

DRAFT INSTREAM FLOW RECOMMENDATION

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

Dear Ms. Bassi:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its recommendation for instream flow water rights on Left Fork Carr Creek, located in Water Division 5.

Location and Land Status. Left Fork Carr Creek originates between Henderson Ridge and Horse Ridge, approximately 11 miles east of Douglas Pass, and flows into Carr Creek. This recommendation covers the stream reach beginning at headwaters and extends downstream to the headgate of the Franklin No. 2 Ditch, located within the SW $\frac{1}{4}$, Section 1, T6S R100W. This stream reach covers a distance of approximately 6.8 miles. BLM manages 3.36 miles of this stream reach, while 3.44 miles are in private ownership.

Biological Summary. Left Fork Carr Creek is a cold-water, high gradient stream in a narrow canyon. The stream is confined by bedrock and generally has large substrate. The stream has a good mix of riffle, run, and deep pool habitats to support a salmonid fishery.

Fisheries surveys have revealed self-sustaining population of genetically pure native cutthroat trout, which are a priority conservation species for BLM. Intensive macro-invertebrate surveys have not been conducted, but spot samples have revealed various species of mayfly, caddisfly, and stonefly.

The riparian community along Left Fork Carr Creek is robust and recovering from historic grazing practices, providing good cover and shading for the stream. The riparian community is comprised mainly of narrowleaf cottonwood, willow, and dogwood.

R2Cross Analysis. BLM collected the following R2Cross data from Left Fork Carr Creek:

Cross Section Date	Discharge Rate	Top Width	Winter Flow Recommendation (meets 2 of 3 hydraulic criteria)	Summer Flow Recommendation (meets 3 of 3 hydraulic criteria)
05/16/2012 #1	1.62 cfs	15.4 feet	1.35 cfs	2.20 cfs
05/16/2012 #2	1.82 cfs	10.7 feet	1.59 cfs	1.74 cfs
Averages:			1.47 cfs	1.97 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.

2.0 cubic feet per second is recommended for the snowmelt runoff and high temperature period from April 1 through August 31. This recommendation is driven by the average velocity and depth criteria. This creek experiences consistently low flows during late summer and fall, so it is important to protect as much physical habitat as possible during the limited time when snowmelt runoff and early summer flows are available.

1.5 cubic feet per second is recommended for the fall period, from September 1 to October 31. This recommendation is driven by the wetted perimeter criteria. This flow rate is capable of maintaining pool habitat in the creek and preventing excessively water high temperatures.

0.8 cubic feet per second is recommended for the late fall and winter period from September 1 to March 31. This recommendation is driven by limited water availability. This flow rate meets the wetted perimeter criteria and provides an average velocity of 0.75 feet per second. It should provide sufficient flow to prevent pools from freezing and protect overwintering fish.

Water Availability. There are several sources of water availability information that could be used for this creek. The USGS Gage 09094400 on Clear Creek near DeBeque is located on another creek within the Roan Creek watershed that is similarly situated, in terms of elevation, aspect, and snowfall. Adjustments to this gage could be made based upon the relative sizes of the Left Fork Carr Creek watershed and the Clear Creek watershed. In addition, a basin apportionment analysis could be performed on USGS Gage 09094200 on Roan Creek above Clear Creek. BLM also recommends consulting the StreamStats package developed jointly between the U.S. Geological Survey and the CWCB.

BLM is not aware of any decreed water rights within the proposed instream flow reach.

Relationship to Land Management Plans. BLM's inventories of conditions on BLM lands in the Left Fork Carr Creek watershed indicate that it is in largely natural condition, with very little surface disturbance and very little development other than trails, two-track roads and limited livestock grazing infrastructure. BLM intends to continue management of the watershed for natural conditions and processes. Appropriation of an instream flow water right would assist BLM in long-term management of outstanding riparian values and important fishery values.

Data sheets, R2Cross output, fishery survey information, and photographs of the cross section were included with BLM's draft recommendation in February 2013. 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,

Leigh Espy
Deputy State Director
Resources and Fire

Cc: Catherine Robertson, Grand Junction FO
Nate Dieterich, Grand Junction FO

Water: Left Fork of Carr Creek
 Date: 06/24/2009
 Location: On Private land-just upstream of confluence with Bear Gulch
 Drainage: Colorado
 Water Code: 19691
 UTM Zone: 12
 UTM X: 0713101
 UTM Y: 4381691
 Station Length = Not determined
 Station Width = Not determined
 Crew: L. Martin, D. Tremblay, A. Romero

Notes: The objective of the sample was to determine fish species presence and composition, specifically related to cutthroat trout. The creek was spot electrofished with a Smith-Root LR 24 backpack electrofisher. Conductivity and salinity were not measured. Twelve upper caudal fin clips were collected for genetic analysis. Photos available.

Species	Count	Length (mm)	Weight (g)	Status	Mark	TagID
CRN	1	162	40.5	1		Fin clip #22
CRN	1	194	75.5	1		Fin clip #23
CRN	1	213	84	1		Fin clip #24
CRN	1	187	59	1		Fin clip #25
CRN	1	148	27.5	1		Fin clip #26
CRN	1	170	45	1		Fin clip #27
CRN	1	65	2.5	1		
CRN	1	117	14.5	1		
CRN	1	133	15.5	1		Left eye bulged
CRN	1	74	3.5	1		
CRN	1	155	35	1		Fin clip #28
CRN	1	135	22	1		Fin clip #29
CRN	1	78	2.5	1		
CRN	1	148	29.5	1		Fin clip #30
CRN	1	172	28	1		Fin clip #31
CRN	1	160	42	1		Fin clip #32
CRN	1	142	25	1		Fin clip #33
CRN	1	148	26.5	1		
CRN	1	149	30	1		
CRN	1	119	15.5	1		
CRN	1	130	18	1		

Water: Left Fork of Carr Creek

Date: 06/24/2009

Location: On Private land-Just downstream of confluence with Bear Gulch

Drainage: Colorado

Water Code:19691

UTM Zone: 12

UTM X: 0713311

UTM Y: 4381659

Station Length = 354.6 feet

Station Width = 21.7 feet

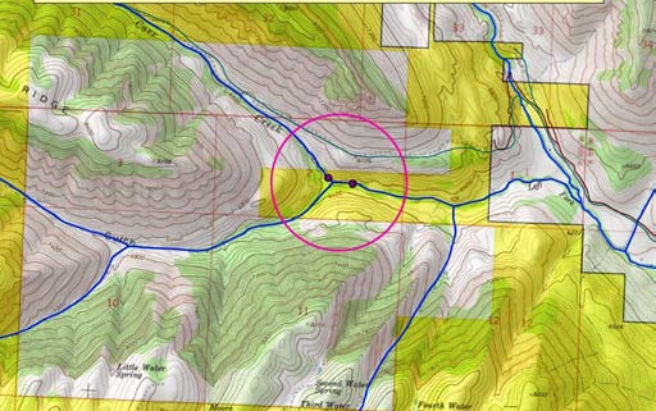
Crew: L. Martin, D. Tremblay, A. Romero

Notes: The objective of this sample was to determine fish species presence and composition, specifically related to cutthroat trout. The creek was electrofished with a Smith-Root LR 24 electrofisher. A two pass (depletion) was performed. At 10:00am, conductivity measured 441.8 microsiemens at 8.5 degrees C and 645 microsiemens at 25 degrees C. Salinity was measured at 0.3 parts per thousand. Twenty-one upper caudal fin clips were collected for genetic analysis. Photos available.

Species	Count	Length (mm)	Weight (g)	Status	Mark	TagID
CRN	1	184	70	1		Fin clip #1
CRN	1	154	34.5	1		Fin clip #2;deformed gill plate
CRN	1	139	28	1		Fin clip #3
CRN	1	224	90.5	1		Fin clip #4
CRN	1	240	144	1		Fin clip #5
CRN	1	177	62.5	1		Fin clip #6
CRN	1	190	75	1		Fin clip #7
CRN	1	162	45	1		Fin clip #8
CRN	1	187	62.5	1		Fin clip #9
CRN	1	163	47	1		Fin clip #10
CRN	1	175	53	1		Fin clip #11
CRN	1	84	5.5	1		
CRN	1	155	33	1		Fin clip #12
CRN	1	164	49.5	1		Fin clip #13
CRN	1	190	59.5	1		Fin clip #14
CRN	1	139	24.5	1		Fin clip #15
CRN	1	143	31	1		Fin clip #16
CRN	1	155	37.5	1		Fin clip #17
CRN	1	134	22.5	2		Fin clip #18
CRN	1	95	8	2		
CRN	1	165	39.5	2		Fin clip #19;bent gill plate
CRN	1	183	58	2		Fin clip #20
CRN	1	203	90	2		Fin clip #21

Left Fork Carr Creek Sampling Sites 6-24-2009

Colorado Parks & Wildlife





STREAM NAME: Left Fork Carr Creek		CROSS-SECTION NO.: 1	
CROSS-SECTION LOCATION: Approx. 1.25 miles upstream from conf. w/ Carr Creek			
DATE: 5-16-12	OBSERVERS: R. Smith, N. Dietrich		
LEGAL DESCRIPTION	1/4 SECTION: SW SW	SECTION: 1	TOWNSHIP: 6 N 13 W
			RANGE: 100 E 12 W PM: 6 1/2
COUNTY: Garfield	WATERSHED: Roan Creek	WATER DIVISION: 5	DOW WATER CODE: 19691
MAP(S):	USGS: Henderson Ridge 7.5'	GPS Zone 12S	713381
	USFS:		4381616

SAG TAPE SECTION SAME AS DISCHARGE SECTION: ☒ YES ☐ NO		METER TYPE: M-M	
METER NUMBER:	DATE RATED:	CALIB/SPIN: _____ sec	TAPE WEIGHT: <u>surveyed</u> _____ lbs/foot
CHANNEL BED MATERIAL SIZE RANGE: <u>gravel to 6" cobbles</u>		PHOTOGRAPHS TAKEN: ☒ YES ☐ NO	TAPE TENSION: <u>surveyed</u> _____ lbs
		NUMBER OF PHOTOGRAPHS: <u>3</u>	

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	7.03/7.03
②	WS Upstream	85.5	5.87
③	WS Downstream	53.0	7.83
SLOPE		1.96/138.5 =	

SECTION

LEGEND:

Stake ⊗

Station ①

Photo ① →

Direction of Flow →

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, stonefly

Ph = 8.13
Cond = 313 temp. corrected
Temp = 19.8°C
Salinity = 0.2

DISCHARGE/CROSS SECTION NOTES

[illegible]

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

LOCATION INFORMATION

STREAM NAME: Left Fork Carr Creek
XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
XS NUMBER: 1

DATE: 16-May-12
OBSERVERS: R. Smith, N. Dieterich

1/4 SEC: SW SW
SECTION: 1
TWP: 6S
RANGE: 100W
PM: Sixth

COUNTY: Garfield
WATERSHED: Roan Creek
DIVISION: 5
DOW CODE: 19691

USGS MAP: Henderson Ridge
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: Left Fork Carr Creek
 XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
 XS NUMBER: 1

DATA POINTS= 31

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL
LS	0.00	5.76		
	2.00	5.80		
	4.00	6.04		
1 G	4.80	6.06		
	6.50	6.79		
W	7.00	7.03	0.00	0.00
	7.50	7.08	0.05	0.26
	8.00	7.13	0.10	0.85
	8.50	7.18	0.15	0.77
	9.00	7.18	0.15	0.98
	9.50	7.23	0.20	0.73
	10.00	7.23	0.20	0.71
	10.50	7.33	0.30	0.60
	11.00	7.33	0.30	0.84
	11.40	7.18	0.15	1.04
	11.80	7.28	0.25	1.47
	12.20	7.38	0.35	1.41
	12.60	7.33	0.30	1.46
	13.00	7.28	0.25	1.55
	13.40	7.33	0.30	1.45
	13.80	7.13	0.10	1.16
	14.20	7.23	0.20	1.41
	14.60	7.08	0.05	0.73
	15.00	7.08	0.05	0.59
	15.40	7.08	0.05	0.00
	15.80	7.03	0.00	0.00
W	16.00	7.03	0.00	0.00
	17.50	6.80		
1 G	18.00	6.02		
	19.00	6.07		
RS	21.00	6.12		

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%
0.50	0.05	0.03	0.01	0.4%
0.50	0.10	0.05	0.04	2.6%
0.50	0.15	0.08	0.06	3.6%
0.50	0.15	0.08	0.07	4.5%
0.50	0.20	0.10	0.07	4.5%
0.50	0.20	0.10	0.07	4.4%
0.51	0.30	0.15	0.09	5.5%
0.50	0.30	0.14	0.11	7.0%
0.43	0.15	0.06	0.06	3.8%
0.41	0.25	0.10	0.15	9.1%
0.41	0.35	0.14	0.20	12.2%
0.40	0.30	0.12	0.18	10.8%
0.40	0.25	0.10	0.16	9.5%
0.40	0.30	0.12	0.17	10.7%
0.45	0.10	0.04	0.05	2.9%
0.41	0.20	0.08	0.11	6.9%
0.43	0.05	0.02	0.01	0.9%
0.40	0.05	0.02	0.01	0.7%
0.40	0.05	0.02	0.00	0.0%
0.40		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%
0.00		0.00	0.00	0.0%

TOTALS -----

8.97 0.35 1.53 1.62 100.0%
 (Max.)

Manning's n = 0.0509
 Hydraulic Radius= 0.17055194

STREAM NAME: Left Fork Carr Creek
 XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.53	1.53	0.0%
6.78	1.53	4.05	164.6%
6.80	1.53	3.83	150.2%
6.82	1.53	3.61	135.9%
6.84	1.53	3.40	121.9%
6.86	1.53	3.18	108.1%
6.88	1.53	2.98	94.6%
6.90	1.53	2.77	81.2%
6.92	1.53	2.57	68.1%
6.94	1.53	2.37	55.2%
6.96	1.53	2.18	42.6%
6.98	1.53	1.99	30.1%
6.99	1.53	1.90	24.0%
7.00	1.53	1.80	17.9%
7.01	1.53	1.71	11.9%
7.02	1.53	1.62	5.9%
7.03	1.53	1.53	0.0%
7.04	1.53	1.44	-5.7%
7.05	1.53	1.36	-11.3%
7.06	1.53	1.27	-16.7%
7.07	1.53	1.19	-22.1%
7.08	1.53	1.11	-27.3%
7.10	1.53	0.97	-36.4%
7.12	1.53	0.84	-45.2%
7.14	1.53	0.71	-53.6%
7.16	1.53	0.59	-61.6%
7.18	1.53	0.47	-69.1%
7.20	1.53	0.38	-75.3%
7.22	1.53	0.29	-80.9%
7.24	1.53	0.22	-85.5%
7.26	1.53	0.16	-89.4%
7.28	1.53	0.11	-93.0%

WATERLINE AT ZERO

AREA ERROR = 7.030

STREAM NAME: Left Fork Carr Creek
 XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
 XS NUMBER: 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.06	15.37	0.83	1.32	12.83	16.17	100.0%	0.79	37.98	2.96
	6.08	14.71	0.85	1.30	12.53	15.50	95.8%	0.81	37.55	3.00
	6.13	12.97	0.91	1.25	11.85	13.71	84.8%	0.86	37.11	3.13
	6.18	12.82	0.87	1.20	11.20	13.53	83.6%	0.83	34.11	3.04
	6.23	12.67	0.83	1.15	10.57	13.34	82.5%	0.79	31.23	2.96
	6.28	12.52	0.79	1.10	9.94	13.15	81.3%	0.76	28.45	2.86
	6.33	12.37	0.75	1.05	9.31	12.97	80.2%	0.72	25.79	2.77
	6.38	12.22	0.71	1.00	8.70	12.78	79.0%	0.68	23.24	2.67
	6.43	12.08	0.67	0.95	8.09	12.59	77.9%	0.64	20.80	2.57
	6.48	11.93	0.63	0.90	7.49	12.41	76.7%	0.60	18.48	2.47
	6.53	11.78	0.59	0.85	6.90	12.22	75.6%	0.56	16.27	2.36
	6.58	11.63	0.54	0.80	6.31	12.04	74.4%	0.52	14.18	2.25
	6.63	11.48	0.50	0.75	5.74	11.85	73.3%	0.48	12.21	2.13
	6.68	11.33	0.46	0.70	5.17	11.66	72.1%	0.44	10.36	2.01
	6.73	11.18	0.41	0.65	4.60	11.48	71.0%	0.40	8.64	1.88
	6.78	11.04	0.37	0.60	4.05	11.29	69.8%	0.36	7.05	1.74
	6.83	10.72	0.33	0.55	3.50	10.95	67.7%	0.32	5.65	1.61
	6.88	10.29	0.29	0.50	2.98	10.51	65.0%	0.28	4.43	1.49
	6.93	9.86	0.25	0.45	2.47	10.06	62.2%	0.25	3.35	1.35
	6.98	9.43	0.21	0.40	1.99	9.62	59.5%	0.21	2.40	1.21
WL	7.03	8.80	0.17	0.35	1.53	8.97	55.5%	0.17	1.62	1.06
	7.08	7.10	0.16	0.30	1.11	7.27	44.9%	0.15	1.10	0.99
	7.13	6.47	0.12	0.25	0.77	6.62	40.9%	0.12	0.64	0.82
	7.18	5.03	0.09	0.20	0.47	5.16	31.9%	0.09	0.33	0.70
	7.23	3.27	0.08	0.15	0.25	3.35	20.7%	0.08	0.16	0.62
	7.28	2.58	0.04	0.10	0.11	2.63	16.3%	0.04	0.04	0.41
	7.33	0.60	0.03	0.05	0.02	0.61	3.8%	0.02	0.00	0.29
	7.38	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Left Fork Carr Creek
XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)= 1.62 cfs
CALCULATED FLOW (Qc)= 1.62 cfs
(Qm-Qc)/Qm * 100 = 0.0 %

MEASURED WATERLINE (WLm)= 7.03 ft
CALCULATED WATERLINE (WLc)= 7.03 ft
(WLm-WLc)/WLm * 100 = 0.0 %

MAX MEASURED DEPTH (Dm)= 0.35 ft
MAX CALCULATED DEPTH (Dc)= 0.35 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 1.06 ft/sec
MANNING'S N= 0.051
SLOPE= 0.014 ft/ft

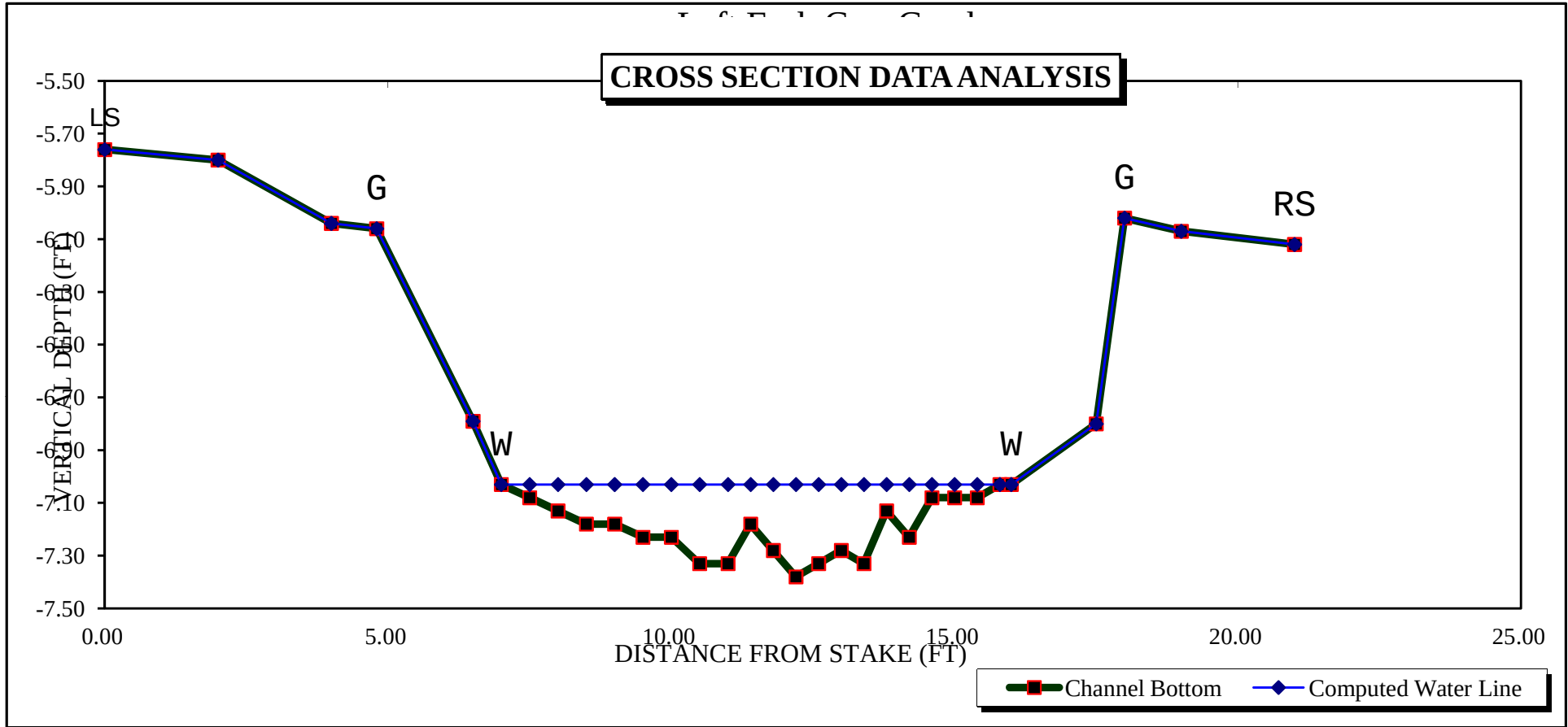
.4 * Qm = 0.6 cfs
2.5 * Qm= 4.1 cfs

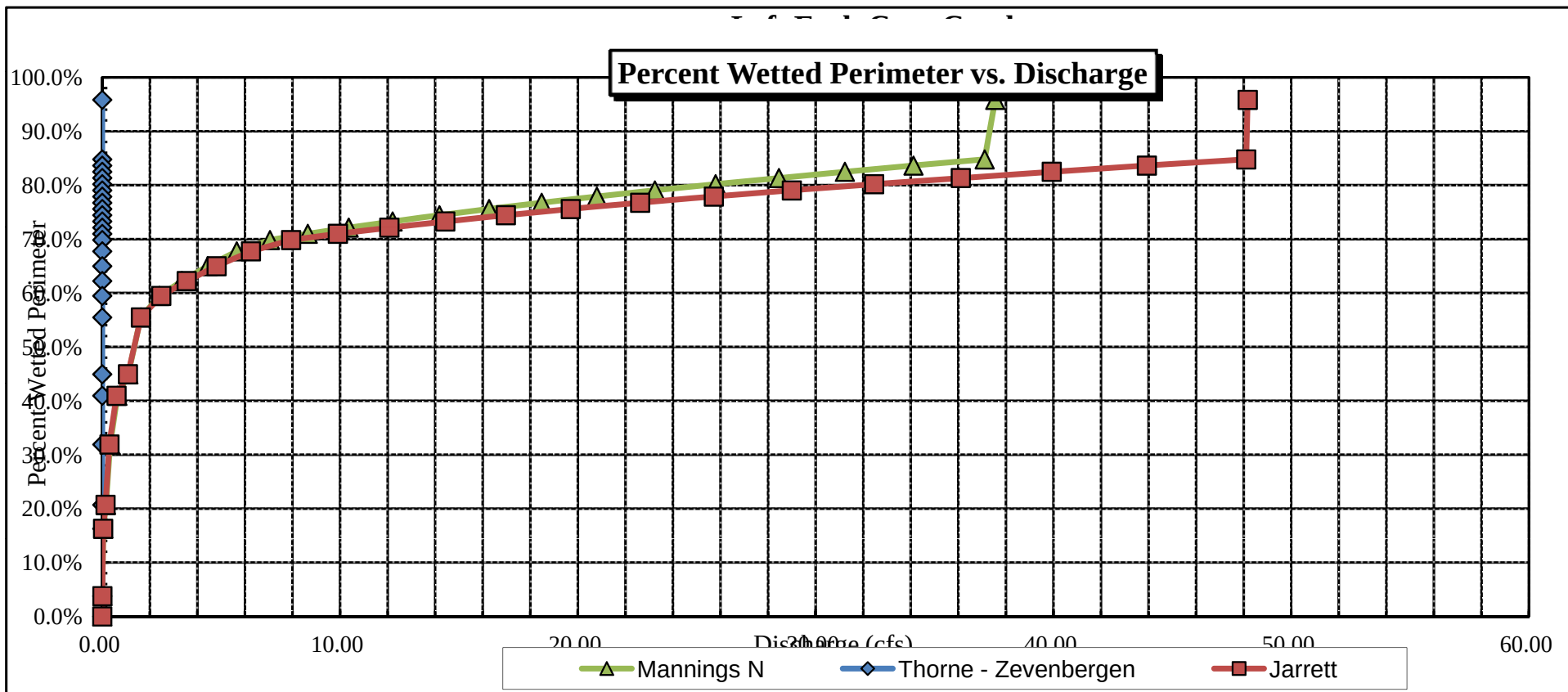
RECOMMENDED INSTREAM FLOW:
=====

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

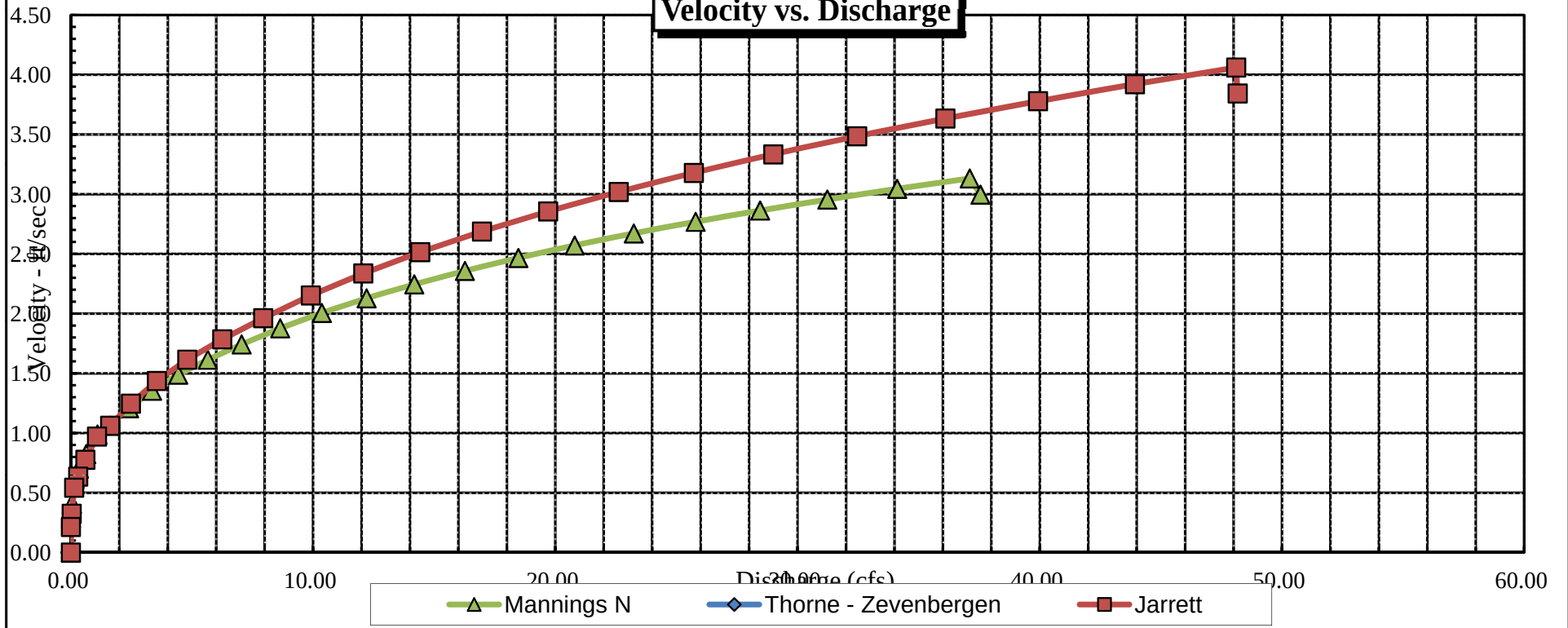
RATIONALE FOR RECOMMENDATION:
=====

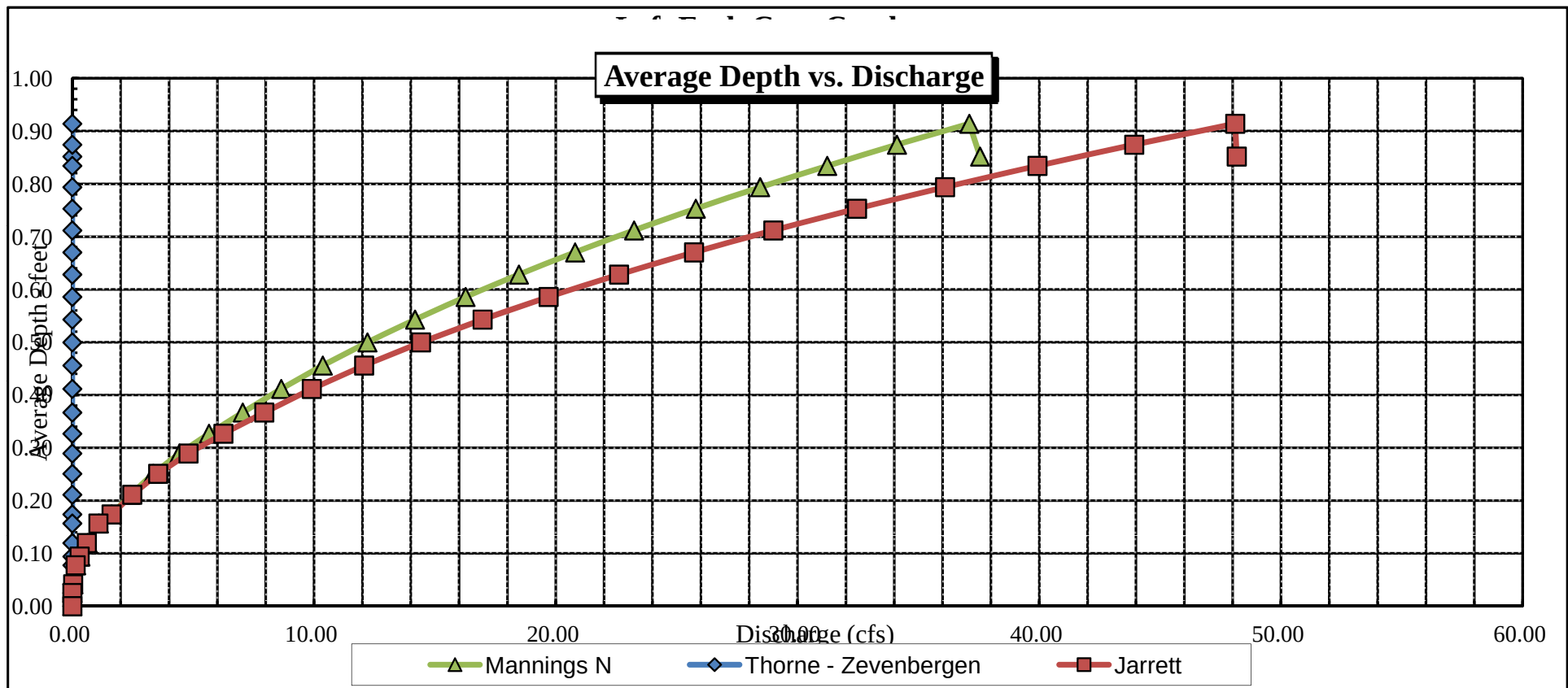
RECOMMENDATION BY: AGENCY..... DATE:.....
CWCB REVIEW BY: DATE:.....



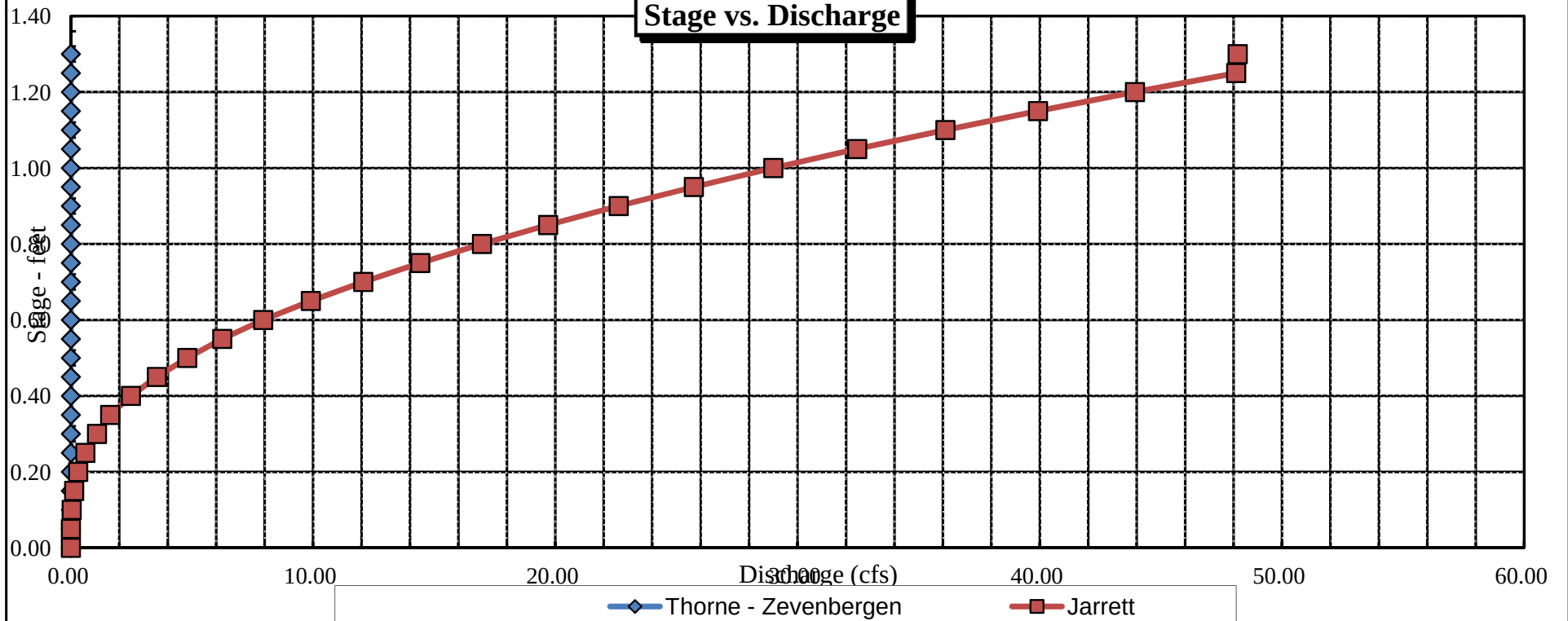


Velocity vs. Discharge





Stage vs. Discharge



DISCHARGE/CROSS SECTION NOTES

[illegible]

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

LOCATION INFORMATION

STREAM NAME: Left Fork Carr Creek
XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
XS NUMBER: 2

DATE: 16-May-12
OBSERVERS: R. Smith, N. Dieterich

1/4 SEC: SW SW
SECTION: 1
TWP: 6S
RANGE: 100W
PM: Sixth

COUNTY: Garfield
WATERSHED: Roan Creek
DIVISION: 5
DOW CODE: 19691

USGS MAP: Henderson Ridge
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: Left Fork Carr Creek
 XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
 XS NUMBER: 2

DATA POINTS= 29

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE		VERT	WATER		WETTED	WATER	AREA	Q	% Q	
		DIST	DEPTH	DEPTH	PERIM.	DEPTH	(Am)	(Qm)	CELL	
1	RS	0.00	6.20		0.00		0.00	0.00	0.0%	
	G	2.50	6.63		0.00		0.00	0.00	0.0%	
		2.60	7.41		0.00		0.00	0.00	0.0%	
W		3.10	7.58	0.00	0.00	0.00	0.00	0.00	0.0%	
		3.50	7.70	0.10	0.03	0.42	0.10	0.04	0.00	0.1%
		3.90	7.75	0.15	0.00	0.40	0.15	0.06	0.00	0.0%
		4.30	7.85	0.25	1.55	0.41	0.25	0.10	0.16	8.5%
		4.70	7.90	0.30	1.31	0.40	0.30	0.12	0.16	8.6%
		5.10	7.85	0.25	1.21	0.40	0.25	0.10	0.12	6.6%
		5.50	7.90	0.30	0.66	0.40	0.30	0.12	0.08	4.3%
		5.90	7.85	0.25	0.70	0.40	0.25	0.10	0.07	3.8%
		6.30	7.80	0.20	1.22	0.40	0.20	0.08	0.10	5.3%
		6.70	7.90	0.30	1.14	0.41	0.30	0.12	0.14	7.5%
		7.10	7.95	0.35	1.09	0.40	0.35	0.14	0.15	8.4%
		7.50	7.85	0.25	0.78	0.41	0.25	0.10	0.08	4.3%
		7.90	7.80	0.20	1.17	0.40	0.20	0.08	0.09	5.1%
		8.30	7.90	0.30	1.22	0.41	0.30	0.12	0.15	8.0%
		8.70	7.85	0.25	1.75	0.40	0.25	0.10	0.18	9.6%
		9.10	7.70	0.10	1.38	0.43	0.10	0.04	0.06	3.0%
		9.50	7.85	0.25	1.46	0.43	0.25	0.10	0.15	8.0%
		9.90	7.75	0.15	1.12	0.41	0.15	0.06	0.07	3.7%
		10.30	7.80	0.20	0.38	0.40	0.20	0.08	0.03	1.7%
		10.70	7.85	0.25	0.60	0.40	0.25	0.10	0.06	3.3%
W		11.10	7.70	0.10	0.06	0.43	0.10	0.04	0.00	0.1%
		11.50	7.61	0.00	0.00	0.41		0.00	0.00	0.0%
		12.00	7.34			0.00		0.00	0.00	0.0%
		13.00	6.77			0.00		0.00	0.00	0.0%
1	G	13.30	6.55		0.00		0.00	0.00	0.0%	
	LS	13.80	5.56		0.00		0.00	0.00	0.0%	
TOTALS -----					8.61	0.35	1.80	1.82	100.0%	
					(Max.)					

STREAM NAME: Left Fork Carr Creek
 XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
 XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	1.80	1.84	2.3%
7.35	1.80	4.08	126.7%
7.37	1.80	3.89	116.3%
7.39	1.80	3.71	105.9%
7.41	1.80	3.52	95.6%
7.43	1.80	3.34	85.3%
7.45	1.80	3.15	75.1%
7.47	1.80	2.97	65.1%
7.49	1.80	2.79	55.1%
7.51	1.80	2.61	45.2%
7.53	1.80	2.44	35.5%
7.55	1.80	2.27	25.9%
7.56	1.80	2.18	21.1%
7.57	1.80	2.09	16.3%
7.58	1.80	2.01	11.6%
7.59	1.80	1.92	6.9%
7.60	1.80	1.84	2.3%
7.61	1.80	1.76	-2.4%
7.62	1.80	1.67	-7.0%
7.63	1.80	1.59	-11.6%
7.64	1.80	1.51	-16.1%
7.65	1.80	1.43	-20.6%
7.67	1.80	1.27	-29.4%
7.69	1.80	1.11	-38.1%
7.71	1.80	0.96	-46.5%
7.73	1.80	0.82	-54.7%
7.75	1.80	0.67	-62.5%
7.77	1.80	0.54	-70.0%
7.79	1.80	0.42	-76.8%
7.81	1.80	0.30	-83.2%
7.83	1.80	0.21	-88.6%
7.85	1.80	0.13	-93.0%

WATERLINE AT ZERO

AREA ERROR = 7.600

STREAM NAME: Left Fork Carr Creek
 XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
 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	6.63	10.69	1.05	1.32	11.28	11.88	100.0%	0.95	31.35	2.78
	6.65	10.66	1.04	1.30	11.07	11.82	99.5%	0.94	30.47	2.75
	6.70	10.59	1.00	1.25	10.54	11.69	98.4%	0.90	28.28	2.68
	6.75	10.51	0.95	1.20	10.01	11.55	97.3%	0.87	26.17	2.61
	6.80	10.43	0.91	1.15	9.48	11.41	96.1%	0.83	24.13	2.54
	6.85	10.33	0.87	1.10	8.97	11.26	94.8%	0.80	22.16	2.47
	6.90	10.24	0.83	1.05	8.45	11.10	93.5%	0.76	20.27	2.40
	6.95	10.14	0.78	1.00	7.94	10.95	92.2%	0.73	18.44	2.32
	7.00	10.05	0.74	0.95	7.44	10.80	91.0%	0.69	16.68	2.24
	7.05	9.96	0.70	0.90	6.94	10.65	89.7%	0.65	14.99	2.16
	7.10	9.86	0.65	0.85	6.44	10.50	88.4%	0.61	13.38	2.08
	7.15	9.77	0.61	0.80	5.95	10.35	87.1%	0.58	11.84	1.99
	7.20	9.67	0.56	0.75	5.46	10.20	85.9%	0.54	10.37	1.90
	7.25	9.58	0.52	0.70	4.98	10.04	84.6%	0.50	8.98	1.80
	7.30	9.48	0.48	0.65	4.51	9.89	83.3%	0.46	7.68	1.70
	7.35	9.39	0.43	0.60	4.03	9.74	82.0%	0.41	6.45	1.60
	7.40	9.29	0.38	0.55	3.57	9.59	80.7%	0.37	5.31	1.49
	7.45	9.08	0.34	0.50	3.11	9.35	78.7%	0.33	4.29	1.38
	7.50	8.84	0.30	0.45	2.66	9.09	76.5%	0.29	3.37	1.27
	7.55	8.60	0.26	0.40	2.22	8.83	74.3%	0.25	2.55	1.15
WL	7.60	8.35	0.22	0.35	1.80	8.56	72.1%	0.21	1.83	1.02
	7.65	7.99	0.17	0.30	1.39	8.18	68.9%	0.17	1.23	0.88
	7.70	7.60	0.13	0.25	1.00	7.78	65.5%	0.13	0.73	0.73
	7.75	6.80	0.09	0.20	0.64	6.95	58.5%	0.09	0.38	0.59
	7.80	5.61	0.06	0.15	0.33	5.71	48.1%	0.06	0.14	0.43
	7.85	3.21	0.03	0.10	0.11	3.25	27.4%	0.03	0.03	0.30
	7.90	0.60	0.03	0.05	0.02	0.61	5.1%	0.02	0.00	0.24
	7.95	0.00	#DIV/0!	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!	#DIV/0!

STREAM NAME: Left Fork Carr Creek
XS LOCATION: 1.25 mi upstream fr conf w/ Carr Creek
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)= 1.82 cfs
CALCULATED FLOW (Qc)= 1.83 cfs
(Qm-Qc)/Qm * 100 = -0.4 %

MEASURED WATERLINE (WLm)= 7.60 ft
CALCULATED WATERLINE (WLc)= 7.60 ft
(WLm-WLc)/WLm * 100 = -0.1 %

MAX MEASURED DEPTH (Dm)= 0.35 ft
MAX CALCULATED DEPTH (Dc)= 0.35 ft
(Dm-Dc)/Dm * 100 = 0.0 %

MEAN VELOCITY= 1.02 ft/sec
MANNING'S N= 0.061
SLOPE= 0.014 ft/ft

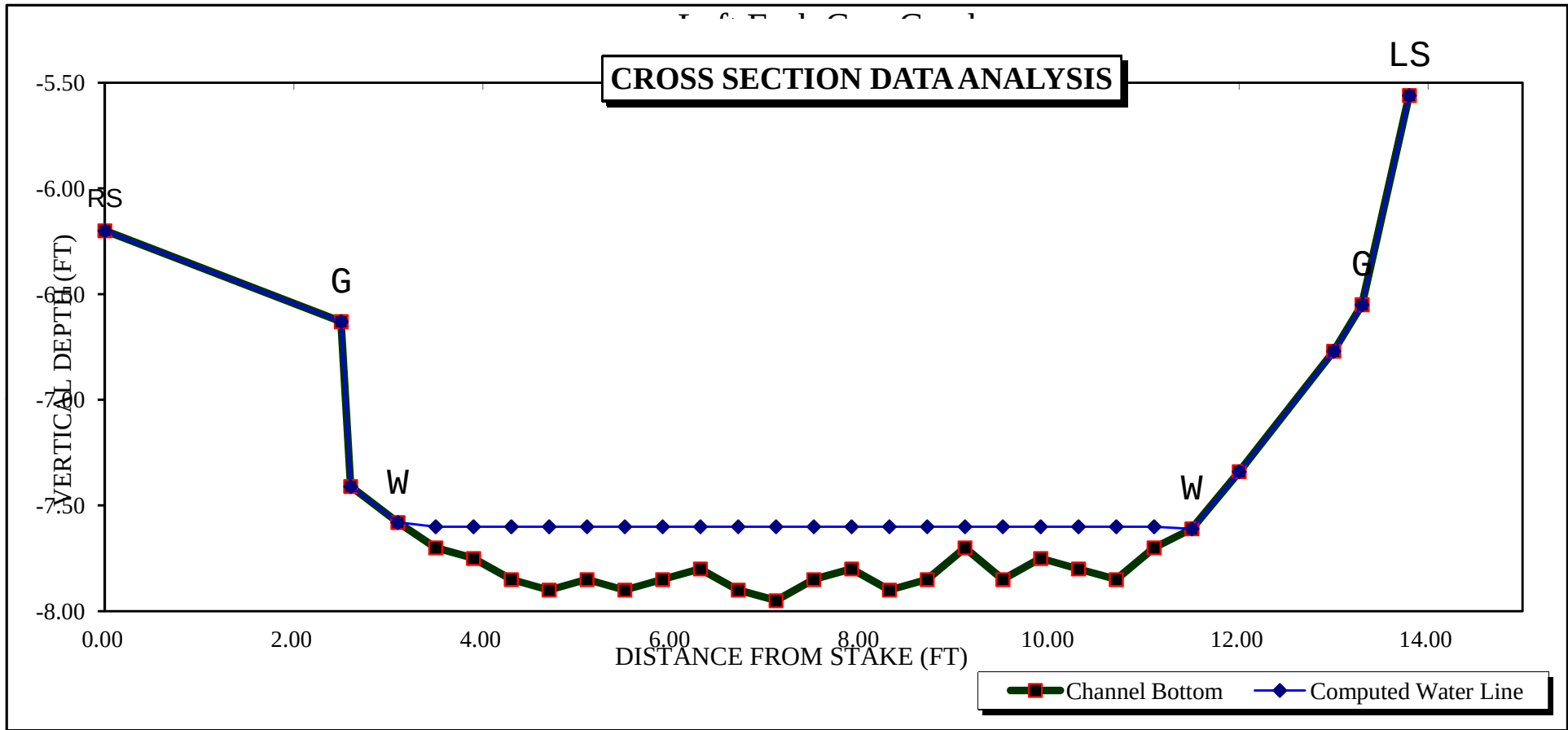
.4 * Qm = 0.7 cfs
2.5 * Qm= 4.6 cfs

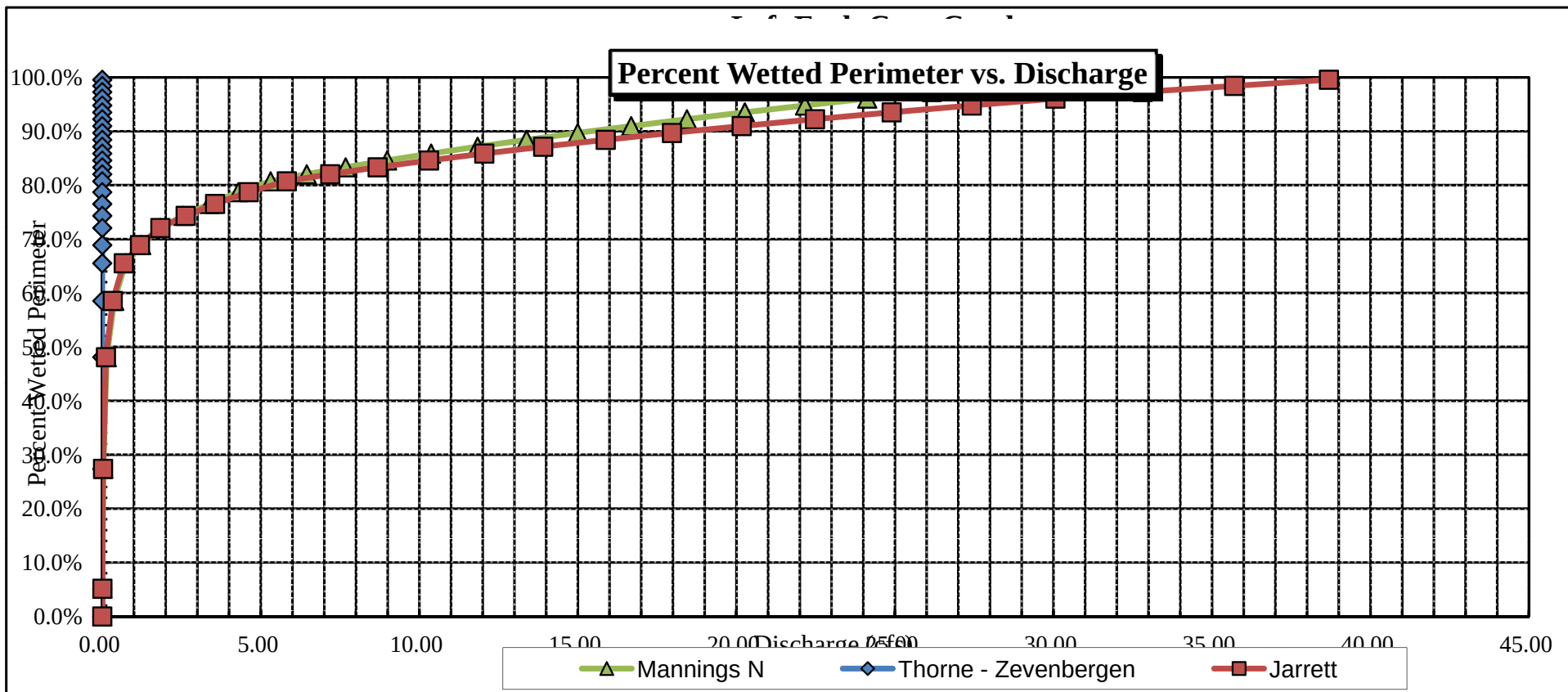
RECOMMENDED INSTREAM FLOW:
=====

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

RATIONALE FOR RECOMMENDATION:
=====

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





Velocity vs. Discharge

