

DRAFT RECOMMENDATION–January 2016 Version

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

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an increase of an existing instream flow water right on a portion of the Piney River, located in Water Division 5.

Location and Land Status. The Piney River originates in the Eagles Nest Wilderness Area, approximately six miles northeast of Vail. The subject of this recommendation is a reach that begins at confluence with Stark Creek and extends to the confluence with the Colorado River, a distance of approximately 6.0 miles. The BLM manages approximately 2.5 miles of this reach and 3.5 miles are in private ownership.

Existing Instream Flow Water Rights. The Colorado Water Conservation Board appropriated an instream flow water right on this portion of the Piney River in 1986. The water right extends from the confluence with the North Fork of the Piney River to the confluence with the Colorado River, a distance of approximately 11.6 miles. The instream flow water right is for 9.0 cfs, year round.

Biological Summary. The Piney River is a cold-water, high gradient stream. It flows through a canyon with a valley floor approximately one-fourth mile in width. The stream cuts through alluvial deposits in the narrow valley and is confined by bedrock in many locations. The stream generally has large substrate, consisting of mostly of small cobbles and boulders of up to two feet in diameter. The stream has a good mix of swift runs and riffles. Slow deep pools and sinuosity are very limited in this reach due to the channel type, but there are some pocket water pools associated with the large rock substrate.

Fisheries surveys have revealed a self-sustaining population of brown trout, rainbow trout, mountain whitefish, sculpin, and longnose sucker. The number of fish is likely to vary seasonally as fish move in and out of this reach from the Colorado River. Intensive macro-invertebrate surveys have not been conducted, but spot samples have revealed various species of mayfly, caddisfly, and stonefly – including the giant salmonfly (*Pteronarcys californica*).

The riparian community is generally comprised of willow, alder, cottonwood, Douglas fir, and red osier dogwood. The riparian community is in very good condition. Given the channel width, the riparian community provides some, but not extensive, shading and cover for fish.

R2Cross Analysis. The BLM collected the following R2Cross data from the Piney 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)
07/23/2015 #1	76.01 cfs	57.7 feet	Out of range	Out of range
07/23/2015 #2	75.64 cfs	74.9 feet	35.85 cfs	73.80 cfs
09/16/2015 #1	31.56 cfs	73.4 feet	25.30 cfs	59.36 cfs
09/16/2015 #2	32.22 cfs	72.8 feet	31.83 cfs	59.53 cfs

Averages: 30.99 cfs 64.23 cfs

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

64.0 cubic feet per second is recommended during the snow melt runoff period from May 1 to July 15. Protecting this flow rate would require an increase of 55.0 cfs to the existing instream flow water right. This recommendation is driven by the average depth criteria. This portion of the river is within a dark canyon, so it experiences significant icing during the winter months. It is important to protect a flow rate that makes most of this habitat available to the fish population while they are completing critical life history functions during the warm weather months. It is also important to make as much physical habitat as possible available to fish that enter the Piney River from the Colorado River. Finally, this flow should help recharge alluvial aquifers along the Piney River that are important for sustaining the riparian community during low flow periods.

25.0 cubic feet per second is recommended from July 16 through August 15. Protecting this flow rate would require an increase of 16 cfs to the existing instream flow water right. This is the highest water temperature period of the year, so it is important to protect sufficient flow rates to keep water temperatures stable and within the tolerance range for salmonid species. This recommendation is driven by water availability, but comes close to meeting two of the three instream flow criteria.

13.0 cubic feet per second is recommended during the period from August 16 to March 31. Protecting this flow rate would require an increase of 4.0 cfs to the existing instream flow water right. This recommendation is driven by limited water availability. This flow rate should prevent pools from freezing, allowing the fish population to successfully overwinter.

25.0 cubic feet per second is recommended from during the beginning of the snowmelt runoff period from April 1 to April 30. Protecting this flow rate would require an increase of 16 cfs to the existing instream flow water right. It is

important to protect a higher flow rate when the fish population is starting to become actively feed during the early portion of the growing season.

Rationale for Instream Flow Increase. BLM believes an instream flow increase for the Piney River is warranted because of physical habitat characteristics. The R2Cross data summarized below clearly indicates that the current instream flow water right does not provide sufficient physical habitat during the warm weather portions of the year when the fish populations are feeding, growing, and spawning. When the existing instream flow rights are applied to the cross sections that were collected, the stream would exhibit between 52% to 65% wetted perimeter. However, this habitat is not highly usable by the fish population, because 9.0 cfs constrains the habitat to an average depth of 0.27 feet and average velocities ranging from 0.65 to 0.80 feet per second. An average habitat depth of 0.27 feet is not sufficient in a stream that averages 70 feet in width. During the warm weather season, the fish population needs to have access to as much of the stream channel as possible for feeding, resting, and spawning if it is to survive the pronounced cold winters in this canyon.

Water Availability. The BLM recommends relying upon USGS Gage 09059500 for the Piney River near State Bridge, CO. This gage is located just upstream from the proposed upper terminus for the instream flow increase, and this gage has a very long period of record. Adjustments will need to be made to this gage for diversions that occur in downstream locations, and for inflow from creeks in downstream locations.

The BLM is aware more than 25 water rights located upstream from the proposed instream flow increase, with decrees allowing more than 60 cfs in diversions. BLM is aware of the following water rights located within the reach proposed for an increase:

Ashlock Ditch -1.8 cfs (1889 priority); 2.95 cfs (1923 priority)
Ashlock Ditch Headgate 2 - 4.05 cfs (1923 priority)
Ashlock No. 2 Ditch Headgate 2 – 2.0 cfs (1923 priority); 3.76 cfs (1938 priority)
Wiltsey Ditch (two decreed points of diversion)– 2.08 cfs (1938 priority)

Relationship to Land Management Plans. BLM's land use plan calls for the riparian resources associated with the Piney River to be managed to emphasize native vegetation, biological diversity, wildlife habitat, and watershed health (Vegetation Objective 03). BLM's plan calls for the fishery resources to maintain and improve fish habitat for both native fishes and for cold water sport fishes (Fish and Wildlife Objective 01). Appropriation of an increase to the existing instream flow water right would assist BLM in long-term management of outstanding riparian values and important fishery values.

Data sheets, R2Cross output, fishery survey information, and photographs of the cross section were included with BLM's draft recommendation in February 2016. We thank both Colorado Parks and Wildlife and the Colorado Water Conservation Board for their cooperation in this effort.

If you have any questions regarding our instream flow recommendation, please contact Roy

Smith at 303-239-3940.

Sincerely,

Brian St. George
Deputy State Director
Resources and Fire

Cc: Pauline Adams, Colorado River Valley Field Office
Tom Fresques, Colorado River Valley Field Office
Karl Mendonca, Colorado River Valley Field Office
Joe Meyer, Northwest District Office



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



**COLORADO WATER
CONSERVATION BOARD**

LOCATION INFORMATION

STREAM NAME:		Piney River				CROSS-SECTION NO.:		1	
CROSS-SECTION LOCATION:		100 ft. upstream from BLM road bridge							
DATE:		7-23-15		OBSERVERS:		R. Smith, P. Adams			
LEGAL DESCRIPTION		1/4 SECTION:		SECTION:		TOWNSHIP:		RANGE:	
		SE		25		2 N/S		83 E/W	
COUNTY:		Eagle		WATERSHED:		Colorado River		WATER DIVISION:	
						5		DOW WATER CODE:	
MAP(S):		USGS:						21535	
		USFS:							

SUPPLEMENTAL DATA

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

CHANNEL PROFILE DATA

STATION		DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗	Tape @ Stake LB	0.0	surveyed
⊗	Tape @ Stake RB	0.0	
①	WS @ Tape LB/RB	0.0	5.60/5.60
②	WS Upstream	62.0	4.72
③	WS Downstream	5.0	5.65
SLOPE		0.93/67.0 = .014	

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

Salinity = 0.1 ppt	Riparian = Dogwood, Alder,
Temp = 13°C	Blue Spruce
Ph = 8.13	
Cond = 187	

DISCHARGE/CROSS SECTION NOTES

DISCHARGE/CROSS SECTION NOTES												
STREAM NAME: <u>Aney River</u>				CROSS-SECTION NO.: <u>1</u>		DATE: <u>7-23-15</u>		SHEET <u> </u> OF <u> </u>				
BEGINNING OF MEASUREMENT			EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)		LEFT / RIGHT		Gage Reading: <u> </u> ft		TIME: <u>9:45 am</u>			
Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)
									At Point	Mean in Vertical		
LS		0.0		0.0								
G		1.6		3.24								
		3.0		3.70								
		6.0		4.31								
		9.0		5.02								
		10.5		5.20								
W		11.5		5.60								
		12		5.90	.3					.38		
		14		6.30	.7					1.23		
		16		6.80	.9					0.02		
		18		6.90	.9					0.08		
		20		6.7	1.1					0.83		
		22		7.0	1.4					2.48		
		23		7.0	1.4					2.67		
		24		7.1	1.5					2.08		
		25		7.1	1.5					2.61		
		26		7.1	1.5					2.0		
		27		7.1	1.5					1.98		
		29		7.1	1.5					1.50		
		30		6.8	1.2					1.86		
		31		6.4	0.8					4.06 ~ 4.06		
		32		6.8	1.2					3.60		
		34		6.8	1.2					2.91		
		36		6.8	1.2					3.22		
		38		6.5	0.9					1.11		
		40		6.6	1.0					0.89		
		42		6.5	0.9					1.12		
		44		6.7	1.1					1.35		
		46		6.35	.75					2.30		
		48		6.30	.70					2.99		
		50		5.8	.20					2.19		
		51.5		6.05	1.45					2.20		
		53		5.65	0.05					Φ		
W		53.6		5.60								
		54.5		5.29								
		57.5		4.35								
R.G.		59.6		3.04								
MS		62.2		2.20								
TOTALS:												
End of Measurement		Time:	Gage Reading: <u> </u> 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: Piney River
XS LOCATION: 100 ft upstream from BLM road bridge
XS NUMBER: 1

DATE: 23-Jul-15
OBSERVERS: R. Smith, P. Adams

1/4 SEC: SE
SECTION: 25
TWP: 2S
RANGE: 83W
PM: Sixth

COUNTY: Eagle
WATERSHED: Colorado River
DIVISION: 5
DOW CODE: 21535

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: 0.014

INPUT DATA CHECKED BY:DATE.....

ASSIGNED TO:DATE.....

STREAM NAME: Piney River
 XS LOCATION: 100 ft upstream from BLM road bridge
 XS NUMBER: 1

DATA POINTS= 38

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
1	LS	0.00	0.00			0.00		0.00	0.00	0.0%
	G	1.60	3.24			0.00		0.00	0.00	0.0%
		3.00	3.70			0.00		0.00	0.00	0.0%
		6.00	4.31			0.00		0.00	0.00	0.0%
		9.00	5.02			0.00		0.00	0.00	0.0%
W		10.50	5.20			0.00		0.00	0.00	0.0%
		11.50	5.60	0.00	0.00	0.00		0.00	0.00	0.0%
		12.00	5.90	0.30	0.38	0.58	0.30	0.38	0.14	0.2%
		14.00	6.30	0.70	1.23	2.04	0.70	1.40	1.72	2.3%
		16.00	6.50	0.90	0.02	2.01	0.90	1.80	0.04	0.0%
		18.00	6.50	0.90	0.08	2.00	0.90	1.80	0.14	0.2%
		20.00	6.70	1.10	0.83	2.01	1.10	2.20	1.83	2.4%
		22.00	7.00	1.40	2.48	2.02	1.40	2.10	5.21	6.9%
		23.00	7.00	1.40	2.67	1.00	1.40	1.40	3.74	4.9%
		24.00	7.10	1.50	2.08	1.00	1.50	1.50	3.12	4.1%
		25.00	7.10	1.50	2.61	1.00	1.50	1.50	3.92	5.2%
		26.00	7.10	1.50	2.00	1.00	1.50	1.50	3.00	3.9%
		27.00	7.10	1.50	1.98	1.00	1.50	2.25	4.46	5.9%
		29.00	7.10	1.50	1.50	2.00	1.50	2.25	3.38	4.4%
		30.00	6.80	1.20	1.86	1.04	1.20	1.20	2.23	2.9%
		31.00	6.40	0.80	4.06	1.08	0.80	0.80	3.25	4.3%
		32.00	6.80	1.20	3.60	1.08	1.20	1.80	6.48	8.5%
		34.00	6.80	1.20	2.91	2.00	1.20	2.40	6.98	9.2%
		36.00	6.80	1.20	3.22	2.00	1.20	2.40	7.73	10.2%
		38.00	6.50	0.90	1.11	2.02	0.90	1.80	2.00	2.6%
		40.00	6.60	1.00	0.89	2.00	1.00	2.00	1.78	2.3%
		42.00	6.50	0.90	1.12	2.00	0.90	1.80	2.02	2.7%
		44.00	6.70	1.10	1.35	2.01	1.10	2.20	2.97	3.9%
		46.00	6.35	0.75	2.30	2.03	0.75	1.50	3.45	4.5%
		48.00	6.30	0.70	2.99	2.00	0.70	1.40	4.19	5.5%
		50.00	5.80	0.20	2.19	2.06	0.20	0.35	0.77	1.0%
		51.50	6.05	0.45	2.20	1.52	0.45	0.68	1.49	2.0%
		53.00	5.65	0.05	0.00	1.55	0.05	0.05	0.00	0.0%
	W	53.60	5.60	0.00	0.00	0.60		0.00	0.00	0.0%
		54.50	5.29			0.00		0.00	0.00	0.0%
		57.50	4.35			0.00		0.00	0.00	0.0%
1	G	59.60	3.04			0.00		0.00	0.00	0.0%
	RS	62.20	2.20			0.00		0.00	0.00	0.0%

TOTALS -----

42.67 1.5 40.45 76.01 100.0%
 (Max.)

Manning's n = 0.0903
 Hydraulic Radius= 0.9479599

STREAM NAME: Piney River
 XS LOCATION: 100 ft upstream from BLM road bridge
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	40.45	40.45	0.0%
5.35	40.45	51.15	26.4%
5.37	40.45	50.28	24.3%
5.39	40.45	49.41	22.2%
5.41	40.45	48.55	20.0%
5.43	40.45	47.69	17.9%
5.45	40.45	46.83	15.8%
5.47	40.45	45.97	13.6%
5.49	40.45	45.12	11.5%
5.51	40.45	44.26	9.4%
5.53	40.45	43.41	7.3%
5.55	40.45	42.56	5.2%
5.56	40.45	42.14	4.2%
5.57	40.45	41.72	3.1%
5.58	40.45	41.30	2.1%
5.59	40.45	40.87	1.0%
5.60	40.45	40.45	0.0%
5.61	40.45	40.03	-1.0%
5.62	40.45	39.61	-2.1%
5.63	40.45	39.20	-3.1%
5.64	40.45	38.78	-4.1%
5.65	40.45	38.37	-5.2%
5.67	40.45	37.54	-7.2%
5.69	40.45	36.71	-9.2%
5.71	40.45	35.89	-11.3%
5.73	40.45	35.07	-13.3%
5.75	40.45	34.25	-15.3%
5.77	40.45	33.43	-17.3%
5.79	40.45	32.62	-19.4%
5.81	40.45	31.81	-21.4%
5.83	40.45	31.00	-23.4%
5.85	40.45	30.20	-25.3%

WATERLINE AT ZERO

AREA ERROR = 5.600

STREAM NAME: Piney River
 XS LOCATION: 100 ft upstream from BLM road bridge
 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	3.24	57.68	2.76	3.86	159.38	59.07	100.0%	2.70	601.43	3.77
	4.60	49.48	1.74	2.50	86.01	50.34	85.2%	1.71	239.33	2.78
	4.65	49.11	1.70	2.45	83.55	49.96	84.6%	1.67	229.18	2.74
	4.70	48.73	1.66	2.40	81.10	49.58	83.9%	1.64	219.23	2.70
	4.75	48.36	1.63	2.35	78.67	49.19	83.3%	1.60	209.49	2.66
	4.80	47.99	1.59	2.30	76.26	48.81	82.6%	1.56	199.95	2.62
	4.85	47.62	1.55	2.25	73.87	48.42	82.0%	1.53	190.61	2.58
	4.90	47.25	1.51	2.20	71.50	48.04	81.3%	1.49	181.48	2.54
	4.95	46.88	1.47	2.15	69.15	47.65	80.7%	1.45	172.56	2.50
	5.00	46.51	1.44	2.10	66.81	47.27	80.0%	1.41	163.84	2.45
	5.05	46.02	1.40	2.05	64.50	46.76	79.2%	1.38	155.60	2.41
	5.10	45.44	1.37	2.00	62.21	46.18	78.2%	1.35	147.76	2.38
	5.15	44.86	1.34	1.95	59.95	45.59	77.2%	1.32	140.12	2.34
	5.20	44.29	1.30	1.90	57.73	45.00	76.2%	1.28	132.69	2.30
	5.25	44.00	1.26	1.85	55.52	44.70	75.7%	1.24	124.90	2.25
	5.30	43.72	1.22	1.80	53.33	44.40	75.2%	1.20	117.31	2.20
	5.35	43.45	1.18	1.75	51.15	44.11	74.7%	1.16	109.90	2.15
	5.40	43.18	1.13	1.70	48.98	43.83	74.2%	1.12	102.71	2.10
	5.45	42.91	1.09	1.65	46.83	43.54	73.7%	1.08	95.71	2.04
	5.50	42.64	1.05	1.60	44.69	43.25	73.2%	1.03	88.93	1.99
	5.55	42.37	1.00	1.55	42.56	42.96	72.7%	0.99	82.36	1.94
WL	5.60	42.10	0.96	1.50	40.45	42.67	72.2%	0.95	76.01	1.88
	5.65	41.42	0.93	1.45	38.36	41.97	71.1%	0.91	70.35	1.83
	5.70	41.15	0.88	1.40	36.30	41.68	70.6%	0.87	64.45	1.78
	5.75	40.87	0.84	1.35	34.25	41.39	70.1%	0.83	58.78	1.72
	5.80	40.60	0.79	1.30	32.21	41.10	69.6%	0.78	53.32	1.66
	5.85	39.83	0.76	1.25	30.20	40.30	68.2%	0.75	48.52	1.61
	5.90	39.06	0.72	1.20	28.23	39.50	66.9%	0.71	43.94	1.56
	5.95	38.12	0.69	1.15	26.30	38.54	65.2%	0.68	39.69	1.51
	6.00	37.19	0.66	1.10	24.42	37.58	63.6%	0.65	35.66	1.46
	6.05	36.25	0.62	1.05	22.58	36.62	62.0%	0.62	31.85	1.41
	6.10	35.80	0.58	1.00	20.78	36.16	61.2%	0.57	27.97	1.35
	6.15	35.35	0.54	0.95	19.00	35.70	60.4%	0.53	24.30	1.28
	6.20	34.90	0.49	0.90	17.25	35.24	59.6%	0.49	20.85	1.21
	6.25	34.45	0.45	0.85	15.51	34.77	58.9%	0.45	17.63	1.14
	6.30	34.00	0.41	0.80	13.80	34.31	58.1%	0.40	14.64	1.06
	6.35	31.50	0.39	0.75	12.16	31.81	53.9%	0.38	12.47	1.03
	6.40	30.71	0.35	0.70	10.61	31.02	52.5%	0.34	10.10	0.95
	6.45	29.68	0.31	0.65	9.10	29.96	50.7%	0.30	8.00	0.88
	6.50	26.64	0.29	0.60	7.64	26.89	45.5%	0.28	6.43	0.84
	6.55	22.77	0.28	0.55	6.40	22.99	38.9%	0.28	5.32	0.83
	6.60	18.90	0.28	0.50	5.36	19.09	32.3%	0.28	4.48	0.84
	6.65	17.04	0.26	0.45	4.46	17.19	29.1%	0.26	3.54	0.79
	6.70	15.17	0.24	0.40	3.66	15.28	25.9%	0.24	2.75	0.75
	6.75	14.25	0.21	0.35	2.92	14.34	24.3%	0.20	1.97	0.67
	6.80	9.33	0.24	0.30	2.23	9.40	15.9%	0.24	1.67	0.75
	6.85	8.83	0.20	0.25	1.78	8.89	15.0%	0.20	1.19	0.67
	6.90	8.33	0.16	0.20	1.35	8.38	14.2%	0.16	0.78	0.58
	6.95	7.83	0.12	0.15	0.95	7.86	13.3%	0.12	0.45	0.47
	7.00	6.33	0.09	0.10	0.57	6.35	10.8%	0.09	0.22	0.39
	7.05	5.67	0.05	0.05	0.27	5.68	9.6%	0.05	0.07	0.25
	7.10	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Piney River
XS LOCATION: 100 ft upstream from BLM road bridge
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	76.01 cfs
CALCULATED FLOW (Qc)=	76.01 cfs
(Qm-Qc)/Qm * 100 =	0.0 %

MEASURED WATERLINE (W _{Lm})=	5.60 ft
CALCULATED WATERLINE (W _{Lc})=	5.60 ft
(W _{Lm} -W _{Lc})/W _{Lm} * 100 =	0.0 %

MAX MEASURED DEPTH (Dm)=	1.50	ft
MAX CALCULATED DEPTH (Dc)=	1.50	ft
(Dm-Dc)/Dm * 100	0.0	%

MEAN VELOCITY=	1.88 ft/sec
MANNING'S N=	0.090
SLOPE=	0.014 ft/ft

.4 * Qm =	30.4 cfs
2.5 * Qm=	190.0 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

[illegible]

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

CWCB REVIEW BY: DATE:

STREAM NAME: Piney River
 XS LOCATION: 100 ft upstream from BLM road bridge
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

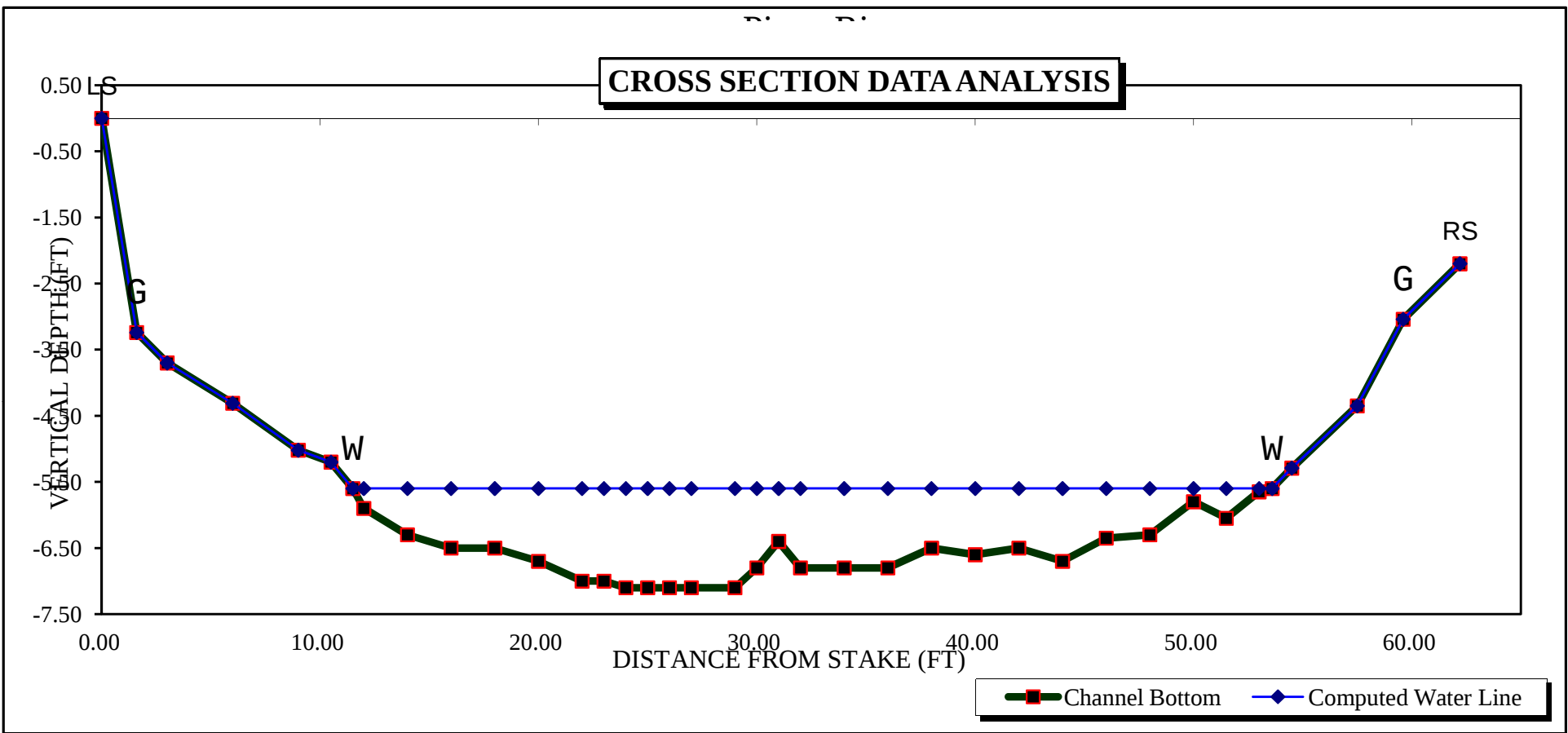
GL = lowest Grassline elevation corrected for sag

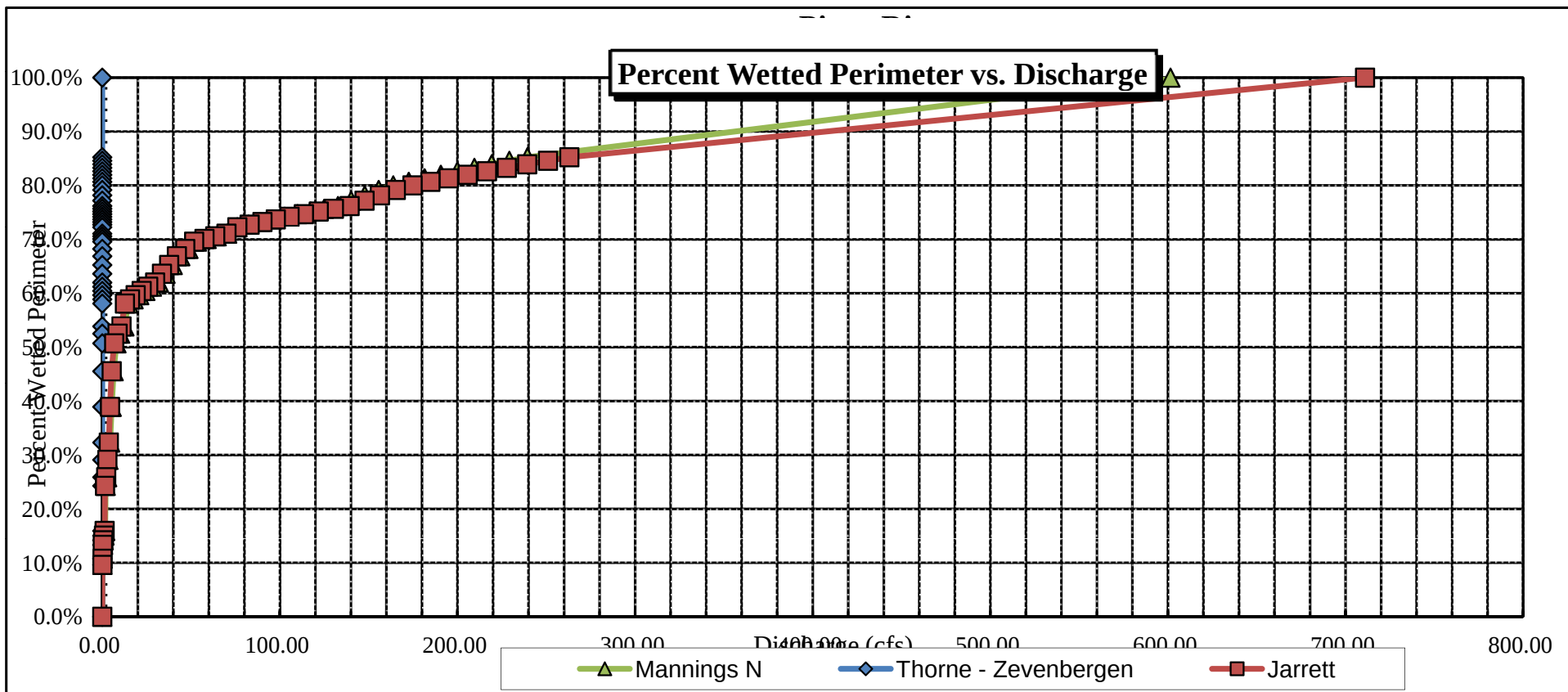
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.24	57.68	2.76	3.86	159.38	59.07	100.0%	2.70	710.99	4.46
	4.60	49.48	1.74	2.50	86.01	50.34	85.2%	1.71	262.98	3.06
	4.65	49.11	1.70	2.45	83.55	49.96	84.6%	1.67	250.97	3.00
	4.70	48.73	1.66	2.40	81.10	49.58	83.9%	1.64	239.23	2.95
	4.75	48.36	1.63	2.35	78.67	49.19	83.3%	1.60	227.77	2.90
	4.80	47.99	1.59	2.30	76.26	48.81	82.6%	1.56	216.59	2.84
	4.85	47.62	1.55	2.25	73.87	48.42	82.0%	1.53	205.69	2.78
	4.90	47.25	1.51	2.20	71.50	48.04	81.3%	1.49	195.07	2.73
	4.95	46.88	1.47	2.15	69.15	47.65	80.7%	1.45	184.72	2.67
	5.00	46.51	1.44	2.10	66.81	47.27	80.0%	1.41	174.66	2.61
	5.05	46.02	1.40	2.05	64.50	46.76	79.2%	1.38	165.23	2.56
	5.10	45.44	1.37	2.00	62.21	46.18	78.2%	1.35	156.31	2.51
	5.15	44.86	1.34	1.95	59.95	45.59	77.2%	1.32	147.65	2.46
	5.20	44.29	1.30	1.90	57.73	45.00	76.2%	1.28	139.27	2.41
	5.25	44.00	1.26	1.85	55.52	44.70	75.7%	1.24	130.42	2.35
	5.30	43.72	1.22	1.80	53.33	44.40	75.2%	1.20	121.83	2.28
	5.35	43.45	1.18	1.75	51.15	44.11	74.7%	1.16	113.50	2.22
	5.40	43.18	1.13	1.70	48.98	43.83	74.2%	1.12	105.45	2.15
	5.45	42.91	1.09	1.65	46.83	43.54	73.7%	1.08	97.67	2.09
	5.50	42.64	1.05	1.60	44.69	43.25	73.2%	1.03	90.17	2.02
	5.55	42.37	1.00	1.55	42.56	42.96	72.7%	0.99	82.95	1.95
WL	5.60	42.10	0.96	1.50	40.45	42.67	72.2%	0.95	76.01	1.88
	5.65	41.42	0.93	1.45	38.36	41.97	71.1%	0.91	69.94	1.82
	5.70	41.15	0.88	1.40	36.30	41.68	70.6%	0.87	63.59	1.75
	5.75	40.87	0.84	1.35	34.25	41.39	70.1%	0.83	57.51	1.68
	5.80	40.60	0.79	1.30	32.21	41.10	69.6%	0.78	51.72	1.61
	5.85	39.83	0.76	1.25	30.20	40.30	68.2%	0.75	46.73	1.55
	5.90	39.06	0.72	1.20	28.23	39.50	66.9%	0.71	42.00	1.49
	5.95	38.12	0.69	1.15	26.30	38.54	65.2%	0.68	37.66	1.43
	6.00	37.19	0.66	1.10	24.42	37.58	63.6%	0.65	33.57	1.37
	6.05	36.25	0.62	1.05	22.58	36.62	62.0%	0.62	29.73	1.32
	6.10	35.80	0.58	1.00	20.78	36.16	61.2%	0.57	25.81	1.24
	6.15	35.35	0.54	0.95	19.00	35.70	60.4%	0.53	22.16	1.17
	6.20	34.90	0.49	0.90	17.25	35.24	59.6%	0.49	18.76	1.09
	6.25	34.45	0.45	0.85	15.51	34.77	58.9%	0.45	15.63	1.01
	6.30	34.00	0.41	0.80	13.80	34.31	58.1%	0.40	12.76	0.92
	6.35	31.50	0.39	0.75	12.16	31.81	53.9%	0.38	10.79	0.89
	6.40	30.71	0.35	0.70	10.61	31.02	52.5%	0.34	8.58	0.81
	6.45	29.68	0.31	0.65	9.10	29.96	50.7%	0.30	6.67	0.73
	6.50	26.64	0.29	0.60	7.64	26.89	45.5%	0.28	5.30	0.69
	6.55	22.77	0.28	0.55	6.40	22.99	38.9%	0.28	4.37	0.68
	6.60	18.90	0.28	0.50	5.36	19.09	32.3%	0.28	3.69	0.69
	6.65	17.04	0.26	0.45	4.46	17.19	29.1%	0.26	2.88	0.64
	6.70	15.17	0.24	0.40	3.66	15.28	25.9%	0.24	2.20	0.60
	6.75	14.25	0.21	0.35	2.92	14.34	24.3%	0.20	1.54	0.53
	6.80	9.33	0.24	0.30	2.23	9.40	15.9%	0.24	1.34	0.60
	6.85	8.83	0.20	0.25	1.78	8.89	15.0%	0.20	0.92	0.52
	6.90	8.33	0.16	0.20	1.35	8.38	14.2%	0.16	0.59	0.43
	6.95	7.83	0.12	0.15	0.95	7.86	13.3%	0.12	0.32	0.34
	7.00	6.33	0.09	0.10	0.57	6.35	10.8%	0.09	0.15	0.27
	7.05	5.67	0.05	0.05	0.27	5.68	9.6%	0.05	0.04	0.16
	7.10	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

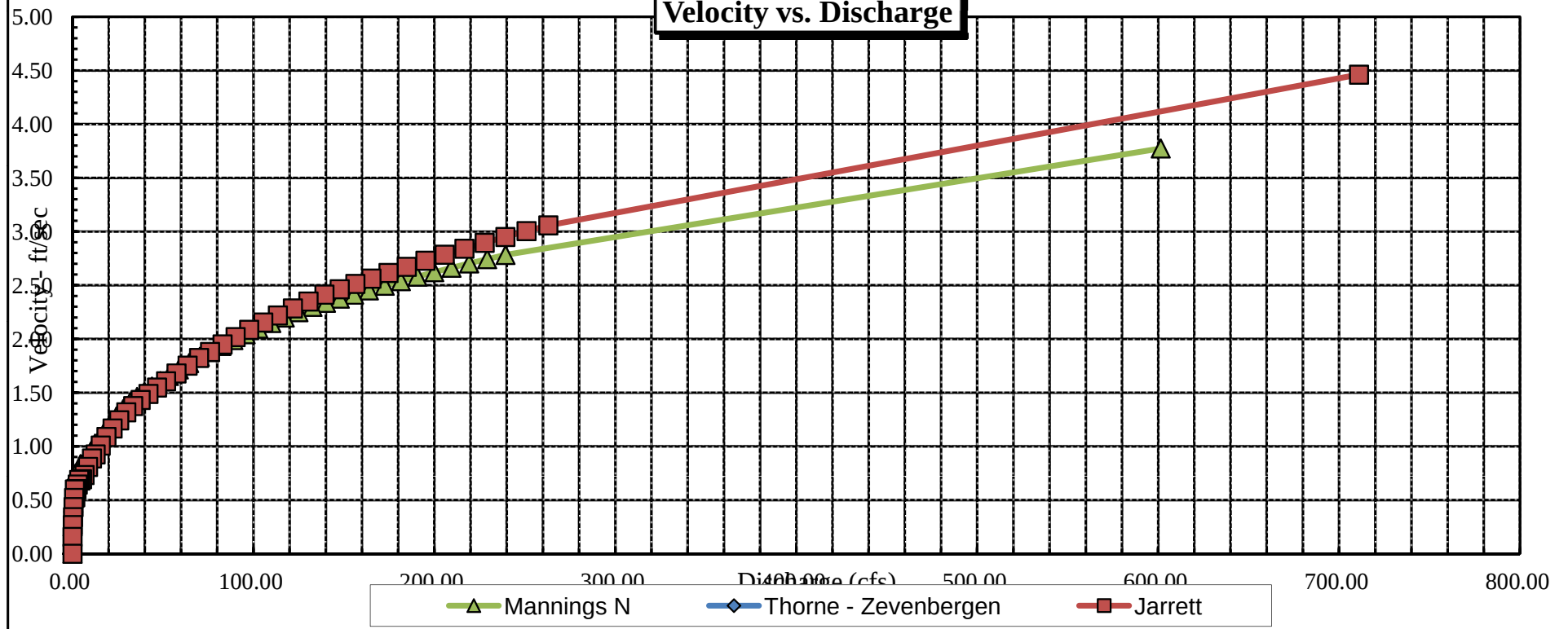
Distance

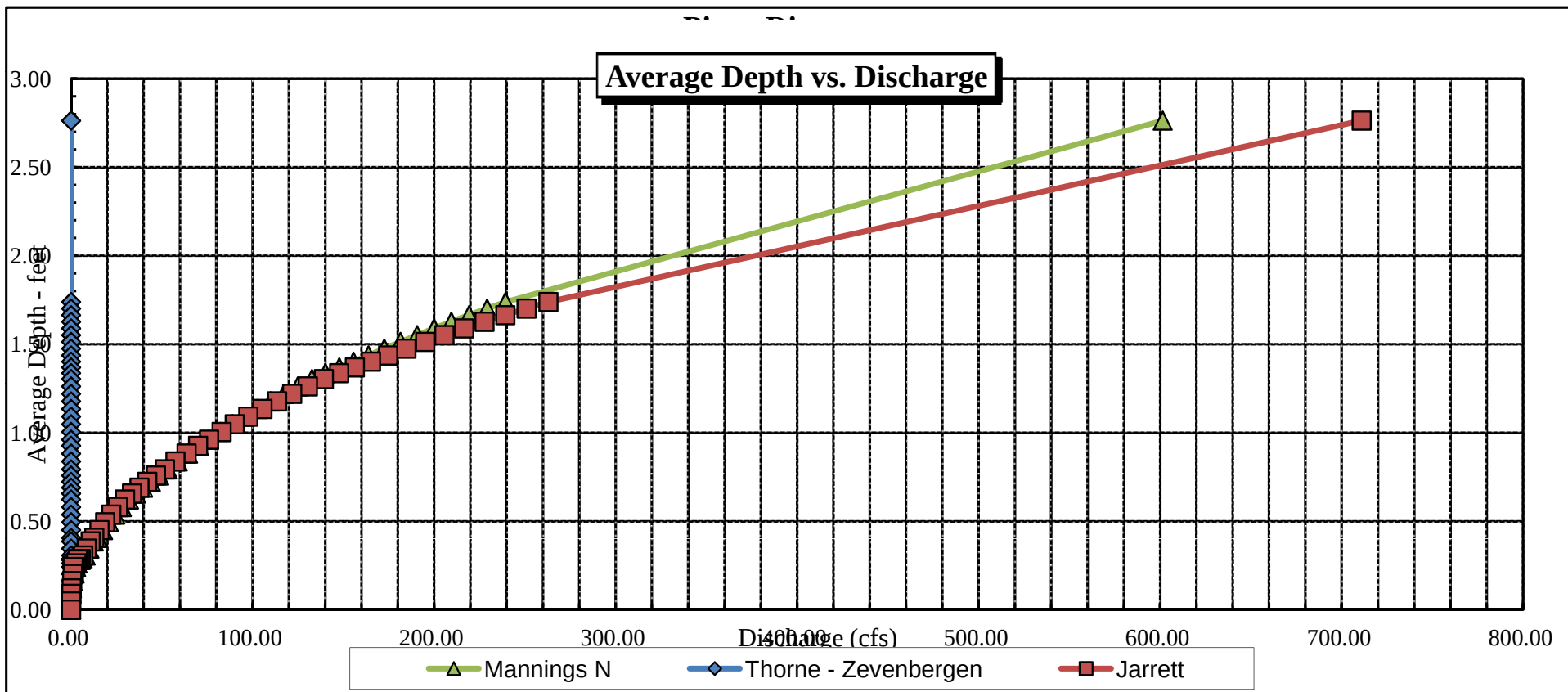
CROSS SECTION DATA ANALYSIS



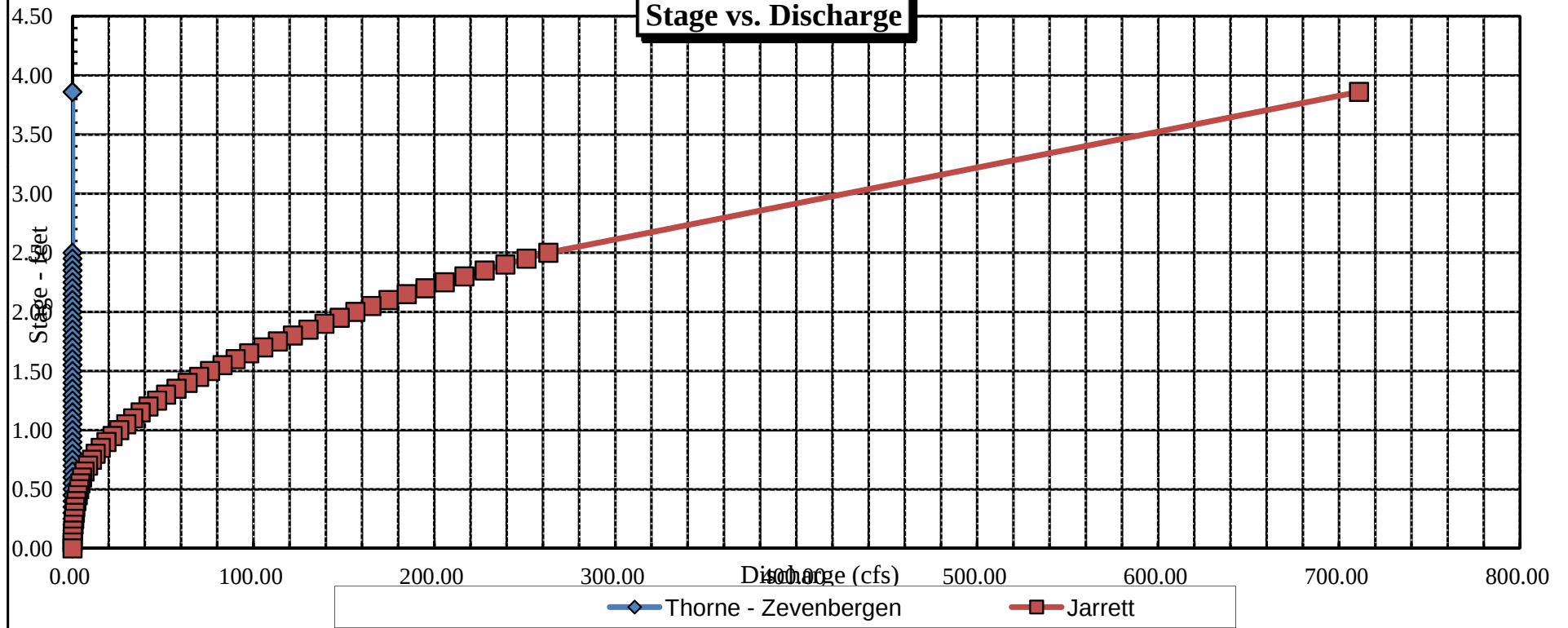


Velocity vs. Discharge





Stage vs. Discharge



STREAM NAME:						CROSS-SECTION NO.	DATE	SHEET OF			
BEGINNING OF MEASUREMENT			EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)		LEFT / RIGHT	Gage Reading: _____ ft	TIME: _____				
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		
R/S	0.0		1.68								
G	5.8		2.02								
	6.0		3.01								
	8.0		3.56								
	11.0		3.84								
	12.5		4.32								
W	13.7		4.80								
	16		5.05	.25				0			
	18		5.3	.50				1.56			
	20		5.6	.8				0.85			
	22		5.6	0.8				1.16			
	24		5.9	1.1				1.04			
	26		5.9	1.1				0.42			
	28		5.45	.65				2.42			
	30		5.9	1.1				2.62			
	32		5.8	1.0	-			2.82			
	34		5.9	1.1				2.74			
	36		5.8	1.0	-			1.35			
	38		5.5	.7				2.26			
	40		5.8	1.0				2.26			
	42		5.8	1.0				2.31			
	44		5.9	1.1				1.74			
	46		5.1	.3				1.68			
	48		5.6	.8				2.28			
	50		5.35	.55				1.81			
	52		5.8	1.0				.98			
	54		5.9	1.1				1.49			
	56		5.8	1.0	-			1.22			
	58		5.75	.45				1.85			
	60		5.10	.30				2.70			
	62		5.35	.55				2.70			
	64		5.50	.70				.01			
	66		5.60	.8				1.56			
	68		5.55	.75				1.95			
	70		5.10	.3				1.54			
W	72.7		4.80								
	74.7		4.33								
	76.8		3.63								
	79.6		2.60								
G	80.8		1.98								
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: Piney River
XS LOCATION: Approx .5 mi upst fr conf w CO River
XS NUMBER: 2

DATE: 23-Jul-15
OBSERVERS: R. Smith, P. Adams

1/4 SEC: SW
SECTION: 25
TWP: 2S
RANGE: 83W
PM: Sixth

COUNTY: Eagle
WATERSHED: Colorado River
DIVISION: 5
DOW CODE: 21535

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: Piney River
 XS LOCATION: Approx .5 mi upst fr conf w CO River
 XS NUMBER: 2

DATA POINTS= 40

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
RS	0.00	1.68		
1 G	5.80	2.02		
	6.00	3.01		
	8.00	3.56		
	11.00	3.84		
	12.50	4.32		
W	13.70	4.80	0.00	0.00
	16.00	5.05	0.25	0.00
	18.00	5.30	0.50	1.56
	20.00	5.60	0.80	0.85
	22.00	5.60	0.80	1.16
	24.00	5.90	1.10	1.04
	26.00	5.90	1.10	0.42
	28.00	5.45	0.65	2.42
	30.00	5.90	1.10	2.62
	32.00	5.80	1.00	2.82
	34.00	5.90	1.10	2.74
	36.00	5.80	1.00	1.35
	38.00	5.50	0.70	2.26
	40.00	5.80	1.00	2.26
	42.00	5.80	1.00	2.31
	44.00	5.90	1.10	1.74
	46.00	5.10	0.30	1.68
	48.00	5.60	0.80	2.28
	50.00	5.35	0.55	1.81
	52.00	5.80	1.00	0.98
	54.00	5.90	1.10	1.49
	56.00	5.80	1.00	1.22
	58.00	5.75	0.95	1.85
	60.00	5.10	0.30	2.70
	62.00	5.35	0.55	2.70
	64.00	5.50	0.70	0.01
	66.00	5.60	0.80	1.56
	68.00	5.55	0.75	1.95
	70.00	5.10	0.30	0.54
W	72.70	4.80	0.00	0.00
	74.70	4.33		
	76.80	3.63		
	79.60	2.60		
1 LS & G	80.80	1.98		

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%
2.31	0.25	0.54	0.00	0.0%
2.02	0.50	1.00	1.56	2.1%
2.02	0.80	1.60	1.36	1.8%
2.00	0.80	1.60	1.86	2.5%
2.02	1.10	2.20	2.29	3.0%
2.00	1.10	2.20	0.92	1.2%
2.05	0.65	1.30	3.15	4.2%
2.05	1.10	2.20	5.76	7.6%
2.00	1.00	2.00	5.64	7.5%
2.00	1.10	2.20	6.03	8.0%
2.00	1.00	2.00	2.70	3.6%
2.02	0.70	1.40	3.16	4.2%
2.02	1.00	2.00	4.52	6.0%
2.00	1.00	2.00	4.62	6.1%
2.00	1.10	2.20	3.83	5.1%
2.15	0.30	0.60	1.01	1.3%
2.06	0.80	1.60	3.65	4.8%
2.02	0.55	1.10	1.99	2.6%
2.05	1.00	2.00	1.96	2.6%
2.00	1.10	2.20	3.28	4.3%
2.00	1.00	2.00	2.44	3.2%
2.00	0.95	1.90	3.52	4.6%
2.10	0.30	0.60	1.62	2.1%
2.02	0.55	1.10	2.97	3.9%
2.01	0.70	1.40	0.01	0.0%
2.00	0.80	1.60	2.50	3.3%
2.00	0.75	1.50	2.93	3.9%
2.05	0.30	0.71	0.38	0.5%
2.72		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 -----

59.71 1.1 44.74 75.64 100.0%
 (Max.)

Manning's n = 0.0761
 Hydraulic Radius= 0.74933883

STREAM NAME: Piney River
 XS LOCATION: Approx .5 mi upst fr conf w CO River
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	44.74	44.74	0.0%
4.55	44.74	59.71	33.4%
4.57	44.74	58.49	30.7%
4.59	44.74	57.28	28.0%
4.61	44.74	56.08	25.3%
4.63	44.74	54.87	22.6%
4.65	44.74	53.67	20.0%
4.67	44.74	52.47	17.3%
4.69	44.74	51.28	14.6%
4.71	44.74	50.08	11.9%
4.73	44.74	48.89	9.3%
4.75	44.74	47.70	6.6%
4.76	44.74	47.11	5.3%
4.77	44.74	46.52	4.0%
4.78	44.74	45.93	2.6%
4.79	44.74	45.33	1.3%
4.80	44.74	44.74	0.0%
4.81	44.74	44.16	-1.3%
4.82	44.74	43.57	-2.6%
4.83	44.74	42.98	-3.9%
4.84	44.74	42.40	-5.2%
4.85	44.74	41.82	-6.5%
4.87	44.74	40.66	-9.1%
4.89	44.74	39.51	-11.7%
4.91	44.74	38.36	-14.3%
4.93	44.74	37.23	-16.8%
4.95	44.74	36.10	-19.3%
4.97	44.74	34.98	-21.8%
4.99	44.74	33.86	-24.3%
5.01	44.74	32.76	-26.8%
5.03	44.74	31.66	-29.2%
5.05	44.74	30.56	-31.7%

WATERLINE AT ZERO

AREA ERROR = 4.800

STREAM NAME: Piney River
 XS LOCATION: Approx .5 mi upst fr conf w CO River
 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	2.02	74.92	3.14	3.88	235.17	77.19	100.0%	3.05	1012.87	4.31
	3.80	65.72	1.63	2.10	107.03	66.74	86.5%	1.60	300.54	2.81
	3.85	65.11	1.59	2.05	103.77	66.12	85.7%	1.57	287.18	2.77
	3.90	64.80	1.55	2.00	100.52	65.79	85.2%	1.53	273.25	2.72
	3.95	64.50	1.51	1.95	97.28	65.47	84.8%	1.49	259.61	2.67
	4.00	64.19	1.47	1.90	94.07	65.15	84.4%	1.44	246.27	2.62
	4.05	63.88	1.42	1.85	90.87	64.83	84.0%	1.40	233.22	2.57
	4.10	63.58	1.38	1.80	87.68	64.51	83.6%	1.36	220.48	2.51
	4.15	63.27	1.34	1.75	84.51	64.18	83.2%	1.32	208.05	2.46
	4.20	62.96	1.29	1.70	81.35	63.86	82.7%	1.27	195.91	2.41
	4.25	62.66	1.25	1.65	78.21	63.54	82.3%	1.23	184.09	2.35
	4.30	62.35	1.20	1.60	75.09	63.22	81.9%	1.19	172.58	2.30
	4.35	62.04	1.16	1.55	71.98	62.89	81.5%	1.14	161.39	2.24
	4.40	61.70	1.12	1.50	68.88	62.53	81.0%	1.10	150.56	2.19
	4.45	61.36	1.07	1.45	65.81	62.18	80.6%	1.06	140.05	2.13
	4.50	61.03	1.03	1.40	62.75	61.83	80.1%	1.01	129.86	2.07
	4.55	60.69	0.98	1.35	59.70	61.48	79.6%	0.97	119.99	2.01
	4.60	60.35	0.94	1.30	56.68	61.12	79.2%	0.93	110.45	1.95
	4.65	60.01	0.89	1.25	53.67	60.77	78.7%	0.88	101.24	1.89
	4.70	59.68	0.85	1.20	50.68	60.42	78.3%	0.84	92.37	1.82
	4.75	59.34	0.80	1.15	47.70	60.06	77.8%	0.79	83.83	1.76
WL	4.80	59.00	0.76	1.10	44.74	59.71	77.4%	0.75	75.64	1.69
	4.85	58.09	0.72	1.05	41.82	58.79	76.2%	0.71	68.28	1.63
	4.90	57.18	0.68	1.00	38.93	57.88	75.0%	0.67	61.25	1.57
	4.95	56.27	0.64	0.95	36.10	56.96	73.8%	0.63	54.58	1.51
	5.00	55.36	0.60	0.90	33.31	56.05	72.6%	0.59	48.24	1.45
	5.05	54.45	0.56	0.85	30.56	55.13	71.4%	0.55	42.26	1.38
	5.10	53.60	0.52	0.80	27.86	54.28	70.3%	0.51	36.60	1.31
	5.15	52.10	0.48	0.75	25.22	52.74	68.3%	0.48	31.60	1.25
	5.20	50.60	0.45	0.70	22.65	51.20	66.3%	0.44	26.95	1.19
	5.25	49.10	0.41	0.65	20.16	49.67	64.3%	0.41	22.64	1.12
	5.30	47.60	0.37	0.60	17.74	48.13	62.4%	0.37	18.69	1.05
	5.35	46.16	0.33	0.55	15.40	46.66	60.4%	0.33	15.07	0.98
	5.40	43.84	0.30	0.50	13.15	44.29	57.4%	0.30	11.99	0.91
	5.45	41.51	0.27	0.45	11.01	41.93	54.3%	0.26	9.26	0.84
	5.50	38.75	0.23	0.40	9.01	39.10	50.7%	0.23	6.93	0.77
	5.55	34.98	0.20	0.35	7.16	35.27	45.7%	0.20	5.07	0.71
	5.60	27.43	0.20	0.30	5.55	27.67	35.9%	0.20	3.90	0.70
	5.65	25.49	0.17	0.25	4.23	25.68	33.3%	0.16	2.60	0.62
	5.70	23.54	0.13	0.20	3.00	23.69	30.7%	0.13	1.55	0.52
	5.75	21.60	0.09	0.15	1.88	21.70	28.1%	0.09	0.75	0.40
	5.80	15.81	0.06	0.10	0.89	15.87	20.6%	0.06	0.27	0.30
	5.85	8.90	0.03	0.05	0.27	8.94	11.6%	0.03	0.05	0.20
	5.90	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Piney River
XS LOCATION: Approx .5 mi upst fr conf w CO River
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)=	75.64 cfs
CALCULATED FLOW (Qc)=	75.64 cfs
(Qm-Qc)/Qm * 100 =	0.0 %
MEASURED WATERLINE (WLm)=	4.80 ft
CALCULATED WATERLINE (WLc)=	4.80 ft
(WLm-WLc)/WLm * 100 =	0.0 %
MAX MEASURED DEPTH (Dm)=	1.10 ft
MAX CALCULATED DEPTH (Dc)=	1.10 ft
(Dm-Dc)/Dm * 100	0.0 %
MEAN VELOCITY=	1.69 ft/sec
MANNING'S N=	0.076
SLOPE=	0.011 ft/ft
.4 * Qm =	30.3 cfs
2.5 * Qm=	189.1 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

[illegible]

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

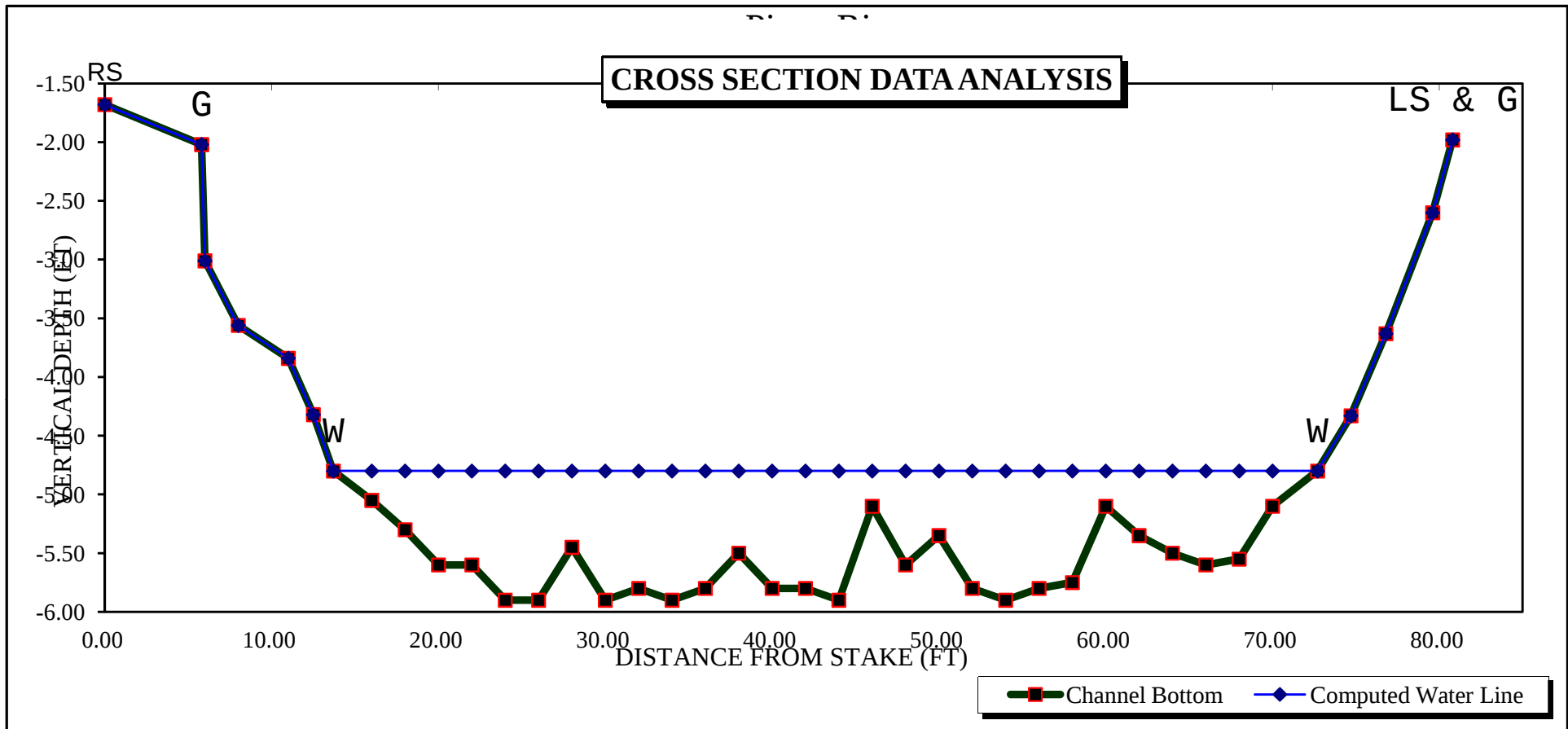
CWCB REVIEW BY: DATE:

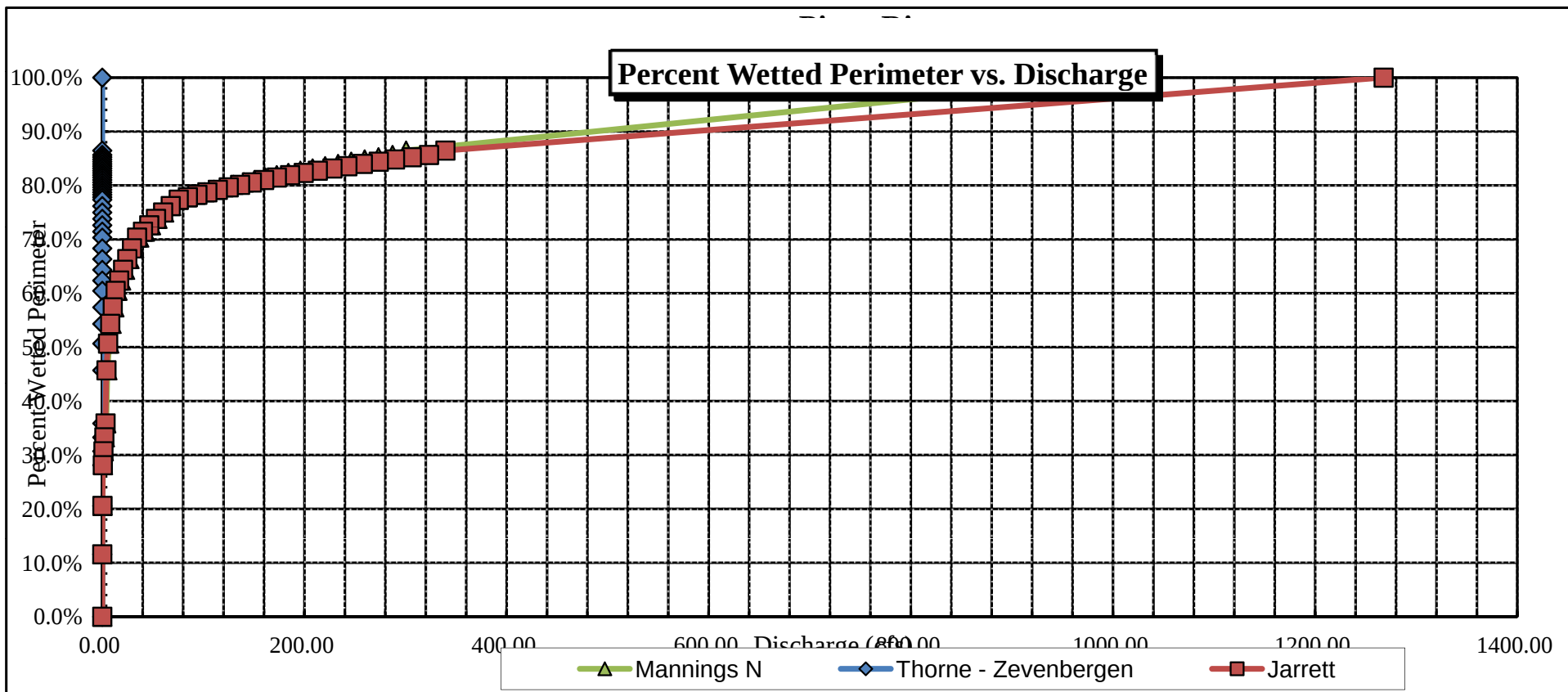
STREAM NAME: Piney River
 XS LOCATION: Approx .5 mi upst fr conf w CO River
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

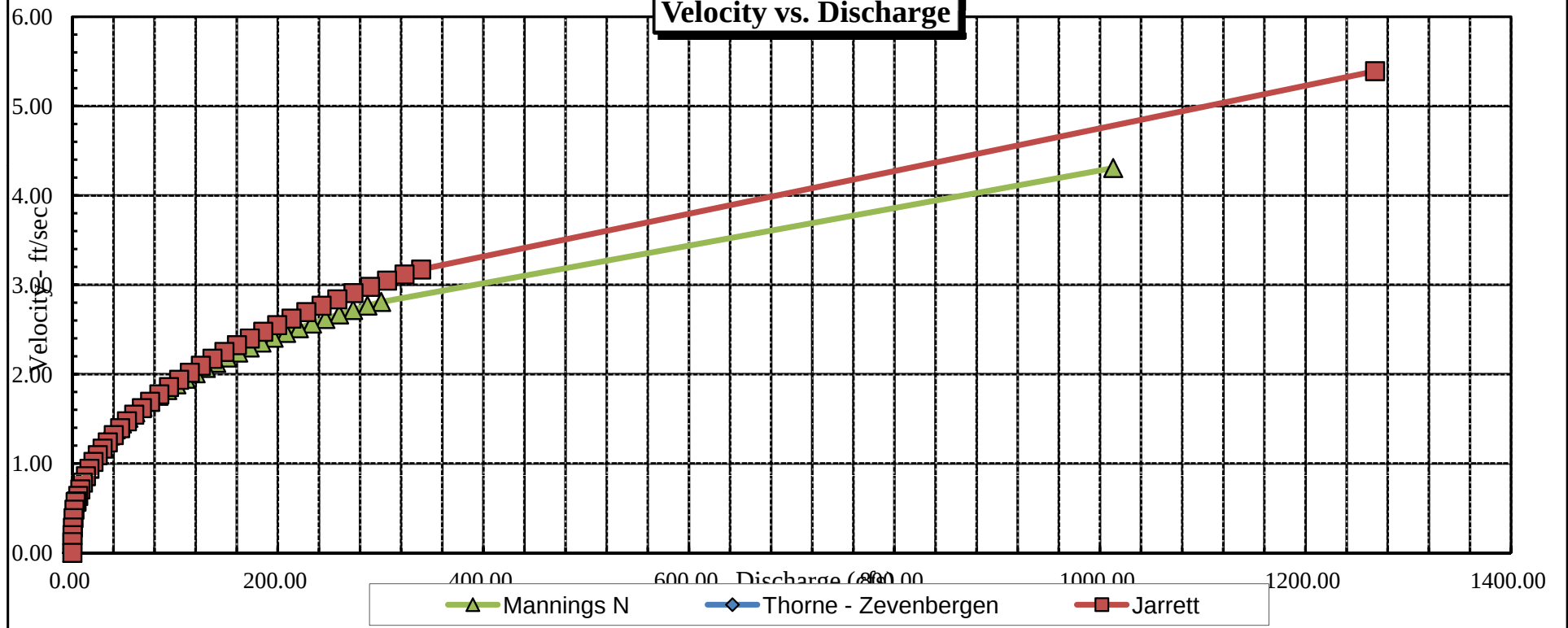
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

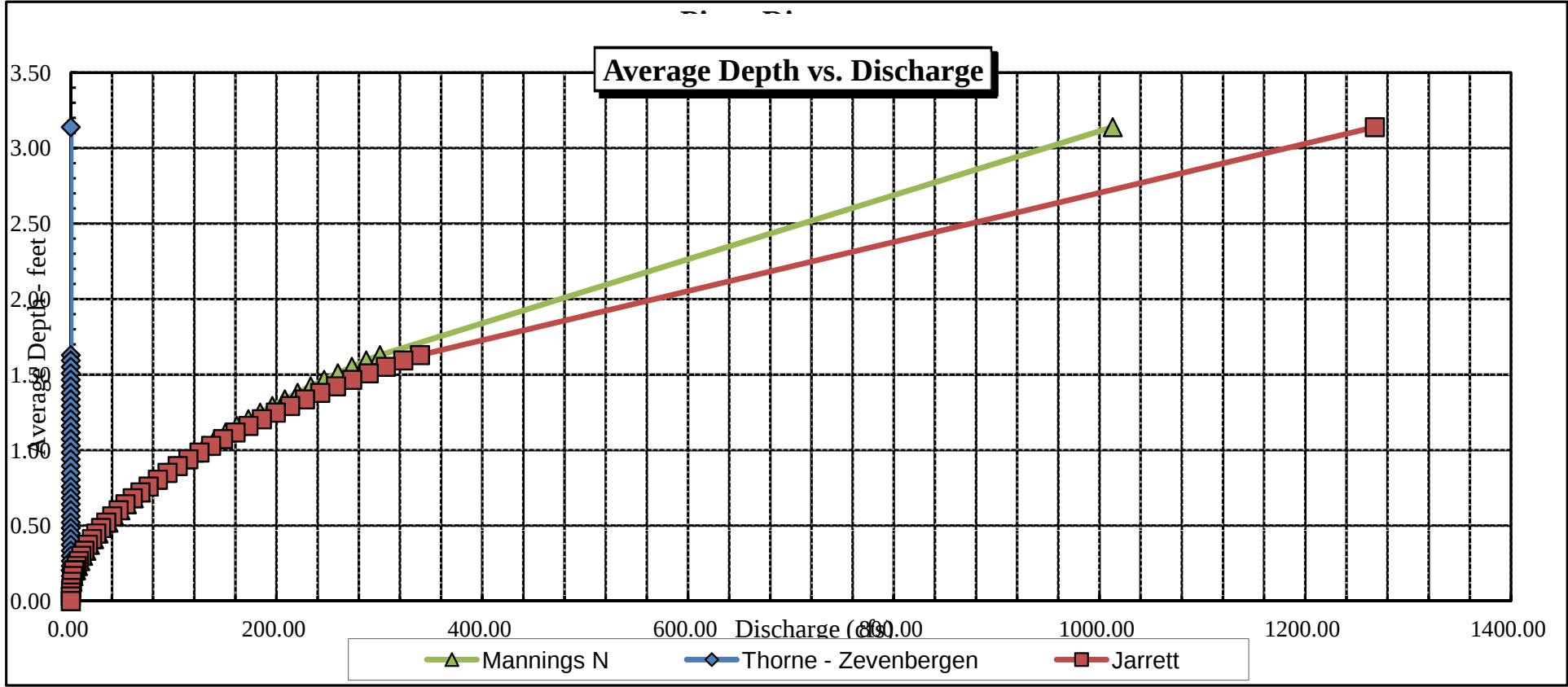
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	2.02	74.92	3.14	3.88	235.17	77.19	100.0%	3.05	1267.70	5.39
	3.80	65.72	1.63	2.10	107.03	66.74	86.5%	1.60	339.45	3.17
	3.85	65.11	1.59	2.05	103.77	66.12	85.7%	1.57	323.24	3.12
	3.90	64.80	1.55	2.00	100.52	65.79	85.2%	1.53	306.23	3.05
	3.95	64.50	1.51	1.95	97.28	65.47	84.8%	1.49	289.66	2.98
	4.00	64.19	1.47	1.90	94.07	65.15	84.4%	1.44	273.51	2.91
	4.05	63.88	1.42	1.85	90.87	64.83	84.0%	1.40	257.80	2.84
	4.10	63.58	1.38	1.80	87.68	64.51	83.6%	1.36	242.52	2.77
	4.15	63.27	1.34	1.75	84.51	64.18	83.2%	1.32	227.68	2.69
	4.20	62.96	1.29	1.70	81.35	63.86	82.7%	1.27	213.27	2.62
	4.25	62.66	1.25	1.65	78.21	63.54	82.3%	1.23	199.31	2.55
	4.30	62.35	1.20	1.60	75.09	63.22	81.9%	1.19	185.78	2.47
	4.35	62.04	1.16	1.55	71.98	62.89	81.5%	1.14	172.71	2.40
	4.40	61.70	1.12	1.50	68.88	62.53	81.0%	1.10	160.13	2.32
	4.45	61.36	1.07	1.45	65.81	62.18	80.6%	1.06	148.00	2.25
	4.50	61.03	1.03	1.40	62.75	61.83	80.1%	1.01	136.31	2.17
	4.55	60.69	0.98	1.35	59.70	61.48	79.6%	0.97	125.07	2.09
	4.60	60.35	0.94	1.30	56.68	61.12	79.2%	0.93	114.28	2.02
	4.65	60.01	0.89	1.25	53.67	60.77	78.7%	0.88	103.94	1.94
	4.70	59.68	0.85	1.20	50.68	60.42	78.3%	0.84	94.05	1.86
	4.75	59.34	0.80	1.15	47.70	60.06	77.8%	0.79	84.62	1.77
WL	4.80	59.00	0.76	1.10	44.74	59.71	77.4%	0.75	75.64	1.69
	4.85	58.09	0.72	1.05	41.82	58.79	76.2%	0.71	67.71	1.62
	4.90	57.18	0.68	1.00	38.93	57.88	75.0%	0.67	60.20	1.55
	4.95	56.27	0.64	0.95	36.10	56.96	73.8%	0.63	53.13	1.47
	5.00	55.36	0.60	0.90	33.31	56.05	72.6%	0.59	46.49	1.40
	5.05	54.45	0.56	0.85	30.56	55.13	71.4%	0.55	40.27	1.32
	5.10	53.60	0.52	0.80	27.86	54.28	70.3%	0.51	34.45	1.24
	5.15	52.10	0.48	0.75	25.22	52.74	68.3%	0.48	29.41	1.17
	5.20	50.60	0.45	0.70	22.65	51.20	66.3%	0.44	24.77	1.09
	5.25	49.10	0.41	0.65	20.16	49.67	64.3%	0.41	20.53	1.02
	5.30	47.60	0.37	0.60	17.74	48.13	62.4%	0.37	16.68	0.94
	5.35	46.16	0.33	0.55	15.40	46.66	60.4%	0.33	13.21	0.86
	5.40	43.84	0.30	0.50	13.15	44.29	57.4%	0.30	10.34	0.79
	5.45	41.51	0.27	0.45	11.01	41.93	54.3%	0.26	7.83	0.71
	5.50	38.75	0.23	0.40	9.01	39.10	50.7%	0.23	5.74	0.64
	5.55	34.98	0.20	0.35	7.16	35.27	45.7%	0.20	4.12	0.57
	5.60	27.43	0.20	0.30	5.55	27.67	35.9%	0.20	3.16	0.57
	5.65	25.49	0.17	0.25	4.23	25.68	33.3%	0.16	2.04	0.48
	5.70	23.54	0.13	0.20	3.00	23.69	30.7%	0.13	1.17	0.39
	5.75	21.60	0.09	0.15	1.88	21.70	28.1%	0.09	0.53	0.28
	5.80	15.81	0.06	0.10	0.89	15.87	20.6%	0.06	0.18	0.20
	5.85	8.90	0.03	0.05	0.27	8.94	11.6%	0.03	0.03	0.12
	5.90	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!



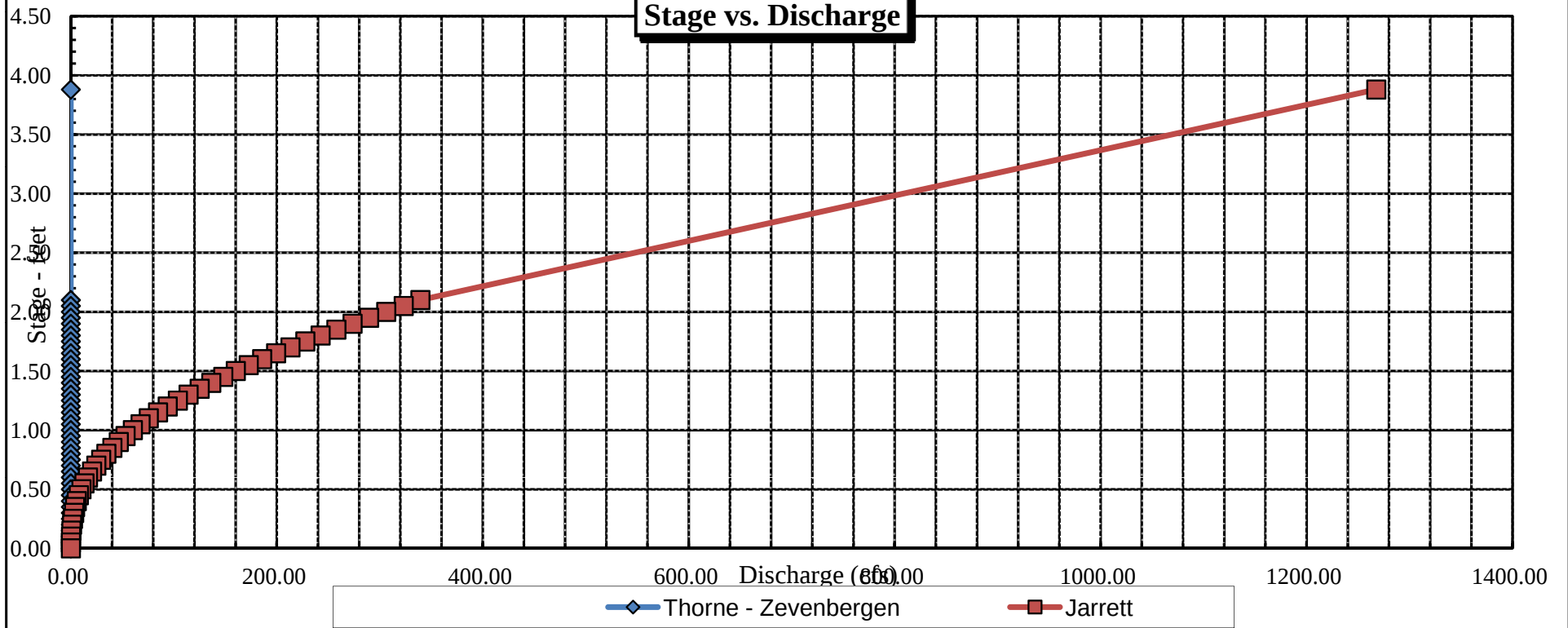


Velocity vs. Discharge





Stage vs. Discharge





LOCATION INFORMATION

STREAM NAME:		Piney River			CROSS-SECTION NO.:		1		
CROSS-SECTION LOCATION:		Approx. 0.5 miles upstream from confluence with Colorado River							
DATE:		9-16-15		OBSERVERS:					
				R. Smith, P. Adams					
LEGAL DESCRIPTION		1/4 SECTION:		SECTION:		TOWNSHIP:		RANGE:	
		SW		25		2 N/S		83 E/W	
COUNTY:		Eagle		WATERSHED:		Colorado R.		DOW WATER CODE:	
						5		21535	
MAP(S):		USGS:						359819	
		USFS:						6,765 sq. ft. 4412491	

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION:		YES / NO	METER TYPE:		M-M				
METER NUMBER:		DATE RATED:		CALIB/SPIN:	sec	TAPE WEIGHT:	lbs/foot	TAPE TENSION:	lbs
CHANNEL BED MATERIAL SIZE RANGE:		4" cobbles to 2-foot boulders		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	66.7 - 5.15 / 5.15
②	WS Upstream	78.4	4.58
③	WS Downstream	69.4	6.17
SLOPE		1.59 / 147.8 = 0.011	

SKETCH

LEGEND:

Stake ⊗

Station ①

Photo ① →

Direction of Flow

AQUATIC SAMPLING SUMMARY

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

COMMENTS

Ph = 8.59
Cond = 299
Salinity = .1
Temp = 15.7°C

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: <u>Piney River</u>				CROSS-SECTION NO.: <u>2</u>		DATE: <u>9-16-15</u>		SHEET <u> </u> OF <u> </u>				
BEGINNING OF MEASUREMENT		EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE)		LEFT / RIGHT		Gage Reading: <u> </u> ft		TIME: <u>12:30 PM</u>				
Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Obser- vation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)		Area (ft ²)	Discharge (cfs)
									At Point	Mean in Vertical		
LS		76.4		1.42								
G		75.0		2.38								
		73.8		3.26								
		72		3.60								
		70.6		3.96								
		68		4.60								
		67.5		4.96								
W		66.7		5.15								
		63		5.75	.6					1.36		
		61		5.70	.55					.41		
		59		5.65	.50					.10		
		57		5.55	.40					.47		
		55		5.55	.40					.35		
		53		5.95	.80					1.22		
		51		5.80	.65					.81		
		49		5.85	.70					1.15		
		47		6.00	.85					.14		
		45		5.80	.65					.96		
		43		5.80	.65					1.80		
		41		5.30	.15					0		
		39		5.80	.65					1.18		
		37		5.65	.50					1.38		
		35		5.75	.60					.87		
		33		5.75	.60					1.30		
		31		5.75	.60					1.29		
28		29	5.7	5.95	.80	<.55				1.68	<.62	
		27		5.95	.80					1.30		
		25		5.60	.45					2.13		
		23		5.55	.40					1.51		
20		21	5.75	6.05	.90	<.60				1.93	<.64	
		19		5.65	.50					.36		
		17		5.15	0					0		
		15		5.75	.60					1.03		
		13		5.45	.30					.63		
		11		5.20	.05					0		
W		9.5		5.15								
		8.1		4.92								
		7.3		4.45								
		6.0		4.06								
		3.0		3.76								
G		1.6		2.41								
12.5		0		2.10								
TOTALS:												
End of Measurement		Time:	Gage Reading: <u> </u> 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: Piney River
XS LOCATION: 0.5 mi from conf with Colorado River
XS NUMBER: 1

DATE: 16-Sep-15
OBSERVERS: R. Smith, P. Adams

1/4 SEC: SW
SECTION: 25
TWP: 2S
RANGE: 83W
PM: Sixth

COUNTY: Eagle
WATERSHED: Colorado River
DIVISION: 5
DOW CODE: 21535

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: Piney River
 XS LOCATION: 0.5 mi from conf with Colorado River
 XS NUMBER: 1

DATA POINTS= 44

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	2.10			0.00		0.00	0.00	0.0%
1 G	1.60	2.41			0.00		0.00	0.00	0.0%
	3.00	3.76			0.00		0.00	0.00	0.0%
	6.00	4.06			0.00		0.00	0.00	0.0%
	7.30	4.45			0.00		0.00	0.00	0.0%
	8.10	4.92			0.00		0.00	0.00	0.0%
W	9.50	5.15	0.00	0.00	0.00		0.00	0.00	0.0%
	11.00	5.20	0.05	0.00	1.50	0.05	0.09	0.00	0.0%
	13.00	5.45	0.30	0.63	2.02	0.30	0.60	0.38	1.2%
	15.00	5.75	0.60	1.03	2.02	0.60	1.20	1.24	3.9%
	17.00	5.15	0.00	0.00	2.09		0.00	0.00	0.0%
	19.00	5.65	0.50	0.36	2.06	0.50	0.75	0.27	0.9%
	20.00	5.75	0.60	1.64	1.00	0.60	0.60	0.98	3.1%
	21.00	6.05	0.90	1.93	1.04	0.90	1.35	2.61	8.3%
	23.00	5.55	0.40	1.51	2.06	0.40	0.80	1.21	3.8%
	25.00	5.60	0.45	2.13	2.00	0.45	0.90	1.92	6.1%
	27.00	5.95	0.80	1.30	2.03	0.80	1.20	1.56	4.9%
	28.00	5.70	0.55	0.62	1.03	0.55	0.55	0.34	1.1%
	29.00	5.95	0.80	1.68	1.03	0.80	1.20	2.02	6.4%
	31.00	5.75	0.60	1.29	2.01	0.60	1.20	1.55	4.9%
	33.00	5.75	0.60	1.30	2.00	0.60	1.20	1.56	4.9%
	35.00	5.75	0.60	0.87	2.00	0.60	1.20	1.04	3.3%
	37.00	5.65	0.50	1.38	2.00	0.50	1.00	1.38	4.4%
	39.00	5.80	0.65	1.18	2.01	0.65	1.30	1.53	4.9%
	41.00	5.30	0.15	0.00	2.06	0.15	0.30	0.00	0.0%
	43.00	5.80	0.65	1.80	2.06	0.65	1.30	2.34	7.4%
	45.00	5.80	0.65	0.96	2.00	0.65	1.30	1.25	4.0%
	47.00	6.00	0.85	0.14	2.01	0.85	1.70	0.24	0.8%
	49.00	5.85	0.70	1.15	2.01	0.70	1.40	1.61	5.1%
	51.00	5.80	0.65	0.81	2.00	0.65	1.30	1.05	3.3%
	53.00	5.95	0.80	1.22	2.01	0.80	1.60	1.95	6.2%
	55.00	5.55	0.40	0.35	2.04	0.40	0.80	0.28	0.9%
	57.00	5.55	0.40	0.47	2.00	0.40	0.80	0.38	1.2%
	59.00	5.65	0.50	0.10	2.00	0.50	1.00	0.10	0.3%
	61.00	5.70	0.55	0.41	2.00	0.55	1.10	0.45	1.4%
	63.00	5.75	0.60	1.36	2.00	0.60	1.71	2.33	7.4%
W	66.70	5.15	0.00	0.00	3.75		0.00	0.00	0.0%
	67.50	4.96			0.00		0.00	0.00	0.0%
	68.00	4.60			0.00		0.00	0.00	0.0%
	70.60	3.96			0.00		0.00	0.00	0.0%
	72.00	3.60			0.00		0.00	0.00	0.0%
1 G	73.80	3.26			0.00		0.00	0.00	0.0%
	75.00	2.38			0.00		0.00	0.00	0.0%
	76.40	1.42			0.00		0.00	0.00	0.0%

TOTALS -----

57.85 0.9 29.45 31.56 100.0%
 (Max.)

Manning's n = 0.0927
 Hydraulic Radius= 0.50906499

STREAM NAME: Piney River
 XS LOCATION: 0.5 mi from conf with Colorado River
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	29.45	29.45	0.0%
4.90	29.45	44.06	49.6%
4.92	29.45	42.87	45.6%
4.94	29.45	41.69	41.6%
4.96	29.45	40.50	37.5%
4.98	29.45	39.32	33.5%
5.00	29.45	38.14	29.5%
5.02	29.45	36.97	25.5%
5.04	29.45	35.80	21.6%
5.06	29.45	34.64	17.6%
5.08	29.45	33.48	13.7%
5.10	29.45	32.32	9.8%
5.11	29.45	31.74	7.8%
5.12	29.45	31.17	5.8%
5.13	29.45	30.59	3.9%
5.14	29.45	30.02	1.9%
5.15	29.45	29.45	0.0%
5.16	29.45	28.88	-1.9%
5.17	29.45	28.31	-3.9%
5.18	29.45	27.75	-5.8%
5.19	29.45	27.19	-7.6%
5.20	29.45	26.64	-9.5%
5.22	29.45	25.55	-13.2%
5.24	29.45	24.46	-16.9%
5.26	29.45	23.38	-20.6%
5.28	29.45	22.31	-24.2%
5.30	29.45	21.25	-27.8%
5.32	29.45	20.20	-31.4%
5.34	29.45	19.16	-34.9%
5.36	29.45	18.13	-38.4%
5.38	29.45	17.11	-41.9%
5.40	29.45	16.11	-45.3%

WATERLINE AT ZERO

AREA ERROR = 5.150

STREAM NAME: Piney River
 XS LOCATION: 0.5 mi from conf with Colorado River
 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	2.41	73.36	2.89	3.64	211.93	75.34	100.0%	2.81	709.83	3.35
	4.15	63.53	1.42	1.90	89.91	64.56	85.7%	1.39	188.48	2.10
	4.20	63.16	1.37	1.85	86.75	64.17	85.2%	1.35	178.25	2.05
	4.25	62.79	1.33	1.80	83.60	63.79	84.7%	1.31	168.27	2.01
	4.30	62.42	1.29	1.75	80.47	63.41	84.2%	1.27	158.54	1.97
	4.35	62.05	1.25	1.70	77.36	63.02	83.7%	1.23	149.05	1.93
	4.40	61.68	1.20	1.65	74.26	62.64	83.1%	1.19	139.82	1.88
	4.45	61.31	1.16	1.60	71.19	62.26	82.6%	1.14	130.84	1.84
	4.50	61.02	1.12	1.55	68.13	61.95	82.2%	1.10	122.01	1.79
	4.55	60.73	1.07	1.50	65.09	61.64	81.8%	1.06	113.44	1.74
	4.60	60.44	1.03	1.45	62.06	61.33	81.4%	1.01	105.12	1.69
	4.65	60.29	0.98	1.40	59.04	61.15	81.2%	0.97	96.94	1.64
	4.70	60.14	0.93	1.35	56.03	60.97	80.9%	0.92	89.02	1.59
	4.75	59.98	0.88	1.30	53.03	60.78	80.7%	0.87	81.37	1.53
	4.80	59.83	0.84	1.25	50.03	60.60	80.4%	0.83	74.01	1.48
	4.85	59.67	0.79	1.20	47.04	60.41	80.2%	0.78	66.92	1.42
	4.90	59.52	0.74	1.15	44.06	60.23	79.9%	0.73	60.13	1.36
	4.95	59.23	0.69	1.10	41.09	59.92	79.5%	0.69	53.71	1.31
	5.00	58.74	0.65	1.05	38.14	59.42	78.9%	0.64	47.71	1.25
	5.05	58.23	0.60	1.00	35.22	58.90	78.2%	0.60	42.02	1.19
	5.10	57.71	0.56	0.95	32.32	58.37	77.5%	0.55	36.63	1.13
WL	5.15	57.20	0.51	0.90	29.45	57.85	76.8%	0.51	31.56	1.07
	5.20	55.02	0.48	0.85	26.64	55.65	73.9%	0.48	27.40	1.03
	5.25	53.95	0.44	0.80	23.92	54.56	72.4%	0.44	23.20	0.97
	5.30	52.87	0.40	0.75	21.25	53.46	71.0%	0.40	19.30	0.91
	5.35	51.40	0.36	0.70	18.64	51.95	69.0%	0.36	15.82	0.85
	5.40	49.92	0.32	0.65	16.11	50.45	67.0%	0.32	12.65	0.79
	5.45	48.45	0.28	0.60	13.65	48.94	65.0%	0.28	9.79	0.72
	5.50	47.04	0.24	0.55	11.26	47.50	63.0%	0.24	7.25	0.64
	5.55	43.63	0.20	0.50	8.94	44.05	58.5%	0.20	5.19	0.58
	5.60	38.77	0.18	0.45	6.88	39.15	52.0%	0.18	3.63	0.53
	5.65	35.63	0.14	0.40	5.02	35.95	47.7%	0.14	2.27	0.45
	5.70	29.52	0.11	0.35	3.39	29.79	39.5%	0.11	1.34	0.39
	5.75	19.01	0.11	0.30	2.08	19.22	25.5%	0.11	0.79	0.38
	5.80	14.14	0.09	0.25	1.20	14.30	19.0%	0.08	0.39	0.32
	5.85	9.17	0.07	0.20	0.62	9.29	12.3%	0.07	0.17	0.28
	5.90	5.54	0.05	0.15	0.25	5.61	7.4%	0.04	0.05	0.21
	5.95	1.90	0.03	0.10	0.07	1.93	2.6%	0.03	0.01	0.18
	6.00	0.37	0.02	0.05	0.01	0.38	0.5%	0.02	0.00	0.14

STREAM NAME: Piney River
XS LOCATION: 0.5 mi from conf with Colorado River
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	31.56 cfs
CALCULATED FLOW (Qc)=	31.56 cfs
(Qm-Qc)/Qm * 100 =	0.0 %
MEASURED WATERLINE (WLm)=	5.15 ft
CALCULATED WATERLINE (WLc)=	5.15 ft
(WLm-WLc)/WLm * 100 =	0.0 %
MAX MEASURED DEPTH (Dm)=	0.90 ft
MAX CALCULATED DEPTH (Dc)=	0.90 ft
(Dm-Dc)/Dm * 100	0.0 %
MEAN VELOCITY=	1.07 ft/sec
MANNING'S N=	0.093
SLOPE=	0.011 ft/ft
.4 * Qm =	12.6 cfs
2.5 * Qm=	78.9 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

[illegible]

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

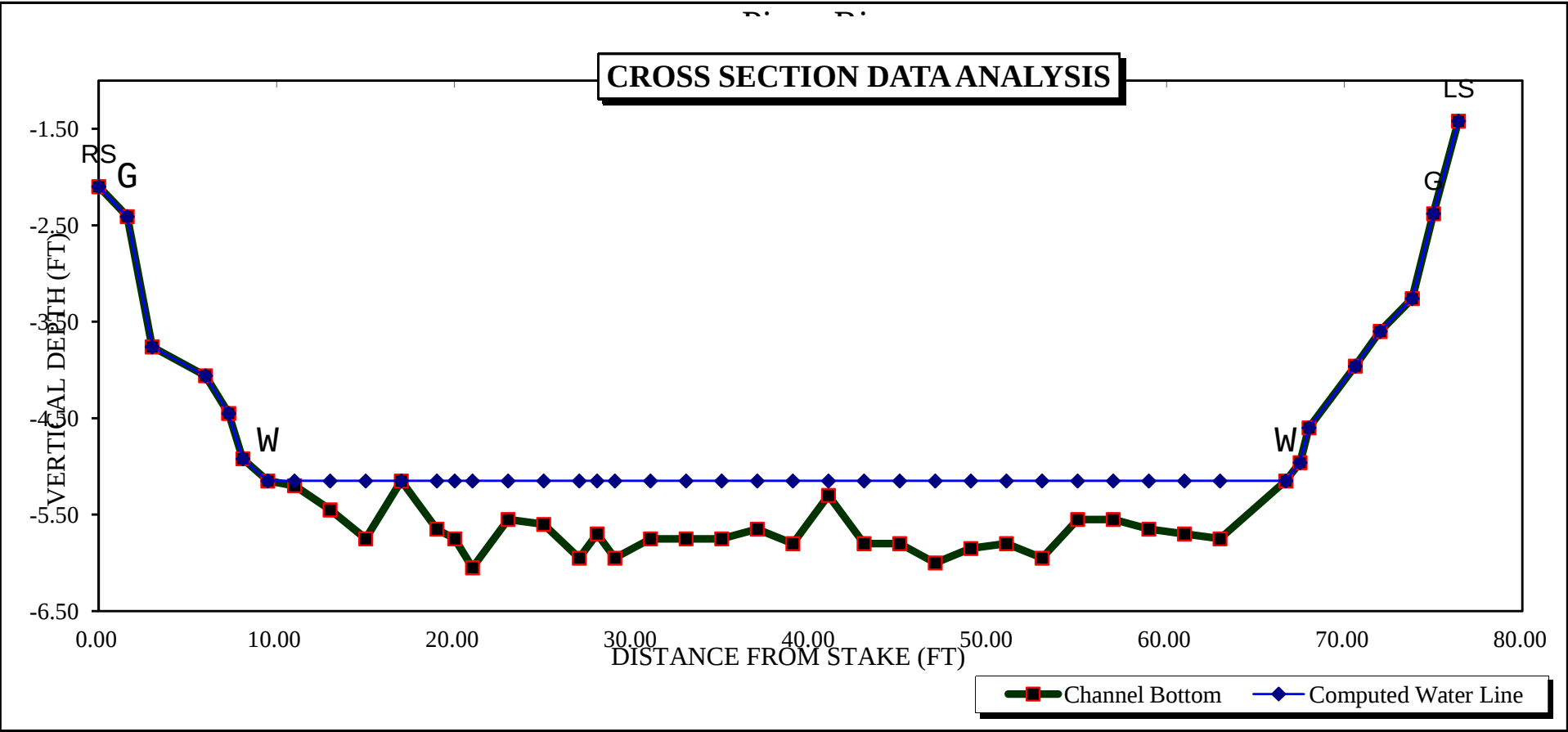
CWCB REVIEW BY: DATE:

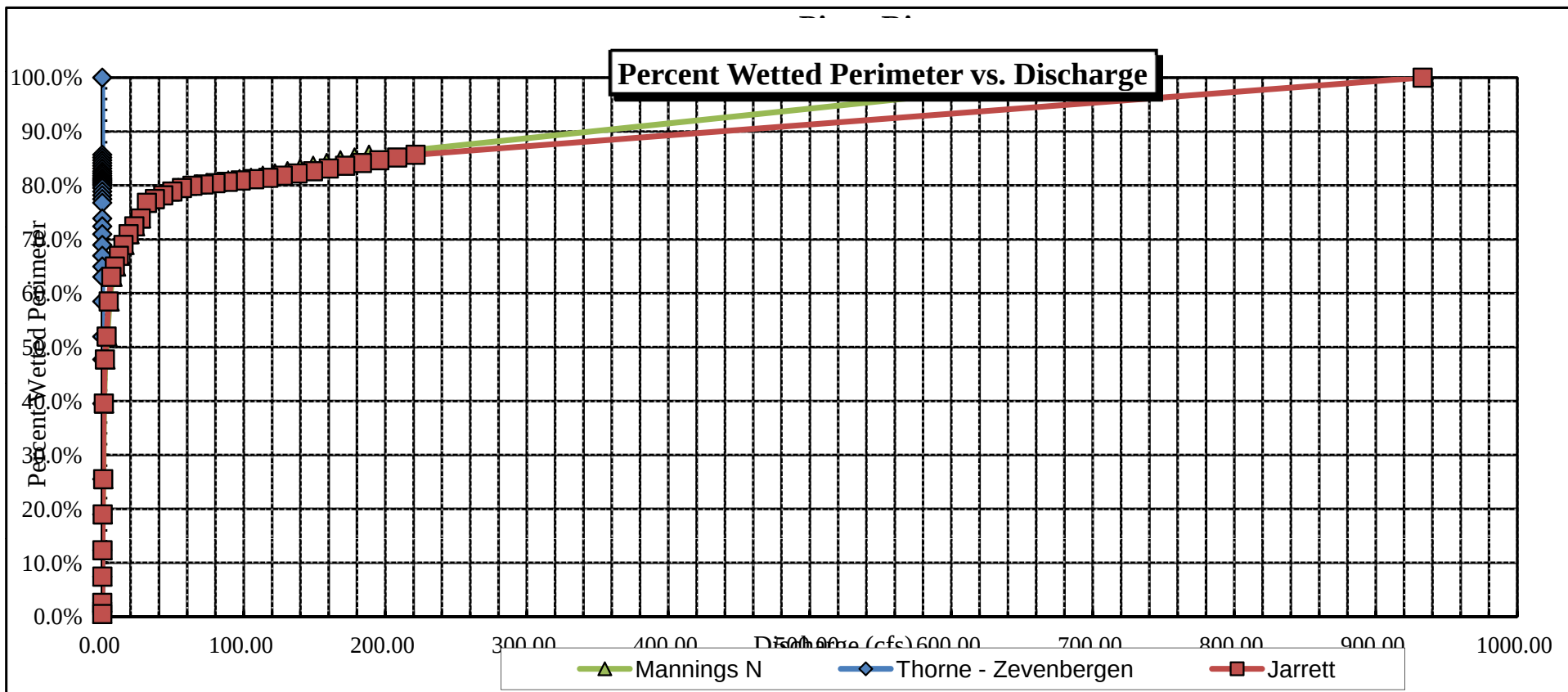
STREAM NAME: Piney River
 XS LOCATION: 0.5 mi from conf with Colorado River
 XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

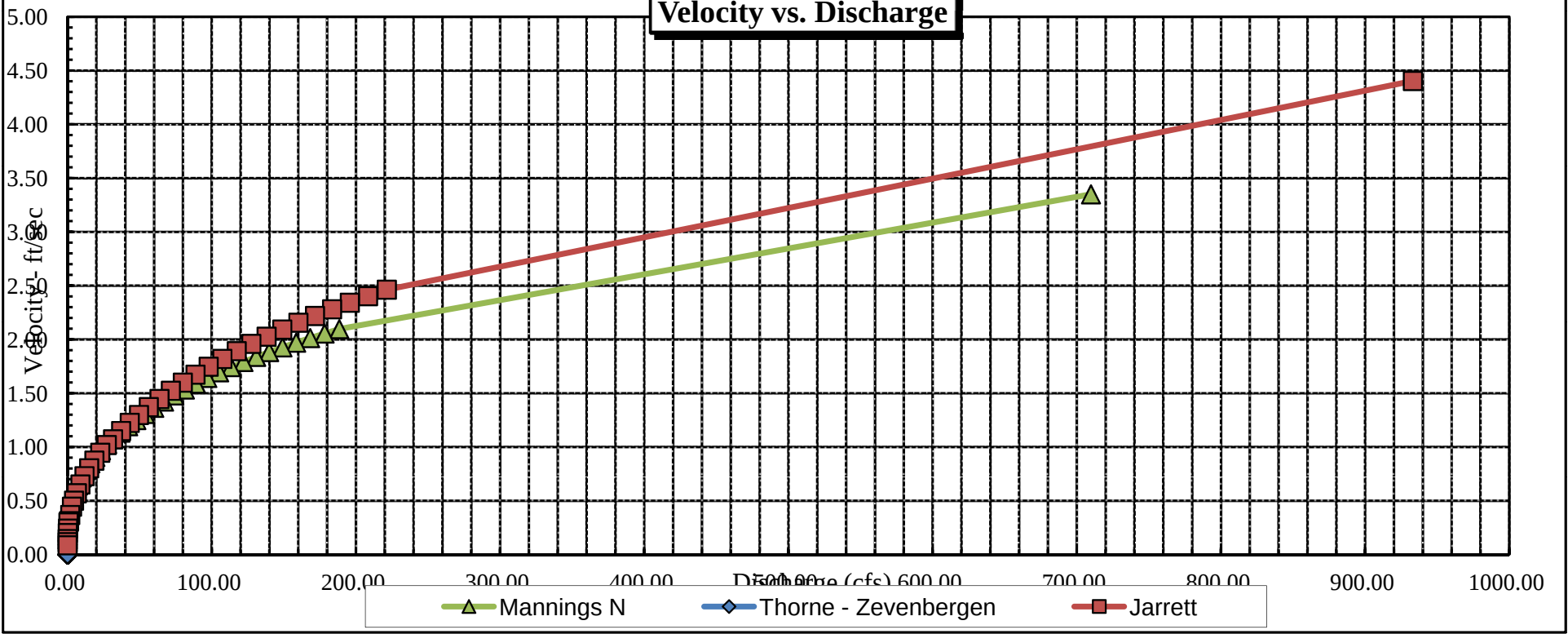
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

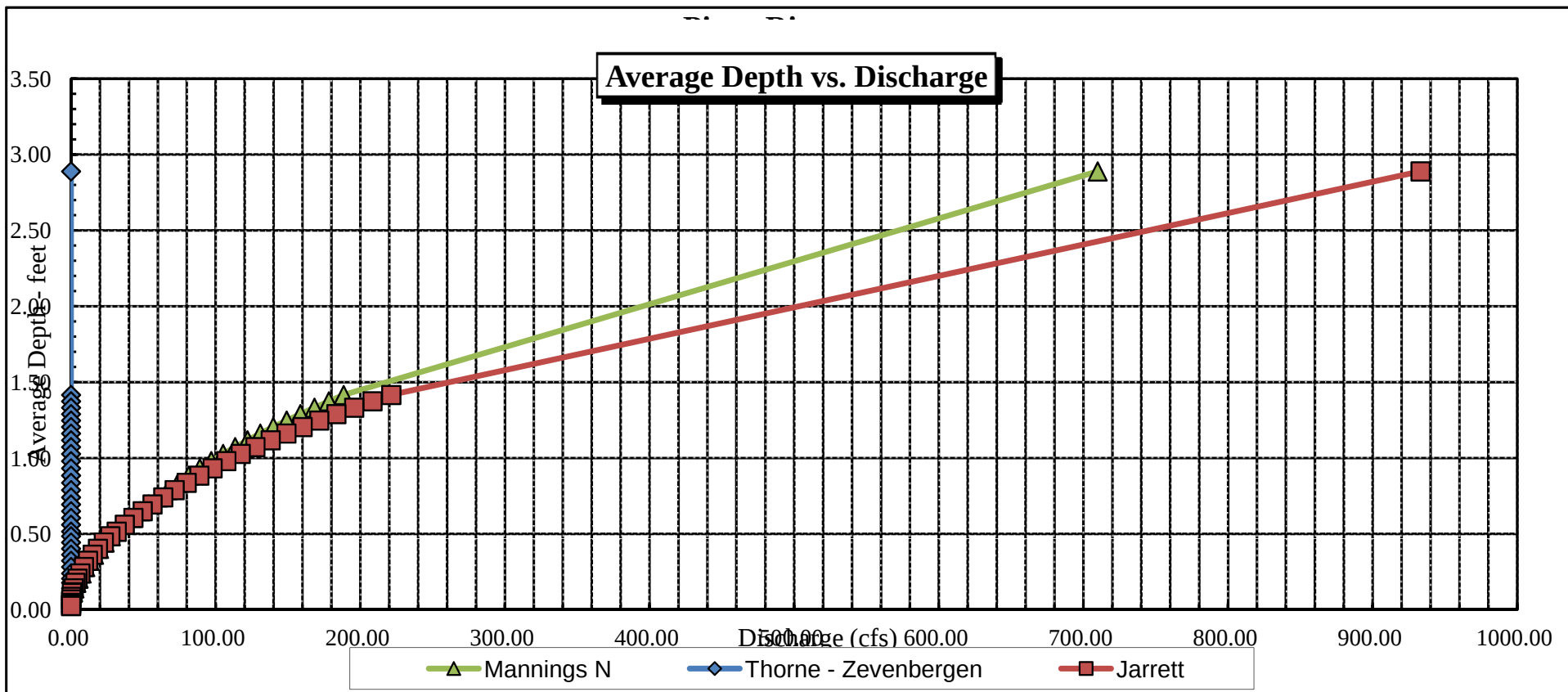
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	2.41	73.36	2.89	3.64	211.93	75.34	100.0%	2.81	933.11	4.40
	4.15	63.53	1.42	1.90	89.91	64.56	85.7%	1.39	221.42	2.46
	4.20	63.16	1.37	1.85	86.75	64.17	85.2%	1.35	208.40	2.40
	4.25	62.79	1.33	1.80	83.60	63.79	84.7%	1.31	195.76	2.34
	4.30	62.42	1.29	1.75	80.47	63.41	84.2%	1.27	183.49	2.28
	4.35	62.05	1.25	1.70	77.36	63.02	83.7%	1.23	171.59	2.22
	4.40	61.68	1.20	1.65	74.26	62.64	83.1%	1.19	160.07	2.16
	4.45	61.31	1.16	1.60	71.19	62.26	82.6%	1.14	148.93	2.09
	4.50	61.02	1.12	1.55	68.13	61.95	82.2%	1.10	138.01	2.03
	4.55	60.73	1.07	1.50	65.09	61.64	81.8%	1.06	127.48	1.96
	4.60	60.44	1.03	1.45	62.06	61.33	81.4%	1.01	117.34	1.89
	4.65	60.29	0.98	1.40	59.04	61.15	81.2%	0.97	107.39	1.82
	4.70	60.14	0.93	1.35	56.03	60.97	80.9%	0.92	97.84	1.75
	4.75	59.98	0.88	1.30	53.03	60.78	80.7%	0.87	88.70	1.67
	4.80	59.83	0.84	1.25	50.03	60.60	80.4%	0.83	79.96	1.60
	4.85	59.67	0.79	1.20	47.04	60.41	80.2%	0.78	71.63	1.52
	4.90	59.52	0.74	1.15	44.06	60.23	79.9%	0.73	63.72	1.45
	4.95	59.23	0.69	1.10	41.09	59.92	79.5%	0.69	56.34	1.37
	5.00	58.74	0.65	1.05	38.14	59.42	78.9%	0.64	49.51	1.30
	5.05	58.23	0.60	1.00	35.22	58.90	78.2%	0.60	43.11	1.22
	5.10	57.71	0.56	0.95	32.32	58.37	77.5%	0.55	37.13	1.15
WL	5.15	57.20	0.51	0.90	29.45	57.85	76.8%	0.51	31.56	1.07
	5.20	55.02	0.48	0.85	26.64	55.65	73.9%	0.48	27.13	1.02
	5.25	53.95	0.44	0.80	23.92	54.56	72.4%	0.44	22.65	0.95
	5.30	52.87	0.40	0.75	21.25	53.46	71.0%	0.40	18.55	0.87
	5.35	51.40	0.36	0.70	18.64	51.95	69.0%	0.36	14.96	0.80
	5.40	49.92	0.32	0.65	16.11	50.45	67.0%	0.32	11.74	0.73
	5.45	48.45	0.28	0.60	13.65	48.94	65.0%	0.28	8.89	0.65
	5.50	47.04	0.24	0.55	11.26	47.50	63.0%	0.24	6.42	0.57
	5.55	43.63	0.20	0.50	8.94	44.05	58.5%	0.20	4.48	0.50
	5.60	38.77	0.18	0.45	6.88	39.15	52.0%	0.18	3.06	0.44
	5.65	35.63	0.14	0.40	5.02	35.95	47.7%	0.14	1.85	0.37
	5.70	29.52	0.11	0.35	3.39	29.79	39.5%	0.11	1.06	0.31
	5.75	19.01	0.11	0.30	2.08	19.22	25.5%	0.11	0.62	0.30
	5.80	14.14	0.09	0.25	1.20	14.30	19.0%	0.08	0.29	0.24
	5.85	9.17	0.07	0.20	0.62	9.29	12.3%	0.07	0.12	0.20
	5.90	5.54	0.05	0.15	0.25	5.61	7.4%	0.04	0.04	0.14
	5.95	1.90	0.03	0.10	0.07	1.93	2.6%	0.03	0.01	0.11
	6.00	0.37	0.02	0.05	0.01	0.38	0.5%	0.02	0.00	0.09



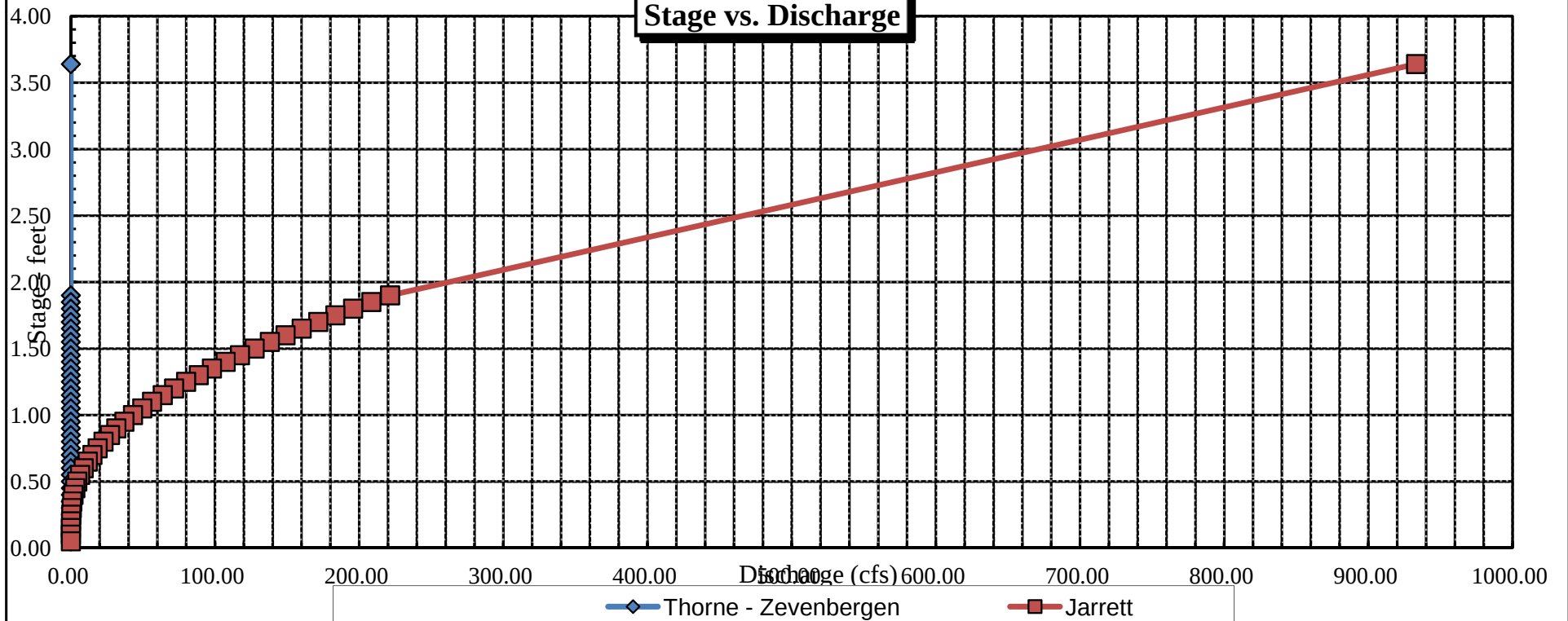


Velocity vs. Discharge





Stage vs. Discharge





FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME: <u>Piney River</u>		CROSS-SECTION NO.: <u>2</u>
CROSS-SECTION LOCATION: <u>Approx. 0.5 mile upstream from confluence with Colorado River</u>		
DATE: <u>9-16-15</u>	OBSERVERS: <u>R. Smith, P. Adams</u>	
LEGAL DESCRIPTION	1/4 SECTION: <u>SW</u>	SECTION: <u>25</u>
	TOWNSHIP: <u>2 N/S</u>	RANGE: <u>83 E/W</u>
COUNTY: <u>Eagle</u>	WATERSHED: <u>Colorado River</u>	WATER DIVISION: <u>5</u>
		DOW WATER CODE: <u>21535</u>
MAP(S):	USGS:	
	USFS:	

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: ☒ YES ☐ NO	METER TYPE: <u>M-M</u>
METER NUMBER:	DATE RATED:
	CALIB/SPIN: _____ sec
	TAPE WEIGHT: <u>surveyed</u> lbs/foot
	TAPE TENSION: <u>surveyed</u> lbs
CHANNEL BED MATERIAL SIZE RANGE: <u>4" cobble to 2-foot boulder</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>66.7</u>	<u>5.35/4.35</u>
② WS Upstream	<u>107.8</u>	<u>4.58</u>
③ WS Downstream	<u>40.0</u>	<u>6.17</u>
SLOPE	<u>1.59 / 147.8 = 0.011</u>	

SKETCH

7.0

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

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:

Piney River

CROSS-SECTION NO.:

2

DATE:

9-16-15

SHEET ____ OF ____

BEGINNING OF MEASUREMENT

EDGE OF WATER LOOKING DOWNSTREAM:
(0.0 AT STAKE)

LEFT / RIGHT

Gage Reading:

____ ft

TIME:

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		1.78								
G		2.0		3.48								
		4.0		4.37								
		5.5		5.08								
W		7.0		5.35								
		9		5.60	.25				.10			
		11		5.80	.45				1.71			
		13		5.70	.35				0			
		15		5.85	.50				1.92			
		17		5.55	.20				.30			
		19		5.70	.35				1.63			
		21		6.05	.70				.36			
		23		5.95	.60				1.61			
		25		5.90	.55				.11			
		27		6.15	.80				1.10			
		29		6.0	.65				.43			
		31		5.85	.50				1.90			
		32		5.95	.60				0			
		34		6.0	.65				.49			
		36		5.90	.55				1.16			
		38		5.85	.5				1.07			
		40		5.85	.5				1.16			
		41		5.80	.45				1.76			
		43		5.50	.15				.90			
		45		5.90	.55				2.38			
		46		5.85	.5				2.05			
		48		5.55	.2				1.43			
		49		6.05	.7				2.56			
		52		6.15	.8				1.41			
		54		6.15	.8				.27			
		56		6.10	.75				1.21			
		58		6.25	.9				1.21			
		60		6.15	.8				.02			
		62		5.95	.6				.63			
		64		5.55	.2				0			
		66		5.65	.3				.72			
W		66.7		5.35								
		71.3		5.01								
		73.3		4.00								
G		74.8		3.48								
LS		76.1		1.84								
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: Piney River
XS LOCATION: 0.5 mile from confluence w Colorado R.
XS NUMBER: 2

DATE: 16-Sep-15
OBSERVERS: R. Smith, P. Adams

1/4 SEC: SW
SECTION: 25
TWP: 2S
RANGE: 83W
PM: Sixth

COUNTY: Eagle
WATERSHED: Colorado River
DIVISION: 5
DOW CODE: 21535

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: Piney River
 XS LOCATION: 0.5 mile from confluence w Colorado R.
 XS NUMBER: 2

DATA POINTS= 41

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
1	RS	0.00	1.78			0.00		0.00	0.00	0.0%
	G	2.00	3.48			0.00		0.00	0.00	0.0%
		4.00	4.37			0.00		0.00	0.00	0.0%
		5.50	5.08			0.00		0.00	0.00	0.0%
W		7.00	5.35	0.00	0.00	0.00		0.00	0.00	0.0%
		9.00	5.60	0.25	0.10	2.02	0.25	0.50	0.05	0.2%
		11.00	5.80	0.45	1.71	2.01	0.45	0.90	1.54	4.8%
		13.00	5.70	0.35	0.00	2.00	0.35	0.70	0.00	0.0%
		15.00	5.85	0.50	1.92	2.01	0.50	1.00	1.92	6.0%
		17.00	5.55	0.20	0.30	2.02	0.20	0.40	0.12	0.4%
		19.00	5.70	0.35	1.63	2.01	0.35	0.70	1.14	3.5%
		21.00	6.05	0.70	0.36	2.03	0.70	1.40	0.50	1.6%
		23.00	5.95	0.60	1.61	2.00	0.60	1.20	1.93	6.0%
		25.00	5.90	0.55	0.11	2.00	0.55	1.10	0.12	0.4%
		27.00	6.15	0.80	1.10	2.02	0.80	1.60	1.76	5.5%
		29.00	6.00	0.65	0.43	2.01	0.65	1.30	0.56	1.7%
		31.00	5.85	0.50	1.90	2.01	0.50	0.75	1.43	4.4%
		32.00	5.95	0.60	0.00	1.00	0.60	0.90	0.00	0.0%
		34.00	6.00	0.65	0.49	2.00	0.65	1.30	0.64	2.0%
		36.00	5.90	0.55	1.16	2.00	0.55	1.10	1.28	4.0%
		38.00	5.85	0.50	1.07	2.00	0.50	1.00	1.07	3.3%
		40.00	5.85	0.50	1.16	2.00	0.50	0.75	0.87	2.7%
		41.00	5.80	0.45	1.76	1.00	0.45	0.68	1.19	3.7%
		43.00	5.50	0.15	0.90	2.02	0.15	0.30	0.27	0.8%
		45.00	5.90	0.55	2.38	2.04	0.55	0.83	1.96	6.1%
		46.00	5.85	0.50	2.05	1.00	0.50	0.75	1.54	4.8%
		48.00	5.55	0.20	1.43	2.02	0.20	0.30	0.43	1.3%
		49.00	6.05	0.70	2.56	1.12	0.70	1.40	3.58	11.1%
		52.00	6.15	0.80	1.41	3.00	0.80	2.00	2.82	8.8%
		54.00	6.15	0.80	0.27	2.00	0.80	1.60	0.43	1.3%
		56.00	6.10	0.75	1.21	2.00	0.75	1.50	1.82	5.6%
		58.00	6.25	0.90	1.21	2.01	0.90	1.80	2.18	6.8%
		60.00	6.15	0.80	0.02	2.00	0.80	1.60	0.03	0.1%
		62.00	5.95	0.60	0.63	2.01	0.60	1.20	0.76	2.3%
		64.00	5.55	0.20	0.00	2.04	0.20	0.40	0.00	0.0%
		66.00	5.65	0.30	0.72	2.00	0.30	0.41	0.29	0.9%
W		66.70	5.35	0.00	0.00	0.76		0.00	0.00	0.0%
		71.30	5.01			0.00		0.00	0.00	0.0%
		73.30	4.00			0.00		0.00	0.00	0.0%
1	G	74.80	3.48			0.00		0.00	0.00	0.0%
	LS	76.10	1.84			0.00		0.00	0.00	0.0%

TOTALS -----

60.16	0.9	31.36	32.22	100.0%
(Max.)				

Manning's n = 0.0982
 Hydraulic Radius= 0.52119648

STREAM NAME: Piney River
 XS LOCATION: 0.5 mile from confluence w Colorado R.
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	31.36	31.36	0.0%
5.10	31.36	46.88	49.5%
5.12	31.36	45.59	45.4%
5.14	31.36	44.31	41.3%
5.16	31.36	43.04	37.3%
5.18	31.36	41.78	33.3%
5.20	31.36	40.53	29.3%
5.22	31.36	39.28	25.3%
5.24	31.36	38.04	21.3%
5.26	31.36	36.81	17.4%
5.28	31.36	35.58	13.5%
5.30	31.36	34.37	9.6%
5.31	31.36	33.76	7.7%
5.32	31.36	33.16	5.7%
5.33	31.36	32.55	3.8%
5.34	31.36	31.95	1.9%
5.35	31.36	31.36	0.0%
5.36	31.36	30.76	-1.9%
5.37	31.36	30.16	-3.8%
5.38	31.36	29.57	-5.7%
5.39	31.36	28.98	-7.6%
5.40	31.36	28.38	-9.5%
5.42	31.36	27.20	-13.2%
5.44	31.36	26.03	-17.0%
5.46	31.36	24.85	-20.7%
5.48	31.36	23.68	-24.5%
5.50	31.36	22.52	-28.2%
5.52	31.36	21.36	-31.9%
5.54	31.36	20.21	-35.5%
5.56	31.36	19.07	-39.2%
5.58	31.36	17.96	-42.7%
5.60	31.36	16.88	-46.2%

WATERLINE AT ZERO

AREA ERROR = 5.350

STREAM NAME: Piney River
 XS LOCATION: 0.5 mile from confluence w Colorado R.
 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	3.48	72.80	2.18	2.77	158.62	73.97	100.0%	2.14	418.52	2.64
	4.35	68.65	1.42	1.90	97.16	69.47	93.9%	1.40	192.82	1.98
	4.40	68.44	1.37	1.85	93.74	69.24	93.6%	1.35	182.02	1.94
	4.45	68.24	1.32	1.80	90.32	69.01	93.3%	1.31	171.47	1.90
	4.50	68.04	1.28	1.75	86.91	68.78	93.0%	1.26	161.19	1.85
	4.55	67.83	1.23	1.70	83.52	68.56	92.7%	1.22	151.16	1.81
	4.60	67.63	1.18	1.65	80.13	68.33	92.4%	1.17	141.39	1.76
	4.65	67.42	1.14	1.60	76.75	68.10	92.1%	1.13	131.90	1.72
	4.70	67.22	1.09	1.55	73.39	67.87	91.8%	1.08	122.67	1.67
	4.75	67.01	1.05	1.50	70.03	67.64	91.4%	1.04	113.72	1.62
	4.80	66.81	1.00	1.45	66.69	67.42	91.1%	0.99	105.05	1.58
	4.85	66.60	0.95	1.40	63.35	67.19	90.8%	0.94	96.66	1.53
	4.90	66.40	0.90	1.35	60.03	66.96	90.5%	0.90	88.55	1.48
	4.95	66.19	0.86	1.30	56.71	66.73	90.2%	0.85	80.73	1.42
	5.00	65.99	0.81	1.25	53.41	66.51	89.9%	0.80	73.21	1.37
	5.05	65.32	0.77	1.20	50.12	65.82	89.0%	0.76	66.32	1.32
	5.10	64.47	0.73	1.15	46.88	64.96	87.8%	0.72	59.84	1.28
	5.15	63.52	0.69	1.10	43.68	64.00	86.5%	0.68	53.72	1.23
	5.20	62.56	0.65	1.05	40.52	63.04	85.2%	0.64	47.89	1.18
	5.25	61.61	0.61	1.00	37.42	62.08	83.9%	0.60	42.37	1.13
	5.30	60.65	0.57	0.95	34.36	61.12	82.6%	0.56	37.14	1.08
WL	5.35	59.70	0.53	0.90	31.35	60.16	81.3%	0.52	32.22	1.03
	5.40	59.18	0.48	0.85	28.38	59.63	80.6%	0.48	27.45	0.97
	5.45	58.67	0.43	0.80	25.44	59.10	79.9%	0.43	23.01	0.90
	5.50	58.15	0.39	0.75	22.52	58.57	79.2%	0.38	18.89	0.84
	5.55	57.05	0.34	0.70	19.64	57.45	77.7%	0.34	15.23	0.78
	5.60	53.27	0.32	0.65	16.88	53.61	72.5%	0.31	12.39	0.73
	5.65	49.38	0.29	0.60	14.31	49.68	67.2%	0.29	9.91	0.69
	5.70	46.62	0.26	0.55	11.91	46.88	63.4%	0.25	7.58	0.64
	5.75	42.56	0.23	0.50	9.68	42.78	57.8%	0.23	5.71	0.59
	5.80	38.51	0.20	0.45	7.66	38.69	52.3%	0.20	4.12	0.54
	5.85	33.29	0.17	0.40	5.81	33.43	45.2%	0.17	2.87	0.49
	5.90	28.24	0.15	0.35	4.27	28.35	38.3%	0.15	1.92	0.45
	5.95	23.04	0.13	0.30	2.99	23.12	31.2%	0.13	1.21	0.41
	6.00	17.09	0.12	0.25	1.99	17.14	23.2%	0.12	0.75	0.38
	6.05	14.13	0.09	0.20	1.21	14.16	19.1%	0.09	0.37	0.31
	6.10	11.07	0.05	0.15	0.58	11.08	15.0%	0.05	0.13	0.22
	6.15	3.33	0.05	0.10	0.17	3.34	4.5%	0.05	0.04	0.22
	6.20	1.67	0.02	0.05	0.04	1.67	2.3%	0.02	0.01	0.14

STREAM NAME: Piney River
XS LOCATION: 0.5 mile from confluence w Colorado R.
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 32.22 cfs
CALCULATED FLOW (Qc)= 32.22 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 5.35 ft
CALCULATED WATERLINE (WLc)= 5.35 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.90 ft
MAX CALCULATED DEPTH (Dc)= 0.90 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 1.03 ft/sec
MANNING'S N= 0.098
SLOPE= 0.011 ft/ft

.4 * Qm = 12.9 cfs
2.5 * Qm= 80.6 cfs

RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

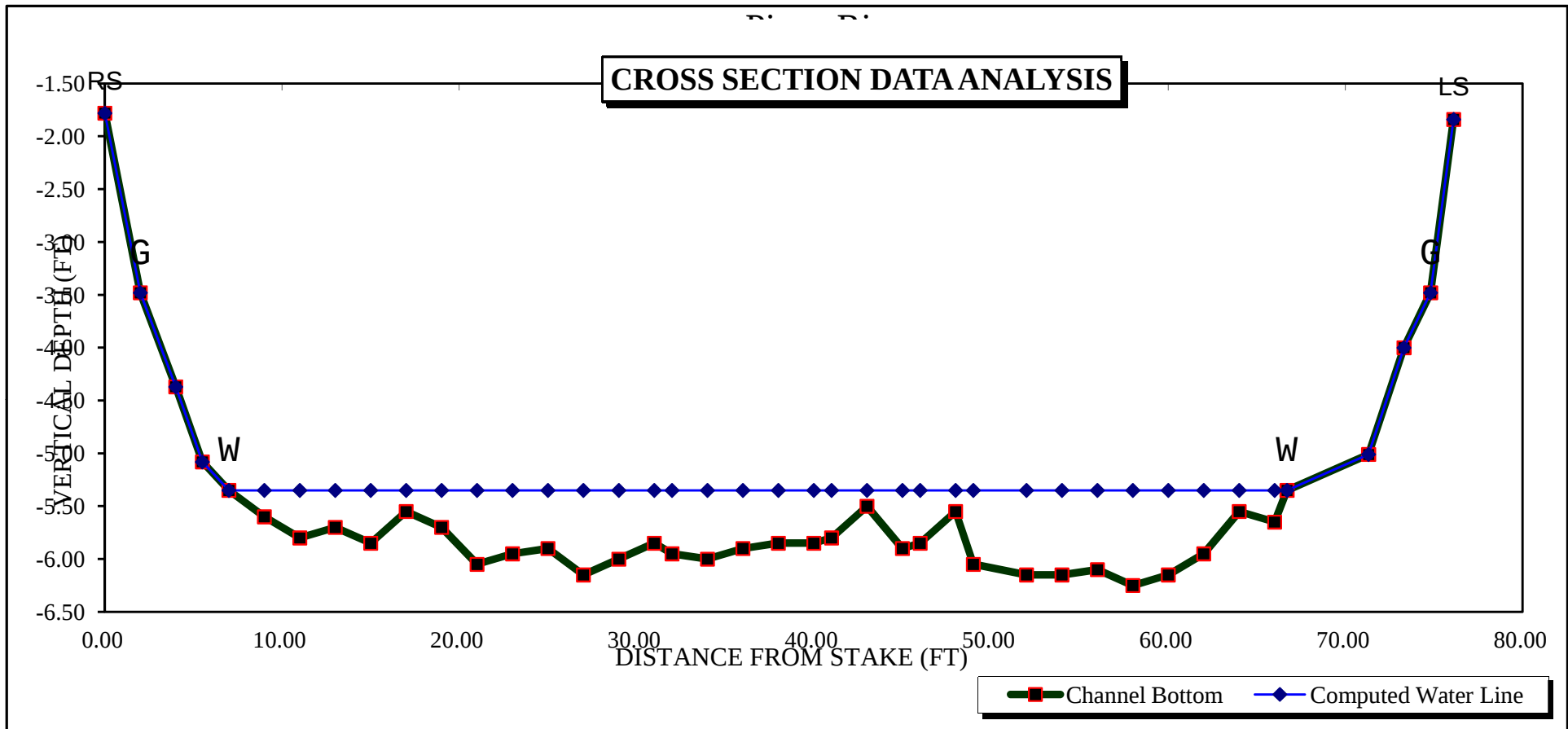
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....

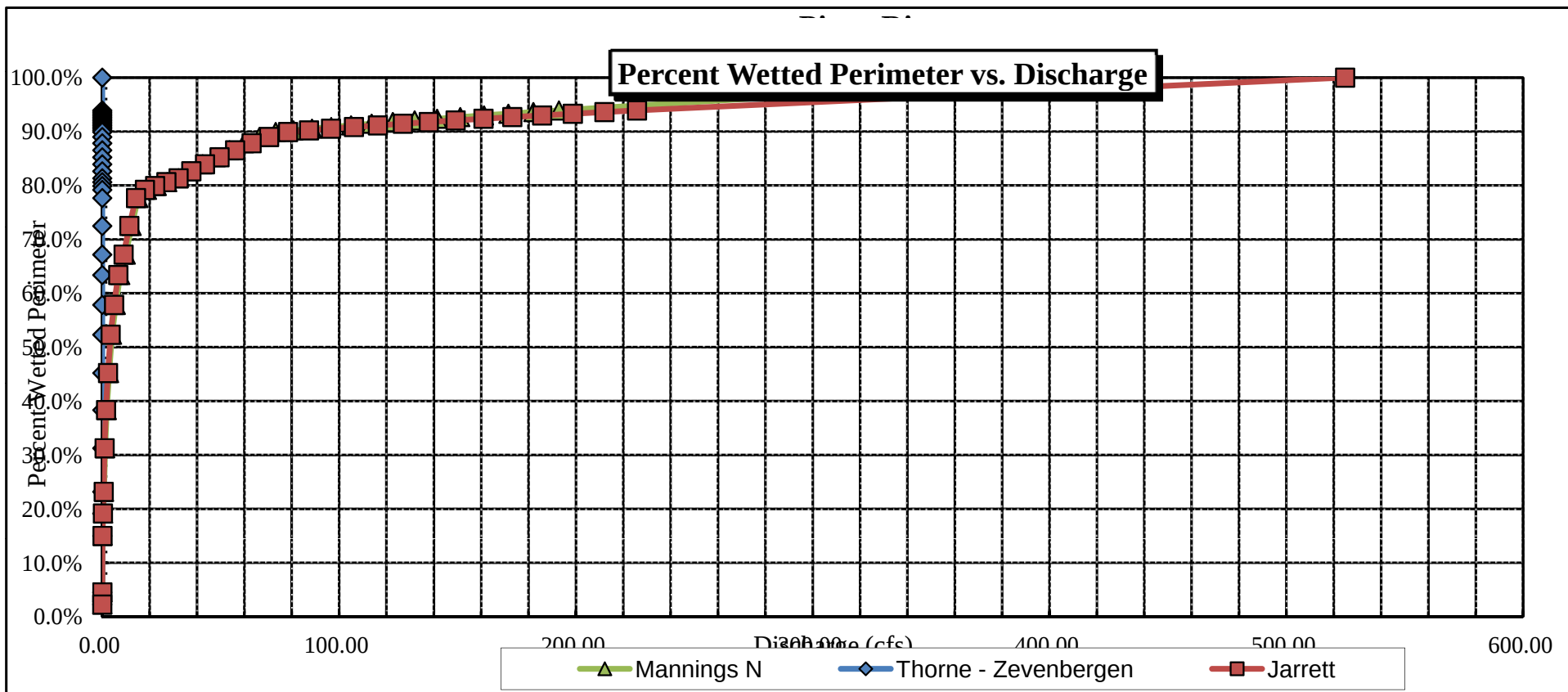
STREAM NAME: Piney River
 XS LOCATION: 0.5 mile from confluence w Colorado R.
 XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

GL = lowest Grassline elevation corrected for sag

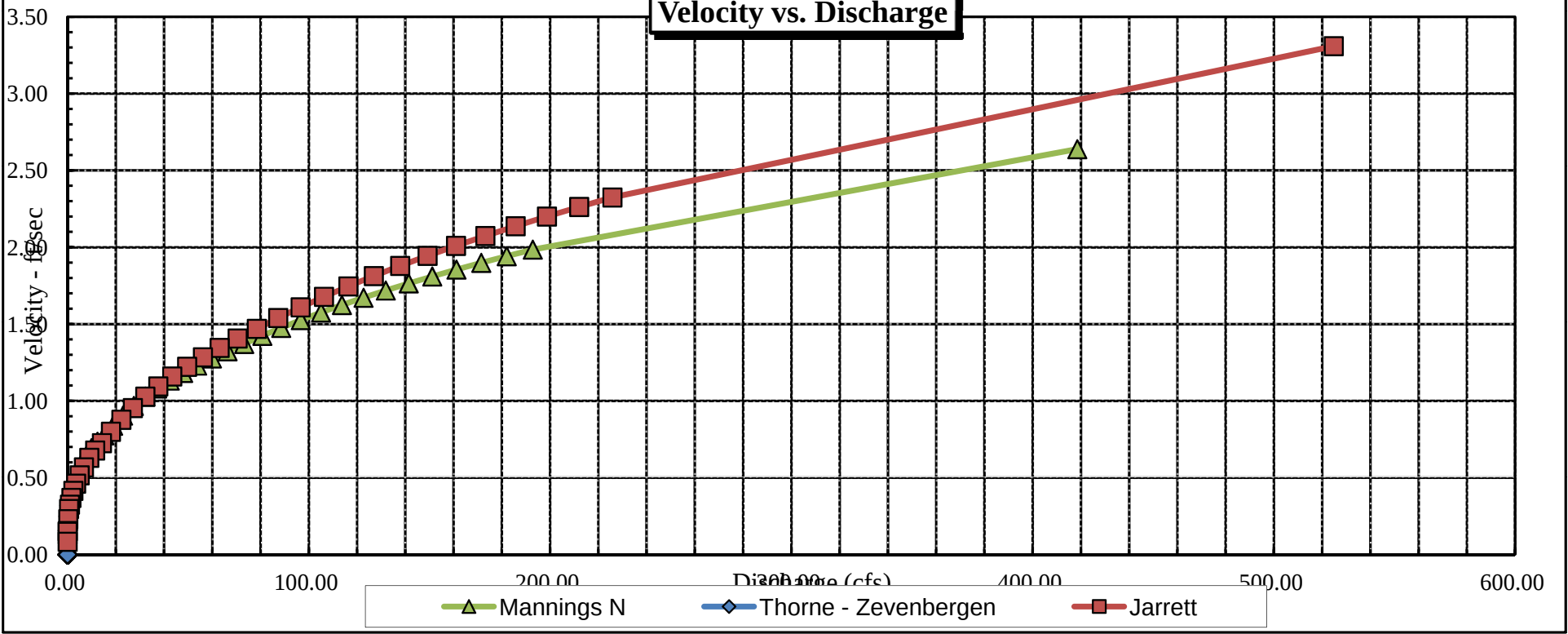
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

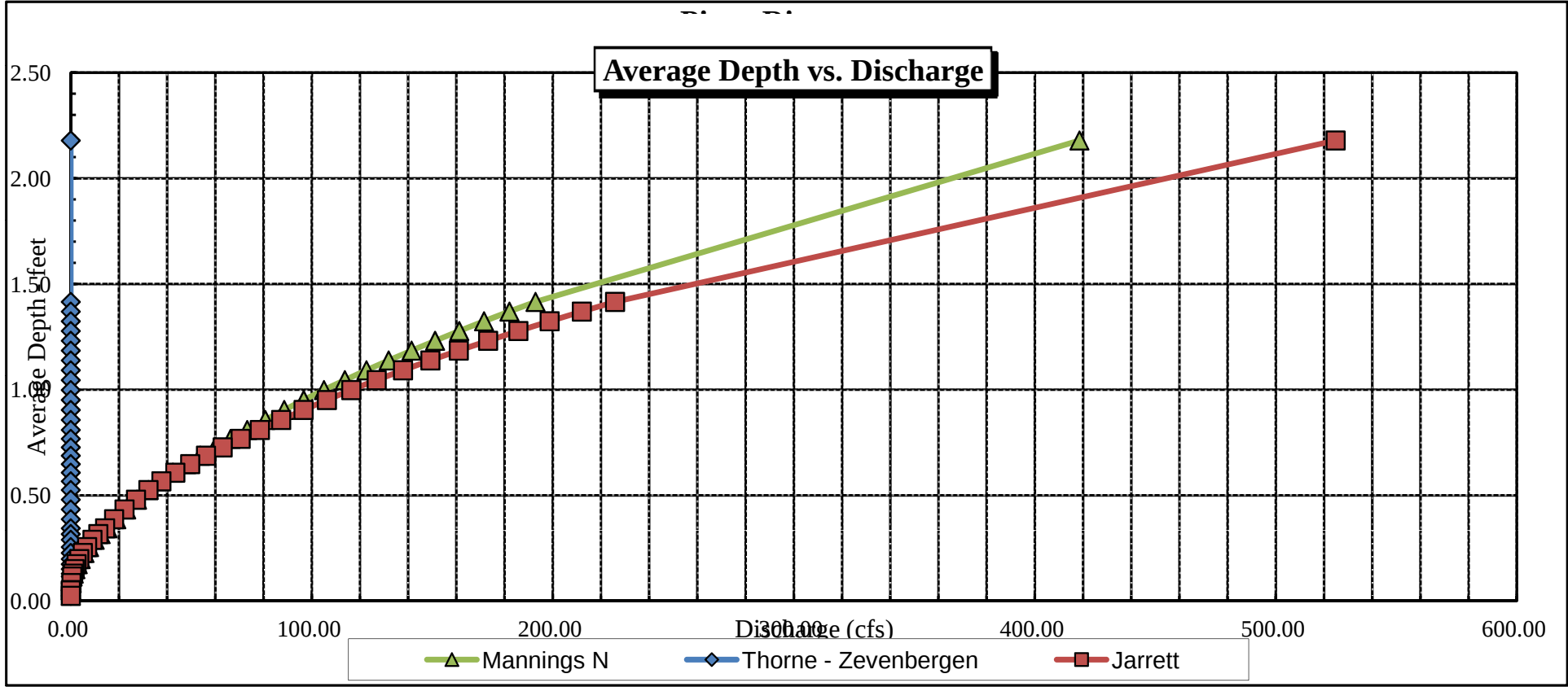
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.48	72.80	2.18	2.77	158.62	73.97	100.0%	2.14	524.81	3.31
	4.35	68.65	1.42	1.90	97.16	69.47	93.9%	1.40	225.81	2.32
	4.40	68.44	1.37	1.85	93.74	69.24	93.6%	1.35	212.06	2.26
	4.45	68.24	1.32	1.80	90.32	69.01	93.3%	1.31	198.69	2.20
	4.50	68.04	1.28	1.75	86.91	68.78	93.0%	1.26	185.72	2.14
	4.55	67.83	1.23	1.70	83.52	68.56	92.7%	1.22	173.15	2.07
	4.60	67.63	1.18	1.65	80.13	68.33	92.4%	1.17	160.98	2.01
	4.65	67.42	1.14	1.60	76.75	68.10	92.1%	1.13	149.22	1.94
	4.70	67.22	1.09	1.55	73.39	67.87	91.8%	1.08	137.87	1.88
	4.75	67.01	1.05	1.50	70.03	67.64	91.4%	1.04	126.92	1.81
	4.80	66.81	1.00	1.45	66.69	67.42	91.1%	0.99	116.39	1.75
	4.85	66.60	0.95	1.40	63.35	67.19	90.8%	0.94	106.27	1.68
	4.90	66.40	0.90	1.35	60.03	66.96	90.5%	0.90	96.58	1.61
	4.95	66.19	0.86	1.30	56.71	66.73	90.2%	0.85	87.30	1.54
	5.00	65.99	0.81	1.25	53.41	66.51	89.9%	0.80	78.46	1.47
	5.05	65.32	0.77	1.20	50.12	65.82	89.0%	0.76	70.46	1.41
	5.10	64.47	0.73	1.15	46.88	64.96	87.8%	0.72	63.04	1.34
	5.15	63.52	0.69	1.10	43.68	64.00	86.5%	0.68	56.09	1.28
	5.20	62.56	0.65	1.05	40.52	63.04	85.2%	0.64	49.53	1.22
	5.25	61.61	0.61	1.00	37.42	62.08	83.9%	0.60	43.37	1.16
	5.30	60.65	0.57	0.95	34.36	61.12	82.6%	0.56	37.60	1.09
WL	5.35	59.70	0.53	0.90	31.35	60.16	81.3%	0.52	32.22	1.03
	5.40	59.18	0.48	0.85	28.38	59.63	80.6%	0.48	27.06	0.95
	5.45	58.67	0.43	0.80	25.44	59.10	79.9%	0.43	22.31	0.88
	5.50	58.15	0.39	0.75	22.52	58.57	79.2%	0.38	17.99	0.80
	5.55	57.05	0.34	0.70	19.64	57.45	77.7%	0.34	14.24	0.73
	5.60	53.27	0.32	0.65	16.88	53.61	72.5%	0.31	11.43	0.68
	5.65	49.38	0.29	0.60	14.31	49.68	67.2%	0.29	9.01	0.63
	5.70	46.62	0.26	0.55	11.91	46.88	63.4%	0.25	6.76	0.57
	5.75	42.56	0.23	0.50	9.68	42.78	57.8%	0.23	4.99	0.52
	5.80	38.51	0.20	0.45	7.66	38.69	52.3%	0.20	3.53	0.46
	5.85	33.29	0.17	0.40	5.81	33.43	45.2%	0.17	2.41	0.41
	5.90	28.24	0.15	0.35	4.27	28.35	38.3%	0.15	1.57	0.37
	5.95	23.04	0.13	0.30	2.99	23.12	31.2%	0.13	0.97	0.32
	6.00	17.09	0.12	0.25	1.99	17.14	23.2%	0.12	0.59	0.30
	6.05	14.13	0.09	0.20	1.21	14.16	19.1%	0.09	0.28	0.23
	6.10	11.07	0.05	0.15	0.58	11.08	15.0%	0.05	0.09	0.15
	6.15	3.33	0.05	0.10	0.17	3.34	4.5%	0.05	0.02	0.15
	6.20	1.67	0.02	0.05	0.04	1.67	2.3%	0.02	0.00	0.08



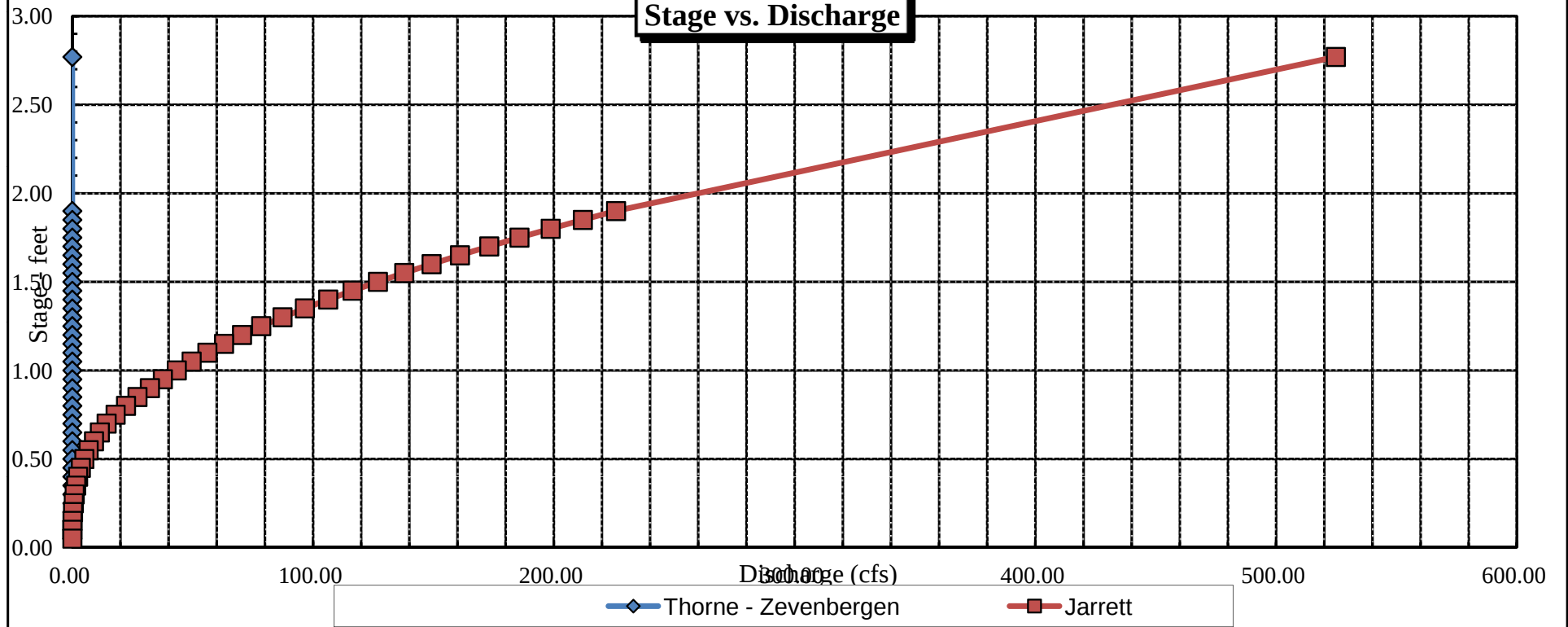


Velocity vs. Discharge





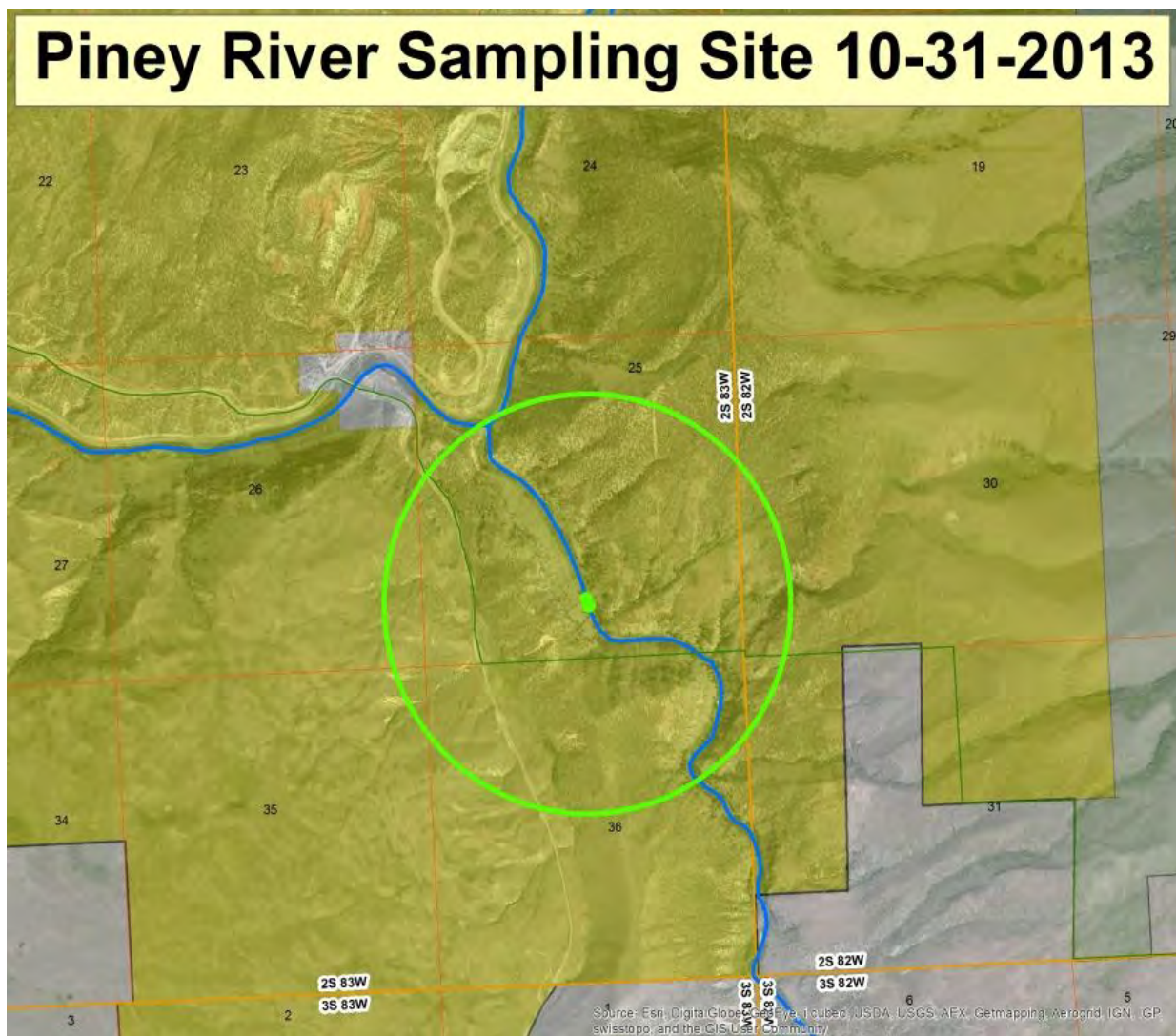
Stage vs. Discharge



Colorado River Valley Field Office Stream Surveys October 2013

Piney River - Water Code # 21535

Piney River, located southeast of State Bridge, Colorado, on BLM lands managed by the Colorado River Valley Field Office, was sampled on October 31, 2013. The Piney River is tributary to the Colorado River. Sampling was conducted to determine the population status of the resident coldwater fishery. One site was sampled. Sampling was conducted with a bank shocking array consisting of 4 electrodes. Brown trout, rainbow trout, mountain whitefish, sculpin, and longnose sucker were collected. Personnel present were Tom Fresques and Gregor Dekleva, BLM, and Kendall Bakich and Jenn Logan and their crews, Colorado Parks & Wildlife.





Sampling Reach



Brown Trout

Discussion:

The Piney River is a mid-sized river with good flow. It is a Rosgen B channel type with large cobble and rock substrate with some gravels and a good mix of swift runs and riffles with some pocket water associated with larger rock and boulder substrates. Slow deep pools are limited and sinuosity within the sample reach was lacking due to channel type. Riparian vegetation is in good condition and consists of willow, alder, cottonwood, spruce, fir, horsetail, red osier dogwood, and some sedges and rushes. The river originates in the Eagles Nest Wilderness Area on USFS lands.

The sample reach contained brown trout, rainbow trout, mountain whitefish, sculpin, and longnose sucker. CPW has the fish data including length and weight information. Based on the sample, the Piney River contains a healthy fish population. Numbers of fish likely vary seasonally as select individuals move into and out of the nearby Colorado River.

Recommendations:

- Periodically monitor stream and riparian habitat conditions





































































