

DRAFT INSTREAM FLOW RECOMMENDATION

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 instream flow recommendation for Yellow Creek, located in Water Division 6.

Location and Land Status. Yellow Creek is tributary to the White River approximately 27 miles northwest of Meeker. This recommendation covers two stream reaches. The first reach begins at the confluence with Barcus Creek and extends downstream to the confluence with Lambert Springs, located in the SE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 16, T2N R98W, Sixth P.M. The second reach begins at the confluence with Lambert Spring and extends to the confluence with the White River.

The first reach is 3.72 miles in length and is located entirely on public lands. The second reach is 3.45 miles in length. Of this length, 2.29 miles are on public lands and 1.16 miles are on private lands.

Biological Summary. Yellow Creek is a small, moderate gradient stream with a highly variable substrate size and a stable channel. Water quality, food sources and physical habitat characteristics are suitable for native species. Because of the small stream size, protection of flows is extremely important for continued existence of the fishery and riparian community.

Fishery surveys indicate that the creek supports self-sustaining populations of speckled dace, along with limited numbers of native mountain suckers. The fish population appears to be limited by lack of extensive pool habitat. The creek also provides habitat for northern leopard frogs.

The riparian community is in stable condition and comprised primarily of willows and grasses. Riparian community health has been impaired by historic grazing practices and invasion of tamarisk. BLM is taking actions to modify management and place the riparian community on an upward trend.

R2Cross Analysis. BLM's data analysis, coordinated with the Division of Parks and Wildlife, indicates that the following flows are needed to protect the fishery and natural environment to a reasonable degree.

Reach 1 – Confluence with Barcus Creek to confluence with Lambert Spring

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)
09/09/2004 #1	0.49 cfs	5.18 feet	0.32 cfs	Out of confidence interval
09/09/2004 #2	0.57 cfs	4.58 feet	0.44 cfs	Out of confidence interval
06/21/2005 #1	0.76 cfs	6.03 feet	0.60 cfs	1.50 cfs
09/27/2011 #3	0.39 cfs	7.50 feet	1.16 cfs	Out of confidence interval

Averages: 0.63 cfs 1.50 cfs

Reach 2 – Confluence with Lambert Spring to confluence with White River

Cross Section Date	Discharge Rate	Top Width	Winter Flow Recommendation (meets 2 of 3 hydraulic criteria)	Summer Flow Recommendation (meets 3 of 3 hydraulic criteria)
09/27/2011 #1	1.19 cfs	12.19 feet	1.18 cfs	3.31 cfs
09/27/2011 #2	1.04 cfs	8.56 feet	0.91 cfs	1.65 cfs

Averages: 1.05 cfs 2.48 cfs

BLM's analysis of this data, coordinated with the Division of Parks and Wildlife, indicates that the following flows are needed to protect the fishery and natural environment to a reasonable degree:

Reach 1 – Confluence with Barcus Gulch to confluence with Lambert Spring

1.50 cubic feet per second is recommended for the snowmelt runoff period from April 1 through June 30. This recommendation is driven by the average velocity criteria. Since this creek is very small and has limited physical habitat, it is important to provide this flow during the spawning season to insure the survival of the native fish population.

0.60 cubic feet per second is recommended for the remainder of year, from July 1 through March 31. This recommendation is driven by the average depth and wetted perimeter criteria. Many portions of this reach have a high width-to-depth ratio, so it is important to maintain sufficient depth for fish passage and overwintering of fish.

Reach 2 – Confluence with Lambert Spring to confluence with White River

2.45 cubic feet per second is recommended for the snowmelt runoff period from April 1 through June 30. Each surveyed reach had distinctly different hydraulic characteristics, so this recommendation is driven by all three of the instream flow criteria. Since this creek is very small and has limited physical habitat, it is important to provide this flow during the spawning season to insure the survival of the native fish population.

1.05 cubic feet per second is recommended for the remainder of year, from July 1 through March 31. This recommendation is driven by a variety of the instream flow criteria, since each surveyed reach had distinctly different hydraulic characteristics. Many portions of this reach have a high width-to-depth ratio, so it is important to maintain sufficient depth for fish passage and overwintering of fish. This flow rate also protects the inflow to the creek from Lambert Spring, which is critical in maintaining water quality and quantity that is capable of supporting a native fishery.

Water Availability. BLM is not aware of any decreed surface diversions within this reach. However, there are numerous decreed diversions, reservoirs, springs, and wells located upstream on Yellow Creek and its tributaries. A high percentage of these water rights are in conditional status. It is important to note that Yellow Creek has dry portions upstream from the reaches recommended in this letter, so diversions in upstream locations will not have a direct relationship to the flow rate in downstream locations. Specifically, BLM is aware of the following absolute water rights in upstream locations:

Lathan Ditch – 2.0 cfs – irrigation use
WH Violet Ditch – 5.0 cfs – irrigation use
Wilson Ditch – 2.4 cfs – irrigation use

BLM recommends using a USGS Gage 09306255, Yellow Creek near White River, as an indicator of water availability. This gage has a long period of record, and indicates that water is available for the proposed appropriations.

Relationship to Management Plans. The White River Field Office Resource Management Plan identifies management of streams supporting native fish species as a priority for BLM. The plan specifies that BLM will work to improve riparian and aquatic conditions in these streams, and will also work to prevent surface disturbances close to them. In addition, the plan specifies that BLM will work with the Colorado Water Conservation Board to appropriate instream flow water rights to protect these fisheries.

Data sheets, R2Cross output, fishery survey information, and photographs of the cross section are enclosed to support this recommendation. We thank both the Division of Wildlife and the 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,

Leigh Espy
Deputy State Director
Resources and Fire

4 Enclosures

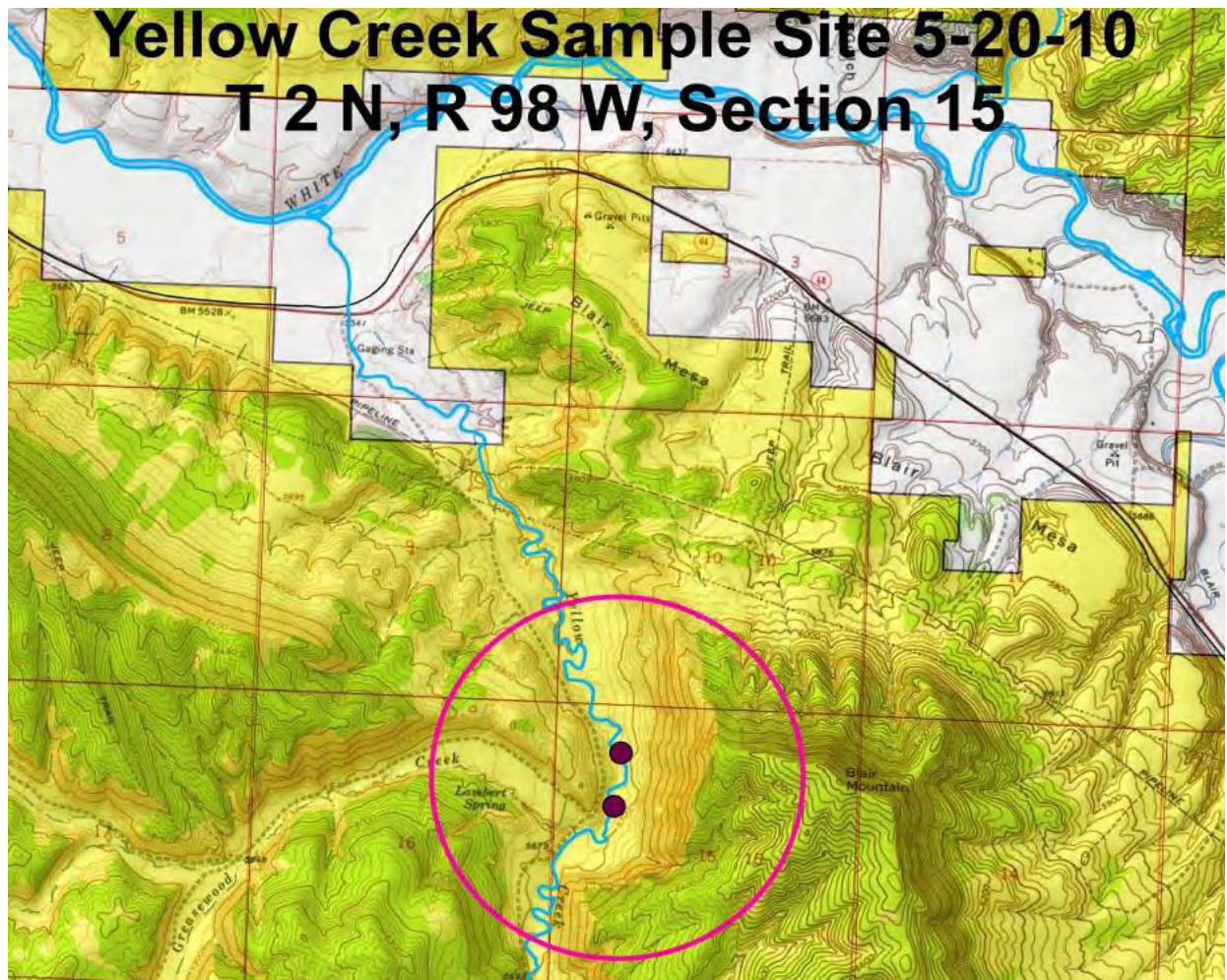
cc: Bob Lange, White River Field Office
Kent Walter, White River Field

White River Field Office Stream Surveys May 2010

Yellow Creek - Water Code #25242

On May 11, 2010 Yellow Creek, located on lands managed by the White River Field Office, was sampled just below the confluence with Barcus Creek. On May 20, 2010, the creek was sampled on BLM lands located approximately 2.5 miles above the confluence with the White River (See Map). Sampling was conducted to determine fishery status and to look specifically for the presence of resident mountain suckers. The site was sampled using a backpack electroshocker and a seine. Personnel present were Tom Fresques, Kristy Wallner, and Gregor Dekleva, BLM, and Jenn Logan, Dan, and Jesse with Colorado Division of Wildlife.

At the Barcus Creek site only native speckled dace were collected or seen. At the lower site, speckled dace and two mountain sucker were collected. In addition, northern leopard frogs were observed and appear common throughout the drainage. A population estimate was not completed.



STREAM SURVEY FISH SAMPLING FORM

Water Yellow Creek **H₂O Code** 25242 **Date** 5/11& 20/2010

Gear BPE **Effort** **Station #** 1 **Pass #** 1

Crew Logan, Thompson, Fresques, Dan, Jesse **Drainage** White River **Location** GPS

PASS	SPECIES	LENGTH	WEIGHT		PASS	SPECIES	LENGTH	WEIGHT
1	SPD	100's						
	MOS							
	MOS							

GPS LOCATION:

STREAM

WIDTH: ft.REACH: ft.

CONDUCTIVITY:

ELECTROSHOCKER SETTINGS :

NOTES: Cows in riparian; alteration high

Sedges common

C/E Channel type

Mountain suckers in 2006 - Lori Martin

Several northern leopard
frogs seen.



Yellow Creek – Seine Site



Northern leopard frog



Yellow Creek Shocking Site above beaver ponds



Mountain sucker



Mountain sucker

Discussion:

Yellow Creek was murky at the beaver pond seine site and mostly clear with a decent mix of runs and riffle habitats with a few decent pools along the stream portions located immediately upstream of the uppermost beaver dam. Deep pool habitat appears to be limiting other than the beaver ponds. The stream was in good condition with good bank stability and proper width to depth ratios. The stream appeared to be a Rosgen C channel type with good sinuosity and low gradient with a wide floodplain. Riparian vegetation consisted of herbaceous species including sedges and rush. Woody species were predominantly salt cedar (tamarisk) with a few willows noted. It appeared that many of the tamarisk were in poor condition due likely to beetle control.

The only fish species collected were speckled dace and mountain sucker, both native species. Fish were only collected during electrofishing efforts as no fish were collected during two seine hauls. In addition, the site contained a robust population of northern leopard frogs. Based on limited sampling, it does not appear that Yellow Creek within the BLM reach is an important tributary stream with regard to spawning habitat for other native species (flannelmouth sucker, bluehead sucker, and roundtail chub) as no adult or young of these species were seen or collected. It is not readily evident what is limiting the mountain sucker population. It could be that drought impacted stream flows and diminished the population, particularly the severe drought of 2002.

Recommendations:

- Determine the extent of the resident frog population
- Periodically sample/monitor the creek to assess fishery composition.
- If possible, look into connectivity to the White River with regard to diversions, barriers, etc. that might impede seasonal use of the creek by other native fish species.
- Perhaps more extensive sampling of the beaver ponds may help to determine if more extensive use of these habitats is occurring by native mountain suckers.



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME <u>Yellow Creek</u>		CROSS-SECTION NO. <u>1</u>	
CROSS SECTION LOCATION <u>1/8 downstream from confluence in Barcus Creek</u>			
DATE <u>7-7-01</u>	OBSERVERS <u>R. Smith, P. Daggett</u>		
LEGAL DESCRIPTION	SECTION <u>NW</u>	SECTION <u>26</u>	TOWNSHIP <u>2 N</u>
COUNTY <u>Rio Blanco</u>	WATERSHED <u>White River</u>	WATER DIVISION <u>6</u>	RANGE <u>98E/W</u> <u>6N</u>
USGS <u>Rough Gulch 7.5'</u>		DOW WATER CODE <u>25242</u>	
MAFIS		12 T 0725062 4444041	

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION	☒ YES ☐ NO	METER TYPE <u>Marsh-McBirney</u>
METER NUMBER	DATE RATED	CALIB/SPIN
CHANNEL BED MATERIAL SIZE RANGE <u>silt to 2" cobbles</u>		sec
		TAPE WEIGHT
		TAPE TENSION
	PHOTOGRAPHS TAKEN ☒ YES ☐ NO	NUMBER OF PHOTOGRAPHS <u>5</u>

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (m)	ROD READING (m)
(X) Tape & Stake LB	0.0	<u>surveyed</u>
(X) Tape & Stake RB	0.0	<u>surveyed</u>
(1) WS @ Tape LB/RB	0.0	<u>6.22/6.21</u>
(2) WS Upstream	<u>15.0'</u>	<u>6.16</u>
(3) WS Downstream	<u>15.0'</u>	<u>6.40</u>
SLOPE	<u>0.24 / 30.0' = 0.01</u>	

SECTION

LEGEND

Stake (X)

Station (O)

Photo (arrow)

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
<u>see attached survey</u>																	
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME																	
<u>mayfly, snails, annelids, caddisfly</u>																	

COMMENTS

TDS = >2000 us Ph = 8.5 Temp = 12°C

DISCHARGE/CROSS SECTION NOTES

STREAM NAME

Yellow Creek

CROSS-SECTION NO.

DATE 9-9-04 SHEET OF

BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE)
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LEFT / RIGHT

Gage Reading

0.3

TIME 9:20 AM

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		5.04								
		0.3		5.30								
	G	2.0		5.74								
		2.7		6.20								
	W	3.0		6.21	0							
		3.3		6.36	0.15							
		3.6		6.42	0.20					0.67		
		3.9		6.45	0.25					0.80		
		4.2		6.49	0.30					0.69		
		4.5		6.52	0.30					0.94		
		4.8		6.51	0.30					0.98		
		5.1		6.55	0.35					0.94		
		5.4		6.50	0.30					0.59		
		5.7		6.54	0.35					0.53		
	W	6.0		6.22	0					0		
	G	7.2		5.75								
	LS	10.8		5.35								
TOTALS												

TOTALS.

Sppt of Measurement:

Time: 9.40

Gage Reading: _____

0.3

CALCULATIONS PERFORMED BY:

CALCULATIONS CHECKED BY:

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

LOCATION INFORMATION

STREAM NAME: Yellow Creek
XS LOCATION: 1/8 mile d/s from conf. w/ Barcus Ck.
XS NUMBER: 1

DATE: 9-Sep-04
OBSERVERS: R. Smith, P. Daggett

1/4 SEC: NW
SECTION: 26
TWP: 2N
RANGE: 98W
PM: Sixth

COUNTY: Rio Blanco
WATERSHED: White River
DIVISION: 6
DOW CODE: 25242

USGS MAP: Rough Gulch 7.5'
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: 0.01

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Yellow Creek
 XS LOCATION: 1/8 mile d/s from conf. w/ Barcus Ck.
 XS NUMBER: 1

DATA POINTS= 17

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	5.04		
	0.50	5.30		
1 G	2.00	5.74		
	2.70	6.20		
W	3.00	6.21	0.00	0.00
	3.30	6.36	0.15	0.00
	3.60	6.42	0.20	0.67
	3.90	6.45	0.25	0.80
	4.20	6.49	0.30	0.69
	4.50	6.52	0.30	0.94
	4.80	6.51	0.30	0.98
	5.10	6.55	0.35	0.94
	5.40	6.50	0.30	0.59
	5.70	6.54	0.35	0.03
W	6.00	6.22	0.00	0.00
1 G	7.20	5.75		
LS	10.80	5.35		

TOTALS -----

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.34	0.15	0.05	0.00	0.0%
0.31	0.20	0.06	0.04	8.2%
0.30	0.25	0.08	0.06	12.2%
0.30	0.30	0.09	0.06	12.7%
0.30	0.30	0.09	0.08	17.3%
0.30	0.30	0.09	0.09	18.0%
0.30	0.35	0.11	0.10	20.1%
0.30	0.30	0.09	0.05	10.8%
0.30	0.35	0.11	0.00	0.6%
0.44		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

3.20 0.35 0.75 0.49 100.0%
 (Max.)

Manning's n = 0.0865
 Hydraulic Radius= 0.23472359

STREAM NAME: Yellow Creek
 XS LOCATION: 1/8 mile d/s from conf. w/ Barcus Ck.
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.75	0.72	-3.8%
5.97	0.75	1.67	122.5%
5.99	0.75	1.58	111.1%
6.01	0.75	1.50	99.9%
6.03	0.75	1.42	89.0%
6.05	0.75	1.34	78.3%
6.07	0.75	1.26	67.7%
6.09	0.75	1.18	57.4%
6.11	0.75	1.11	47.4%
6.13	0.75	1.03	37.5%
6.15	0.75	0.96	27.9%
6.17	0.75	0.89	18.4%
6.18	0.75	0.85	13.8%
6.19	0.75	0.82	9.2%
6.20	0.75	0.79	4.7%
6.21	0.75	0.75	0.3%
6.22	0.75	0.72	-3.8%
6.23	0.75	0.69	-7.8%
6.24	0.75	0.66	-11.7%
6.25	0.75	0.63	-15.6%
6.26	0.75	0.60	-19.5%
6.27	0.75	0.58	-23.3%
6.29	0.75	0.52	-30.8%
6.31	0.75	0.46	-38.1%
6.33	0.75	0.41	-45.3%
6.35	0.75	0.36	-52.4%
6.37	0.75	0.31	-59.3%
6.39	0.75	0.26	-65.9%
6.41	0.75	0.21	-72.2%
6.43	0.75	0.16	-78.2%
6.45	0.75	0.12	-83.6%
6.47	0.75	0.09	-88.5%

WATERLINE AT ZERO

AREA ERROR = 6.206

STREAM NAME: Yellow Creek
 XS LOCATION: 1/8 mile d/s from conf. w/ Barcus 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	5.75	5.18	0.52	0.80	2.69	5.60	100.0%	0.48	2.83	1.05
	5.76	5.16	0.52	0.79	2.66	5.58	99.5%	0.48	2.79	1.05
	5.81	4.96	0.49	0.74	2.41	5.35	95.5%	0.45	2.43	1.01
	5.86	4.75	0.46	0.69	2.16	5.12	91.4%	0.42	2.09	0.97
	5.91	4.55	0.42	0.64	1.93	4.89	87.3%	0.39	1.78	0.92
	5.96	4.35	0.39	0.59	1.71	4.66	83.2%	0.37	1.50	0.88
	6.01	4.14	0.36	0.54	1.50	4.44	79.2%	0.34	1.25	0.83
	6.06	3.94	0.33	0.49	1.29	4.21	75.1%	0.31	1.01	0.78
	6.11	3.74	0.30	0.44	1.10	3.98	71.0%	0.28	0.80	0.73
	6.16	3.53	0.26	0.39	0.92	3.75	67.0%	0.25	0.62	0.67
WL	6.21	3.17	0.24	0.34	0.75	3.36	60.0%	0.22	0.47	0.63
	6.26	2.88	0.21	0.29	0.60	3.04	54.3%	0.20	0.35	0.58
	6.31	2.73	0.17	0.24	0.46	2.86	51.1%	0.16	0.24	0.51
	6.36	2.58	0.13	0.19	0.33	2.68	47.9%	0.12	0.14	0.42
	6.41	2.30	0.09	0.14	0.21	2.37	42.3%	0.09	0.07	0.34
	6.46	1.84	0.06	0.09	0.10	1.89	33.7%	0.05	0.03	0.25
	6.51	1.30	0.02	0.04	0.02	1.32	23.6%	0.02	0.00	0.11

STREAM NAME: Yellow Creek
XS LOCATION: 1/8 mile d/s from conf. w/ Barcus Ck.
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.49 cfs
CALCULATED FLOW (Qc)= 0.47 cfs
(Qm-Qc)/Qm * 100 = 3.4 %

MEASURED WATERLINE (WLm)= 6.22 ft
CALCULATED WATERLINE (WLc)= 6.21 ft
(WLm-WLc)/WLm * 100 = 0.1 %

MAX MEASURED DEPTH (Dm)= 0.35 ft
MAX CALCULATED DEPTH (Dc)= 0.34 ft
(Dm-Dc)/Dm * 100 = 1.6 %

MEAN VELOCITY= 0.63 ft/sec
MANNING'S N= 0.087
SLOPE= 0.01 ft/ft

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

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

CROSS SECTION DATA ANALYSIS

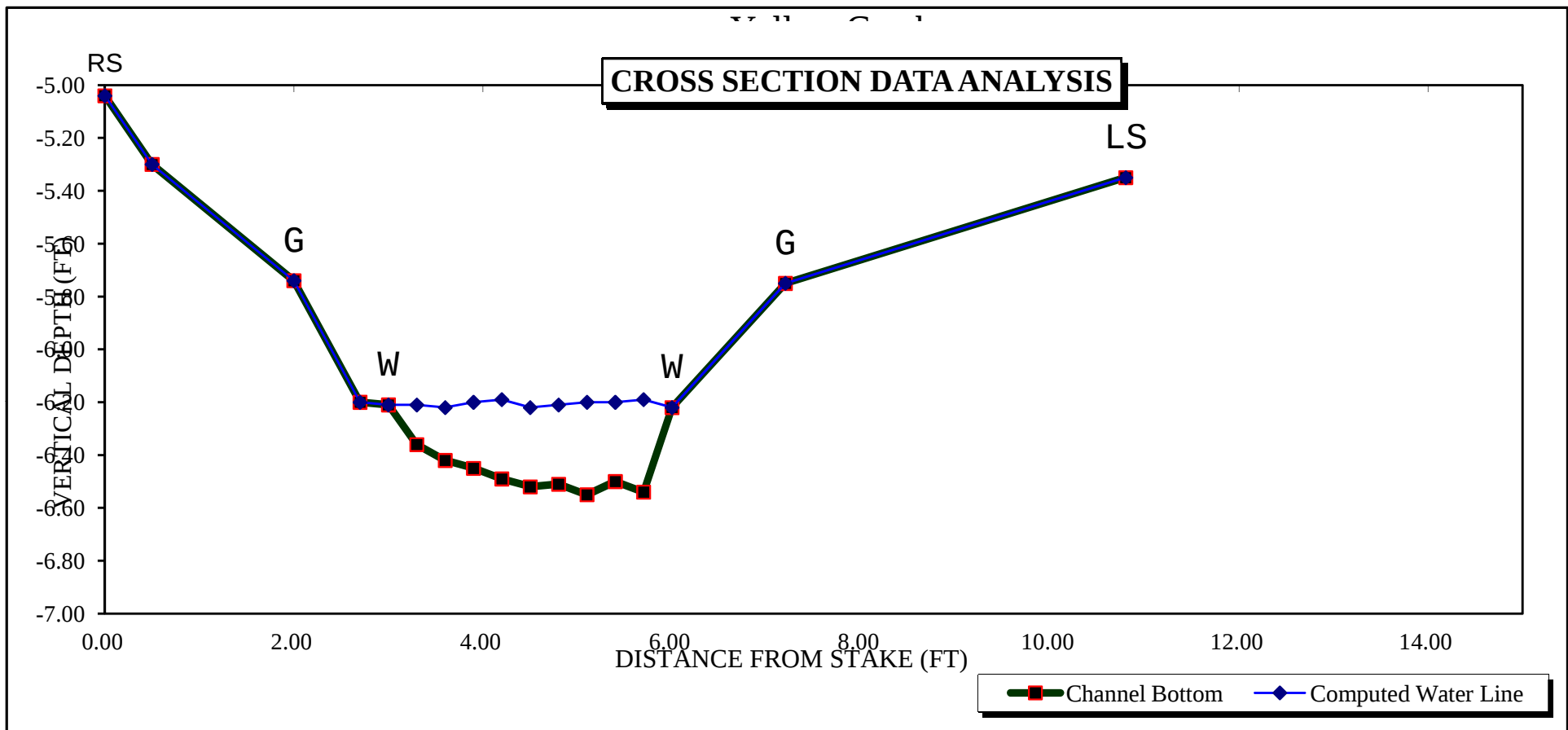
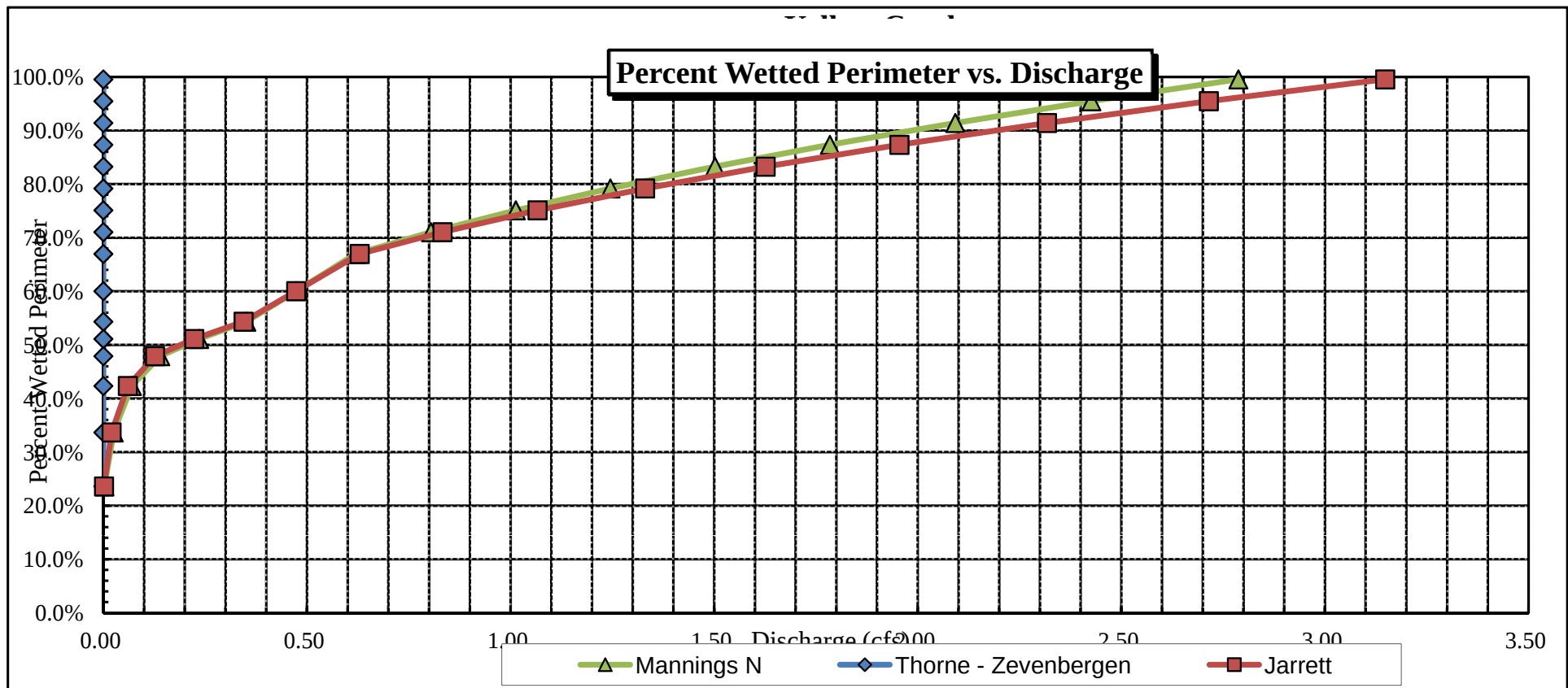
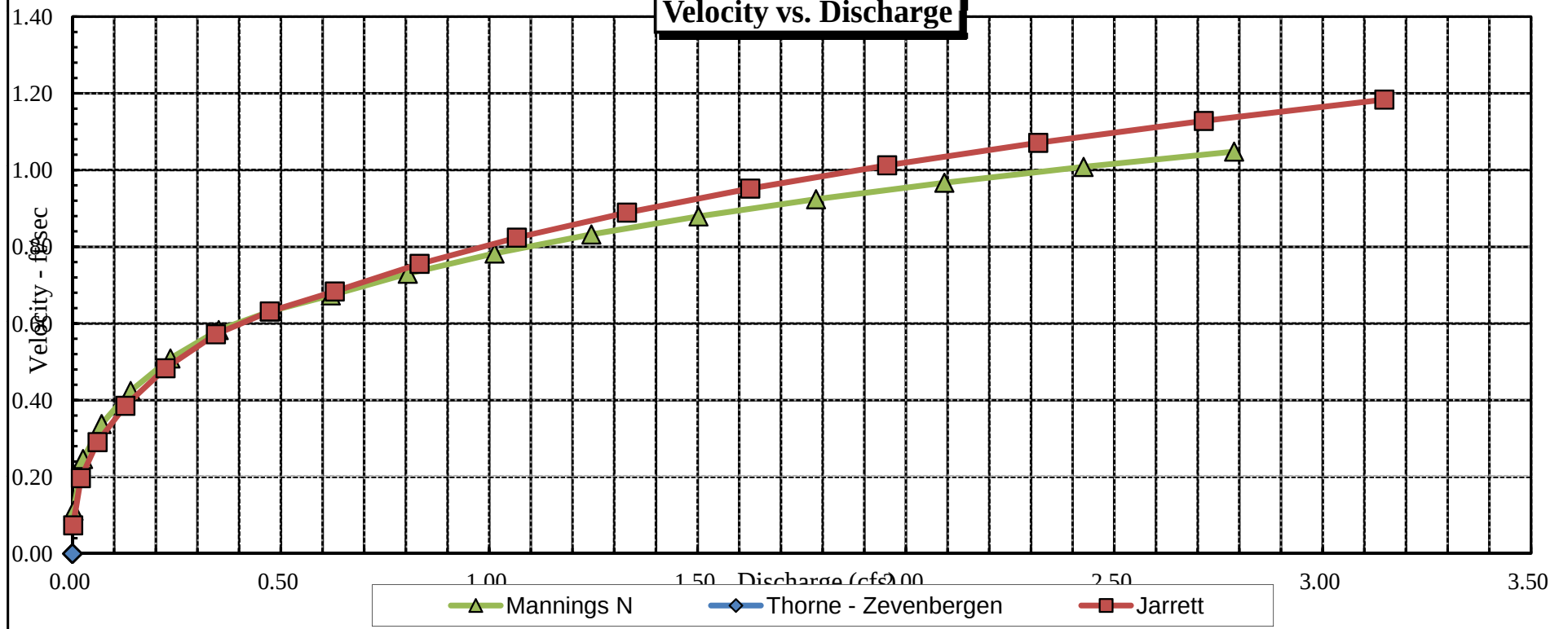
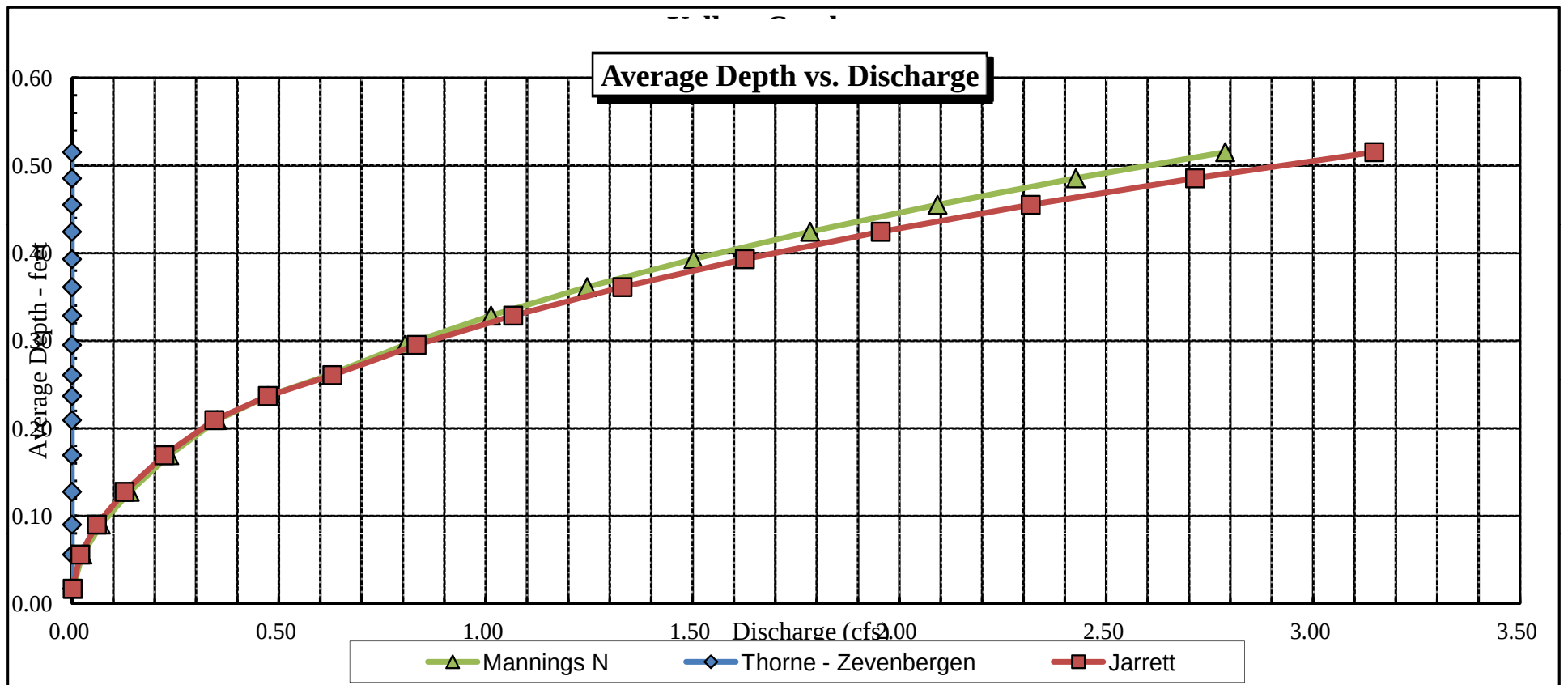


Figure 1

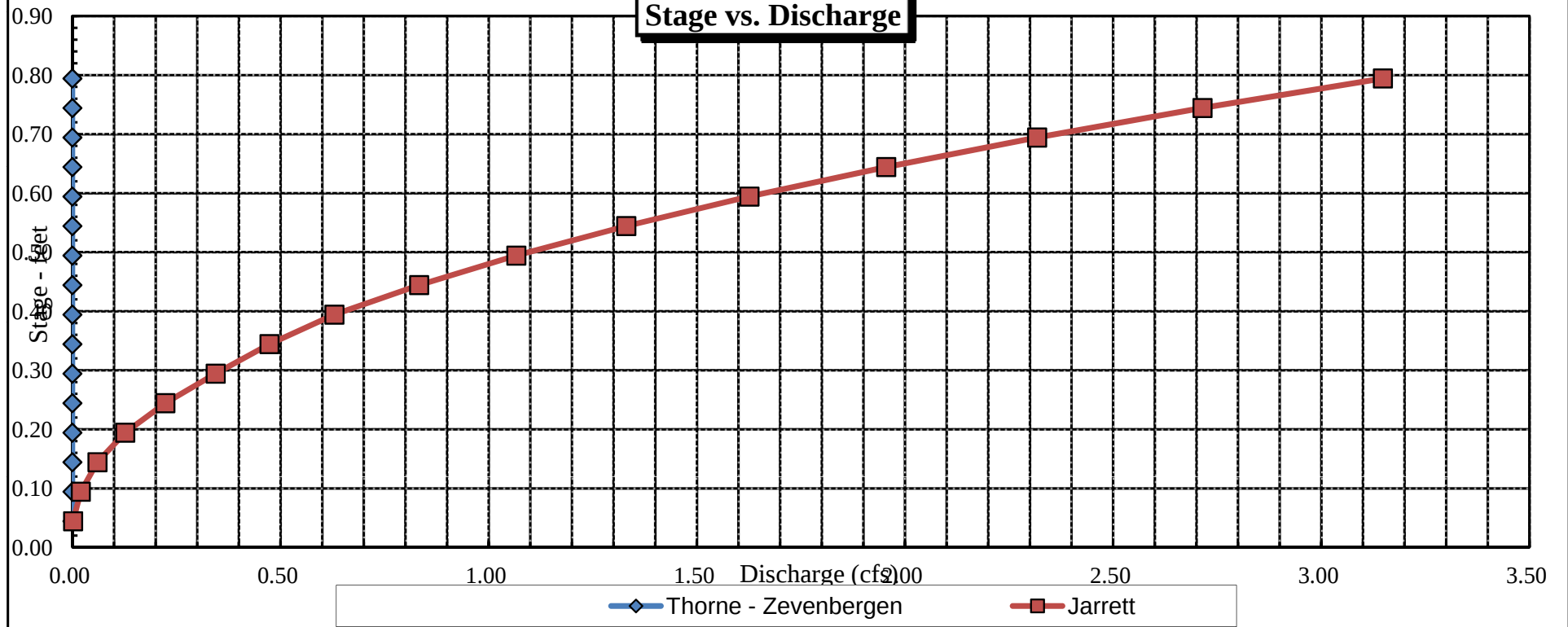


Velocity vs. Discharge





Stage vs. Discharge





FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME		Yellow Creek		CROSS-SECTION NO		2									
CROSS SECTION LOCATION		1/8 mile downstream from confluence w/ Borcas Creek													
DATE	9-9-04														
OBSERVERS		R. Smith, R. Daggett													
LEGAL DESCRIPTION	SECTION	NW		SECTION	26		TOWNSHIP	2 N S		RANGE	98 E W		PM	6th	
COUNTY	Rio Blanco		WATERSHED		White River		WATER DIVISION		6		DOW WATER CODE				
MAP(S)	USGS	Rough Gulch 7.5'						Zone 12		729962					
	USFS							NA027		4444002					

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION	YES/NO	METER TYPE		Marsh-McBirney				
METER NUMBER	DATE RATED		CALIB. SPIN	sec	TAPE WEIGHT	lbs/100	TAPE TENSION	lbs
				surveyed		surveyed		
CHANNEL BED MATERIAL SIZE RANGE		silt to 2" cobbles		PHOTOGRAPHS TAKEN		YES/NO		NUMBER OF PHOTOGRAPHS
				3				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	5.70/5.70
(2) WS Upstream	15.0'	5.31
(3) WS Downstream	15.0'	5.90
SLOPE	0.59 / 30.0 = 0.02	

LEGEND

Stake (X)

Station (O)

Photo (circle with dot)

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, snails																	

COMMENTS

TDS = 7200 μ S pH = 8.5 Temp = 12°C

DISCHARGE/CROSS SECTION NOTES

STREAM NAME.

Yellow Creek

CROSS-SECTION NO

100

DATE _____

DATE 9-9-04

SHEET: 1 OF 1

BEGINNING OF MEASUREMENT

EDGE OF WATER LOOKING DOWNSTREAM:
(00 AT STAKE)

LEFT / RIGHT

Gage Reading:

0.3

TIME 10:30

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		4.60								
	G	0.4		4.94								
		1.3		5.46								
	W	2.0		5.70	0							
		2.3		6.06	0.35							
		2.6		5.88	0.20							
		2.9		5.89	0.20					0.11		
		3.2		5.85	0.15					0.33		
		3.5		6.00	0.30					0.70		
		3.8		6.02	0.30					1.09		
		4.1		6.01	0.30					1.13		
		4.4		6.00	0.30					1.61		
		4.7		5.97	0.30					1.09		
		5.0		5.96	0.25					0.52		
		5.3		5.86	0.15					0.09		
		5.6		5.80	0.10					0		
	W	5.8		5.70	0					0		
		5.9		5.41								
	G	6.4		5.16								
		9.0		5.00								
	LS	10.6		4.88								
TOTALS:												

TOTALS.

End of Measurement

Time: 10:50

Gage Reading: _____

0.3

CALCULATIONS PERFORMED BY

CALCULATIONS CHECKED BY

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

LOCATION INFORMATION

STREAM NAME: Yellow Creek
XS LOCATION: 1/8 mile d/s fr conf. w/ Barcus Ck.
XS NUMBER: 2

DATE: 9-Sep-04
OBSERVERS: R. Smith, P. Daggett

1/4 SEC: NW
SECTION: 26
TWP: 2N
RANGE: 98W
PM: Sixth

COUNTY: Rio Blanco
WATERSHED: White River
DIVISION: 6
DOW CODE: 25242

USGS MAP: Rough Gulch 7.5
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: 0.02

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Yellow Creek
 XS LOCATION: 1/8 mile d/s fr conf. w/ Barcus Ck.
 XS NUMBER: 2

DATA POINTS= 21

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	4.60		
	0.40	4.94		
1 G	1.30	5.46		
W	2.00	5.70	0.00	0.00
	2.30	6.06	0.35	0.00
	2.60	5.88	0.20	0.00
	2.90	5.89	0.20	0.11
	3.20	5.85	0.15	0.38
	3.50	6.00	0.30	0.70
	3.80	6.02	0.30	1.09
	4.10	6.01	0.30	1.13
	4.40	6.00	0.30	1.61
	4.70	5.97	0.30	1.09
	5.00	5.96	0.25	0.52
	5.30	5.86	0.15	0.09
	5.60	5.80	0.10	0.00
W	5.80	5.70	0.00	0.00
1 G	5.90	5.41		
	6.40	5.16		
	9.00	5.00		
LS	10.60	4.88		

TOTALS -----

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.47	0.35	0.11	0.00	0.0%
0.35	0.20	0.06	0.00	0.0%
0.30	0.20	0.06	0.01	1.2%
0.30	0.15	0.05	0.02	3.0%
0.34	0.30	0.09	0.06	11.0%
0.30	0.30	0.09	0.10	17.1%
0.30	0.30	0.09	0.10	17.8%
0.30	0.30	0.09	0.14	25.3%
0.30	0.30	0.09	0.10	17.1%
0.30	0.25	0.08	0.04	6.8%
0.32	0.15	0.05	0.00	0.7%
0.31	0.10	0.03	0.00	0.0%
0.22		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

4.11 0.35 0.87 0.57 100.0%
 (Max.)

Manning's n = 0.1124
 Hydraulic Radius= 0.21071137

STREAM NAME: Yellow Creek
 XS LOCATION: 1/8 mile d/s fr conf. w/ Barcus Ck.
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.87	0.87	0.0%
5.45	0.87	1.92	121.6%
5.47	0.87	1.83	111.0%
5.49	0.87	1.73	100.6%
5.51	0.87	1.65	90.3%
5.53	0.87	1.56	80.1%
5.55	0.87	1.47	70.1%
5.57	0.87	1.39	60.3%
5.59	0.87	1.30	50.6%
5.61	0.87	1.22	41.1%
5.63	0.87	1.14	31.7%
5.65	0.87	1.06	22.4%
5.66	0.87	1.02	17.9%
5.67	0.87	0.98	13.3%
5.68	0.87	0.94	8.9%
5.69	0.87	0.90	4.4%
5.70	0.87	0.87	0.0%
5.71	0.87	0.83	-4.4%
5.72	0.87	0.79	-8.7%
5.73	0.87	0.75	-13.0%
5.74	0.87	0.72	-17.3%
5.75	0.87	0.68	-21.6%
5.77	0.87	0.61	-29.9%
5.79	0.87	0.53	-38.2%
5.81	0.87	0.46	-46.3%
5.83	0.87	0.40	-54.2%
5.85	0.87	0.33	-61.8%
5.87	0.87	0.27	-68.9%
5.89	0.87	0.21	-75.2%
5.91	0.87	0.17	-80.5%
5.93	0.87	0.13	-85.4%
5.95	0.87	0.09	-90.0%

WATERLINE AT ZERO

AREA ERROR = 5.700

STREAM NAME: Yellow Creek
 XS LOCATION: 1/8 mile d/s fr conf. w/ Barcus 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	5.46	4.58	0.41	0.60	1.87	5.10	100.0%	0.37	1.79	0.96
	5.50	4.45	0.38	0.56	1.69	4.93	96.8%	0.34	1.55	0.92
	5.55	4.29	0.34	0.51	1.47	4.73	92.7%	0.31	1.26	0.86
	5.60	4.13	0.31	0.46	1.26	4.52	88.6%	0.28	1.01	0.80
	5.65	3.96	0.27	0.41	1.06	4.31	84.6%	0.25	0.78	0.73
WL	5.70	3.80	0.23	0.36	0.86	4.11	80.5%	0.21	0.57	0.66
	5.75	3.66	0.19	0.31	0.68	3.93	77.0%	0.17	0.39	0.58
	5.80	3.52	0.14	0.26	0.50	3.75	73.6%	0.13	0.24	0.49
	5.85	3.22	0.10	0.21	0.33	3.43	67.3%	0.10	0.13	0.39
	5.90	2.28	0.08	0.16	0.19	2.44	47.8%	0.08	0.07	0.34
	5.95	1.90	0.05	0.11	0.09	2.00	39.3%	0.04	0.02	0.23
	6.00	1.05	0.01	0.06	0.01	1.10	21.5%	0.01	0.00	0.10
	6.05	0.02	0.00	0.01	0.00	0.03	0.6%	0.00	0.00	0.05

STREAM NAME: Yellow Creek
XS LOCATION: 1/8 mile d/s fr conf. w/ Barcus Ck.
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.57 cfs
CALCULATED FLOW (Qc)= 0.57 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 5.70 ft
CALCULATED WATERLINE (WLc)= 5.70 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.35 ft
MAX CALCULATED DEPTH (Dc)= 0.36 ft
(Dm-Dc)/Dm * 100 = -2.9 %

MEAN VELOCITY= 0.66 ft/sec
MANNING'S N= 0.112
SLOPE= 0.02 ft/ft

.4 * Qm = 0.2 cfs
2.5 * Qm= 1.4 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

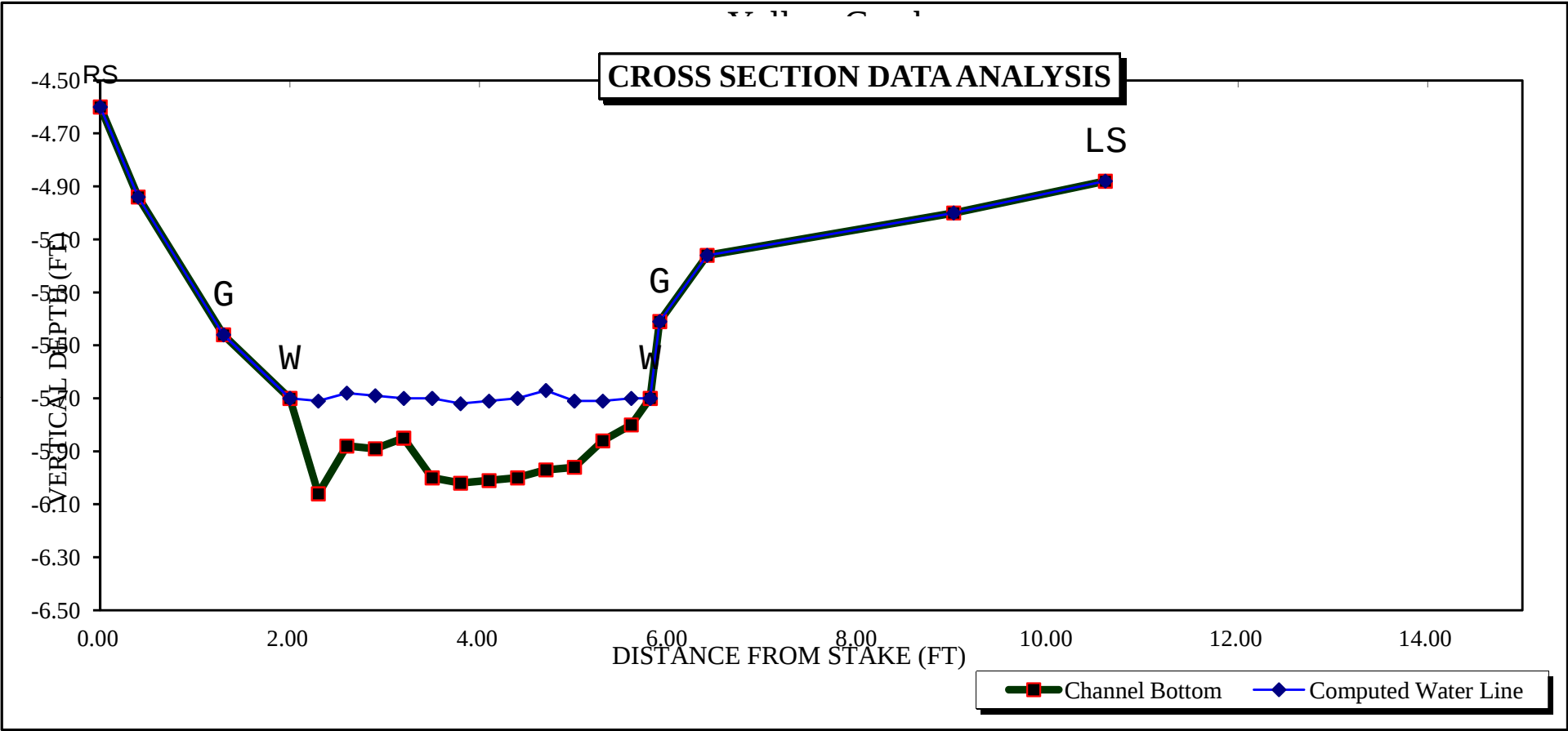
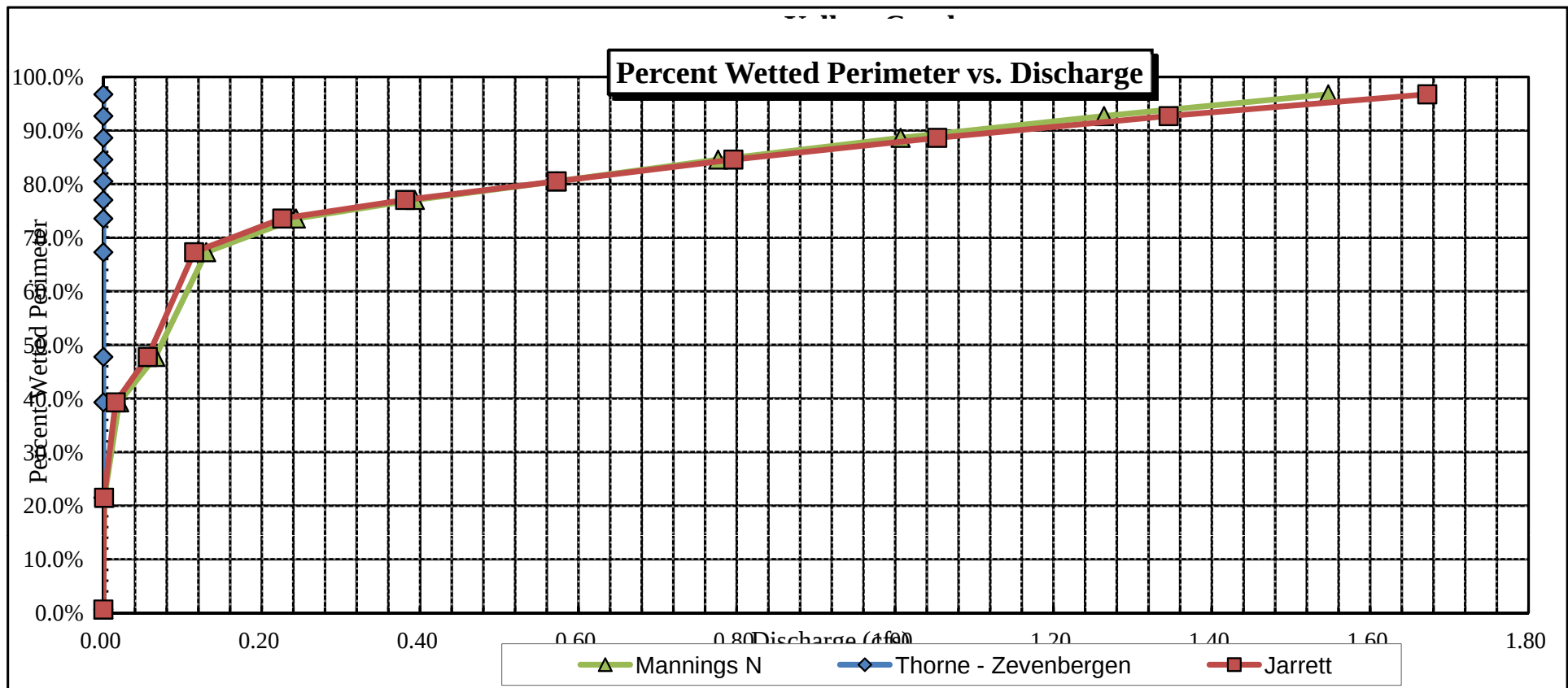
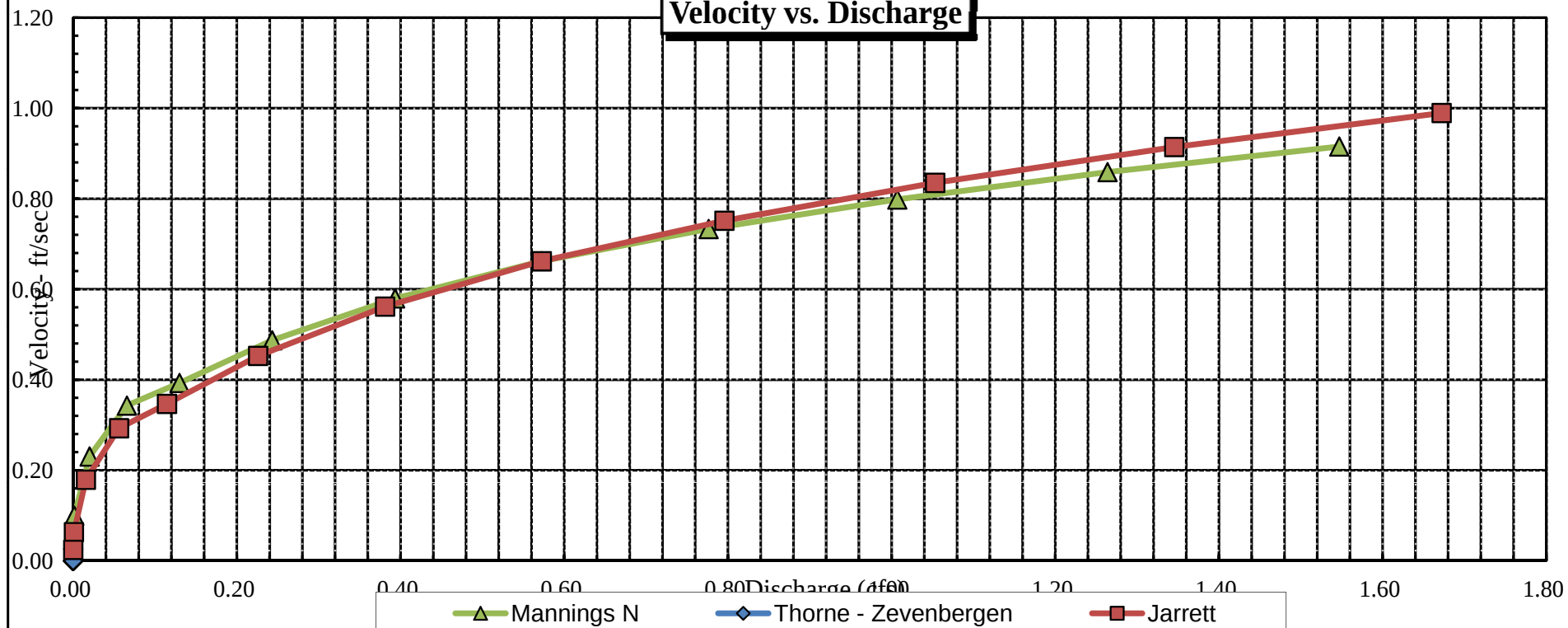
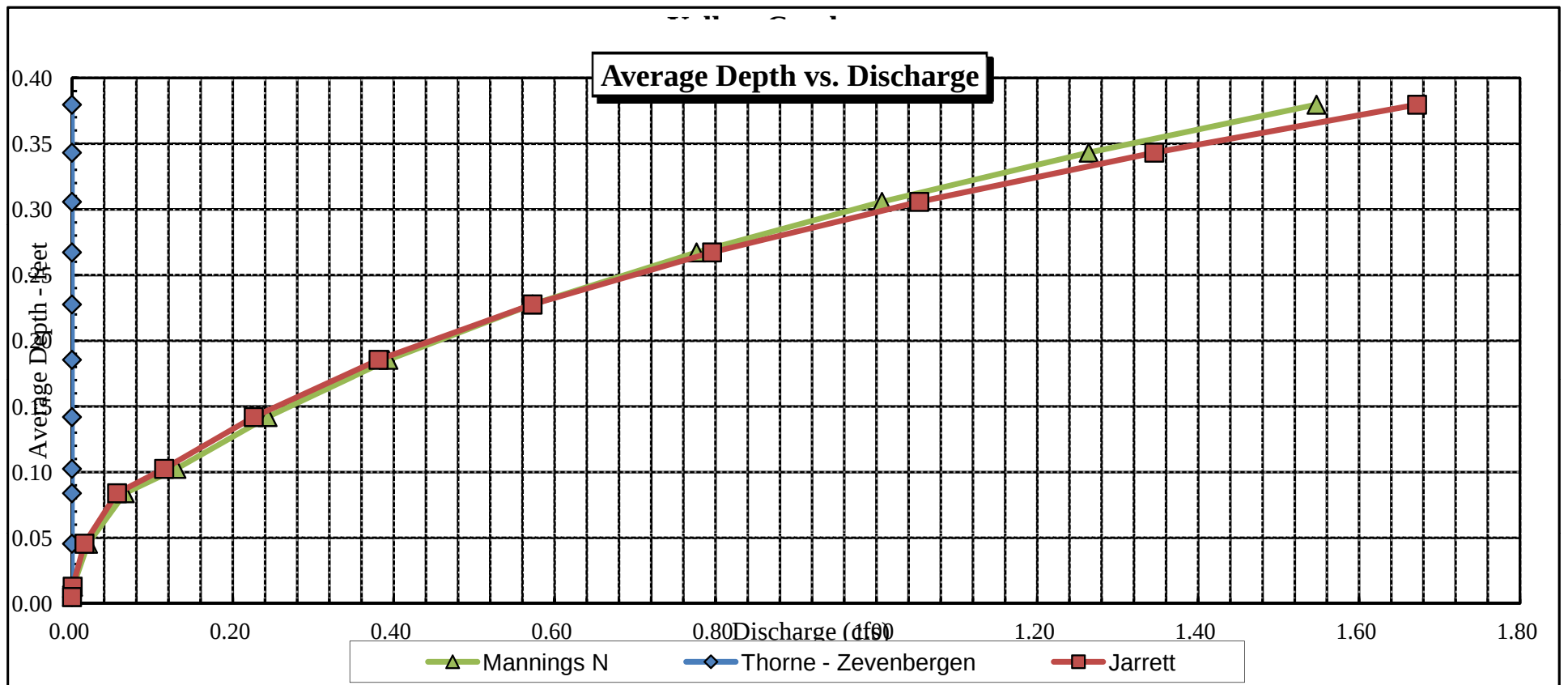


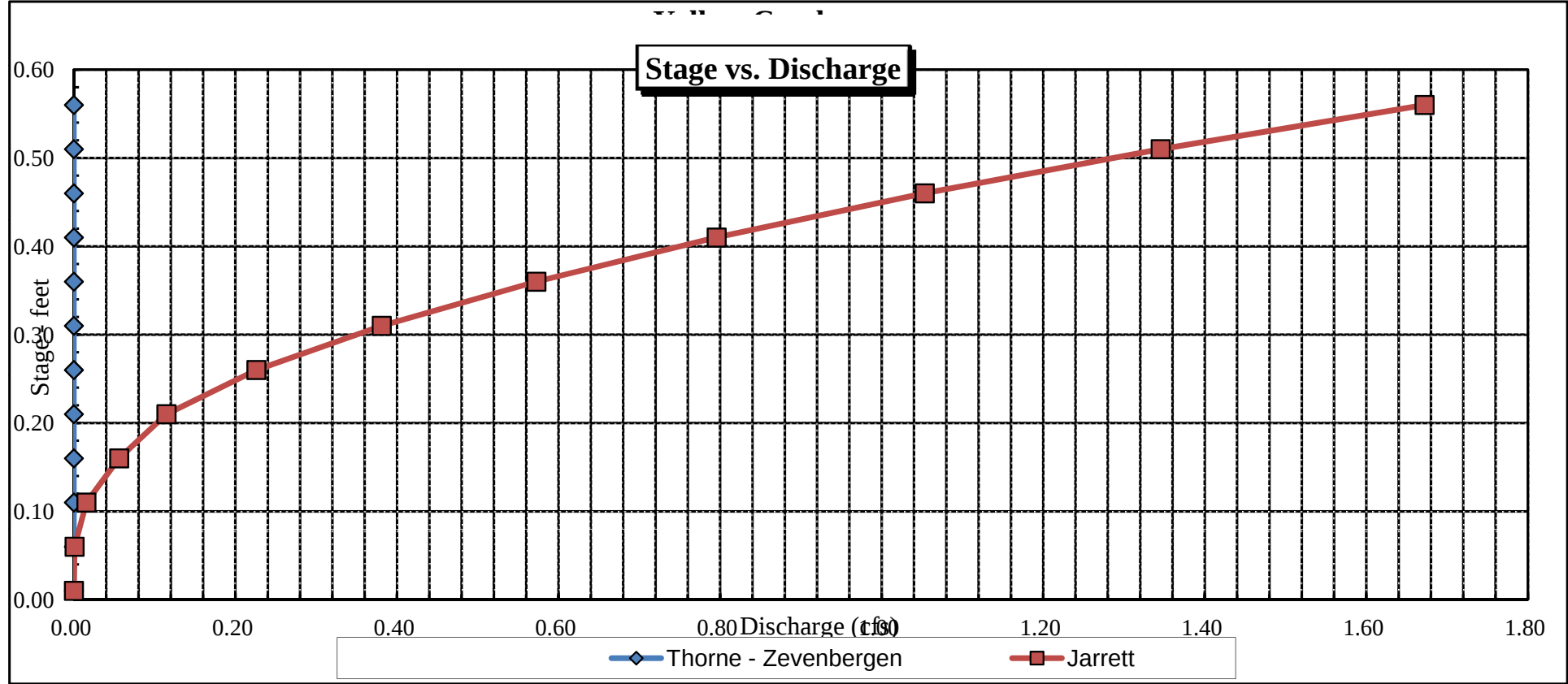
Figure 1



Velocity vs. Discharge









LOCATION INFORMATION

STREAM NAME:		Yellow Creek		CROSS-SECTION NO.:		0306-2105	
CROSS-SECTION LOCATION:		≈ 1800 Ft w/s of confluence w/ Barcus Creek					
DATE:		6/2/82		OBSERVERS:		Upendahl / Gilbert / Grafe	
LEGAL DESCRIPTION:		N SECTION:		SECTION:		TOWNSHIP:	
		NW		26		2 (N) S	
COUNTY:		WATERSHED:		RANGE:		6	
Rio Blanco		White		98 E/W		6	
MAP(S):		USGS:		WATER DIVISION:		DOW WATER CODE:	
		Barcus Creek SE		6			
		USFS:					

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION:		YES NO	METER TYPE		FLO-MAT ⁵	
METER NUMBER:		DATE RATED:		GALIB/SPIN:	_____ 885	TAPE WEIGHT: _____ 126/100
CHANNEL BED MATERIAL SIZE RANGE:				PHOTOGRAPHS TAKEN:	YES NO	NUMBER OF PHOTOGRAPHS: 4

CHANNEL PROFILE DATA

STATION		DISTANCE FROM TAPE (ft)	ROD READING (ft)
(*)	Tape @ Stake LB	0.0	4.80
(*)	Tape @ Stake RB	0.0	5.15
(1)	WS @ Tape LB/RB	0.0	6.75 / 6.75
(S)	WS Upstream	32	6.40
(S)	WS Downstream	50	7.05
SLOPE	$.65/82 = .008$		

SKETCH

LEGEND:

Stake (*)

Station (1)

Photo (1) →

Direction of Flow
←

AQUATIC SAMPLING SUMMARY

[illegible]

COMMENTS

		COMMENTS
WOOD STAKE	LB	
6AGE	6/21/05	= Stage 4.93 Q = 1.4 cfs

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: <u>Yellow Creek</u>		CROSS-SECTION NO: <u>03062105</u>		DATE: <u>6/2/05</u>		SHEET <u>1</u> OF <u>1</u>						
BEGINNING OF MEASUREMENT		EDGE OF WATER LOOKING DOWNSTREAM: <u>LEFT</u> <u>RIGHT</u>		Gage Reading: <u>—</u>		TIME: <u>15:30</u>						
Features	Stake Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/net (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		5.15								
		3.0		5.35								
		6.0		5.90								
		8.0		6.15								
		10.0		6.45								
		11.0		6.50								
	B	11.5		6.35								
	W	11.6		6.75		0.6						
		11.9		6.95	.20							
		12.2		7.15	.40					.19	.06	.01
		12.5		7.20	.45					.38	.12	.05
		12.8		7.15	.40					.84	.14	.11
		13.1		7.25	.50					1.69	.12	.20
		13.4		7.25	.50					1.47	.15	.22
		13.7		7.25	.50					.70	.15	.11
		14.0		7.35	.60					.41	.15	.06
		14.3		6.95	.20					.13	.18	.02
		14.6		6.90	.10					.0	.06	.00
	W	14.9		6.75						.0	.03	.00
	W	15.6		6.15						.0	.0	.0
		16.5		5.85								
		17.5		5.55								
	Top of N	19.0		4.50								
		19.6		4.80								
TOTALS:												
End of Measurement		Time: <u>15:40</u>		Gage Reading: <u>—</u>		CALCULATIONS PERFORMED BY:		CALCULATIONS CHECKED BY:		<u>JB</u>		

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

LOCATION INFORMATION

STREAM NAME: Yellow Creek
XS LOCATION: 1800 ft d/s conf w/ Barcus Creek
XS NUMBER: 1

DATE: 21-Jun-05
OBSERVERS: Uppendahl, Graf, and Dilger

1/4 SEC: NW
SECTION: 26
TWP: 2N
RANGE: 98W
PM: Sixth

COUNTY: Rio Blanco
WATERSHED: White River
DIVISION: 6
DOW CODE: 25242

USGS MAP: Rough Gulch 7.5'
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: 0.00792683

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Yellow Creek
 XS LOCATION: 1800 ft d/s conf w/ Barcus Creek
 XS NUMBER: 1

DATA POINTS= 24

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
S	0.00	5.16		
	3.00	5.35		
	6.00	5.90		
	8.00	6.15		
	10.00	6.45		
	11.00	6.50		
1 G	11.50	6.35		
W	11.60	6.75	0.00	0.00
	11.90	6.95	0.20	0.19
	12.20	7.15	0.40	0.38
	12.50	7.20	0.45	0.84
	12.80	7.15	0.40	1.69
	13.10	7.25	0.50	1.74
	13.40	7.25	0.50	0.70
	13.70	7.25	0.50	0.41
	14.00	7.35	0.60	0.13
	14.30	6.95	0.20	0.00
	14.60	6.90	0.10	0.00
W	14.90	6.75	0.00	0.00
1 G	15.60	6.15		
	16.50	5.85		
	17.50	5.55		
	19.00	4.50		
S	19.60	4.80		

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.36	0.20	0.06	0.01	1.4%
0.36	0.40	0.12	0.05	5.5%
0.30	0.45	0.14	0.11	13.8%
0.30	0.40	0.12	0.20	24.6%
0.32	0.50	0.15	0.26	31.7%
0.30	0.50	0.15	0.11	12.7%
0.30	0.50	0.15	0.06	7.5%
0.32	0.60	0.18	0.02	2.8%
0.50	0.20	0.06	0.00	0.0%
0.30	0.10	0.03	0.00	0.0%
0.34		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 -----

3.70	0.6	1.16	0.82	100.0%
(Max.)				

Manning's n = 0.0853
 Hydraulic Radius= 0.3120449

STREAM NAME: Yellow Creek
 XS LOCATION: 1800 ft d/s conf w/ Barcus Creek
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.16	1.17	1.3%
6.50	1.16	2.04	76.6%
6.52	1.16	1.97	70.3%
6.54	1.16	1.89	64.0%
6.56	1.16	1.82	57.8%
6.58	1.16	1.75	51.6%
6.60	1.16	1.68	45.5%
6.62	1.16	1.61	39.5%
6.64	1.16	1.54	33.5%
6.66	1.16	1.47	27.5%
6.68	1.16	1.40	21.6%
6.70	1.16	1.34	15.7%
6.71	1.16	1.30	12.8%
6.72	1.16	1.27	9.9%
6.73	1.16	1.24	7.0%
6.74	1.16	1.20	4.2%
6.75	1.16	1.17	1.3%
6.76	1.16	1.14	-1.5%
6.77	1.16	1.10	-4.4%
6.78	1.16	1.07	-7.1%
6.79	1.16	1.04	-9.9%
6.80	1.16	1.01	-12.6%
6.82	1.16	0.95	-18.0%
6.84	1.16	0.89	-23.2%
6.86	1.16	0.83	-28.3%
6.88	1.16	0.77	-33.3%
6.90	1.16	0.71	-38.1%
6.92	1.16	0.66	-42.8%
6.94	1.16	0.61	-47.2%
6.96	1.16	0.56	-51.4%
6.98	1.16	0.51	-55.5%
7.00	1.16	0.47	-59.5%

WATERLINE AT ZERO

AREA ERROR = 6.755

STREAM NAME: Yellow Creek
 XS LOCATION: 1800 ft d/s conf w/ Barcus Creek
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.35	6.03	0.46	1.00	2.80	6.93	100.0%	0.40	2.37	0.85
	6.35	5.98	0.46	1.00	2.77	6.87	99.2%	0.40	2.35	0.85
	6.40	5.41	0.46	0.95	2.49	6.23	89.9%	0.40	2.09	0.84
	6.45	4.78	0.47	0.90	2.23	5.53	79.8%	0.40	1.89	0.85
	6.50	3.65	0.55	0.85	2.02	4.33	62.5%	0.47	1.89	0.93
	6.55	3.58	0.51	0.80	1.84	4.20	60.7%	0.44	1.65	0.89
	6.60	3.51	0.47	0.75	1.66	4.07	58.8%	0.41	1.42	0.85
	6.65	3.44	0.43	0.70	1.49	3.95	57.0%	0.38	1.21	0.81
	6.70	3.36	0.39	0.65	1.32	3.82	55.1%	0.35	1.01	0.76
WL	6.75	3.28	0.35	0.60	1.15	3.68	53.2%	0.31	0.83	0.72
	6.80	3.11	0.32	0.55	1.00	3.48	50.3%	0.29	0.67	0.67
	6.85	2.93	0.29	0.50	0.84	3.28	47.3%	0.26	0.53	0.63
	6.90	2.74	0.26	0.45	0.70	3.06	44.2%	0.23	0.41	0.58
	6.95	2.39	0.24	0.40	0.57	2.69	38.8%	0.21	0.32	0.55
	7.00	2.28	0.20	0.35	0.46	2.53	36.6%	0.18	0.23	0.50
	7.05	2.16	0.16	0.30	0.35	2.38	34.4%	0.15	0.15	0.43
	7.10	2.05	0.12	0.25	0.24	2.23	32.2%	0.11	0.08	0.35
	7.15	1.88	0.08	0.20	0.14	2.01	29.1%	0.07	0.04	0.26
	7.20	1.15	0.06	0.15	0.07	1.24	17.9%	0.05	0.01	0.22
	7.25	0.36	0.05	0.10	0.02	0.42	6.1%	0.04	0.00	0.18
	7.30	0.17	0.02	0.05	0.00	0.20	2.9%	0.02	0.00	0.11

STREAM NAME: Yellow Creek
XS LOCATION: 1800 ft d/s conf w/ Barcus Creek
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.82 cfs
CALCULATED FLOW (Qc)= 0.83 cfs
(Qm-Qc)/Qm * 100 = -0.3 %

MEASURED WATERLINE (WLm)= 6.75 ft
CALCULATED WATERLINE (WLc)= 6.75 ft
(WLm-WLc)/WLm * 100 = -0.1 %

MAX MEASURED DEPTH (Dm)= 0.60 ft
MAX CALCULATED DEPTH (Dc)= 0.60 ft
(Dm-Dc)/Dm * 100 = 0.8 %

MEAN VELOCITY= 0.72 ft/sec
MANNING'S N= 0.085
SLOPE= 0.00792683 ft/ft

.4 * Qm = 0.3 cfs
2.5 * Qm= 2.1 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

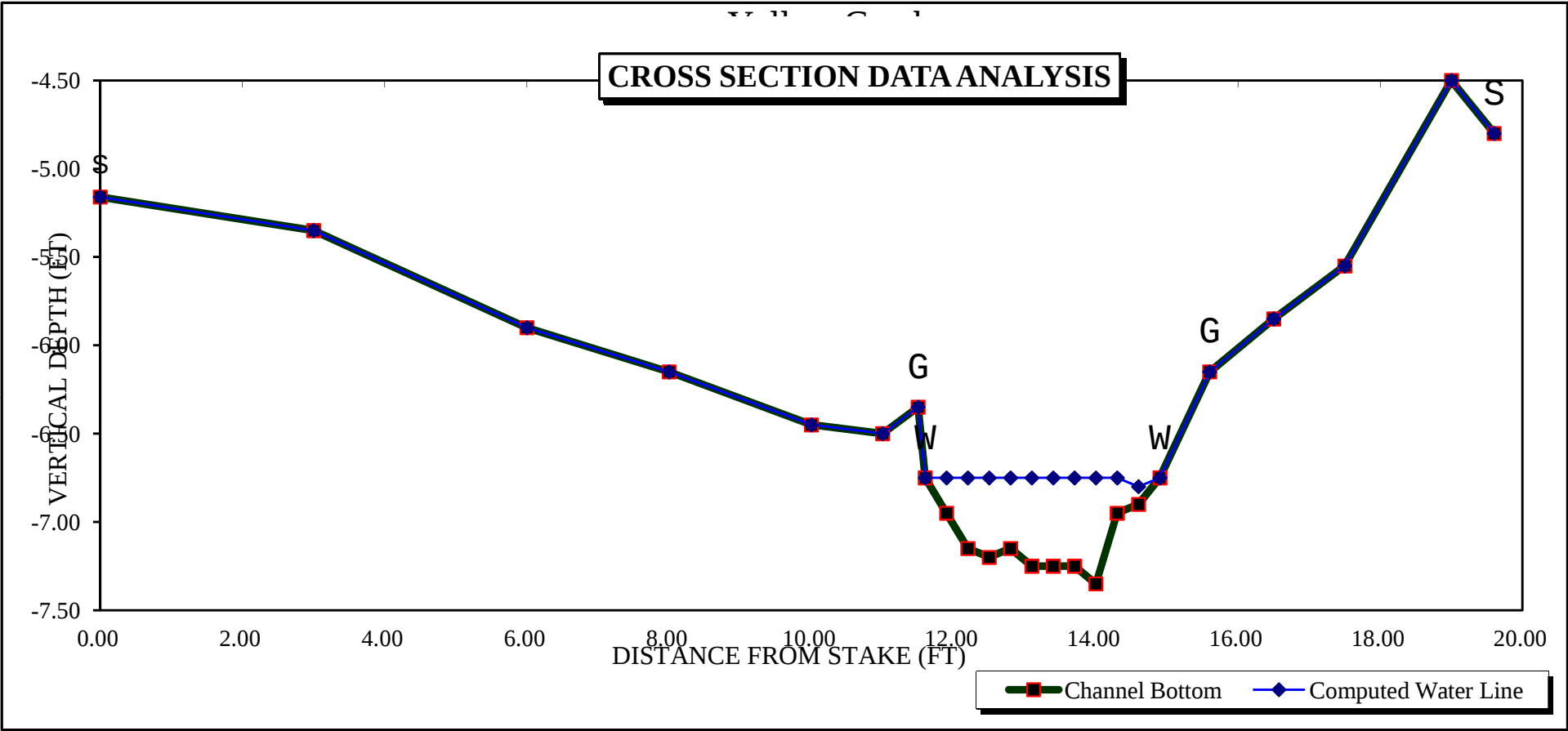
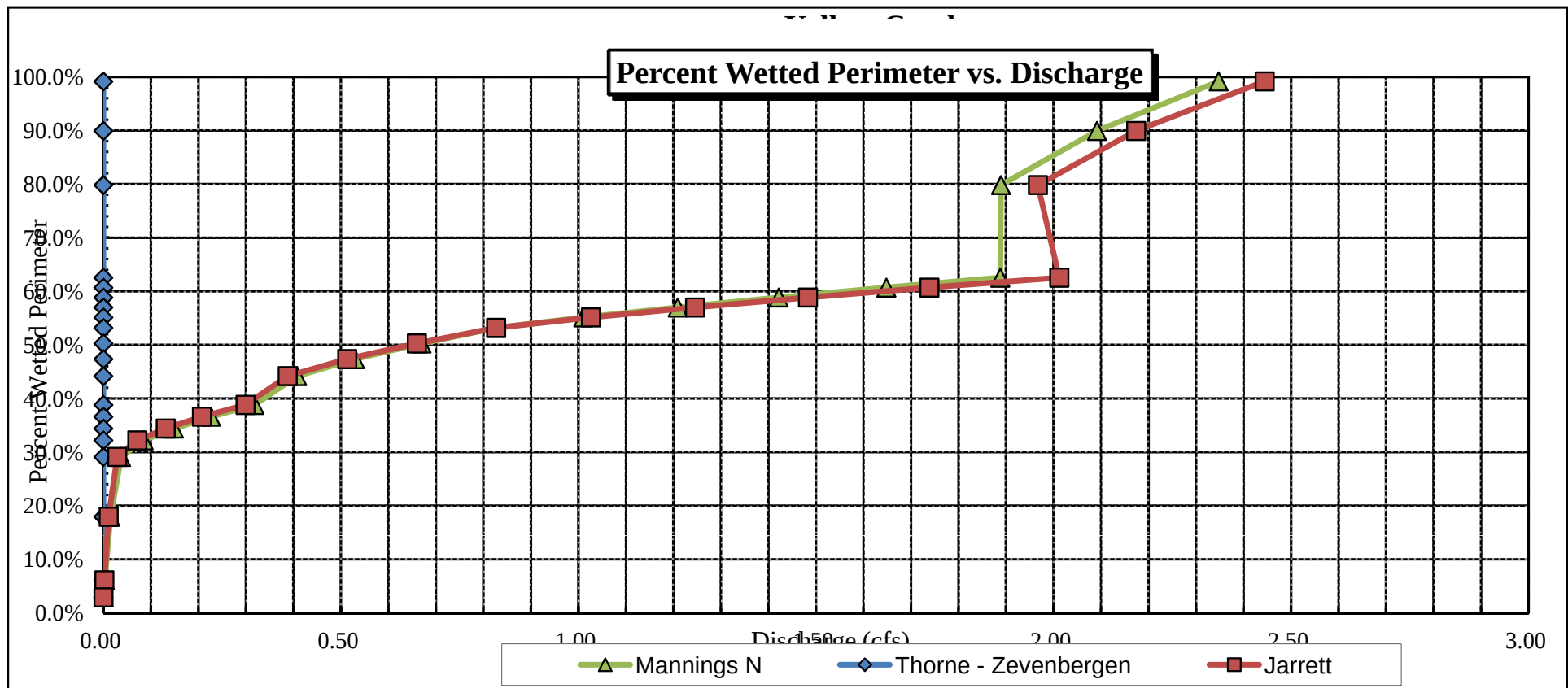
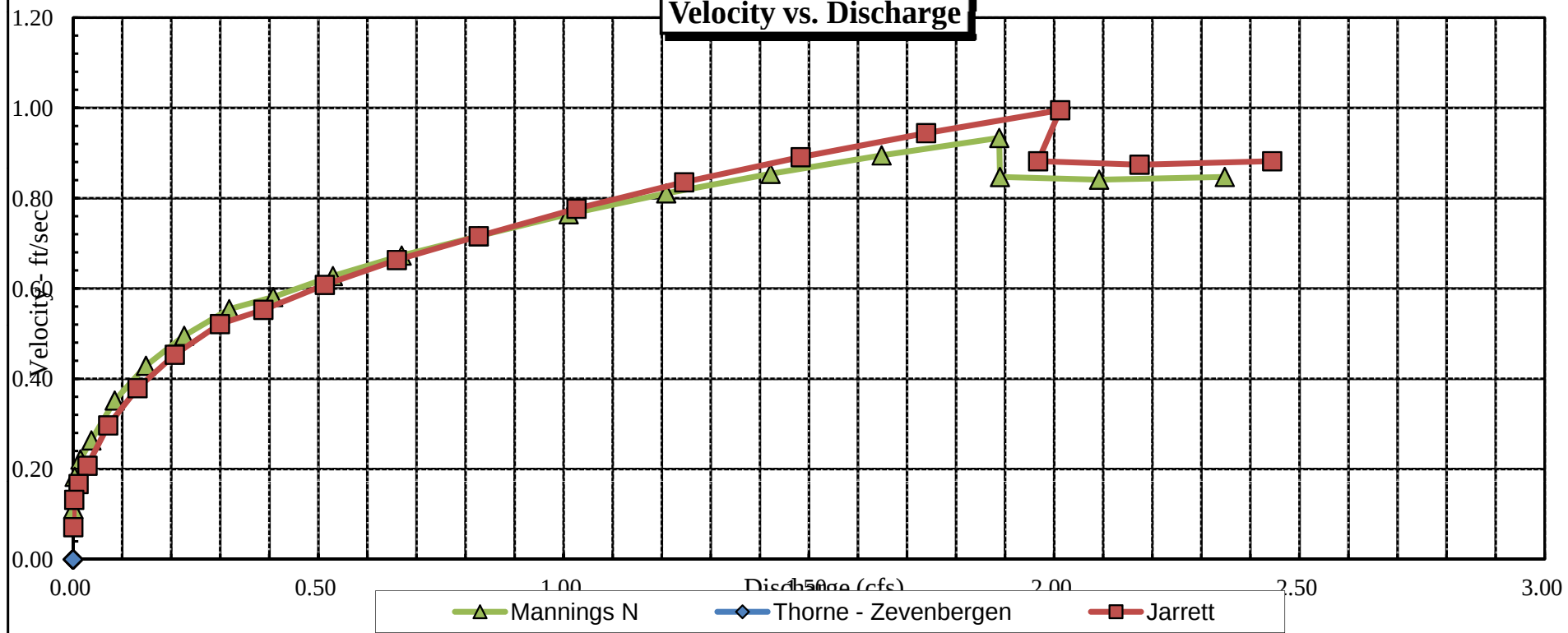
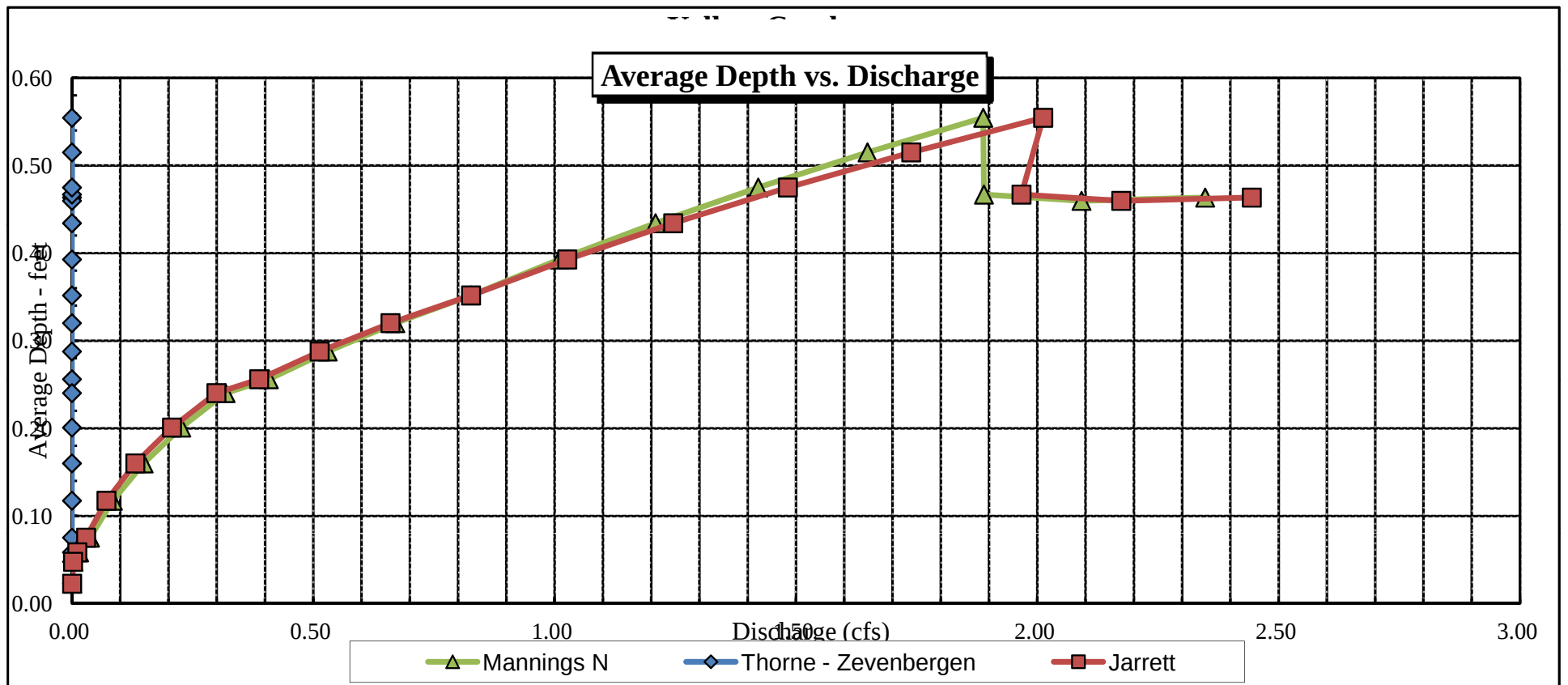


Figure 1

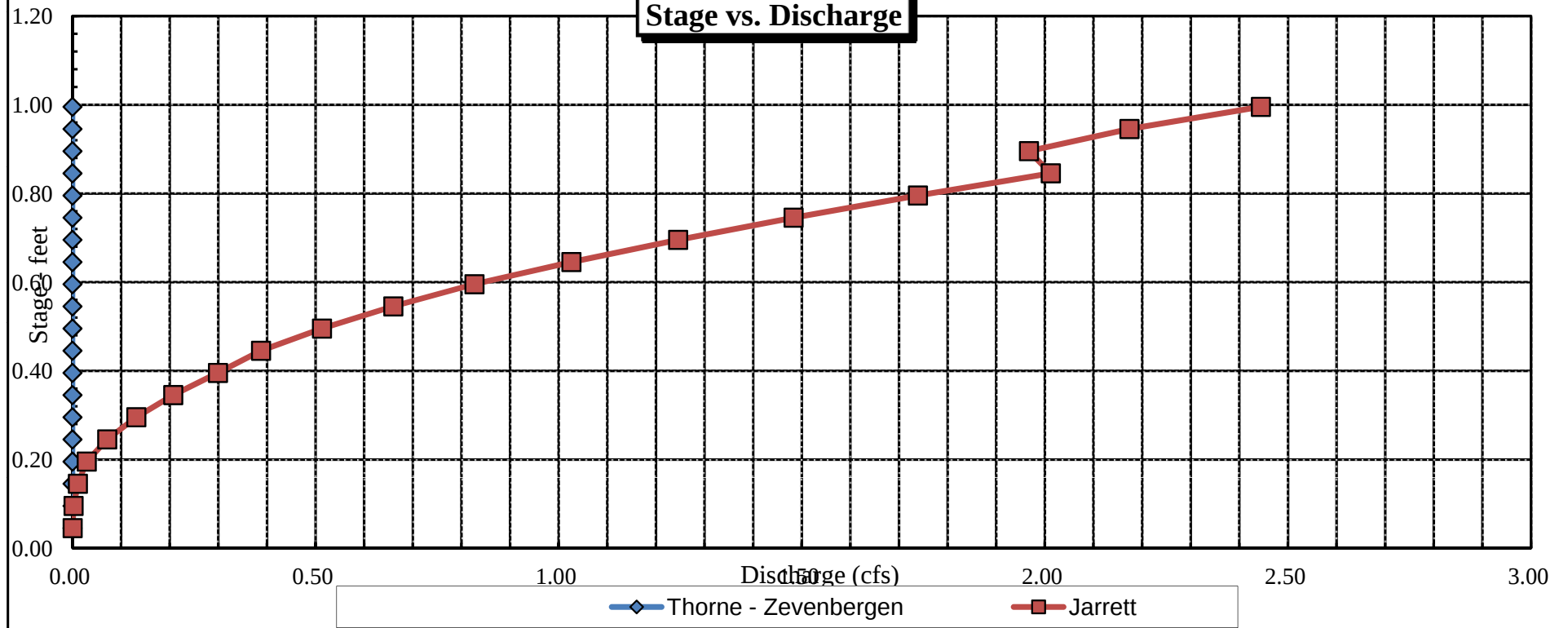


Velocity vs. Discharge





Stage vs. Discharge





COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>Yellow Creek</u>				CROSS-SECTION NO. <u>1</u>	
CROSS-SECTION LOCATION <u>Below Lambert Spring</u>					
DATE: <u>9-27-11</u> OBSERVERS: <u>R. Smith, B. Lange</u>					
LEGAL DESCRIPTION	1/4 SECTION: <u>SW NW</u>	SECTION: <u>15</u>	TOWNSHIP: <u>20 N</u>	RANGE: <u>98 E</u>	PM: <u>6:45</u>
COUNTY: <u>Rio Blanco</u>	WATERSHED: <u>White River</u>		WATER DIVISION: <u>6</u>		DOW WATER CODE: <u>25343</u>
MAP(S):	USGS: <u>GPS Zone 12 722903</u>				
	USFS: <u>4447247</u>				

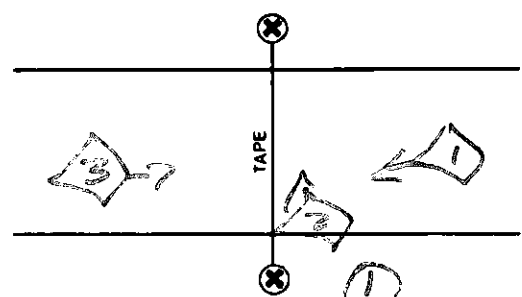
SUPPLEMENTAL DATA

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

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	<u>surveyed</u>
⊗ Tape @ Stake RB	0.0	<u>surveyed</u>
① WS @ Tape LB/RB	0.0	<u>4.81/4.82</u>
② WS Upstream	<u>12.7</u>	<u>4.70</u>
③ WS Downstream	<u>10.9</u>	<u>4.88</u>
SLOPE: <u>0.18 / 23.6 = .008</u>		

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																	
<u>mayfly, black fly</u>																	

COMMENTS

<u>PK = 8.35</u>
<u>Temp = 15.40</u>
<u>Cond = 332</u>
<u>Salinity = 1.7</u>

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:						CROSS-SECTION NO.	DATE:	SHEET		
<u>Yellow Crk</u>							<u>9/27/11</u>	<u>1 OF 1</u>		
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)				LEFT / RIGHT	Gage Reading:	TIME			
Stake 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) At Point Mean in Vertical	Area (ft ²)	Discharge (cfs)
RS	0.0		3.22							
RG	1.8		4.01							
	2.2		4.39							
RW	2.7		4.82							
LW	3.0		4.81							
	9.0		4.38							
	11.0		4.34							
	13.6		4.65							
LG	14.0		4.0							
LS	14.7		4.50							
TJ	3.0		4.85	0.05				V		
	3.3		4.9	0.1				0.06		
	3.6		5.0	0.2				0.67		
	3.9		5.0	0.2				1.21		
	4.2		5.0	0.2				1.62		
	4.5		5.0	0.2				1.41		
	4.8		5.0	0.2				1.47		
	5.1		5.05	0.25				1.55		
	5.4		5.10	0.3				1.42		
	5.7		5.10	0.3				1.40		
	6.0		5.10	0.3				1.42		
	6.3		5.05	0.25				1.30		
	6.6		5.10	0.3				0.88		
	6.9		5.05	0.25				1.09		
	7.2		5.0	0.2				0.67		
	7.5		5.0	0.2				0.07		
TOTALS										
End of Measurement	Time	Gage Reading	CALCULATIONS PERFORMED BY				CALCULATIONS CHECKED BY			

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

LOCATION INFORMATION

STREAM NAME: Yellow Creek
XS LOCATION: below Lambert Spring
XS NUMBER: 1

DATE: 27-Sep-11
OBSERVERS: R. Smith, B. Lange, K. Sauter

1/4 SEC: SW NW
SECTION: 15
TWP: 2N
RANGE: 98W
PM: Sixth

COUNTY: Rio Blanco
WATERSHED: White River
DIVISION: 6
DOW CODE: 25242

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: 0.008

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Yellow Creek
 XS LOCATION: below Lambert Spring
 XS NUMBER: 1

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	RS	0.00	3.22			0.00		0.00	0.00	0.0%
1	G	1.80	4.01			0.00		0.00	0.00	0.0%
		2.20	4.39			0.00		0.00	0.00	0.0%
	W	2.70	4.82	0.00	0.00	0.00		0.00	0.00	0.0%
		3.00	4.85	0.05	0.00	0.30	0.05	0.02	0.00	0.0%
		3.30	4.90	0.10	0.06	0.30	0.10	0.03	0.00	0.2%
		3.60	5.00	0.20	0.67	0.32	0.20	0.06	0.04	3.4%
		3.90	5.00	0.20	1.21	0.30	0.20	0.06	0.07	6.1%
		4.20	5.00	0.20	1.62	0.30	0.20	0.06	0.10	8.2%
		4.50	5.00	0.20	1.41	0.30	0.20	0.06	0.08	7.1%
		4.80	5.00	0.20	1.47	0.30	0.20	0.06	0.09	7.4%
		5.10	5.05	0.25	1.55	0.30	0.25	0.08	0.12	9.8%
		5.40	5.10	0.30	1.42	0.30	0.30	0.09	0.13	10.7%
		5.70	5.10	0.30	1.40	0.30	0.30	0.09	0.13	10.6%
		6.00	5.10	0.30	1.48	0.30	0.30	0.09	0.13	11.2%
		6.30	5.05	0.25	1.30	0.30	0.25	0.08	0.10	8.2%
		6.60	5.10	0.30	0.88	0.30	0.30	0.09	0.08	6.6%
		6.90	5.05	0.25	1.09	0.30	0.25	0.08	0.08	6.9%
		7.20	5.00	0.20	0.67	0.30	0.20	0.06	0.04	3.4%
		7.50	5.00	0.20	0.07	0.30	0.20	0.08	0.01	0.5%
	W	8.00	4.81	0.00	0.00	0.53		0.00	0.00	0.0%
		9.00	4.38			0.00		0.00	0.00	0.0%
		11.00	4.34			0.00		0.00	0.00	0.0%
		13.60	4.65			0.00		0.00	0.00	0.0%
1	G	14.00	4.00			0.00		0.00	0.00	0.0%
	LS	14.70	3.50			0.00		0.00	0.00	0.0%
TOTALS -----						5.38	0.3	1.07	1.19	100.0%
						(Max.)				
						Manning's n =		0.0406		
						Hydraulic Radius=		0.19882659		

STREAM NAME: Yellow Creek
 XS LOCATION: below Lambert Spring
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.07	1.00	-6.9%
4.57	1.07	2.46	130.0%
4.59	1.07	2.32	117.3%
4.61	1.07	2.19	105.0%
4.63	1.07	2.07	93.2%
4.65	1.07	1.95	81.9%
4.67	1.07	1.83	71.0%
4.69	1.07	1.71	60.2%
4.71	1.07	1.60	49.5%
4.73	1.07	1.49	38.9%
4.75	1.07	1.38	28.5%
4.77	1.07	1.27	18.2%
4.78	1.07	1.21	13.1%
4.79	1.07	1.16	8.1%
4.80	1.07	1.10	3.0%
4.81	1.07	1.05	-1.9%
4.82	1.07	1.00	-6.9%
4.83	1.07	0.94	-11.8%
4.84	1.07	0.89	-16.6%
4.85	1.07	0.84	-21.3%
4.86	1.07	0.79	-25.9%
4.87	1.07	0.74	-30.4%
4.89	1.07	0.65	-39.2%
4.91	1.07	0.56	-47.6%
4.93	1.07	0.47	-55.8%
4.95	1.07	0.39	-63.7%
4.97	1.07	0.30	-71.5%
4.99	1.07	0.22	-79.1%
5.01	1.07	0.15	-85.7%
5.03	1.07	0.11	-89.8%
5.05	1.07	0.07	-93.5%
5.07	1.07	0.04	-96.7%

WATERLINE AT ZERO
 AREA ERROR = 4.801

STREAM NAME: Yellow Creek
 XS LOCATION: below Lambert Spring
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.01	12.19	0.68	1.09	8.31	13.05	100.0%	0.64	20.11	2.42
	4.05	12.13	0.64	1.05	7.81	12.94	99.2%	0.60	18.23	2.34
	4.10	12.04	0.60	1.00	7.20	12.81	98.2%	0.56	16.05	2.23
	4.15	11.96	0.55	0.95	6.60	12.68	97.2%	0.52	13.98	2.12
	4.20	11.88	0.51	0.90	6.01	12.55	96.2%	0.48	12.03	2.00
	4.25	11.79	0.46	0.85	5.42	12.42	95.1%	0.44	10.19	1.88
	4.30	11.71	0.41	0.80	4.83	12.29	94.1%	0.39	8.47	1.75
	4.35	10.98	0.39	0.75	4.25	11.51	88.2%	0.37	7.15	1.68
	4.40	8.98	0.42	0.70	3.76	9.45	72.4%	0.40	6.67	1.77
	4.45	8.35	0.40	0.65	3.33	8.77	67.2%	0.38	5.72	1.72
	4.50	7.73	0.38	0.60	2.93	8.09	61.9%	0.36	4.87	1.66
	4.55	7.11	0.36	0.55	2.56	7.40	56.7%	0.35	4.12	1.61
	4.60	6.48	0.34	0.50	2.22	6.72	51.5%	0.33	3.47	1.56
	4.65	5.87	0.33	0.45	1.91	6.04	46.3%	0.32	2.90	1.52
	4.70	5.69	0.28	0.40	1.62	5.84	44.7%	0.28	2.26	1.39
	4.75	5.52	0.24	0.35	1.34	5.64	43.2%	0.24	1.68	1.26
WL	4.80	5.34	0.20	0.30	1.07	5.43	41.6%	0.20	1.18	1.11
	4.85	4.89	0.17	0.25	0.81	4.96	38.0%	0.16	0.79	0.98
	4.90	4.46	0.13	0.20	0.58	4.52	34.6%	0.13	0.48	0.83
	4.95	4.18	0.09	0.15	0.36	4.22	32.3%	0.09	0.23	0.64
	5.00	2.39	0.07	0.10	0.16	2.41	18.5%	0.07	0.09	0.54
	5.05	1.77	0.03	0.05	0.06	1.79	13.7%	0.03	0.02	0.33

STREAM NAME: Yellow Creek
XS LOCATION: below Lambert Spring
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 1.19 cfs
CALCULATED FLOW (Qc)= 1.18 cfs
(Qm-Qc)/Qm * 100 = 0.6 %

MEASURED WATERLINE (WLm)= 4.82 ft
CALCULATED WATERLINE (WLc)= 4.80 ft
(WLm-WLc)/WLm * 100 = 0.3 %

MAX MEASURED DEPTH (Dm)= 0.30 ft
MAX CALCULATED DEPTH (Dc)= 0.30 ft
(Dm-Dc)/Dm * 100 = 0.4 %

MEAN VELOCITY= 1.11 ft/sec
MANNING'S N= 0.041
SLOPE= 0.008 ft/ft

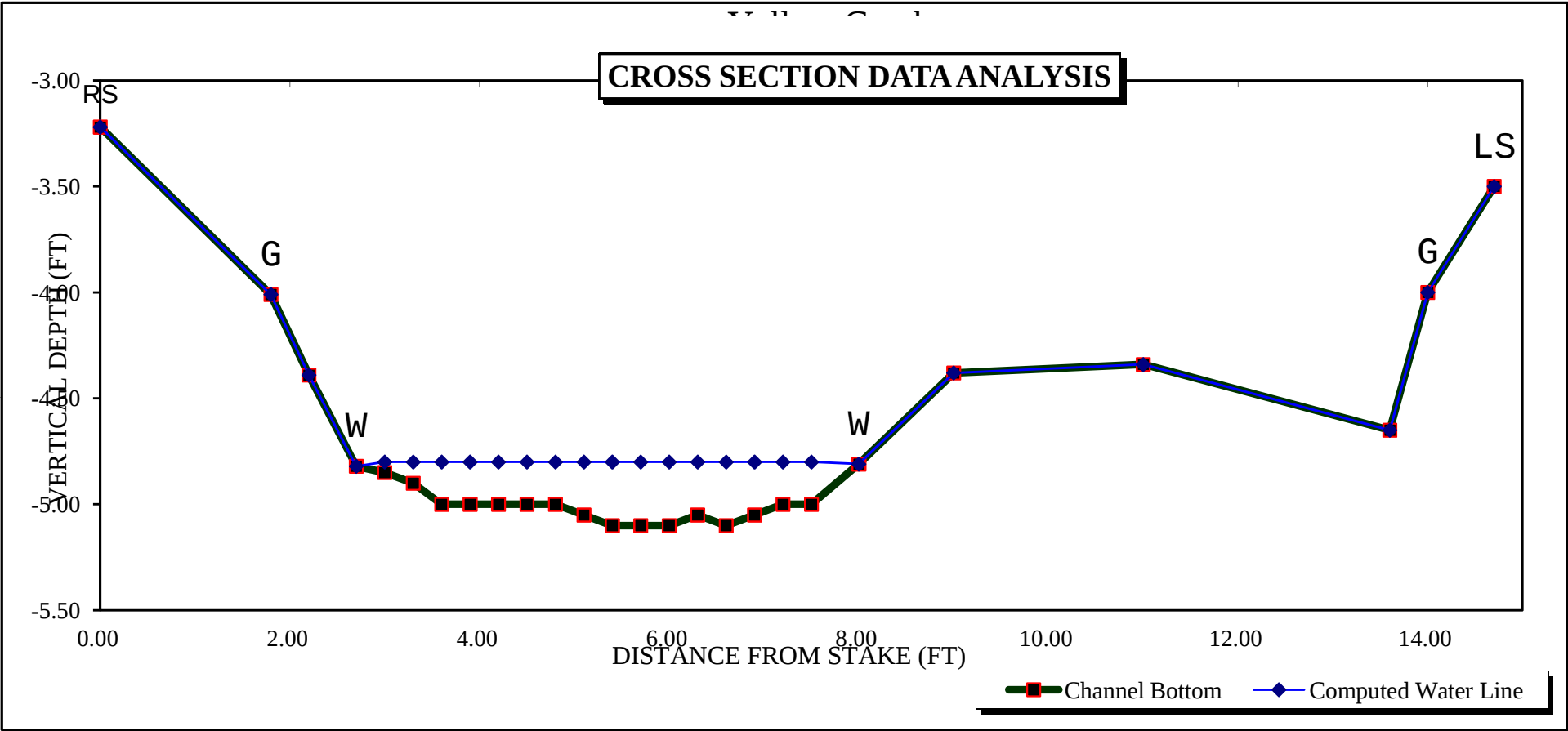
.4 * Qm = 0.5 cfs
2.5 * Qm= 3.0 cfs

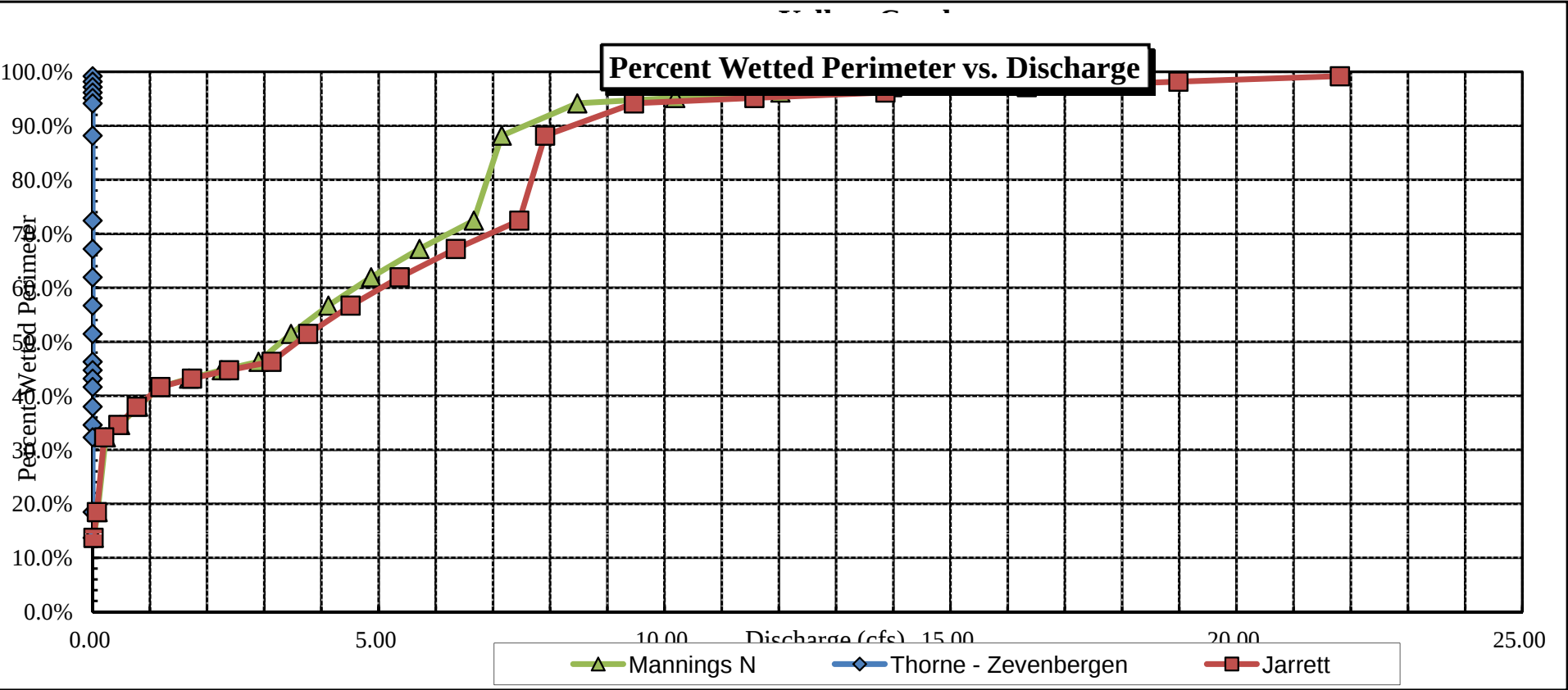
RECOMMENDED INSTREAM FLOW:
=====

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

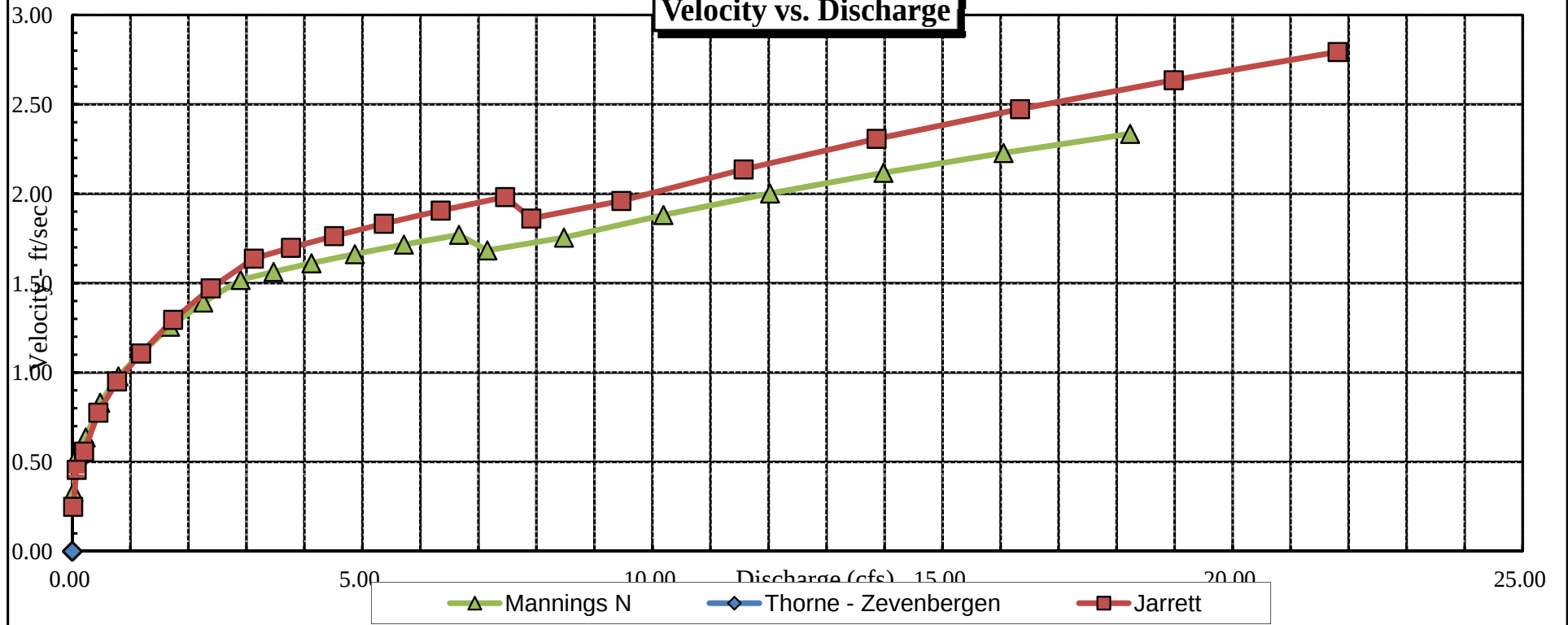
RATIONALE FOR RECOMMENDATION:
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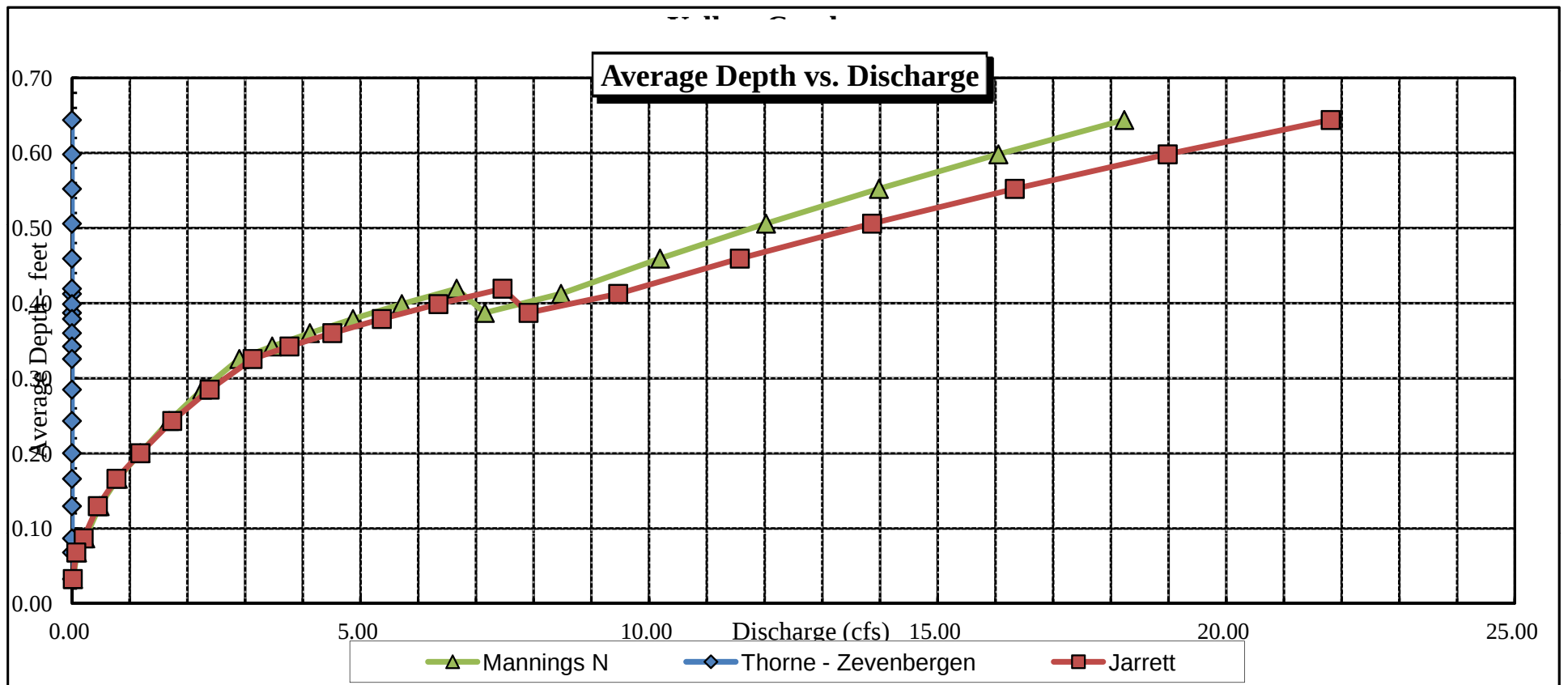
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....



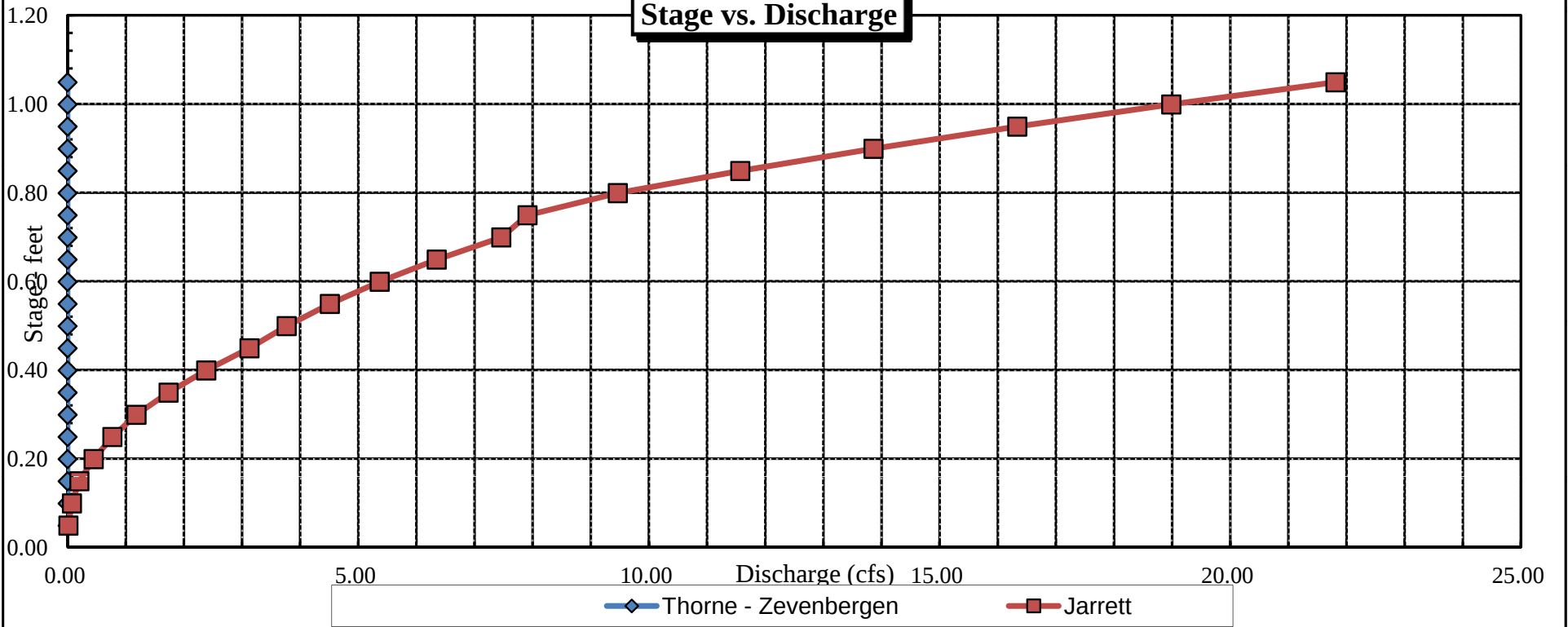


Velocity vs. Discharge





Stage vs. Discharge





COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: <u>Yellow Creek</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>Below Lambert Spring</u>		
DATE: <u>9-27-11</u>	OBSERVERS: <u>R. Smith, B. Lange</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>SW 1/4</u>	SECTION: <u>15</u>
	TOWNSHIP: <u>20N</u>	RANGE: <u>98E</u>
COUNTY: <u>Pio Blanco</u>	WATERSHED: <u>White River</u>	WATER DIVISION: <u>6</u>
		DOW WATER CODE: <u>25343</u>
MAP(S):	USGS:	USFS: <u>GPS Zone 12 4447036</u>

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: <u>YES</u>	METER TYPE: <u>M-M</u>
METER NUMBER:	DATE RATED:
CALIB/SPIN: <u>58C</u>	TAPE WEIGHT: <u>5.0</u> lbs/100'
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel</u>	TAPE TENSION: <u>5.0</u> lbs
PHOTOGRAPHS TAKEN: <u>YES</u>	NUMBER OF PHOTOGRAPHS: <u>3</u>

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	<u>5.74</u>
⊗ Tape @ Stake RB	0.0	<u>5.74</u>
① WS @ Tape LB/RB	0.0	<u>5.74/5.74</u>
② WS Upstream	<u>22.7</u>	<u>5.52</u>
③ WS Downstream	<u>14.0</u>	<u>5.82</u>
SLOPE	<u>0.30 / 36.7 = .008</u>	

SKETCH

LEGEND:
Stake ⊗
Station ①
Photo ◇
Direction of Flow →

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: <u>YES</u>	DISTANCE ELECTROFISHED: <u>11</u>	FISH CAUGHT: <u>YES</u>	WATER CHEMISTRY SAMPLED: <u>YES</u>														
LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)																	
SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL
AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:																	
<u>mayfly, black fly</u>																	

COMMENTS

<u>Ph = 8.35</u>
<u>Temp = 15.4°</u>
<u>Cond = 3324</u>
<u>Salinity = 1.7</u>

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Yellow Crk.						CROSS-SECTION NO.: 2	DATE: 9/27	SHEET 1 OF 1				
BEGINNING OF MEASUREMENT			EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)		LEFT / RIGHT	Gage Reading: — ft	TIME: 1325					
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		
LS		0.0		3.90								
LG		2.7		4.80								
		4.0		5.47								
LW		4.5		5.74								
				T		D		V				
				4.8	6.0	0.25		0.01				
				5.1	6.05	0.3		0.17				
				5.4	5.95	0.2		0.50				
				5.7	5.95	0.2		0.92				
				6.0	5.95	0.2		1.42				
				6.3	5.95	0.2		1.51				
				6.6	5.95	0.2		1.30				
				6.9	5.95	0.2		0.80				
				7.2	5.95	0.2		0.89				
				7.5	5.95	0.2		0.96				
				7.8	5.95	0.2		0.96				
				8.1	5.95	0.2		1.10				
				8.4	5.95	0.2		1.21				
				8.7	5.95	0.2		1.63				
				9.0	5.95	0.2		1.40				
				9.3	6.05	0.3		0.67				
				9.6	6.10	0.35		0.10				
				9.9	6.10	0.35		0				
RW		10.1		5.74								
		10.2		5.35								
RG		11.3		4.82								
		12.0		4.50								
RS		15.5		4.20								
TOTALS:												
End of Measurement		Time	Gage Reading		CALCULATIONS PERFORMED BY			CALCULATIONS CHECKED BY				

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

LOCATION INFORMATION

STREAM NAME: Yellow Creek
XS LOCATION: Downstream from Lambert Spring
XS NUMBER: 2

DATE: 27-Sep-11
OBSERVERS: R. Smith, B. Lange, K. Sauter

1/4 SEC: SW NW
SECTION: 15
TWP: 2N
RANGE: 98W
PM: Sixth

COUNTY: Rio Blanco
WATERSHED: White River
DIVISION: 6
DOW CODE: 25343

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: 0.008

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Yellow Creek
 XS LOCATION: Downstream from Lambert Spring
 XS NUMBER: 2

DATA POINTS= 27

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	3.90		
1 G	2.70	4.80		
	4.00	5.47		
W	4.50	5.74	0.00	
	4.80	6.00	0.25	0.00
	5.10	6.05	0.30	0.01
	5.40	5.95	0.20	0.17
	5.70	5.95	0.20	0.50
	6.00	5.95	0.20	0.92
	6.30	5.95	0.20	1.42
	6.60	5.95	0.20	1.51
	6.90	5.95	0.20	1.30
	7.20	5.95	0.20	0.80
	7.50	5.95	0.20	0.89
	7.80	5.95	0.20	0.90
	8.10	5.95	0.20	0.96
	8.40	5.95	0.20	1.10
	8.70	5.95	0.20	1.81
	9.00	5.95	0.20	1.63
	9.30	6.05	0.30	1.40
	9.60	6.10	0.35	0.69
	9.90	6.10	0.35	0.10
W	10.10	5.74	0.00	0.00
	10.80	5.35		
1 G	11.30	4.82		
	12.00	4.50		
RS	15.50	4.20		

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%
0.40	0.25	0.08	0.00	0.0%
0.30	0.30	0.09	0.00	0.1%
0.32	0.20	0.06	0.01	1.0%
0.30	0.20	0.06	0.03	2.9%
0.30	0.20	0.06	0.06	5.3%
0.30	0.20	0.06	0.09	8.2%
0.30	0.20	0.06	0.09	8.7%
0.30	0.20	0.06	0.08	7.5%
0.30	0.20	0.06	0.05	4.6%
0.30	0.20	0.06	0.05	5.1%
0.30	0.20	0.06	0.05	5.2%
0.30	0.20	0.06	0.06	5.5%
0.30	0.20	0.06	0.07	6.3%
0.30	0.20	0.06	0.11	10.4%
0.30	0.20	0.06	0.10	9.4%
0.32	0.30	0.09	0.13	12.1%
0.30	0.35	0.11	0.07	6.9%
0.30	0.35	0.09	0.01	0.8%
0.41		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

5.95 0.35 1.23 1.04 100.0%
 (Max.)

Manning's n = 0.0546
 Hydraulic Radius= 0.20631828

STREAM NAME: Yellow Creek
 XS LOCATION: Downstream from Lambert Spring
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.23	1.28	4.4%
5.49	1.23	2.79	127.7%
5.51	1.23	2.67	117.1%
5.53	1.23	2.54	106.7%
5.55	1.23	2.41	96.4%
5.57	1.23	2.29	86.2%
5.59	1.23	2.16	76.1%
5.61	1.23	2.04	66.2%
5.63	1.23	1.92	56.3%
5.65	1.23	1.80	46.6%
5.67	1.23	1.68	37.0%
5.69	1.23	1.57	27.5%
5.70	1.23	1.51	22.8%
5.71	1.23	1.45	18.2%
5.72	1.23	1.39	13.5%
5.73	1.23	1.34	8.9%
5.74	1.23	1.28	4.4%
5.75	1.23	1.23	-0.2%
5.76	1.23	1.17	-4.7%
5.77	1.23	1.11	-9.3%
5.78	1.23	1.06	-13.8%
5.79	1.23	1.00	-18.3%
5.81	1.23	0.89	-27.2%
5.83	1.23	0.78	-36.1%
5.85	1.23	0.68	-45.0%
5.87	1.23	0.57	-53.8%
5.89	1.23	0.46	-62.5%
5.91	1.23	0.35	-71.2%
5.93	1.23	0.25	-79.8%
5.95	1.23	0.14	-88.4%
5.97	1.23	0.11	-90.9%
5.99	1.23	0.08	-93.2%

WATERLINE AT ZERO

AREA ERROR = 5.750

STREAM NAME: Yellow Creek
 XS LOCATION: Downstream from Lambert Spring
 XS NUMBER: 2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	4.82	8.56	0.92	1.28	7.88	9.47	100.0%	0.83	16.95	2.15
	4.85	8.48	0.90	1.25	7.62	9.36	98.9%	0.81	16.17	2.12
	4.90	8.33	0.86	1.20	7.20	9.18	97.0%	0.78	14.91	2.07
	4.95	8.19	0.83	1.15	6.79	9.01	95.1%	0.75	13.69	2.02
	5.00	8.04	0.79	1.10	6.38	8.83	93.3%	0.72	12.52	1.96
	5.05	7.90	0.76	1.05	5.99	8.65	91.4%	0.69	11.39	1.90
	5.10	7.76	0.72	1.00	5.59	8.47	89.5%	0.66	10.32	1.84
	5.15	7.61	0.68	0.95	5.21	8.29	87.6%	0.63	9.30	1.78
	5.20	7.47	0.65	0.90	4.83	8.12	85.7%	0.60	8.32	1.72
	5.25	7.32	0.61	0.85	4.46	7.94	83.9%	0.56	7.40	1.66
	5.30	7.18	0.57	0.80	4.10	7.76	82.0%	0.53	6.52	1.59
	5.35	7.03	0.53	0.75	3.75	7.58	80.1%	0.49	5.70	1.52
	5.40	6.85	0.50	0.70	3.40	7.37	77.9%	0.46	4.94	1.45
	5.45	6.66	0.46	0.65	3.06	7.16	75.6%	0.43	4.23	1.38
	5.50	6.48	0.42	0.60	2.73	6.95	73.4%	0.39	3.57	1.31
	5.55	6.29	0.38	0.55	2.41	6.74	71.2%	0.36	2.96	1.23
	5.60	6.11	0.34	0.50	2.10	6.53	69.0%	0.32	2.40	1.14
	5.65	5.93	0.30	0.45	1.80	6.33	66.8%	0.28	1.90	1.05
	5.70	5.75	0.26	0.40	1.51	6.12	64.6%	0.25	1.45	0.96
WL	5.75	5.58	0.22	0.35	1.23	5.92	62.6%	0.21	1.05	0.85
	5.80	5.50	0.17	0.30	0.95	5.79	61.2%	0.16	0.69	0.73
	5.85	5.41	0.13	0.25	0.68	5.66	59.8%	0.12	0.40	0.59
	5.90	5.33	0.08	0.20	0.41	5.52	58.3%	0.07	0.18	0.43
	5.95	1.64	0.09	0.15	0.14	1.79	18.9%	0.08	0.07	0.45
	6.00	1.26	0.06	0.10	0.07	1.34	14.2%	0.05	0.02	0.34
	6.05	0.63	0.04	0.05	0.02	0.66	7.0%	0.04	0.01	0.26
	6.10	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Yellow Creek
XS LOCATION: Downstream from Lambert Spring
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 1.04 cfs
CALCULATED FLOW (Qc)= 1.05 cfs
(Qm-Qc)/Qm * 100 = -0.3 %

MEASURED WATERLINE (WLm)= 5.74 ft
CALCULATED WATERLINE (WLc)= 5.75 ft
(WLm-WLc)/WLm * 100 = -0.2 %

MAX MEASURED DEPTH (Dm)= 0.35 ft
MAX CALCULATED DEPTH (Dc)= 0.35 ft
(Dm-Dc)/Dm * 100 = -0.1 %

MEAN VELOCITY= 0.85 ft/sec
MANNING'S N= 0.055
SLOPE= 0.008 ft/ft

.4 * Qm = 0.4 cfs
2.5 * Qm= 2.6 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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

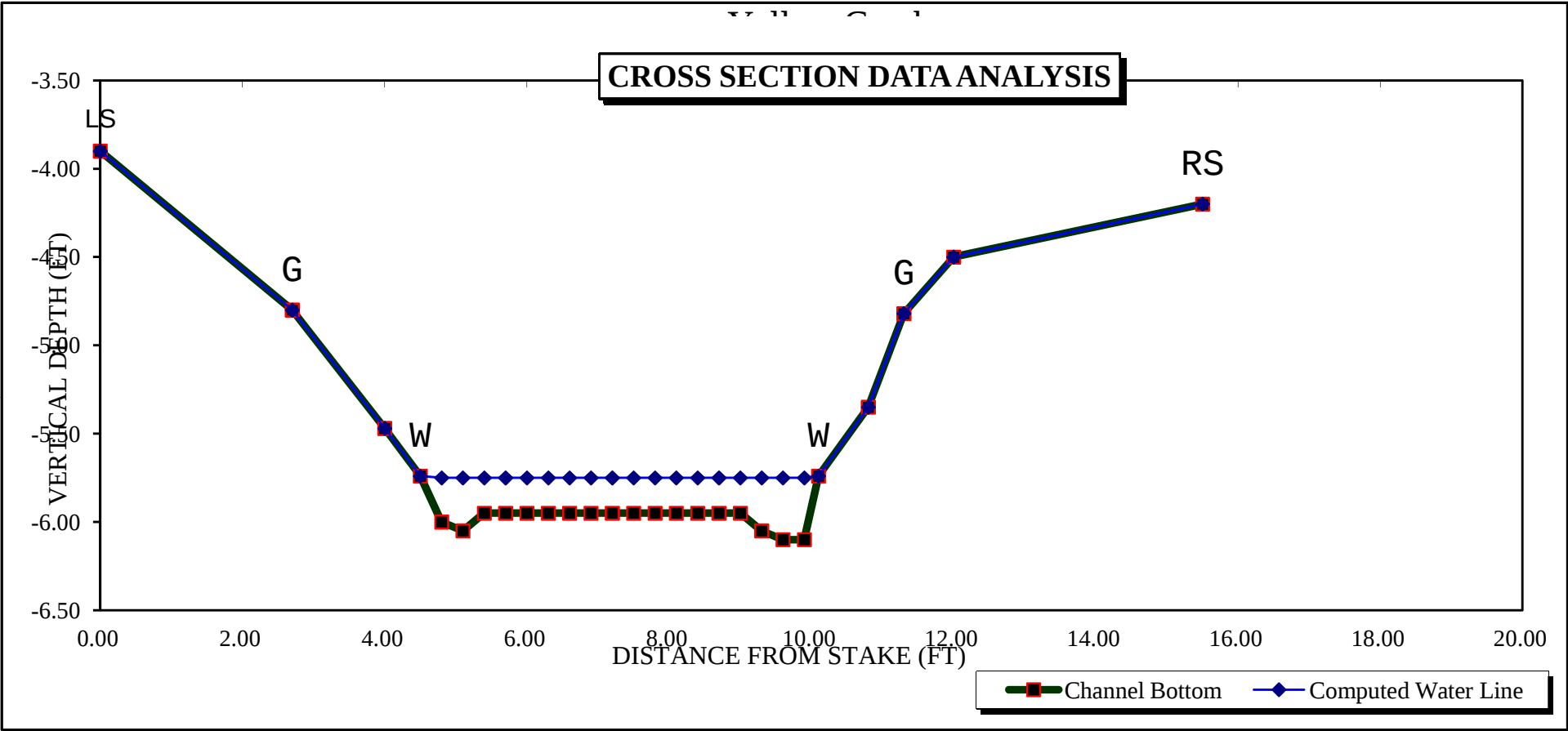
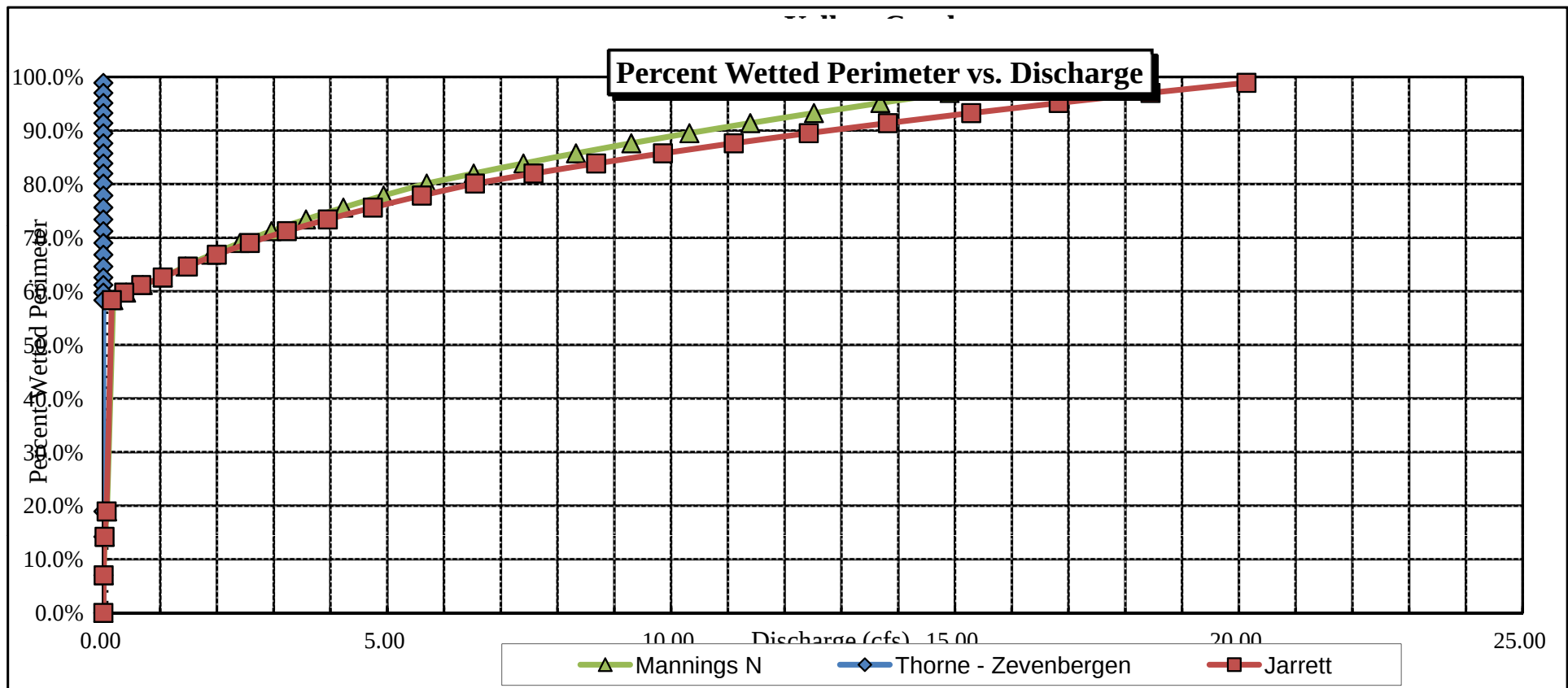
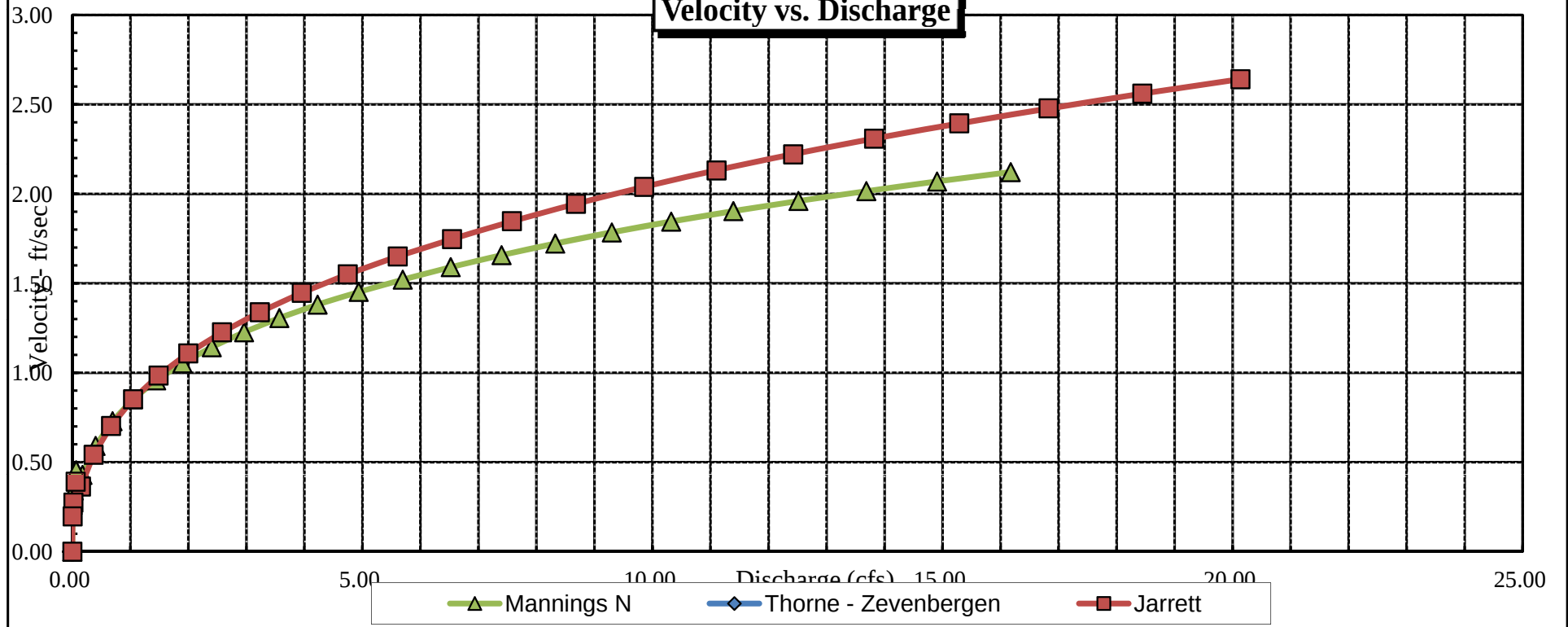
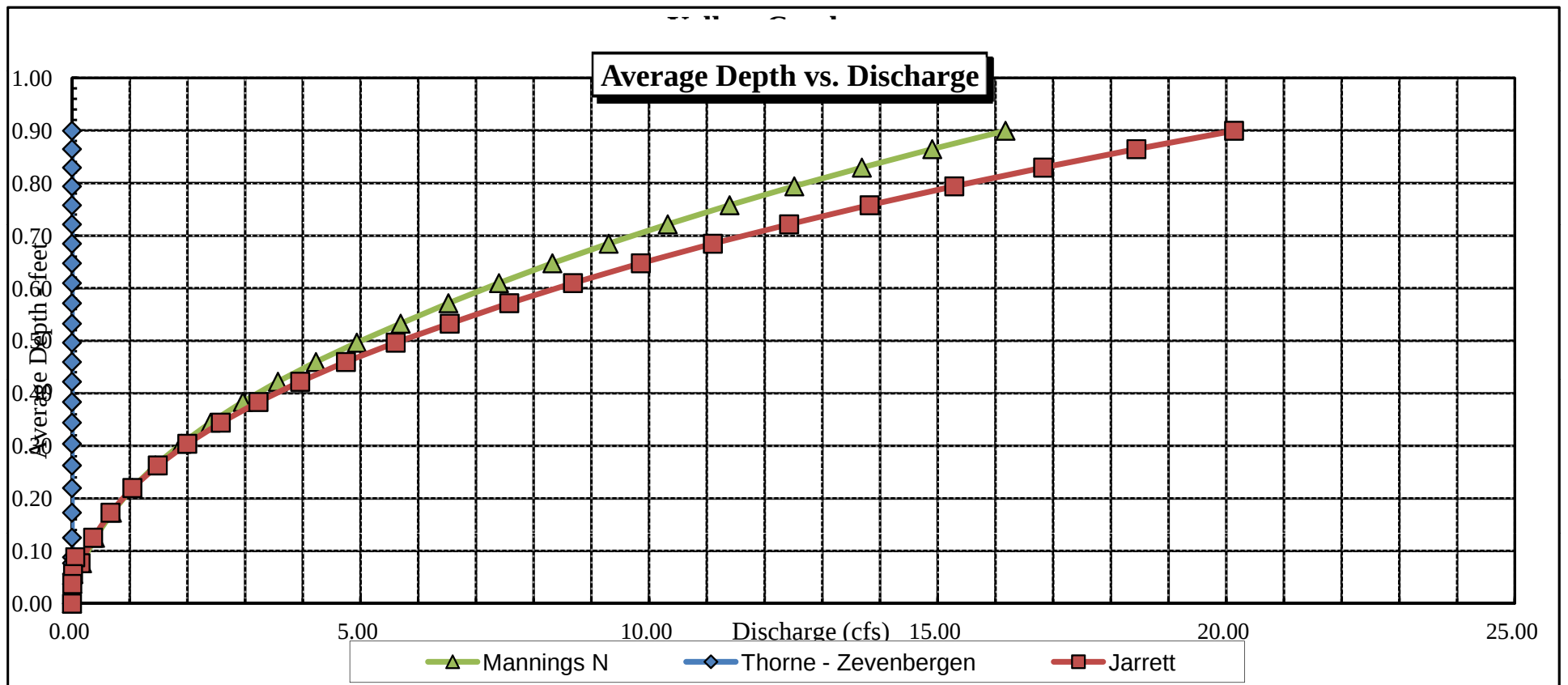


Figure 1

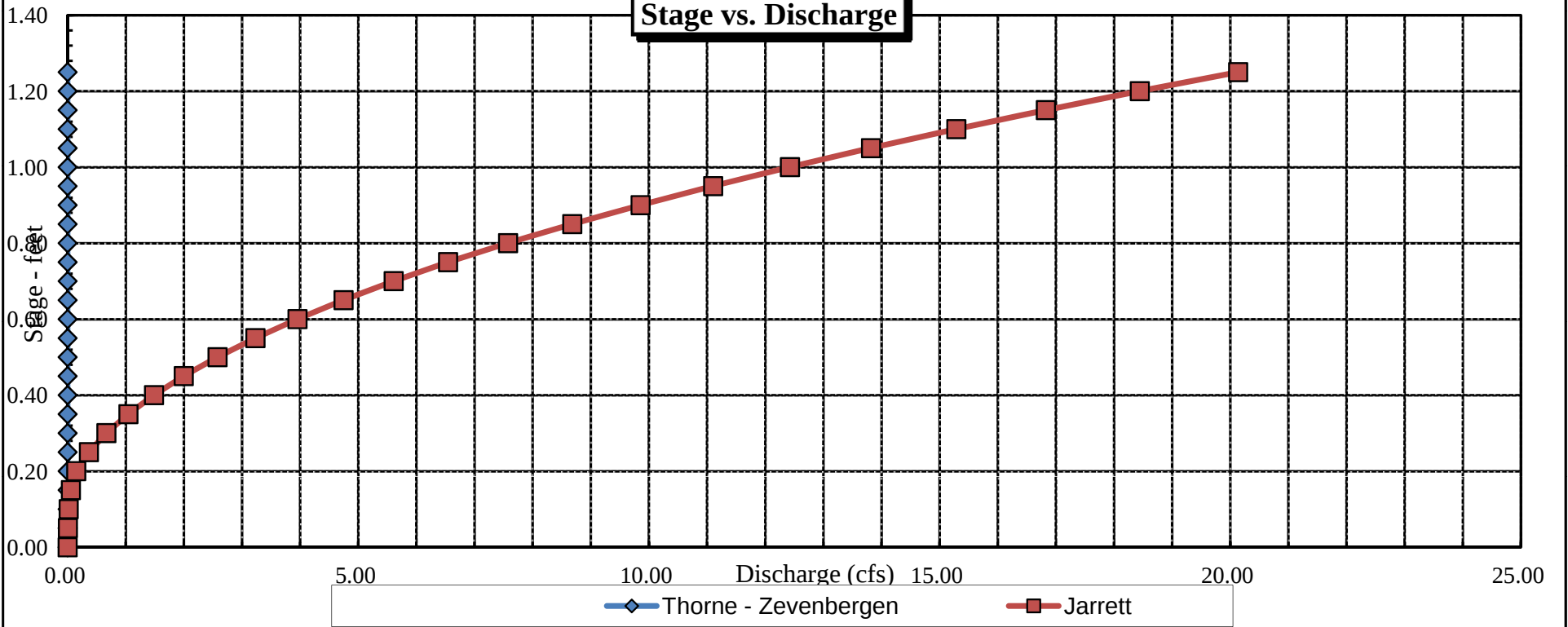


Velocity vs. Discharge





Stage vs. Discharge





FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>Yellow Creek</u>		CROSS-SECTION NO. <u>3</u>
CROSS-SECTION LOCATION <u>above Lambert Spring</u>		
DATE: <u>9-27-11</u>	OBSERVERS: <u>R. Smith, B. Lange</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>NW SE</u>	SECTION: <u>110</u>
	TOWNSHIP: <u>20N</u>	RANGE: <u>98E</u> PM: <u>Sixth</u>
COUNTY: <u>Rio Blanco</u>	WATERSHED: <u>White River</u>	WATER DIVISION: <u>6</u>
		DOW WATER CODE: <u>25343</u>
MAP(S):	USGS: <u>722544</u> <u>GPS Zone 12 1246441</u>	
	USFS:	

SUPPLEMENTAL DATA

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

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)	SKETCH
(X) Tape @ Stake LB	0.0	<u>surveyed</u>	
(X) Tape @ Stake RB	0.0	<u>surveyed</u>	
(1) WS @ Tape LB/RB	0.0	<u>6.96 / 6.96</u>	
(2) WS Upstream	<u>10.3</u>	<u>6.88</u>	
(3) WS Downstream	<u>9.1</u>	<u>7.10</u>	
SLOPE	<u>0.22 / 19.4 = .011</u>		

AQUATIC SAMPLING SUMMARY

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

COMMENTS

<u>PH = 8.65</u>
<u>Temp = 22.7°C</u>
<u>Cond = 3054</u>
<u>Sal = 1.6</u>

DISCHARGE/CROSS SECTION NOTES

[illegible]

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

LOCATION INFORMATION

STREAM NAME: Yellow Creek
XS LOCATION: Above Lambert Spring
XS NUMBER: 3

DATE: 27-Sep-11
OBSERVERS: R. Smith, B. Lange, K. Sauter

1/4 SEC: NW SE
SECTION: 16
TWP: 2N
RANGE: 98W
PM: Sixth

COUNTY: Rio Blanco
WATERSHED: White River
DIVISION: 6
DOW CODE: 25343

USGS MAP: 0
USFS MAP: 0

SUPPLEMENTAL DATA

*** NOTE ***

Leave TAPE WT and TENSION
at defaults for data collected
with a survey level and rod

TAPE WT: 0.0106
TENSION: 99999

CHANNEL PROFILE DATA

SLOPE: 0.011

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Yellow Creek
 XS LOCATION: Above Lambert Spring
 XS NUMBER: 3

DATA POINTS= 18

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		DIST	VERT DEPTH	WATER DEPTH	VEL
1	LS	0.00	5.34		
		2.00	6.02		
	G	2.70	5.96		
	W	3.00	6.96	0.00	0.00
		3.30	7.25	0.30	0.04
		3.60	7.25	0.30	0.09
		3.90	7.15	0.20	0.34
		4.20	7.15	0.20	0.69
		4.50	7.25	0.30	0.94
		4.80	7.25	0.30	1.14
		5.10	7.20	0.25	1.09
		5.40	7.15	0.20	0.59
		5.70	7.15	0.20	0.22
		6.00	7.05	0.10	0.00
	W	6.20	6.96	0.00	0.00
		7.50	6.42		
	G	9.40	5.94		
	RS	11.40	5.36		

TOTALS -----

WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.42	0.30	0.09	0.00	0.9%
0.30	0.30	0.09	0.01	2.1%
0.32	0.20	0.06	0.02	5.2%
0.30	0.20	0.06	0.04	10.6%
0.32	0.30	0.09	0.08	21.6%
0.30	0.30	0.09	0.10	26.2%
0.30	0.25	0.08	0.08	20.9%
0.30	0.20	0.06	0.04	9.1%
0.30	0.20	0.06	0.01	3.4%
0.32	0.10	0.03	0.00	0.0%
0.22		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

3.39	0.3	0.70	0.39	100.0%
(Max.)				

Manning's n = 0.0974
 Hydraulic Radius= 0.20627491

STREAM NAME: Yellow Creek
 XS LOCATION: Above Lambert Spring
 XS NUMBER: 3

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	0.70	0.67	-4.2%
6.71	0.70	1.56	122.2%
6.73	0.70	1.48	111.2%
6.75	0.70	1.40	100.3%
6.77	0.70	1.33	89.6%
6.79	0.70	1.25	79.1%
6.81	0.70	1.18	68.7%
6.83	0.70	1.11	58.5%
6.85	0.70	1.04	48.4%
6.87	0.70	0.97	38.5%
6.89	0.70	0.90	28.7%
6.91	0.70	0.83	19.1%
6.92	0.70	0.80	14.4%
6.93	0.70	0.77	9.7%
6.94	0.70	0.74	5.0%
6.95	0.70	0.70	0.4%
6.96	0.70	0.67	-4.2%
6.97	0.70	0.64	-8.8%
6.98	0.70	0.61	-13.3%
6.99	0.70	0.58	-17.7%
7.00	0.70	0.55	-22.1%
7.01	0.70	0.51	-26.5%
7.03	0.70	0.45	-35.1%
7.05	0.70	0.40	-43.5%
7.07	0.70	0.34	-51.7%
7.09	0.70	0.28	-59.6%
7.11	0.70	0.23	-67.4%
7.13	0.70	0.18	-74.9%
7.15	0.70	0.13	-82.1%
7.17	0.70	0.09	-87.2%
7.19	0.70	0.06	-91.5%
7.21	0.70	0.03	-95.1%

WATERLINE AT ZERO

AREA ERROR = 6.951

STREAM NAME: Yellow Creek
 XS LOCATION: Above Lambert Spring
 XS NUMBER: 3

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	5.96	7.50	0.72	1.29	5.41	8.61	100.0%	0.63	6.36	1.17
	6.00	6.73	0.76	1.25	5.12	7.80	90.5%	0.66	6.20	1.21
	6.05	6.23	0.77	1.20	4.80	7.26	84.3%	0.66	5.84	1.22
	6.10	6.02	0.75	1.15	4.50	7.00	81.3%	0.64	5.36	1.19
	6.15	5.81	0.72	1.10	4.20	6.75	78.3%	0.62	4.91	1.17
	6.20	5.60	0.70	1.05	3.92	6.49	75.3%	0.60	4.48	1.14
	6.25	5.38	0.68	1.00	3.64	6.23	72.4%	0.58	4.08	1.12
	6.30	5.17	0.65	0.95	3.38	5.98	69.4%	0.57	3.70	1.09
	6.35	4.96	0.63	0.90	3.13	5.72	66.4%	0.55	3.34	1.07
	6.40	4.74	0.61	0.85	2.88	5.46	63.4%	0.53	3.01	1.05
	6.45	4.58	0.58	0.80	2.65	5.25	61.0%	0.50	2.69	1.01
	6.50	4.44	0.55	0.75	2.43	5.07	58.9%	0.48	2.37	0.98
	6.55	4.31	0.51	0.70	2.21	4.89	56.7%	0.45	2.08	0.94
	6.60	4.17	0.48	0.65	1.99	4.70	54.6%	0.42	1.80	0.90
	6.65	4.04	0.44	0.60	1.79	4.52	52.5%	0.40	1.54	0.86
	6.70	3.90	0.41	0.55	1.59	4.34	50.4%	0.37	1.30	0.82
	6.75	3.77	0.37	0.50	1.40	4.16	48.3%	0.34	1.08	0.77
	6.80	3.63	0.33	0.45	1.21	3.97	46.2%	0.31	0.88	0.73
	6.85	3.50	0.30	0.40	1.04	3.79	44.0%	0.27	0.70	0.67
	6.90	3.36	0.26	0.35	0.86	3.61	41.9%	0.24	0.53	0.62
WL	6.95	3.22	0.22	0.30	0.70	3.43	39.8%	0.20	0.39	0.55
	7.00	3.07	0.18	0.25	0.54	3.24	37.6%	0.17	0.26	0.49
	7.05	2.90	0.14	0.20	0.39	3.04	35.3%	0.13	0.16	0.41
	7.10	2.70	0.09	0.15	0.25	2.81	32.6%	0.09	0.08	0.32
	7.15	1.89	0.07	0.10	0.12	1.97	22.9%	0.06	0.03	0.25
	7.20	1.24	0.04	0.05	0.05	1.28	14.9%	0.04	0.01	0.17

STREAM NAME: Yellow Creek
XS LOCATION: Above Lambert Spring
XS NUMBER: 3

SUMMARY SHEET

MEASURED FLOW (Qm)= 0.39 cfs
CALCULATED FLOW (Qc)= 0.39 cfs
(Qm-Qc)/Qm * 100 = 0.7 %

MEASURED WATERLINE (WLm)= 6.96 ft
CALCULATED WATERLINE (WLc)= 6.95 ft
(WLm-WLc)/WLm * 100 = 0.1 %

MAX MEASURED DEPTH (Dm)= 0.30 ft
MAX CALCULATED DEPTH (Dc)= 0.30 ft
(Dm-Dc)/Dm * 100 = 0.3 %

MEAN VELOCITY= 0.55 ft/sec
MANNING'S N= 0.097
SLOPE= 0.011 ft/ft

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

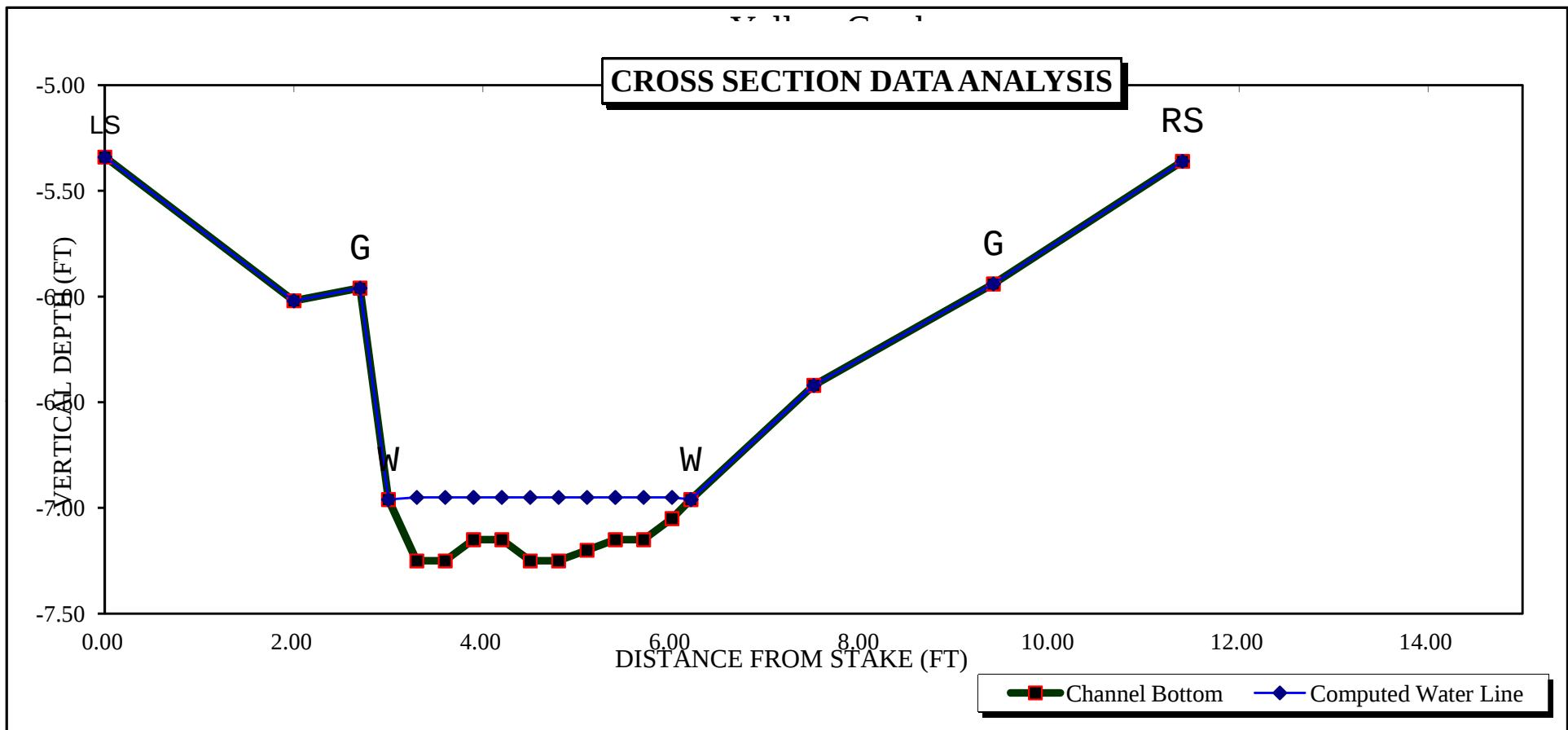
RECOMMENDED INSTREAM FLOW:
=====

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

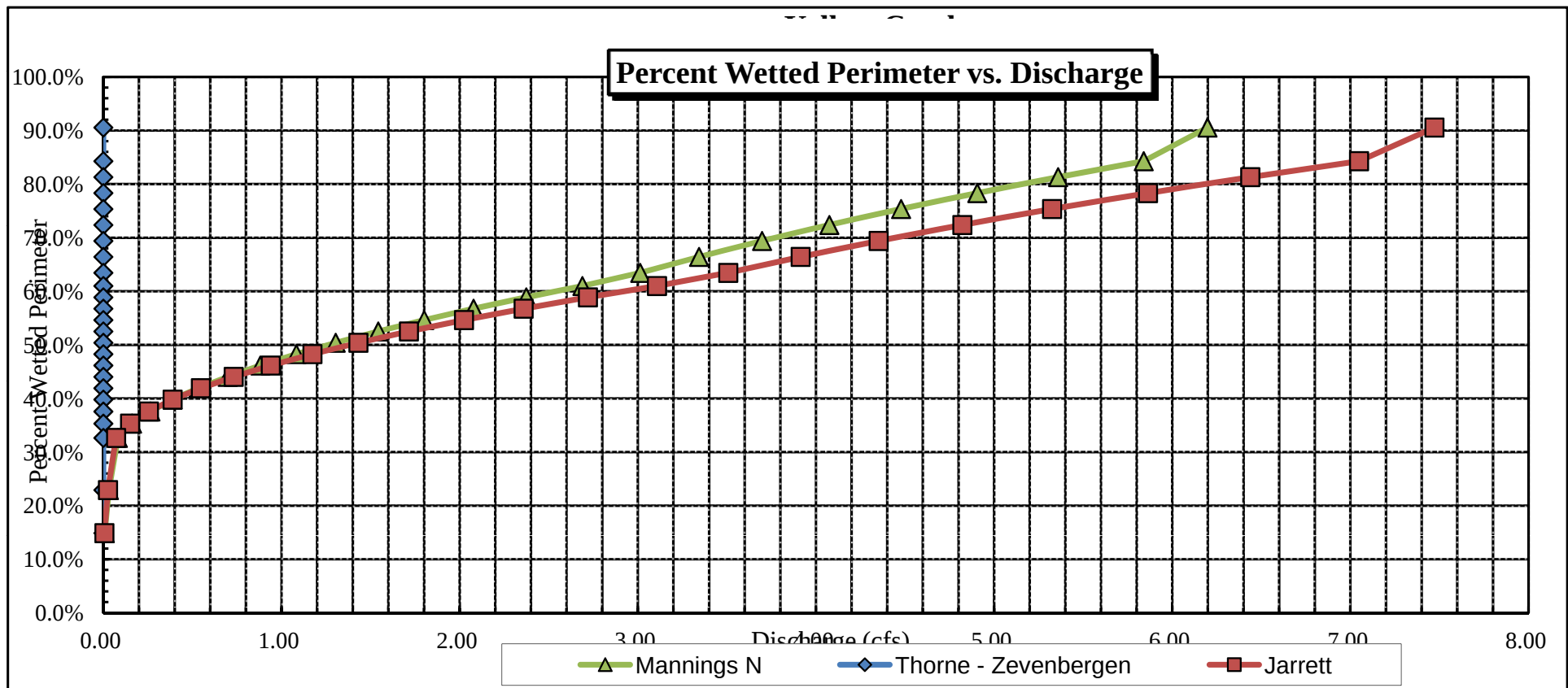
RATIONALE FOR RECOMMENDATION:
=====

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

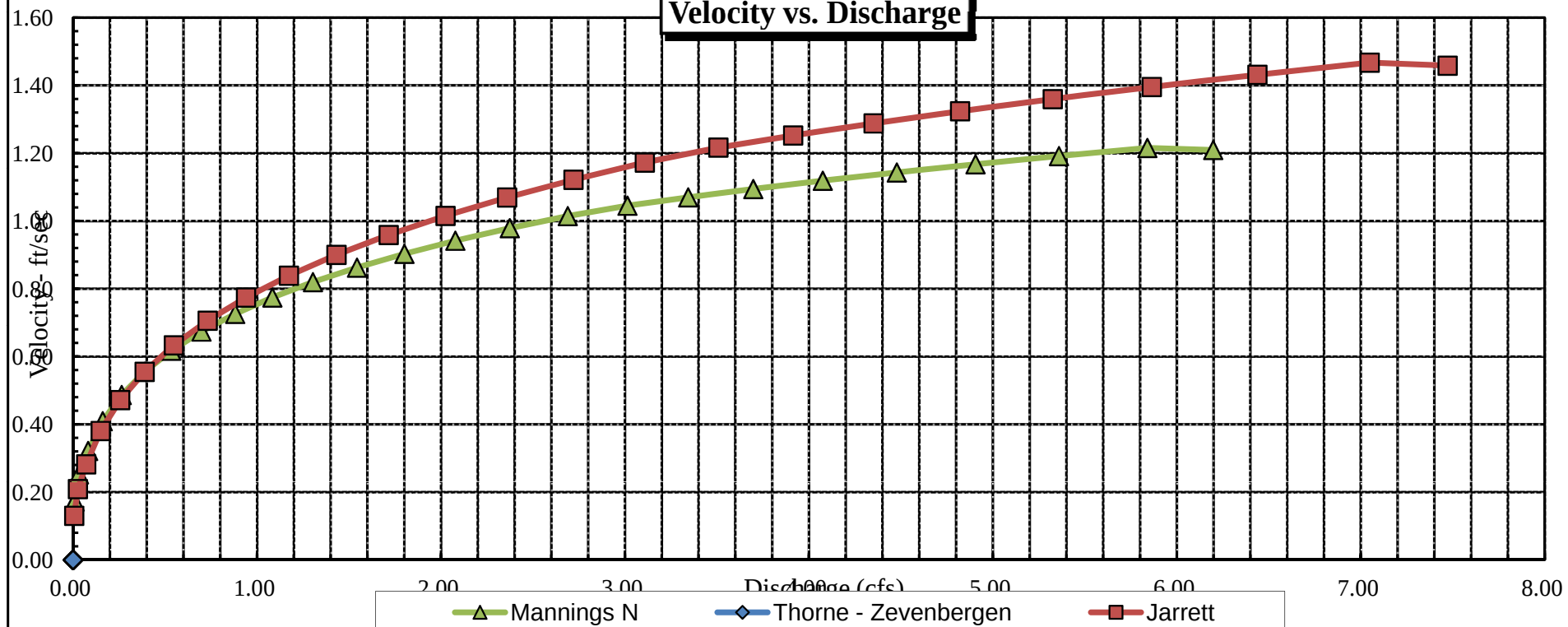
CROSS SECTION DATA ANALYSIS

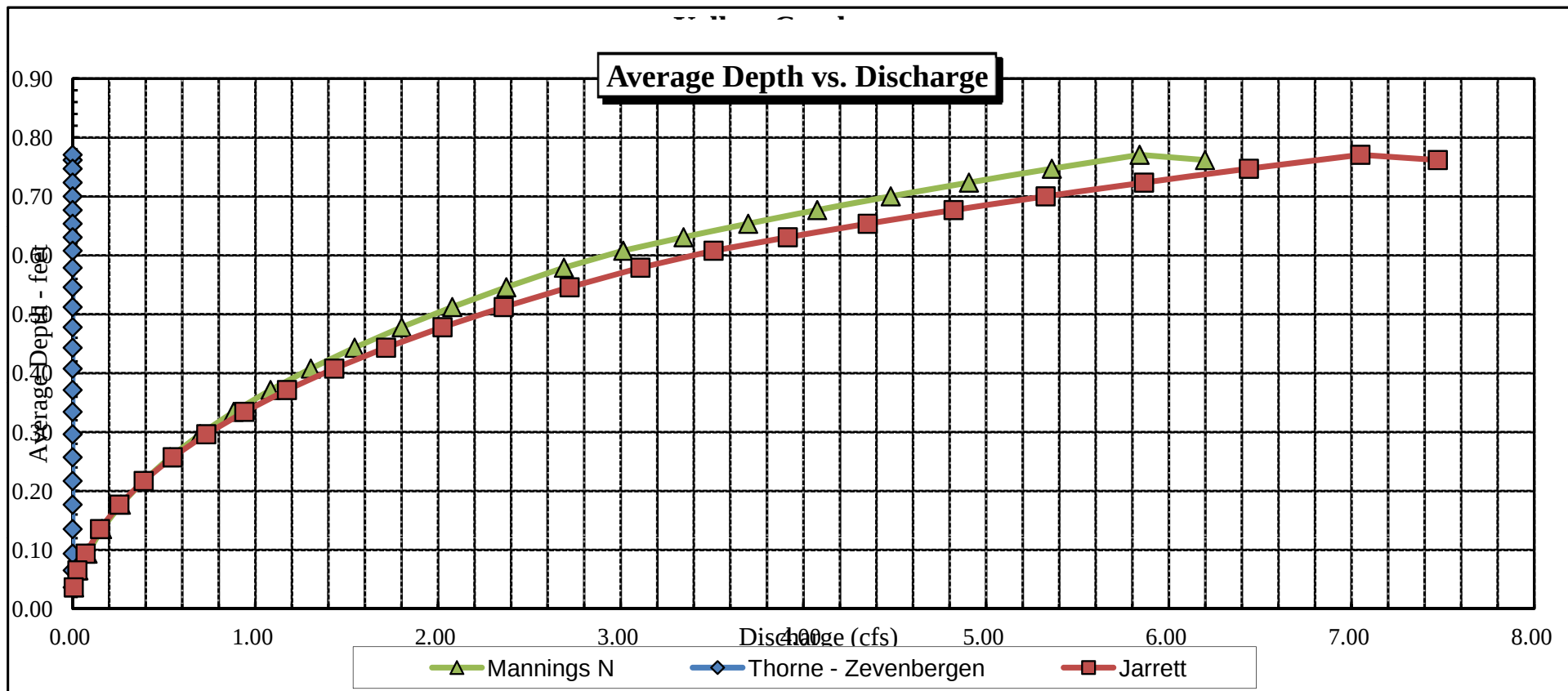


Sheet 1 of 1

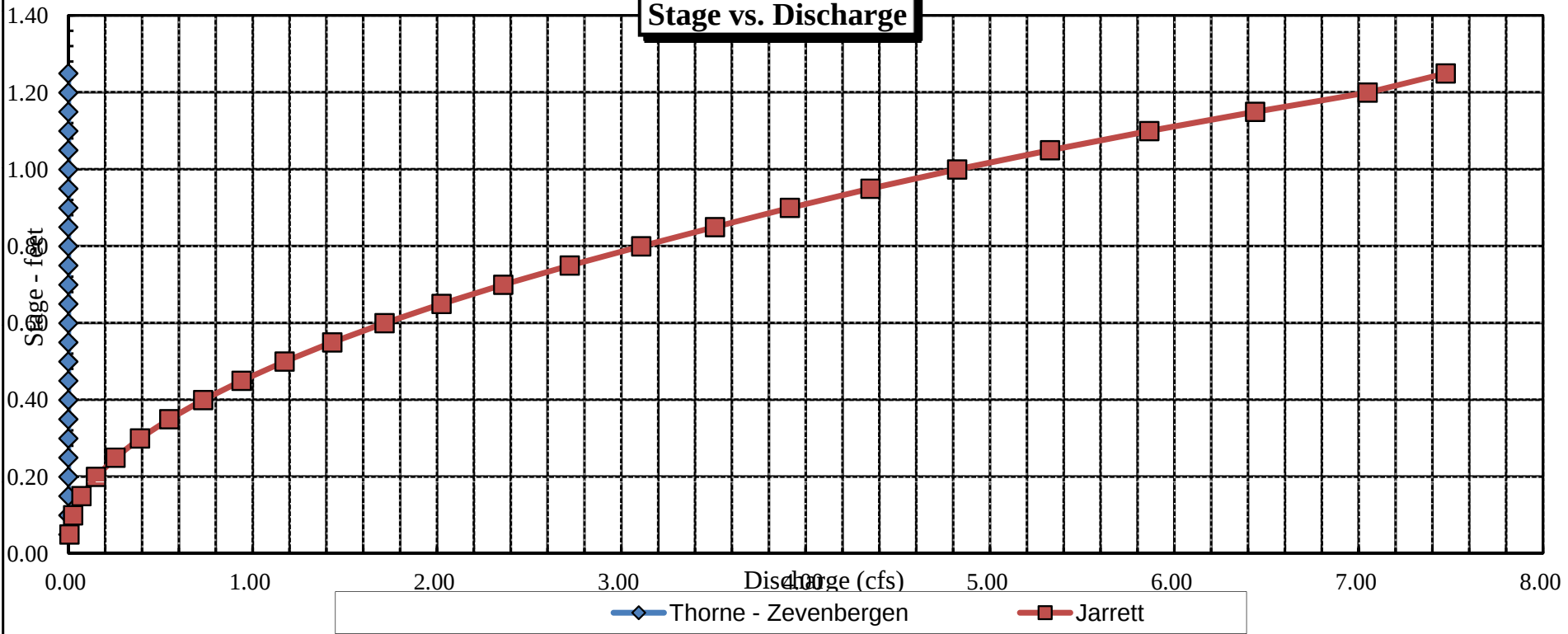


Velocity vs. Discharge





Stage vs. Discharge



Stinking Spring 120-02 (9/14/2005)

Photo #1

































































