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-930)

DEC 2 2 2014

Ms. Linda Bassi
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Dear Ms Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally update its instream flow recommendation for Yellow Creek, located in Water Division 6. The BLM originally made a recommendation on this stream in a letter dated December 18, 2012. This letter makes minor adjustments to the recommended flow rates and corrects minor errors to the data sets used to support the instream flow recommendations.

Location and Land Status. Yellow Creek is tributary to the White River approximately 27 miles northwest of Meeker, CO. 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 ¼ NE ¼, 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 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 and native mountain suckers, with density of mountain suckers slightly exceeding densities of speckled dace. The creek also provides habitat for northern leopard frogs. It is important to note that both mountain suckers and northern leopard frog appear on the BLM's sensitive species list.

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. The BLM is taking actions to modify management and place the riparian community on an upward trend.

R2Cross Analysis. The 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	0.82 cfs	6.03 feet	0.55 cfs	1.50 cfs
09/27/2011 #3	0.39 cfs	7.50 feet	1.00 cfs *See note below.*	Out of confidence interval
		Averages:	0.58 cfs	1.50 cfs

Note: 1.0 cfs provides 47.5% wetted perimeter and exceeds the depth criteria. The flow rate that fully meets all three instream flow criteria – 1.26 cfs is outside the confidence interval of the modeled data set.

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	2.90 cfs *See note below.*
09/27/2011 #2	1.04 cfs	8.56 feet	0.91 cfs	1.65 cfs
		Averages:	1.05 cfs	2.28 cfs

Note: 2.90 cfs does not meet all three instream flow criteria, but it does meet the average depth criteria, average velocity criteria, and provides 46.3 percent wetted perimeter, which is very close to meeting the third instream flow criteria. The flow rate that fully meets all three instream,flow criteria – 3.31cfs-- is slightly outside the confidence interval of the modeled data set.

The 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 March 1 through June 15. This recommendation is driven by the average velocity criteria.
>
> 0.60 cubic feet per second is recommended from June 16 through February 28. 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. Since this creek is very small and has limited physical habitat, meeting the wetted perimeter and depth criteria will ensure that the limited usable habitat is available to the native fish population.

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

> 2.30 cubic feet per second is recommended for the snowmelt runoff period from March 1 through June 15. Each surveyed reach had distinctly different hydraulic characteristics, so this recommendation is driven by both the average velocity and wetted perimeter criteria. Since this creek is very small and has limited physical habitat, it is important to meet all three instream flow criteria during the spawning season to insure the survival of the native fish population.
>
> 1.10 cubic feet per second is recommended for the remainder of year, from June 16 through February 28. 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. The 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, the BLM is aware of the following absolute water rights in upstream locations:

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

The BLM recommends using U.S. Geological Survey (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 the BLM. The plan specifies that the 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 to support this recommendation were provided with our previous letter. We thank both the Division of Parks and 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,

Acting

Brian St. George
Deputy State Director
Resources and Fire Management

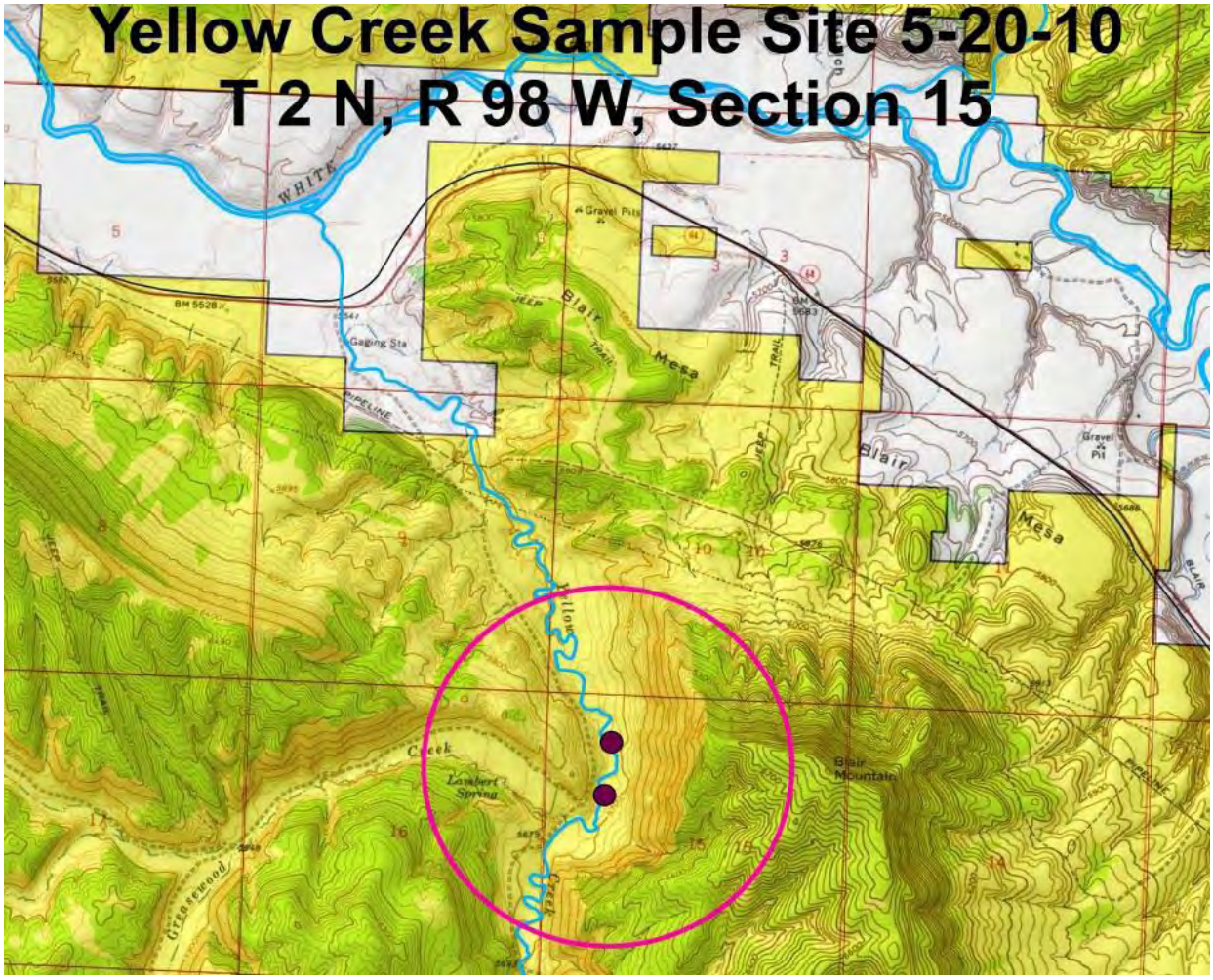
cc: Keith Sauter, White River Field Office
Kent Walter, White River Field

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 **H_2O 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 ceder (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.

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellow Creek | CROSS-SECTION NO.: 1

CROSS SECTION LOCATION: 1/8 downstream from confluence w/ Barcus Creek

DATE: 7-7-04 | OBSERVERS: R. Smith, P Daggett

LEGAL DESCRIPTION	¼ SECTION	SECTION	TOWNSHIP	RANGE	PM
	NW	26	2 (N)S	98 E/(W)	6th

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

MAP(S): USGS: Rough Gulch 7.5' 12 T 0725062 4444041

USFS:

SUPPLEMENTAL DATA

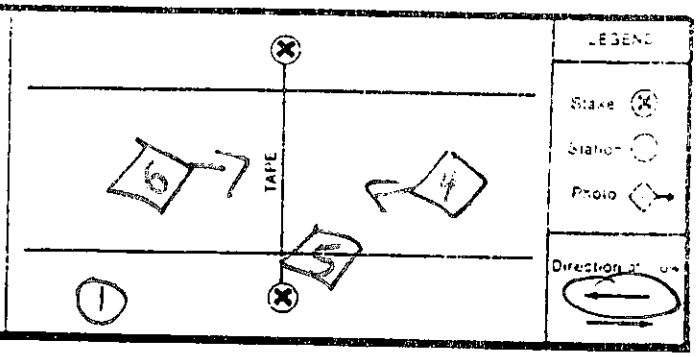
TAG TAPE SECTION SAME AS DISCHARGE SECTION: (YES) NO | METER TYPE: Marsh-McBirney

METER NUMBER: | DATE RATED: | CALIB/SPIN ____ sec | TAPE WEIGHT surveyed ____ lbs/foot | TAPE TENSION surveyed ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: silt to 2" cobbles | PHOTOGRAPHS TAKEN: (YES)/NO | NUMBER OF PHOTOGRAPHS: 5

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	6.22/6.21
② WS Upstream	15.0'	6.16
③ WS Downstream	15.0'	6.40
SLOPE	0.24/30.0' = 0.01	



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 survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

mayfly, snails, annelids, caddisfly

COMMENTS

TDS: >2000 µs 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) | LEFT / RIGHT | Gage Reading: 0.3 ft | 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) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft²)	Discharge (cfs)
RS	0.0		5.04								
	0.5		5.30								
G	2.0		5.74								
	2.7		6.20								
W	3.0		6.21	0				0			
	3.3		6.36	0.15				0			
	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				0.03			
W	6.0		6.22	0				0			
G	7.2		5.75								
LS	10.8		5.35								
TOTALS											

End of Measurement | Time: 9:40 | Gage Reading: 0.3 ft | 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
TAPE WT:	0.0106	with a survey level and rod
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	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	RS	0.00	5.04			0.00		0.00	0.00	0.0%
		0.50	5.30			0.00		0.00	0.00	0.0%
1	G	2.00	5.74			0.00		0.00	0.00	0.0%
		2.70	6.20			0.00		0.00	0.00	0.0%
	W	3.00	6.21	0.00	0.00	0.00		0.00	0.00	0.0%
		3.30	6.36	0.15	0.00	0.34	0.15	0.05	0.00	0.0%
		3.60	6.42	0.20	0.67	0.31	0.20	0.06	0.04	8.2%
		3.90	6.45	0.25	0.80	0.30	0.25	0.08	0.06	12.2%
		4.20	6.49	0.30	0.69	0.30	0.30	0.09	0.06	12.7%
		4.50	6.52	0.30	0.94	0.30	0.30	0.09	0.08	17.3%
		4.80	6.51	0.30	0.98	0.30	0.30	0.09	0.09	18.0%
		5.10	6.55	0.35	0.94	0.30	0.35	0.11	0.10	20.1%
		5.40	6.50	0.30	0.59	0.30	0.30	0.09	0.05	10.8%
		5.70	6.54	0.35	0.03	0.30	0.35	0.11	0.00	0.6%
	W	6.00	6.22	0.00	0.00	0.44		0.00	0.00	0.0%
1	G	7.20	5.75			0.00		0.00	0.00	0.0%
	LS	10.80	5.35			0.00		0.00	0.00	0.0%
	TOTALS ----------					3.20	0.35 (Max.)	0.75	0.49	100.0%

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:
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____
____
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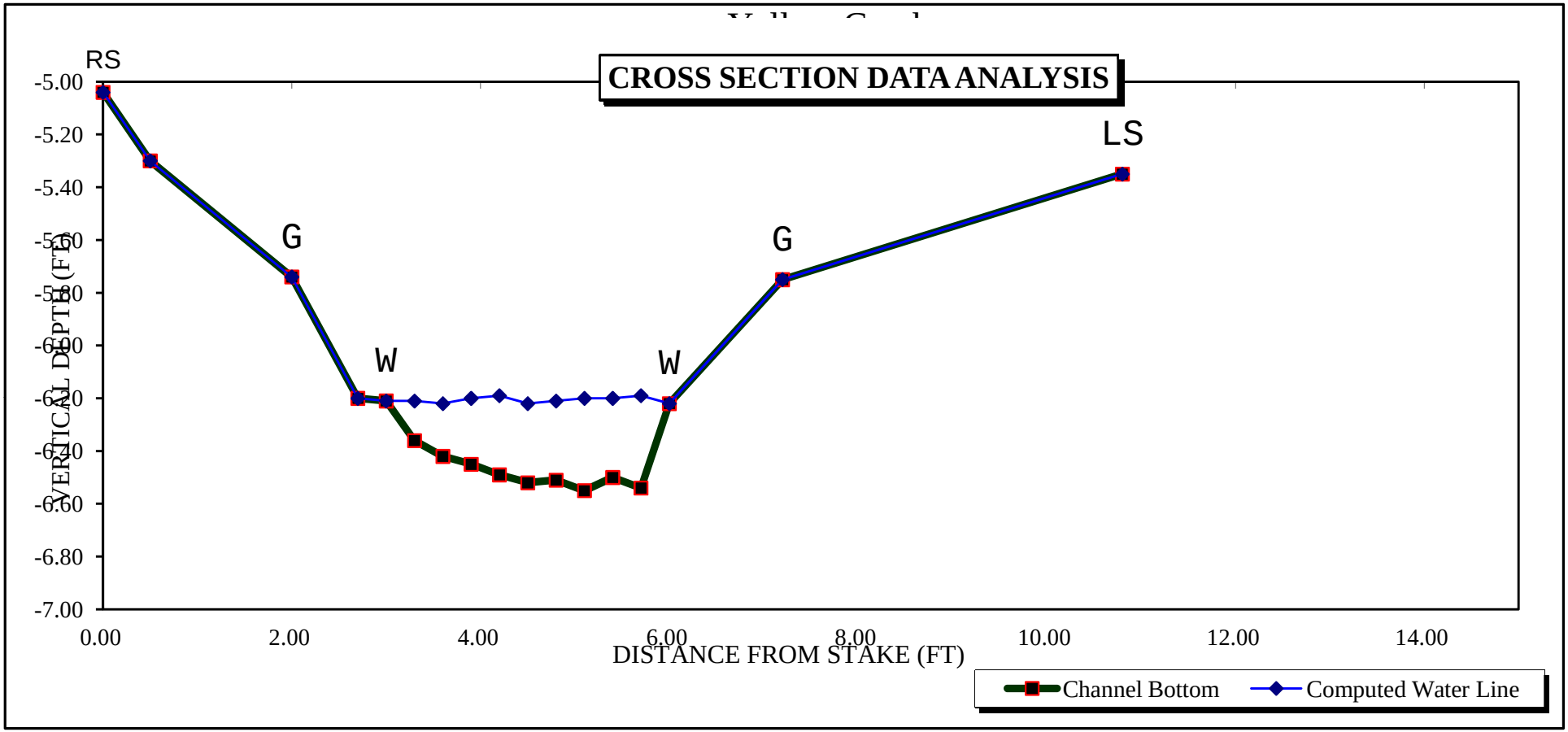
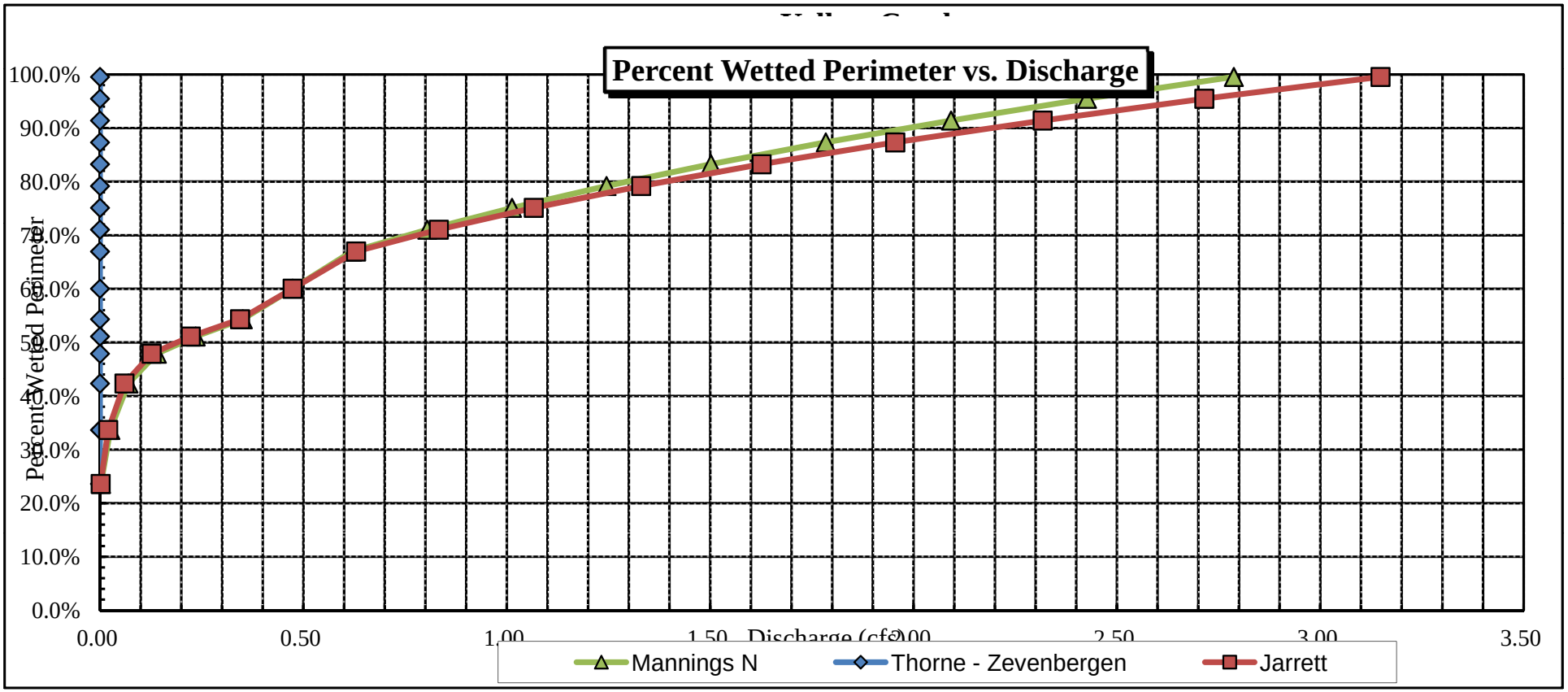
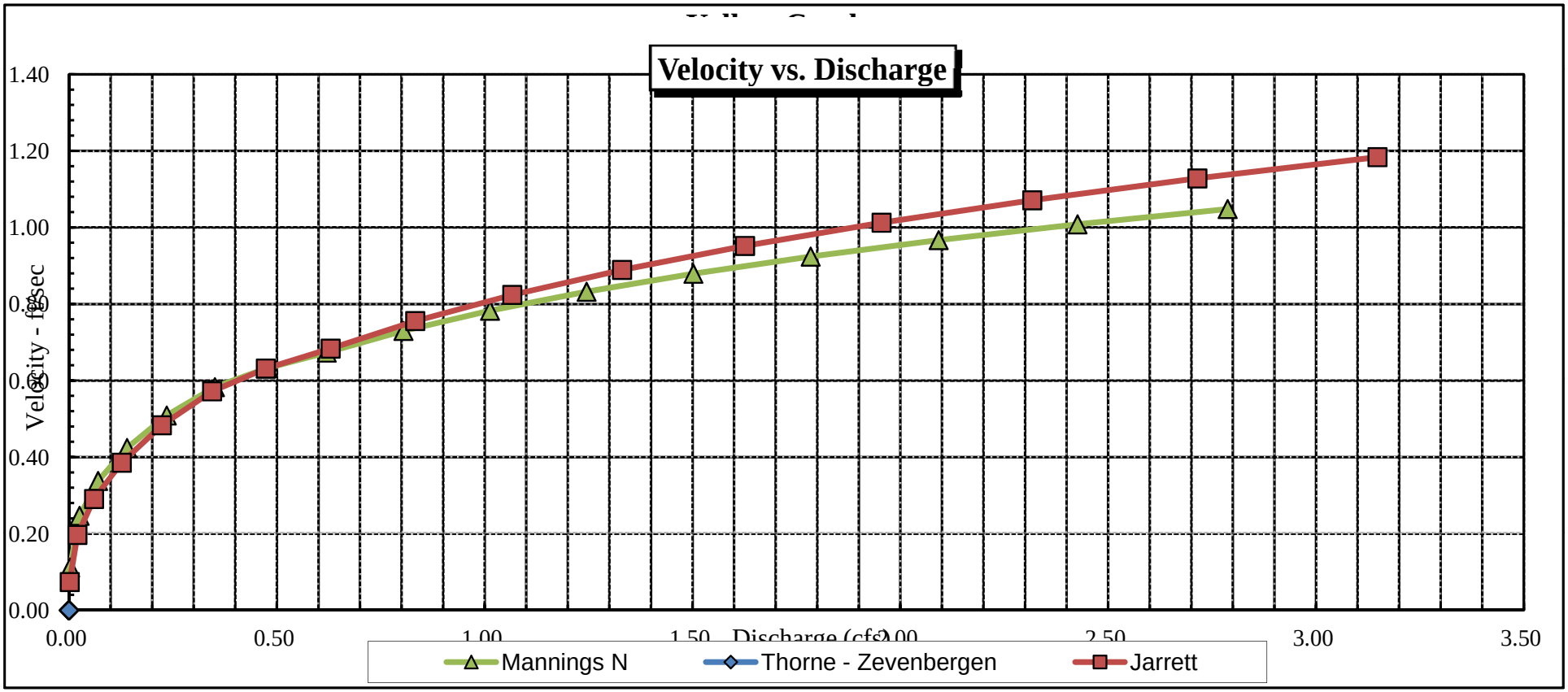
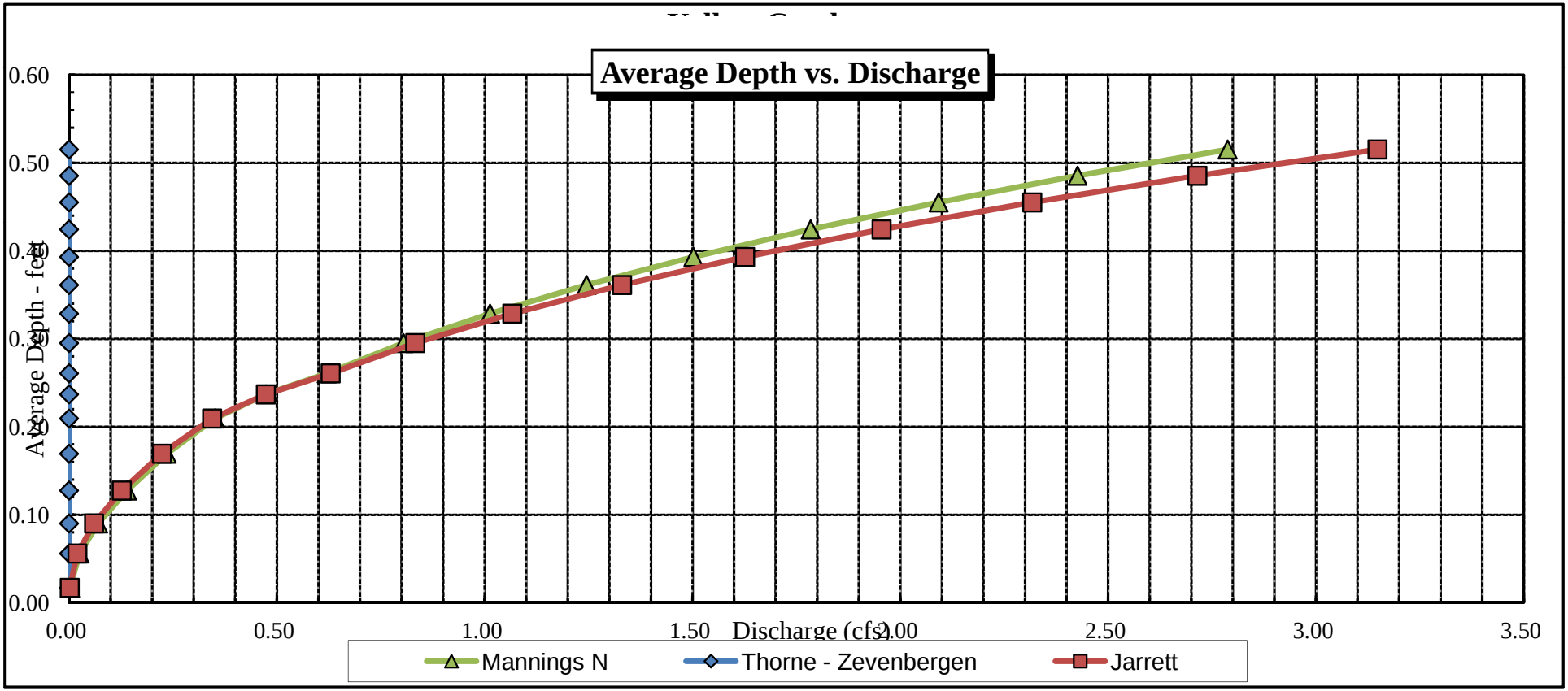
RECOMMENDATION BY: ……………………...………..……............................... AGENCY..……………………….....……...…....…….…...... DATE:.......…...…......……………

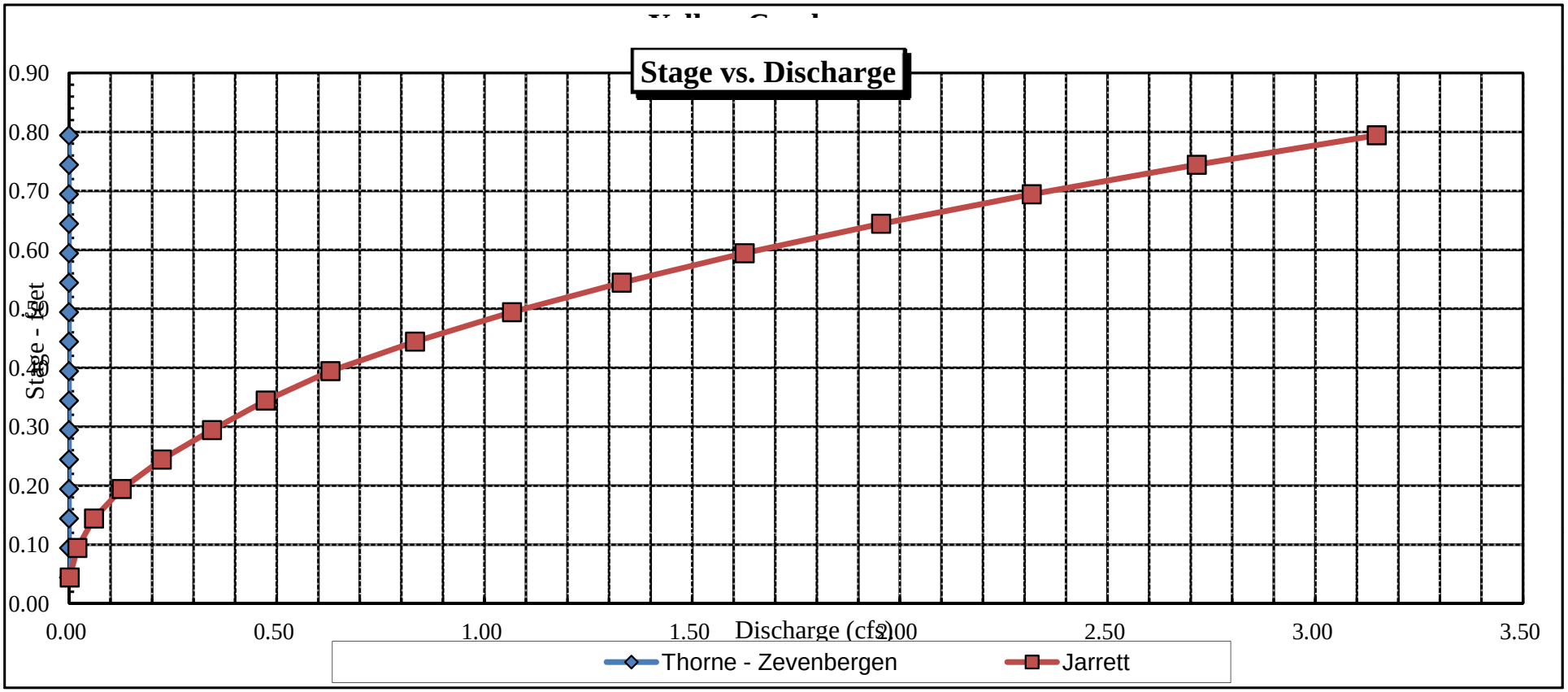
CWCB REVIEW BY: ..……………………………....…………………………………………………...…............. DATE:.................…………….....…


CROSS SECTION DATA ANALYSIS
RS
G
W
W
G
LS
-5.00
-5.20
-5.40
-6.60
-6.80
-7.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Stage - feet
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: Yellow Creek | CROSS-SECTION NO: 2

CROSS SECTION LOCATION: 1/8 mile downstream from confluence w/ Baraus Creek

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

LEGAL DESCRIPTION: ¼ 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' | USFS:

Zone 12 729462 NAD 27 4444 [illegible]

SUPPLEMENTAL DATA

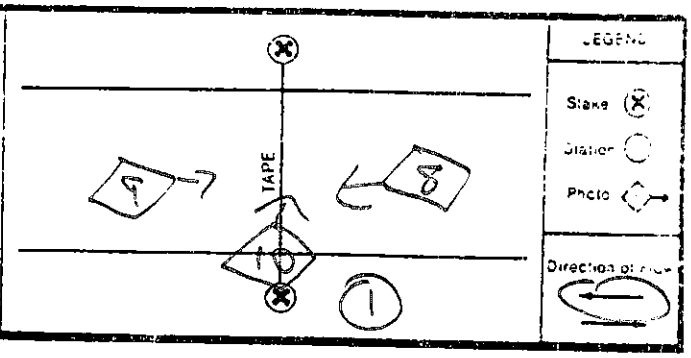
TAG TAPE SECTION SAME AS DISCHARGE SECTION (YES/NO) | METER TYPE: Marsh-McBirney

METER NUMBER | DATE RATED: | CALIB/SPIN ____ sec | TAPE WEIGHT surveyed ____ lbs/100' | TAPE TENSION surveyed ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: silt to 2" cobbles | 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	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	



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 = >2000 µs Ph: 8.5 Temp: 12°C

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Yellow Creek | CROSS-SECTION NO: 2 | DATE: 9-9-04 | SHEET: __ OF __

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading: 0.3 ft | 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): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS	0.0		4.60								
G	0.4		4.94								
	1.3		5.46								
W	2.0		5.70	Ø				Ø			
	2.3		6.06	0.35							
	2.6		5.88	0.20				0			
	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				1.03			
	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	Ø				Ø			
	5.9		5.41								
G	6.4		5.16								
	9.0		5.00								
LS	10.6		4.88								
TOTALS											

End of Measurement | Time: 10:50 | Gage Reading: 0.3 ft | 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

TAPE WT:	0.0106
TENSION:	99999

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

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	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
RS	0.00	4.60			0.00		0.00	0.00	0.0%
	0.40	4.94			0.00		0.00	0.00	0.0%
1 G	1.30	5.46			0.00		0.00	0.00	0.0%
W	2.00	5.70	0.00	0.00	0.00		0.00	0.00	0.0%
	2.30	6.06	0.35	0.00	0.47	0.35	0.11	0.00	0.0%
	2.60	5.88	0.20	0.00	0.35	0.20	0.06	0.00	0.0%
	2.90	5.89	0.20	0.11	0.30	0.20	0.06	0.01	1.2%
	3.20	5.85	0.15	0.38	0.30	0.15	0.05	0.02	3.0%
	3.50	6.00	0.30	0.70	0.34	0.30	0.09	0.06	11.0%
	3.80	6.02	0.30	1.09	0.30	0.30	0.09	0.10	17.1%
	4.10	6.01	0.30	1.13	0.30	0.30	0.09	0.10	17.8%
	4.40	6.00	0.30	1.61	0.30	0.30	0.09	0.14	25.3%
	4.70	5.97	0.30	1.09	0.30	0.30	0.09	0.10	17.1%
	5.00	5.96	0.25	0.52	0.30	0.25	0.08	0.04	6.8%
	5.30	5.86	0.15	0.09	0.32	0.15	0.05	0.00	0.7%
	5.60	5.80	0.10	0.00	0.31	0.10	0.03	0.00	0.0%
W	5.80	5.70	0.00	0.00	0.22		0.00	0.00	0.0%
1 G	5.90	5.41			0.00		0.00	0.00	0.0%
	6.40	5.16			0.00		0.00	0.00	0.0%
	9.00	5.00			0.00		0.00	0.00	0.0%
LS	10.60	4.88			0.00		0.00	0.00	0.0%
TOTALS ----------					4.11	0.35 (Max.)	0.87	0.57	100.0%

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:
=============================

____
____
____
____
____
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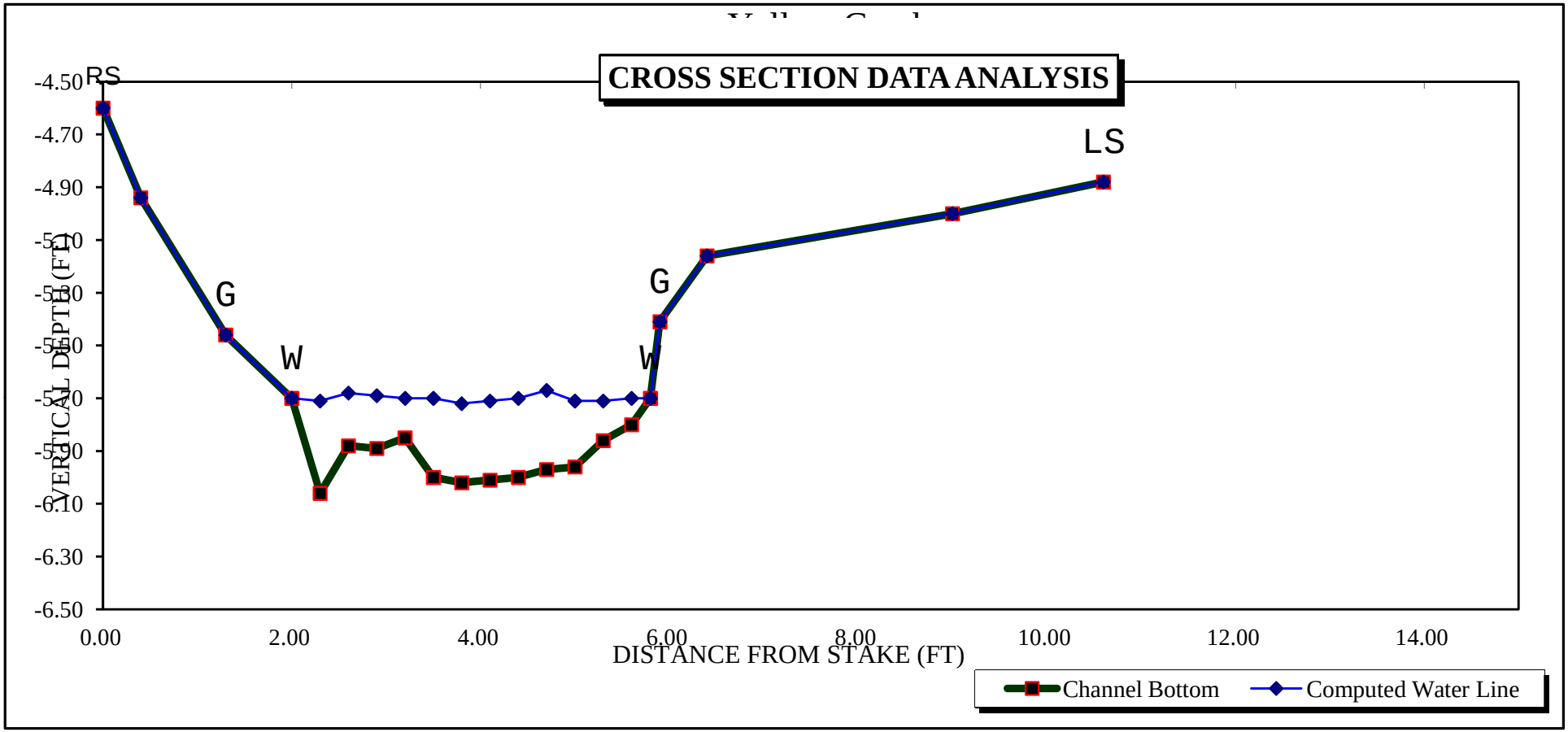
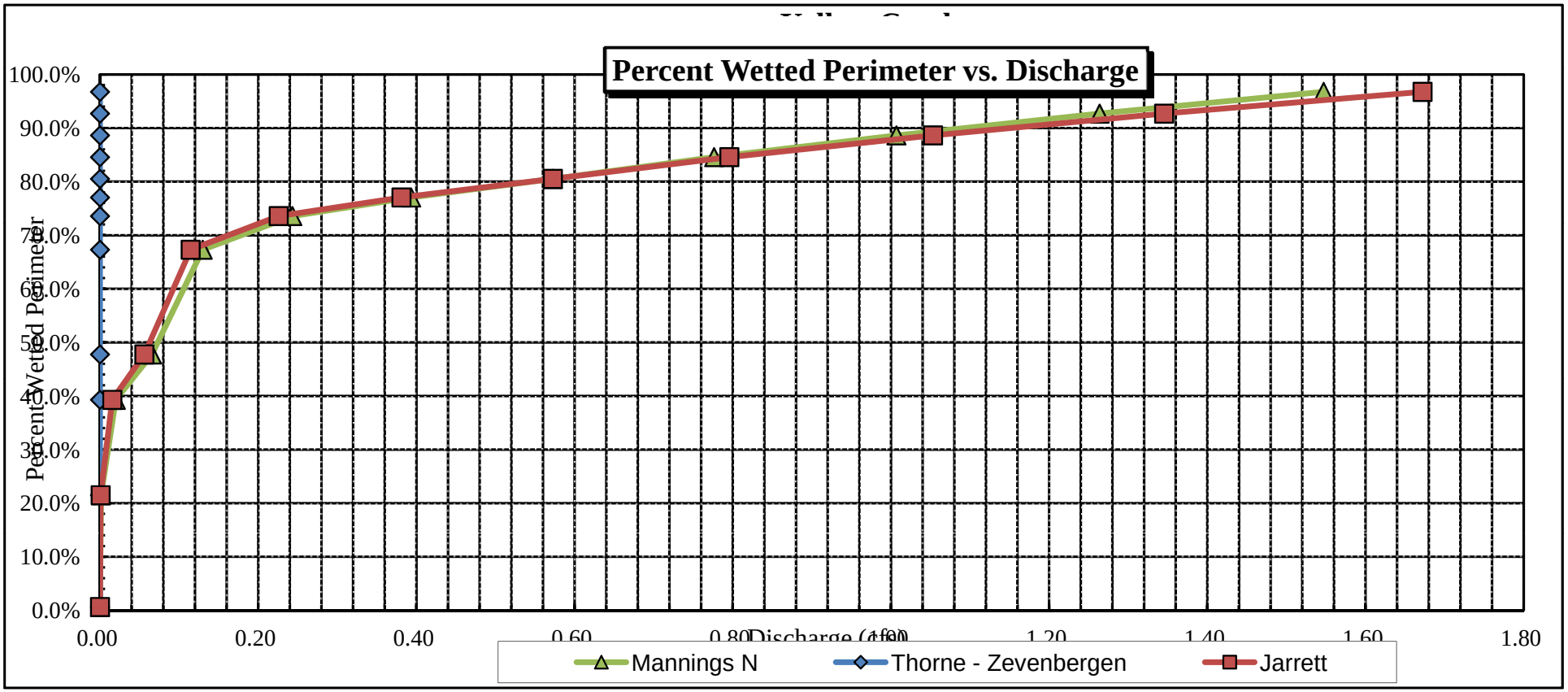
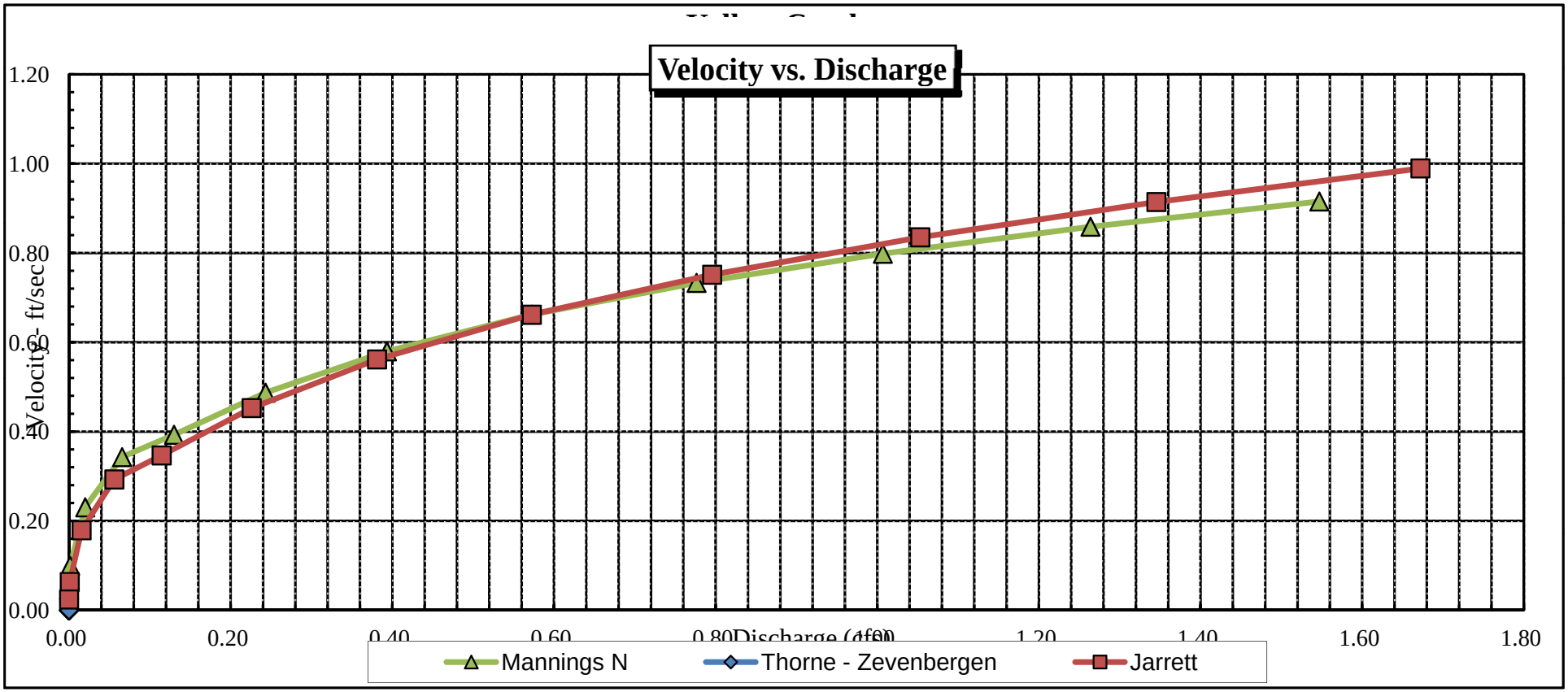
____

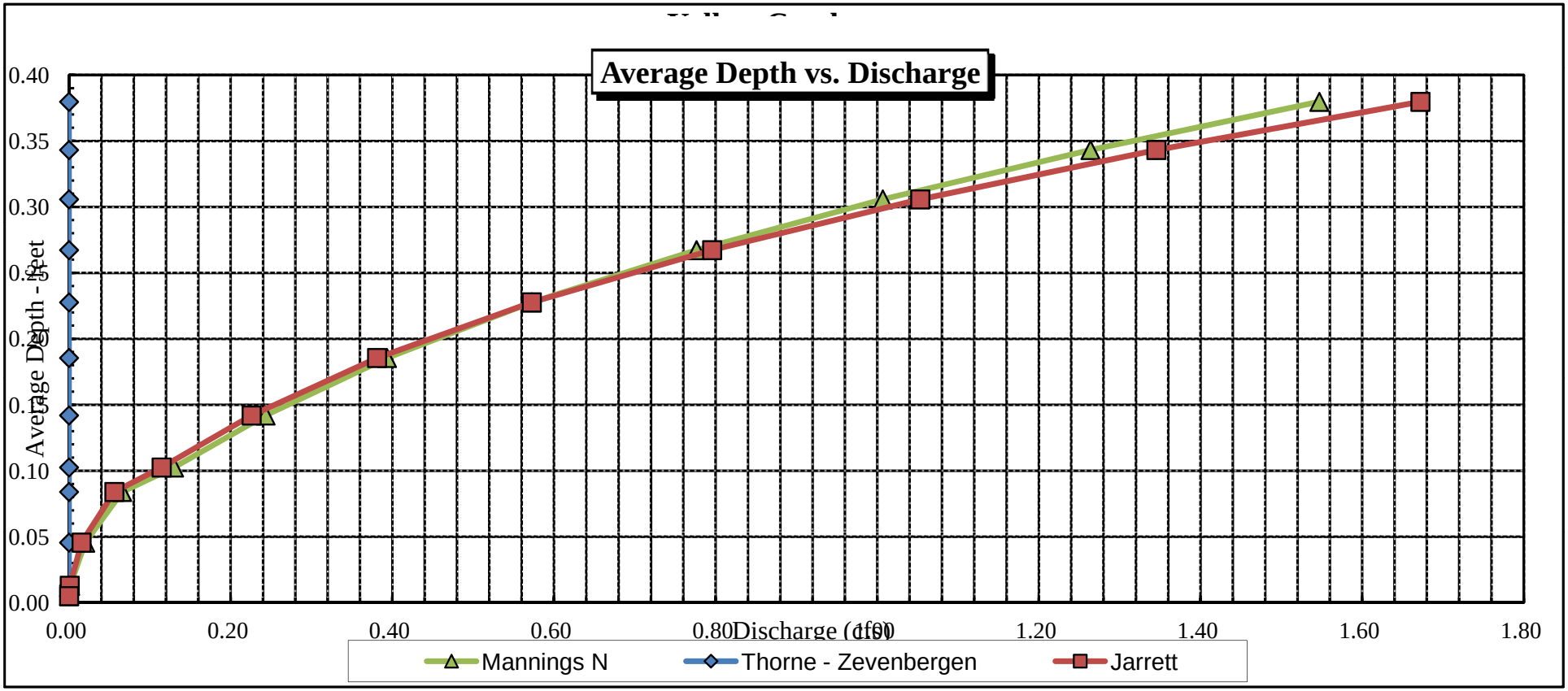
RECOMMENDATION BY: .... AGENCY................................ DATE:................................

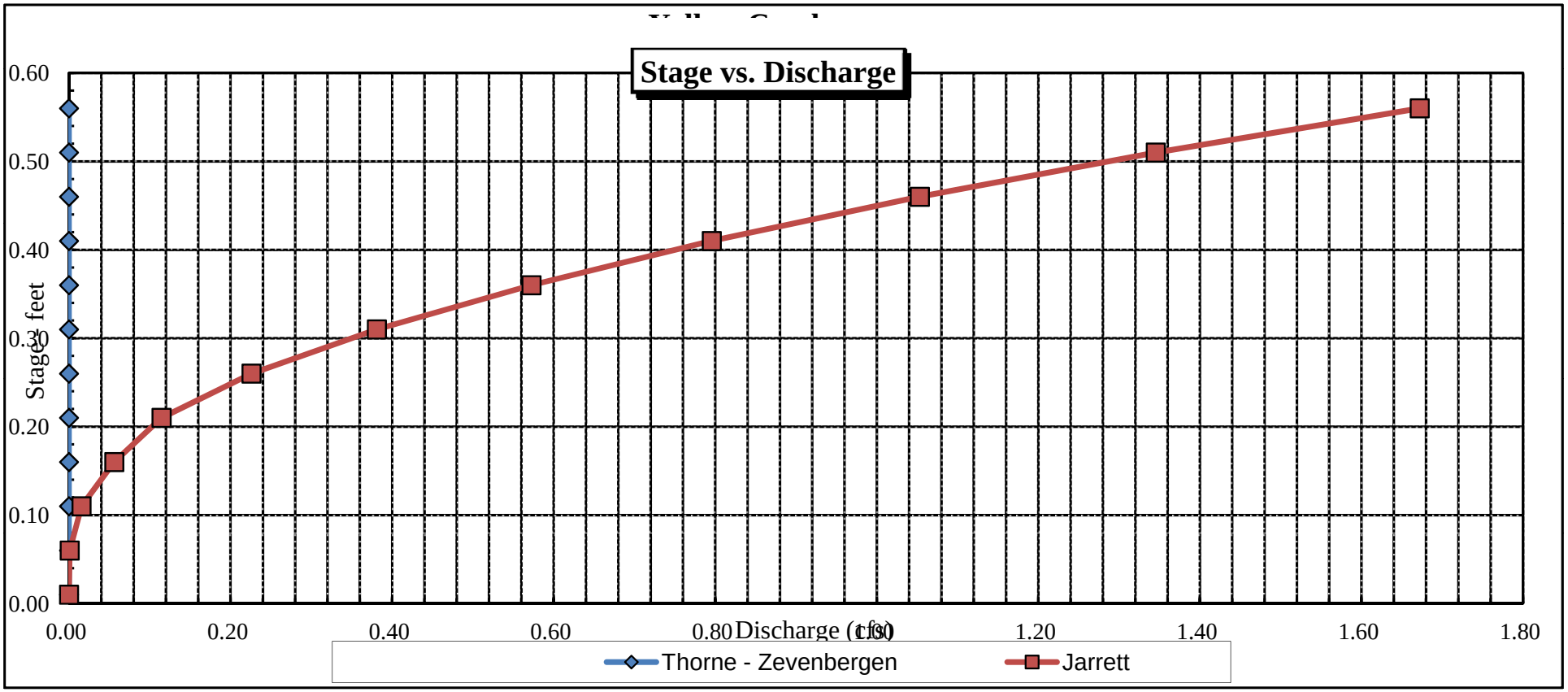
CWCB REVIEW BY: .... DATE:................................


CROSS SECTION DATA ANALYSIS
RS
LS
G
W
G
W
-4.50
-4.70
-4.90
-6.10
-6.30
-6.50
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Velocity - ft/sec
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - Feet
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Stage, feet
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME:	Yellow Creek
CROSS-SECTION NO.:	03062105
CROSS-SECTION LOCATION:	≈ 1800 Ft u/s of conf w/ Barcus Creek 40 06 53.4 108 21 33.0
DATE:	6/21/05
OBSERVERS:	Uppendahl / Bilger / Graf
LEGAL DESCRIPTION ¼ SECTION:	NW
SECTION:	26
TOWNSHIP:	2 (N)/S
RANGE:	98 E/(W)
PM:	6
COUNTY:	Rio Blanco
WATERSHED:	White
WATER DIVISION:	6
DOW WATER CODE:	
MAP(S): USGS:	Barcus creek SE
MAP(S): USFS:	

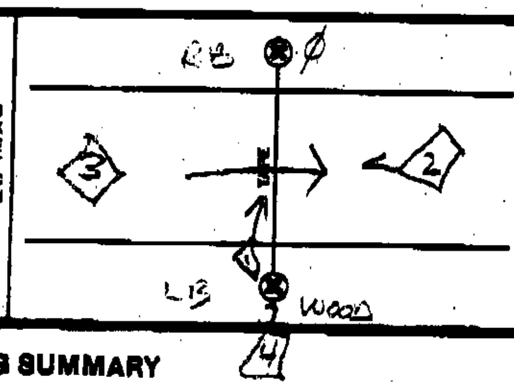
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION:	(YES)/NO
METER TYPE:	FLO-MATE
METER NUMBER:	
DATE RATED:	
CALIB/SPIN:	____ sec
TAPE WEIGHT:	____ lbs/foot
TAPE TENSION:	____ lbs
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
② WS Upstream	32	6.40
③ WS Downstream	50	7.05
SLOPE	.65/82 = .008	

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

WOOD STAKE LB

GAGE 6/21/05 = Stage 4.93 Q = 1.4 cfs

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Yellow Creek | CROSS-SECTION NO.: 03062105 | DATE: 6/21/05 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (LEFT) RIGHT (0.0 AT STAKE) | Gage Reading: ____ ft | TIME: 15:30

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): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft²)	Discharge (cfs)
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	WD # 0.6						
	11.9		6.95	.20					0	0	0
	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					0	.03	.00
B	15.6		6.15						0	0	0
	16.5		5.85								
	17.5		5.55								
TOP BJN	19.0		4.50								
	19.6		4.80								
TOTALS:											.78

End of Measurement | Time: 15:40 | Gage Reading: ____ ft | 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:	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
TAPE WT:	0.0106	with a survey level and rod
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	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
S	0.00	5.16			0.00		0.00	0.00	0.0%
	3.00	5.35			0.00		0.00	0.00	0.0%
	6.00	5.90			0.00		0.00	0.00	0.0%
	8.00	6.15			0.00		0.00	0.00	0.0%
	10.00	6.45			0.00		0.00	0.00	0.0%
	11.00	6.50			0.00		0.00	0.00	0.0%
1 G	11.50	6.35			0.00		0.00	0.00	0.0%
W	11.60	6.75	0.00	0.00	0.00		0.00	0.00	0.0%
	11.90	6.95	0.20	0.19	0.36	0.20	0.06	0.01	1.4%
	12.20	7.15	0.40	0.38	0.36	0.40	0.12	0.05	5.5%
	12.50	7.20	0.45	0.84	0.30	0.45	0.14	0.11	13.8%
	12.80	7.15	0.40	1.69	0.30	0.40	0.12	0.20	24.6%
	13.10	7.25	0.50	1.74	0.32	0.50	0.15	0.26	31.7%
	13.40	7.25	0.50	0.70	0.30	0.50	0.15	0.11	12.7%
	13.70	7.25	0.50	0.41	0.30	0.50	0.15	0.06	7.5%
	14.00	7.35	0.60	0.13	0.32	0.60	0.18	0.02	2.8%
	14.30	6.95	0.20	0.00	0.50	0.20	0.06	0.00	0.0%
	14.60	6.90	0.10	0.00	0.30	0.10	0.03	0.00	0.0%
W	14.90	6.75	0.00	0.00	0.34		0.00	0.00	0.0%
1 G	15.60	6.15			0.00		0.00	0.00	0.0%
	16.50	5.85			0.00		0.00	0.00	0.0%
	17.50	5.55			0.00		0.00	0.00	0.0%
	19.00	4.50			0.00		0.00	0.00	0.0%
S	19.60	4.80			0.00		0.00	0.00	0.0%
TOTALS ----------					3.70	0.6 (Max.)	1.16	0.82	100.0%

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:.................…………….....

STREAM NAME: Yellow Creek
XS LOCATION: ~ 1800' u/s of confl w/Barcus Creek
XS NUMBER: 3082105

Thorne-Zevenbergen D84 Correction Applied
Estimated D84 = 0.58

STAGING TABLE
"GL" = lowest Grassline elevation corrected for sag
"WL" = Waterline corrected for variations in field measured water surface elevations and sag

Velocity based on test of R/D84>1

	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	2.95	1.05
	6.35	5.95	0.46	1.00	2.77	6.87	99.2%	0.40	2.91	1.05
	6.40	5.41	0.46	0.95	2.49	6.23	89.9%	0.40	2.60	1.04
	6.45	4.78	0.47	0.90	2.23	5.53	79.8%	0.40	2.42	1.08
	6.50	3.85	0.55	0.85	2.02	4.33	62.5%	0.47	3.14	1.55
	6.55	3.68	0.51	0.80	1.84	4.20	60.7%	0.44	2.49	1.35
	6.60	3.51	0.47	0.75	1.66	4.07	58.8%	0.41	1.93	1.16
	6.65	3.44	0.43	0.70	1.49	3.95	57.0%	0.38	1.47	0.99
	6.70	3.36	0.39	0.65	1.32	3.82	55.1%	0.35	1.09	0.83
"WL"	6.75	3.28	0.35	0.60	1.15	3.68	53.2%	0.31	0.79	0.68
	6.80	3.11	0.32	0.55	1.00	3.48	50.3%	0.29	0.57	0.57
	6.85	2.93	0.29	0.50	0.84	3.28	47.3%	0.26	0.40	0.47
	6.90	2.74	0.26	0.45	0.70	3.06	44.2%	0.23	0.27	0.38
	6.95	2.39	0.24	0.40	0.57	2.69	38.8%	0.21	0.19	0.33
	7.00	2.28	0.20	0.35	0.46	2.53	36.6%	0.18	0.11	0.25
	7.05	2.18	0.16	0.30	0.35	2.38	34.4%	0.15	0.06	0.18
	7.10	2.05	0.12	0.25	0.24	2.23	32.2%	0.11	0.03	0.12
	7.15	1.88	0.08	0.20	0.14	2.01	29.1%	0.07	0.01	0.07
	7.20	1.15	0.08	0.15	0.07	1.24	17.9%	0.05	0.00	0.04
	7.25	0.38	0.05	0.10	0.02	0.42	6.1%	0.04	0.00	0.01
	7.30	0.17	0.02	0.05	0.00	0.20	2.9%	0.02	0.00	0.00

3/3 = 1.5
2/3 = 0.6
1/3 = 0.1

Data Input & Proofing

STREAM NAME: Yellow Creek
XS LOCATION: ~ 1600' U/S of confl w/Barcus Creek
XS NUMBER: 3062105
DATE: 6/21/2005
OBSERVERS: Uppendahl, Graf & Diiger

1/4 SEC: NW
SECTION: 26
TWP: 2 N
RANGE: 98 W
PM: 6

COUNTY: RIO BLANCO
WATERSHED: White River
DIVISION: 6
DOW CODE:
USGS MAP: BARCUS CREEK SE
USFS MAP:

Level and Rod Survey
TAPE WT: 0.0106 lbs / ft
TENSION: 999999 lbs

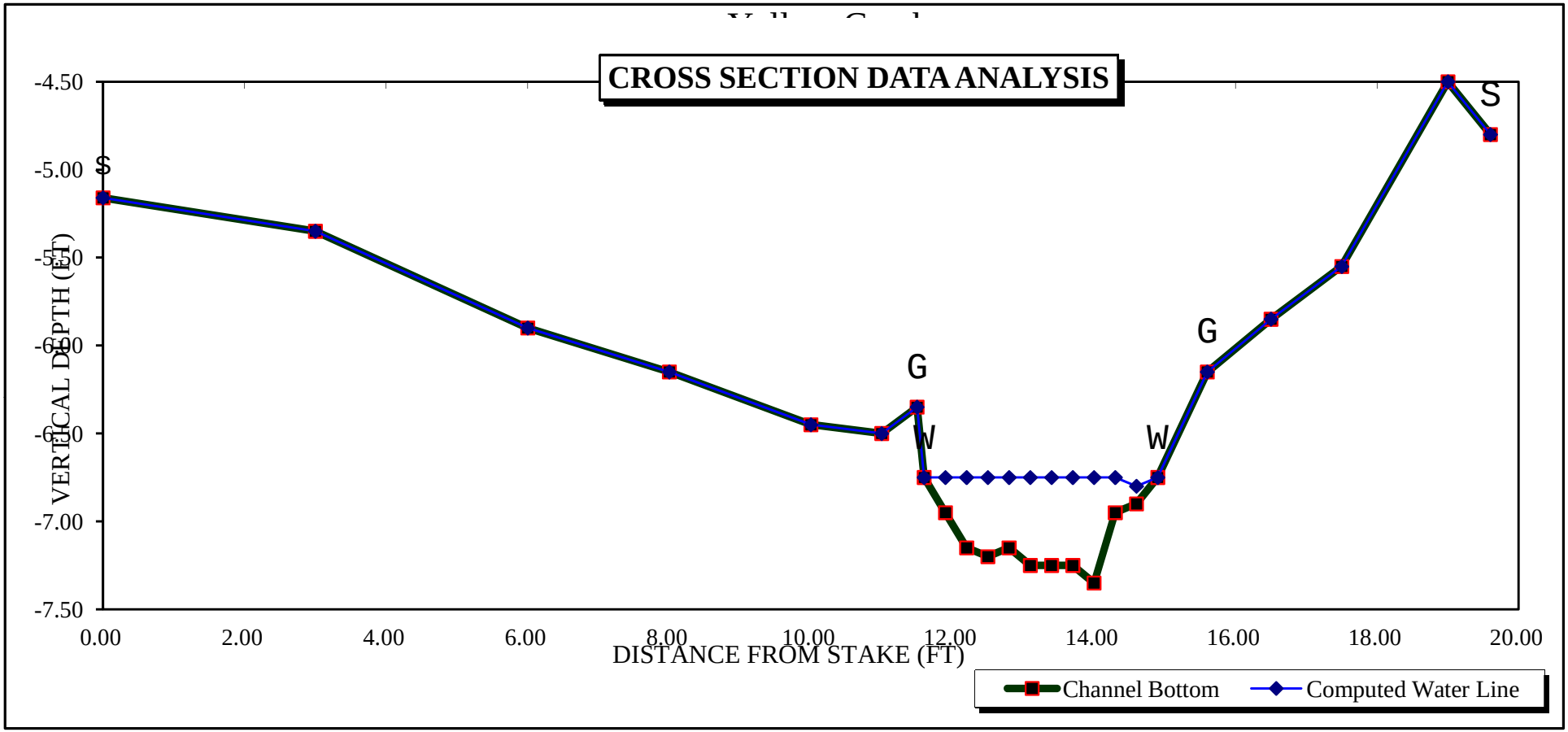
SLOPE: 0.007926829 ft / ft

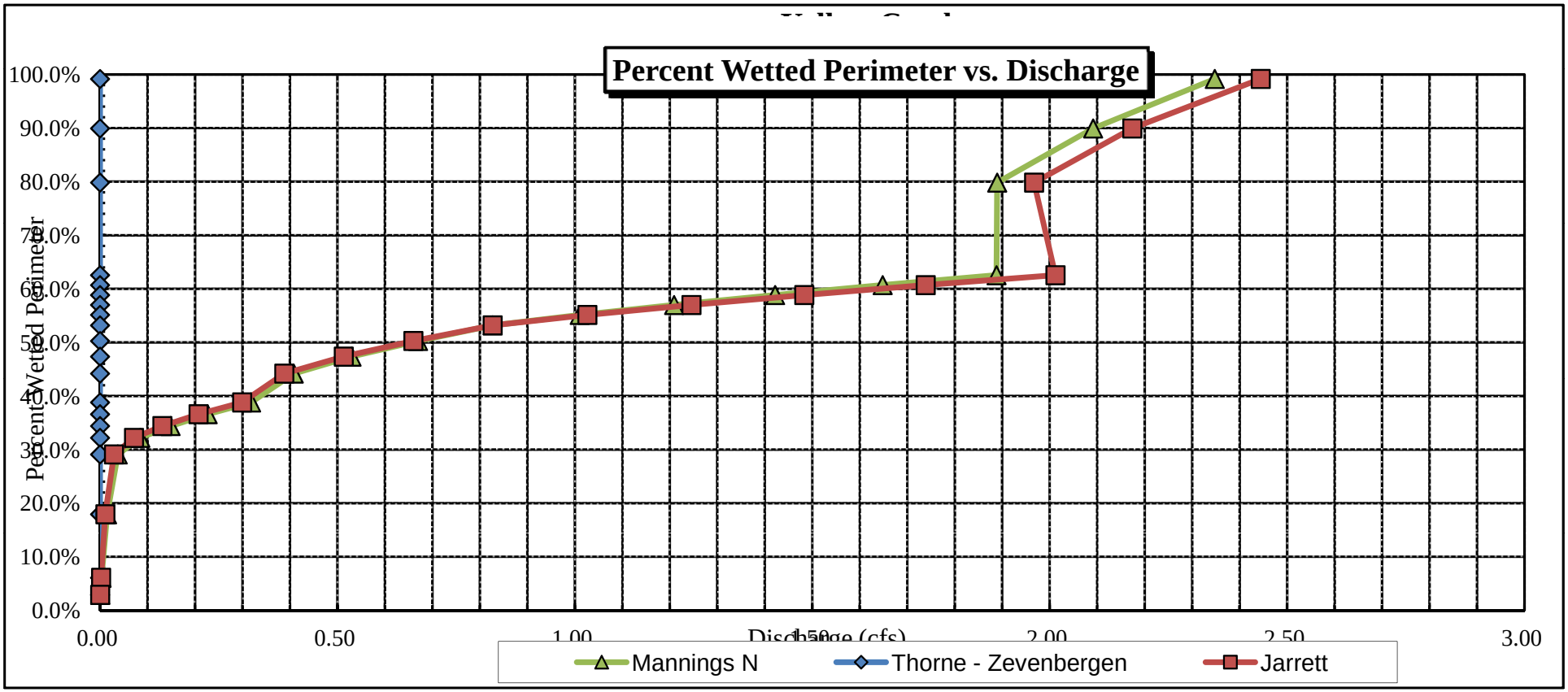
CHECKED BY:.....DATE.....

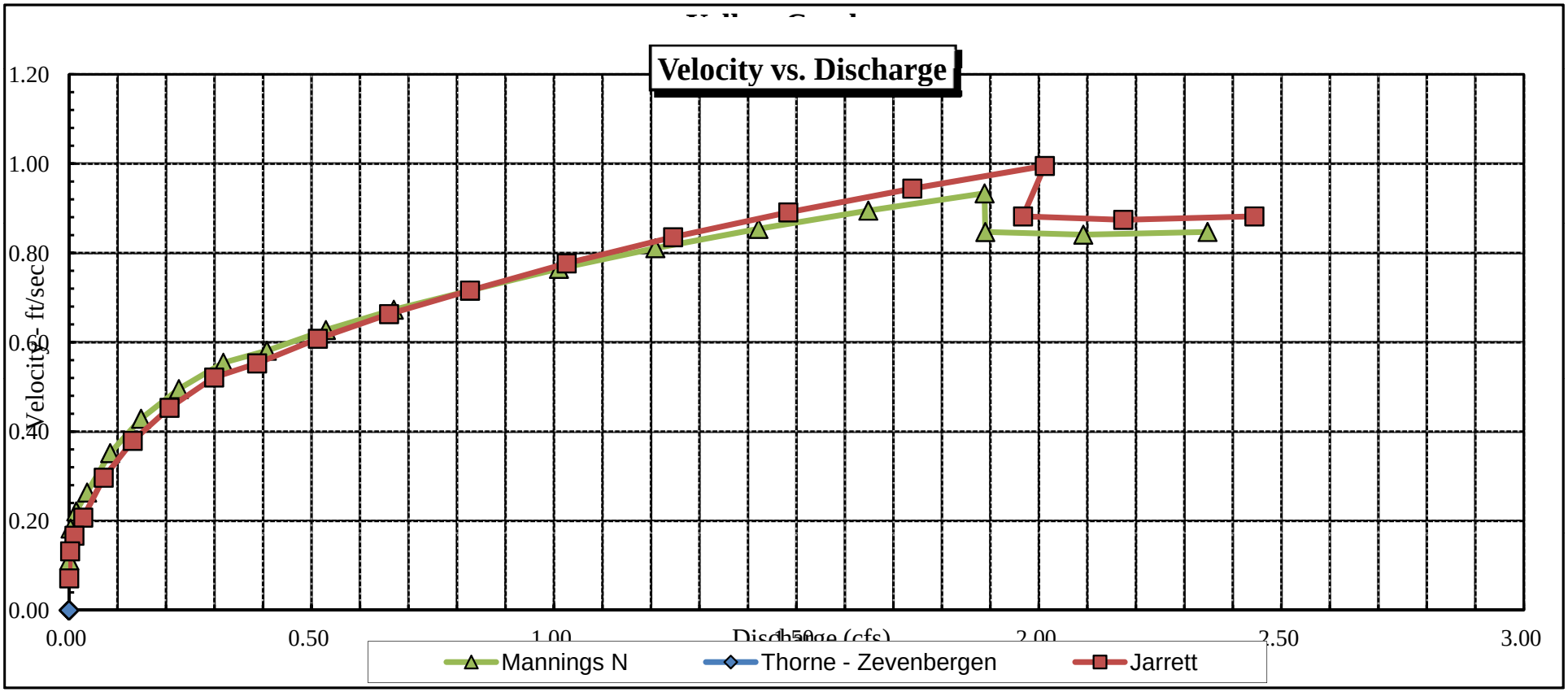
ASSIGNED TO: .....DATE.....

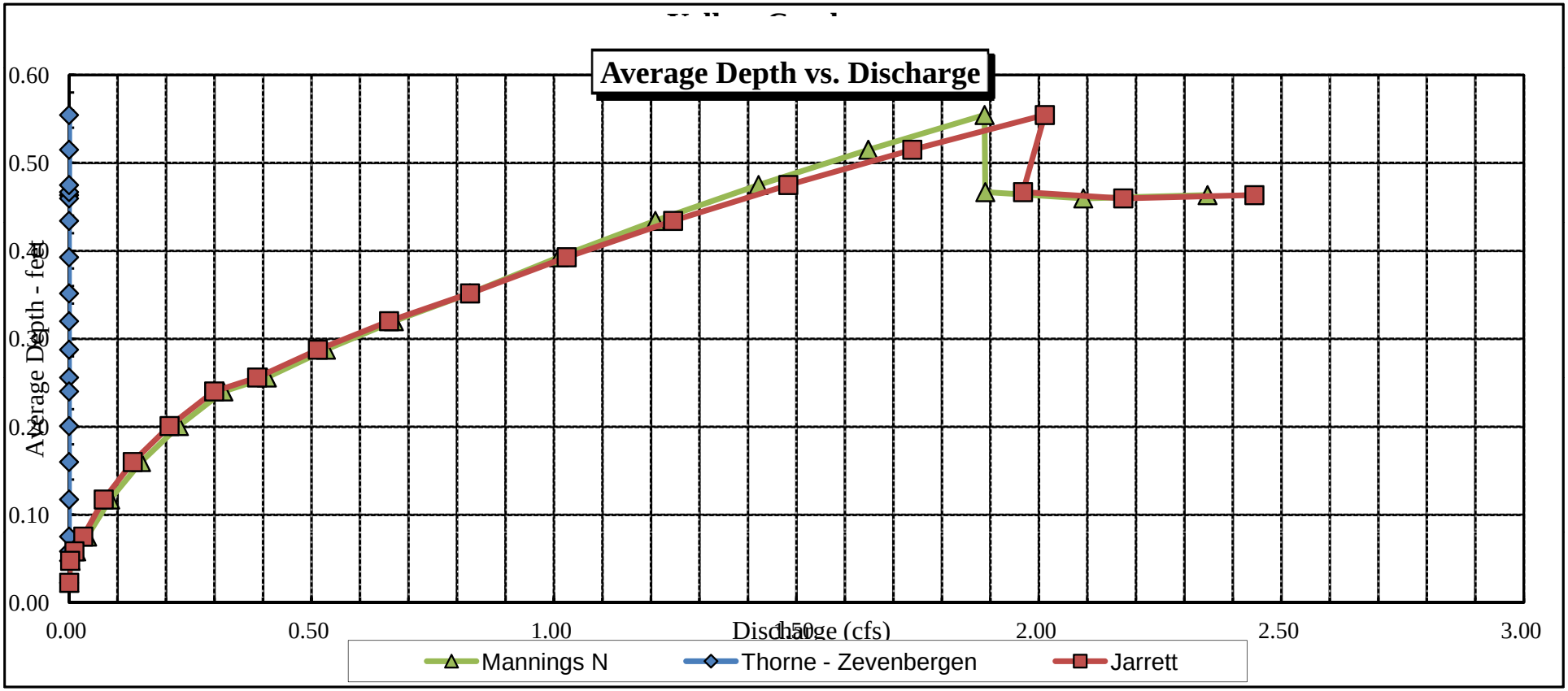
Total Data Points = 24

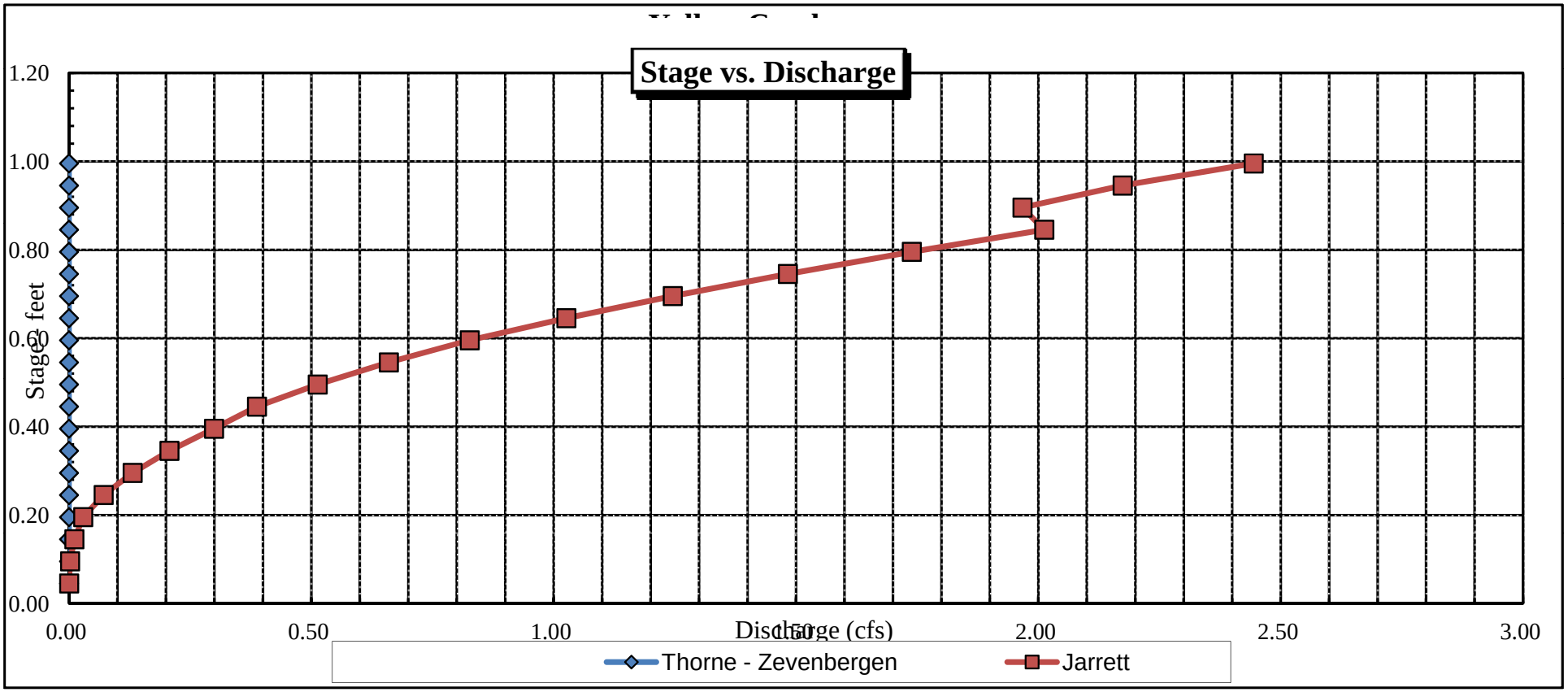
GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	S	0.00	5.16			0.00	0.00	0.00
		3.00	5.35			0.00	0.00	0.00
		6.00	6.15			0.00	0.00	0.00
		8.00	6.30			0.00	0.00	0.00
		10.00	6.45			0.00	0.00	0.00
		11.00	6.50			0.00	0.00	0.00
1	G	11.50	6.35			0.00	0.00	0.00
	W	11.60	6.75	0.00	0.00	0.00	0.00	0.00
		11.90	6.95	0.20	0.19	0.06	0.01	6.75
		12.20	7.15	0.40	0.38	0.12	0.05	6.75
		12.50	7.20	0.45	0.84	0.14	0.11	6.75
		12.80	7.15	0.40	1.69	0.12	0.20	6.75
		13.10	7.25	0.50	1.47	0.15	0.22	6.75
		13.40	7.25	0.50	0.70	0.15	0.11	6.75
		13.70	7.25	0.50	0.41	0.15	0.06	6.75
		14.00	7.35	0.60	0.13	0.18	0.02	6.75
		14.30	6.95	0.20	0.00	0.06	0.00	6.75
		14.60	6.90	0.10	0.00	0.03	0.00	6.80
	W	14.90	6.75	0.00	0.00	0.00	0.00	0.00
1	G	15.60	6.15			0.00	0.00	0.00
		16.50	5.85			0.00	0.00	0.00
		17.50	5.55			0.00	0.00	0.00
	TOP	19.00	4.50			0.00	0.00	0.00
	S	19.60	4.80			0.00	0.00	0.00
					totals	1.151	0.75	


CROSS SECTION DATA ANALYSIS
VERTICAL DEPTH (FT)
-4.50
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
S
G
W
W
G
S
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Velocity - ft/sec
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage, feet
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellow Creek						CROSS-SECTION NO.: 1
CROSS-SECTION LOCATION: Below Lambert Spring						
DATE: 9-27-11	OBSERVERS: R. Smith, B. Lange					
LEGAL DESCRIPTION	¼ SECTION: SW NW	SECTION: 15	TOWNSHIP: 2 (N)/S	RANGE: 98 E(W)	PM: Sixth	
COUNTY: Rio Blanco	WATERSHED: White River	WATER DIVISION: 6	DOW WATER CODE: 25345			
MAP(S): USGS:	GPS Zone 12 722903					
USFS:	4447247					

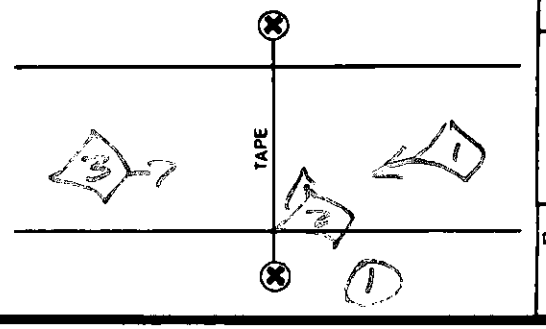
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION (YES)/NO	METER TYPE: AA-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravels	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	4.81/4.82
② WS Upstream	12.7	4.70
③ WS Downstream	10.9	4.88
SLOPE	0.19 / 23.6 = .008	

SKETCH



LEGEND:
Stake ⊗
Station ①
Photo ◇
Direction of Flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/(NO)	DISTANCE ELECTROFISHED: ____ ft	FISH CAUGHT YES/NO	WATER CHEMISTRY SAMPLED: (YES)/NO

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

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

COMMENTS

pH = 8.35
Temp = 15.4°
Cond = 332
Salinity = 1.7

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Yellow Crk	CROSS-SECTION NO.	DATE: 9/27/11	SHEET 1 OF 1

BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: — ft	TIME: 1300

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) At Point	Velocity (ft/sec) 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	8.0		4.81								
	9.0		4.38								
	11.0		4.34								
	13.6		4.65								
LG	14.0		4.0								
LS	14.7		3.50								
	T			0				V			
	3.0		4.85	0.05				Ø			
	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				1.48			
	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 ft	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

TAPE WT:	0.0106	*** NOTE *** Leave TAPE WT and TENSION at defaults for data collected with a survey level and rod
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 (Max.)	1.07	1.19	100.0%

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

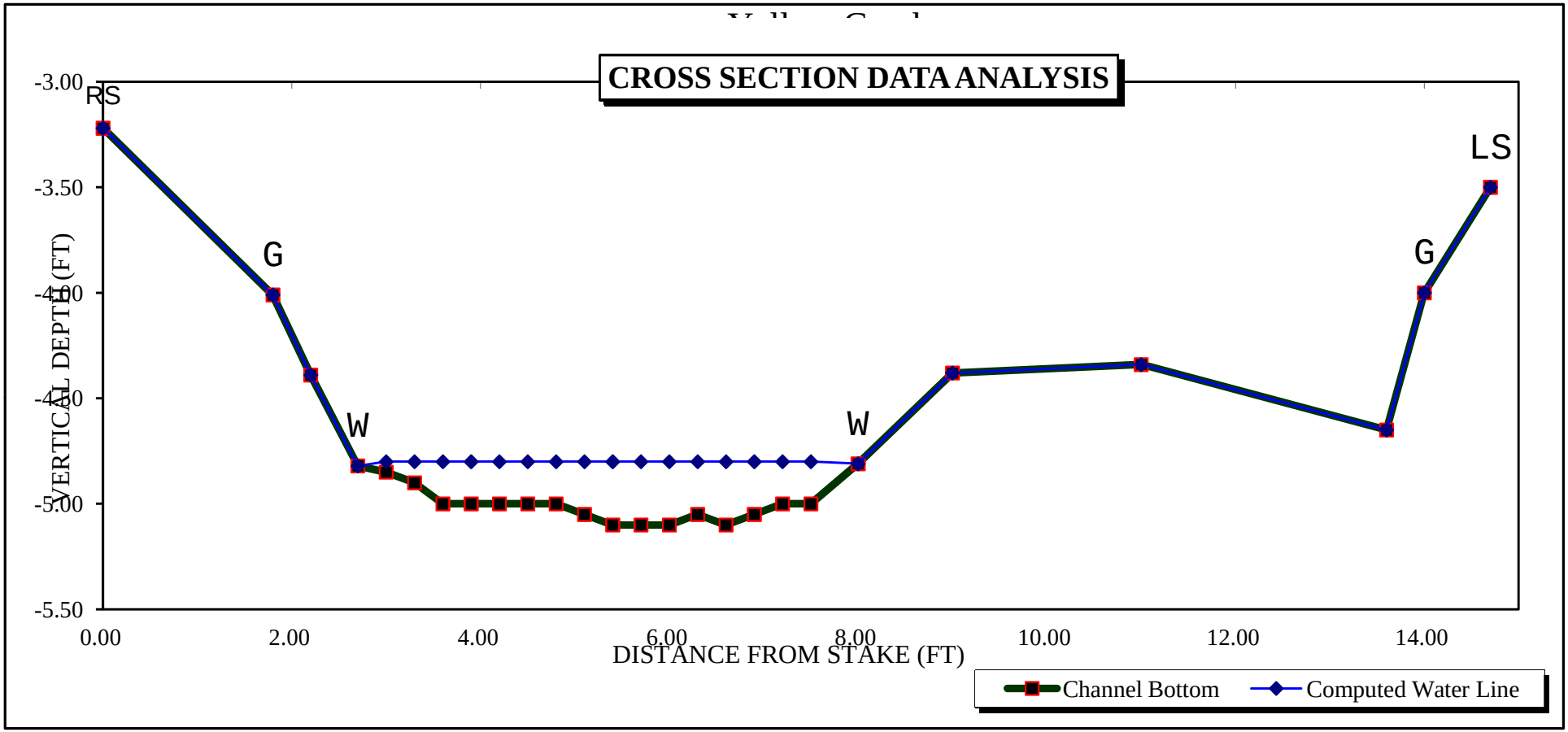
RECOMMENDED INSTREAM FLOW:
=============================

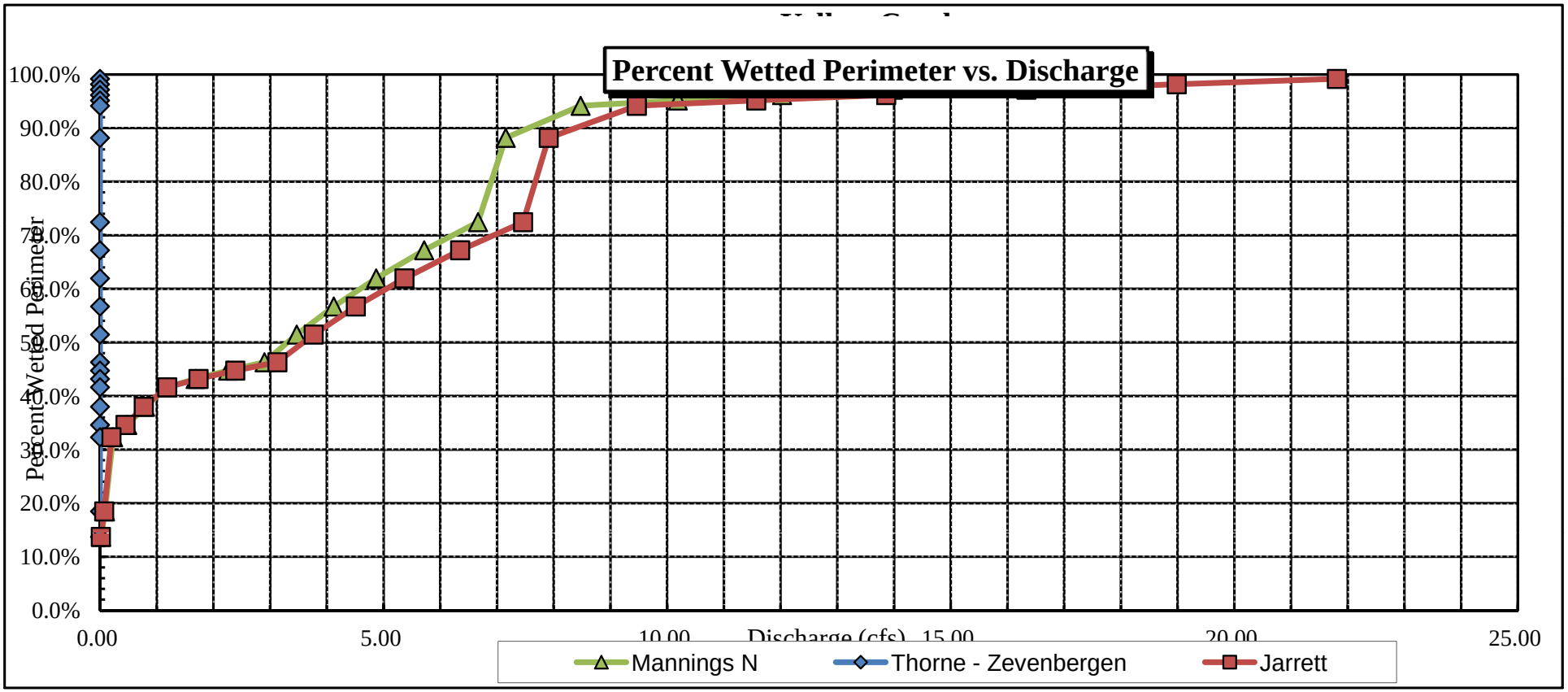
FLOW (CFS)	PERIOD
___________________	___________________
___________________	___________________
___________________	___________________
___________________	___________________

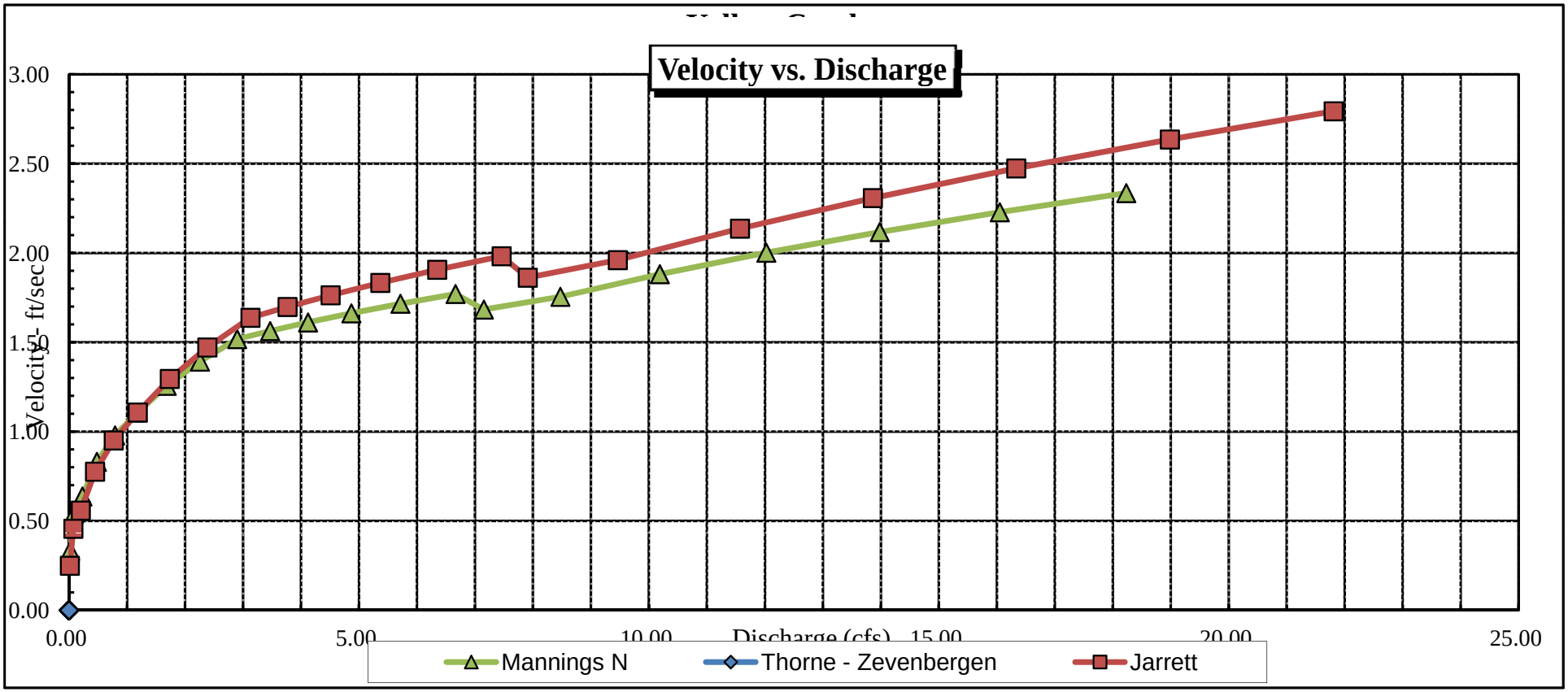
RATIONALE FOR RECOMMENDATION:
=============================

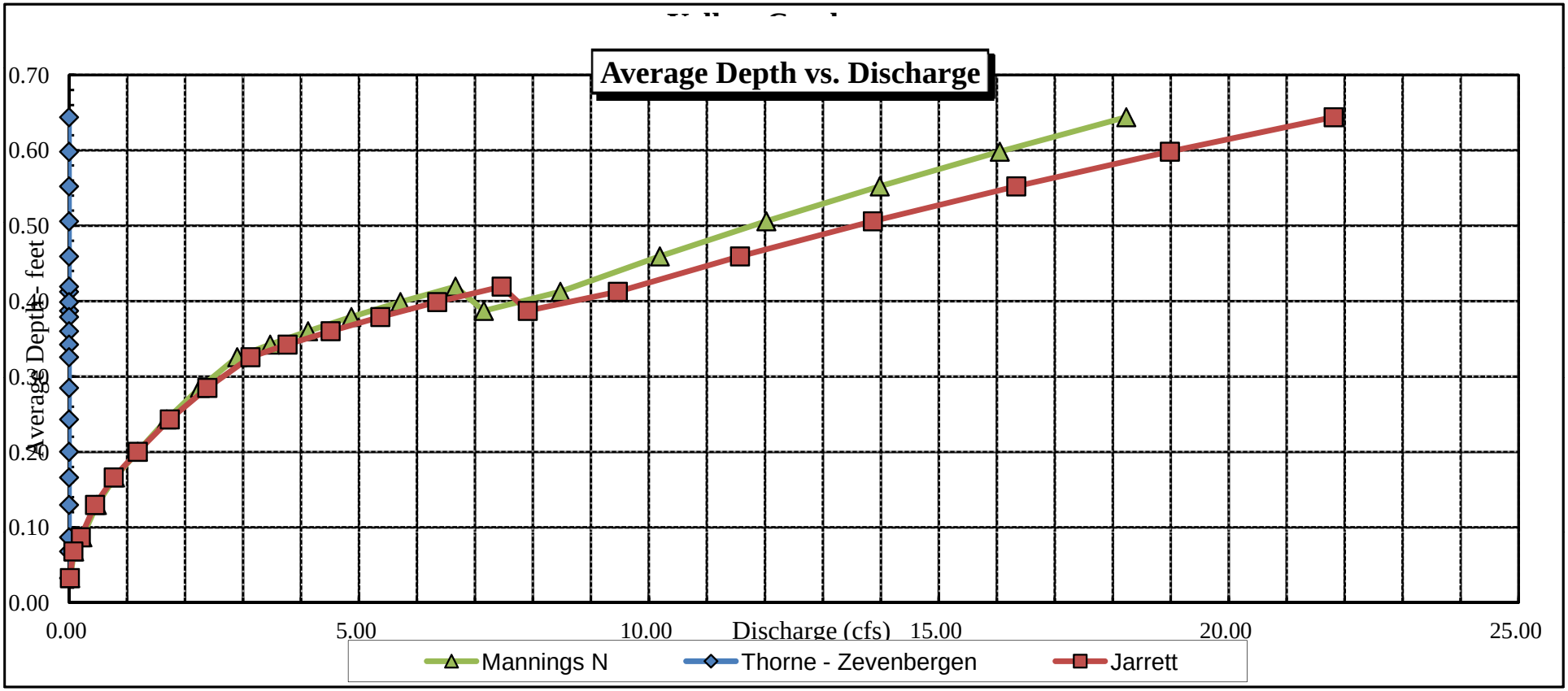
RECOMMENDATION BY: ……………………...………..…….............................. AGENCY..…………………………......…....…....…....... DATE:......…...…......……………

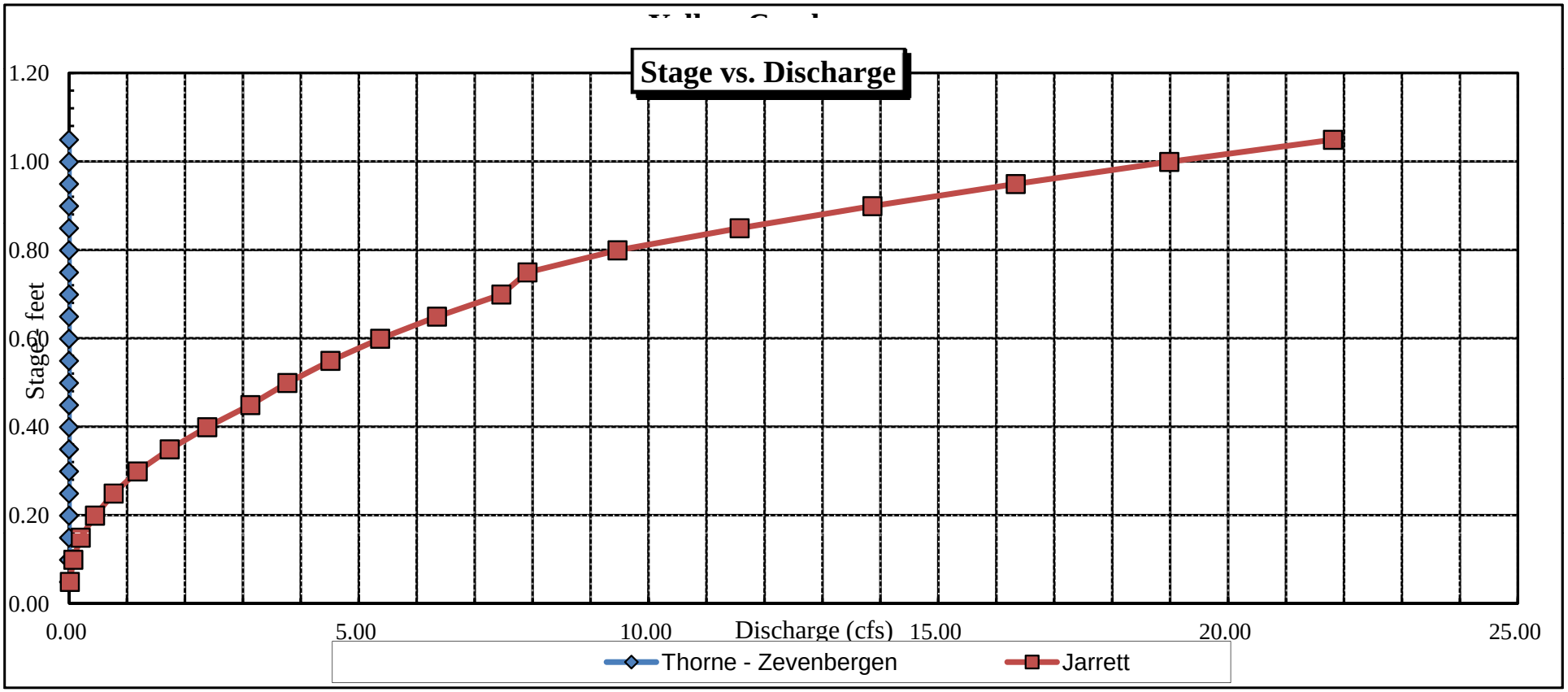
CWCB REVIEW BY: ..…………………………....………………………………………………...…............. DATE:.................…………….…


CROSS SECTION DATA ANALYSIS
RS
G
W
W
G
LS
-3.00
-3.50
-4.00
-4.50
-5.00
-5.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
5.00
10.00
15.00
20.00
25.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Velocity - ft/sec
0.00
5.00
10.00
15.00
20.00
25.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
5.00
10.00
15.00
20.00
25.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage, feet
0.00
5.00
10.00
15.00
20.00
25.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellow Creek						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: Below Lambert Spring						
DATE: 9-27-11	OBSERVERS: R. Smith, B. Lange					
LEGAL DESCRIPTION	¼ SECTION: SW NW	SECTION: 15	TOWNSHIP: 2 (N) S	RANGE: 98 E (W)	PM: Sixth	
COUNTY: Rio Blanco	WATERSHED: White River	WATER DIVISION: 6	DOW WATER CODE: 25345			
MAP(S): USGS:						
USFS: GPS Zone 12 4497036						

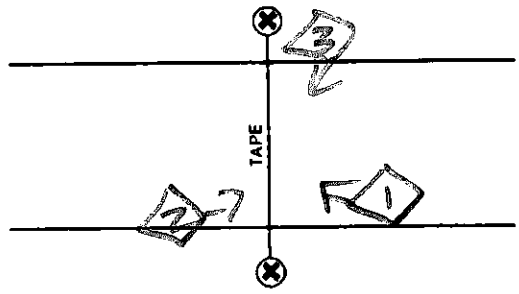
SUPPLEMENTAL DATA

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: gravels	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	5.74 / 5.74
② WS Upstream	22.7	5.52
③ WS Downstream	14.0	5.82
SLOPE	0.30 / 36.7 = .008	

SKETCH



LEGEND:
Stake ⊗
Station ①
Photo ◇
Direction of Flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/(NO)	DISTANCE ELECTROFISHED ____ ft	FISH CAUGHT YES/NO	WATER CHEMISTRY SAMPLED: (YES)/NO

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:
mayfly, black fly

COMMENTS

pH = 8.35
Temp = 15.4°
Cond = 3324
Salinity = 1.7

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) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
LS	0.0		3.90								
LG	2.7		4.80								
	4.0		5.47								
LW	4.5		5.74								
			I		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		1.41				
			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		1.31				
			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								
	10.8		5.35								
RG	11.3		4.82								
	12.0		4.50								
RS	15.5		4.20								
TOTALS:											

End of Measurement	Time	Gage Reading ft	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

TAPE WT:	0.0106
TENSION:	99999

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

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	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	LS	0.00	3.90			0.00		0.00	0.00	0.0%
1	G	2.70	4.80			0.00		0.00	0.00	0.0%
		4.00	5.47			0.00		0.00	0.00	0.0%
	W	4.50	5.74	0.00		0.00		0.00	0.00	0.0%
		4.80	6.00	0.25	0.00	0.40	0.25	0.08	0.00	0.0%
		5.10	6.05	0.30	0.01	0.30	0.30	0.09	0.00	0.1%
		5.40	5.95	0.20	0.17	0.32	0.20	0.06	0.01	1.0%
		5.70	5.95	0.20	0.50	0.30	0.20	0.06	0.03	2.9%
		6.00	5.95	0.20	0.92	0.30	0.20	0.06	0.06	5.3%
		6.30	5.95	0.20	1.42	0.30	0.20	0.06	0.09	8.2%
		6.60	5.95	0.20	1.51	0.30	0.20	0.06	0.09	8.7%
		6.90	5.95	0.20	1.30	0.30	0.20	0.06	0.08	7.5%
		7.20	5.95	0.20	0.80	0.30	0.20	0.06	0.05	4.6%
		7.50	5.95	0.20	0.89	0.30	0.20	0.06	0.05	5.1%
		7.80	5.95	0.20	0.90	0.30	0.20	0.06	0.05	5.2%
		8.10	5.95	0.20	0.96	0.30	0.20	0.06	0.06	5.5%
		8.40	5.95	0.20	1.10	0.30	0.20	0.06	0.07	6.3%
		8.70	5.95	0.20	1.81	0.30	0.20	0.06	0.11	10.4%
		9.00	5.95	0.20	1.63	0.30	0.20	0.06	0.10	9.4%
		9.30	6.05	0.30	1.40	0.32	0.30	0.09	0.13	12.1%
		9.60	6.10	0.35	0.69	0.30	0.35	0.11	0.07	6.9%
		9.90	6.10	0.35	0.10	0.30	0.35	0.09	0.01	0.8%
	W	10.10	5.74	0.00	0.00	0.41		0.00	0.00	0.0%
		10.80	5.35			0.00		0.00	0.00	0.0%
1	G	11.30	4.82			0.00		0.00	0.00	0.0%
		12.00	4.50			0.00		0.00	0.00	0.0%
	RS	15.50	4.20			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

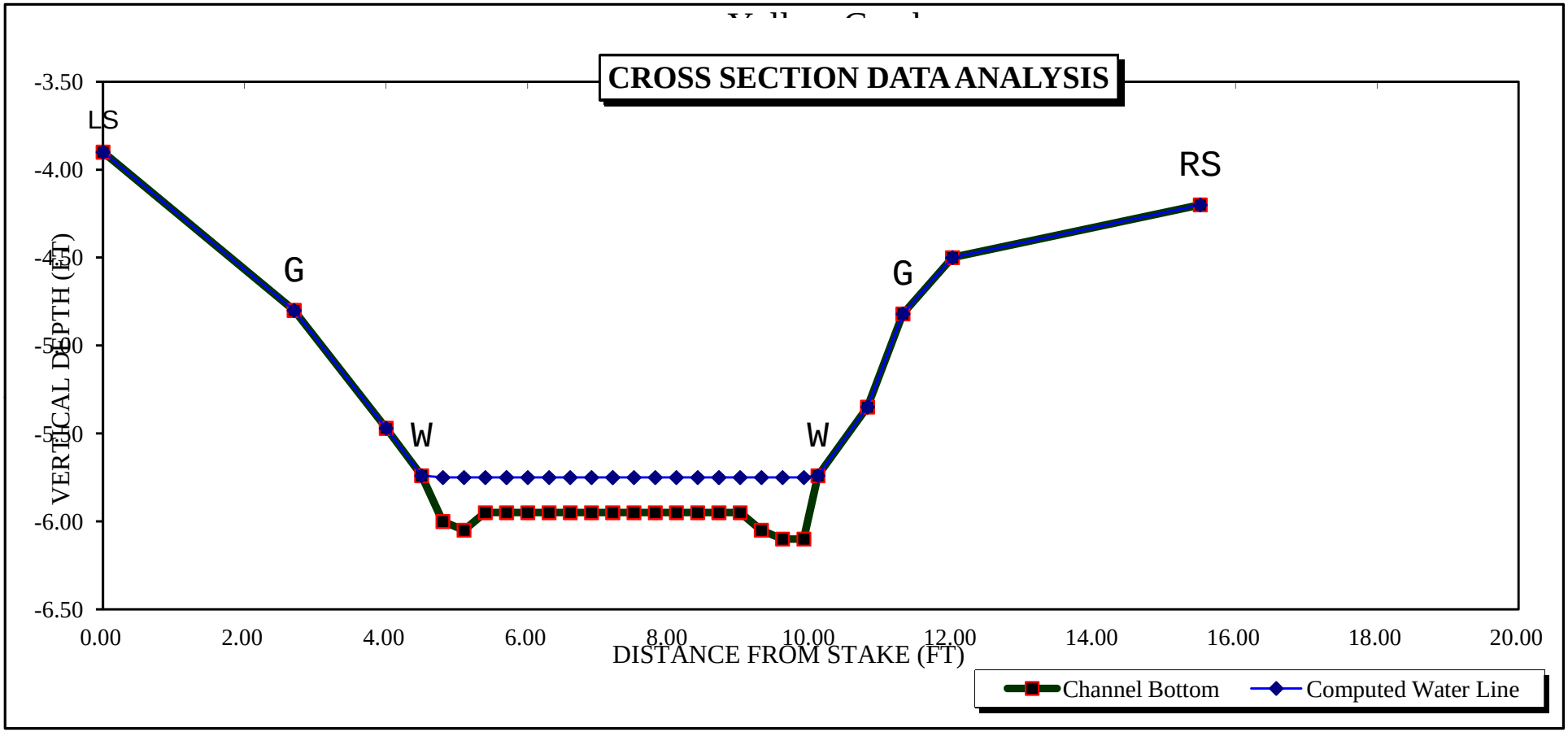
RECOMMENDED INSTREAM FLOW:
=============================

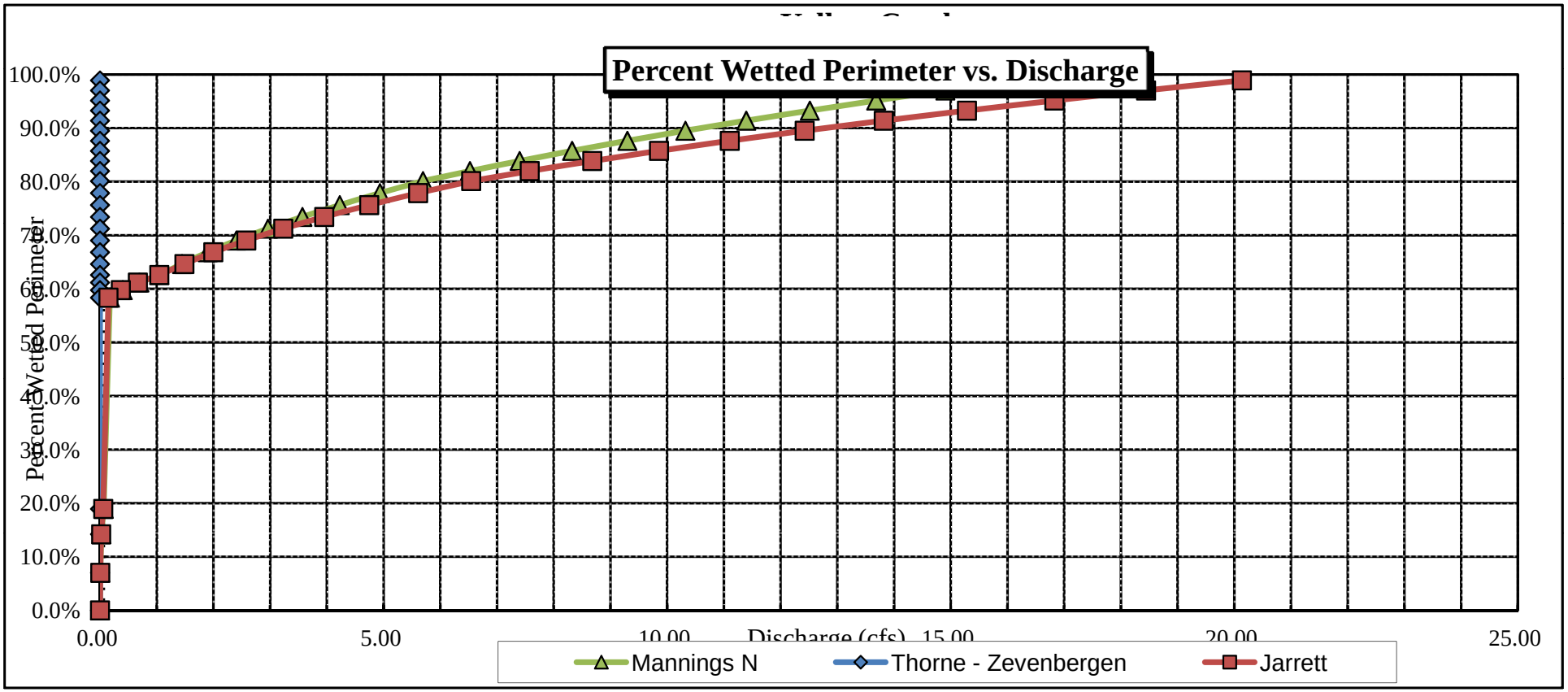
FLOW (CFS)	PERIOD
===========	========
____________________	____________________
____________________	____________________
____________________	____________________
____________________	____________________

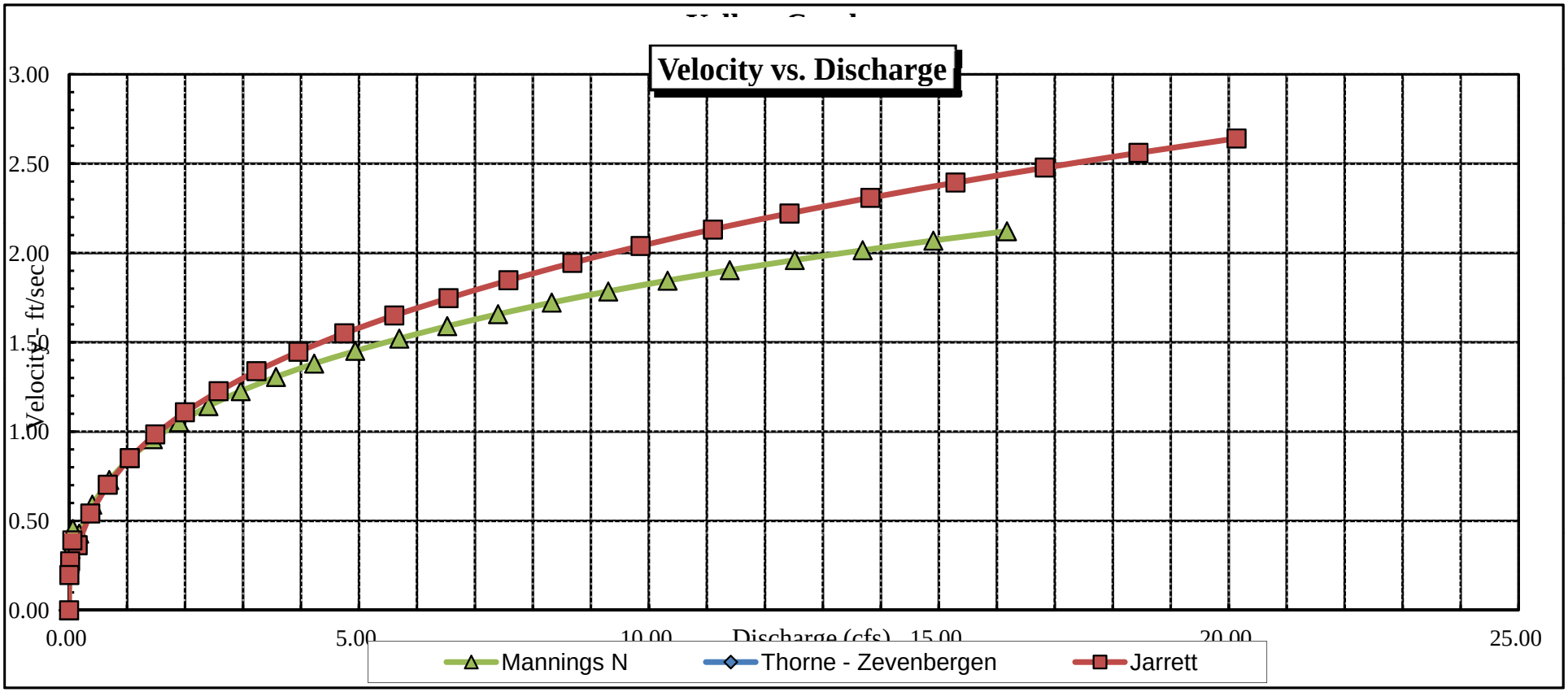
RATIONALE FOR RECOMMENDATION:
=============================

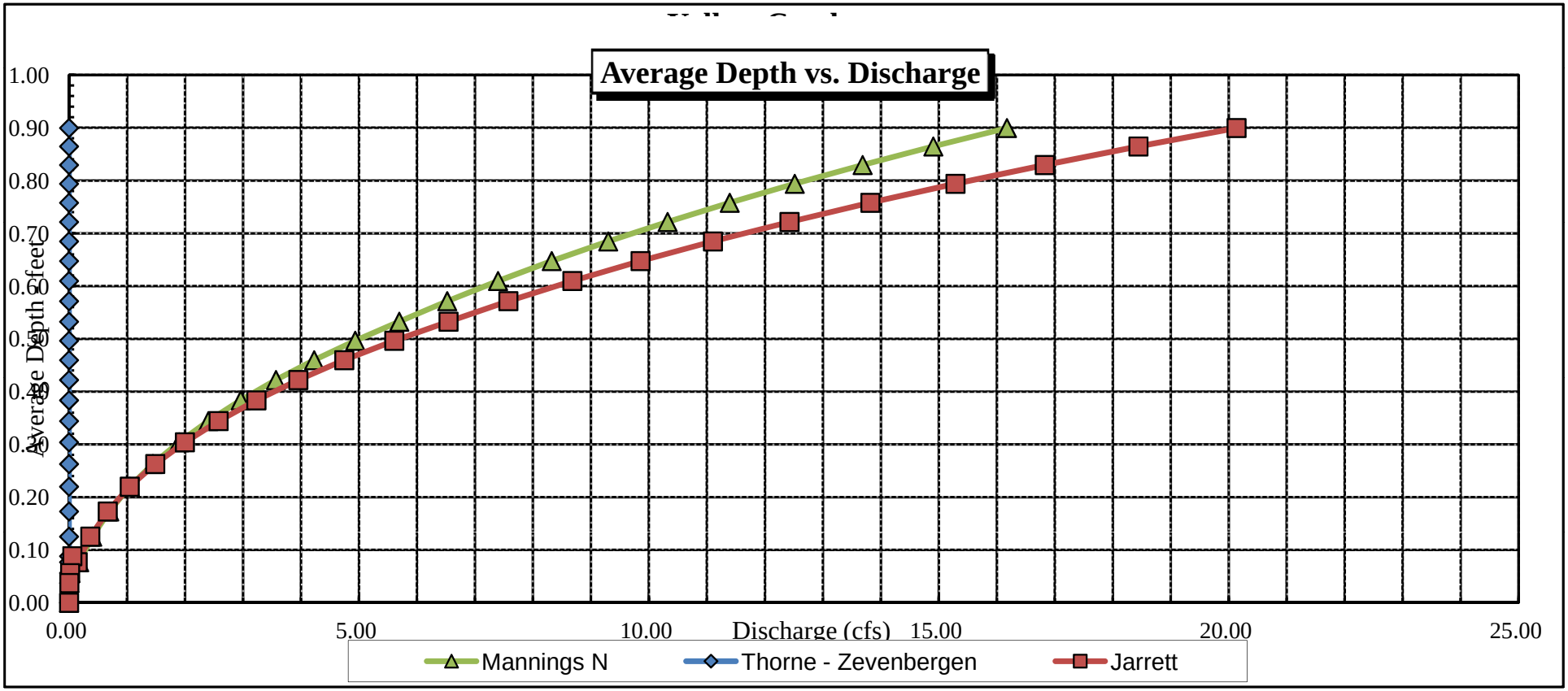
RECOMMENDATION BY: ………………...………..……............................... AGENCY..……………………......…....…....…….…...... DATE:......…...…......……………

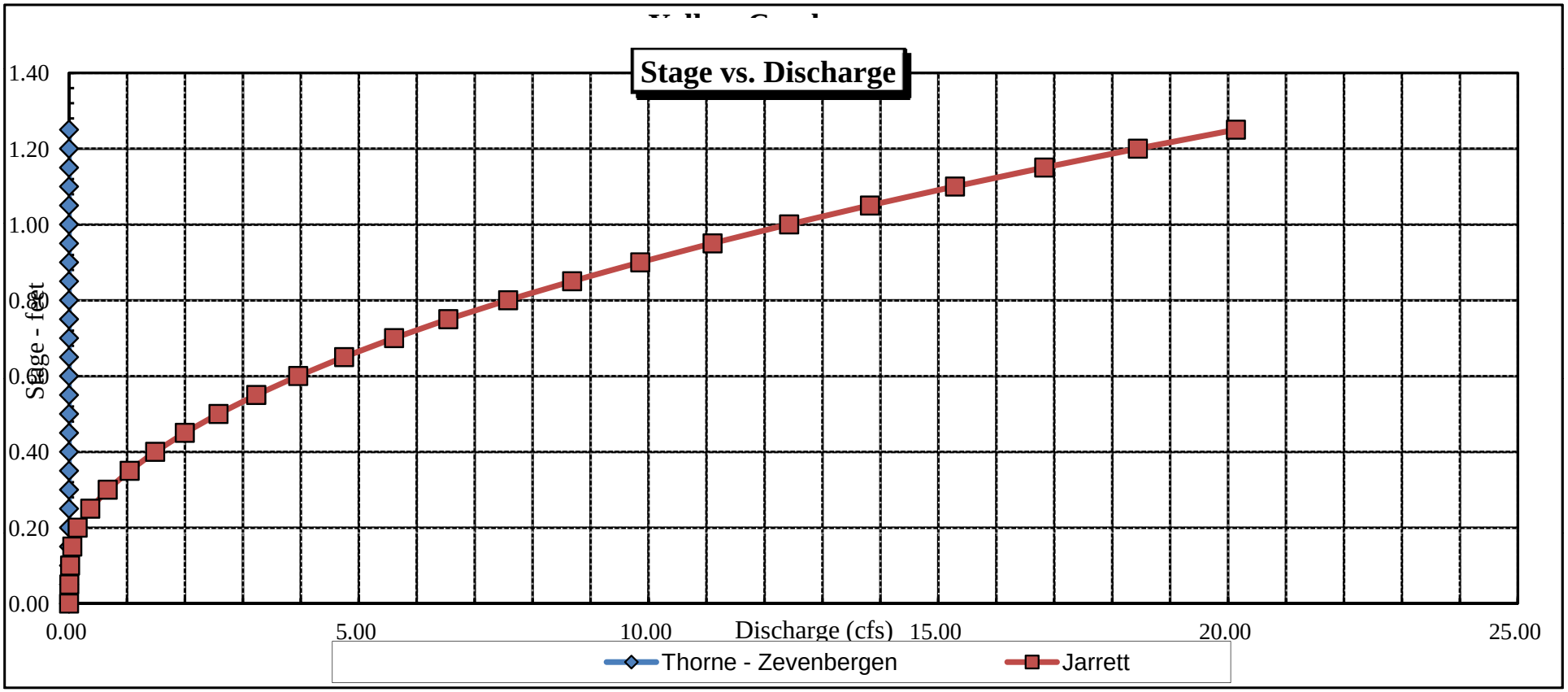
CWCB REVIEW BY: ..…………………………....………………………………………………...…............. DATE:.................…………….....


CROSS SECTION DATA ANALYSIS
LS
G
W
W
G
RS
-3.50
-4.00
-4.50
-5.00
-5.50
-6.00
-6.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
5.00
10.00
Discharge (cfs)
15.00
20.00
25.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Velocity - ft/sec
0.00
5.00
10.00
15.00
20.00
25.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth (feet)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
5.00
10.00
Discharge (cfs)
15.00
20.00
25.00
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage - feet
0.00
5.00
10.00
Discharge (cfs)
15.00
20.00
25.00
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellow Creek						CROSS-SECTION NO.: 3
CROSS-SECTION LOCATION: above Lambert Spring						
DATE: 9-27-11	OBSERVERS: R. Smith, B. Lange					
LEGAL DESCRIPTION	¼ SECTION: NW SE	SECTION: 16	TOWNSHIP: 2 (N) S	RANGE: 98 E (W)	PM: Sixth	
COUNTY: Rio Blanco	WATERSHED: White River	WATER DIVISION: 6	DOW WATER CODE: 25343			
MAP(S): USGS:		utm zone 12 722547 4446441				
USFS:						

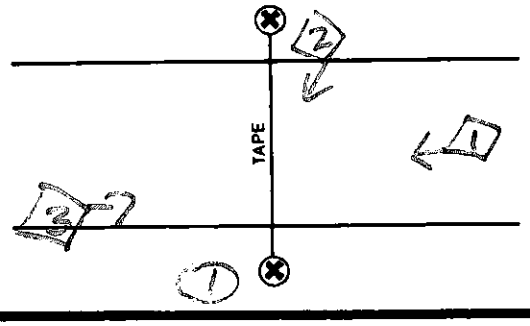
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION (YES / NO)	METER TYPE: M-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravels	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	6.96 / 6.96
(2) WS Upstream	10.3	6.88
(3) WS Downstream	9.1	7.10
SLOPE	0.22 / 19.4 = .011	

SKETCH



LEGEND:
Stake (X)
Station (1)
Photo (1)
Direction of Flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	DISTANCE ELECTROFISHED ____ ft	FISH CAUGHT YES/NO	WATER CHEMISTRY SAMPLED YES/NO

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

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

COMMENTS

pH = 8.65
Temp = 22.7°C
Cond = 3054
Sal = 1.6

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Yellow Creek	CROSS-SECTION NO.:	DATE: 9-27-11	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT	Gage Reading: _____ ft	TIME: 2:10 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) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
S	0.0		5.34								
	2.0		6.06								
G	2.7		5.96								
W	3.0		6.96								
	3.3		7.25	.3				.04			
	3.6		7.25	0.3				0.09			
	3.9		7.15	0.2				0.34			
	4.2		7.15	0.2				0.69			
	4.5		7.25	0.3				0.94			
	4.8		7.25	0.3				1.14			
	5.1		7.20	0.25				1.09			
	5.4		7.15	0.2				0.59			
	5.7		7.15	0.2				0.22			
	6.0		7.05	0.1				Ø			
W	6.2		6.96								
	7.5		6.12								
G	9.4		5.94								
RS	11.4		5.36								
TOTALS:											

End of Measurement	Time	Gage Reading ft	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:	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

TAPE WT:	0.0106
TENSION:	99999

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

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	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	LS	0.00	5.34			0.00		0.00	0.00	0.0%
		2.00	6.02			0.00		0.00	0.00	0.0%
1	G	2.70	5.96			0.00		0.00	0.00	0.0%
	W	3.00	6.96	0.00	0.00	0.00		0.00	0.00	0.0%
		3.30	7.25	0.30	0.04	0.42	0.30	0.09	0.00	0.9%
		3.60	7.25	0.30	0.09	0.30	0.30	0.09	0.01	2.1%
		3.90	7.15	0.20	0.34	0.32	0.20	0.06	0.02	5.2%
		4.20	7.15	0.20	0.69	0.30	0.20	0.06	0.04	10.6%
		4.50	7.25	0.30	0.94	0.32	0.30	0.09	0.08	21.6%
		4.80	7.25	0.30	1.14	0.30	0.30	0.09	0.10	26.2%
		5.10	7.20	0.25	1.09	0.30	0.25	0.08	0.08	20.9%
		5.40	7.15	0.20	0.59	0.30	0.20	0.06	0.04	9.1%
		5.70	7.15	0.20	0.22	0.30	0.20	0.06	0.01	3.4%
		6.00	7.05	0.10	0.00	0.32	0.10	0.03	0.00	0.0%
	W	6.20	6.96	0.00	0.00	0.22		0.00	0.00	0.0%
		7.50	6.42			0.00		0.00	0.00	0.0%
1	G	9.40	5.94			0.00		0.00	0.00	0.0%
	RS	11.40	5.36			0.00		0.00	0.00	0.0%
	TOTALS ----------					3.39	0.3 (Max.)	0.70	0.39	100.0%

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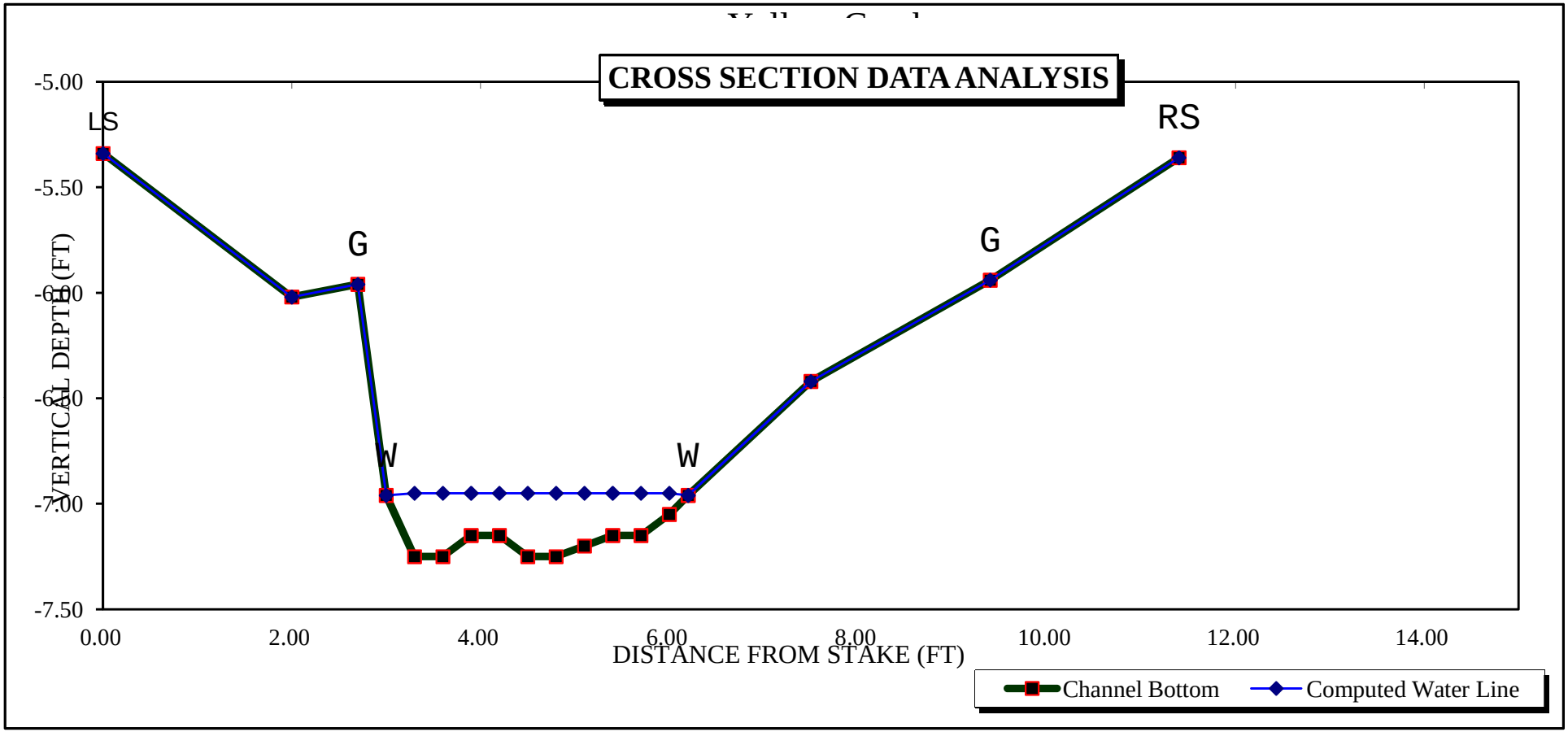
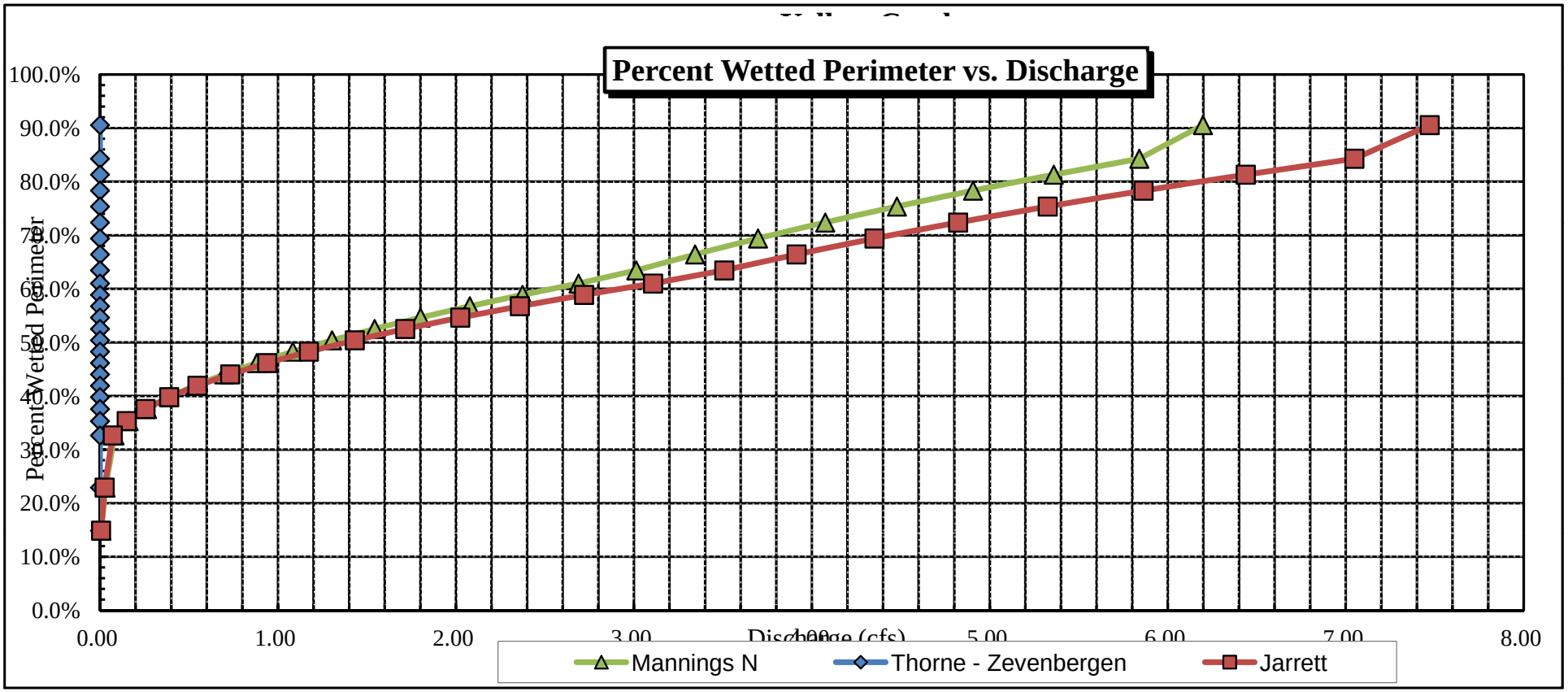
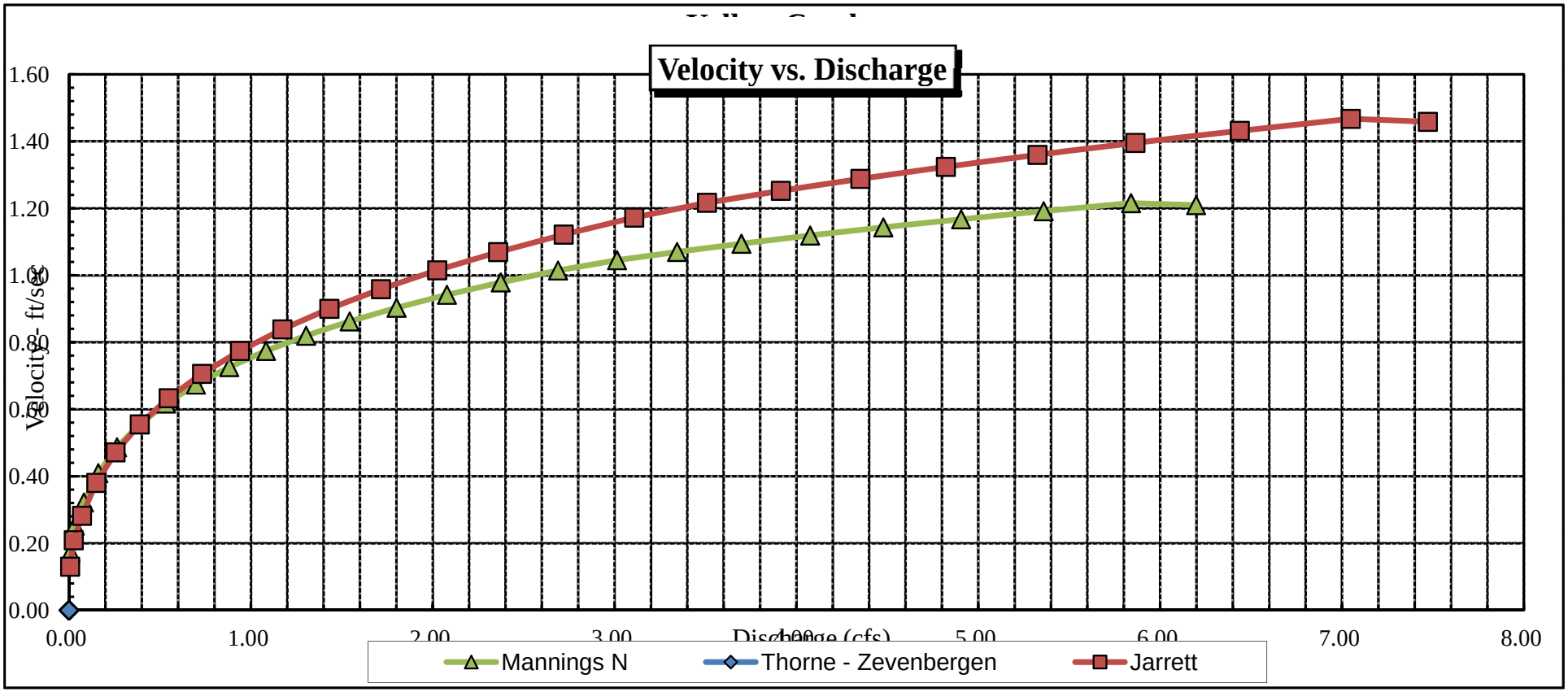
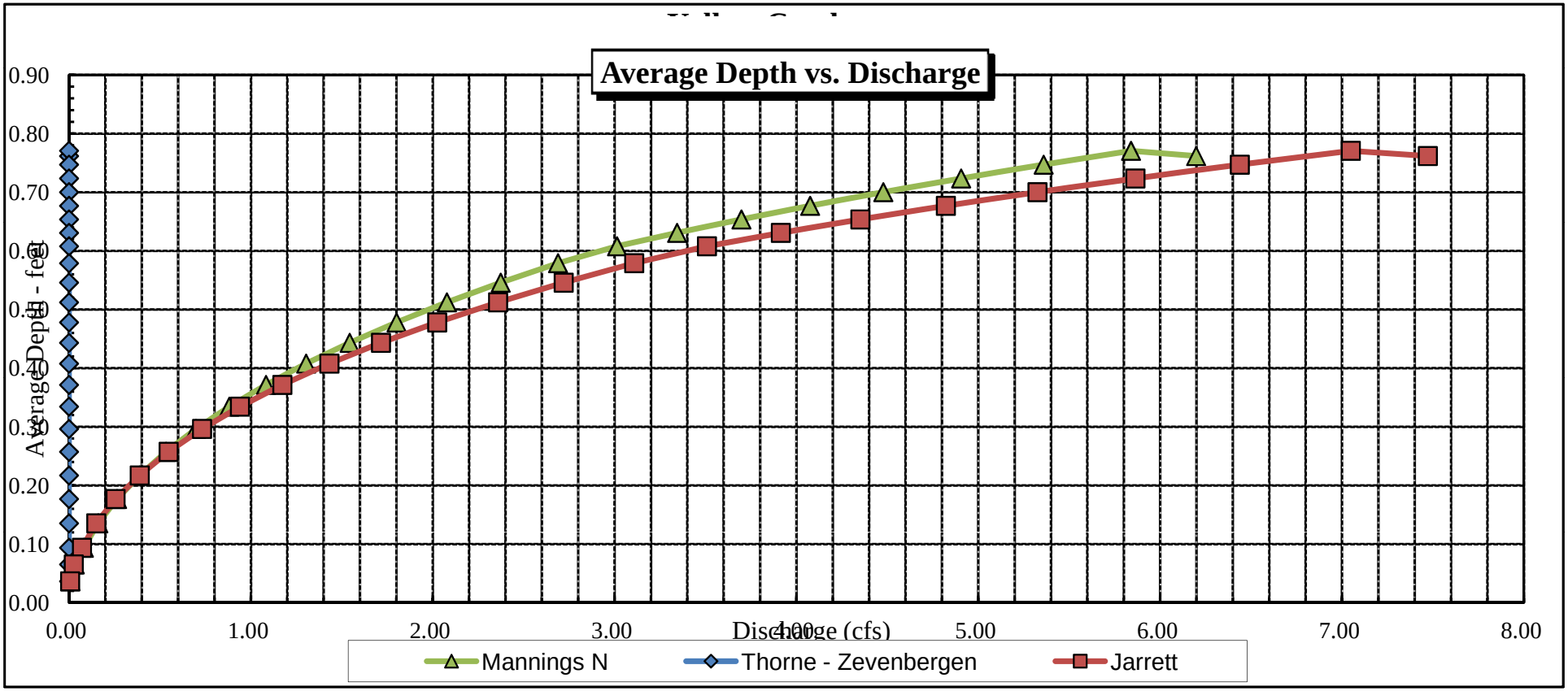
RECOMMENDATION BY: ……………………...………..……............................... AGENCY..……………………….....……....…...…….….... DATE:......…...…......……………

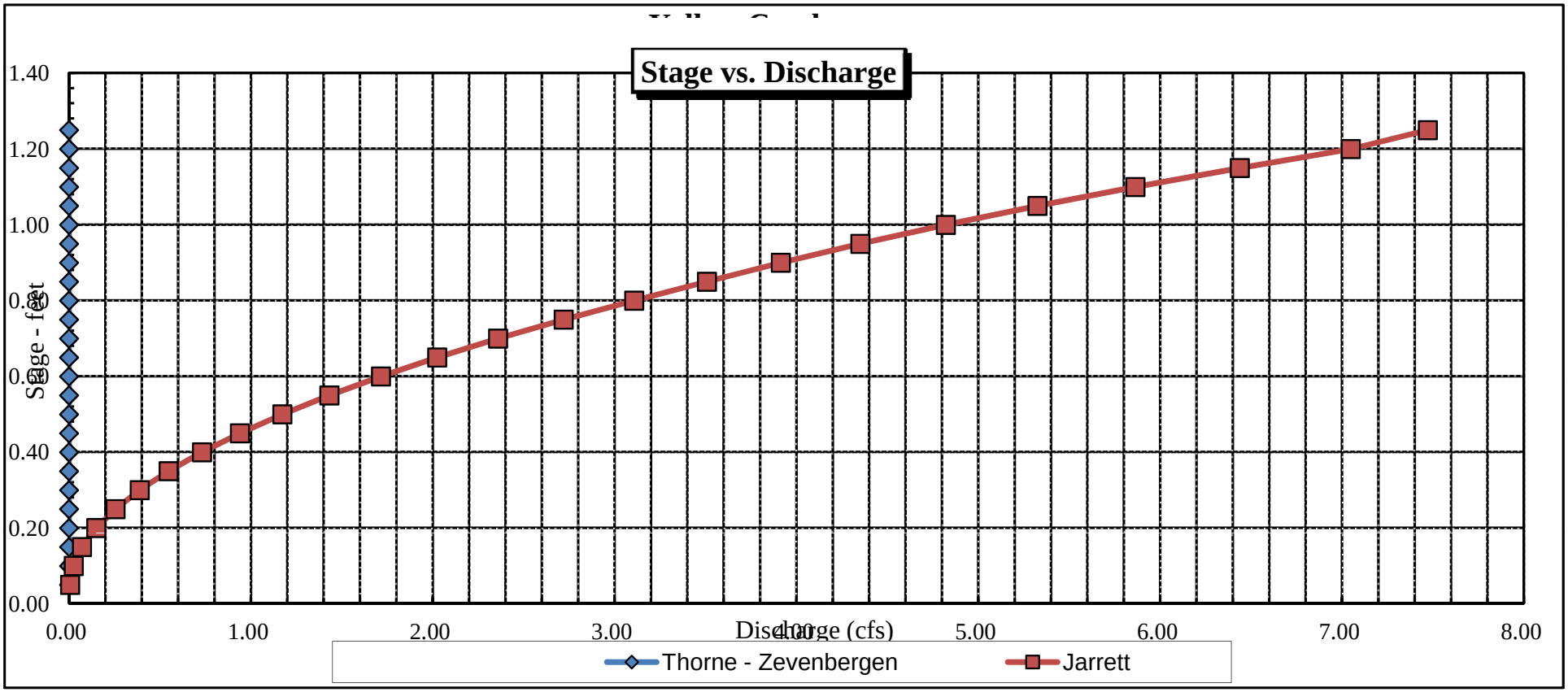
CWCB REVIEW BY: ..………………………….....………………………………………………..…............. DATE:.................…………….....…


CROSS SECTION DATA ANALYSIS
LS
G
W
W
G
RS
-5.00
-5.50
-6.00
-6.50
-7.00
-7.50
VERTICAL DEPTH (FT)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
DISTANCE FROM STAKE (FT)
Channel Bottom
Computed Water Line


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
1.00
2.00
3.00
5.00
6.00
7.00
8.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
Velocity - ft/sec
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Stage - feet
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

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

Photo #1