



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7210
www.co.blm.gov



In Reply Refer To:
7250 (CO-932)

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 Turkey Creek, located in Water Division 2.

Location and Land Status. The Turkey Creek watershed originates on the east flank of Black Mountain, approximately 10 miles southwest of Colorado Springs. This reach begins at the confluence of East Fork Turkey Creek and West Fork Turkey Creek and extends downstream to the confluence with an unnamed tributary located within the SW/4 SW/4, Section 29, T16S R67W, Sixth P.M. The BLM manages approximately 0.5 miles of this reach, while 1.5 miles are in private ownership.

Biological Summary. Turkey Creek is a cold-water, high gradient stream that flows through a narrow canyon. The stream is confined by bedrock in most locations. The stream generally has large-sized substrate, consisting of cobbles and small boulders. The stream has a good mix of pools, small riffles and runs.

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

The riparian community is generally comprised of cottonwood, various 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 Turkey 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)
05/27/2014 #1	2.11 cfs	13.07 feet	0.93 cfs	3.72 cfs
05/27/2014 #2	2.05 cfs	16.13 feet	1.10 cfs	Out of range

Averages: 1.01 cfs 3.72 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.

3.7 cubic feet per second is recommended during the warm weather period from May 1 to August 31. This recommendation is driven by the average velocity criteria. This creek is steep and has limited physical habitat, so it is important to protect a flow rate that provides usable habitat in riffles when fish are completing critical life history functions during the warm weather months.

1.8 cubic feet per second is recommended during the fall period, from September 1 to November 30. This recommendation is driven by limited water availability. This flow rates significantly exceeds the average depth and wetted perimeter criteria, and provides an average velocity of approximately 0.8 feet per second.

1.00 cfs is recommended during the winter period from December 1 through March 31. 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.

3.0 cfs is recommended during the early portion of the snowmelt runoff period, from the April 1 to April 30. This flow rate comes close to meeting all three instream flow criteria, but reflects the fact that snowmelt runoff is not yet sufficient during April to meet all three instream flow criteria.

Water Availability. The BLM recommends relying upon two sources of data for water availability analysis. United States Geological Survey (USGS) Gage 07105945 (Rock Creek above Fort Carson Reservation, CO) measures flow from a watershed immediately to the north of Turkey Creek with very similar watershed characteristics. In addition, this gage is located on Rock Creek immediately as it exits the mountains, which provides a better estimate of mountain-influenced runoff. A basin apportionment analysis could be performed to derive flow rates for Turkey Creek. The BLM does not recommending reliance upon USGS Gage 07099215 (Turkey Creek near Fountain, CO). This gage is located adjacent to State Highway 115, after the creek exits the mountains and loses a very significant amount of flow to seepage. In addition, it appears that the gage may be influenced by diversion from the Strobel Ditch.

Streamstats should also be consulted. The Streamstats model produces similar estimates of

baseflow as basin apportionment calculations of the Rock Creek gage.

BLM does not recommend relying upon diversion records from the Strobel Ditch. This ditch appears to divert fairly infrequently, likely because of its junior priority within the Arkansas River basin.

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

Relationship to Land Management Plans. The BLM's land use plan calls for Turkey 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.

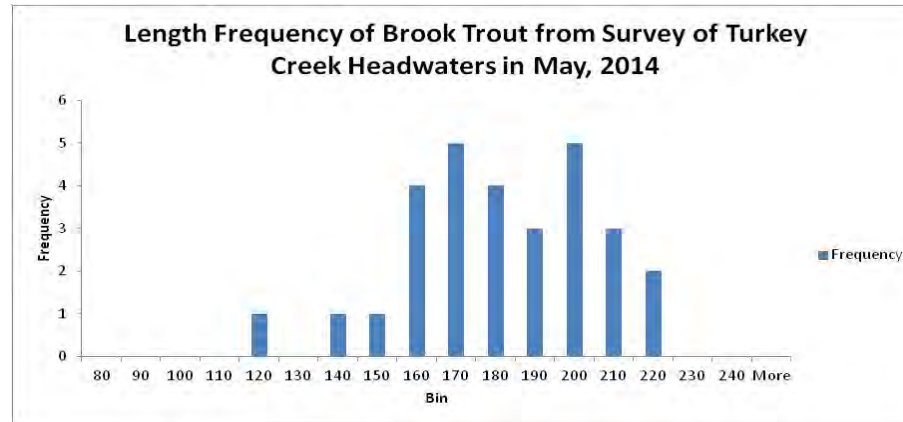
Sincerely,

A handwritten signature in black ink, appearing to read "B. St. George", with a horizontal line extending to the right.

Brian St. George
Deputy State Director
Resources and Fire

Cc: David Gilbert, Royal Gorge FO
Keith Berger, Royal Gorge FO

<u>HUC12</u>	<u>Description</u>	<u>SampleDate</u>	<u>SiteName</u>	<u>Location</u>	<u>Protocol</u>	<u>TotalCatch</u>	<u>CommonName</u>	<u>TotalEffort</u>	<u>EffortMetric</u>	<u>LengthRange</u>	<u>CPUE</u>
110200020701	Headwaters Turkey Cre	27-May-14	NULL	Upstream of Hwy 115 and gravel mine	TWO-PASS REMOVAL	29	BROOK TROUT	2	PASS	115 - 215	NULL
110200020702	Upper Turkey Creek	9-Nov-11	Fort Carson #50 in TA 38	Fort Carson #50 in TA 38	CPUE	97	CENTRAL STONEROLLER	2	NET	59 - 103	48.50 / NET
110200020702	Upper Turkey Creek	9-Nov-11	TA 38 North of Two Track intersect	TA 38 North of Two Track intersect	PRESENCE/ABSENCE	NULL	NULL	1	PASS	NULL	NULL
110200020704	Lower Turkey Creek	9-Nov-11	Downstream Dam Outlet Teller Reservoir	BLW Teller Reservoir Dam Outlet	PRESENCE/ABSENCE	NULL	NULL	1	PASS	NULL	NULL
110200020704	Lower Turkey Creek	9-Nov-11	AT CARRIZO SPRINGS	ABV W Carrizo Springs Ave	PRESENCE/ABSENCE	NULL	NULL	1	PASS	NULL	NULL



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

LOCATION INFORMATION

STREAM NAME: Turkey Creek
XS LOCATION: 800 ft. dwnst fr conf with E Fk & W Fk
XS NUMBER: 0

DATE: 0-Jan-00
OBSERVERS: 0

1/4 SEC: 0
SECTION: 0
TWP: 0
RANGE: 0
PM: 0

COUNTY: 0
WATERSHED: 0
DIVISION: 0
DOW CODE: 0

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: 0.022

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. dwnst fr conf with E Fk & W Fk
 XS NUMBER: 0

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER	VEL	WETTED	WATER	AREA	Q	% Q
		DEPTH	DEPTH		PERIM.	DEPTH	(Am)	(Qm)	CELL
1 RS & G		1.50	6.04		0.00		0.00	0.00	0.0%
	W	2.50	6.65	0.00	0.00		0.00	0.00	0.0%
		3.00	6.88	0.23	0.55	0.23	0.12	0.00	0.0%
		3.50	7.02	0.37	0.52	0.37	0.19	0.00	0.0%
		4.00	7.25	0.60	0.55	0.60	0.30	0.17	8.5%
		4.50	7.22	0.57	0.50	0.57	0.29	0.32	15.7%
		5.00	7.08	0.43	0.52	0.43	0.22	0.30	14.8%
		5.50	7.15	0.50	0.50	0.50	0.25	0.32	15.4%
		6.00	7.20	0.55	0.50	0.55	0.28	0.22	10.7%
		6.50	7.11	0.46	0.51	0.46	0.23	0.13	6.5%
		7.00	7.20	0.55	0.51	0.55	0.28	0.07	3.2%
		7.50	6.98	0.33	0.55	0.33	0.17	0.00	0.0%
		8.00	7.00	0.35	0.50	0.35	0.18	0.02	1.2%
		8.50	7.04	0.39	0.50	0.39	0.20	0.07	3.5%
		9.00	6.65	0.00	0.63		0.00	0.00	0.0%
		9.50	6.70	0.05	0.50	0.05	0.03	0.02	0.8%
		10.00	7.04	0.39	0.60	0.39	0.20	0.16	7.7%
		10.50	7.20	0.55	0.52	0.55	0.28	0.16	7.6%
		11.00	6.77	0.12	0.66	0.12	0.06	0.02	1.1%
		11.50	6.95	0.30	0.53	0.30	0.15	0.07	3.2%
	W	12.00	6.65	0.00	0.58		0.00	0.00	0.0%
		13.00	6.28		0.00		0.00	0.00	0.0%
		15.00	6.40		0.00		0.00	0.00	0.0%
		17.00	6.35		0.00		0.00	0.00	0.0%
1 G		17.70	6.08		0.00		0.00	0.00	0.0%
LS		19.60	5.20		0.00		0.00	0.00	0.0%

TOTALS -----

10.25 0.6 3.37 2.05 100.0%
 (Max.)

Manning's n = 0.1724
 Hydraulic Radius= 0.32871651

STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. dwnst fr conf with E Fk & W Fk
 XS NUMBER: 0

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	3.37	3.37	0.0%
6.40	3.37	5.88	74.5%
6.42	3.37	5.67	68.2%
6.44	3.37	5.46	62.0%
6.46	3.37	5.25	55.9%
6.48	3.37	5.05	49.8%
6.50	3.37	4.84	43.7%
6.52	3.37	4.64	37.7%
6.54	3.37	4.44	31.8%
6.56	3.37	4.24	25.9%
6.58	3.37	4.05	20.0%
6.60	3.37	3.85	14.3%
6.61	3.37	3.75	11.4%
6.62	3.37	3.66	8.5%
6.63	3.37	3.56	5.7%
6.64	3.37	3.47	2.8%
6.65	3.37	3.37	0.0%
6.66	3.37	3.28	-2.8%
6.67	3.37	3.18	-5.5%
6.68	3.37	3.09	-8.3%
6.69	3.37	3.00	-10.9%
6.70	3.37	2.91	-13.5%
6.72	3.37	2.74	-18.7%
6.74	3.37	2.57	-23.8%
6.76	3.37	2.40	-28.7%
6.78	3.37	2.24	-33.7%
6.80	3.37	2.07	-38.4%
6.82	3.37	1.92	-43.1%
6.84	3.37	1.76	-47.7%
6.86	3.37	1.62	-52.1%
6.88	3.37	1.47	-56.4%
6.90	3.37	1.33	-60.5%

WATERLINE AT ZERO

AREA ERROR = 6.650

STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. downst fr conf with E Fk & W Fk
 XS NUMBER: 0

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.08	16.13	0.66	1.17	10.64	17.17	100.0%	0.62	9.89	0.93
	6.10	16.05	0.64	1.15	10.32	17.07	99.5%	0.60	9.43	0.91
	6.15	15.84	0.60	1.10	9.52	16.84	98.1%	0.57	8.32	0.87
	6.20	15.63	0.56	1.05	8.74	16.60	96.7%	0.53	7.28	0.83
	6.25	15.41	0.52	1.00	7.96	16.37	95.3%	0.49	6.29	0.79
	6.30	14.82	0.49	0.95	7.20	15.74	91.7%	0.46	5.46	0.76
	6.35	13.64	0.48	0.90	6.49	14.53	84.6%	0.45	4.84	0.75
	6.40	10.59	0.56	0.85	5.88	11.45	66.7%	0.51	4.82	0.82
	6.45	10.37	0.52	0.80	5.36	11.21	65.3%	0.48	4.18	0.78
	6.50	10.15	0.48	0.75	4.84	10.97	63.9%	0.44	3.59	0.74
	6.55	9.93	0.44	0.70	4.34	10.73	62.5%	0.40	3.04	0.70
	6.60	9.72	0.40	0.65	3.85	10.49	61.1%	0.37	2.52	0.66
WL	6.65	9.50	0.35	0.60	3.37	10.25	59.7%	0.33	2.05	0.61
	6.70	8.74	0.33	0.55	2.91	9.45	55.1%	0.31	1.70	0.58
	6.75	8.41	0.30	0.50	2.48	9.06	52.8%	0.27	1.34	0.54
	6.80	7.97	0.26	0.45	2.07	8.54	49.8%	0.24	1.03	0.50
	6.85	7.44	0.23	0.40	1.69	7.93	46.2%	0.21	0.77	0.46
	6.90	6.89	0.19	0.35	1.33	7.29	42.5%	0.18	0.55	0.41
	6.95	6.29	0.16	0.30	1.00	6.62	38.5%	0.15	0.36	0.36
	7.00	5.37	0.13	0.25	0.70	5.63	32.8%	0.12	0.22	0.32
	7.05	4.42	0.10	0.20	0.46	4.62	26.9%	0.10	0.13	0.27
	7.10	3.77	0.07	0.15	0.25	3.91	22.8%	0.06	0.05	0.21
	7.15	2.35	0.04	0.10	0.10	2.43	14.2%	0.04	0.01	0.15
	7.20	0.68	0.03	0.05	0.02	0.69	4.0%	0.03	0.00	0.12

STREAM NAME: Turkey Creek
XS LOCATION: 800 ft. dwntst fr conf with E Fk & W Fk
XS NUMBER: 0

SUMMARY SHEET

MEASURED FLOW (Qm)= 2.05 cfs
CALCULATED FLOW (Qc)= 2.05 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 6.65 ft
CALCULATED WATERLINE (WLc)= 6.65 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.60 ft
MAX CALCULATED DEPTH (Dc)= 0.60 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.61 ft/sec
MANNING'S N= 0.172
SLOPE= 0.022 ft/ft

.4 * Qm = 0.8 cfs
2.5 * Qm= 5.1 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

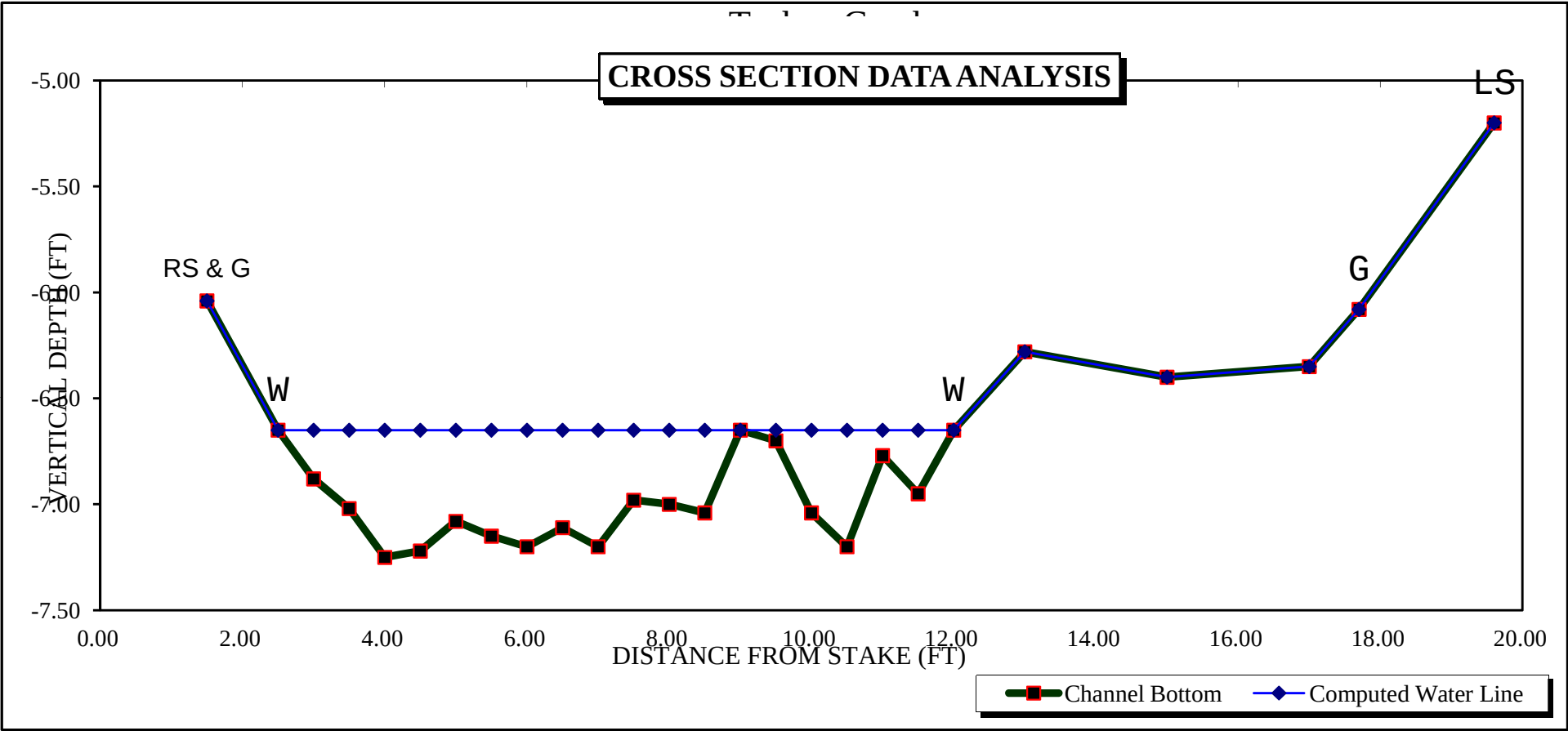
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

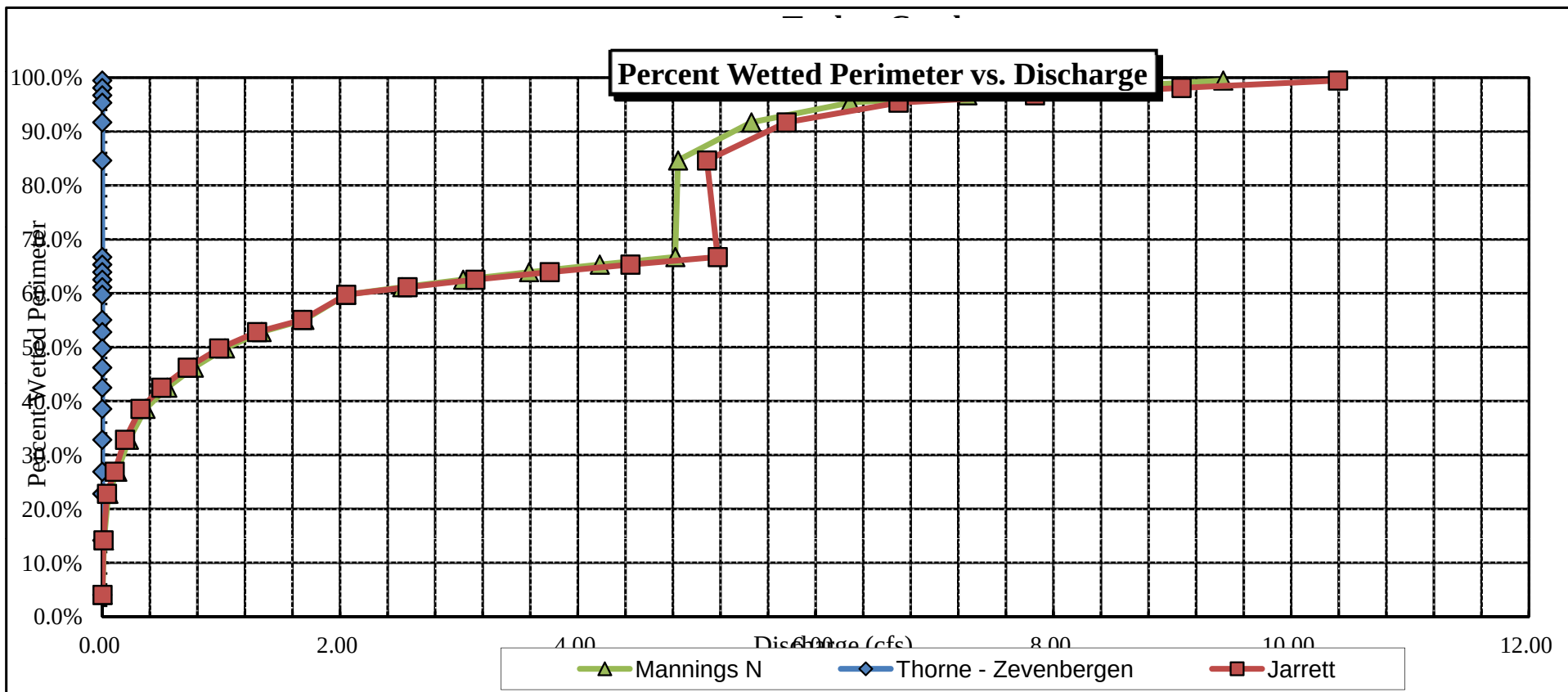
STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. downst fr conf with E Fk & W Fk
 XS NUMBER: 0 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

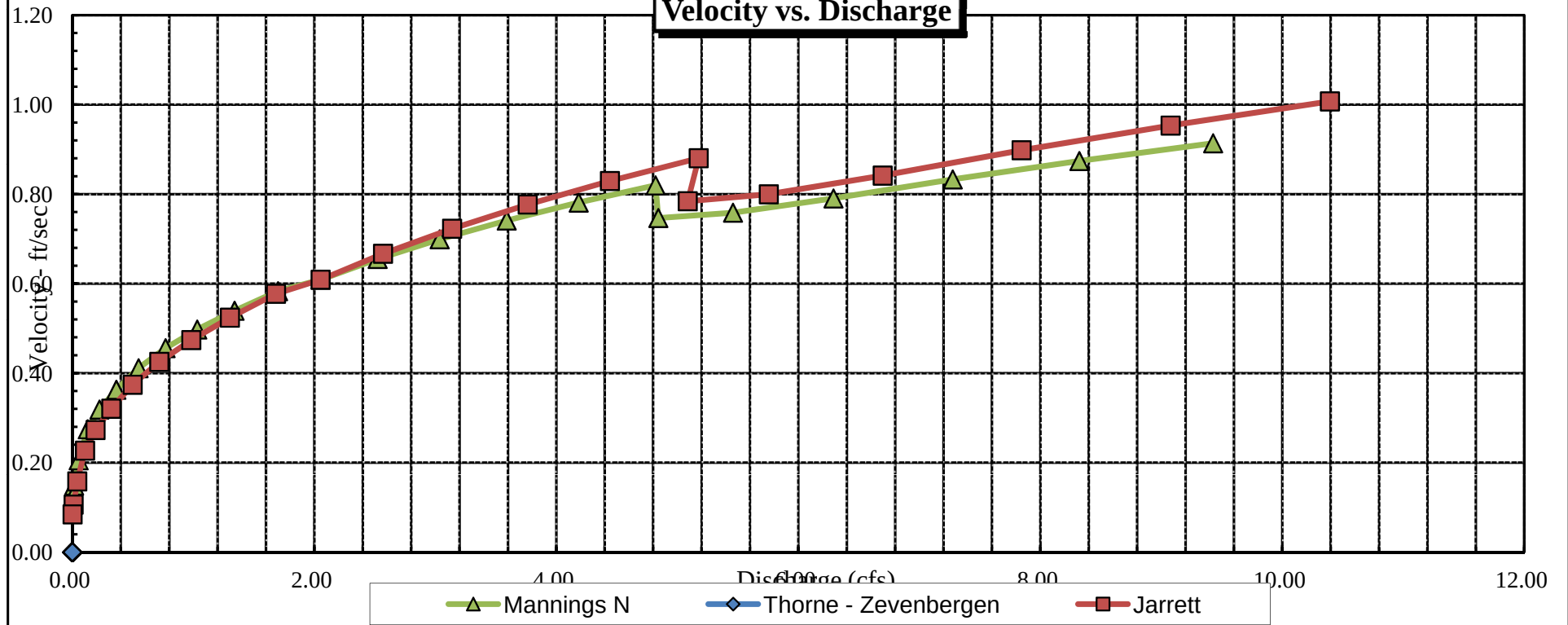
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

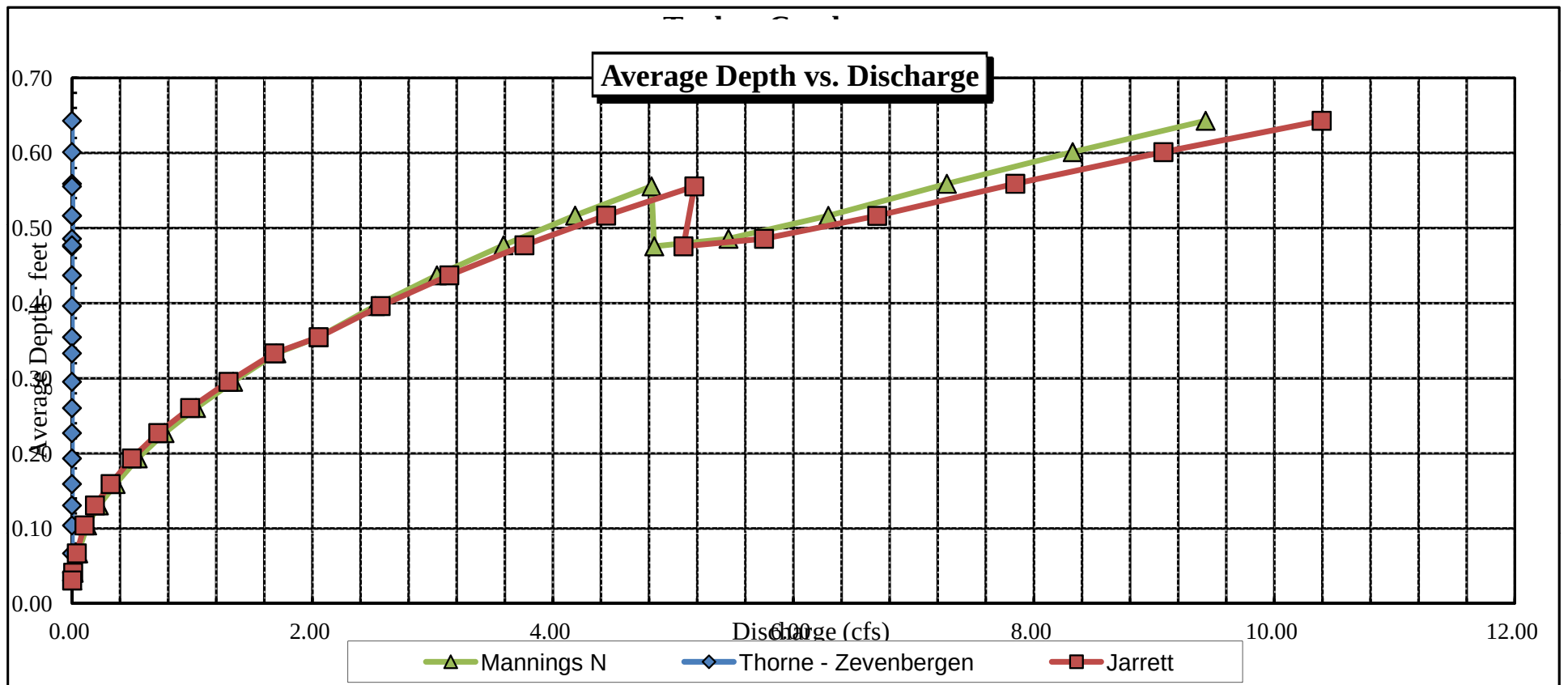
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.08	16.13	0.66	1.17	10.64	17.17	100.0%	0.62	10.94	1.03
	6.10	16.05	0.64	1.15	10.32	17.07	99.5%	0.60	10.39	1.01
	6.15	15.84	0.60	1.10	9.52	16.84	98.1%	0.57	9.08	0.95
	6.20	15.63	0.56	1.05	8.74	16.60	96.7%	0.53	7.84	0.90
	6.25	15.41	0.52	1.00	7.96	16.37	95.3%	0.49	6.70	0.84
	6.30	14.82	0.49	0.95	7.20	15.74	91.7%	0.46	5.76	0.80
	6.35	13.64	0.48	0.90	6.49	14.53	84.6%	0.45	5.09	0.78
	6.40	10.59	0.56	0.85	5.88	11.45	66.7%	0.51	5.18	0.88
	6.45	10.37	0.52	0.80	5.36	11.21	65.3%	0.48	4.44	0.83
	6.50	10.15	0.48	0.75	4.84	10.97	63.9%	0.44	3.76	0.78
	6.55	9.93	0.44	0.70	4.34	10.73	62.5%	0.40	3.14	0.72
	6.60	9.72	0.40	0.65	3.85	10.49	61.1%	0.37	2.57	0.67
WL	6.65	9.50	0.35	0.60	3.37	10.25	59.7%	0.33	2.05	0.61
	6.70	8.74	0.33	0.55	2.91	9.45	55.1%	0.31	1.68	0.58
	6.75	8.41	0.30	0.50	2.48	9.06	52.8%	0.27	1.30	0.52
	6.80	7.97	0.26	0.45	2.07	8.54	49.8%	0.24	0.98	0.47
	6.85	7.44	0.23	0.40	1.69	7.93	46.2%	0.21	0.72	0.43
	6.90	6.89	0.19	0.35	1.33	7.29	42.5%	0.18	0.50	0.37
	6.95	6.29	0.16	0.30	1.00	6.62	38.5%	0.15	0.32	0.32
	7.00	5.37	0.13	0.25	0.70	5.63	32.8%	0.12	0.19	0.27
	7.05	4.42	0.10	0.20	0.46	4.62	26.9%	0.10	0.10	0.23
	7.10	3.77	0.07	0.15	0.25	3.91	22.8%	0.06	0.04	0.16
	7.15	2.35	0.04	0.10	0.10	2.43	14.2%	0.04	0.01	0.11
	7.20	0.68	0.03	0.05	0.02	0.69	4.0%	0.03	0.00	0.08



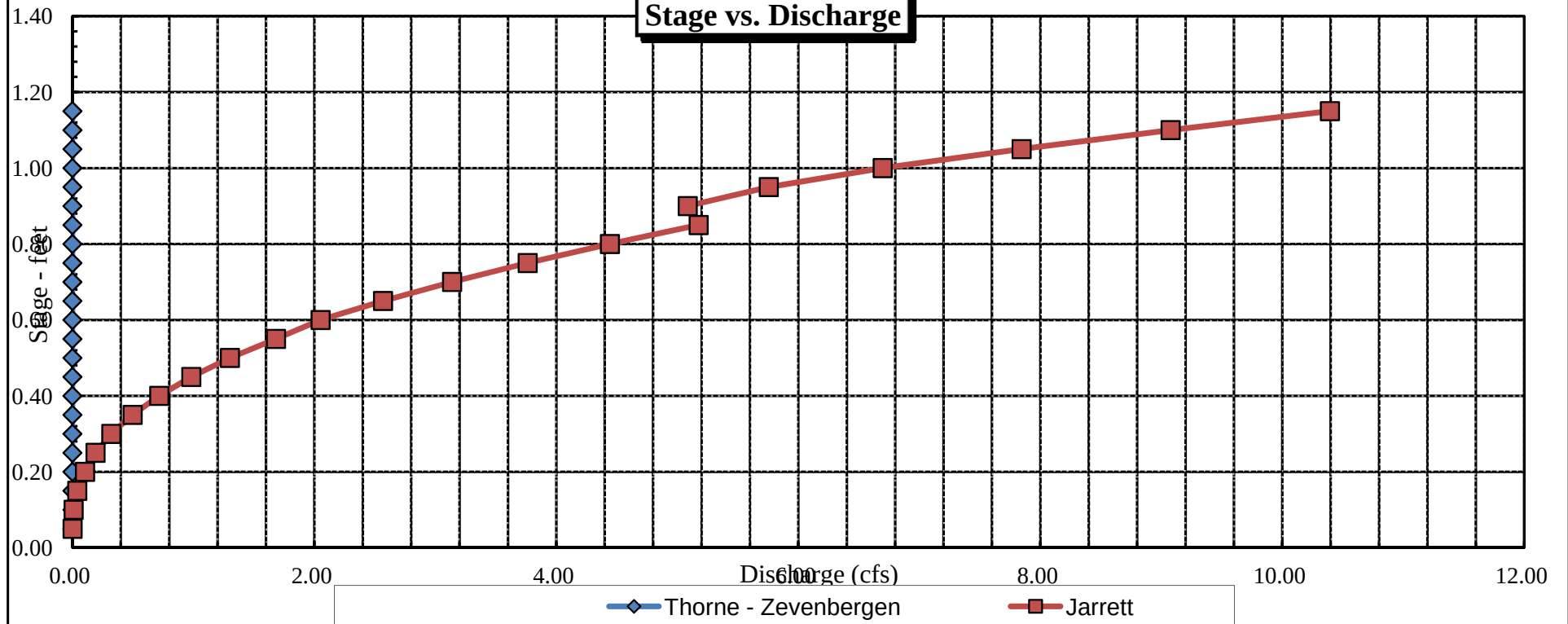


Velocity vs. Discharge





Stage vs. Discharge



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

LOCATION INFORMATION

STREAM NAME: Turkey Creek
XS LOCATION: 800 ft. dwnst fr confl of E Fk & W Fk
XS NUMBER: 1

DATE: 27-May-14
OBSERVERS: R. Smith, D. Gilbert

1/4 SEC: SW
SECTION: 19
TWP: 16S
RANGE: 67W
PM: Sixth

COUNTY: El Paso
WATERSHED: Arkansas
DIVISION: 2
DOW CODE: 33592

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: 0.022

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. dwntst fr confl of E Fk & W Fk
 XS NUMBER: 1

DATA POINTS= 24

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	5.32		
1 G	1.50	6.28		
	2.60	7.00		
W	3.90	7.45	0.00	0.00
	4.80	7.65	0.20	0.00
	5.50	7.72	0.27	1.81
	6.00	7.72	0.27	1.45
	6.50	7.79	0.34	0.85
	7.00	7.80	0.35	1.07
	7.50	7.93	0.48	1.17
	8.00	8.00	0.55	0.11
	8.50	7.86	0.41	0.21
	9.00	7.90	0.45	1.31
	9.50	7.83	0.38	0.86
	10.00	7.83	0.38	0.83
	10.50	7.83	0.38	1.34
	11.00	7.60	0.15	0.77
	11.50	7.74	0.29	0.06
W	12.20	7.45	0.00	0.00
	13.00	7.11		
	13.50	6.90		
	14.00	6.70		
1 G	14.60	6.30		
LS	16.00	5.62		

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%
0.92	0.20	0.16	0.00	0.0%
0.70	0.27	0.16	0.29	13.9%
0.50	0.27	0.14	0.20	9.3%
0.50	0.34	0.17	0.14	6.8%
0.50	0.35	0.18	0.19	8.9%
0.52	0.48	0.24	0.28	13.3%
0.50	0.55	0.28	0.03	1.4%
0.52	0.41	0.21	0.04	2.0%
0.50	0.45	0.23	0.29	13.9%
0.50	0.38	0.19	0.16	7.7%
0.50	0.38	0.19	0.16	7.5%
0.50	0.38	0.19	0.25	12.0%
0.55	0.15	0.08	0.06	2.7%
0.52	0.29	0.17	0.01	0.5%
0.76		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 -----

8.50	0.55	2.57	2.11	100.0%
(Max.)				

Manning's n = 0.1204
 Hydraulic Radius= 0.30170796

STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. dwnst fr confl of E Fk & W Fk
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.57	2.57	0.0%
7.20	2.57	4.80	87.2%
7.22	2.57	4.61	79.8%
7.24	2.57	4.42	72.4%
7.26	2.57	4.24	65.1%
7.28	2.57	4.05	57.9%
7.30	2.57	3.87	50.8%
7.32	2.57	3.69	43.8%
7.34	2.57	3.51	36.8%
7.36	2.57	3.33	29.9%
7.38	2.57	3.16	23.1%
7.40	2.57	2.99	16.4%
7.41	2.57	2.90	13.1%
7.42	2.57	2.82	9.8%
7.43	2.57	2.73	6.5%
7.44	2.57	2.65	3.2%
7.45	2.57	2.57	0.0%
7.46	2.57	2.48	-3.2%
7.47	2.57	2.40	-6.4%
7.48	2.57	2.32	-9.6%
7.49	2.57	2.24	-12.7%
7.50	2.57	2.16	-15.8%
7.52	2.57	2.00	-22.0%
7.54	2.57	1.85	-28.0%
7.56	2.57	1.69	-34.0%
7.58	2.57	1.55	-39.8%
7.60	2.57	1.40	-45.5%
7.62	2.57	1.26	-51.0%
7.64	2.57	1.12	-56.4%
7.66	2.57	0.99	-61.6%
7.68	2.57	0.86	-66.5%
7.70	2.57	0.74	-71.1%

WATERLINE AT ZERO

AREA ERROR = 7.450

STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. downst fr confl of E Fk & W Fk
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.30	13.07	1.16	1.70	15.19	13.83	100.0%	1.10	29.62	1.95
	6.45	12.62	1.05	1.55	13.27	13.29	96.1%	1.00	24.27	1.83
	6.50	12.46	1.01	1.50	12.64	13.10	94.8%	0.96	22.60	1.79
	6.55	12.31	0.98	1.45	12.02	12.92	93.4%	0.93	20.98	1.74
	6.60	12.16	0.94	1.40	11.41	12.74	92.1%	0.90	19.41	1.70
	6.65	12.01	0.90	1.35	10.81	12.56	90.8%	0.86	17.90	1.66
	6.70	11.86	0.86	1.30	10.21	12.38	89.5%	0.82	16.44	1.61
	6.75	11.66	0.83	1.25	9.62	12.15	87.9%	0.79	15.08	1.57
	6.80	11.46	0.79	1.20	9.04	11.93	86.2%	0.76	13.77	1.52
	6.85	11.25	0.75	1.15	8.48	11.70	84.6%	0.72	12.52	1.48
	6.90	11.05	0.72	1.10	7.92	11.47	83.0%	0.69	11.32	1.43
	6.95	10.86	0.68	1.05	7.37	11.25	81.4%	0.65	10.18	1.38
	7.00	10.66	0.64	1.00	6.83	11.03	79.8%	0.62	9.09	1.33
	7.05	10.40	0.61	0.95	6.31	10.75	77.7%	0.59	8.09	1.28
	7.10	10.13	0.57	0.90	5.79	10.47	75.7%	0.55	7.15	1.23
	7.15	9.87	0.54	0.85	5.29	10.19	73.7%	0.52	6.26	1.18
	7.20	9.61	0.50	0.80	4.80	9.91	71.6%	0.48	5.43	1.13
	7.25	9.35	0.46	0.75	4.33	9.63	69.6%	0.45	4.66	1.07
	7.30	9.09	0.43	0.70	3.87	9.35	67.6%	0.41	3.94	1.02
	7.35	8.82	0.39	0.65	3.42	9.07	65.6%	0.38	3.27	0.96
	7.40	8.56	0.35	0.60	2.99	8.79	63.5%	0.34	2.66	0.89
WL	7.45	8.30	0.31	0.55	2.57	8.50	61.5%	0.30	2.11	0.82
	7.50	7.95	0.27	0.50	2.16	8.14	58.9%	0.27	1.63	0.76
	7.55	7.61	0.23	0.45	1.77	7.78	56.3%	0.23	1.21	0.68
	7.60	7.26	0.19	0.40	1.40	7.42	53.7%	0.19	0.84	0.60
	7.65	6.63	0.16	0.35	1.05	6.76	48.8%	0.16	0.56	0.53
	7.70	5.72	0.13	0.30	0.74	5.82	42.1%	0.13	0.34	0.46
	7.75	4.46	0.11	0.25	0.49	4.53	32.7%	0.11	0.21	0.42
	7.80	3.57	0.08	0.20	0.28	3.62	26.2%	0.08	0.10	0.34
	7.85	2.16	0.06	0.15	0.13	2.20	15.9%	0.06	0.04	0.28
	7.90	0.97	0.05	0.10	0.05	0.99	7.2%	0.05	0.01	0.26
	7.95	0.54	0.03	0.05	0.01	0.55	3.9%	0.02	0.00	0.15
	8.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Turkey Creek
XS LOCATION: 800 ft. dwntst fr confl of E Fk & W Fk
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 2.11 cfs
CALCULATED FLOW (Qc)= 2.11 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 7.45 ft
CALCULATED WATERLINE (WLc)= 7.45 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.55 ft
MAX CALCULATED DEPTH (Dc)= 0.55 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 0.82 ft/sec
MANNING'S N= 0.120
SLOPE= 0.022 ft/ft

.4 * Qm = 0.8 cfs
2.5 * Qm= 5.3 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

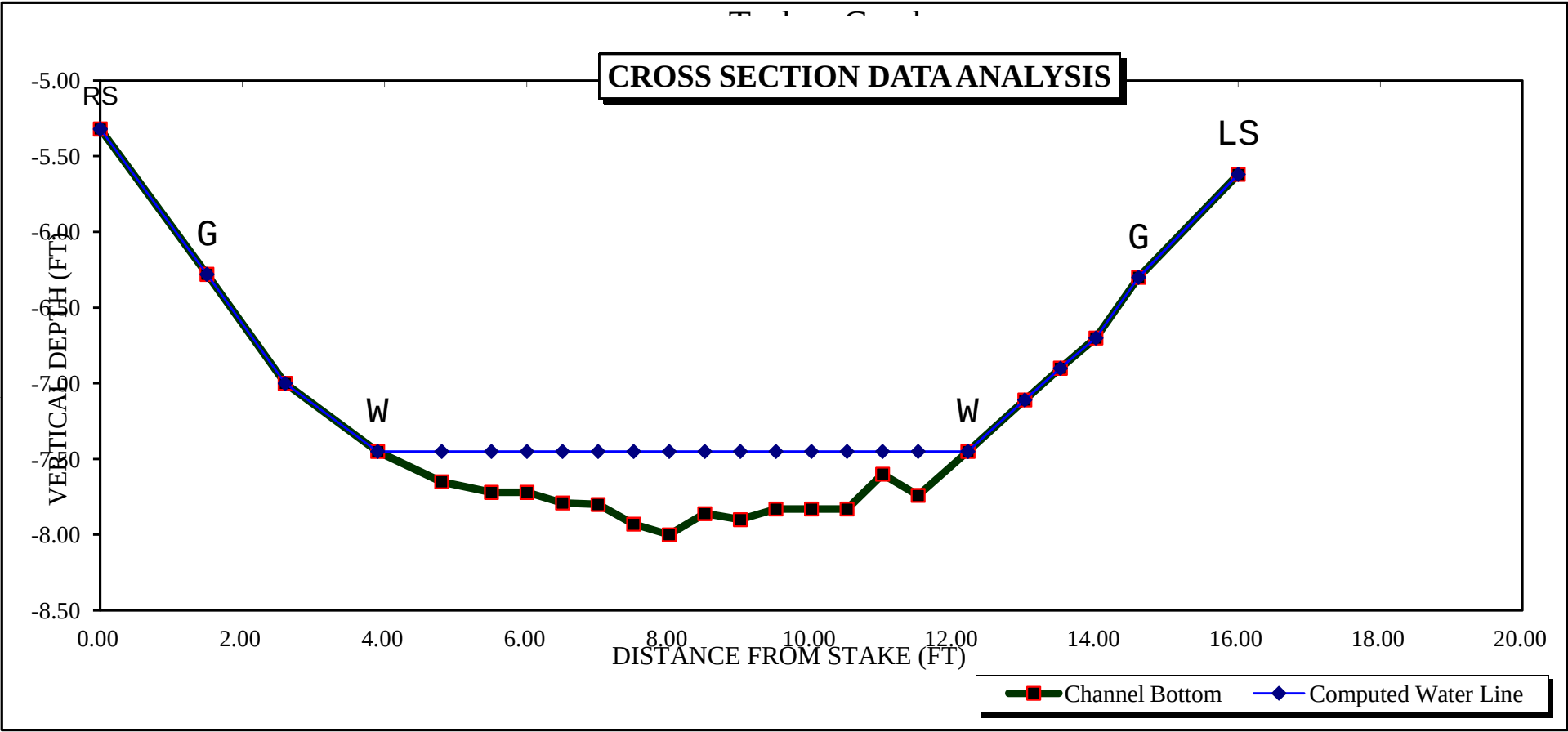
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

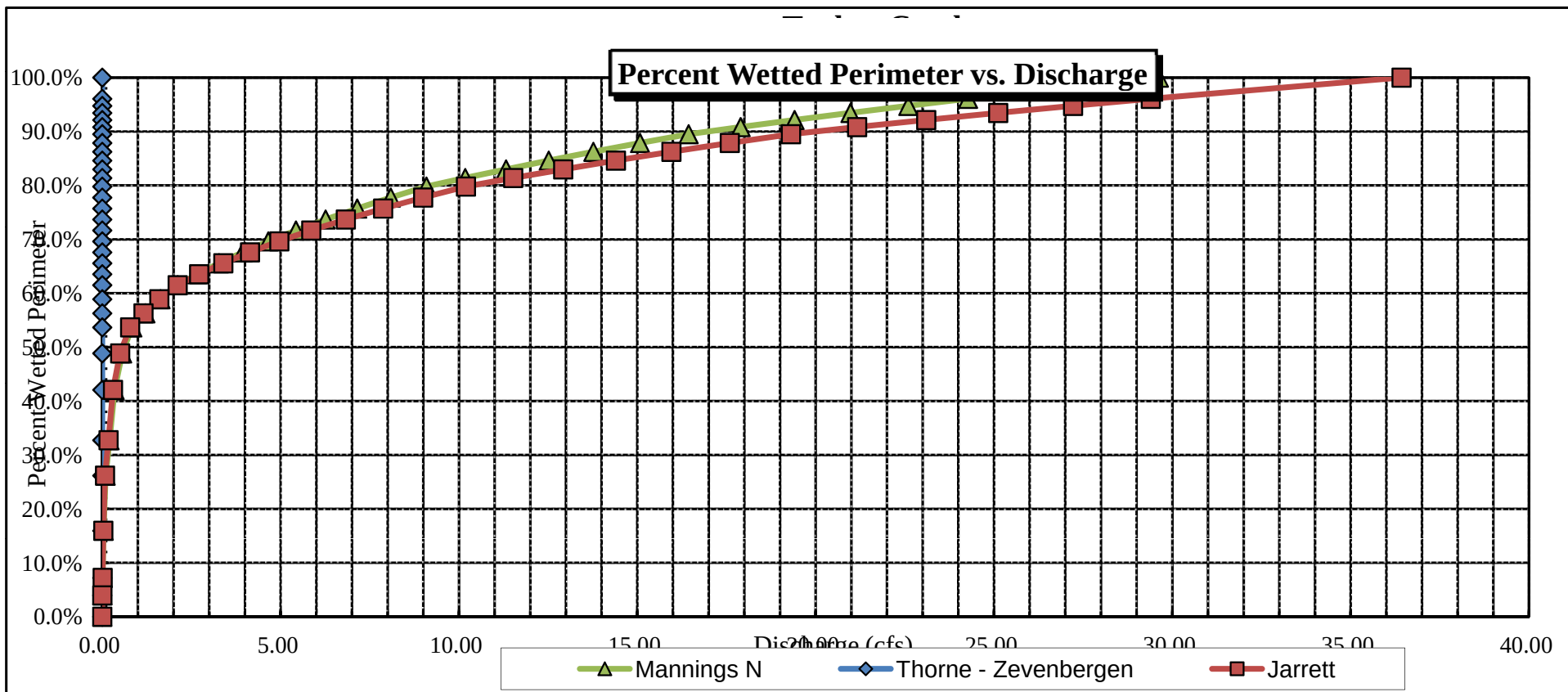
STREAM NAME: Turkey Creek
 XS LOCATION: 800 ft. downst fr confl of E Fk & W Fk
 XS NUMBER: 1
 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

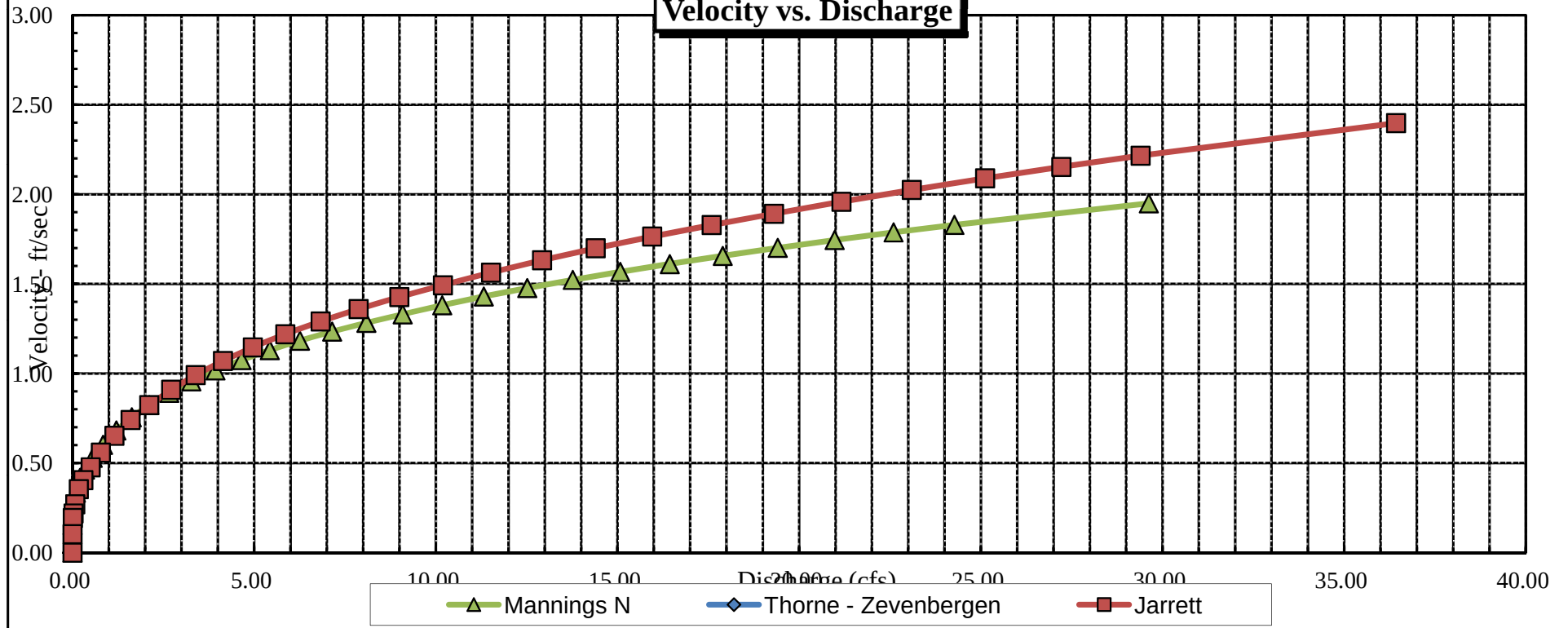
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

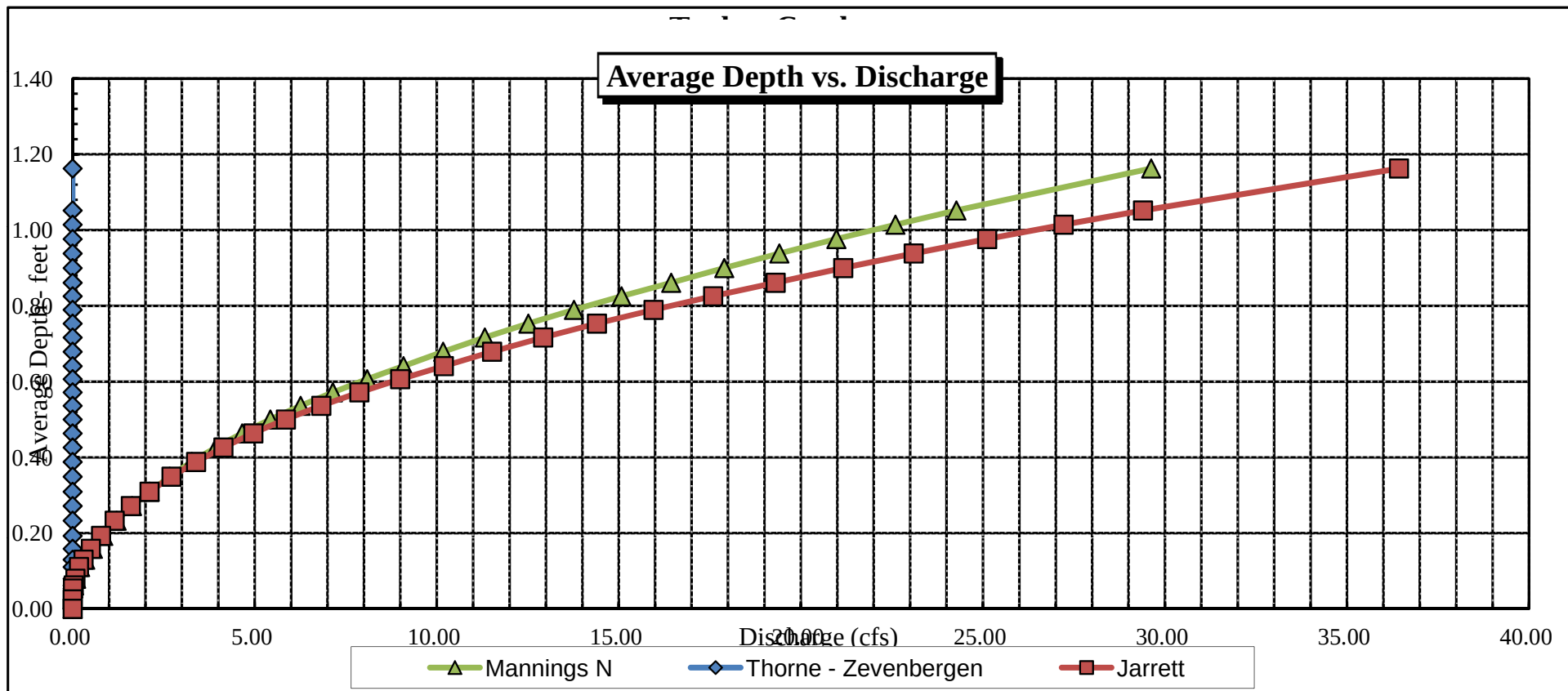
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.30	13.07	1.16	1.70	15.19	13.83	100.0%	1.10	36.43	2.40
	6.45	12.62	1.05	1.55	13.27	13.29	96.1%	1.00	29.40	2.22
	6.50	12.46	1.01	1.50	12.64	13.10	94.8%	0.96	27.22	2.15
	6.55	12.31	0.98	1.45	12.02	12.92	93.4%	0.93	25.12	2.09
	6.60	12.16	0.94	1.40	11.41	12.74	92.1%	0.90	23.10	2.02
	6.65	12.01	0.90	1.35	10.81	12.56	90.8%	0.86	21.16	1.96
	6.70	11.86	0.86	1.30	10.21	12.38	89.5%	0.82	19.31	1.89
	6.75	11.66	0.83	1.25	9.62	12.15	87.9%	0.79	17.59	1.83
	6.80	11.46	0.79	1.20	9.04	11.93	86.2%	0.76	15.96	1.76
	6.85	11.25	0.75	1.15	8.48	11.70	84.6%	0.72	14.40	1.70
	6.90	11.05	0.72	1.10	7.92	11.47	83.0%	0.69	12.92	1.63
	6.95	10.86	0.68	1.05	7.37	11.25	81.4%	0.65	11.52	1.56
	7.00	10.66	0.64	1.00	6.83	11.03	79.8%	0.62	10.20	1.49
	7.05	10.40	0.61	0.95	6.31	10.75	77.7%	0.59	9.00	1.43
	7.10	10.13	0.57	0.90	5.79	10.47	75.7%	0.55	7.87	1.36
	7.15	9.87	0.54	0.85	5.29	10.19	73.7%	0.52	6.83	1.29
	7.20	9.61	0.50	0.80	4.80	9.91	71.6%	0.48	5.86	1.22
	7.25	9.35	0.46	0.75	4.33	9.63	69.6%	0.45	4.96	1.15
	7.30	9.09	0.43	0.70	3.87	9.35	67.6%	0.41	4.14	1.07
	7.35	8.82	0.39	0.65	3.42	9.07	65.6%	0.38	3.39	0.99
	7.40	8.56	0.35	0.60	2.99	8.79	63.5%	0.34	2.72	0.91
WL	7.45	8.30	0.31	0.55	2.57	8.50	61.5%	0.30	2.11	0.82
	7.50	7.95	0.27	0.50	2.16	8.14	58.9%	0.27	1.60	0.74
	7.55	7.61	0.23	0.45	1.77	7.78	56.3%	0.23	1.15	0.65
	7.60	7.26	0.19	0.40	1.40	7.42	53.7%	0.19	0.78	0.56
	7.65	6.63	0.16	0.35	1.05	6.76	48.8%	0.16	0.50	0.48
	7.70	5.72	0.13	0.30	0.74	5.82	42.1%	0.13	0.30	0.40
	7.75	4.46	0.11	0.25	0.49	4.53	32.7%	0.11	0.17	0.35
	7.80	3.57	0.08	0.20	0.28	3.62	26.2%	0.08	0.08	0.27
	7.85	2.16	0.06	0.15	0.13	2.20	15.9%	0.06	0.03	0.22
	7.90	0.97	0.05	0.10	0.05	0.99	7.2%	0.05	0.01	0.19
	7.95	0.54	0.03	0.05	0.01	0.55	3.9%	0.02	0.00	0.10
	8.00	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



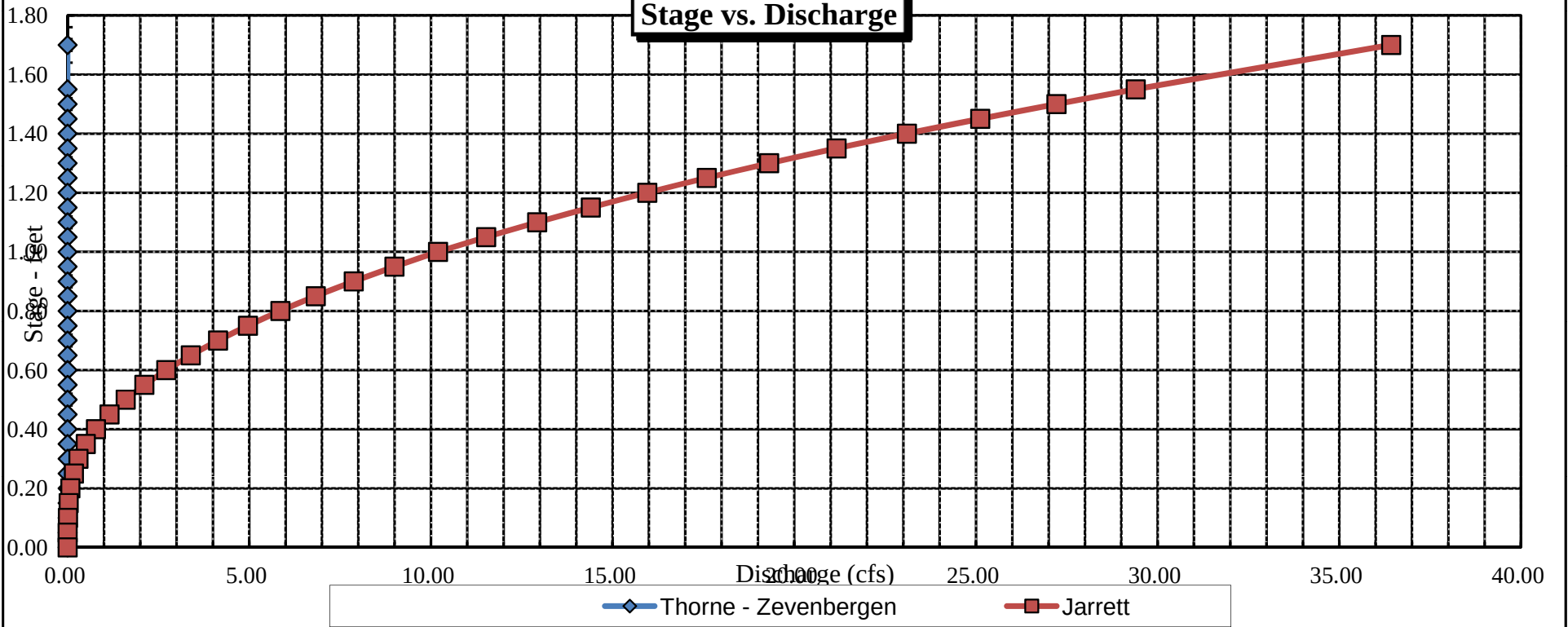


Velocity vs. Discharge





Stage vs. Discharge





FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME:		Turkey Creek				CROSS-SECTION NO.:		2	
CROSS-SECTION LOCATION:		800 ft. downstream from confluence of East Fork + West Fork							
DATE:		5-27-14		OBSERVERS:		R. Smith, D. Gilbert			
LEGAL DESCRIPTION		1/4 SECTION:		SECTION:		TOWNSHIP:		RANGE:	
		SW		19		16 N 10		67 E 10	
COUNTY:		E1 Paso		WATERSHED:		Arkansas R.		DOW WATER CODE:	
						2		33592	
MAP(S):		USGS:							
		USFS:							

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES NO		METER TYPE: M-M	
METER NUMBER:		DATE RATED:	
		CALIB/SPIN: sec	
CHANNEL BED MATERIAL SIZE RANGE: sand to 2-foot boulders		TAPE WEIGHT: su weyed lbs/foot	
		TAPE TENSION: su weyed lbs	
PHOTOGRAPHS TAKEN: YES/NO		NUMBER OF PHOTOGRAPHS: 3	

CHANNEL PROFILE DATA

STATION		DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗	Tape @ Stake LB	0.0	SURVEYED
⊗	Tape @ Stake RB	0.0	SURVEYED
①	WS @ Tape LB/RB	0.0	6.65 / 6.65
②	WS Upstream	5.0	6.34
③	WS Downstream	70.5	8.03
SLOPE		$1.69 / 75.5 = 0.022$	

SKETCH

LEGEND:

Stake ⊗

Station ①

Photo ◇ →

Direction of Flow →

AQUATIC SAMPLING SUMMARY

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

COMMENTS

PH = 7.6
Cond = 122
Temp = 13°C
Salinity = 0.1

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Turkey Creek				CROSS-SECTION NO.:		DATE: 5-27-14		SHEET ___ OF ___				
BEGINNING OF MEASUREMENT		EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)		LEFT / RIGHT		Gage Reading: _____ ft		TIME: 2:50 PM				
Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)
									At Point	Mean in Vertical		
G+LS		1.5		6.04								
W		2.5		6.65	0							
		3.0		6.88	.23			→	0.0			
		3.5		7.02	.37				0.0			
		4.0		7.25	.60				0.58			
		4.5		7.22	.57				1.13			
		5.0		7.08	.43				1.41			
		5.5		7.15	.50				1.26			
		6.0		7.20	.55				0.80			
		6.5		7.11	.46				0.58			
		7.0		7.20	.55				0.24			
		7.5		6.98	.33				0.0			
		8.0		7.00	.35				0.14			
		8.5		7.04	.39				0.37			
		9.0		6.65	0				0.0			
		9.5		6.70	.05				0.69			
		10.0		7.04	.39				0.81			
		10.5		7.20	.55				0.57			
		11.0		6.77	.12				0.39			
		11.5		6.95	.30				0.44			
W		12.0		6.65	0							
		13.0		6.28								
		15.0		6.40								
		17.0		6.35								
G		17.7		6.08								
LS		19.6		5.20								
TOTALS:												
End of Measurement		Time:		Gage Reading: _____ ft		CALCULATIONS PERFORMED BY:				CALCULATIONS CHECKED BY:		



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: Turkey Creek		CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: 800 ft. downstream from confluence of East Fk + West Fk			
DATE: 5-27-14	OBSERVERS: R. Smith, D. Gilbert		
LEGAL DESCRIPTION	1/4 SECTION: SW	SECTION: 19	TOWNSHIP: 16 N/S
		RANGE: 67 E/W	PM: Sixth
COUNTY: El Paso	WATERSHED: Arkansas	WATER DIVISION: 2	DOW WATER CODE: 33592
MAP(S):	USGS: GPS Zone 13 505818		
	USFS: 4277032		

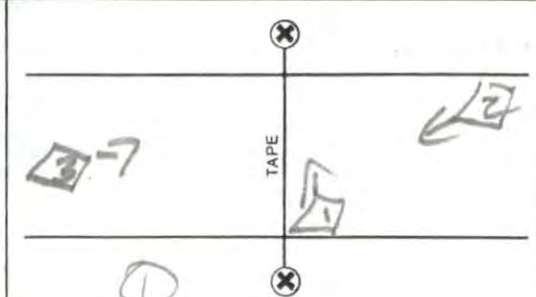
SUPPLEMENTAL DATA

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

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(X) Tape @ Stake LB	0.0	surveyed
(X) Tape @ Stake RB	0.0	surveyed
(1) WS @ Tape LB/RB	0.0	7.45/7.45
(2) WS Upstream	40.0'	6.34
(3) WS Downstream	35.5'	8.03
SLOPE	1.69 / 75.5' = 0.022	

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
see attached																	
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	
mayfly, caddisfly, stonefly, damselfly																	

COMMENTS

Significant

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Turkey Creek

CROSS-SECTION NO.: 1

DATE: 5-27-14

SHEET ___ OF ___

BEGINNING OF MEASUREMENT

EDGE OF WATER LOOKING DOWNSTREAM:
(0.0 AT STAKE)

LEFT / RIGHT

Gage Reading: _____ ft

TIME: 2:05 pm

Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)
									At Point	Mean in Vertical		
	RS	0.0		5.32								
	G	1.5		6.28								
		2.6		7.00								
	W	3.9		7.45	φ				φ			
		4.8		7.65	.20				φ			
		5.5		7.72	.27				1.81			
		6.0		7.72	.27				1.45			
		6.5		7.79	.34				0.85			
		7.0		7.80	.35				1.07			
		7.5		7.93	.48				1.17			
		8.0		8.00	.55				0.11			
		8.5		7.86	.41				0.21			
		9.0		7.90	.45				1.31			
		9.5		7.83	.38				0.86			
		10.0		7.83	.38				0.83			
		10.5		7.83	.38				1.34			
		11.0		7.60	.15				0.77			
		11.5		7.74	.27				0.06			
	W	12.2		7.45	φ				φ			
		13.0		7.11								
		13.5		6.90								
		14.0		6.70								
	G	14.6		6.30								
	LS	16.0		5.62								
TOTALS:												
End of Measurement		Time:		Gage Reading: _____ ft		CALCULATIONS PERFORMED BY:				CALCULATIONS CHECKED BY:		

Discharge Measurement Summary

Date Generated: Wed Nov 18 2015

File Information

File Name TRKCBLCN.002.WAD
Start Date and Time 2015/09/22 16:27:57

Site Details

Site Name TURKEY CR AT HN R RD
Operator(s) BRIAN EPSTEIN

System Information

Sensor Type FlowTracker
Serial # P2354
CPU Firmware Version 3.9
Software Ver 2.30
Mounting Correction 0.0%

Units (English Units)

Distance ft
Velocity ft/s
Area ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.4%	4.0%
Velocity	0.8%	2.7%
Width	0.1%	0.1%
Method	1.8%	-
# Stations	2.5%	-
Overall	3.4%	4.9%

Summary

Averaging Int. 40 # Stations 20
Start Edge REW Total Width 7.100
Mean SNR 20.5 dB Total Area 1.831
Mean Temp 60.67 °F Mean Depth 0.258
Disch. Equation Mid-Section Mean Velocity 0.2236
Total Discharge 0.4093

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	16:27	2.20	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	16:27	2.60	0.6	0.200	0.6	0.080	0.3041	1.00	0.3041	0.070	0.0213	5.2
2	16:29	2.90	0.6	0.230	0.6	0.092	0.3438	1.00	0.3438	0.069	0.0237	5.8
3	16:30	3.20	0.6	0.310	0.6	0.124	0.2766	1.00	0.2766	0.093	0.0257	6.3
4	16:31	3.50	0.6	0.310	0.6	0.124	0.2608	1.00	0.2608	0.093	0.0242	5.9
5	16:32	3.80	0.6	0.230	0.6	0.092	0.3615	1.00	0.3615	0.069	0.0249	6.1
6	16:33	4.10	0.6	0.240	0.6	0.096	0.3730	1.00	0.3730	0.072	0.0269	6.6
7	16:34	4.40	0.6	0.350	0.6	0.140	0.3091	1.00	0.3091	0.105	0.0324	7.9
8	16:35	4.70	0.6	0.220	0.6	0.088	0.2995	1.00	0.2995	0.066	0.0198	4.8
9	16:36	5.00	0.6	0.330	0.6	0.132	0.2871	1.00	0.2871	0.099	0.0284	6.9
10	16:37	5.30	0.6	0.330	0.6	0.132	0.2953	1.00	0.2953	0.099	0.0292	7.1
11	16:38	5.60	0.6	0.360	0.6	0.144	0.2254	1.00	0.2254	0.108	0.0243	5.9
12	16:40	5.90	0.6	0.400	0.6	0.160	0.1991	1.00	0.1991	0.120	0.0239	5.8
13	16:41	6.20	0.6	0.320	0.6	0.128	0.1991	1.00	0.1991	0.112	0.0223	5.5
14	16:42	6.60	0.6	0.380	0.6	0.152	0.1529	1.00	0.1529	0.153	0.0233	5.7
15	16:43	7.00	0.6	0.320	0.6	0.128	0.1414	1.00	0.1414	0.144	0.0204	5.0
16	16:45	7.50	0.6	0.260	0.6	0.104	0.1342	1.00	0.1342	0.129	0.0174	4.2
17	16:46	8.00	0.6	0.200	0.6	0.080	0.1227	1.00	0.1227	0.100	0.0122	3.0
18	16:47	8.50	0.6	0.200	0.6	0.080	0.0679	1.00	0.0679	0.130	0.0088	2.2
19	16:47	9.30	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.



Discharge Measurement Summary

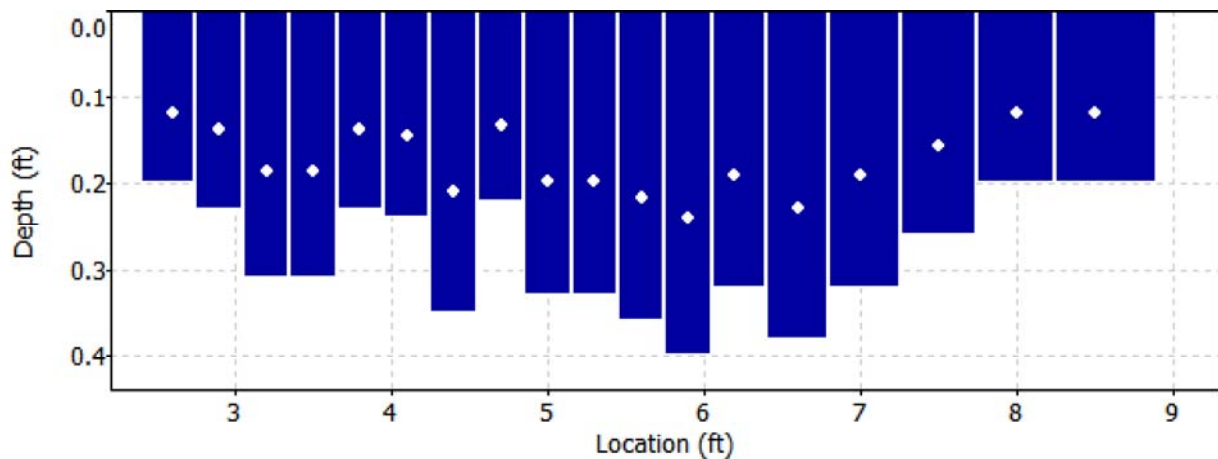
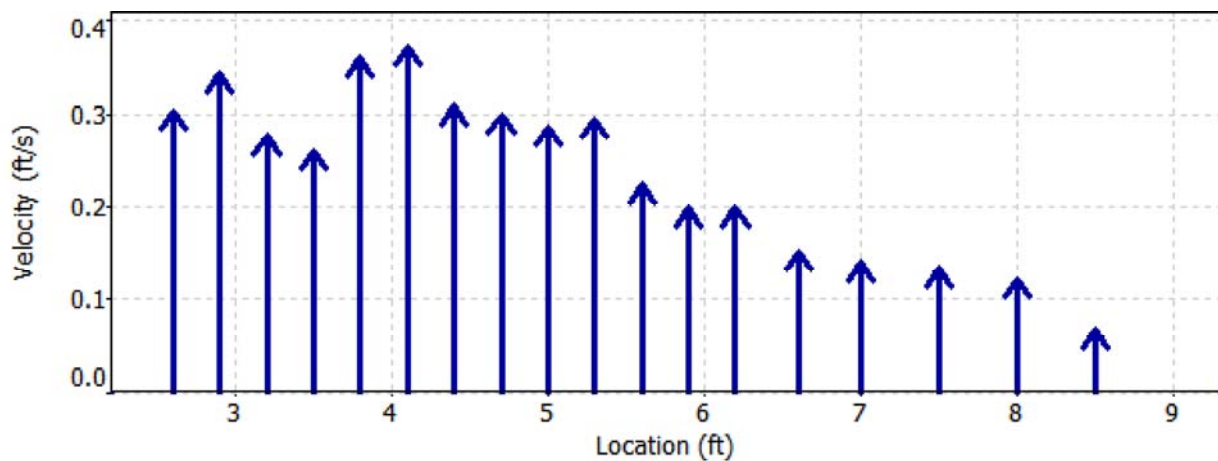
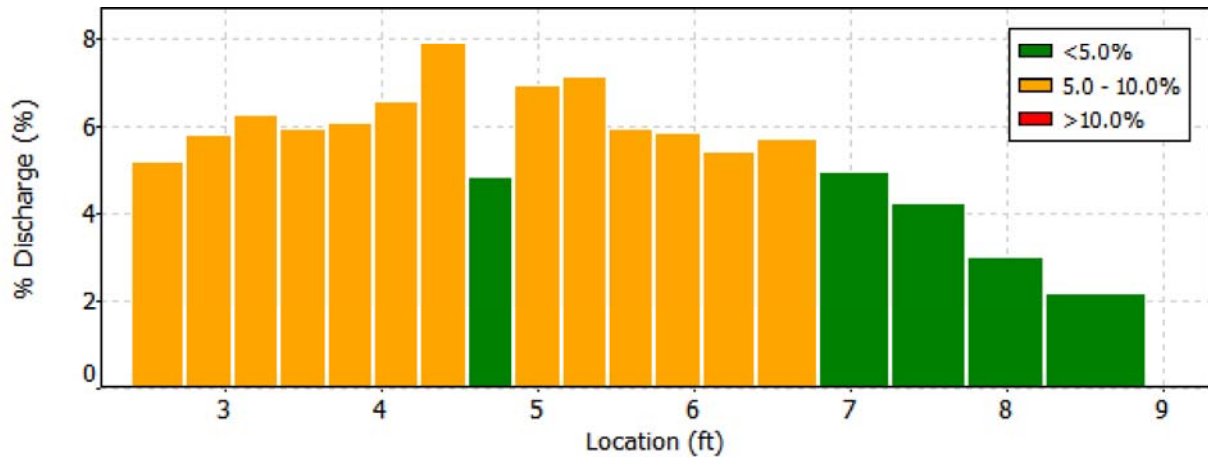
Date Generated: Wed Nov 18 2015

File Information

File Name TRKCBLCN.002.WAD
Start Date and Time 2015/09/22 16:27:57

Site Details

Site Name TURKEY CR AT HN R RD
Operator(s) BRIAN EPSTEIN





Discharge Measurement Summary

Date Generated: Wed Nov 18 2015

File Information

File Name TRKCBLCN.002.WAD
Start Date and Time 2015/09/22 16:27:57

Site Details

Site Name TURKEY CR AT HN R RD
Operator(s) BRIAN EPSTEIN

Quality Control

No Quality Control warnings



Discharge Measurement Summary

Date Generated: Wed Nov 18 2015

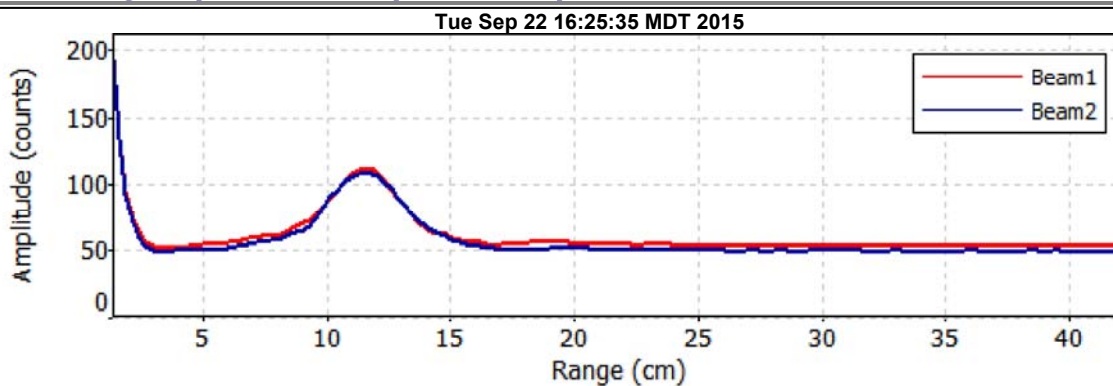
File Information

File Name TRKCBLCN.002.WAD
Start Date and Time 2015/09/22 16:27:57

Site Details

Site Name TURKEY CR AT HN R RD
Operator(s) BRIAN EPSTEIN

Automatic Quality Control Test (BeamCheck)



- ✓ Noise level check - Pass
- ✓ SNR check - Pass
- ✓ Peak location check - Pass
- ✓ Peak shape check - Pass

Discharge Measurement Summary

Date Generated: Wed Sep 2 2015

File Information

File Name TRKCBLCN.001.WAD
Start Date and Time 2015/08/10 15:03:27

Site Details

Site Name TURKEY CR BL CANYON
Operator(s) BRIAN EPSTEIN

System Information

Sensor Type FlowTracker
Serial # P2354
CPU Firmware Version 3.9
Software Ver 2.30
Mounting Correction 0.0%

Units (English Units)

Distance ft
Velocity ft/s
Area ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.3%	1.9%
Velocity	0.8%	1.8%
Width	0.1%	0.1%
Method	1.6%	-
# Stations	1.6%	-
Overall	2.6%	2.8%

Summary

Averaging Int. 40 # Stations 32
Start Edge REW Total Width 12.700
Mean SNR 48.9 dB Total Area 9.293
Mean Temp 60.91 °F Mean Depth 0.732
Disch. Equation Mid-Section Mean Velocity 1.5603
Total Discharge 14.4996

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	15:03	2.20	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	15:03	2.60	0.6	0.200	0.6	0.080	0.4446	1.00	0.4446	0.080	0.0356	0.2
2	15:04	3.00	0.6	0.430	0.6	0.172	0.6693	1.00	0.6693	0.172	0.1151	0.8
3	15:05	3.40	0.6	0.550	0.6	0.220	0.8245	1.00	0.8245	0.220	0.1813	1.3
4	15:06	3.80	0.6	0.670	0.6	0.268	0.7559	1.00	0.7559	0.268	0.2025	1.4
5	15:08	4.20	0.6	0.800	0.6	0.320	0.8146	1.00	0.8146	0.320	0.2606	1.8
6	15:09	4.60	0.6	0.950	0.6	0.380	1.1335	1.00	1.1335	0.380	0.4307	3.0
7	15:10	5.00	0.6	1.000	0.6	0.400	1.4613	1.00	1.4613	0.400	0.5844	4.0
8	15:11	5.40	0.6	1.000	0.6	0.400	1.9075	1.00	1.9075	0.400	0.7629	5.3
9	15:12	5.80	0.6	0.980	0.6	0.392	2.1115	1.00	2.1115	0.392	0.8276	5.7
10	15:13	6.20	0.6	1.020	0.6	0.408	2.3360	1.00	2.3360	0.408	0.9529	6.6
11	15:15	6.60	0.6	1.050	0.6	0.420	2.8061	1.00	2.8061	0.420	1.1782	8.1
12	15:16	7.00	0.6	0.900	0.6	0.360	2.7175	1.00	2.7175	0.360	0.9781	6.7
13	15:18	7.40	0.6	0.950	0.6	0.380	2.0764	1.00	2.0764	0.380	0.7890	5.4
14	15:19	7.80	0.6	0.850	0.6	0.340	1.5184	1.00	1.5184	0.340	0.5162	3.6
15	15:21	8.20	0.6	0.850	0.6	0.340	1.6020	1.00	1.6020	0.340	0.5446	3.8
16	15:22	8.60	0.6	0.750	0.6	0.300	2.1260	1.00	2.1260	0.300	0.6377	4.4
17	15:23	9.00	0.6	0.850	0.6	0.340	1.8406	1.00	1.8406	0.340	0.6257	4.3
18	15:24	9.40	0.6	0.900	0.6	0.360	1.7539	1.00	1.7539	0.360	0.6313	4.4
19	15:26	9.80	0.6	0.750	0.6	0.300	2.1637	1.00	2.1637	0.300	0.6490	4.5
20	15:27	10.20	0.6	0.650	0.6	0.260	2.0482	1.00	2.0482	0.260	0.5324	3.7
21	15:28	10.60	0.6	0.400	0.6	0.160	2.3629	1.00	2.3629	0.160	0.3779	2.6
22	15:29	11.00	0.6	0.400	0.6	0.160	1.8701	1.00	1.8701	0.160	0.2991	2.1
23	15:30	11.40	0.6	0.650	0.6	0.260	1.4820	1.00	1.4820	0.260	0.3852	2.7
24	15:31	11.80	0.6	1.030	0.6	0.412	1.2828	1.00	1.2828	0.412	0.5284	3.6
25	15:32	12.20	0.6	1.000	0.6	0.400	0.9747	1.00	0.9747	0.400	0.3898	2.7
26	15:34	12.60	0.6	0.600	0.6	0.240	0.8983	1.00	0.8983	0.240	0.2156	1.5
27	15:35	13.00	0.6	0.550	0.6	0.220	0.8724	1.00	0.8724	0.220	0.1918	1.3
28	15:36	13.40	0.6	0.650	0.6	0.260	0.8983	1.00	0.8983	0.260	0.2335	1.6
29	15:37	13.80	0.6	0.850	0.6	0.340	0.6916	1.00	0.6916	0.340	0.2351	1.6
30	15:38	14.20	0.6	0.730	0.6	0.292	0.5151	1.00	0.5151	0.402	0.2071	1.4
31	15:38	14.90	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.



Discharge Measurement Summary

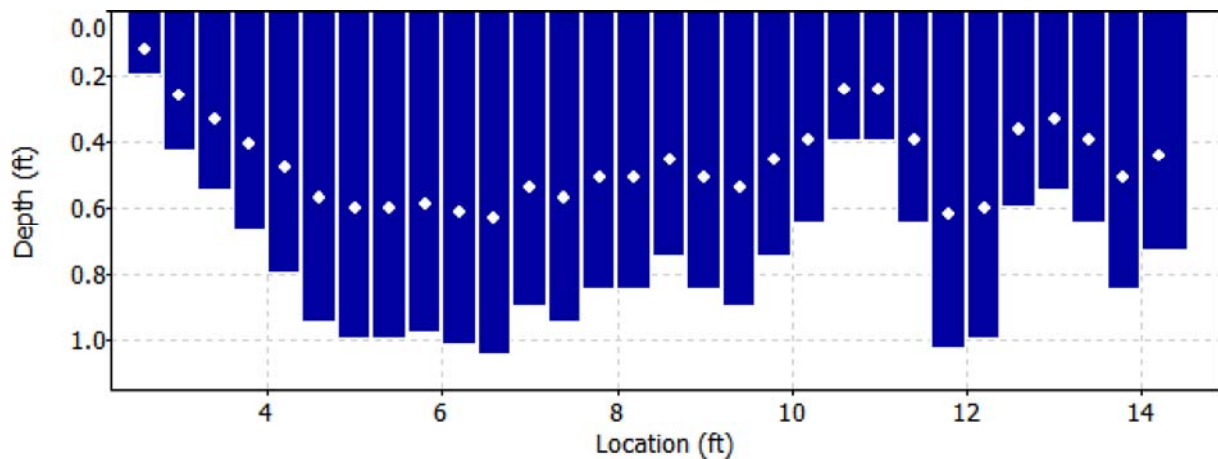
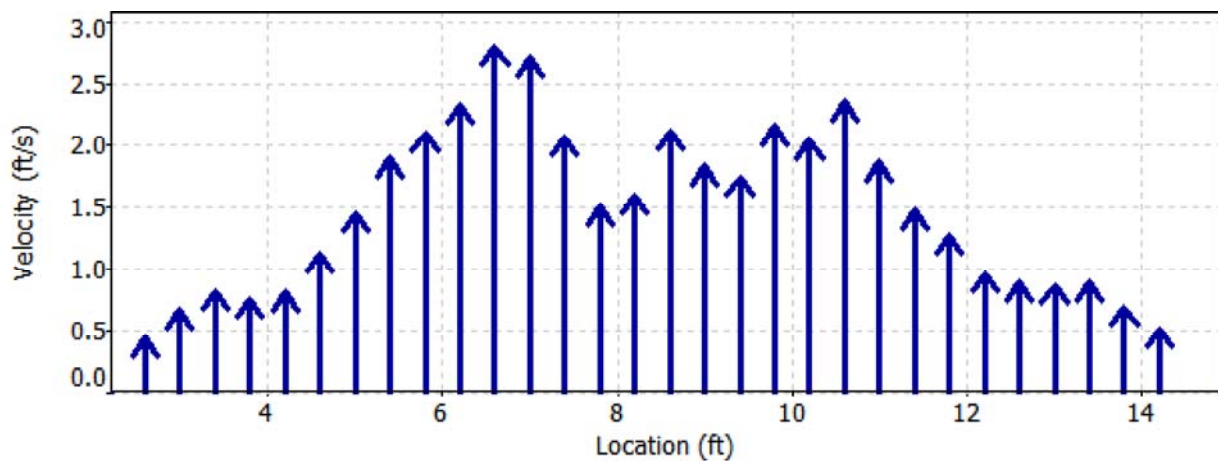
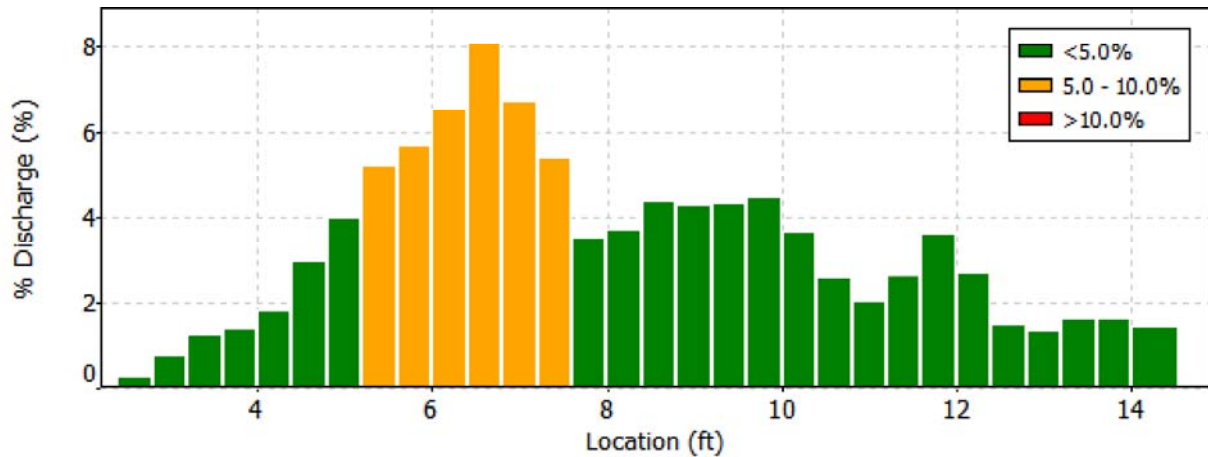
Date Generated: Wed Sep 2 2015

File Information

File Name TRKCBLCN.001.WAD
Start Date and Time 2015/08/10 15:03:27

Site Details

Site Name TURKEY CR BL CANYON
Operator(s) BRIAN EPSTEIN





Discharge Measurement Summary

Date Generated: Wed Sep 2 2015

File Information

File Name TRKCBLCN.001.WAD
Start Date and Time 2015/08/10 15:03:27

Site Details

Site Name TURKEY CR BL CANYON
Operator(s) BRIAN EPSTEIN

Quality Control

St	Loc	%Dep	Message
20	10.20	0.6	High standard error: 0.105



Discharge Measurement Summary

Date Generated: Wed Sep 2 2015

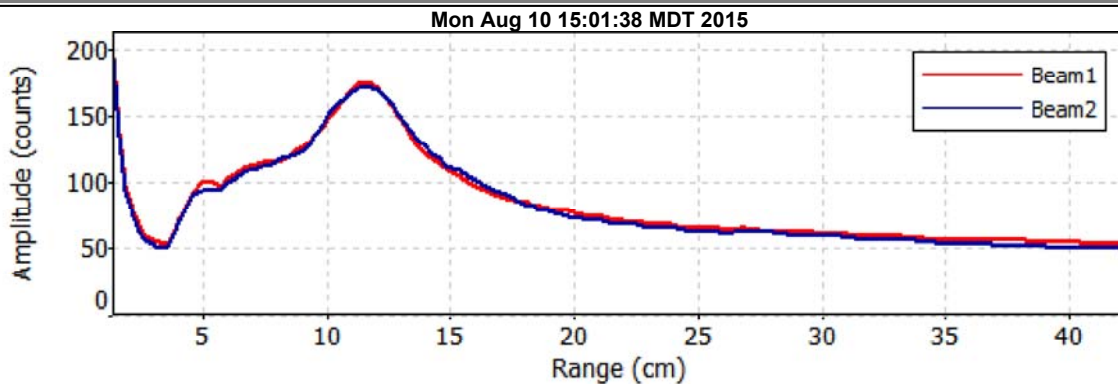
File Information

File Name TRKCBLCN.001.WAD
Start Date and Time 2015/08/10 15:03:27

Site Details

Site Name TURKEY CR BL CANYON
Operator(s) BRIAN EPSTEIN

Automatic Quality Control Test (BeamCheck)



- ✓ Noise level check - Pass
- ✓ SNR check - Pass
- ✓ Peak location check - Pass
- ✓ Peak shape check - Pass

Discharge Measurement Summary

Date Generated: Wed Jun 3 2015

File Information

File Name TRKCRAMN.001.WAD
Start Date and Time 2015/05/11 13:29:02

Site Details

Site Name TURKEY AT MINE
Operator(s) BRIAN EPSTEIN

System Information

Sensor Type FlowTracker
Serial # P2354
CPU Firmware Version 3.9
Software Ver 2.30
Mounting Correction 0.0%

Units (English Units)

Distance ft
Velocity ft/s
Area ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	2.4%
Velocity	0.7%	3.5%
Width	0.1%	0.1%
Method	1.8%	-
# Stations	2.2%	-
Overall	3.1%	4.4%

Summary

Averaging Int. 40 # Stations 23
Start Edge REW Total Width 13.000
Mean SNR 47.4 dB Total Area 12.160
Mean Temp 40.01 °F Mean Depth 0.935
Disch. Equation Mid-Section Mean Velocity 4.4535
Total Discharge 54.1549

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Mon May 11 13:56:59 MDT 2015	14.000			ST19 REV MTR CF NEG1

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	13:29	3.10	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	13:29	4.50	0.6	0.590	0.6	0.236	0.1873	1.00	0.1873	0.708	0.1326	0.2
2	13:30	5.50	0.6	0.690	0.6	0.276	4.0738	1.00	4.0738	0.517	2.1081	3.9
3	13:31	6.00	0.6	1.050	0.6	0.420	4.4436	1.00	4.4436	0.525	2.3326	4.3
4	13:32	6.50	0.6	0.900	0.6	0.360	4.5843	1.00	4.5843	0.450	2.0628	3.8
5	13:34	7.00	0.6	1.220	0.6	0.488	5.0810	1.00	5.0810	0.610	3.0998	5.7
6	13:36	7.50	0.6	1.340	0.6	0.536	5.1909	1.00	5.1909	0.670	3.4777	6.4
7	13:37	8.00	0.6	1.450	0.6	0.580	5.4042	1.00	5.4042	0.725	3.9184	7.2
8	13:39	8.50	0.6	1.310	0.6	0.524	5.6709	1.00	5.6709	0.655	3.7146	6.9
9	13:41	9.00	0.6	1.520	0.6	0.608	5.1565	1.00	5.1565	0.760	3.9190	7.2
10	13:42	9.50	0.6	1.400	0.6	0.560	5.3107	1.00	5.3107	0.700	3.7173	6.9
11	13:43	10.00	0.6	1.420	0.6	0.568	5.4528	1.00	5.4528	0.710	3.8713	7.1
12	13:45	10.50	0.6	1.280	0.6	0.512	5.4098	1.00	5.4098	0.640	3.4619	6.4
13	13:46	11.00	0.6	1.360	0.6	0.544	5.4921	1.00	5.4921	0.680	3.7344	6.9
14	13:47	11.50	0.6	1.360	0.6	0.544	4.6339	1.00	4.6339	0.680	3.1508	5.8
15	13:49	12.00	0.6	1.420	0.6	0.568	4.6152	1.00	4.6152	0.710	3.2766	6.1
16	13:50	12.50	0.6	1.280	0.6	0.512	5.0089	1.00	5.0089	0.640	3.2053	5.9
17	13:51	13.00	0.6	1.000	0.6	0.400	1.7477	1.00	1.7477	0.500	0.8739	1.6
18	13:53	13.50	0.6	0.790	0.6	0.316	3.2671	1.00	3.2671	0.395	1.2905	2.4
19	13:54	14.00	0.6	0.750	0.6	0.300	-4.9521	-1.00	4.9521	0.375	1.8570	3.4
20	13:58	14.50	0.6	0.300	0.6	0.120	3.2054	1.00	3.2054	0.150	0.4806	0.9
21	13:59	15.00	0.6	0.450	0.6	0.180	1.3045	1.00	1.3045	0.360	0.4698	0.9
22	13:59	16.10	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.



Discharge Measurement Summary

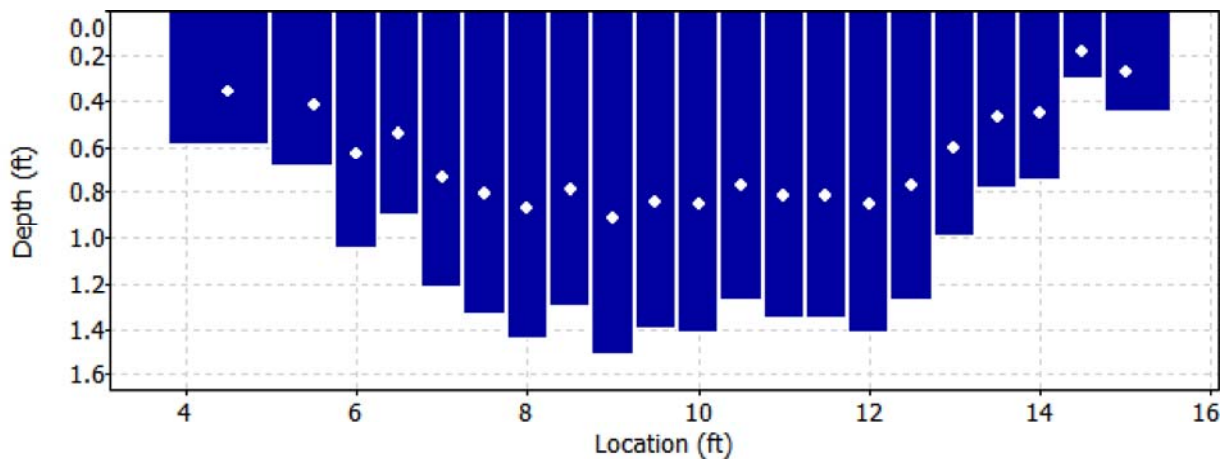
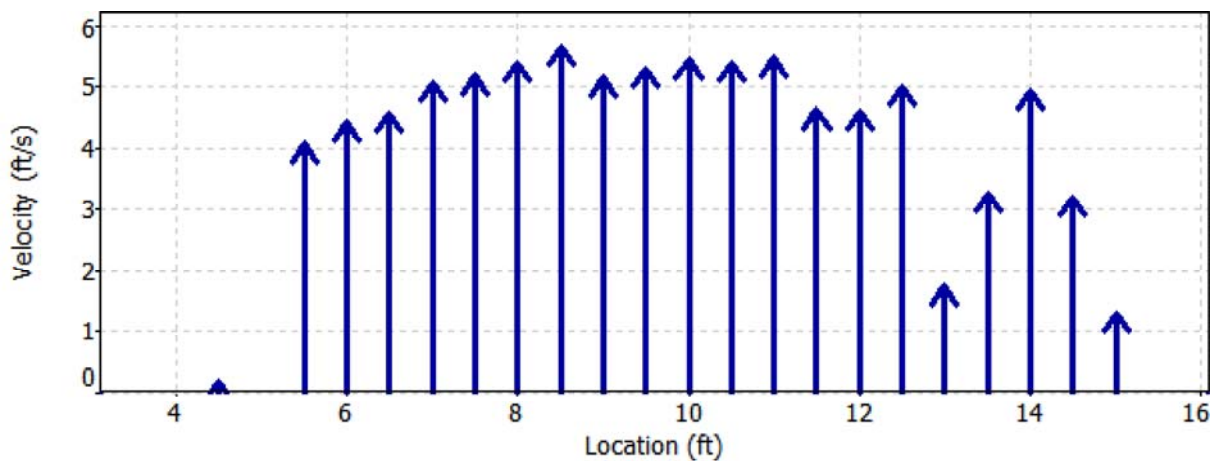
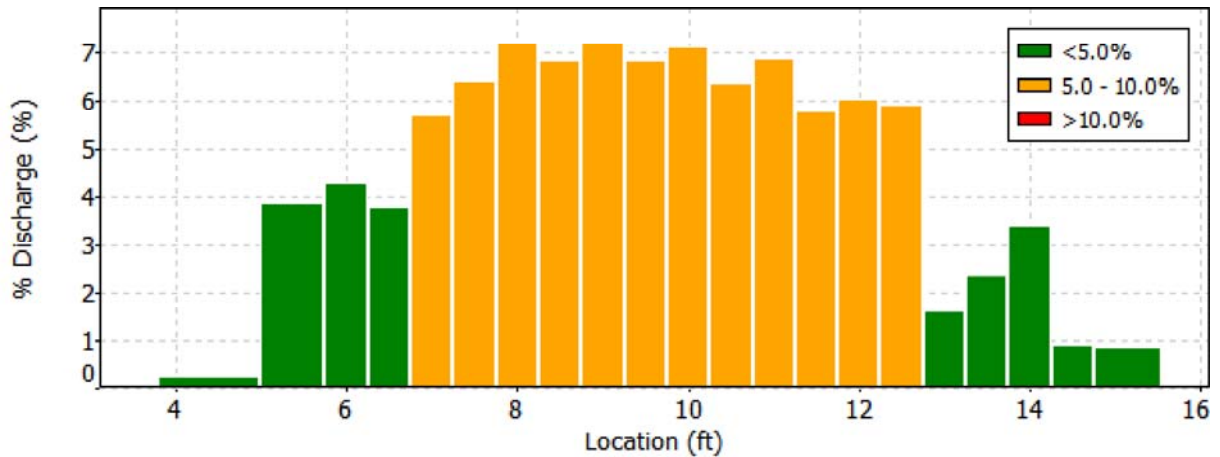
Date Generated: Wed Jun 3 2015

File Information

File Name TRKCRAMN.001.WAD
Start Date and Time 2015/05/11 13:29:02

Site Details

Site Name TURKEY AT MINE
Operator(s) BRIAN EPSTEIN





Discharge Measurement Summary

Date Generated: Wed Jun 3 2015

File Information

File Name TRKCRAMN.001.WAD
Start Date and Time 2015/05/11 13:29:02

Site Details

Site Name TURKEY AT MINE
Operator(s) BRIAN EPSTEIN

Quality Control

St	Loc	%Dep	Message
18	13.50	0.6	High standard error: 0.209
19	14.00	0.6	High angle: -176
		0.6	High SNR variation during measurement: 6.0,4.7



Discharge Measurement Summary

Date Generated: Wed Jun 3 2015

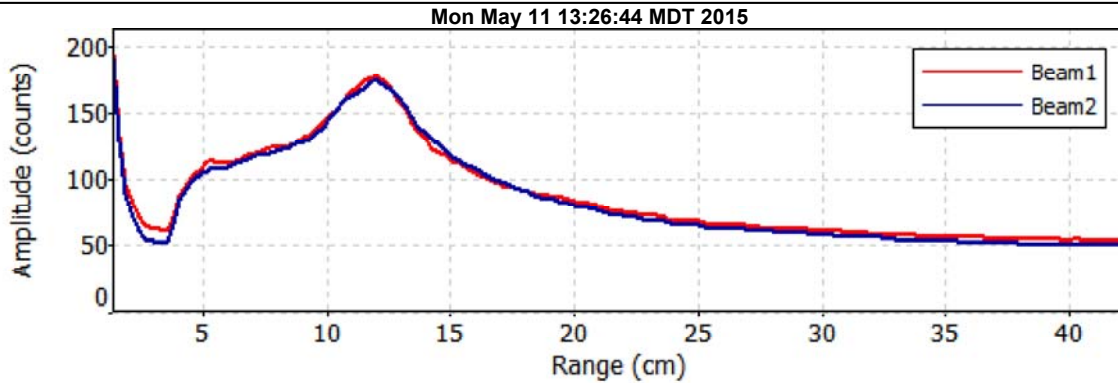
File Information

File Name TRKCRAMN.001.WAD
Start Date and Time 2015/05/11 13:29:02

Site Details

Site Name TURKEY AT MINE
Operator(s) BRIAN EPSTEIN

Automatic Quality Control Test (BeamCheck)



- ✓ Noise level check - Pass
- ✓ SNR check - Pass
- ✓ Peak location check - Pass
- ✓ Peak shape check - Pass



20150922_TurkeyCreekAndTribs_FieldNotes

1 message

Brian Epstein - DNR <brian.epstein@state.co.us>

Tue, Nov 10, 2015 at 12:09 PM

To: Brian Epstein <Brian.Epstein@state.co.us>

Turkey Creek and Tributaries East And West Forks Turkey Creeks Field Notes 20150922

•using Timble GPS Hunt, camera, and notes apps on iPhone

* East = East Fork Turkey Creek, West = West Fork Turkey Creek, and Turkey = Turkey Creek

11:24 Arrive confluence of East and West Forks Turkey Creek

20150922TurkeyCr001

- vids 12:14 and 12:16

- hiking up creek saw trout in a hole

20150922TurkeyCr002

- confluence of East and West Forks Turkey Creeks

- fish observed in confluence pool but sheltered before identified type

20150922TurkeyCr003

- 12:33 Picture of confluence: picture left is West and right is East, bottom is the beginning of Turkey Creek proper

- 12:42 video panning from Turkey Creek upstream to confluence, first coming into view East and then West

20150922EFTurkeyCr001

- FlowTracker s/n P2354

- discharge measurement location: East Fork Turkey Creek near Mouth

- 13:49 pic x-section, looking upstream

- File: EFTURCNM.001

- mostly cloudy, ~ 70F, no wind

- x-sec: pool in step pool environment, bed sand/cobble with some boulders
- flow conditions: mostly parallel flow paths
- measurement rated: poor
- start edge/time: REW 3.5' 13:56
- end edge/time: LEW 6.4' 14:11
- discharge: 0.18
- uncertainty (%): 5.5
- # stations: 12
- Vmean: 0.26
- Vmax: 0.41
- width: 2.9
- area: 0.7
- Dmean: 0.24
- Dmax: 0.42
- SNR: 31.1
- sigmaV: 0.016
- H2O temp (F): 56.4

20150922WFTurkeyCr001

- 13:15 video of trout

20150922WFTurkeyCr002

- FlowTracker s/n P2354
- discharge measurement location: West Fork Turkey Creek near Mouth
- 14:28 & 14:29 Pic discharge measurement section looking upstream
- File: WFTURCNM.001
- mostly cloudy, ~ 70F, no wind
- x-sec: pool in step pool environment, bed sand with some boulders
- flow conditions: mostly parallel flow paths
- measurement rated: poor
- start edge/time: REW 6.0' / 14:35

- end edge/time: LEW 7.7' / 14:47

- discharge: 0.27

- uncertainty: 7.8

- # stations: 8

- Vmean: 0.40

- Vmax: 0.47

- width: 1.7

- area: 0.68

- Dmean: 0.40

- Dmax: 0.66

- SNR: 37.2

- sigmaV: 0.022

- H2O temp: 54.4

- 14:56 pic taken 100' ds of x-section, looking downstream, consistent plunge pool environment, good bank stability because good riparian veg, boulders and woody debris

- 15:52 pic Turkey Creek at quarry, observed water truck pumping out of creek for dust suppression at quarry

20150922TurkeyCr004

- FlowTracker s/n P2354

- discharge measurement location: Turkey Creek at Henry Ride Road

- 16:11 & 16:16 Pic discharge measurement section looking upstream

- 16:16 fish

- File: TRKCBLCN.002

- mostly cloudy, ~ 70F, no wind

- x-sec: glide, in riffle-run-pool-glide environment, sand and cobble bed

- flow conditions: mostly parallel flow paths

- measurement rated: fair

- start edge/time: REW 2.2' / 16:26

- end edge/time: LEW 9.3' / 16:49

- discharge: 0.41

- uncertainty: 3.4

- # stations: 20
- Vmean: 0.22
- Vmax: 0.37
- width: 7.1
- area: 1.83
- Dmean: 0.26
- Dmax: 0.40
- SNR: 20.4
- sigmaV: 0.007
- H2O temp: 60.7

General Observation

- fish observed at every site in different life stages
- macro invertebrates observed at East and West
- pond skippers at all sites
- East, West, and Turkey up in the Canyon have similar geometry: high gradient, plunge-pool, plenty of bank stabilizing entities
- Turkey changes when it comes out of the canyon to a low gradient, riffle-run-pool-glide geometry, plenty of banks stability in area not altered by man from riparian vegetation

17:00 departing Turkey Creek

Brian Epstein
Hydrologist, Stream and Lake Protection Section



COLORADO

Colorado Water
Conservation Board

Department of Natural Resources

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Page <u>1</u> of <u>2</u>	State of Colorado	Meas. No.: <u>001</u>
YYYY: <u>2015</u>	Colorado Water Conservation Board	Division: <u>2</u>
MM-DD: <u>08/0</u>	ADV Discharge Measurement Notes	District: <u>10</u>

Station Name:		
<u>Turkey</u> River, <u>Creek</u> , Canal, Ditch		
At, Near, Above, Below <u>Canyon</u> at <u>Kerry Rude Heights Road</u>		
Latitude:	Longitude:	
Party: <u>Brian Epton, Jeff Bressler, Keith Cunningham</u>		
Conditions		
Weather: <u>mostly cloudy ~66°F</u>		
Wind Spd / Dir: <u>0 mph</u>	Water Temp:	
X-Sec Desc: <u>straight 200' vs 2 25' ds mostly sand/silt some hardpan</u>		
Flow Conds: <u>mostly straight flow lines</u>		
Control Desc: <u>NA</u>		
Measurement Rated: Excellent (2%) / <u>Good (5%)</u> / Fair (8%) / Poor (>8%) [based on the above conditions]		
Water Level Reading		
Time	Staff Gage	Pressure Trans.
<u>N/A</u>		
Pressure Transducer Download		Weighted MGH
File Name:	<u>N/A</u>	GH Corr.
Time:		Correct MGH
Discharge Measurement		
Manufacturer:	SonTek	Model: FlowTracker S/N: <u>P2354 / P2355</u>
Firmware:	3.9	Software: 2.20 <u>TRUCKERSON.DON</u>
Diag Test File:	<u>Yes</u> or No	Raw Data File: <u>TURKEY TRUCKERSON</u>
Meas Type:	<u>Wading</u> / Boat / Bridge / Cableway	Method: <u>0.10</u>
ft. or mi / upstream or downstream of gage		
Start Edge:	<u>REW 2.2</u>	End Edge: <u>LEW 14.9</u> Total Width: <u>12.7</u>
Start Time:	<u>15:02</u>	End Time: <u>15:41</u>
Discharge:	<u>14.50 cfs</u>	Uncertainty: <u>2.6</u> # Stations: <u>32</u>
Mean v:	<u>1.56</u>	Width: <u>12.70</u> Mean d: <u>0.73</u>
Max v:	<u>2.81</u>	Area: <u>9.29</u> Max d: <u>1.05</u>
Mean SNR:	<u>48.90</u>	cv: <u>0.60</u> Mean Temp: <u>60.9°F</u>
Meas. By:	<u>BE</u>	Notes By: <u>KC/OE</u>
Processed By:		Reviewed By:

Remarks:

Turkey Canyon Ranch Rd

- cottonwood dominate along riparian corridor, as big tree
- more than three species of riparian veg in riparian area
- banks in good condition after high flows in May

Page <u>1</u> of <u>2</u>	State of Colorado	Meas. No.: <u>001</u>
YYY: <u>2015</u>	Colorado Water Conservation Board	Division: <u>2</u>
MM-DD: <u>05-11</u>	ADV Discharge Measurement Notes	District: <u>10</u>

Station Name:	<u>TRKCRAMN (GA Ant Mine)</u>	
	<u>Turkey</u>	River, <u>Creek</u> , Canal, Ditch
(A) Near, Above, Below	<u>Mine</u>	
Latitude: <u>N 38° 37' 16.66"</u>	Longitude: <u>W 104° 55' 04.97"</u> <u>N4083</u>	
Party:	<u>Brian Epstein</u>	

Conditions	
Weather:	<u>Cloudy ~ 50°F</u>
Wind Spd / Dir:	<u>0 mph / 0°</u>
X-Sec Desc:	<u>Boulder bed, straightaway 50' vs 405</u>
Flow Conds:	<u>turbulent</u>
Control Desc.:	<u>N/A</u>

Measurement Rated: Excellent (2%) / Good (5%) / Fair (8%) / Poor (>8%) (based on the above conditions)

Water Level Reading					
Time	Staff Gage	Pressure Trans.	Time	Staff Gage	Pressure Trans.
<u>N/A</u>					

Pressure Transducer Download	Weighted MGH	GH Corr.	Correct MGH
File Name: <u>N/A</u>			
Time:			

Discharge Measurement				
Manufacturer: <u>SonTek</u>	Model: <u>FlowTracker</u>	S/N: <u>P2354 / P2355</u>		
Firmware: <u>3.9</u>	Software: <u>2.20</u>			
Diag Test File: <u>Yes or No</u>	Raw Data File: <u>TRKCRAMN.001</u>			
Meas Type: <u>Wading / Boat / Bridge / Cableway</u>	Method: <u>0.6</u>			
<u>N/A</u> ft. or mi / upstream or downstream of gage				
Start Edge: <u>REW 3.1</u>	End Edge: <u>LW 16.1</u>	Total Width: <u>13.0</u>		
Start Time: <u>13:26</u>	End Time: <u>14:02</u>			
Discharge: <u>54.155</u>	Uncertainty: <u>3.1</u>	# Stations: <u>23</u>		
Mean v: <u>4.454</u>	Width: <u>12.999</u>	Mean d: <u>0.94</u>		
Max v: <u>5.671</u>	Area: <u>12.160</u>	Max d: <u>1.52</u>		
Mean SNR: <u>47.3</u>	cv: <u>0.120</u>	Mean Temp: <u>40.0</u>		
Meas. By: <u>BJE</u>	Notes By: <u>BJE</u>			
Processed By:	Reviewed By:			

Remarks:

11:49 Arrive at Turkey Creek & CO-115

11:49 Pic 979 Turkey Creek sign @ Bridge

11:49 GPS: Turkey Creek 001

Turkey Creek from CO-115 Bridge

11:50 Pic 980 Turkey Creek upstream of CO-115,
from bridge looking upstream

11:52 Pic 981 Turkey Creek upstream of CO-115,
from bridge look upstream, on private
land some sort of drop structure

11:52 Pic 982 Turkey Creek downstream of CO-115,
from bridge looking downstream, Fort
Carson lands

11:53 Pic 983 same as above looking further
downstream

12:22 GPS: Turkey Creek 002

12:24 Pic 984 Turkey Creek from left edge
of water looking upstream

12:24 Pic 985 Turkey Creek from left
edge looking downstream

12:25 Pic 986 about 1/4 mile upstream of GPS
Point a locked gate

13:17 TRKCRAMN (GPS Point)

- location of spot discharge measurement

- 13:25 Pic 987 X-section from ds looking
us

- 13:25 Pic 988 X-section from LEW looking
at right bank

- next to Schmidt Mine Mercur Quarry

• Road is washed out at two locations, has been
fixed.

• high water from recent precipitation (rain and
snow) on and off in area from S16 to S100

















