Section

CROSS SECTION DATA ANALYSIS

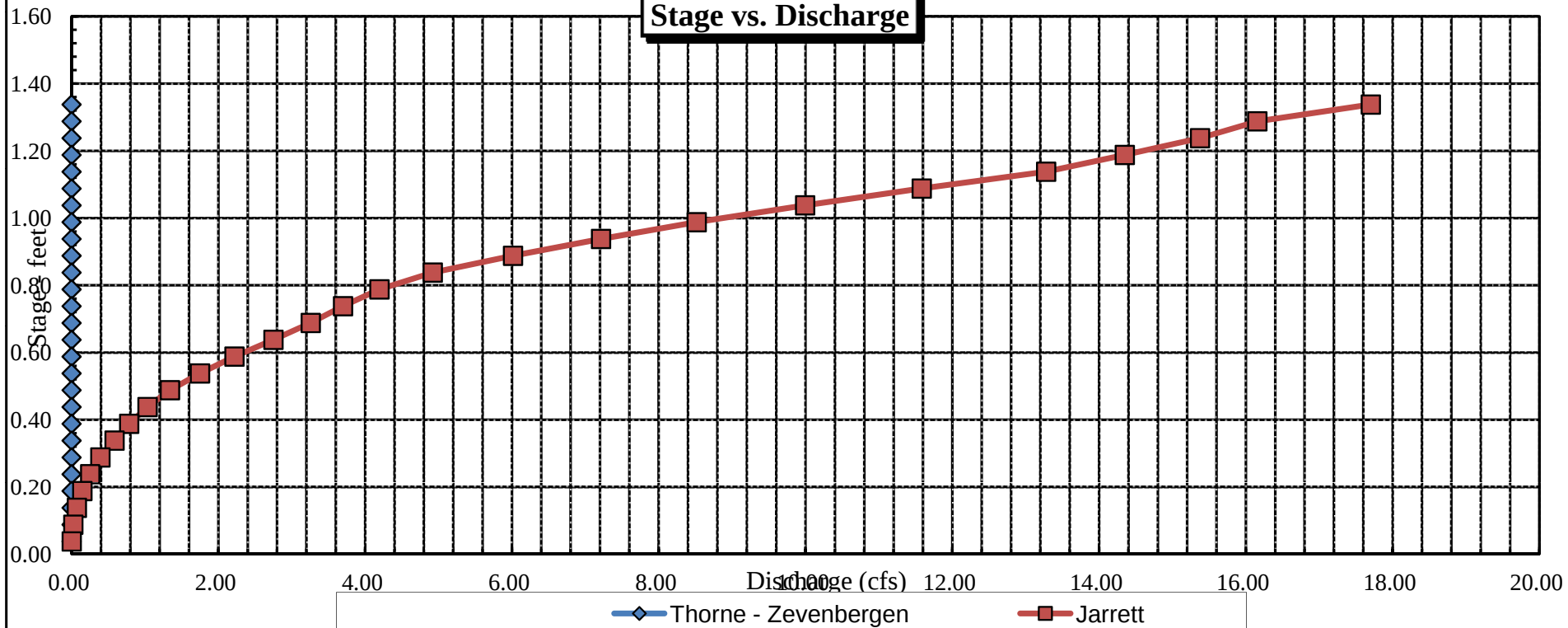








Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: East Hawxhurst Creek
XS LOCATION: 500' upst fr conf w/ W. Hawxhurst Ck
XS NUMBER: 11

DATE: 22-Jul-14
OBSERVERS: N. Dieterich, K. Jones

1/4 SEC: NW
SECTION: 8
TWP: 9S
RANGE: 94W
PM: Sixth

COUNTY: Mesa
WATERSHED: Buzzard Creek
DIVISION: 5
DOW CODE: 27981

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: 0.052

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w/ W. Hawxhurst Ck
 XS NUMBER: 11

DATA POINTS= 32

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
S	0.00	7.66		
	1.00	8.24		
	2.00	8.58		
1 G	2.40	8.86		
	3.00	9.16		
W	4.10	9.55	0.00	0.00
	4.40	9.66	0.05	0.00
	4.80	9.66	0.05	0.00
	5.20	9.65	0.05	0.00
	5.60	9.60	0.10	0.48
	6.00	9.49	0.10	0.07
	6.40	9.42	0.05	0.00
	6.80	9.44	0.00	0.00
	7.20	9.72	0.05	0.73
	7.60	9.74	0.20	0.90
	8.00	9.75	0.10	0.39
	8.40	9.72	0.20	0.57
	8.80	9.82	0.30	1.31
	9.20	9.79	0.35	1.86
	9.60	9.79	0.25	1.80
	10.00	9.94	0.25	1.21
	10.40	9.80	0.30	0.56
	10.80	9.85	0.30	0.60
	11.20	9.85	0.30	0.52
	11.60	9.68	0.20	0.00
W	12.00	9.55	0.00	0.00
	13.00	9.23		
	15.00	9.06		
	16.70	8.98		
1 G	16.90	8.84		
	18.00	8.40		
S	19.20	7.66		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.32	0.05	0.02	0.00	0.0%
0.40	0.05	0.02	0.00	0.0%
0.40	0.05	0.02	0.00	0.0%
0.40	0.10	0.04	0.02	1.8%
0.41	0.10	0.04	0.00	0.3%
0.41	0.05	0.02	0.00	0.0%
0.40		0.00	0.00	0.0%
0.49	0.05	0.02	0.01	1.3%
0.40	0.20	0.08	0.07	6.6%
0.40	0.10	0.04	0.02	1.4%
0.40	0.20	0.08	0.05	4.2%
0.41	0.30	0.12	0.16	14.4%
0.40	0.35	0.14	0.26	23.9%
0.40	0.25	0.10	0.18	16.5%
0.43	0.25	0.10	0.12	11.1%
0.42	0.30	0.12	0.07	6.2%
0.40	0.30	0.12	0.07	6.6%
0.40	0.30	0.12	0.06	5.7%
0.43	0.20	0.08	0.00	0.0%
0.42		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

8.16 0.35 1.28 1.09 100.0%
 (Max.)

Manning's n = 0.1154
 Hydraulic Radius= 0.15661457

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w/ W. Hawxhurst Ck
 XS NUMBER: 11

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.28	1.26	-1.1%
9.30	1.28	3.32	160.1%
9.32	1.28	3.14	145.5%
9.34	1.28	2.95	131.1%
9.36	1.28	2.77	116.9%
9.38	1.28	2.59	102.9%
9.40	1.28	2.41	89.0%
9.42	1.28	2.24	75.3%
9.44	1.28	2.07	62.2%
9.46	1.28	1.91	49.9%
9.48	1.28	1.76	37.9%
9.50	1.28	1.61	26.3%
9.51	1.28	1.54	20.7%
9.52	1.28	1.47	15.1%
9.53	1.28	1.40	9.6%
9.54	1.28	1.33	4.2%
9.55	1.28	1.26	-1.1%
9.56	1.28	1.20	-6.3%
9.57	1.28	1.13	-11.4%
9.58	1.28	1.07	-16.5%
9.59	1.28	1.00	-21.5%
9.60	1.28	0.94	-26.3%
9.62	1.28	0.82	-35.8%
9.64	1.28	0.71	-44.7%
9.66	1.28	0.60	-53.1%
9.68	1.28	0.51	-60.1%
9.70	1.28	0.42	-67.1%
9.72	1.28	0.33	-73.9%
9.74	1.28	0.26	-80.0%
9.76	1.28	0.19	-84.8%
9.78	1.28	0.14	-89.1%
9.80	1.28	0.09	-92.9%

WATERLINE AT ZERO

AREA ERROR = 9.548

STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w/ W. Hawxhurst Ck
 XS NUMBER: 11

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	8.86	14.47	0.60	1.08	8.63	14.96	100.0%	0.58	17.56	2.03
	8.90	14.34	0.56	1.04	8.08	14.81	99.0%	0.55	15.85	1.96
	8.95	14.17	0.52	0.99	7.37	14.61	97.7%	0.50	13.72	1.86
	9.00	13.64	0.49	0.94	6.67	14.06	94.0%	0.47	11.91	1.79
	9.05	12.48	0.48	0.89	6.02	12.89	86.1%	0.47	10.63	1.77
	9.10	11.68	0.46	0.84	5.41	12.07	80.7%	0.45	9.32	1.72
	9.15	10.99	0.44	0.79	4.85	11.37	76.0%	0.43	8.07	1.66
	9.20	10.27	0.42	0.74	4.32	10.64	71.1%	0.41	6.95	1.61
	9.25	9.70	0.39	0.69	3.82	10.05	67.2%	0.38	5.89	1.54
	9.30	9.40	0.36	0.64	3.34	9.74	65.1%	0.34	4.81	1.44
	9.35	9.10	0.32	0.59	2.88	9.42	63.0%	0.31	3.84	1.33
	9.40	8.80	0.28	0.54	2.43	9.11	60.9%	0.27	2.96	1.22
	9.45	7.94	0.25	0.49	2.01	8.22	54.9%	0.24	2.31	1.15
	9.50	7.30	0.22	0.44	1.63	7.55	50.4%	0.22	1.72	1.06
WL	9.55	6.75	0.19	0.39	1.28	6.96	46.5%	0.18	1.21	0.95
	9.60	6.20	0.15	0.34	0.95	6.37	42.6%	0.15	0.79	0.83
	9.65	5.45	0.12	0.29	0.66	5.58	37.3%	0.12	0.47	0.71
	9.70	4.39	0.10	0.24	0.43	4.50	30.0%	0.10	0.26	0.61
	9.75	3.04	0.08	0.19	0.23	3.12	20.9%	0.07	0.12	0.52
	9.80	2.08	0.05	0.14	0.09	2.15	14.4%	0.04	0.03	0.37
	9.85	0.93	0.03	0.09	0.02	0.96	6.4%	0.03	0.01	0.25
	9.90	0.23	0.02	0.04	0.00	0.25	1.7%	0.02	0.00	0.21

STREAM NAME: East Hawxhurst Creek
XS LOCATION: 500' upst fr conf w/ W. Hawxhurst Ck
XS NUMBER: 11

SUMMARY SHEET

MEASURED FLOW (Qm)=	1.09 cfs
CALCULATED FLOW (Qc)=	1.21 cfs
(Qm-Qc)/Qm * 100 =	-11.2 %
MEASURED WATERLINE (WLm)=	9.55 ft
CALCULATED WATERLINE (WLc)=	9.55 ft
(WLm-WLc)/WLm * 100 =	0.0 %
MAX MEASURED DEPTH (Dm)=	0.35 ft
MAX CALCULATED DEPTH (Dc)=	0.39 ft
(Dm-Dc)/Dm * 100	-12.0 %
MEAN VELOCITY=	0.95 ft/sec
MANNING'S N=	0.115
SLOPE=	0.052 ft/ft
.4 * Qm =	0.4 cfs
2.5 * Qm=	2.7 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

[illegible]

RECOMMENDATION BY: AGENCY DATE:

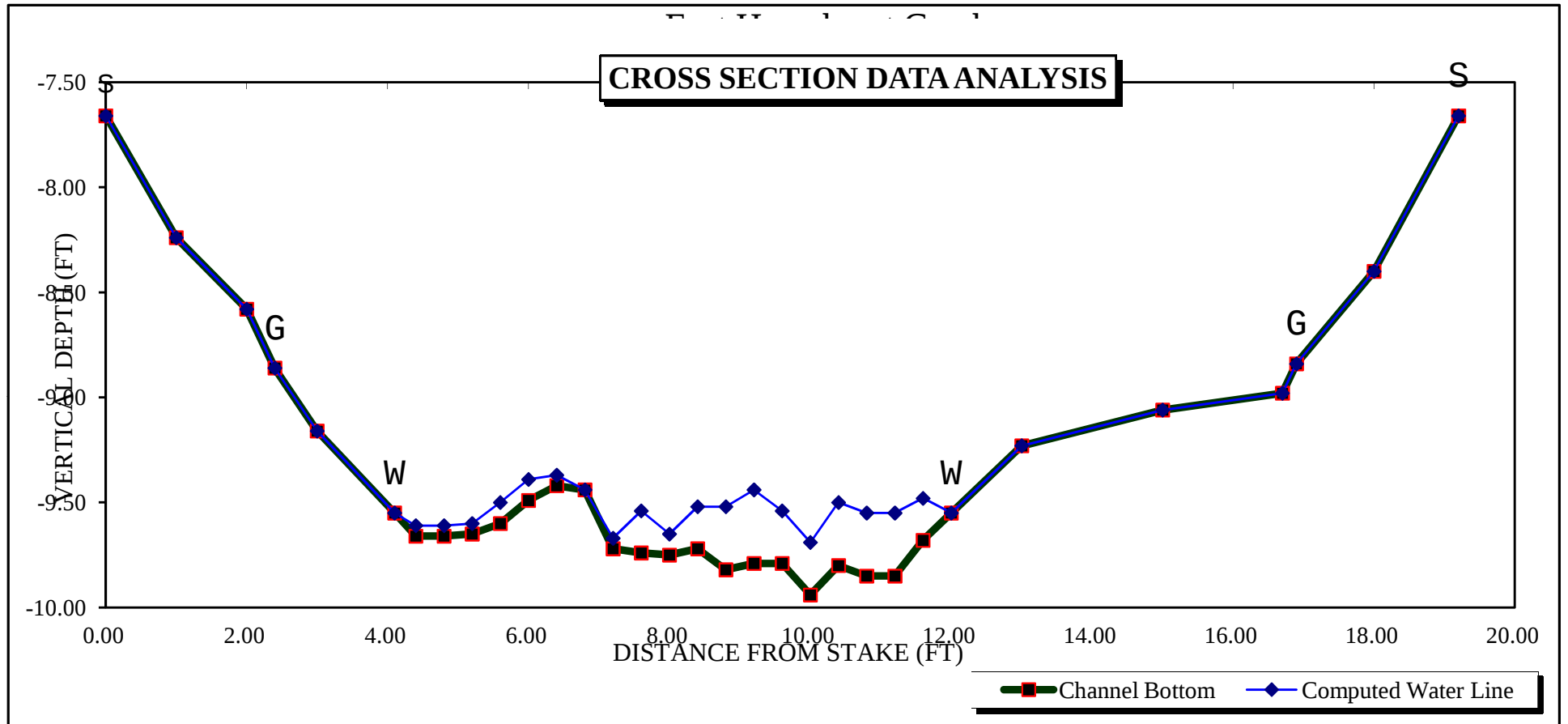
CWCB REVIEW BY: DATE:

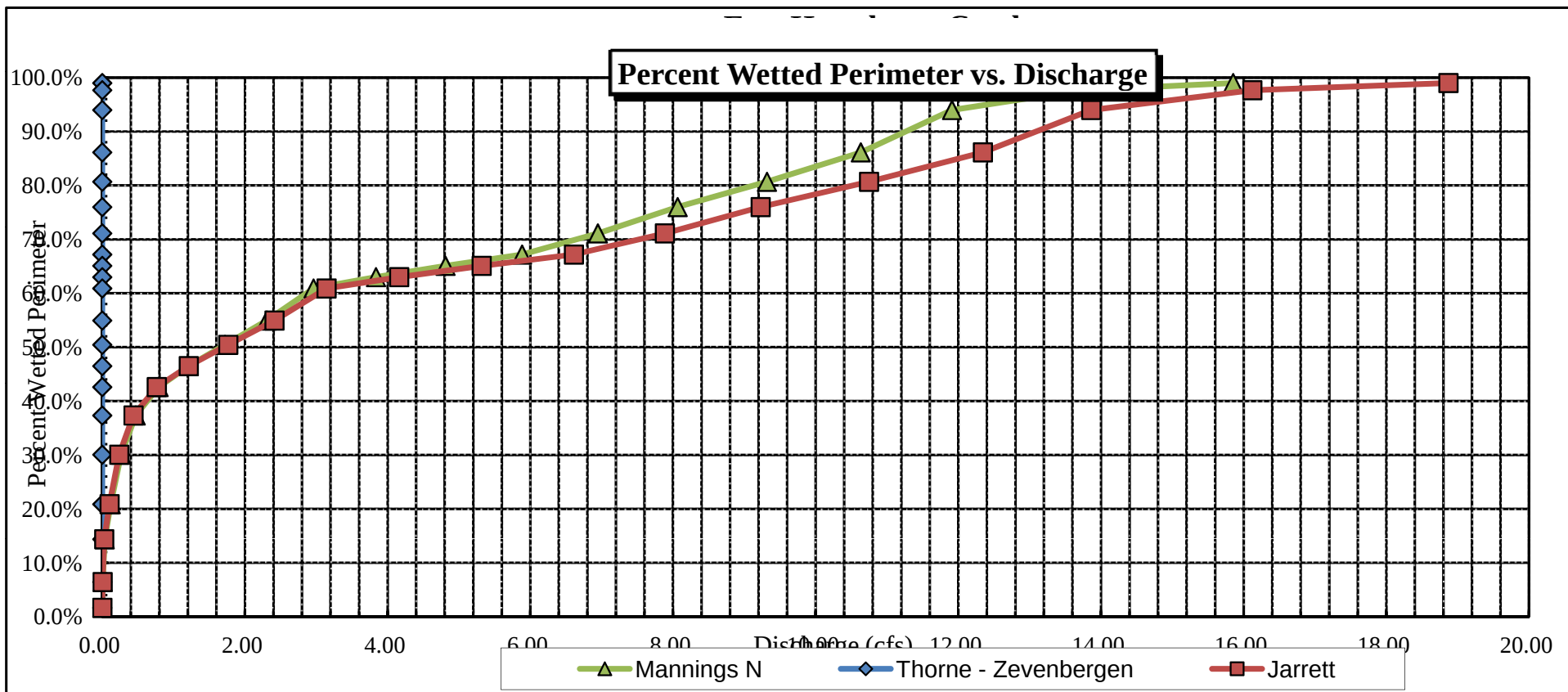
STREAM NAME: East Hawxhurst Creek
 XS LOCATION: 500' upst fr conf w/ W. Hawxhurst Ck
 XS NUMBER: 11 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

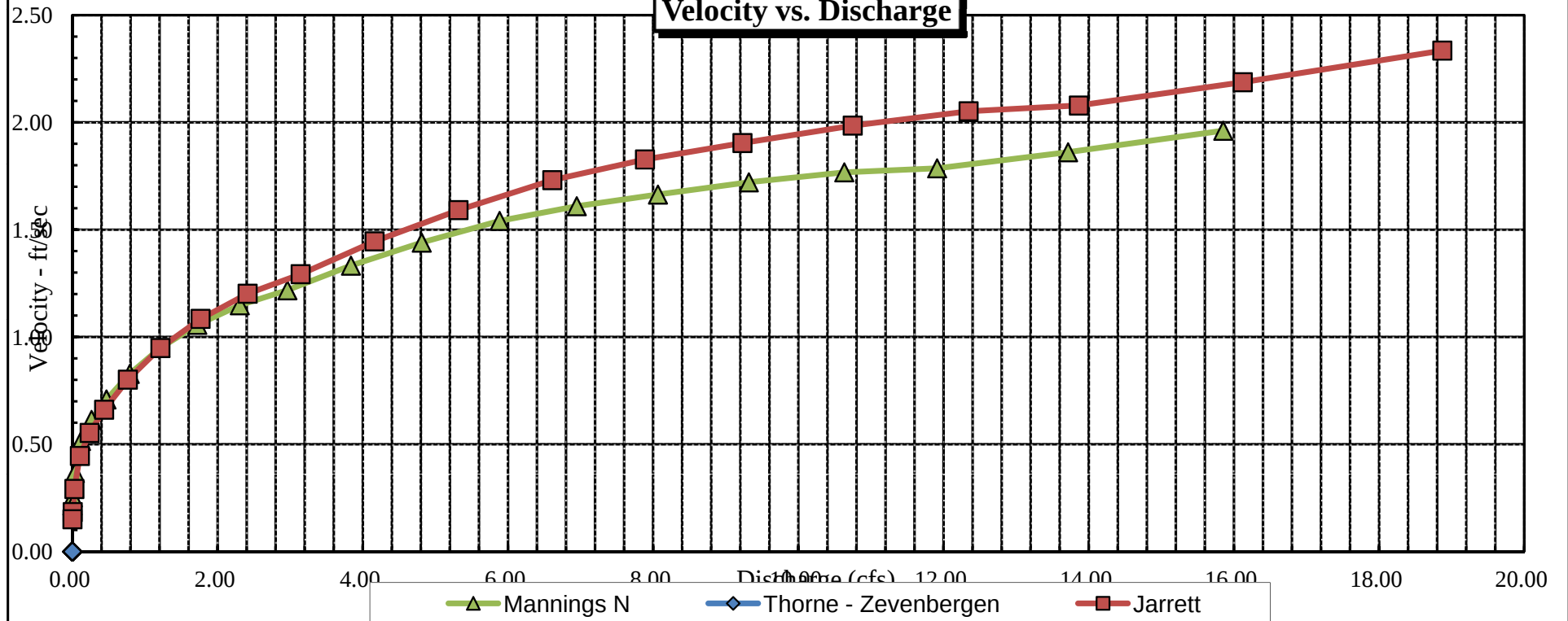
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

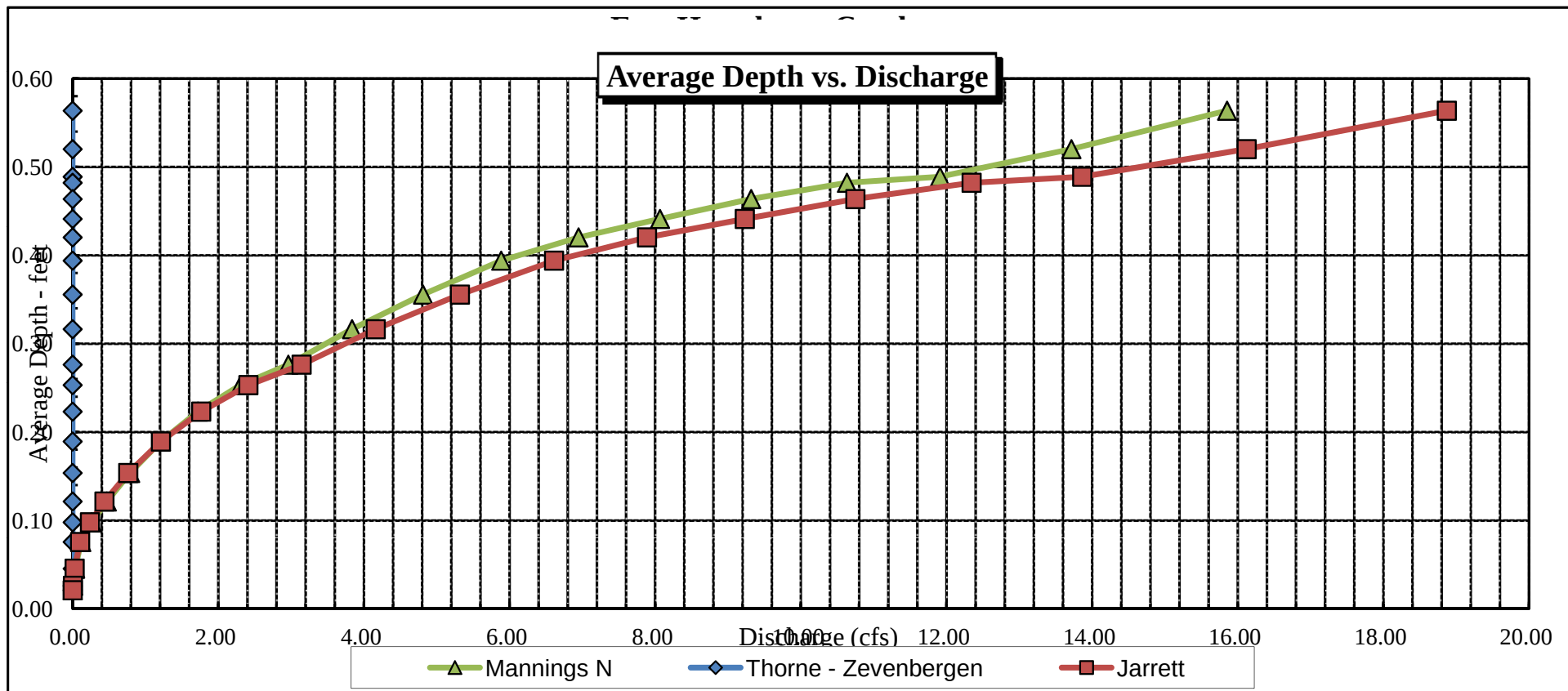
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	8.86	14.47	0.60	1.08	8.63	14.96	100.0%	0.58	21.09	2.44
	8.90	14.34	0.56	1.04	8.08	14.81	99.0%	0.55	18.87	2.33
	8.95	14.17	0.52	0.99	7.37	14.61	97.7%	0.50	16.12	2.19
	9.00	13.64	0.49	0.94	6.67	14.06	94.0%	0.47	13.86	2.08
	9.05	12.48	0.48	0.89	6.02	12.89	86.1%	0.47	12.34	2.05
	9.10	11.68	0.46	0.84	5.41	12.07	80.7%	0.45	10.75	1.99
	9.15	10.99	0.44	0.79	4.85	11.37	76.0%	0.43	9.23	1.90
	9.20	10.27	0.42	0.74	4.32	10.64	71.1%	0.41	7.89	1.83
	9.25	9.70	0.39	0.69	3.82	10.05	67.2%	0.38	6.61	1.73
	9.30	9.40	0.36	0.64	3.34	9.74	65.1%	0.34	5.32	1.59
	9.35	9.10	0.32	0.59	2.88	9.42	63.0%	0.31	4.16	1.45
	9.40	8.80	0.28	0.54	2.43	9.11	60.9%	0.27	3.14	1.29
	9.45	7.94	0.25	0.49	2.01	8.22	54.9%	0.24	2.41	1.20
	9.50	7.30	0.22	0.44	1.63	7.55	50.4%	0.22	1.77	1.08
WL	9.55	6.75	0.19	0.39	1.28	6.96	46.5%	0.18	1.21	0.95
	9.60	6.20	0.15	0.34	0.95	6.37	42.6%	0.15	0.76	0.80
	9.65	5.45	0.12	0.29	0.66	5.58	37.3%	0.12	0.44	0.66
	9.70	4.39	0.10	0.24	0.43	4.50	30.0%	0.10	0.24	0.55
	9.75	3.04	0.08	0.19	0.23	3.12	20.9%	0.07	0.10	0.45
	9.80	2.08	0.05	0.14	0.09	2.15	14.4%	0.04	0.03	0.29
	9.85	0.93	0.03	0.09	0.02	0.96	6.4%	0.03	0.00	0.18
	9.90	0.23	0.02	0.04	0.00	0.25	1.7%	0.02	0.00	0.15

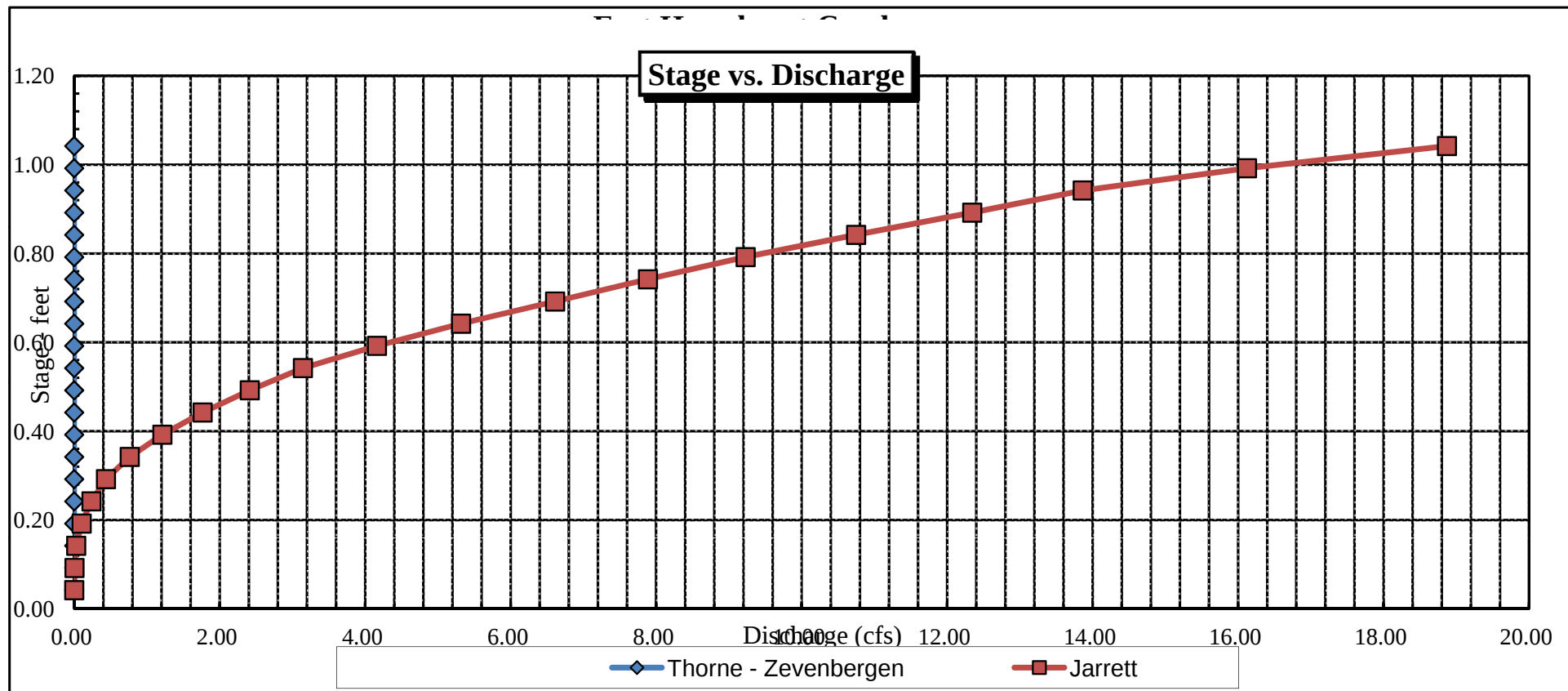




Velocity vs. Discharge









FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: East Hawkhurst Creek				CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: Nad 1983 Zone 13S 0249078 4353182					
DATE: 10/4/11		OBSERVERS: N. Dietrich / C. Ewing			
LEGAL DESCRIPTION		% SECTION: NW	SECTION: 8	TOWNSHIP: 9 N(S)	RANGE: 94 E(W) PM: 6th
COUNTY: Mesa		WATERSHED: Buzzard Creek		WATER DIVISION: Division 5 (Lower Colorado)	DOW WATER CODE: 27981
MAP(S):		USGS: Hawkhurst Cr.			
		USFS:			

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: ☒ YES ☐ NO		METER TYPE: Marsh McInerney				
METER NUMBER:		DATE RATED:		CALIB/SPIN: _____ sec	TAPE WEIGHT: _____ lbs/foot	TAPE TENSION: _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: Cobble				PHOTOGRAPHS TAKEN ☒ YES ☐ NO	NUMBER OF PHOTOGRAPHS: 4	

CHANNEL PROFILE DATA

STATION		DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗	Tape @ Stake LB	0.0	7.6
⊗	Tape @ Stake RB	0.0	7.25
①	WS @ Tape LB/RB	0.0	9.23 / 9.20
②	WS Upstream	33.7'	7.88
③	WS Downstream	32.0'	11.06
SLOPE		4.84%	

SKETCH

LEGEND:

Stake ⊗

Station ①

Photo ⑤ →

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:

• No fish observed

COMMENTS

pH = 8.48
SC = 231 μ S
temp = 11.3°C

* See comment on W. Handedurst pertaining to resurvey point on USFS
scheduled for spring/summer 2012.

Nad 1983 Zone 13S 0249078
4353182

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:

East Hawkhurst Creek

CROSS-SECTION NO. 1

DATE

10/4/11

SHEET 1 OF 1

BEGINNING OF MEASUREMENT

EDGE OF WATER LOOKING DOWNSTREAM:
(0.0 AT STAKE)LEFT ☒ RIGHT

Gage Reading:

N/A ft

TIME: 1030

Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)
									At Point	Mean in Vertical		
BM#1		—	—	8.7 +								
S		0	—	7.25								
G		0.8	0.8	7.82								
		2	1.2	8.35								
		3	1	8.68								
		4	1	8.85								
		5	1	9.07								
right W		5.4	0.4	9.20	0	0.6d		20	0		0	0
		5.7	0.3	9.35	0.15				0.3		0.05	0.14
		6		9.37	0.17				0.79		0.05	0.04
		6.3		9.35	0.15				1.56		0.05	0.07
		6.6		9.39	0.19				1.57		0.06	0.09
		6.9		9.65	0.45				0.72		0.14	0.1
		7.2		9.43	0.23				1.89		0.07	0.13
		7.5		9.54	0.34				0.41		0.1	0.04
		7.8		9.42	0.22				0.15		0.7	0.01
		8.1		9.41	0.21				1.35		0.06	0.09
		8.4		9.47	0.27				1.37		0.08	0.11
		8.7		9.63	0.43				0		0.13	0
left W		8.9	0.2	9.2	0				0		0	0
		9.1	0.2	8.83								
		10	0.9	8.65								
		10.5	0.5	8.5								
		11	0.5	8.35								
G		11.75	0.75	7.77								
S		12	0.25	7.6								
TOTALS:												

total = 0.81 cfs

HI = 108.7'

BM#1 = 100' (arbitrary datum)

End of Measurement

Time: 1130

Gage Reading: _____ ft

CALCULATIONS PERFORMED BY:

N. Detenich

CALCULATIONS CHECKED BY:



**COLORADO WATER
CONSERVATION BOARD**

LOCATION INFORMATION

CONSERVATION BOARD									
STREAM NAME: <u>East Hawkhurst Creek</u>								CROSS-SECTION NO.: <u>1</u>	
CROSS-SECTION LOCATION: <u>Nad 1983 Zone 12S 0249098</u> <u>4353242</u>									
DATE: <u>7/22/14</u>		OBSERVERS: <u>N. Dieterich / K. Jones</u>							
LEGAL DESCRIPTION		W. SECTION		SECTION		TOWNSHIP: <u>9</u> <u>N</u> <u>15</u>		RANGE: <u>94</u> <u>E</u> <u>10</u> PM: <u>6th</u>	
COUNTY: <u>Mesa</u>		WATERSHED: <u>Buzzard Creek</u>		WATER DIVISION: <u>Dragon 5 (Lower Chords)</u>				DOW WATER CODE: <u>---</u>	
MAP(S): <u>USGS</u> <u>Hawkhurst</u>		USFS							

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION		(YES) NO	METER TYPE <i>Mars-McBainex</i>	
METER NUMBER		DATE RATED <i>4/14</i>	CALIB/SPIN _____ SEC	TAPE WEIGHT _____ lbs/foot
CHANNEL BED MATERIAL SIZE RANGE <i>gravel/cobble</i>		PHOTOGRAPHS TAKEN (YES) NO		NUMBER OF PHOTOGRAPHS <i>x 4</i>

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	
② WS Upstream		
③ WS Downstream		
SLOPE Ave = 5.2%		

SKETCH

LEGEND

Stake ⊗

Station ①

Photo ① →

Direction of Flow →

AQUATIC SAMPLING SUMMARY

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

COMMENTS

pH = 8.2 SC = 1161.4 μ S @ 25°C Temp = 17.5°C

BM#1 = 5.37

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: <u>East Hawxhurst Creek</u>				CROSS-SECTION NO: <u>1</u>		DATE: <u>7/22/14</u> SHEET <u>1</u> OF <u>1</u>																																														
BEGINNING OF MEASUREMENT		EDGE OF WATER LOOKING DOWNSTREAM: <u>(LEFT)</u> / RIGHT		Gage Reading: <u> </u> ft		TIME: <u>1300</u>																																														
Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)																																								
								At Point	Mean in Vertical																																											
	S	0	—	0.62		7.66																																														
		1	1			8.24																																														
		2	1			8.58																																														
(BF) G		2.4	0.4			8.86																																														
		3	0.6			9.16																																														
W		4.1	1.1		0	9.55		20	0		1																																									
		4.4	0.3		0.05	9.66			0																																											
		4.8	0.4		0.05	9.66			0																																											
		5.2	0.4		0.05	9.65			0		0.04	0																																								
		5.6	0.4		0.1	9.6			0.48		0.02	.010																																								
R		6	0.4		0.1	9.49			0.07		0	0																																								
R		6.4	0.4		0.05	9.42			0		0	0																																								
R		6.8	0.4		0	9.44			0		0	0																																								
		7.2	0.4		0.05	9.72			0.73		0.068	.05																																								
		7.6	0.4		0.2	9.74			0.9		0.076	.068																																								
		8	0.4		0.1	9.75			0.39		0.08	.031																																								
		8.4	0.4		0.2	9.72			0.57		0.068	.039																																								
		8.8	0.4		0.3	9.82			1.31		0.108	.141																																								
		9.2	0.4		0.35	9.79			1.86		0.096	.179																																								
		9.6	0.4		0.25	9.79			1.8		0.096	.173																																								
		10	0.4		0.25	9.94			1.21		0.156	.189																																								
		10.4	0.4		0.3	9.8			0.56		0.1	.056																																								
		10.8	0.4		0.3	9.85			0.6		0.12	.072																																								
		11.2	0.4		0.3	9.85			0.52		0.12	.062																																								
		11.6	0.4		0.2	9.68			0		0.052	0																																								
W		12	0.4		0	9.55			0		0	0																																								
		13	1			9.23																																														
		15	2			9.06																																														
		16.7	1.7			8.98																																														
(BF) G		16.9	0.2			8.84																																														
		18	1.1			8.4																																														
S		19.2	1.2			7.66																																														
Long Profile <table border="1"> <thead> <tr> <th>Station</th> <th>H₂O Surface</th> <th>H₂O Surface Elevation</th> <th>% Slope</th> </tr> </thead> <tbody> <tr><td>0</td><td>7.37</td><td>100.82</td><td></td></tr> <tr><td>CS#2</td><td>18</td><td>8.34</td><td>5.39</td></tr> <tr><td></td><td>31</td><td>8.79</td><td>3.46</td></tr> <tr><td>TP#1</td><td>42</td><td>9.25</td><td></td></tr> <tr><td>"</td><td>45</td><td>6.95</td><td></td></tr> <tr><td></td><td>45</td><td>8.19</td><td>12.1</td></tr> <tr><td>CS#1</td><td>68</td><td>8.58</td><td>1.7</td></tr> <tr><td></td><td>85</td><td>9.32</td><td>4.4</td></tr> <tr><td>TOTALS:</td><td>100</td><td>10.14</td><td>5.5</td></tr> </tbody> </table> BM = 8.19 for CS#2 TP#1 = 9.25 HI! / Avg % Slope = <u>5.42</u>													Station	H ₂ O Surface	H ₂ O Surface Elevation	% Slope	0	7.37	100.82		CS#2	18	8.34	5.39		31	8.79	3.46	TP#1	42	9.25		"	45	6.95			45	8.19	12.1	CS#1	68	8.58	1.7		85	9.32	4.4	TOTALS:	100	10.14	5.5
Station	H ₂ O Surface	H ₂ O Surface Elevation	% Slope																																																	
0	7.37	100.82																																																		
CS#2	18	8.34	5.39																																																	
	31	8.79	3.46																																																	
TP#1	42	9.25																																																		
"	45	6.95																																																		
	45	8.19	12.1																																																	
CS#1	68	8.58	1.7																																																	
	85	9.32	4.4																																																	
TOTALS:	100	10.14	5.5																																																	

End of Measurement	Time:	Gage Reading:	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:
--------------------	-------	---------------	----------------------------	--------------------------







