United States Department of the Interior

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

In Reply Refer To:
7250 (CO-932)

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

DEC 0 5 2016

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for an increase to 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 the confluence with Grape Creek and extends to the confluence with the Colorado River, a distance of approximately 7.7 miles. The BLM manages approximately 2.5 miles of this reach and 5.2 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-quarter 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 preserve 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.

17.0 cubic feet per second is recommended from August 16 through November

30. This recommendation is driven by water availability. Protecting this flow rate would require an increase of 8.0 over the current instream flow water right. Even though this flow rate does not meet two instream flow criteria, it does protect substantially more habitat than the current instream flow water right during a critical period of the year for the fish population.

13.0 cubic feet per second is recommended during the period from December 1 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 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 above 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 percent to 65 percent 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 United States Geological Survey 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.

The BLM is aware of 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). The 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: Chad Mickschl, Colorado River Valley Field Office
Tom Fresques, Colorado River Valley Field Office
Karl Mendonca, Colorado River Valley Field Office
Andrew Archuleta, Northwest District Office

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

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 | ¼ SECTION: SE | SECTION: 25 | TOWNSHIP: 2 (N/S) | RANGE: 83 (E/W) | PM: 6th

COUNTY: Eagle | WATERSHED: Colo. River | WATER DIVISION: 5 | DOW WATER CODE: 21535

MAP(S): USGS: | USFS:

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO | METER TYPE: M-M

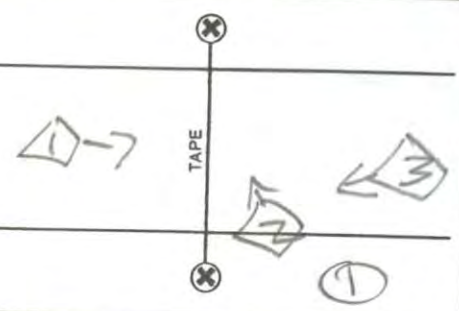
METER NUMBER: | DATE RATED: | CALIB/SPIN: ____ sec | TAPE WEIGHT: surveyed ____ lbs/foot | TAPE TENSION: surveyed ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: 7" cobble 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	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 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

Salinity = 0.1 ppt
Temp = 13°C
Ph = 8.13
Cond = 187

Riparian = Dogwood, Alder, Blue Spruce

DM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piney River	CROSS-SECTION NO.: 1	DATE: 7-23-15	SHEET ___ OF ___
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: LEFT / RIGHT (0.0 AT STAKE)	Gage Reading: _____ ft	TIME: 9:45 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 (ft^2)	Discharge (cfs)
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		6.50	.9				0.02			
	18		6.50	.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	.45				2.20			
	53		5.65	0.05				0			
W	53.6		5.60								
	54.5		5.29								
	57.5		4.35								
RG	59.6		3.04								
RS	62.2		2.20								
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:	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

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:	0.014

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
	LS	0.00	0.00			0.00		0.00	0.00	0.0%
1	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%
		10.50	5.20			0.00		0.00	0.00	0.0%
	W	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 (Max.)	40.45	76.01	100.0%

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 (WLm)=	5.60	ft
CALCULATED WATERLINE (WLc)=	5.60	ft
(WLm-WLc)/WLm * 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:
=============================

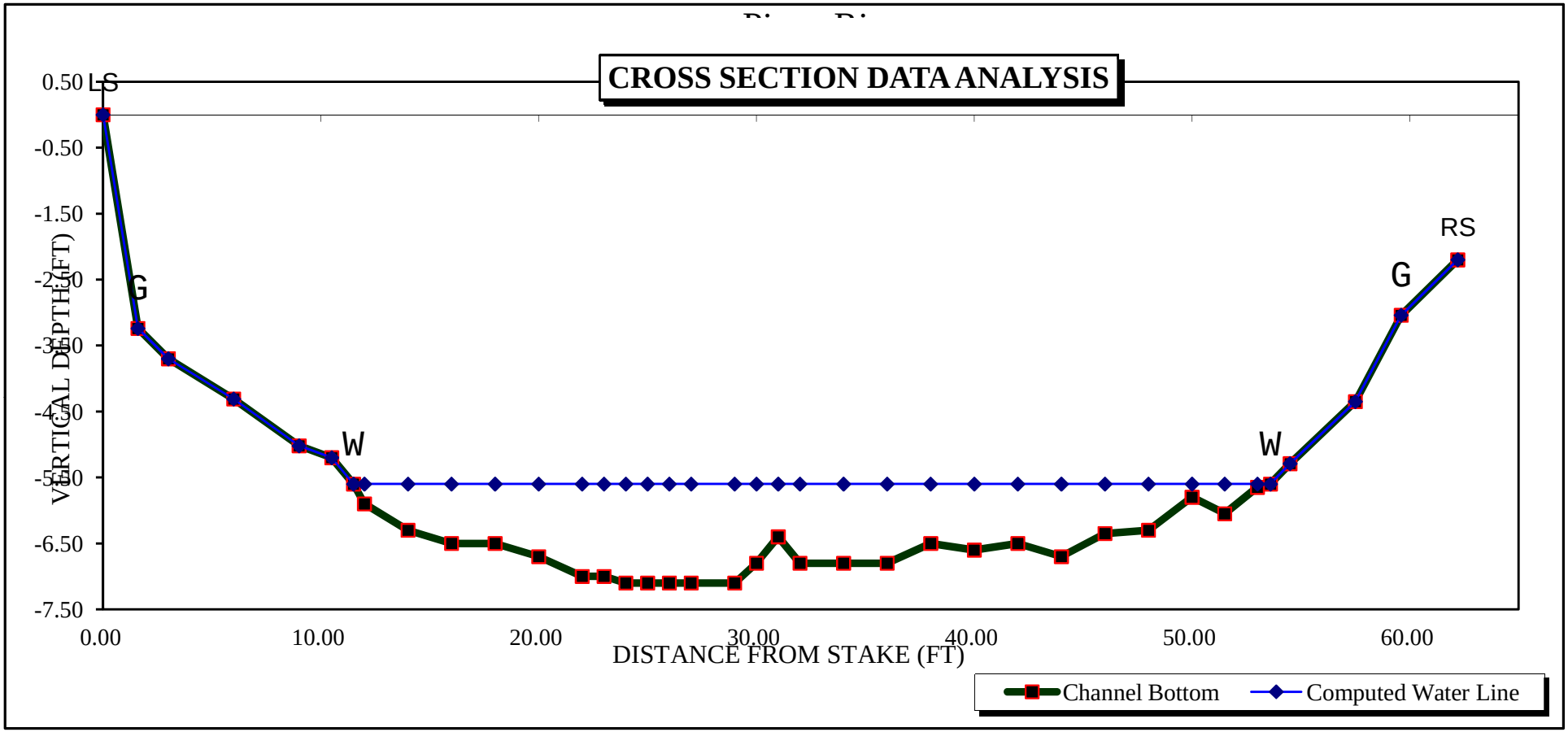
RECOMMENDATION BY: ………………...………..……............................... AGENCY..……………………......…....…...…….....… DATE:......…...…......……………

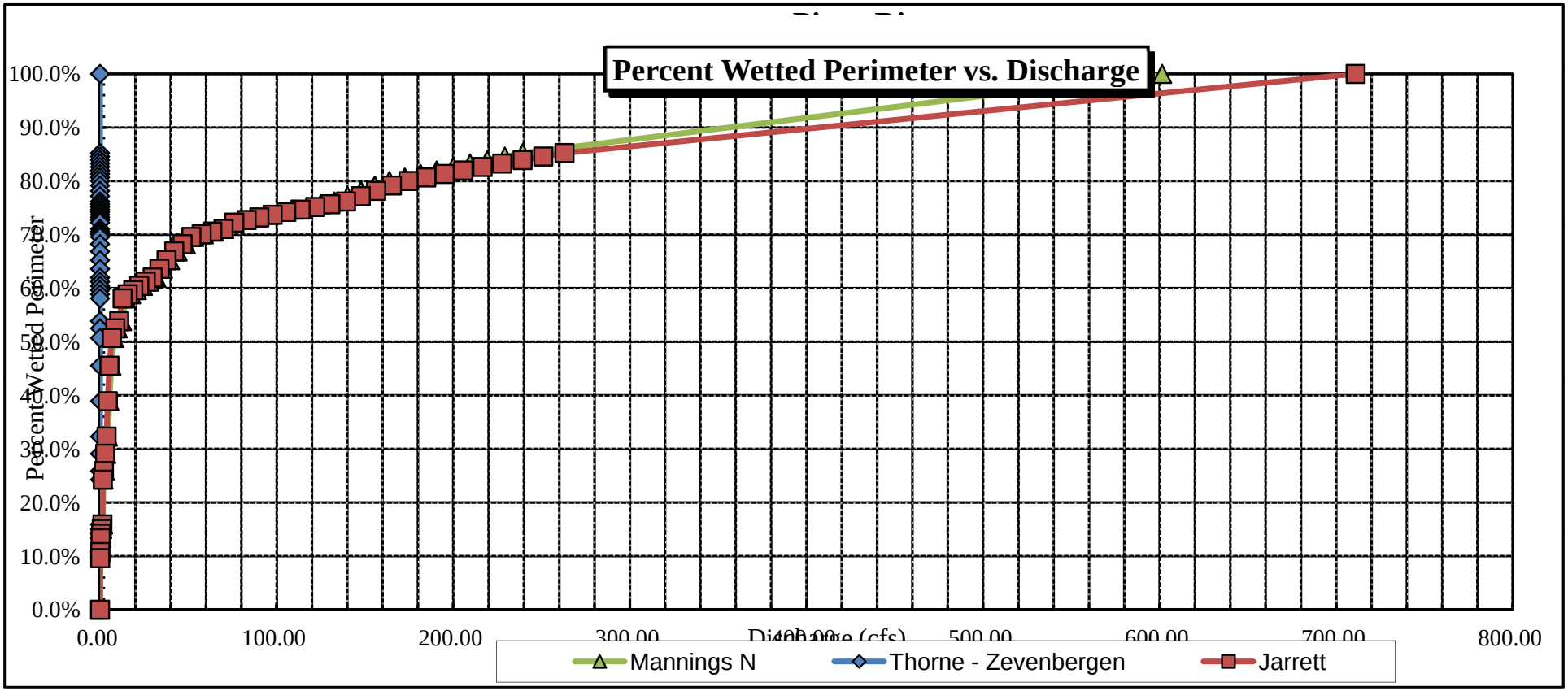
CWCB REVIEW BY: ..……………………….....……………………………………………...…............. DATE:.................……………...…

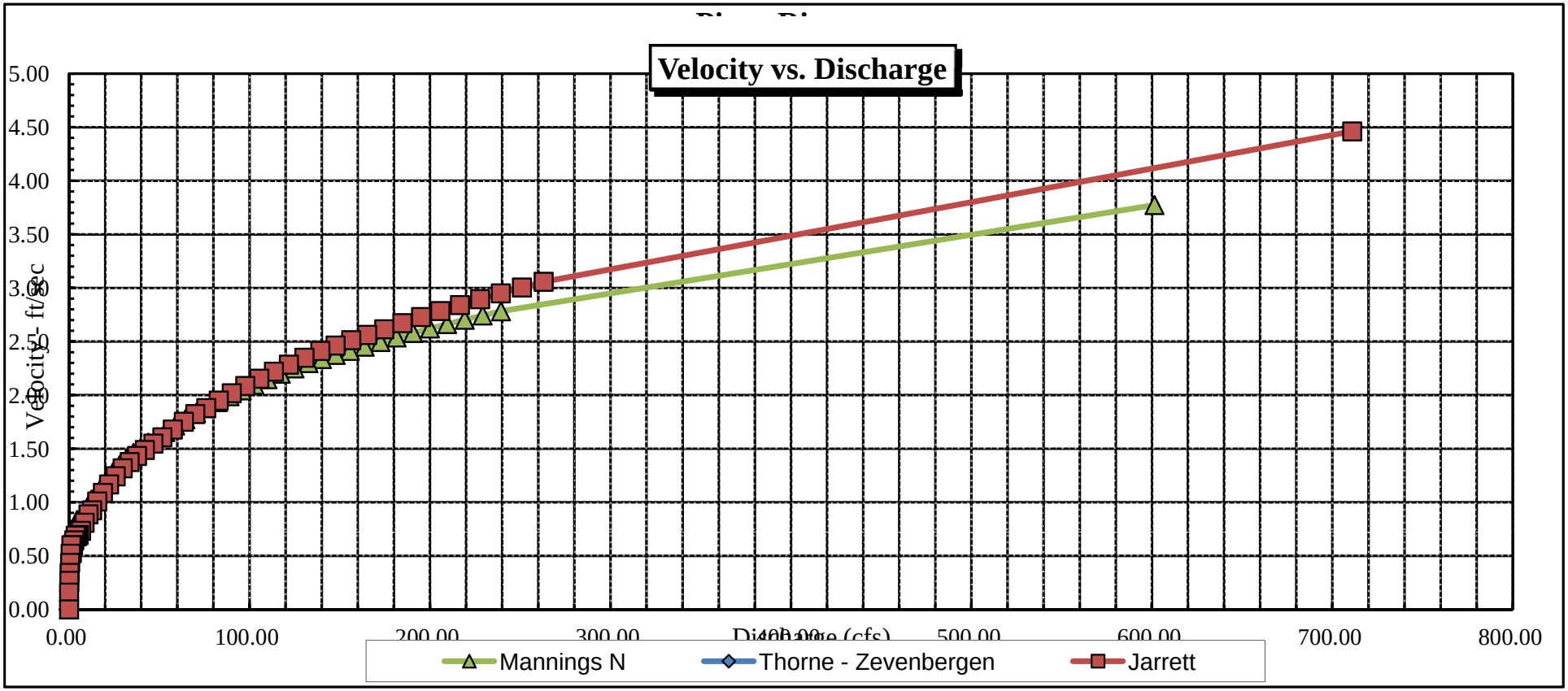
STREAM NAME: Piney River
XS LOCATION: 100 ft upstream from BLM road bridge
XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

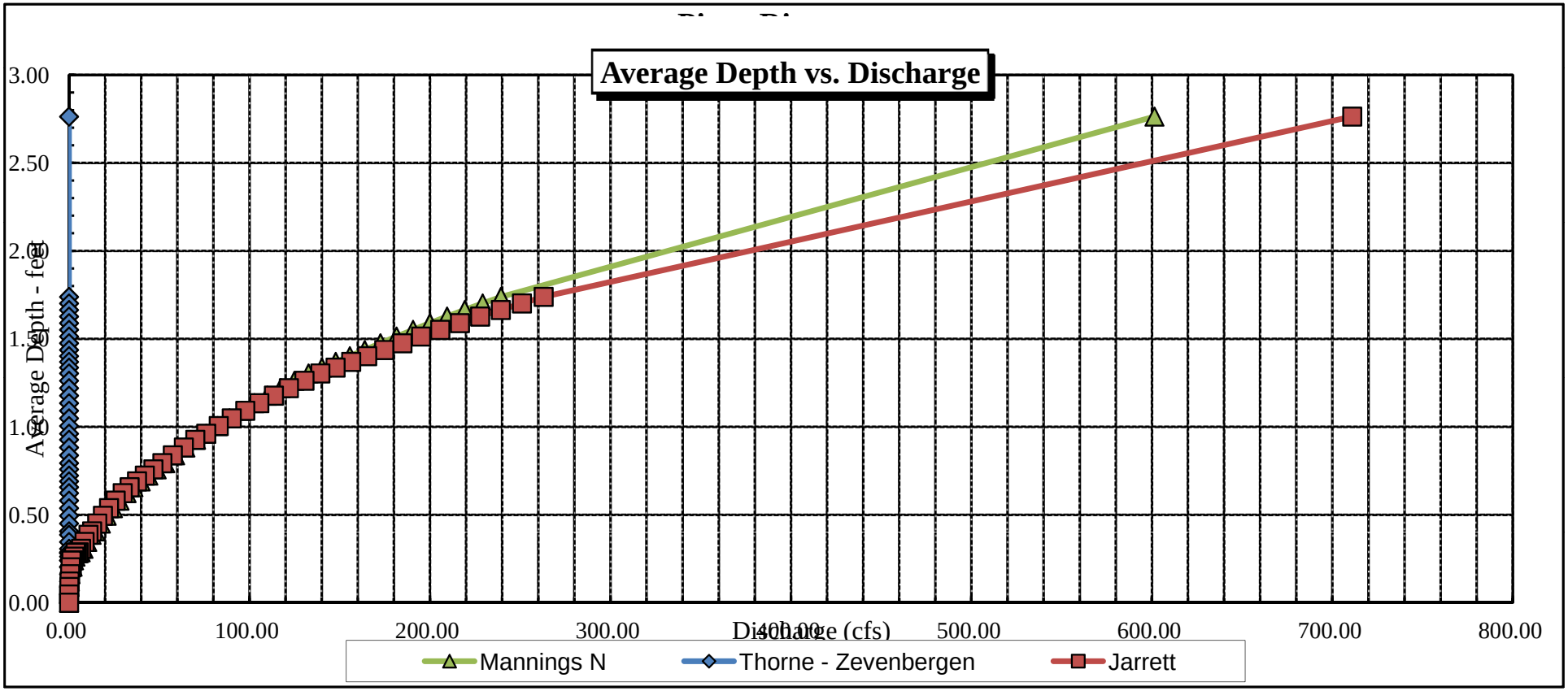
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

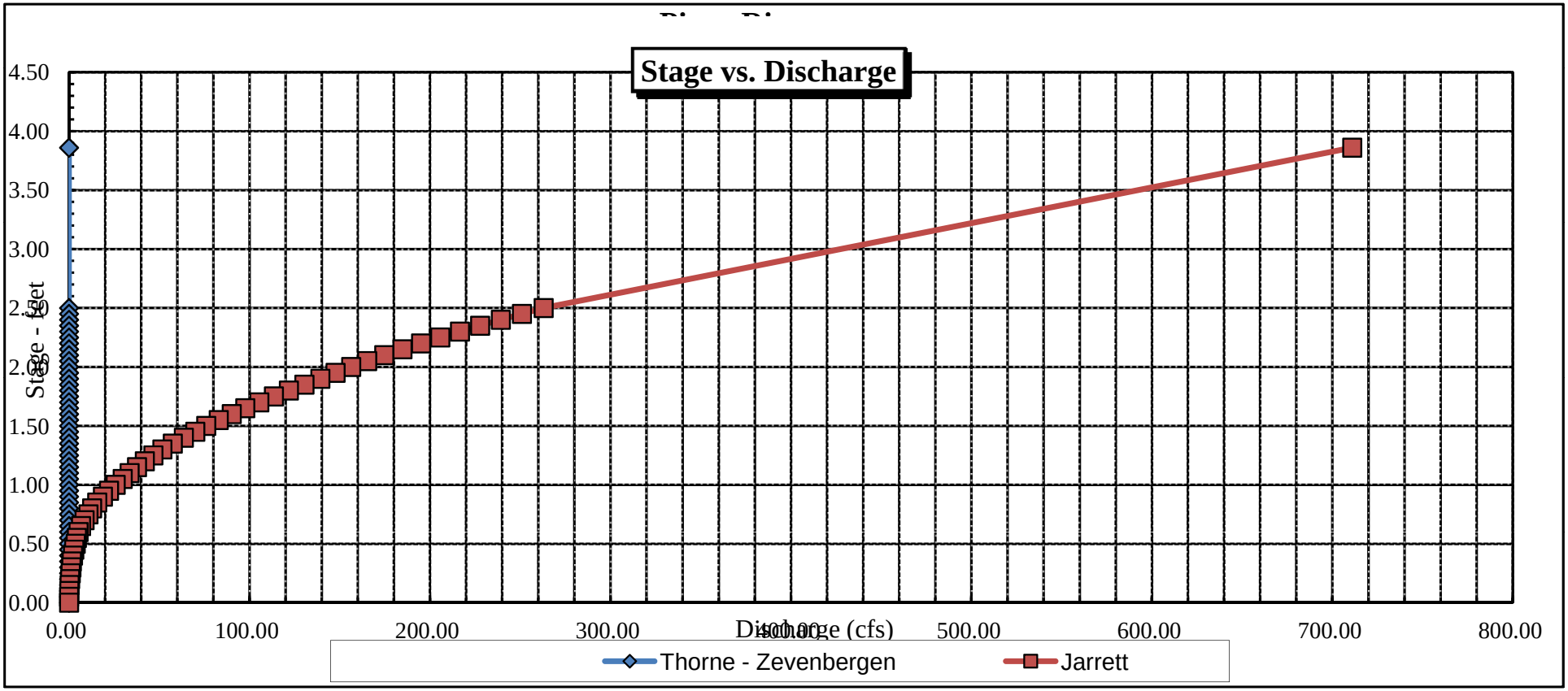
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.24	57.68	2.76	3.86	159.38	59.07	100.0%	2.70	710.99	4.46
	4.60	49.48	1.74	2.50	86.01	50.34	85.2%	1.71	262.98	3.06
	4.65	49.11	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!


CROSS SECTION DATA ANALYSIS
LS
G
W
W
G
RS
0.50
-0.50
-1.50
-2.50
-3.50
-4.50
-5.50
-6.50
-7.50
VERTICAL DEPTH (FT)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
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
100.00
200.00
300.00
500.00
600.00
700.00
800.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
Velocity - ft/sec
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
100.00
200.00
300.00
500.00
600.00
700.00
800.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piney River						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: Approx. 0.5 mile upstream from confluence w/ Colorado River						
DATE: 7-23-15	OBSERVERS: R. Smith, P. Adams					
LEGAL DESCRIPTION	¼ SECTION: SW	SECTION: 25	TOWNSHIP: 2 N/S	RANGE: 83 E/W	PM: 6th	
COUNTY: Eagle	WATERSHED: Colo. R.	WATER DIVISION: 5	DOW WATER CODE: 21535			
MAP(S): USGS:			135 359819			
USFS:			6765 ft. 4412491			

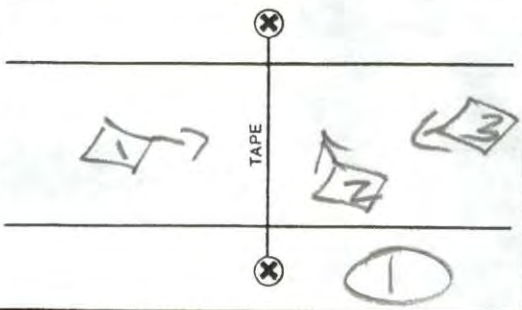
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: M-M			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: surveyed ____ lbs/foot	TAPE TENSION: surveyed ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: 2" cobble to 2-foot	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	4.8/4.8
② WS Upstream	59.0'	4.36
③ WS Downstream	53.0'	5.64
SLOPE	1.26/112.0' ≈ .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:

mayfly, caddisfly (super abundant), worms, beetles

COMMENTS

Cross section at first spruce on east bank upstream from cut on east bank. / Riparian = Alder, Dogwood, Spruce, Narrowleaf Cottonwood

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Piney River | CROSS-SECTION NO.: 2 | DATE: 7-23-14 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: _____ ft | TIME: 11:30 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 (ft^2)	Discharge (cfs)
RS	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	.95				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				.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: 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:	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

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:	0.011

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	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
RS	0.00	1.68			0.00		0.00	0.00	0.0%
1 G	5.80	2.02			0.00		0.00	0.00	0.0%
	6.00	3.01			0.00		0.00	0.00	0.0%
	8.00	3.56			0.00		0.00	0.00	0.0%
	11.00	3.84			0.00		0.00	0.00	0.0%
	12.50	4.32			0.00		0.00	0.00	0.0%
W	13.70	4.80	0.00	0.00	0.00		0.00	0.00	0.0%
	16.00	5.05	0.25	0.00	2.31	0.25	0.54	0.00	0.0%
	18.00	5.30	0.50	1.56	2.02	0.50	1.00	1.56	2.1%
	20.00	5.60	0.80	0.85	2.02	0.80	1.60	1.36	1.8%
	22.00	5.60	0.80	1.16	2.00	0.80	1.60	1.86	2.5%
	24.00	5.90	1.10	1.04	2.02	1.10	2.20	2.29	3.0%
	26.00	5.90	1.10	0.42	2.00	1.10	2.20	0.92	1.2%
	28.00	5.45	0.65	2.42	2.05	0.65	1.30	3.15	4.2%
	30.00	5.90	1.10	2.62	2.05	1.10	2.20	5.76	7.6%
	32.00	5.80	1.00	2.82	2.00	1.00	2.00	5.64	7.5%
	34.00	5.90	1.10	2.74	2.00	1.10	2.20	6.03	8.0%
	36.00	5.80	1.00	1.35	2.00	1.00	2.00	2.70	3.6%
	38.00	5.50	0.70	2.26	2.02	0.70	1.40	3.16	4.2%
	40.00	5.80	1.00	2.26	2.02	1.00	2.00	4.52	6.0%
	42.00	5.80	1.00	2.31	2.00	1.00	2.00	4.62	6.1%
	44.00	5.90	1.10	1.74	2.00	1.10	2.20	3.83	5.1%
	46.00	5.10	0.30	1.68	2.15	0.30	0.60	1.01	1.3%
	48.00	5.60	0.80	2.28	2.06	0.80	1.60	3.65	4.8%
	50.00	5.35	0.55	1.81	2.02	0.55	1.10	1.99	2.6%
	52.00	5.80	1.00	0.98	2.05	1.00	2.00	1.96	2.6%
	54.00	5.90	1.10	1.49	2.00	1.10	2.20	3.28	4.3%
	56.00	5.80	1.00	1.22	2.00	1.00	2.00	2.44	3.2%
	58.00	5.75	0.95	1.85	2.00	0.95	1.90	3.52	4.6%
	60.00	5.10	0.30	2.70	2.10	0.30	0.60	1.62	2.1%
	62.00	5.35	0.55	2.70	2.02	0.55	1.10	2.97	3.9%
	64.00	5.50	0.70	0.01	2.01	0.70	1.40	0.01	0.0%
	66.00	5.60	0.80	1.56	2.00	0.80	1.60	2.50	3.3%
	68.00	5.55	0.75	1.95	2.00	0.75	1.50	2.93	3.9%
	70.00	5.10	0.30	0.54	2.05	0.30	0.71	0.38	0.5%
W	72.70	4.80	0.00	0.00	2.72		0.00	0.00	0.0%
	74.70	4.33			0.00		0.00	0.00	0.0%
	76.80	3.63			0.00		0.00	0.00	0.0%
	79.60	2.60			0.00		0.00	0.00	0.0%
1 LS & G	80.80	1.98			0.00		0.00	0.00	0.0%
TOTALS ----------					59.71	1.1 (Max.)	44.74	75.64	100.0%

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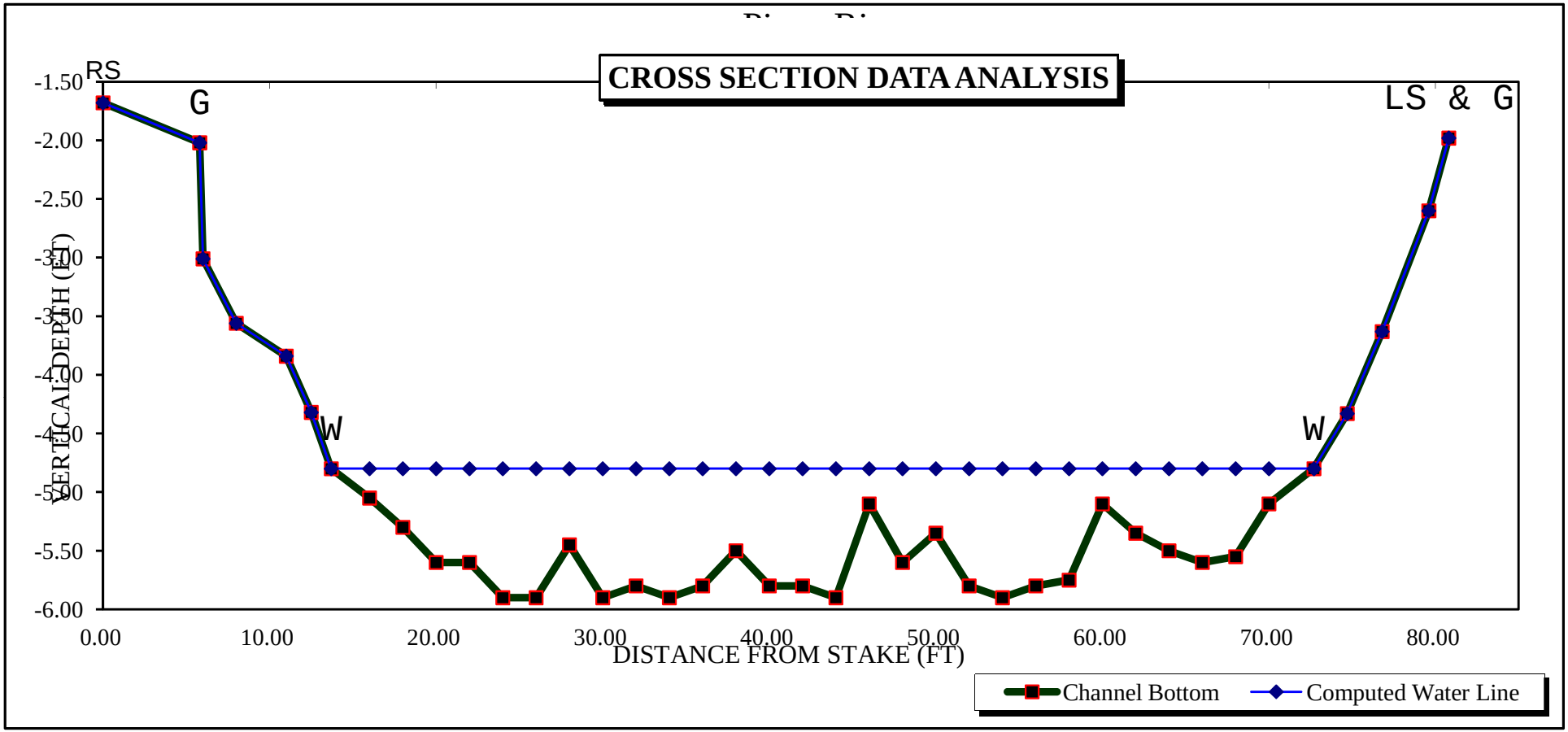
RECOMMENDATION BY: ……………………………………………… AGENCY……………………………………………… DATE:………………………

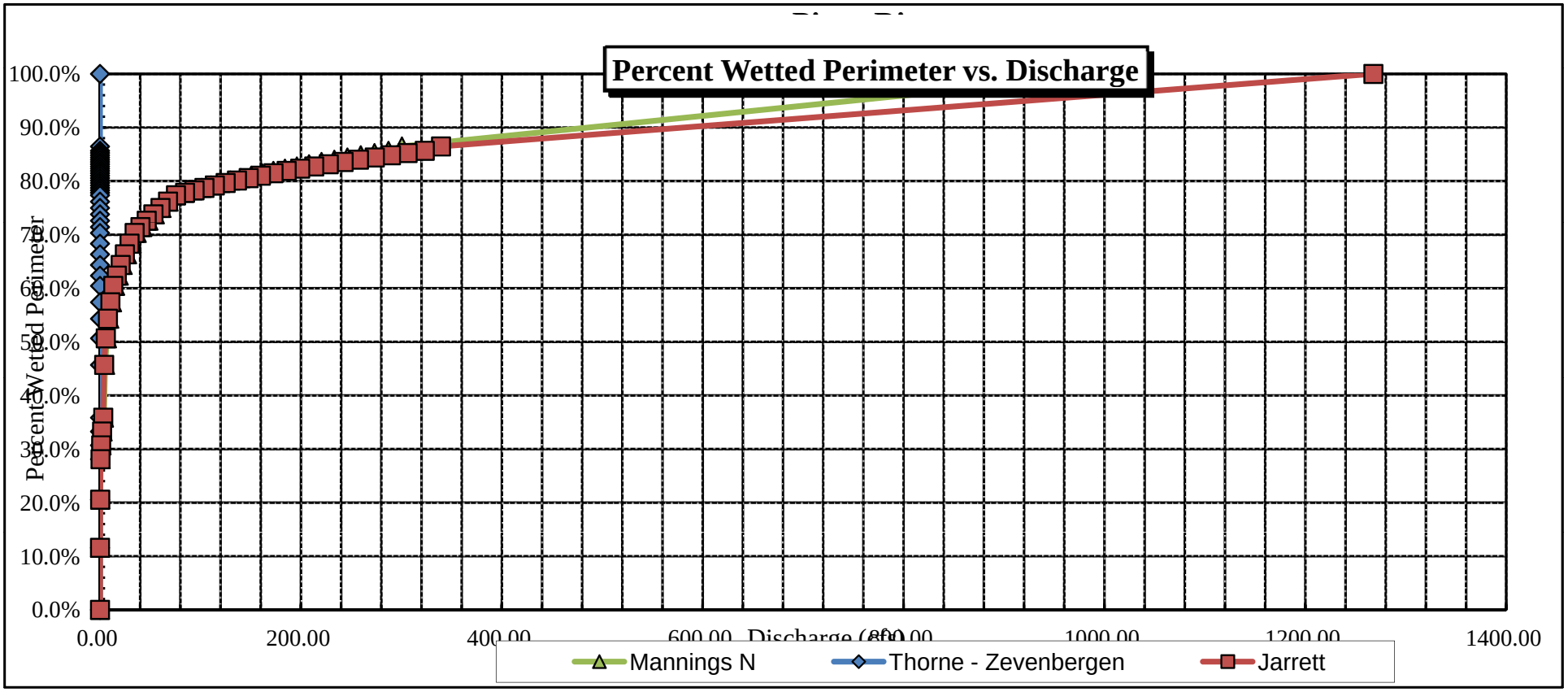
CWCB REVIEW BY: ………………………………………………………………………………………………… DATE:………………………

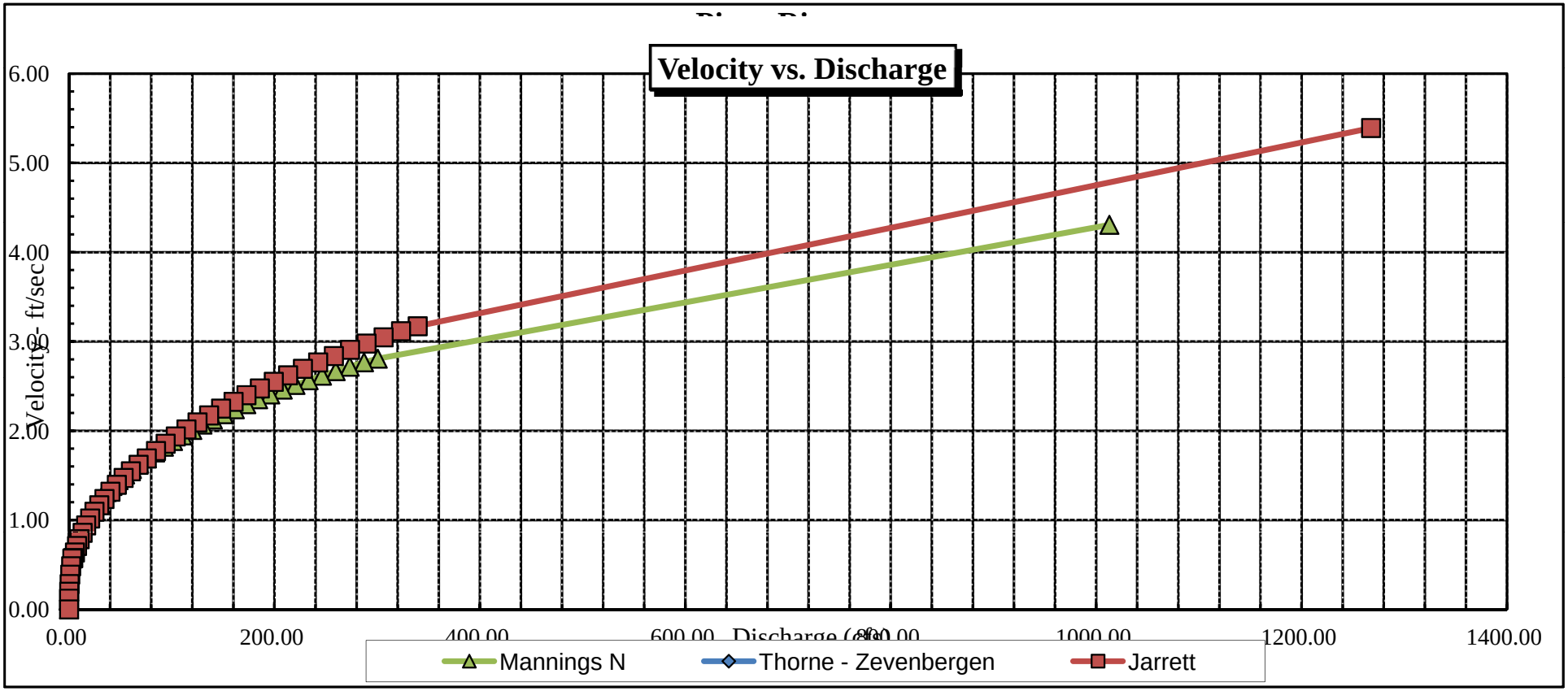
STREAM NAME: Piney River
XS LOCATION: Approx .5 mi upst fr conf w CO River
XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

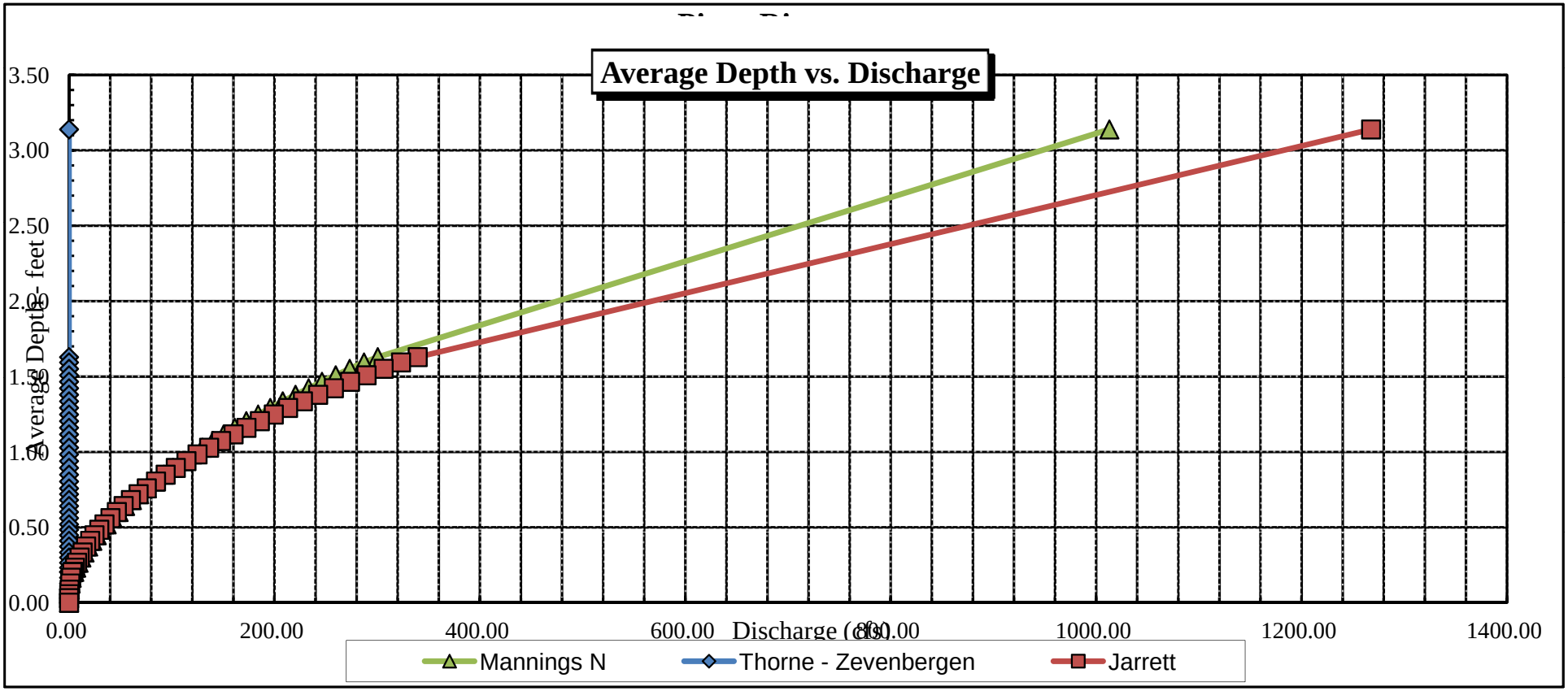
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

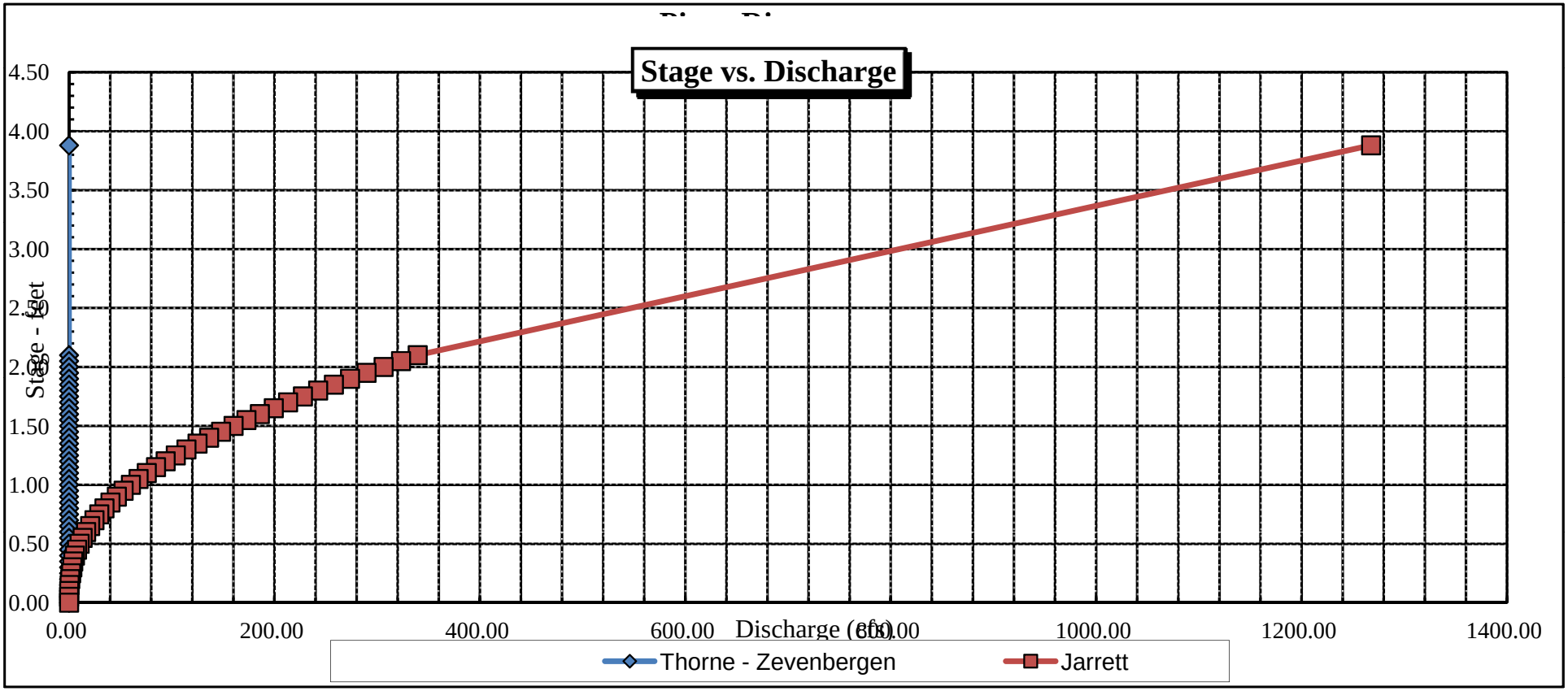
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	2.02	74.92	3.14	3.88	235.17	77.19	100.0%	3.05	1267.70	5.39
	3.80	65.72	1.63	2.10	107.03	66.74	86.5%	1.60	339.45	3.17
	3.85	65.11	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!


CROSS SECTION DATA ANALYSIS
RS
G
W
W
LS & G
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
-4.50
-5.00
-5.50
-6.00
VERTICAL DEPTH (FT)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
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
200.00
400.00
600.00
Discharge (cfs)
1000.00
1200.00
1400.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Velocity - ft/sec
0.00
200.00
400.00
600.00
800.00
1000.00
1200.00
1400.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
200.00
400.00
600.00
800.00
1000.00
1200.00
1400.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
200.00
400.00
600.00
800.00
1000.00
1200.00
1400.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piney River						CROSS-SECTION NO.: 1
CROSS-SECTION LOCATION: Approx. 0.5 miles upstream from confl. with Colorado River						
DATE: 9-16-15	OBSERVERS: R. Smith, P. Adams					
LEGAL DESCRIPTION	¼ SECTION: SW	SECTION: 25	TOWNSHIP: 2 N/S	RANGE: 83 E/W	PM: 6th	
COUNTY: Eagle	WATERSHED: Colorado R.	WATER DIVISION: 5	DOW WATER CODE: 21535			
MAP(S): USGS:					359819	
USFS:					6,765 ft. 44/249	

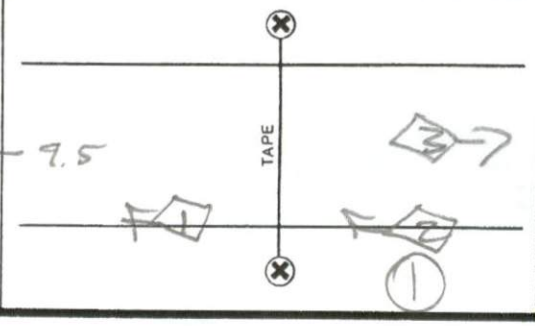
SUPPLEMENTAL DATA

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: 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: 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: 12:30 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)
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				Ø			
	39		5.80	.65				1.18			
	37		5.65	.50				1.38			
	35		5.75	.60				.57			
	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	<1.04		
	19		5.65	.50				.36			
	17		5.15	Ø				Ø			
	15		5.75	.60				1.03			
	13		5.45	.30				.63			
	11		5.20	.05				Ø			
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								
RS	0		2.10								
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 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
TAPE WT:	0.0106	with a survey level and rod
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%
		73.80	3.26			0.00		0.00	0.00	0.0%
1	G	75.00	2.38			0.00		0.00	0.00	0.0%
	LS	76.40	1.42			0.00		0.00	0.00	0.0%
	TOTALS ----------					57.85	0.9 (Max.)	29.45	31.56	100.0%

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

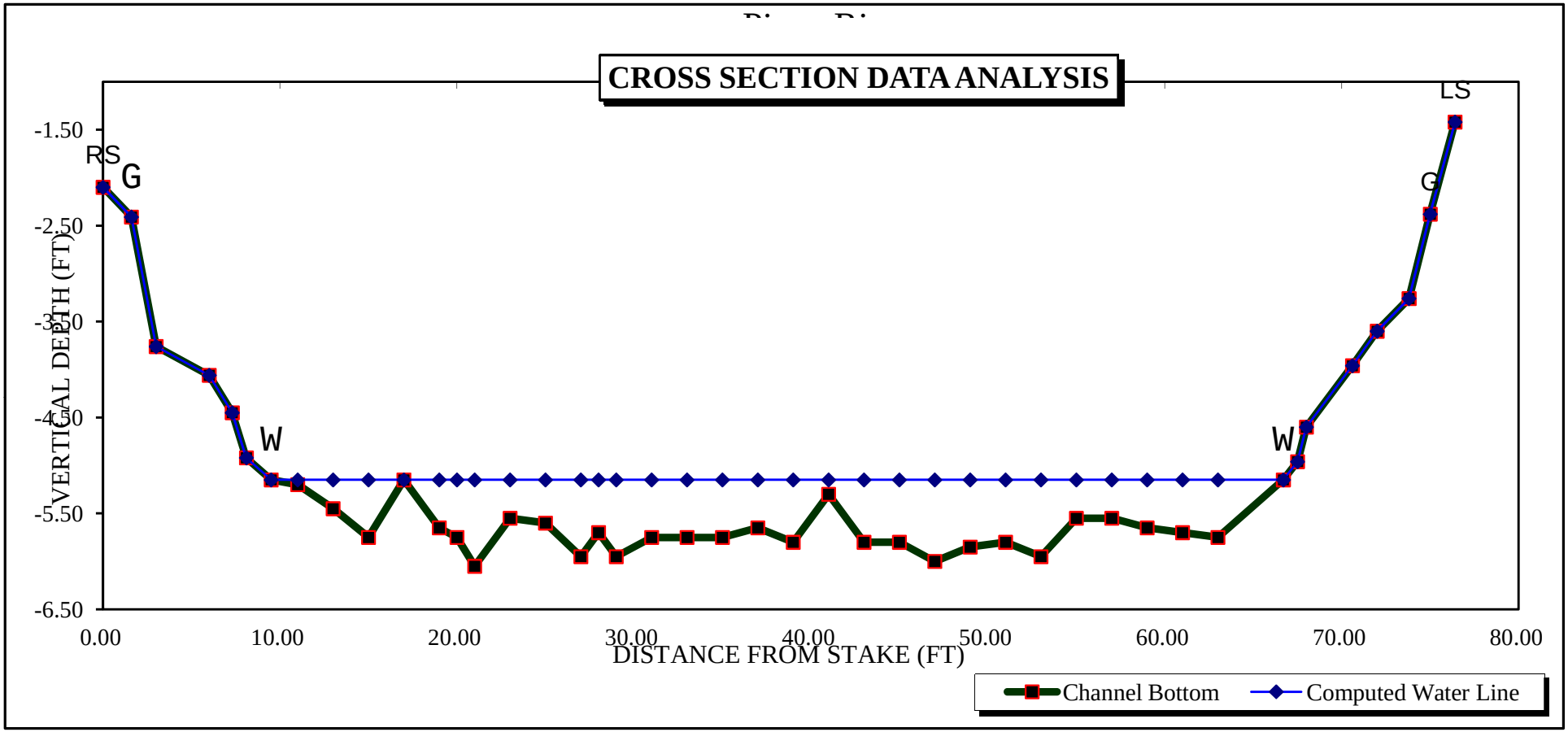
RECOMMENDATION BY: ……………………..………..……............................... AGENCY..…………………………......……....…....……....... DATE:.......…...…......……………

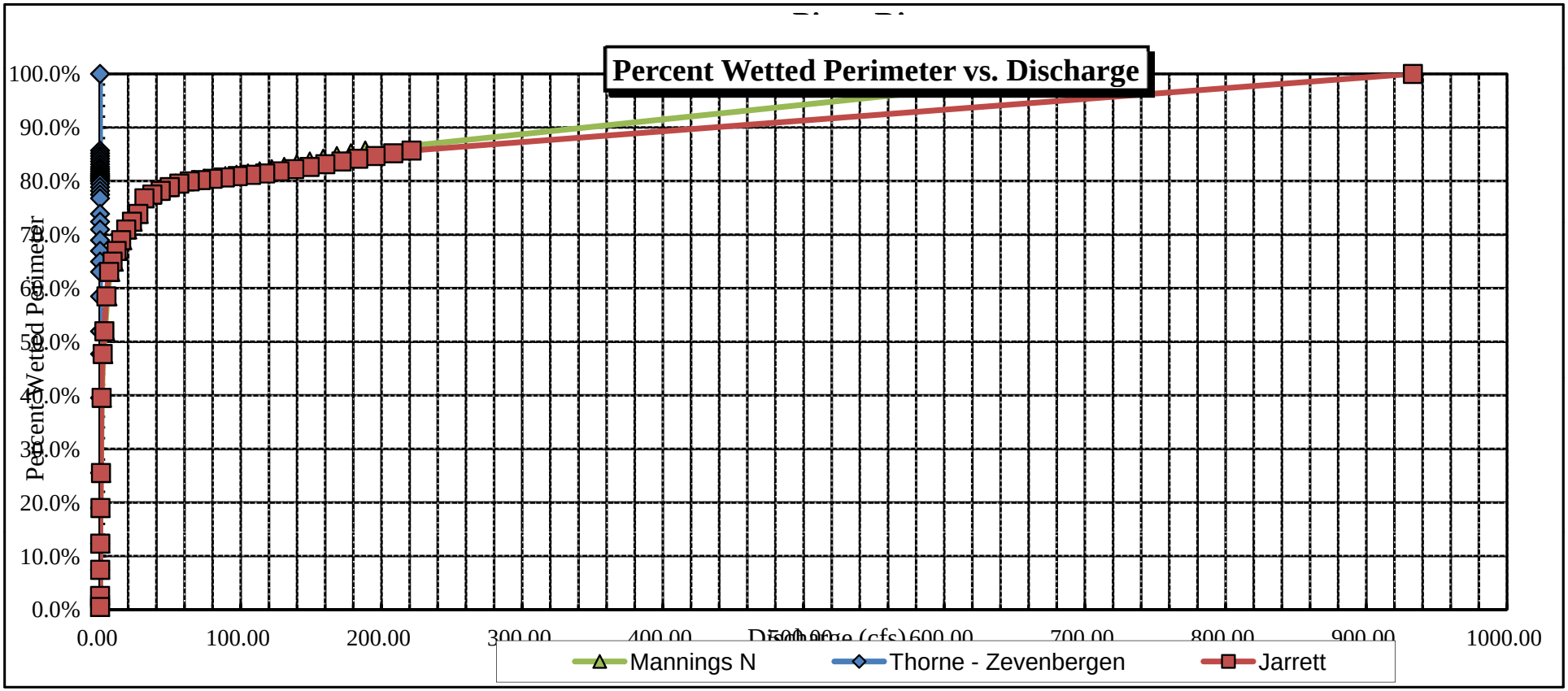
CWCB REVIEW BY: ..……………………………....…………………………………………………...…............. DATE:.................….……………...…

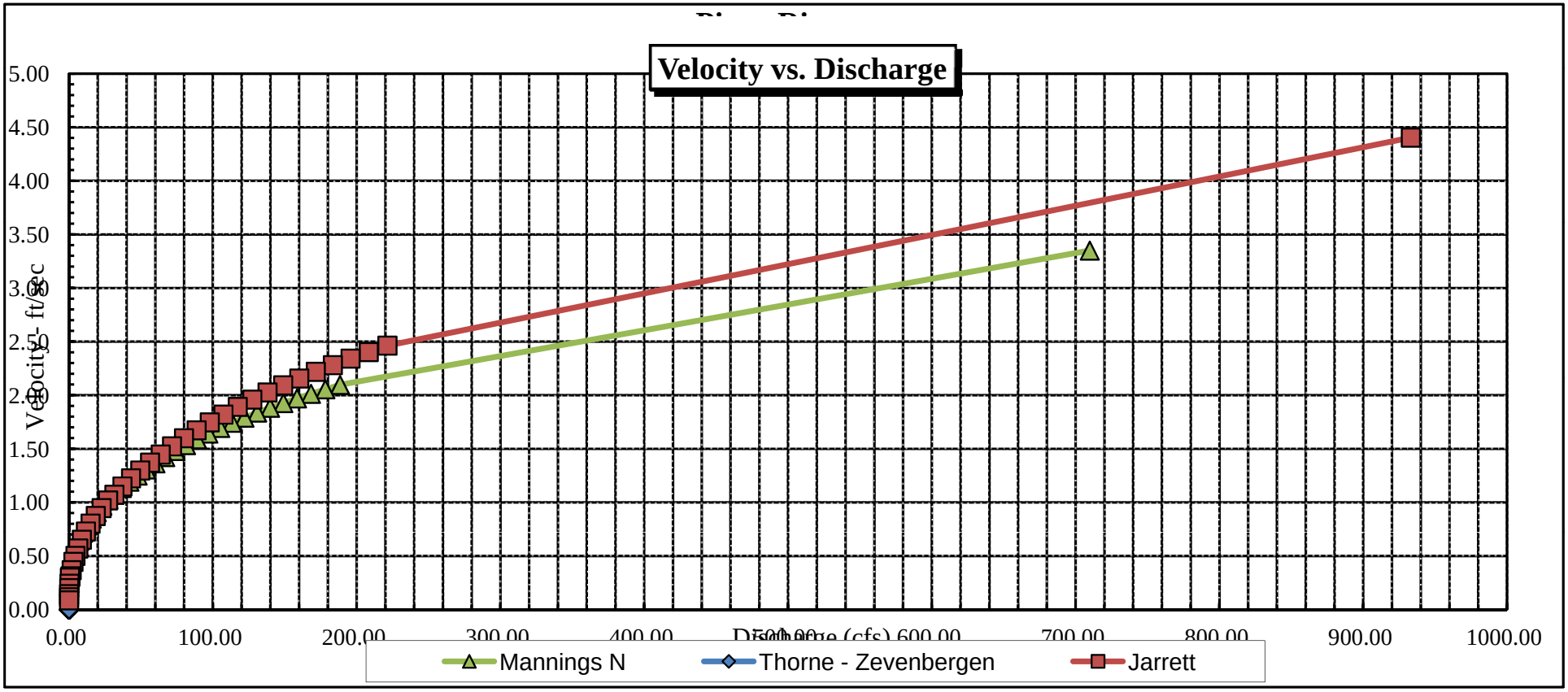
STREAM NAME: Piney River
XS LOCATION: 0.5 mi from conf with Colorado River
XS NUMBER: 1 Jarrett Variable Manning's n Correction Applied

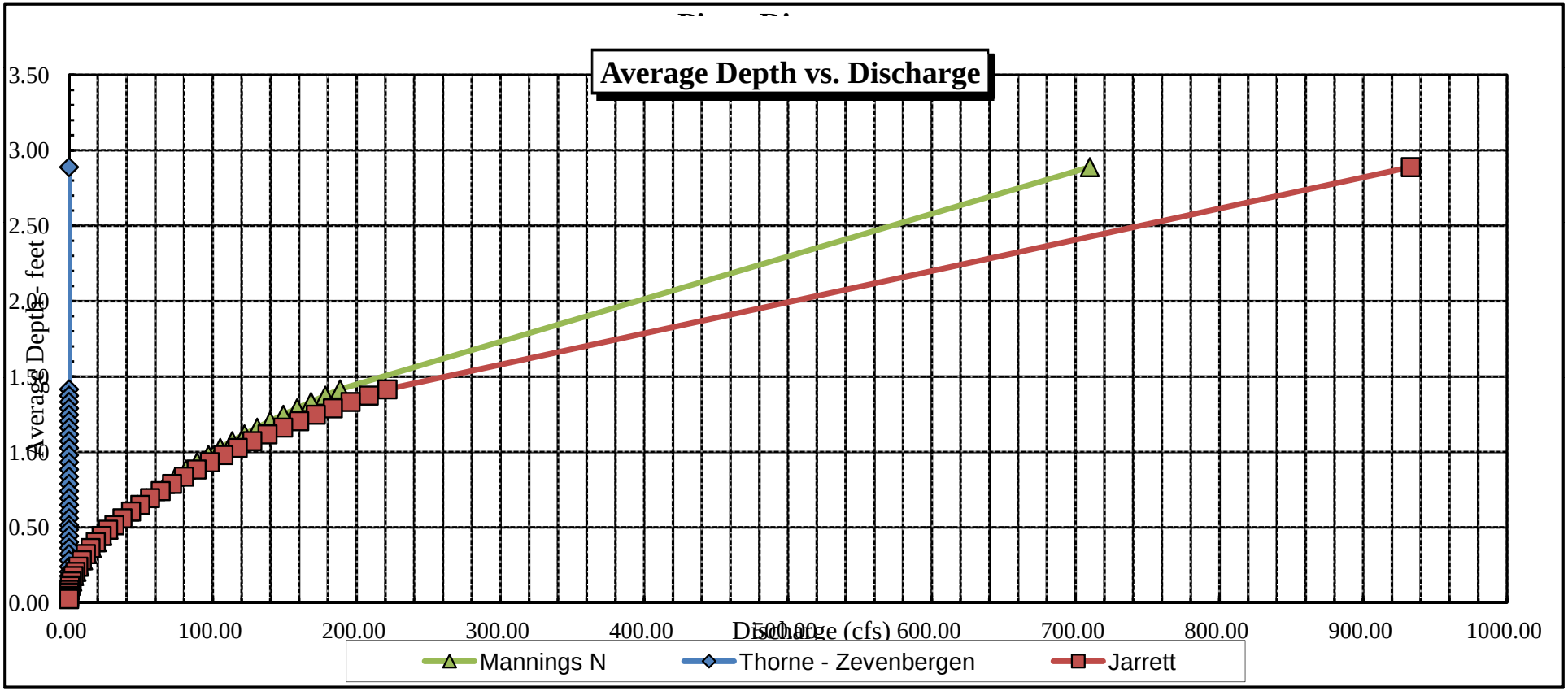
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

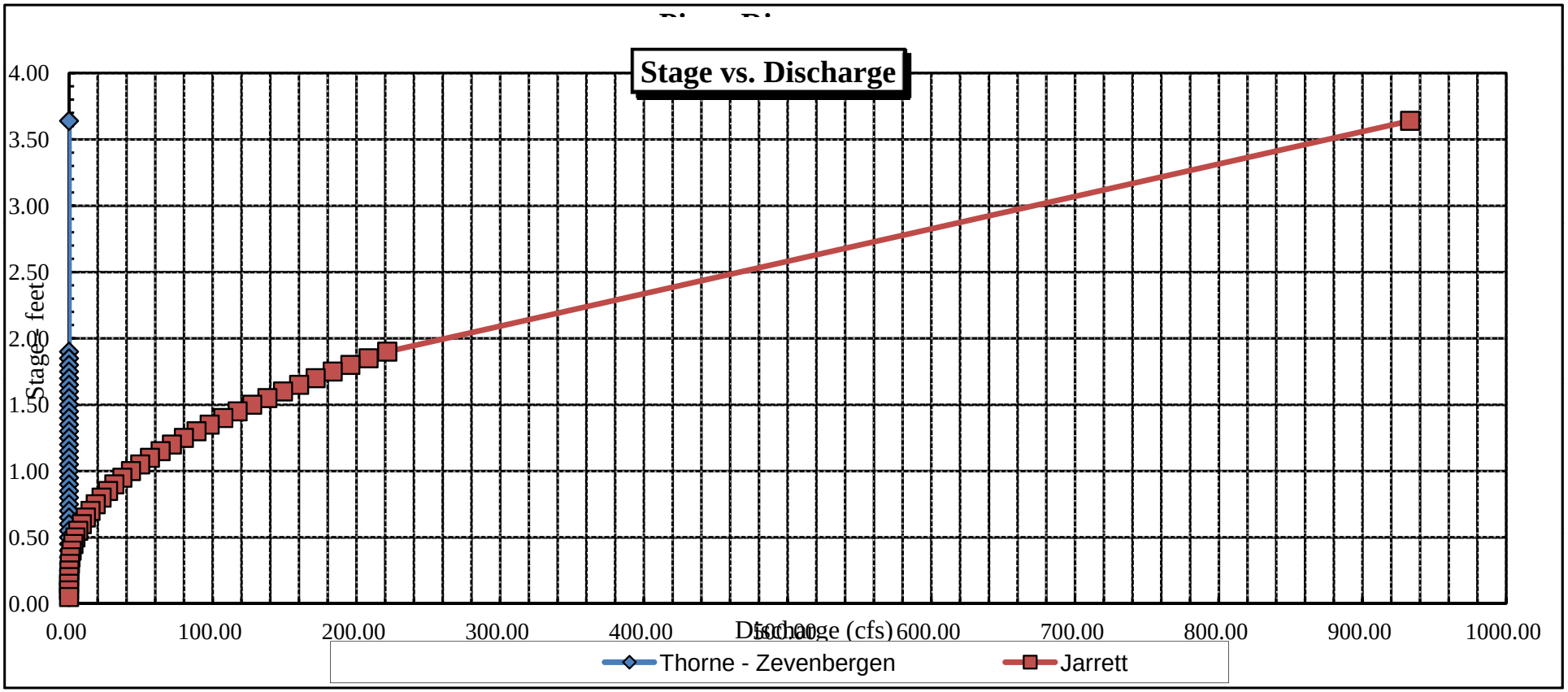
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	2.41	73.36	2.89	3.64	211.93	75.34	100.0%	2.81	933.11	4.40
	4.15	63.53	1.42	1.90	89.91	64.56	85.7%	1.39	221.42	2.46
	4.20	63.16	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


CROSS SECTION DATA ANALYSIS
VERTICAL DEPTH (FT)
-1.50
-2.50
-3.50
-4.50
-5.50
-6.50
RS
G
W
W
G
LS
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
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
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
900.00
1000.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
Velocity - ft/sec
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
900.00
1000.00
Mannings N
Thorne - Zevenbergen
Jarrett


Average Depth vs. Discharge
Average Depth - feet
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
900.00
1000.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
900.00
1000.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Piney River						CROSS-SECTION NO.: 2
CROSS-SECTION LOCATION: Approx. 0.5 mile upstream from confluence with Colorado River						
DATE: 9-16-15	OBSERVERS: R. Smith, P. Adams					
LEGAL DESCRIPTION	¼ SECTION: SW	SECTION: 25	TOWNSHIP: 2 N/S	RANGE: 83 E/W	PM: 6th	
COUNTY: Eagle	WATERSHED: Colorado River	WATER DIVISION: 5	DOW WATER CODE: 21535			
MAP(S): USGS:						
USFS:						

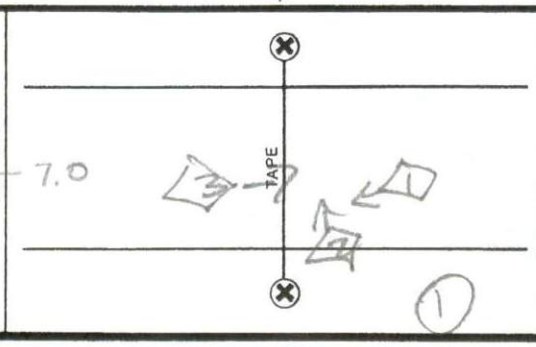
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: (YES) NO	METER TYPE: M-H			
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: surveyed _____ lbs/foot	TAPE TENSION: surveyed _____ lbs
CHANNEL BED MATERIAL SIZE RANGE: 4" cobble to 2-foot boulder	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 — 5.35/4.35 — 7.0	
② WS Upstream	107.8	4.58
③ WS Downstream	40.0	6.17
SLOPE	1.59 / 147.8 = 0.011	

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

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) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
LS	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				∅			
	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				∅			
	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				.07			
	62		5.95	.6				.63			
	64		5.55	.2				∅			
	66		5.65	.3				.42			
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
TAPE WT:	0.0106	with a survey level and rod
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
	RS	0.00	1.78			0.00		0.00	0.00	0.0%
1	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 (Max.)	31.36	32.22	100.0%

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

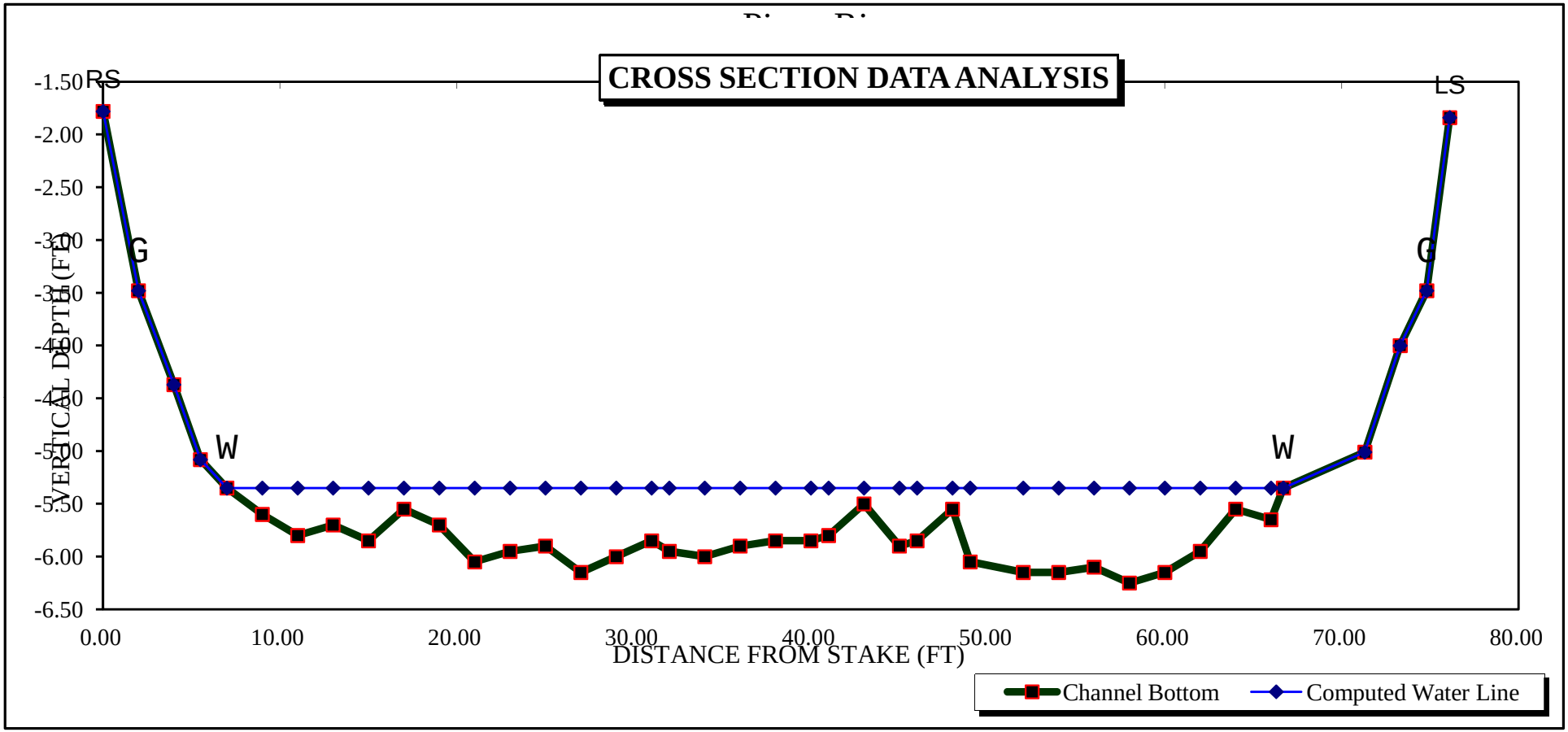
RECOMMENDATION BY: …………………...………..……............................... AGENCY...……………………......……......…......……....... DATE:.......…....…......……………

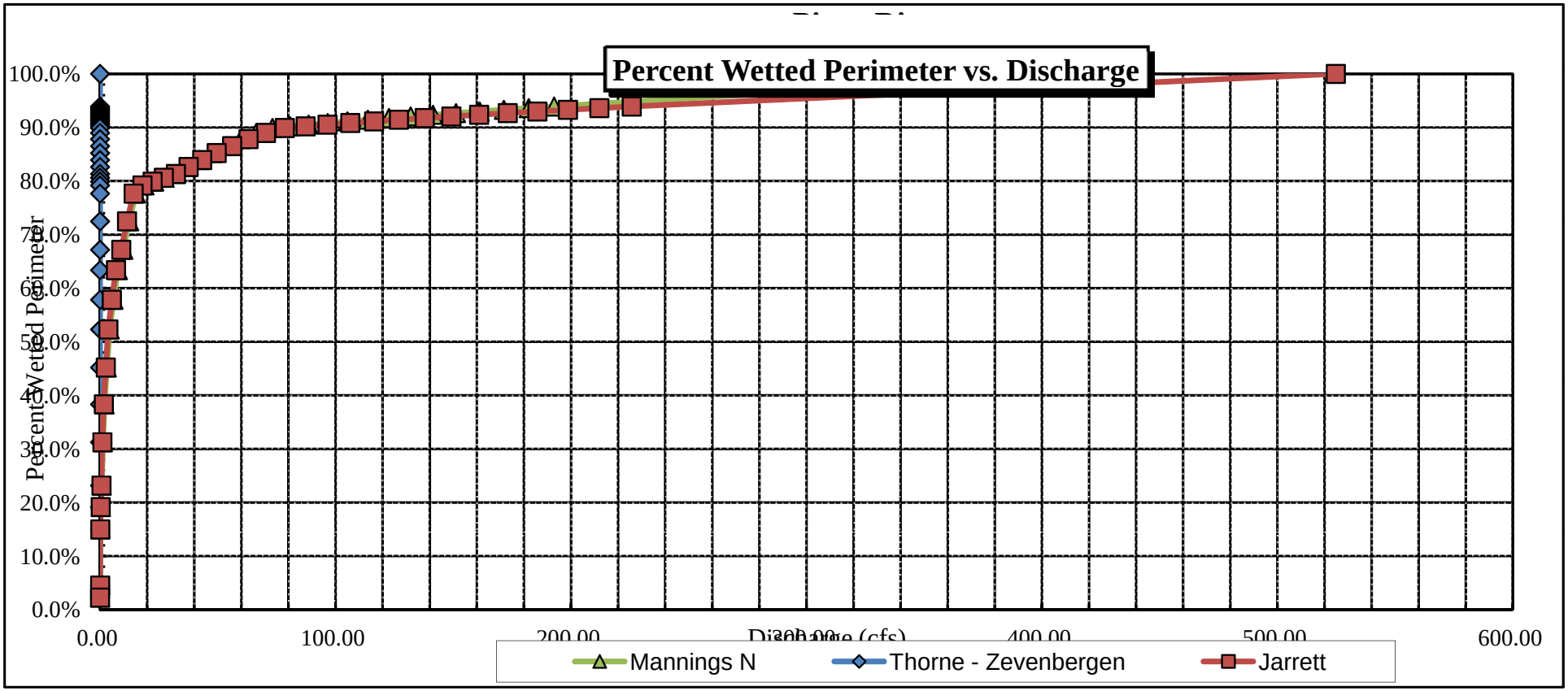
CWCB REVIEW BY: ...…………………………......……………………………………………………...……............. DATE:.................…………….....…

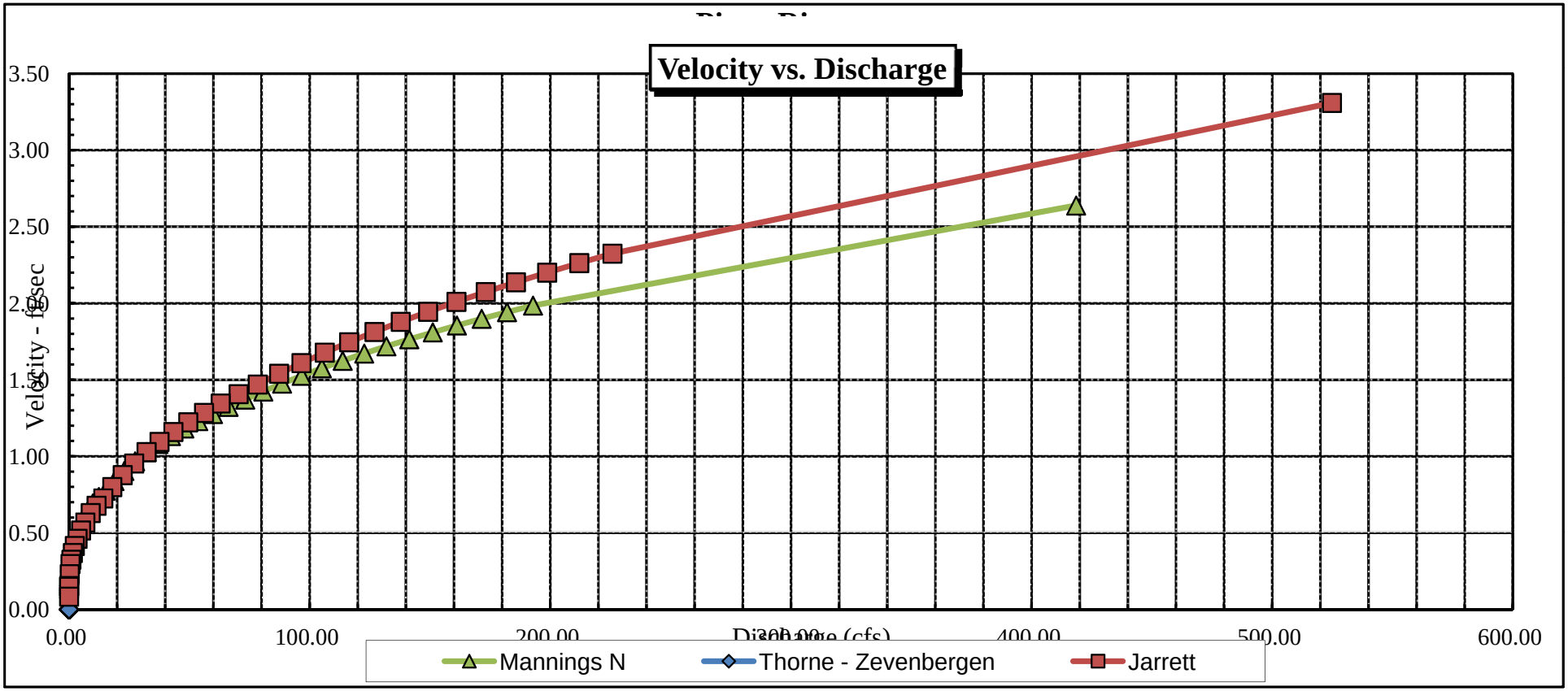
STREAM NAME: Piney River
XS LOCATION: 0.5 mile from confluence w Colorado R.
XS NUMBER: 2 Jarrett Variable Manning's n Correction Applied

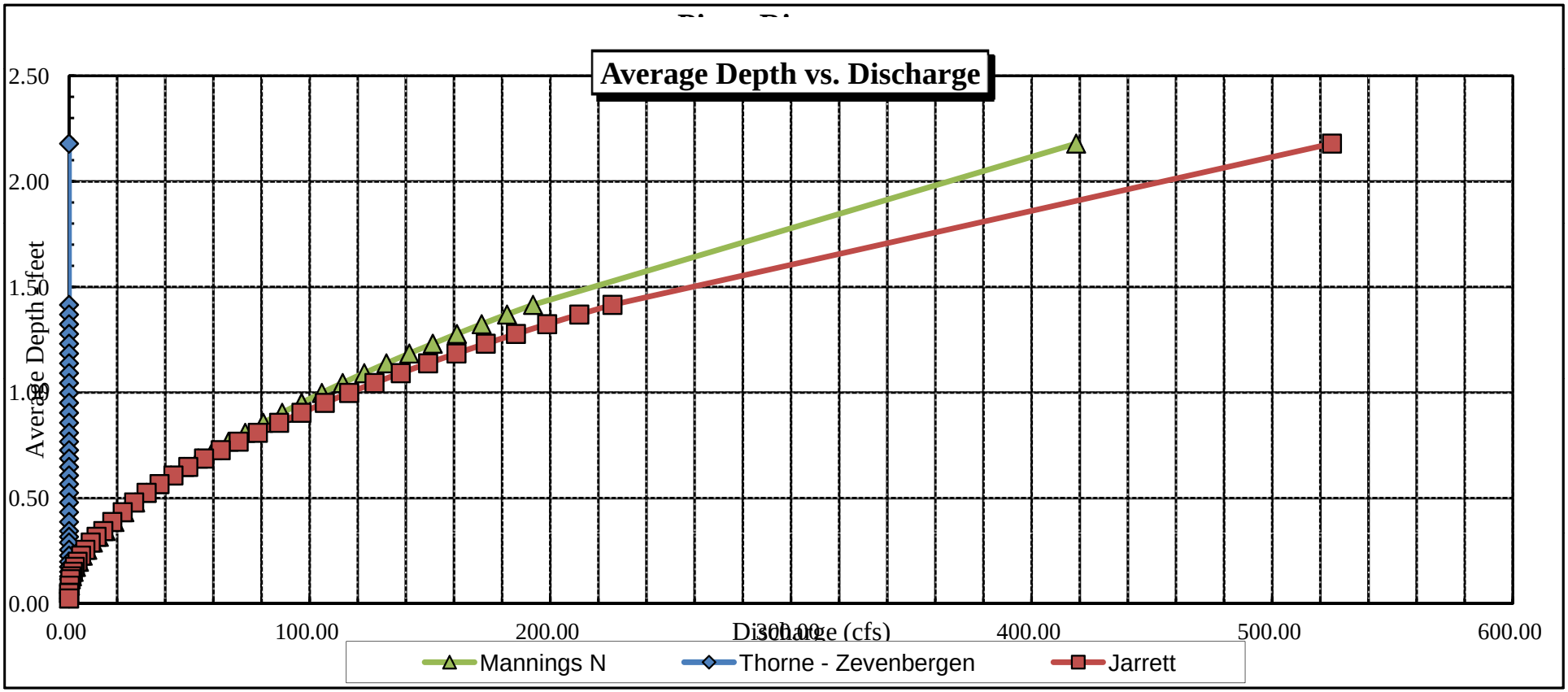
GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

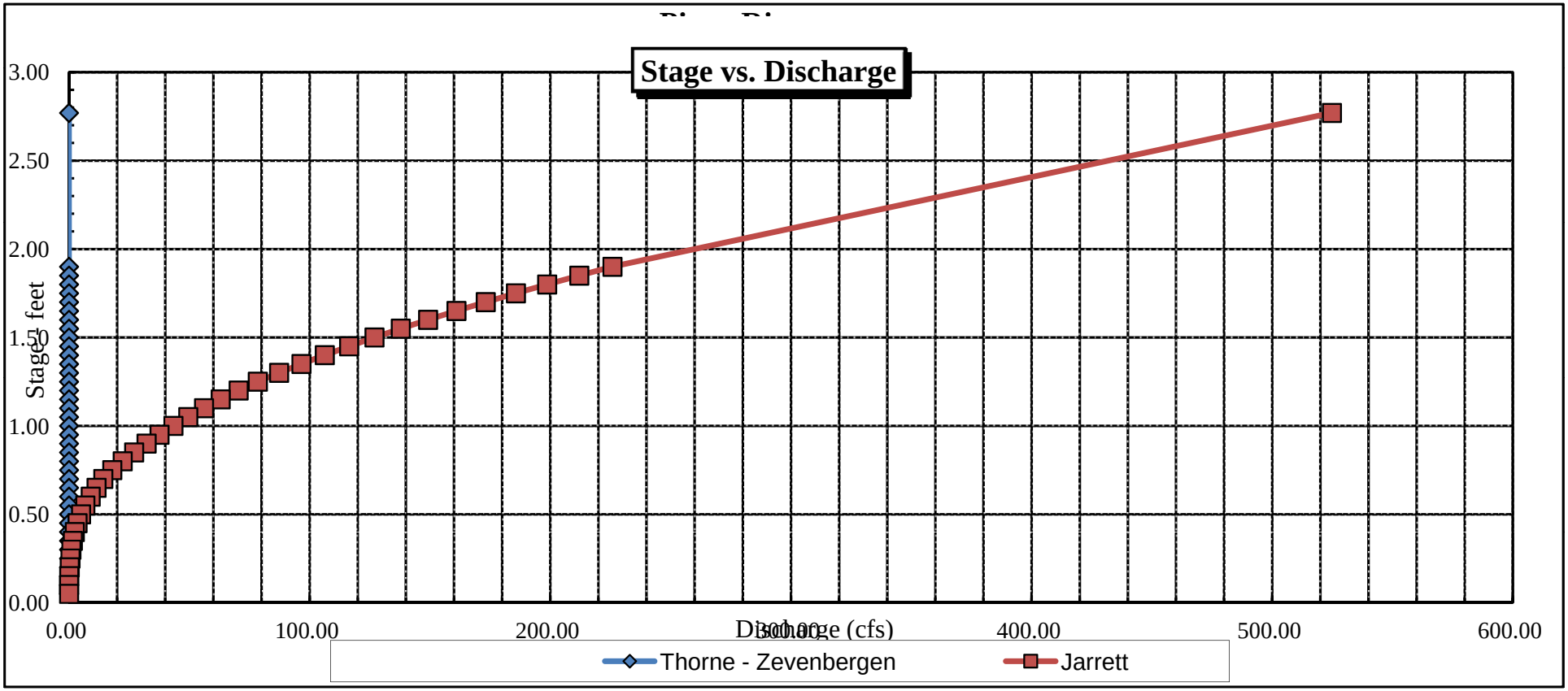
	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	3.48	72.80	2.18	2.77	158.62	73.97	100.0%	2.14	524.81	3.31
	4.35	68.65	1.42	1.90	97.16	69.47	93.9%	1.40	225.81	2.32
	4.40	68.44	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


CROSS SECTION DATA ANALYSIS
RS
LS
G
G
W
W
-1.50
-2.00
-2.50
-3.00
-3.50
-4.00
-4.50
-5.00
-5.50
-6.00
-6.50
VERTICAL DEPTH (FT)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
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
100.00
200.00
400.00
500.00
600.00
Mannings N
Thorne - Zevenbergen
Jarrett


Velocity vs. Discharge
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.00
100.00
200.00
300.00
400.00
500.00
600.00
Mannings N
Thorne - Zevenbergen
Jarrett

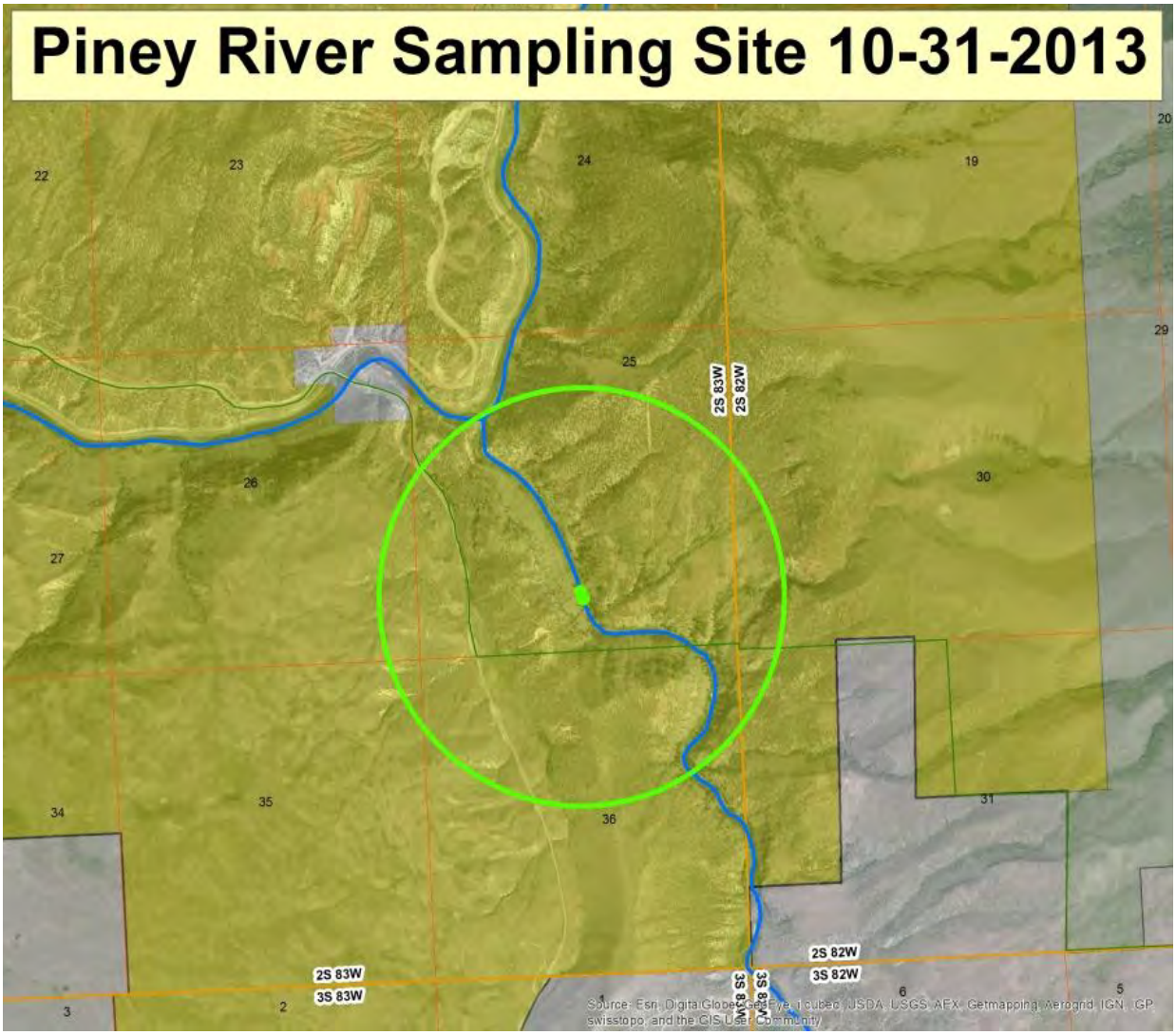

Average Depth vs. Discharge
Average Depth (feet
2.50
2.00
1.50
1.00
0.50
0.00
0.00
100.00
200.00
300.00
400.00
500.00
600.00
Discharge (cfs)
Mannings N
Thorne - Zevenbergen
Jarrett


Stage vs. Discharge
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Stage - feet
0.00
100.00
200.00
300.00
400.00
500.00
600.00
Discharge (cfs)
Thorne - Zevenbergen
Jarrett

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

Discharge Measurment Field Visit Data Report *(Filters: Name begins with Piney; Processing Status = Moving Forward;)*

Div	Name	CWCB Case Number	Segment ID	Meas. Date	UTM	Location	Flow Amount (cfs)	Meas #	Rating	Station ID
5	Piney River		17/5/A-001	08/10/2016	UTMx: 360030.8728 UTMy: 4411974.4190	Piney River At BLM Road Crossing	39.72	.001	Fair (<=8%)	PINRATTD
5	Piney River		17/5/A-001	09/21/2016	UTMx: 360023.6716 UTMy: 4412015.8550	Piney River At BLM Road	18.41	.002	Poor (>8%)	PINRATRD

General Site Field Visit Data Report *(Filters: Name begins with Piney;)*

Type		Div	Name	CWCB Case Number	Segment ID	Visit Date	Location Description
Stream		5	Piney River		17/5/A-001	8/10/2016	Piney River

Remarks

Date	Remark
10/08/16 12:50	Arrive Piney River road.
10/08/16 13:00	Arrive Piney River BLM road bridge crossing.
10/08/16 13:52	Set up discharge measurement, Piney River at BLM Road Crossing (PINRATTD).

GPS Log

GPS Date	Device	GPSPoint Name	Latitude	Longitude	UTM Zone	UTM Easting	UTMNorthing	Horizontal Accuracy
10/08/16 13:05	Phone (BJE)	PR001	39.846733	-106.636203				10.000000

Photo Log

Photo Date	Camera	Media Type	Photo Video ID	Caption	Photo Comment
10/08/16 13:06	iPhone (BJE)	Photograph		Piney River above BLM Road Bridge Crossing	Standing on bridge, looking upstream.
Link: https://1b679d435a9c0cb855a4-5e783ede762bf508243fd6d1ba1484df.ssl.cf2.rackcdn.com/iformbuilder.com/461577/_data461577_cwcb_general_subform_photos/field_212382560582b9487953d0.jpg					
10/08/16 13:09	Panasonic Lumix DMC-TS2 (BJE)	Photograph	721	Piney River at BLM Road Bridge Crossing	Standing on bridge, looking upstream.
Link:					
10/08/16 13:09	Panasonic Lumix DMC-TS2 (BJE)	Photograph	722	Piney River at BLM Road Bridge	Standing on bridge, looking downstream
Link:					
10/08/16 13:14	Panasonic Lumix DMC-TS2 (BJE)	Video	723	Video of Piney River above BLM Road Bridge Crossin	
Link:					
10/08/16 15:21	iPhone (BJE)	Photograph		Discharge measurement cross-section	Taken from center of channel downstream, looking
Link: https://1b679d435a9c0cb855a4-5e783ede762bf508243fd6d1ba1484df.ssl.cf2.rackcdn.com/iformbuilder.com/461577/_data461577_cwcb_general_subform_photos/field_622338328582b948d040e7.jpg					
10/08/16 16:05	iPhone (BJE)	Photograph		Proposed Lower Terminus	Piney River flowing, from picture bottom, grayish-gr Colorado River.
Link: https://1b679d435a9c0cb855a4-5e783ede762bf508243fd6d1ba1484df.ssl.cf2.rackcdn.com/iformbuilder.com/461577/_data461577_cwcb_general_subform_photos/field_502418997582b948e76592.jpg					

GPSDescription
Piney River BLM Road bridge crossing. Photos taken at 11:06 and 11:09, and video taken at 11:14 are from this location.
upstream.
een, into

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Colorado Water Conservation Board
Department of Natural Resources

Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information

File Name	PINRATRD.002.WAD
Start Date and Time	2016/09/21 14:04:52

Site Details

Site Name	PINEY AT BLM ROAD
Operator(s)	BJE

System Information

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

Units (English Units)

Distance	ft
Velocity	ft/s
Area	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	4.7%
Velocity	1.9%	8.4%
Width	0.1%	0.1%
Method	2.0%	-
# Stations	2.6%	-
Overall	**4.0%**	**9.7%**

Summary

Averaging Int.	40	# Stations	19
Start Edge	REW	Total Width	9.000
Mean SNR	39.3 dB	Total Area	9.133
Mean Temp	55.87 °F	Mean Depth	1.015
Disch. Equation	Mid-Section	Mean Velocity	2.0163
		Total Discharge	**18.4138**

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	14:04	7.10	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	14:06	7.40	0.6	1.550	0.6	0.620	1.8556	1.00	1.8556	0.465	0.8624	4.7
2	14:08	7.70	0.6	1.450	0.6	0.580	1.1227	1.00	1.1227	0.435	0.4882	2.7
3	14:09	8.00	0.6	1.200	0.6	0.480	0.5666	1.00	0.5666	0.780	0.4421	2.4
4	*14:12*	*9.00*	*0.6*	*1.450*	*0.6*	*0.580*	*0.8865*	*1.00*	*0.8865*	*1.088*	*0.9643*	*5.2*
5	14:14	9.50	0.6	1.150	0.6	0.460	3.9593	1.00	3.9593	0.575	2.2765	12.4
6	14:15	10.00	0.6	1.100	0.6	0.440	3.8917	1.00	3.8917	0.550	2.1406	11.6
7	14:16	10.50	0.6	0.800	0.6	0.320	3.1490	1.00	3.1490	0.400	1.2594	6.8
8	14:17	11.00	0.6	0.600	0.6	0.240	3.2966	1.00	3.2966	0.300	0.9891	5.4
9	14:18	11.50	0.6	0.500	0.6	0.200	3.0627	1.00	3.0627	0.250	0.7657	4.2
10	14:21	12.00	0.6	1.300	0.6	0.520	2.5663	1.00	2.5663	0.650	1.6679	9.1
11	14:22	12.50	0.6	1.100	0.6	0.440	1.9928	1.00	1.9928	0.550	1.0961	6.0
12	*14:24*	*13.00*	*0.6*	*1.100*	*0.6*	*0.440*	*1.0561*	*1.00*	*1.0561*	*0.550*	*0.5809*	*3.2*
13	14:25	13.50	0.6	1.000	0.6	0.400	2.5758	1.00	2.5758	0.500	1.2879	7.0
14	14:26	14.00	0.6	1.000	0.6	0.400	2.6667	1.00	2.6667	0.500	1.3333	7.2
15	14:27	14.50	0.6	1.200	0.6	0.480	1.8806	1.00	1.8806	0.600	1.1285	6.1
16	*14:29*	*15.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.8947*	*1.00*	*0.8947*	*0.500*	*0.4473*	*2.4*
17	*14:30*	*15.50*	*0.6*	*0.800*	*0.6*	*0.320*	*1.5538*	*1.00*	*1.5538*	*0.440*	*0.6836*	*3.7*
18	14:30	16.10	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

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

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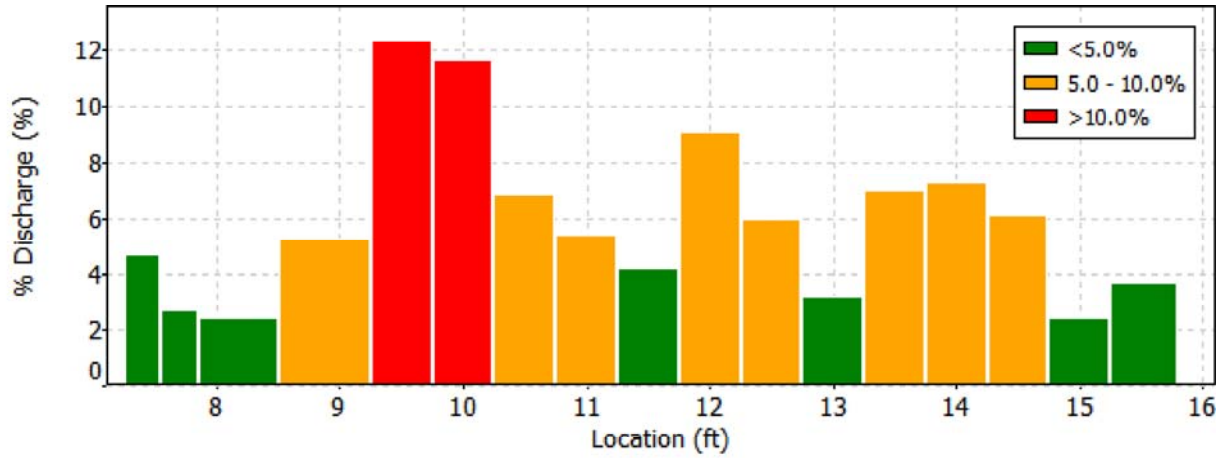
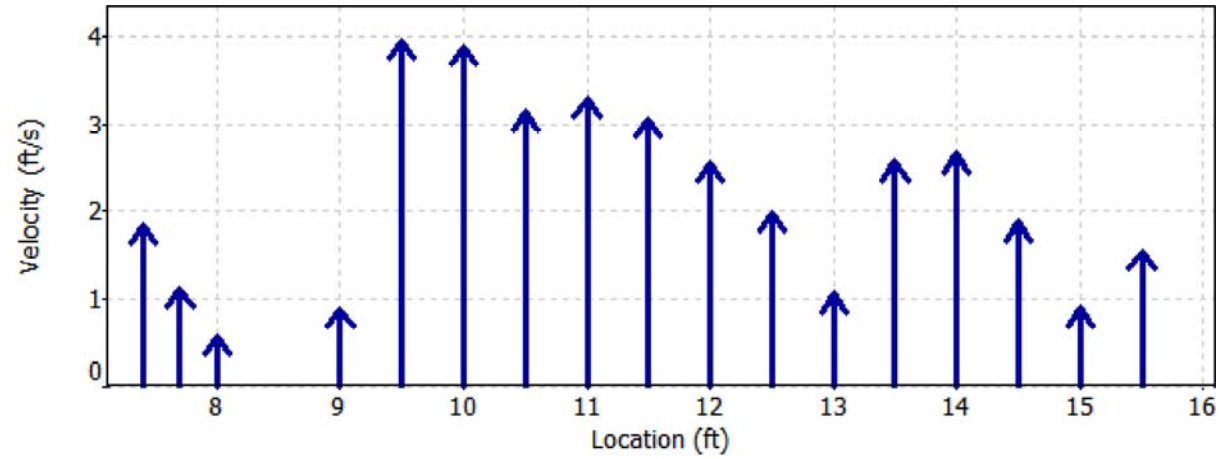
Colorado Water Conservation Board
Department of Natural Resources

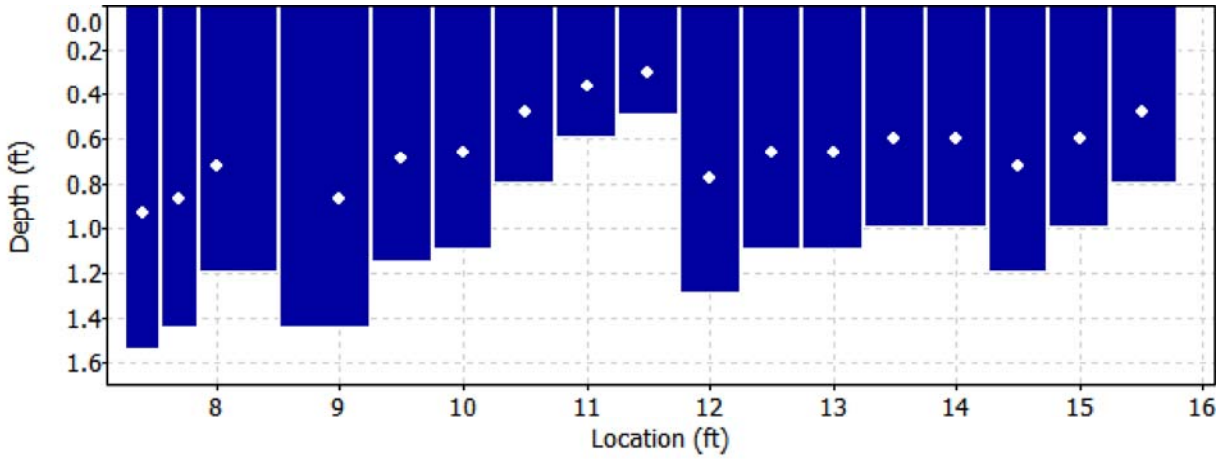
Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information		Site Details	
File Name	PINRATRD.002.WAD	Site Name	PINEY AT BLM ROAD
Start Date and Time	2016/09/21 14:04:52	Operator(s)	BJE







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Department of Natural Resources

Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information

File Name	PINRATRD.002.WAD
Start Date and Time	2016/09/21 14:04:52

Site Details

Site Name	PINEY AT BLM ROAD
Operator(s)	BJE

Quality Control

St	Loc	%Dep	Message
4	9.00	0.6	High standard error: 0.240
12	13.00	0.6	High angle: -23
16	15.00	0.6	High angle: -31
17	15.50	0.6	High angle: -30
		0.6	High standard error: 0.171

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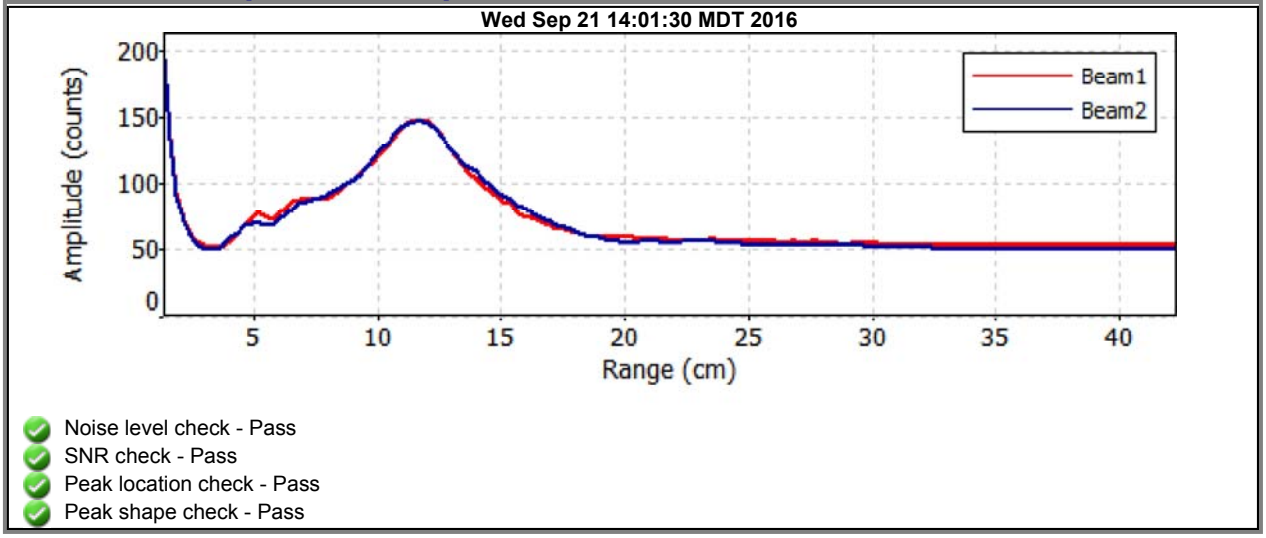
Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information		Site Details	
File Name	PINRATRD.002.WAD	Site Name	PINEY AT BLM ROAD
Start Date and Time	2016/09/21 14:04:52	Operator(s)	BJE

Automatic Quality Control Test (BeamCheck)



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

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Department of Natural Resources

Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information

File Name	PINRATRD.001.WAD
Start Date and Time	2016/08/10 12:13:17

Site Details

Site Name	PINEY RV AT BLM BRDG
Operator(s)	BRIAN EPSTEIN

System Information

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

Units (English Units)

Distance	ft
Velocity	ft/s
Area	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	4.0%
Velocity	0.8%	3.5%
Width	0.1%	0.1%
Method	1.2%	-
# Stations	1.1%	-
Overall	**2.1%**	**5.4%**

Summary

Averaging Int.	40	# Stations	49
Start Edge	REW	Total Width	33.500
Mean SNR	38.1 dB	Total Area	27.232
Mean Temp	61.24 °F	Mean Depth	0.813
Disch. Equation	Mid-Section	Mean Velocity	1.4586
		Total Discharge	**39.7214**

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Department of Natural Resources

Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information

File Name	PINRATRD.001.WAD
Start Date and Time	2016/08/10 12:13:17

Site Details

Site Name	PINEY RV AT BLM BRDG
Operator(s)	BRIAN EPSTEIN

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	12:13	9.30	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	12:13	10.30	0.6	0.900	0.6	0.360	1.4918	1.00	1.4918	0.900	1.3425	3.4
2	12:14	11.30	0.6	0.950	0.6	0.380	1.2306	1.00	1.2306	0.950	1.1693	2.9
3	12:15	12.30	0.6	1.250	0.6	0.500	0.3878	1.00	0.3878	1.250	0.4847	1.2
4	12:17	13.30	0.6	0.320	0.6	0.128	0.8862	1.00	0.8862	0.320	0.2835	0.7
5	12:18	14.30	0.6	1.200	0.6	0.480	1.2106	1.00	1.2106	1.200	1.4529	3.7
6	12:19	15.30	0.6	1.200	0.6	0.480	0.9616	1.00	0.9616	1.200	1.1541	2.9
7	12:21	16.30	0.6	0.950	0.6	0.380	1.2198	1.00	1.2198	0.950	1.1590	2.9
8	12:22	17.30	0.6	0.650	0.6	0.260	1.0456	1.00	1.0456	0.650	0.6796	1.7
9	12:23	18.30	0.6	0.650	0.6	0.260	1.4826	1.00	1.4826	0.650	0.9636	2.4
10	12:24	19.30	0.6	1.150	0.6	0.460	2.2979	1.00	2.2979	0.862	1.9818	5.0
11	12:26	19.80	0.6	1.100	0.6	0.440	2.6542	1.00	2.6542	0.550	1.4599	3.7
12	12:27	20.30	0.6	1.100	0.6	0.440	2.6142	1.00	2.6142	0.550	1.4379	3.6
13	12:28	20.80	0.6	0.650	0.6	0.260	2.7956	1.00	2.7956	0.325	0.9085	2.3
14	*12:29*	*21.30*	*0.6*	*1.050*	*0.6*	*0.420*	*1.9429*	*1.00*	*1.9429*	*0.525*	*1.0199*	*2.6*
15	*12:30*	*21.80*	*0.6*	*1.100*	*0.6*	*0.440*	*1.4423*	*1.00*	*1.4423*	*0.550*	*0.7933*	*2.0*
16	12:31	22.30	0.6	1.250	0.6	0.500	2.9259	1.00	2.9259	0.625	1.8287	4.6
17	*12:33*	*22.80*	*0.6*	*1.150*	*0.6*	*0.460*	*1.8606*	*1.00*	*1.8606*	*0.575*	*1.0698*	*2.7*
18	*12:35*	*23.30*	*0.6*	*1.300*	*0.6*	*0.520*	*0.5597*	*1.00*	*0.5597*	*0.780*	*0.4366*	*1.1*
19	*12:37*	*24.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.5082*	*1.00*	*0.5082*	*0.600*	*0.3050*	*0.8*
20	*12:39*	*24.50*	*0.6*	*1.350*	*0.6*	*0.540*	*0.4127*	*1.00*	*0.4127*	*0.675*	*0.2786*	*0.7*
21	*12:40*	*25.00*	*0.6*	*1.200*	*0.6*	*0.480*	*1.0656*	*1.00*	*1.0656*	*0.600*	*0.6394*	*1.6*
22	*12:41*	*25.50*	*0.6*	*1.400*	*0.6*	*0.560*	*1.4193*	*1.00*	*1.4193*	*0.700*	*0.9935*	*2.5*
23	*12:43*	*26.00*	*0.6*	*1.000*	*0.6*	*0.400*	*1.7936*	*1.00*	*1.7936*	*0.500*	*0.8968*	*2.3*
24	12:44	26.50	0.6	0.800	0.6	0.320	2.7730	1.00	2.7730	0.400	1.1090	2.8
25	12:45	27.00	0.6	0.800	0.6	0.320	3.2897	1.00	3.2897	0.400	1.3157	3.3
26	12:46	27.50	0.6	0.900	0.6	0.360	2.7559	1.00	2.7559	0.450	1.2401	3.1
27	12:47	28.00	0.6	1.050	0.6	0.420	1.8848	1.00	1.8848	0.525	0.9894	2.5
28	12:49	28.50	0.6	0.450	0.6	0.180	1.7139	1.00	1.7139	0.225	0.3857	1.0
29	12:50	29.00	0.6	0.400	0.6	0.160	1.9508	1.00	1.9508	0.200	0.3901	1.0
30	*12:51*	*29.50*	*0.6*	*0.500*	*0.6*	*0.200*	*2.1795*	*1.00*	*2.1795*	*0.250*	*0.5449*	*1.4*
31	12:52	30.00	0.6	1.000	0.6	0.400	2.3406	1.00	2.3406	0.500	1.1703	2.9
32	12:54	30.50	0.6	0.550	0.6	0.220	2.5564	1.00	2.5564	0.275	0.7029	1.8
33	12:55	31.00	0.6	0.650	0.6	0.260	2.6198	1.00	2.6198	0.325	0.8513	2.1
34	12:56	31.50	0.6	1.000	0.6	0.400	2.8018	1.00	2.8018	0.500	1.4009	3.5
35	12:57	32.00	0.6	0.700	0.6	0.280	2.7379	1.00	2.7379	0.350	0.9584	2.4
36	12:58	32.50	0.6	0.800	0.6	0.320	2.6283	1.00	2.6283	0.400	1.0511	2.6
37	13:00	33.00	0.6	0.700	0.6	0.280	2.5486	1.00	2.5486	0.350	0.8922	2.2
38	13:02	33.50	0.6	0.800	0.6	0.320	2.2480	1.00	2.2480	0.400	0.8991	2.3
39	*13:03*	*34.00*	*0.6*	*1.100*	*0.6*	*0.440*	*1.1847*	*1.00*	*1.1847*	*0.825*	*0.9774*	*2.5*
40	13:04	35.00	0.6	0.900	0.6	0.360	0.9944	1.00	0.9944	0.900	0.8949	2.3
41	13:05	36.00	0.6	0.750	0.6	0.300	0.1161	1.00	0.1161	0.750	0.0871	0.2
42	*13:06*	*37.00*	*0.6*	*0.700*	*0.6*	*0.280*	*0.2904*	*1.00*	*0.2904*	*0.700*	*0.2033*	*0.5*
43	13:08	38.00	0.6	0.750	0.6	0.300	0.2103	1.00	0.2103	0.750	0.1577	0.4
44	13:10	39.00	0.6	0.400	0.6	0.160	1.0194	1.00	1.0194	0.400	0.4077	1.0
45	13:11	40.00	0.6	0.250	0.6	0.100	1.0545	1.00	1.0545	0.250	0.2636	0.7
46	*13:12*	*41.00*	*0.6*	*0.350*	*0.6*	*0.140*	*0.3018*	*1.00*	*0.3018*	*0.350*	*0.1057*	*0.3*
47	*13:13*	*42.00*	*0.6*	*0.300*	*0.6*	*0.120*	*-0.0584*	*1.00*	*-0.0584*	*0.270*	*-0.0158*	*0.0*
48	13:13	42.80	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

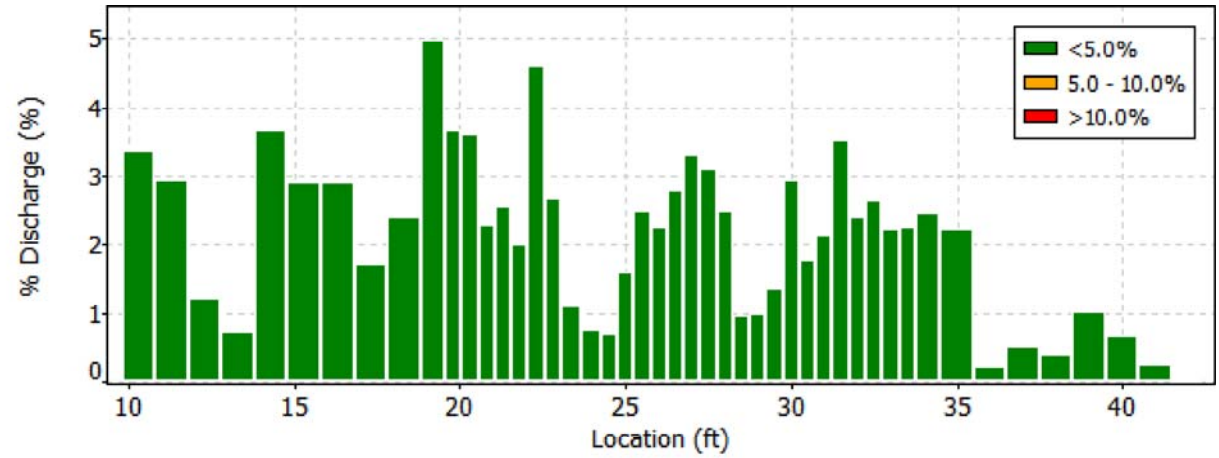
Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.

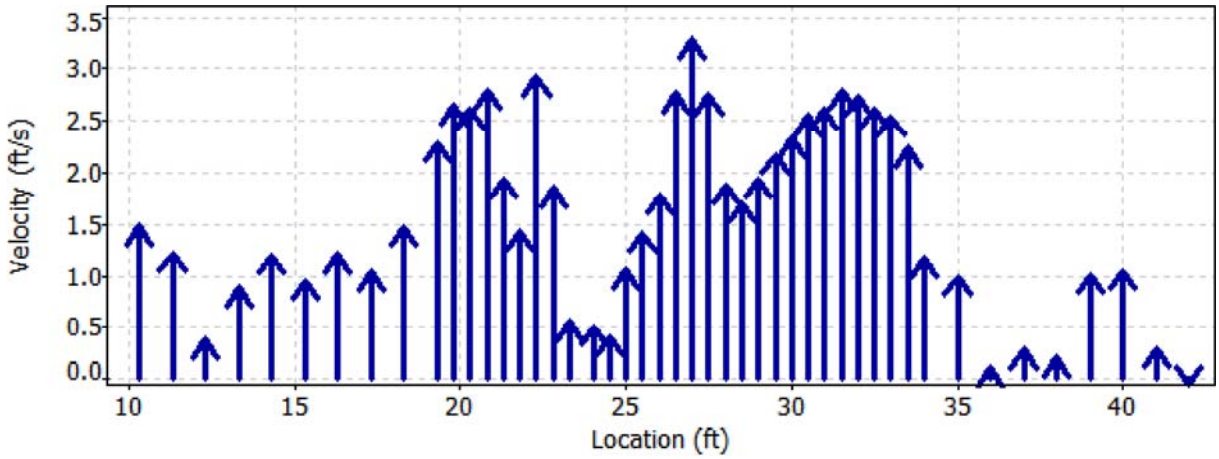
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

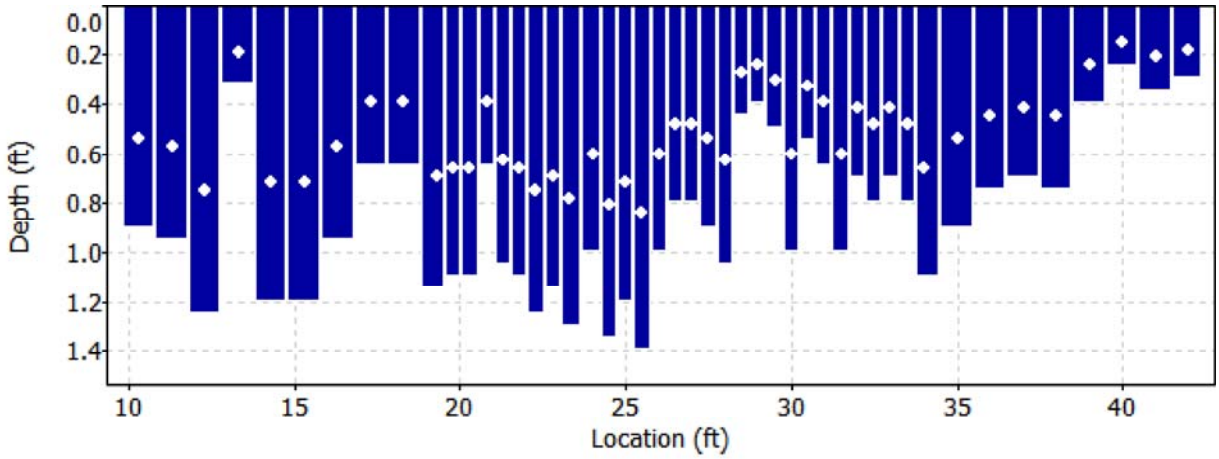
Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information		Site Details	
File Name	PINRATRD.001.WAD	Site Name	PINEY RV AT BLM BRDG
Start Date and Time	2016/08/10 12:13:17	Operator(s)	BRIAN EPSTEIN







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Colorado Water Conservation Board
Department of Natural Resources

Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information

File Name	PINRATRD.001.WAD
Start Date and Time	2016/08/10 12:13:17

Site Details

Site Name	PINEY RV AT BLM BRDG
Operator(s)	BRIAN EPSTEIN

Quality Control

St	Loc	%Dep	Message
14	21.30	0.6	High standard error: 0.112
15	21.80	0.6	High standard error: 0.141
17	22.80	0.6	High standard error: 0.140
18	23.30	0.6	High angle: -23
19	24.00	0.6	High standard error: 0.122
20	24.50	0.6	High angle: -48
21	25.00	0.6	High angle: -22
		0.6	High standard error: 0.105
22	25.50	0.6	High angle: -25
23	26.00	0.6	High angle: -26
30	29.50	0.6	High standard error: 0.118
39	34.00	0.6	High angle: 33
42	37.00	0.6	High angle: -35
		0.6	High standard error: 0.107
46	41.00	0.6	High angle: 26
47	42.00	0.6	High angle: 146

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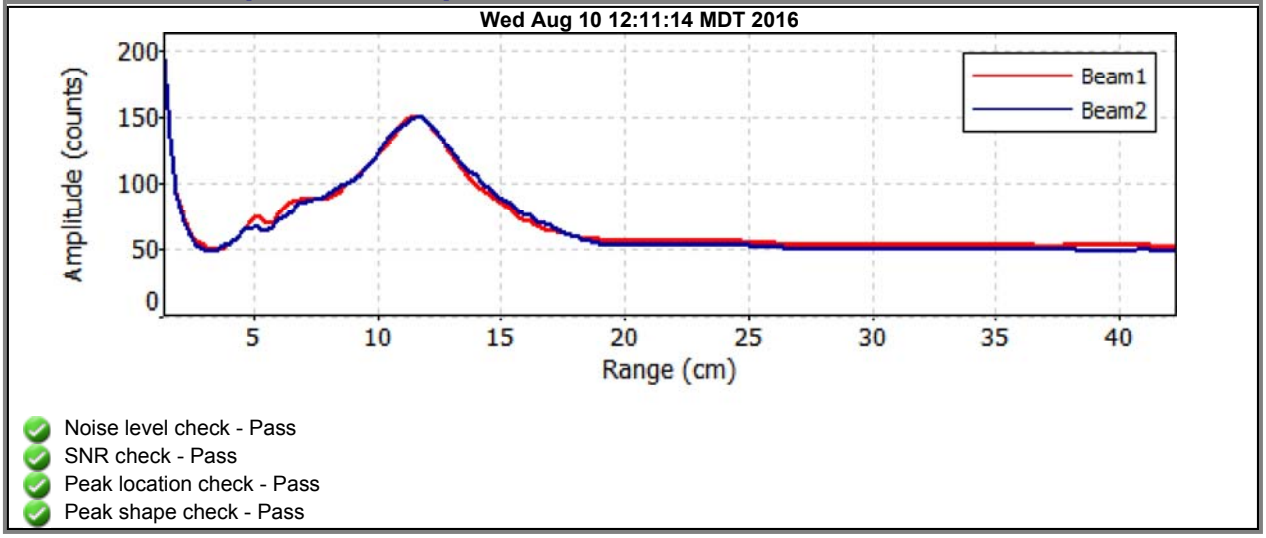
Discharge Measurement Summary

Date Generated: Mon Dec 19 2016

File Information		Site Details	
File Name	PINRATRD.001.WAD	Site Name	PINEY RV AT BLM BRDG
Start Date and Time	2016/08/10 12:13:17	Operator(s)	BRIAN EPSTEIN

Automatic Quality Control Test (BeamCheck)



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


2015


ETTORE