DRAFT INSTREAM FLOW RECOMMENDATION

Mr. Dan Merriman
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Mr. Merriman:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its instream flow recommendation for North Fork North Platte River, located in Water Division 6.

Location and Land Status. North Fork North Platte is tributary to the North Platte River approximately six miles west of Walden. This recommendation covers the stream reach beginning at the headwaters downstream to the headgate of the Little Nellie Ditch. Approximately 60% of the 7.50-mile reach is federally owned, while the remaining 40% is privately owned.

Biological Summary. North Fork North Platte River transitions from a high gradient to a low gradient stream within the proposed reach. The stream channel is stable and well anchored by a vigorous riparian community. Water quality, food supplies, and substrate are excellent for salmonids. This stream supports one of the best fisheries in North Park. Fisheries surveys indicate self-sustaining populations of brown trout and brook trout, with brown trout specimens of up to 19 inches in length.

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

> 7.10 cubic feet per second is recommended for the high temperature period from May 1 to October 31. This recommendation is driven by the average velocity criteria and the average depth criteria. It is important to provide adequate velocity and physical habitat during this time for fish spawning and incubation of eggs. In addition, it is important to provide adequate depth and velocity to maintain low water temperatures, because the lower elevations portions of the reach do not have significant shading and cover. Protecting flows during this time period is also important for recharging the alluvial aquifer, which discharges water to the stream and maintains flow levels during later summer.
>
> 5.60 cubic feet per second is recommended from November 1 through April 30. This recommendation is driven by the average depth criteria. This flow rate will allow fish to survive in pools, provide sufficient physical habitat in riffles between pools, and will prevent the riparian environment from being seriously stressed.

Water Availability. BLM is not aware of any decreed water rights within this reach. However, there are two diversions located on tributaries to this stream reach. The Goose Creek Ditch is located on Goose Creek, and the Shafer Ditch is located on Shafer Creek. The Little Nellie Ditch, which is the proposed lower terminus for this reach, is senior to the Goose Creek Ditch and the Shafer Ditch. BLM recommends that the CWCB utilize the Encampment River gage above Hog Park, WY or Elk River above Clark, Colorado, and perform a basin comparison analysis. Another good source of water availability information would be diversion records for the Little Nellie Ditch.

Relationship to Management Plans. This stream reach is one of the few fisheries managed by BLM in North Park. Accordingly, BLM places a strong emphasis on managing grazing, transportation routes, and recreation use to maintain and enhance both riparian and fisheries resources. BLM's efforts to maintain riparian and fisheries health will be supplemented by an instream flow appropriation that works to keep the riparian community watered, especially during high temperature periods.

The BLM requests that the Board recognize that this recommendation is based only upon the minimum flows necessary to support cold-water fishery values. BLM may wish to work with the Board and/or through the Colorado water rights system to appropriate flows to optimally protect fish values and to protect other water-dependent values specified in BLM resource management plans.

Data sheets, R2Cross output, fishery survey information, and photographs of the cross section are enclosed to support this recommendation. We thank both the Division of Wildlife and the Water Conservation Board for their cooperation in this effort.

If you have any questions regarding our instream flow recommendation, please contact Roy Smith at 303-239-3940.

Sincerely,

Linda Anania
Deputy State Director
Resources and Fire

4 Enclosures

cc: Paula Belcher, Kremmling FO
John Ruhs, Kremmling FO

Stream: North Fork North Platte River

Executive Summary

Water Division: 6
Water District: 47
CDOW#: 11798
CWCB ID#: 07/6/A-006

Segment:

Upper Terminus: Headwaters
Latitude: 40° 53' 5.5"N Longitude: 106° 38' 5.2"W
UTM North: 4528185.6 UTM East: 362289.4
SE SW S29, T11N, R82W 6th PM
1978' East of West Section Line, 749' North of South Section Line

Lower Terminus: Little Nellie Ditch
Latitude: 40° 50' 47.5"N Longitude: 106° 32' 36.4"W
UTM North: 4522866.4 UTM East: 369891.4
NW NW S18, T10N, R81W 6th PM
1040' East of the West Section Line, 605' South of North Section Line

Counties: Jackson
Length: 9.8 miles
USGS Quad(s): Davis Peak, Pearl and Boettcher Lake
ISF Appropriation: 7.1 cfs (April 1 to July 31)
4.5 cfs (August 1 to October 31)
2.8 cfs (November 1 to March 31)

Summary

The information contained in this report and the associated appendix forms the basis for staff's instream flow recommendation to be considered by the Board. It is staff's opinion that the information contained in this report is sufficient to support the findings required in Rule 5i.

Colorado's Instream Flow Program was created in 1973 when the Colorado State Legislature recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment" (see 37-92-102 (3) C.R.S.). The statute vests the CWCB with the exclusive authority to appropriate and acquire instream flow and natural lake level water rights. In order to encourage other entities to participate in Colorado's Instream Flow Program, the statute directs the CWCB to request instream flow recommendations from other state and federal agencies. The Bureau of Land Management recommended this segment of North Fork North Platte River to the CWCB for inclusion into the Instream Flow Program. North Fork North Platte River is being considered for inclusion into the Instream Flow Program because it has a natural environment that can be preserved to a reasonable degree with an instream flow water right. The BLM is very interested in protecting stream flows because the North Fork of the North Platte supports one of the best fisheries in North Park, and it also supports an extremely healthy riparian community.

North Fork North Platte River is 30.4 miles long. It begins at its headwaters on the northeastern flank of Red Elephant Mountain near Big Creek Lakes at an elevation of approximately 9,195 feet. It terminates at the confluence with the Platte River at an elevation of approximately 8,100 feet. Approximately 62% of the 9.8-mile segment addressed by this report is located on federal lands. North Fork North Platte River is located within Jackson County. The total drainage area of the creek is approximately 28.3 square miles. North Fork North Platte River generally flows in a southeasterly direction.

The subject of this report is a segment of the North Fork North Platte River beginning at the headwaters and extending downstream to the headgate of the Little Nellie Ditch. The proposed segment is located northwest of the town of Walden. The staff has received one recommendation for this segment from the BLM. The recommendation for this segment is discussed below.

Instream Flow Recommendation(s)

BLM recommended 7.1 cfs (summer), 5.6 cfs (winter), based on data collection efforts on September 29, 2005. The modeling results from these survey efforts are within the confidence interval produced by the R2Cross model.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Headwaters	Little Nellie Ditch	9.8	38%	62%

Of the 62% of land under public ownership, 12% is managed by BLM and 50% is managed by USFS.

Biological Data

The BLM has conducted field surveys of the fishery resources on this stream and have found a natural environment that can be preserved. As reported in the letter from BLM to the CWCB "North Fork North Platte River transitions from a high gradient to a low gradient stream within the proposed reach. The stream channel is stable and well anchored by a vigorous riparian community. Water quality, food supplies, and substrate are excellent for salmonids. This stream supports one of the best fisheries in North Park. Fisheries surveys indicate self-sustaining populations of brown trout and brook trout, with brown trout specimens of up to 19 inches in length." (See CDOW Fish Survey in the appendix).

Field Survey Data

BLM staff used the R2Cross methodology to quantify the amount of water required to preserve the natural environment to a reasonable degree. The R2Cross method requires that stream discharge and channel profile data be collected in a riffle stream habitat type. Riffles are most easily visualized, as the stream habitat types that would dry up first should streamflow cease. This type of hydraulic data collection consists of setting up a transect, surveying the stream channel geometry, and measuring the stream discharge. The appendix contains copies of field data collected for this proposed segment.

Biological Flow Recommendation

The CWCB staff relied upon the biological expertise of the cooperating agencies to interpret output from the R2Cross data collected to develop the initial, biologic instream flow recommendation. This initial recommendation is designed to address the unique biologic requirements of each stream without regard to water availability. Three instream flow hydraulic parameters, average depth, percent wetted perimeter, and average velocity are used to develop biologic instream flow recommendations. The CDOW has determined that maintaining these three hydraulic parameters at adequate levels across riffle habitat types, aquatic habitat in pools and runs will also be maintained for most life stages of fish and aquatic invertebrates (Nehring 1979; Espegren 1996).

For this segment of stream, two data sets were collected with the results shown in Table 1 below. Table 1 shows who collected the data (Party), the date the data was collected (Date), the measured discharge at the time of the survey (Q), the accuracy range of the predicted flows based on Manning's Equation (240% and 40% of Q), the summer flow recommendation based on meeting 3 of 3 hydraulic criteria and the winter flow recommendation based upon 2 of 3 hydraulic criteria.

Table 1: Data

Party	Date	Q	250%-40%	Summer (3/3)	Winter (2/3)
BLM	09/29/2005	13.5	33.6 – 5.4	6.2	5.6
BLM	09/29/2005	15.2	38.0 – 6.1	8.0	(1)

BLM = Bureau of Land Management DOW = Division of Wildlife
(1) Predicted flow outside of the accuracy range of Manning's Equation. ? = Criteria never met in R2CROSS Staging Table.

Biologic Flow Recommendation

The summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 7.1 cfs. This recommendation was produced by averaging the data sets. The winter flow recommendation, which meets 2 of 2 criteria and is within the accuracy range of the R2Cross model is 5.6 cfs. It is our belief that recommendations that fall outside of the accuracy range of the model, over 250% of the measured discharge or under 40% of the measured discharge may not give an accurate estimate of the necessary instream flow required.

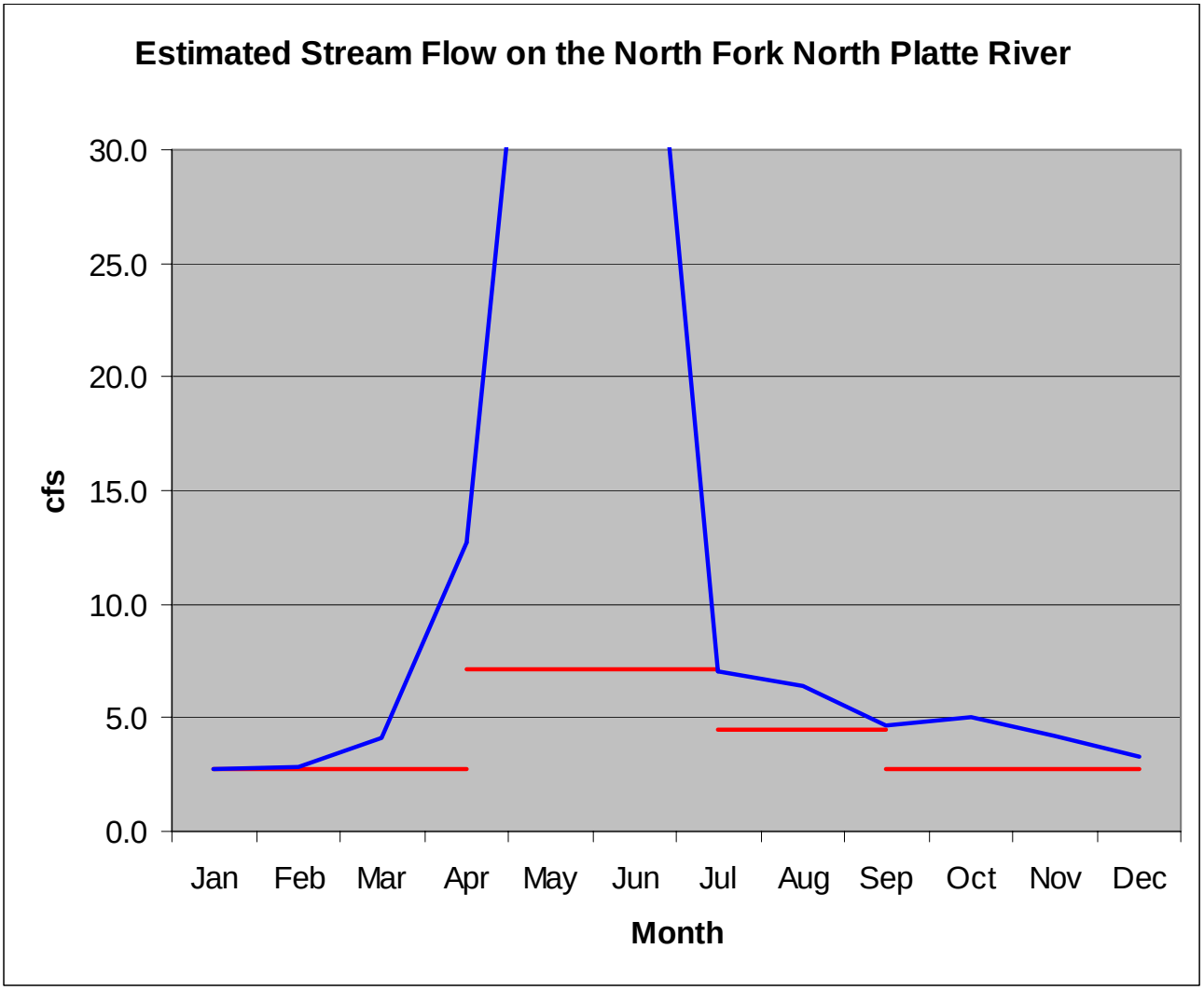
Hydrologic Data

After receiving the cooperating agency's biologic recommendation, the CWCB staff conducted an evaluation of the stream hydrology to determine if water was physically available for an instream flow appropriation. While a historic gaging station was found downstream from the proposed instream flow segment on the North Fork North Platte River, the gage is heavily affected by diversions and has a period of record from 1923 to 1945. With so limited a record, it was necessary to use indirect methods to define the stream's flow regime (the appendix contains the summary of gage data for the two gages mentioned above). The hydrograph below was produced using the USDI Geological Survey's StreamStats system. This methodology estimates streamflow in ungaged basins through statistical analyses of selected watershed characteristics. The StreamStats values for discharge represent the "natural" or undiminished flow of the basin. However, water is diverted from the North Fork North Platte River above the point at which the StreamStats analysis was made. To better estimate the actual (depleted) flows of North Fork North Platte River, the mean monthly diversions (or consumptive use associated with upstream diversions) was subtracted from the mean monthly stream flows of StreamStats. To do this it was assumed that 1) consumptive use was 50% of the amount diverted, and 2) diversion occurred during each day of the irrigation season month, for 24 hours a day.

Table 2 and Figure 1 below show that the recommended summer flow of 7.1 cfs is available on average during the period of April 1 through July 31. Due to limited water availability, the summer flow recommendation has been reduced to 4.5 cfs during the period of August 1 to October 31. In addition, due to limited water availability, the winter flow of 5.6 cfs was reduced to 2.8 cfs during the period of November 1 to March 31.

Table 2: Estimated Stream Flow on North Fork North Platte River:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unadjusted Mean Monthly Stream Flow (cfs)	**2.8**	**2.9**	**4.1**	**13.0**	**56.2**	**65.6**	**17.1**	**7.1**	**5.0**	**5.1**	**4.2**	**3.3**
Mean Monthly Stream Flow Adjusted for Upstream Diversions (cfs)	**2.8**	**2.9**	**4.1**	**12.7**	**49.1**	**46.5**	**7.0**	**6.4**	**4.7**	**5.1**	**4.2**	**3.3**



Existing Water Right Information

Staff has analyzed the water rights tabulation and consulted with the Division Engineer Office (DEO) to identify any potential water availability problems. One decreed surface diversion is located within the proposed reach, the Pleasant Valley Ditch (36 cfs). Two other diversions are located on tributaries to this reach, Beaverdale Ditch (12 cfs) on Goose Creek and Shafer Ditch (48 cfs) on Shafer Creek. Based on this analysis staff has determined that water is available for appropriation on North Fork North Platte River, from the headwaters to the headgate of the Little Nellie Ditch, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid water rights.

CWCB Staff's Instream Flow Recommendation

Based on the CDOW recommendation, staff recommends the Board form its intent to appropriate on the following stream reach:

Segment:

Upper Terminus: Headwaters

Latitude: 40° 53' 5.5"N Longitude: 106° 38' 5.2"W
UTM North: 4528185.6 UTM East: 362289.4
SE SW S29, T11N, R82W 6th PM
1978' East of West Section Line, 749' North of South Section Line

Lower Terminus: Little Nellie Ditch

Latitude: 40° 50' 47.5"N Longitude: 106° 32' 36.4"W
UTM North: 4522866.4 UTM East: 369891.4
NW NW S 18, T10N, R81W 6th PM
1040' East of the West Section Line, 605' South of North Section Line

Counties: Jackson
Length: 9.8 miles
USGS Quad(s): Davis Peak, Pearl and Boettcher Lake
ISF Appropriation: 7.1 cfs (April 1 to July 31)
4.5 cfs (August 1 to October 31)
2.8 cfs (November 1 to March 31)

Figure 2: North Fork North Platte River--Land Ownership

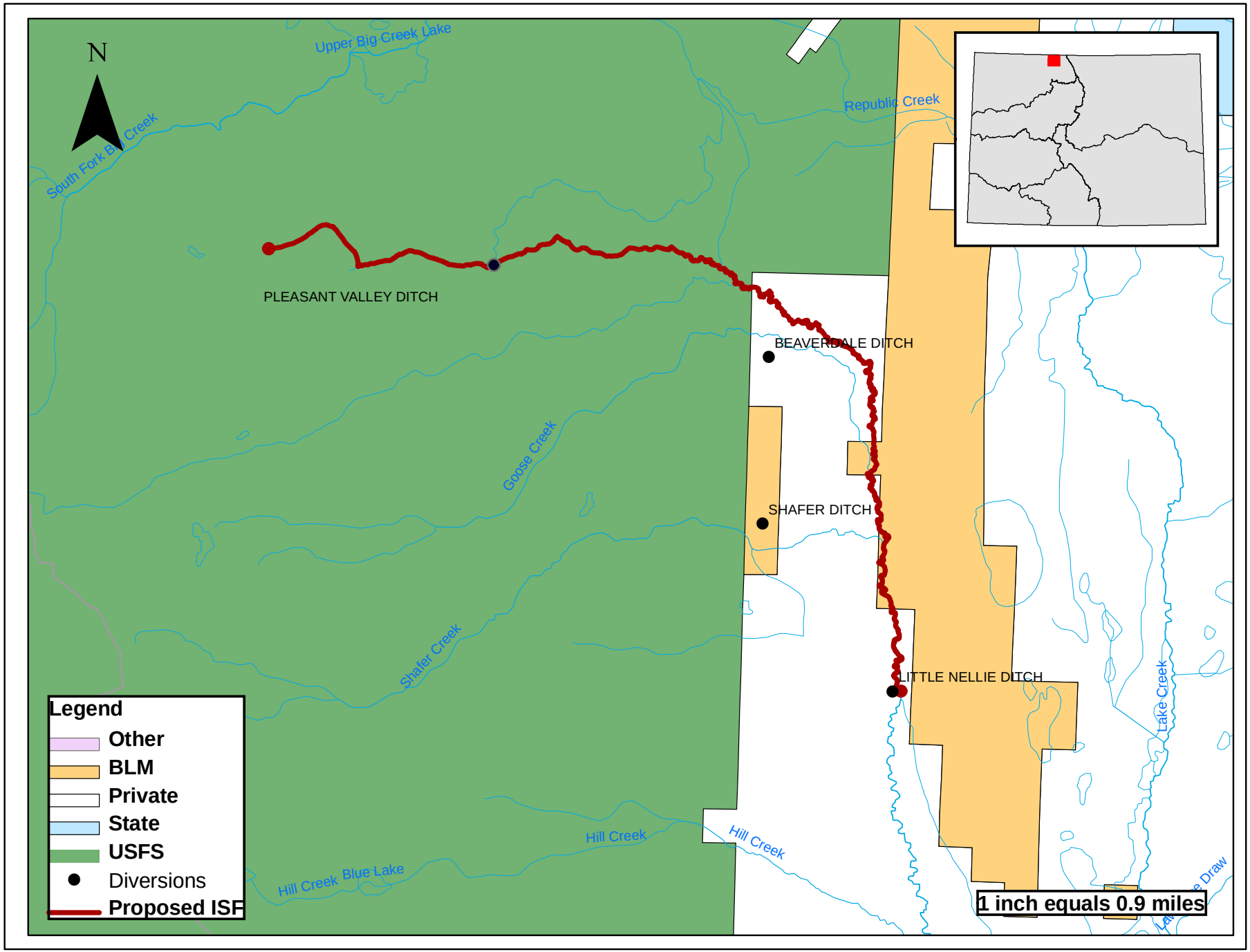
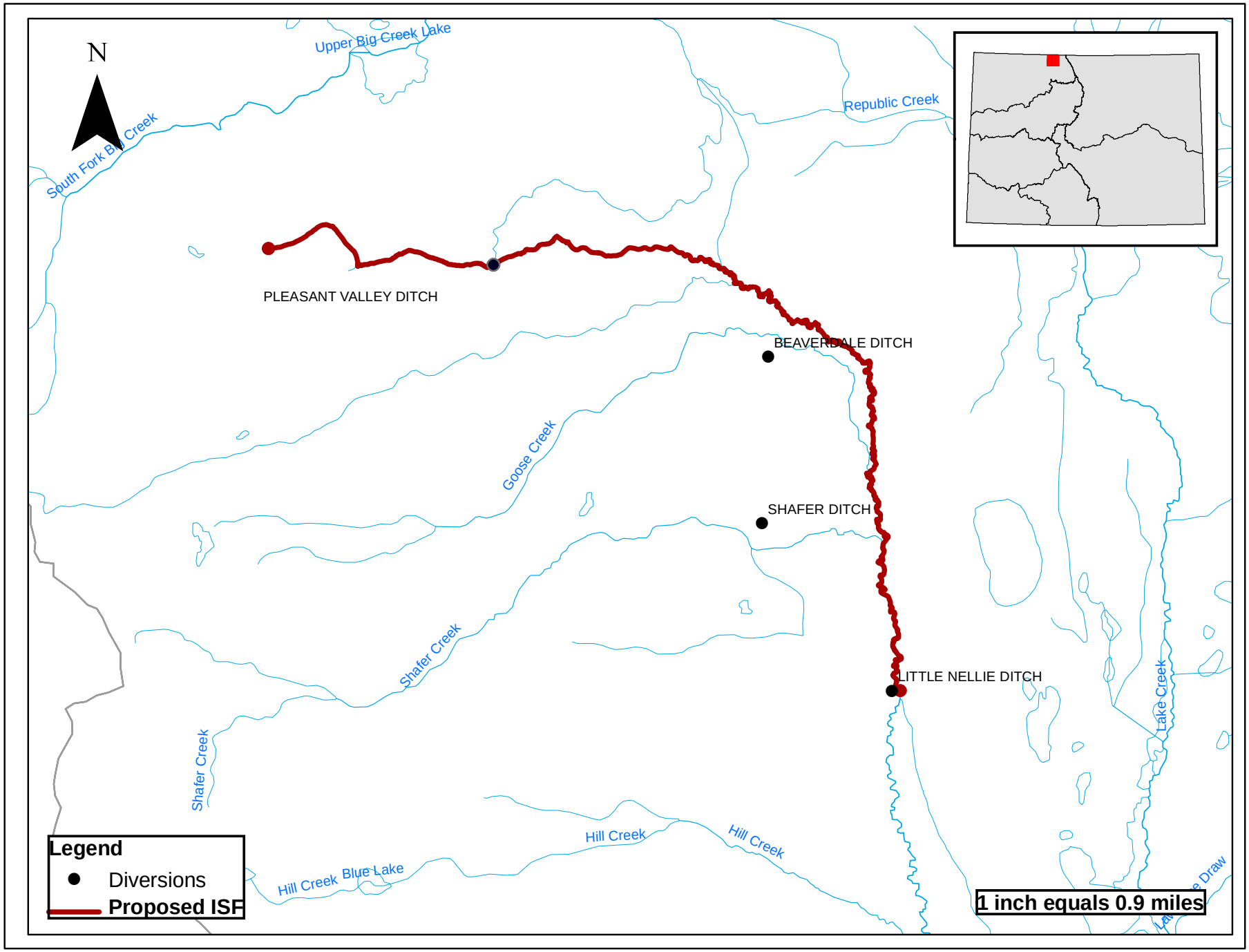


Figure 3: North Fork North Platte River--Water Rights



Field Data

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: North Fork North Platte | CROSS-SECTION NO.: 1

CROSS-SECTION LOCATION: 1/2 mile downstream from confluence with Goose Creek

DATE: 9-29-05 | OBSERVERS: R. Smith, P. Ledford

LEGAL DESCRIPTION | ¼ SECTION: NW | SECTION: 7 | TOWNSHIP: 10(N)S | RANGE: 87 (E)(W) | PM: 6th

COUNTY: Jackson | WATERSHED: N. Platte | WATER DIVISION: 6 | DOW WATER CODE: 11798

MAP(S): USGS: Boettcher Lake 7.5' GPS Zone 13 0369657 4524171 | USFS:

SUPPLEMENTAL DATA

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

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

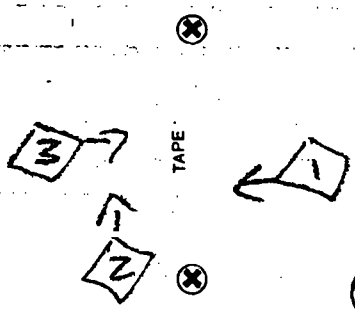
CHANNEL BED MATERIAL SIZE RANGE: gravel to 4" cobbles | PHOTOGRAPHS TAKEN (YES) NO | NUMBER OF PHOTOGRAPHS: 3

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	surveyed
⊗ Tape @ Stake RB	0.0	surveyed
① WS @ Tape LB/RB	0.0	4.68 / 4.70
② WS Upstream	50.0'	4.34
③ WS Downstream	45.0	5.04

SLOPE | 0.70 / 95.0' = 0.007

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
see attached survey																	

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

caddisfly, mayfly, stonefly - all abundant

COMMENTS

Stream Temp: 46°
Ph = 8.5
TDS = 40

Riparian in excellent condition.

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: N. Fk. N. Platte | CROSS-SECTION NO.: 1 | DATE: 9-29-05 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading: 0.4 ft | TIME: 10:40 a

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/G	0.0		3.62								
	0.5		3.94								
W	0.9	5.63	4.65	1.0	0.4			0.86			
1.0	2.5		5.08	0.4							
	4.0		5.02	0.35				0.74			
	5.5		5.14	0.45				1.00			
	7.0		5.00	0.35				0.81			
	8.5		4.95	0.30				0.90			
	10.0		4.95	0.30				0.71			
	11.5		5.05	0.40				1.17			
	13.0		5.08	0.45				1.51			
	14.5		4.98	0.40				1.57			
	16.0		5.14	0.50				1.98			
	17.0		5.14	0.50				1.95			
	18.0		5.25	0.60				2.47			
	19.0		5.19	0.50				0.21			
	20.0		5.16	0.45				2.70			
	21.0		5.15	0.45				2.26			
	22.0		4.98	0.30				1.74			
	23.0		5.02	0.30				2.72			
24.3	24.0	5.07	5.04	0.35				1.52			
W	24.4		4.70	0.40				1.71			
	24.7		3.70								
G	25.0		3.60								
RS	25.4		3.20								

TOTALS:

End of Measurement | Time: 11:30 | Gage Reading: 0.4 ft | CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY:

Data Input & Proofing

STREAM NAME: |N. Fork N. Platte
XS LOCATION: |1/2 mi. downstream from confl. w/ Goose Creek
XS NUMBER: |1
DATE: |9/29/05
OBSERVERS: |R. Smith, P. Ledford

1/4 SEC: |NW
SECTION: |7
TWP: |10 N
RANGE: |81 W
PM: |6th

COUNTY: |Jackson
WATERSHED: |N. Platte
DIVISION: |6
DOW CODE: |11798
USGS MAP: |
USFS MAP: |

TAPE WT: |0.0106 |Level and Rod Survey | lbs / ft
TENSION: |99999 lbs

SLOPE: | 0.007 |ft / ft

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

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

Total Data Points = 26

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
1	LS/GL	0.00	3.62			0.00	0.00	0.00
		0.50	3.94			0.00	0.00	0.00
	W	0.90	4.65	0.00	0.00	0.00	0.00	0.00
		1.00	5.00	0.40	0.80	0.32	0.26	4.60
		2.50	5.08	0.40	0.86	0.60	0.52	4.68
		4.00	5.03	0.35	0.74	0.53	0.39	4.68
		5.50	5.14	0.45	1.00	0.68	0.68	4.69
		7.00	5.00	0.35	0.81	0.53	0.43	4.65
		8.50	4.95	0.30	0.90	0.45	0.41	4.65
		10.00	4.95	0.30	0.71	0.45	0.32	4.65
		11.50	5.05	0.40	1.17	0.60	0.70	4.65
		13.00	5.08	0.45	1.51	0.68	1.02	4.63
		14.50	4.98	0.40	1.57	0.60	0.94	4.58
		16.00	5.14	0.50	1.98	0.63	1.24	4.64
		17.00	5.14	0.50	1.95	0.50	0.98	4.64
		18.00	5.25	0.60	2.47	0.60	1.48	4.65
		19.00	5.19	0.50	0.21	0.50	0.11	4.69
		20.00	5.16	0.45	2.70	0.45	1.22	4.71
		21.00	5.15	0.45	2.26	0.45	1.02	4.70
		22.00	4.98	0.30	1.74	0.30	0.52	4.68
		23.00	5.02	0.30	2.72	0.30	0.82	4.72
		24.00	5.04	0.35	1.51	0.23	0.34	4.69
		24.30	5.09	0.40	1.21	0.08	0.10	4.69
	W	24.40	4.70	0.00	0.00	0.00	0.00	0.00
		24.70	3.70			0.00	0.00	0.00
1	GL	25.00	3.60			0.00	0.00	0.00
	RS	25.40	3.30					
					Totals	9.45	13.46	

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

LOCATION INFORMATION

STREAM NAME:	N. Fork N. Platte
XS LOCATION:	1/2 mi. downstream from confl. w/ Goose Creek
XS NUMBER:	1
DATE:	29-Sep-05
OBSERVERS:	R. Smith, P. Ledford
1/4 SEC:	NW
SECTION:	7
TWP:	10 N
RANGE:	81 W
PM:	6th
COUNTY:	Jackson
WATERSHED:	N. Platte
DIVISION:	6
DOW CODE:	11798
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE: 0.007

INPUT DATA CHECKED BY: .....DATE.....

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

STREAM NAME: N. Fork N. Platte
XS LOCATION: 1/2 mi. downstream from confl. w/ Goose Creek
XS NUMBER: 1

DATA POINTS= 26

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
1 LS/GL	0.00	3.62			0.00		0.00	0.00	0.0%
	0.50	3.94			0.00		0.00	0.00	0.0%
W	0.90	4.65	0.00	0.00	0.00		0.00	0.00	0.0%
	1.00	5.03	0.40	0.80	0.39	0.40	0.32	0.26	1.9%
	2.50	5.08	0.40	0.86	1.50	0.40	0.60	0.52	3.8%
	4.00	5.03	0.35	0.74	1.50	0.35	0.53	0.39	2.9%
	5.50	5.14	0.45	1.00	1.50	0.45	0.68	0.68	5.0%
	7.00	5.00	0.35	0.81	1.51	0.35	0.53	0.43	3.2%
	8.50	4.95	0.30	0.90	1.50	0.30	0.45	0.41	3.0%
	10.00	4.95	0.30	0.71	1.50	0.30	0.45	0.32	2.4%
	11.50	5.05	0.40	1.17	1.50	0.40	0.60	0.70	5.2%
	13.00	5.08	0.45	1.51	1.50	0.45	0.68	1.02	7.6%
	14.50	4.98	0.40	1.57	1.50	0.40	0.60	0.94	7.0%
	16.00	5.14	0.50	1.98	1.51	0.50	0.63	1.24	9.2%
	17.00	5.14	0.50	1.95	1.00	0.50	0.50	0.98	7.2%
	18.00	5.25	0.60	2.47	1.01	0.60	0.60	1.48	11.0%
	19.00	5.19	0.50	0.21	1.00	0.50	0.50	0.11	0.8%
	20.00	5.16	0.45	2.70	1.00	0.45	0.45	1.22	9.0%
	21.00	5.15	0.45	2.26	1.00	0.45	0.45	1.02	7.6%
	22.00	4.98	0.30	1.74	1.01	0.30	0.30	0.52	3.9%
	23.00	5.02	0.30	2.72	1.00	0.30	0.30	0.82	6.1%
	24.00	5.04	0.35	1.51	1.00	0.35	0.23	0.34	2.6%
	24.30	5.09	0.40	1.21	0.30	0.40	0.08	0.10	0.7%
W	24.40	4.70	0.00	0.00	0.40		0.00	0.00	0.0%
	24.70	3.70			0.00		0.00	0.00	0.0%
1 GL	25.00	3.60			0.00		0.00	0.00	0.0%
TOTALS ----------					24.15	0.6 (Max.)	9.45	13.46	100.0%

Manning's n = 0.0467
Hydraulic Radius= 0.391377337

STREAM NAME: N. Fork N. Platte
XS LOCATION: 1/2 mi. downstream from confl. w/ Goose Creek
XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	9.45	9.13	-3.4%
4.43	9.45	15.03	59.0%
4.45	9.45	14.55	54.0%
4.47	9.45	14.08	49.0%
4.49	9.45	13.61	44.0%
4.51	9.45	13.13	39.0%
4.53	9.45	12.66	34.0%
4.55	9.45	12.19	29.0%
4.57	9.45	11.72	24.0%
4.59	9.45	11.25	19.0%
4.61	9.45	10.78	14.0%
4.63	9.45	10.30	9.0%
4.64	9.45	10.07	6.5%
4.65	9.45	9.83	4.0%
4.66	9.45	9.60	1.5%
4.67	9.45	9.36	-0.9%
4.68	9.45	9.13	-3.4%
4.69	9.45	8.89	-5.9%
4.70	9.45	8.66	-8.4%
4.71	9.45	8.42	-10.9%
4.72	9.45	8.19	-13.4%
4.73	9.45	7.95	-15.9%
4.75	9.45	7.48	-20.8%
4.77	9.45	7.02	-25.8%
4.79	9.45	6.55	-30.7%
4.81	9.45	6.08	-35.7%
4.83	9.45	5.61	-40.7%
4.85	9.45	5.14	-45.6%
4.87	9.45	4.67	-50.6%
4.89	9.45	4.20	-55.5%
4.91	9.45	3.74	-60.5%
4.93	9.45	3.27	-65.4%

WATERLINE AT ZERO
AREA ERROR = 4.661

STREAM NAME: N Fork N. Platte
XS LOCATION: 1/2 mi. downstream from confl w/ Goose Creek
XS NUMBER: 1

Constant Manning's n

STAGING TABLE

"GL" = lowest Grassline elevation corrected for sag
"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"	3.62	24.94	1.38	1.63	34.45	26.86	100.0%	1.28	108.25	3.14
	3.66	24.75	1 35	1.59	33.43	26 65	99.2%	1.25	103.47	3 10
	3 71	24.55	1.31	1.54	32.20	26.42	98.4%	1.22	97.75	3 04
	3.76	24.46	1.27	1 49	30.97	26 28	97.8%	1.18	91.97	2.97
	3.81	24.37	1.22	1.44	29.75	26.13	97.3%	1 14	86.32	2 90
	3 86	24.27	1.18	1.39	28.54	25.99	96.8%	1.10	80.82	2.83
	3.91	24.18	1.13	1 34	27 32	25 84	96 2%	1,06	75.47	2.76
	3.96	24.11	1.08	1.29	26.12	25 71	95.7%	1.02	70.23	2.69
	4.01	24.07	1.04	1.24	24.91	25.60	95.3%	0.97	65 10	2.61
	4.06	24.02	0.99	1.19	23.71	25.49	94.9%	0 93	60.12	2.54
	4.11	23.98	0.94	1.14	22.51	25.39	94.5%	0.89	55.29	2 46
	4.16	23.94	0.89	1.09	21.31	25 28	94.1%	0 84	50.62	2.38
	4.21	23.89	0.84	1.04	20.12	25.17	93.7%	0.80	46.11	2.29
	4.26	23.85	0.79	0.99	18.92	25.06	93.3%	0.76	41.76	2.21
	4.31	23.81	0.74	0.94	17.73	24.95	92.9%	0.71	37.58	2.12
	4.36	23.76	0.70	0.89	16.54	24.84	92.5%	0.67	33 57	2.03
	4.41	23.72	0.65	0.84	15.36	24.73	92.1%	0.62	29.74	1.94
	4.46	23.68	0.60	0.79	14.17	24.62	91.7%	0.58	26 09	1.84
	4.51	23.63	0.55	0.74	12.99	24.51	91.3%	0.53	22.63	1.74
	4.56	23.59	0.50	0.69	11.81	24.40	90 8%	0.48	19.37	1.64
	4.61	23.55	0 45	0.64	10 63	24.29	90.4%	0.44	16.30	1.53
"WL"	4.66	23.51	0 40	0.59	9 45	24.18	90.0%	0.39	13 45	1.42
	4.71	23 48	0.35	0.54	8.28	24.08	89.6%	0.34	10.81	1.31
	4.76	23 46	0.30	0 49	7.10	23.97	89.3%	0.30	8.40	1.18
	4.81	23.43	0.25	0.44	5.93	23 87	88.9%	0.25	6.24	1.05
	4.86	23.40	0.20	0.39	4.76	23.77	88.5%	0.20	4.34	0.91
	4.91	23.38	0.15	0.34	3.59	23.66	88.1%	0.15	2.72	0.76
	4 96	21.35	0.11	0.29	2.44	21.56	80.3%	0.11	1.52	0.62
	5.01	17.56	0.08	0.24	1.46	17.69	65.8%	0 08	0.74	0.50
	5.06	10.71	0 07	0.19	0.73	10.76	40.1%	0.07	0.32	0.44
	5.11	6.20	0.06	0.14	0.35	6.21	23 1%	0.06	0.14	0.39
	5.16	2.77	0.04	0.09	0.11	2.77	10.3%	0.04	0.03	0.31
	5.21	1.00	0.02	0.04	0.02	1.00	3.7%	0.02	0.00	0.19

3/3 : 6.24 cfs
2/3 : 5.56 cfs

STREAM NAME N Fork N. Platte
XS LOCATION 1/2 mi. downstream from confl w/ Goose Creek
XS NUMBER: 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	13 46	cfs
CALCULATED FLOW (Qc)=	13.45	cfs
(Qm-Qc)/Qm * 100 =	0.1	%
MEASURED WATERLINE (WLm)=	4.68	ft
CALCULATED WATERLINE (WLc)=	4.66	ft
(WLm-WLc)/WLm * 100 =	0.3	%
MAX MEASURED DEPTH (Dm)=	0.60	ft
MAX CALCULATED DEPTH (Dc)=	0.59	ft
(Dm-Dc)/Dm * 100	1.9	%
MEAN VELOCITY=	1.42	ft/sec
MANNING'S N=	0.047	
SLOPE=	0 007	ft/ft
4 * Qm =	5.4	cfs
2 5 * Qm=	33.6	cfs

RECOMMENDED INSTREAM FLOW:

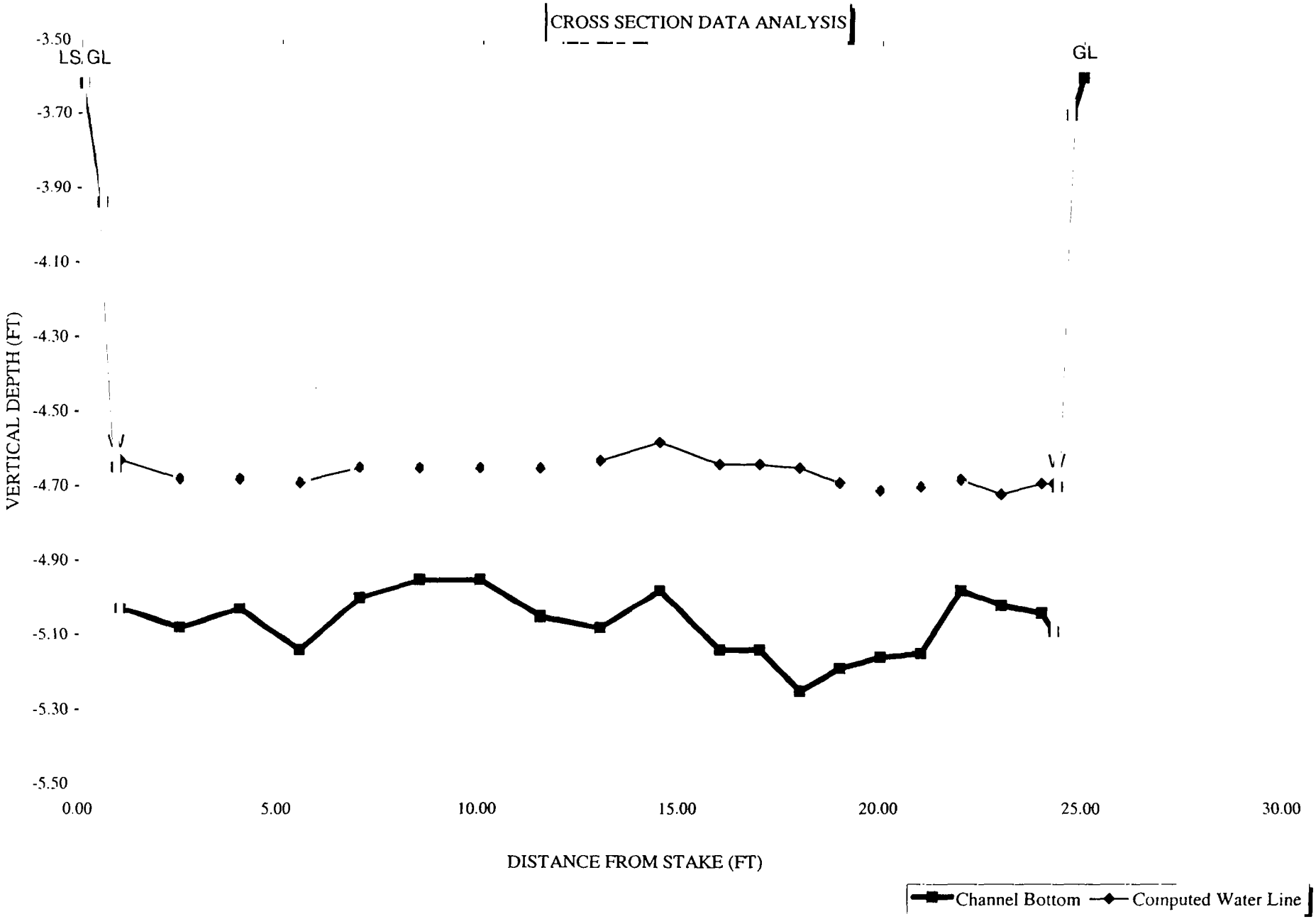
FLOW (CFS)	PERIOD

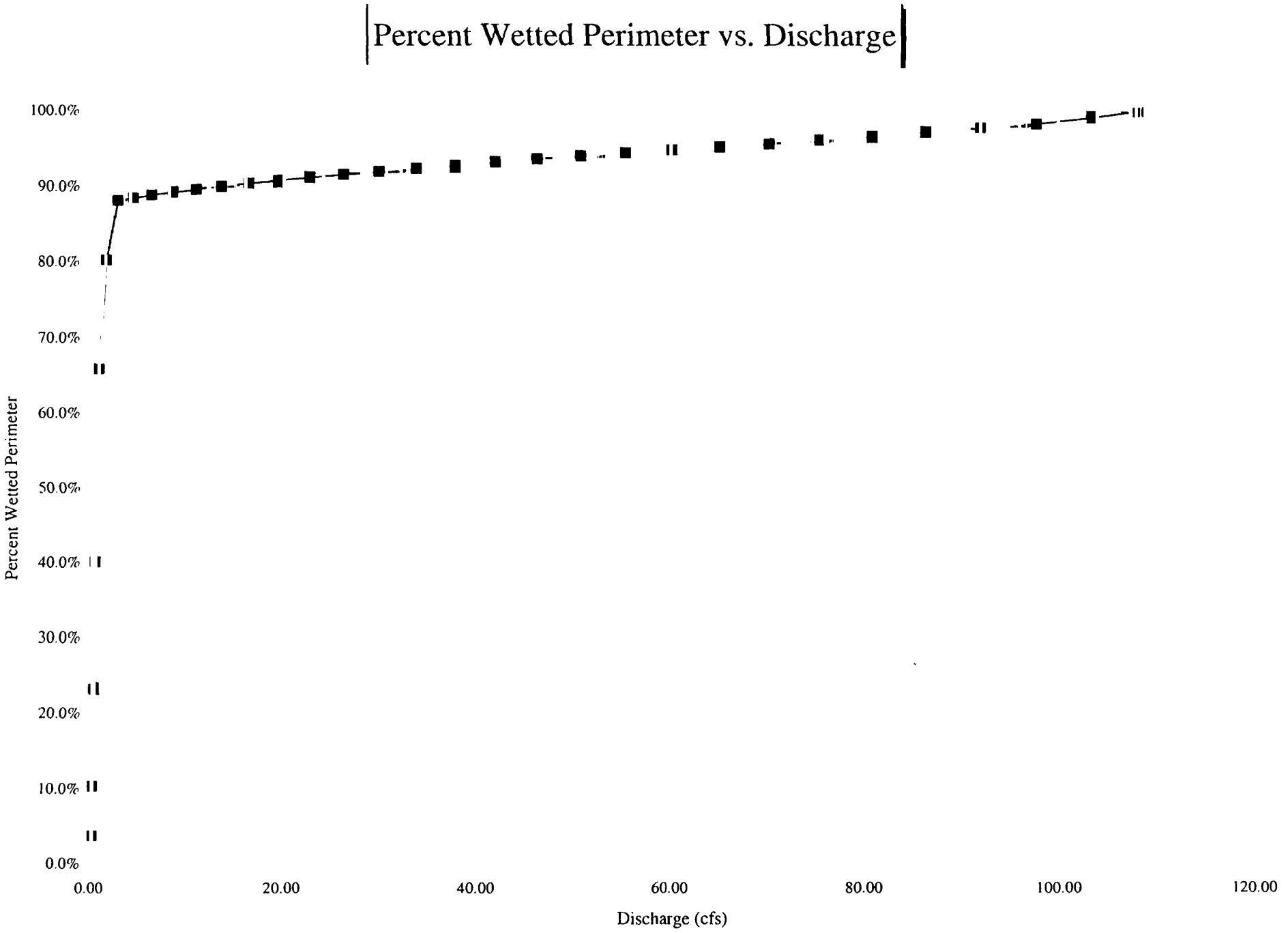
RATIONALE FOR RECOMMENDATION:

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

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

N. Fork N. Platte




Percent Wetted Perimeter vs. Discharge
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Percent Wetted Perimeter
0.00
20.00
40.00
60.00
80.00
100.00
120.00
Discharge (cfs)

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: North Fork North Platte | CROSS-SECTION NO.: 2

CROSS-SECTION LOCATION: 1/4 mile downstream from confluence w/ Goose Creek

DATE: 9-29-05 | OBSERVERS:

LEGAL DESCRIPTION | ¼ SECTION: NW | SECTION: 7 | TOWNSHIP: 10 (N)/S | RANGE: 81 E(W) | PM: 6th

COUNTY: Jackson | WATERSHED: North Platte | WATER DIVISION: 6 | DOW WATER CODE: 11798

MAP(S): USGS: Boettcher Lake 7.5' Zone 13 0369696 GPS 4524309

USFS:

SUPPLEMENTAL DATA

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

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

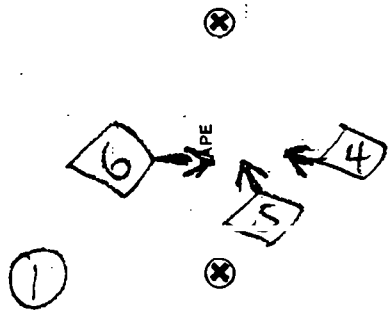
CHANNEL BED MATERIAL SIZE RANGE: gravel to 4" cobbles | PHOTOGRAPHS TAKEN: YES/NO | NUMBER OF PHOTOGRAPHS: 3

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	surveyed
⊗ Tape @ Stake RB	0.0	surveyed
① WS @ Tape LB/RB	0.0	6.78 / 6.75
② WS Upstream	44.0	6.55
③ WS Downstream	50.0	6.80

SLOPE | 0.25 / 95.0' = 0.003

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
see attached survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME.

caddisfly, mayfly, stonefly - all abundant

COMMENTS

Temp = 46°
Ph = 8.5
TDS = 40

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: N. Fk, N. Platte | CROSS-SECTION NO.: 2 | DATE: 9-29-05 | SHEET __ OF __

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: 0.4 ft | TIME: Noon

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	24.5		5.46								
G	24.0		5.62								
W	23.5		6.78	Ø							
	23.4		7.72	0.95				1.46			
	22.0		7.66	0.95				1.71			
	21.0		7.62	0.9				1.29			
	20.0		7.56	0.8				1.58			
	19.0		7.46	0.95				0.87			
	18.0		7.36	0.6				1.07			
	17.0		7.32	0.5				1.28			
	16.0		7.18	0.4				1.15			
	15.0		7.18	0.45				1.00			
	13.5		7.18	0.4				1.26			
	12.0		7.10	0.3				1.65			
	10.5		7.10	0.4				1.92			
	9.0		7.20	0.4				1.88			
	7.5		7.30	0.5				1.81			
	6.0		7.07	0.3				1.74			
	4.5		7.22	0.4				0.81			
	3.0		7.21	0.4				0.36			
	1.5		7.38	0.55				0.32			
W	0.9		7.32	0.55				0.16			
W	0.8		6.75	Ø							
DS/G	0.3		5.34								

TOTALS:

End of Measurement | Time: 2:30 | Gage Reading: 0.4 ft | CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY:

Data Input & Proofing

STREAM NAME:	N. Fork N. Platte River
XS LOCATION:	1/4 mi. downstream from confl. w/ Goose Crk
XS NUMBER:	2
DATE:	9/29/05
OBSERVERS:	R. Smith
1/4 SEC:	NW
SECTION:	7
TWP:	10 N
RANGE:	81 W
PM:	6th
COUNTY:	Jackson
WATERSHED:	North Platte
DIVISION:	6
DOW CODE:	11798
USGS MAP:	
USFS MAP:	
	Level and Rod Survey
TAPE WT:	0.0106 lbs / ft
TENSION:	99999 lbs
SLOPE:	0.003 ft / ft

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

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

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
			Total Data Points = 23					
1	RS/GL	0.30	5.34			0.00	0.00	0.00
	W	0.80	6.75	0.00		0.00	0.00	0.00
		0.90	7.32	0.55	0.16	0.19	0.03	6.77
		1.50	7.36	0.55	0.32	0.58	0.18	6.83
		3.00	7.21	0.40	0.36	0.60	0.22	6.81
		4.50	7.22	0.40	0.81	0.60	0.49	6.82
		6.00	7.07	0.30	1.74	0.45	0.78	6.77
		7.50	7.30	0.50	1.81	0.75	1.36	6.80
		9.00	7.20	0.40	1.88	0.60	1.13	6.80
		10.50	7.10	0.40	1.92	0.60	1.15	6.70
		12.00	7.10	0.30	1.65	0.45	0.74	6.80
		13.50	7.18	0.40	1.26	0.60	0.76	6.78
		15.00	7.18	0.45	1.00	0.56	0.56	6.73
		16.00	7.18	0.40	1.15	0.40	0.46	6.78
		17.00	7.32	0.50	1.28	0.50	0.64	6.82
		18.00	7.36	0.60	1.07	0.60	0.64	6.76
		19.00	7.46	0.75	0.87	0.75	0.65	6.71
		20.00	7.56	0.80	1.58	0.80	1.26	6.76
		21.00	7.62	0.90	1.29	0.90	1.16	6.72
		22.00	7.66	0.95	1.71	1.14	1.95	6.71
		23.40	7.72	0.95	1.46	0.71	1.04	6.77
	W	23.50	6.78	0.00		0.00	0.00	0.00
1	GL	24.00	5.62			0.00	0.00	0.00
	LS	24.50	5.46					
					Totals	11.79	15.21	

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

LOCATION INFORMATION

STREAM NAME:	N. Fork N. Platte River
XS LOCATION:	1/4 mi. downstream from confl. w/ Goose Crk
XS NUMBER:	2
DATE:	29-Sep-05
OBSERVERS:	R. Smith
1/4 SEC:	NW
SECTION:	7
TWP:	10 N
RANGE:	81 W
PM:	6th
COUNTY:	Jackson
WATERSHED:	North Platte
DIVISION:	6
DOW CODE:	11798
USGS MAP:	0
USFS MAP:	0

SUPPLEMENTAL DATA

TAPE WT:	0.0106
TENSION:	99999

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

CHANNEL PROFILE DATA

SLOPE:	0.003

INPUT DATA CHECKED BY: .....DATE.....

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

STREAM NAME: N. Fork N. Platte River
XS LOCATION: 1/4 mi. downstream from confl. w/ Goose Crk
XS NUMBER: 2

DATA POINTS= 23

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
1 RS/GL	0.30	5.34			0.00		0.00	0.00	0.0%
W	0.80	6.75	0.00		0.00		0.00	0.00	0.0%
	0.90	7.32	0.55	0.16	0.58	0.55	0.19	0.03	0.2%
	1.50	7.38	0.55	0.32	0.60	0.55	0.58	0.18	1.2%
	3.00	7.21	0.40	0.36	1.51	0.40	0.60	0.22	1.4%
	4.50	7.22	0.40	0.81	1.50	0.40	0.60	0.49	3.2%
	6.00	7.07	0.30	1.74	1.51	0.30	0.45	0.78	5.1%
	7.50	7.30	0.50	1.81	1.52	0.50	0.75	1.36	8.9%
	9.00	7.20	0.40	1.88	1.50	0.40	0.60	1.13	7.4%
	10.50	7.10	0.40	1.92	1.50	0.40	0.60	1.15	7.6%
	12.00	7.10	0.30	1.65	1.50	0.30	0.45	0.74	4.9%
	13.50	7.18	0.40	1.26	1.50	0.40	0.60	0.76	5.0%
	15.00	7.18	0.45	1.00	1.50	0.45	0.56	0.56	3.7%
	16.00	7.18	0.40	1.15	1.00	0.40	0.40	0.46	3.0%
	17.00	7.32	0.50	1.28	1.01	0.50	0.50	0.64	4.2%
	18.00	7.36	0.60	1.07	1.00	0.60	0.60	0.64	4.2%
	19.00	7.46	0.75	0.87	1.00	0.75	0.75	0.65	4.3%
	20.00	7.56	0.80	1.58	1.00	0.80	0.80	1.26	8.3%
	21.00	7.62	0.90	1.29	1.00	0.90	0.90	1.16	7.6%
	22.00	7.66	0.95	1.71	1.00	0.95	1.14	1.95	12.8%
	23.40	7.72	0.95	1.46	1.40	0.95	0.71	1.04	6.8%
W	23.50	6.78	0.00		0.95		0.00	0.00	0.0%
1 GL	24.00	5.62			0.00		0.00	0.00	0.0%
TOTALS ----------					24.09	0.95 (Max.)	11.79	15.21	100.0%

Manning's n = 0.0392
Hydraulic Radius= 0.489108631

STREAM NAME: N. Fork N. Platte River
XS LOCATION: 1/4 mi. downstream from confl. w/ Goose Crk
XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	11.79	11.95	1.4%
6.52	11.79	17.65	49.8%
6.54	11.79	17.19	45.9%
6.56	11.79	16.73	42.0%
6.58	11.79	16.28	38.1%
6.60	11.79	15.82	34.2%
6.62	11.79	15.36	30.4%
6.64	11.79	14.91	26.5%
6.66	11.79	14.45	22.6%
6.68	11.79	14.00	18.8%
6.70	11.79	13.54	14.9%
6.72	11.79	13.09	11.0%
6.73	11.79	12.86	9.1%
6.74	11.79	12.63	7.2%
6.75	11.79	12.40	5.2%
6.76	11.79	12.18	3.3%
6.77	11.79	11.95	1.4%
6.78	11.79	11.72	-0.5%
6.79	11.79	11.50	-2.5%
6.80	11.79	11.27	-4.4%
6.81	11.79	11.04	-6.3%
6.82	11.79	10.81	-8.2%
6.84	11.79	10.36	-12.1%
6.86	11.79	9.91	-15.9%
6.88	11.79	9.45	-19.8%
6.90	11.79	9.00	-23.6%
6.92	11.79	8.55	-27.5%
6.94	11.79	8.09	-31.3%
6.96	11.79	7.64	-35.2%
6.98	11.79	7.19	-39.0%
7.00	11.79	6.74	-42.8%
7.02	11.79	6.28	-46.7%

WATERLINE AT ZERO
AREA ERROR = 6.772

STREAM NAME: N. Fork N. Platte River
XS LOCATION: 1/4 mi. downstream from confl. w/ Goose Crk
XS NUMBER: 2

Constant Manning's n

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
"GL"	5.62	23.60	1.63	2.10	38.46	26.56	100.0%	1.45	102.33	2.66
	5.77	23.48	1.49	1.95	34.87	26.23	98.8%	1.33	87.66	2.51
	5.82	23.44	1.44	1.90	33.70	26.12	98.4%	1.29	83.03	2.46
	5.87	23.40	1.39	1.85	32.53	26.01	98.0%	1.25	78.49	2.41
	5.92	23.36	1.34	1.80	31.36	25.91	97.6%	1.21	74.05	2.36
	5.97	23.32	1.29	1.75	30.19	25.80	97.1%	1.17	69.70	2.31
	6.02	23.28	1.25	1.70	29.03	25.69	96.7%	1.13	65.46	2.26
	6.07	23.25	1.20	1.65	27.86	25.58	96.3%	1.09	61.32	2.20
	6.12	23.21	1.15	1.60	26.70	25.48	95.9%	1.05	57.28	2.15
	6.17	23.17	1.10	1.55	25.54	25.37	95.5%	1.01	53.34	2.09
	6.22	23.13	1.05	1.50	24.39	25.26	95.1%	0.97	49.52	2.03
	6.27	23.09	1.01	1.45	23.23	25.15	94.7%	0.92	45.80	1.97
	6.32	23.05	0.96	1.40	22.08	25.05	94.3%	0.88	42.19	1.91
	6.37	23.01	0.91	1.35	20.93	24.94	93.9%	0.84	38.70	1.85
	6.42	22.97	0.86	1.30	19.78	24.83	93.5%	0.80	35.32	1.79
	6.47	22.93	0.81	1.25	18.63	24.72	93.1%	0.75	32.07	1.72
	6.52	22.89	0.76	1.20	17.48	24.62	92.7%	0.71	28.93	1.65
	6.57	22.85	0.72	1.15	16.34	24.51	92.3%	0.67	25.92	1.59
	6.62	22.81	0.67	1.10	15.20	24.40	91.9%	0.62	23.04	1.52
	6.67	22.77	0.62	1.05	14.06	24.29	91.5%	0.58	20.29	1.44
	6.72	22.73	0.57	1.00	12.92	24.19	91.1%	0.53	17.68	1.37
"WL"	6.77	22.70	0.52	0.95	11.78	24.08	90.7%	0.49	15.21	1.29
	6.82	22.68	0.47	0.90	10.65	23.98	90.3%	0.44	12.89	1.21
	6.87	22.67	0.42	0.85	9.52	23.88	89.9%	0.40	10.71	1.13
	6.92	22.65	0.37	0.80	8.38	23.78	89.5%	0.35	8.70	1.04
	6.97	22.64	0.32	0.75	7.25	23.68	89.2%	0.31	6.85	0.94
	7.02	22.63	0.27	0.70	6.12	23.57	88.8%	0.26	5.18	0.85
	7.07	22.58	0.22	0.65	4.99	23.44	88.3%	0.21	3.70	0.74
	7.12	19.49	0.20	0.60	3.92	20.25	76.3%	0.19	2.73	0.70
	7.17	16.96	0.18	0.55	3.01	17.63	66.4%	0.17	1.93	0.64
	7.22	10.83	0.22	0.50	2.33	11.41	42.9%	0.20	1.68	0.72
	7.27	8.95	0.21	0.45	1.84	9.42	35.5%	0.20	1.29	0.70
	7.32	7.47	0.19	0.40	1.43	7.85	29.6%	0.18	0.96	0.67
	7.37	5.46	0.20	0.35	1.11	5.79	21.8%	0.19	0.77	0.69
	7.42	4.81	0.18	0.30	0.86	5.09	19.2%	0.17	0.55	0.64
	7.47	4.30	0.15	0.25	0.63	4.54	17.1%	0.14	0.35	0.56
	7.52	3.80	0.11	0.20	0.43	3.98	15.0%	0.11	0.20	0.47
	7.57	3.21	0.08	0.15	0.25	3.35	12.6%	0.08	0.09	0.37
	7.62	2.35	0.05	0.10	0.11	2.44	9.2%	0.05	0.03	0.27
	7.67	1.12	0.02	0.05	0.03	1.16	4.4%	0.02	0.00	0.17

3/3 = 7.96

2/3 = out of range

STREAM NAME: N. Fork N. Platte River
XS LOCATION: 1/4 mi. downstream from confl. w/ Goose Crk
XS NUMBER: 2

SUMMARY SHEET

MEASURED FLOW (Qm)=	15.21	cfs
CALCULATED FLOW (Qc)=	15.21	cfs
(Qm-Qc)/Qm * 100 =	0.0	%
MEASURED WATERLINE (WLm)=	6.77	ft
CALCULATED WATERLINE (WLc)=	6.77	ft
(WLm-WLc)/WLm * 100 =	-0.1	%
MAX MEASURED DEPTH (Dm)=	0.95	ft
MAX CALCULATED DEPTH (Dc)=	0.95	ft
(Dm-Dc)/Dm * 100	0.2	%
MEAN VELOCITY=	1.29	ft/sec
MANNING'S N=	0.039	
SLOPE=	0.003	ft/ft
.4 * Qm =	6.1	cfs
2.5 * Qm=	38.0	cfs

RECOMMENDED INSTREAM FLOW:

FLOW (CFS)	PERIOD

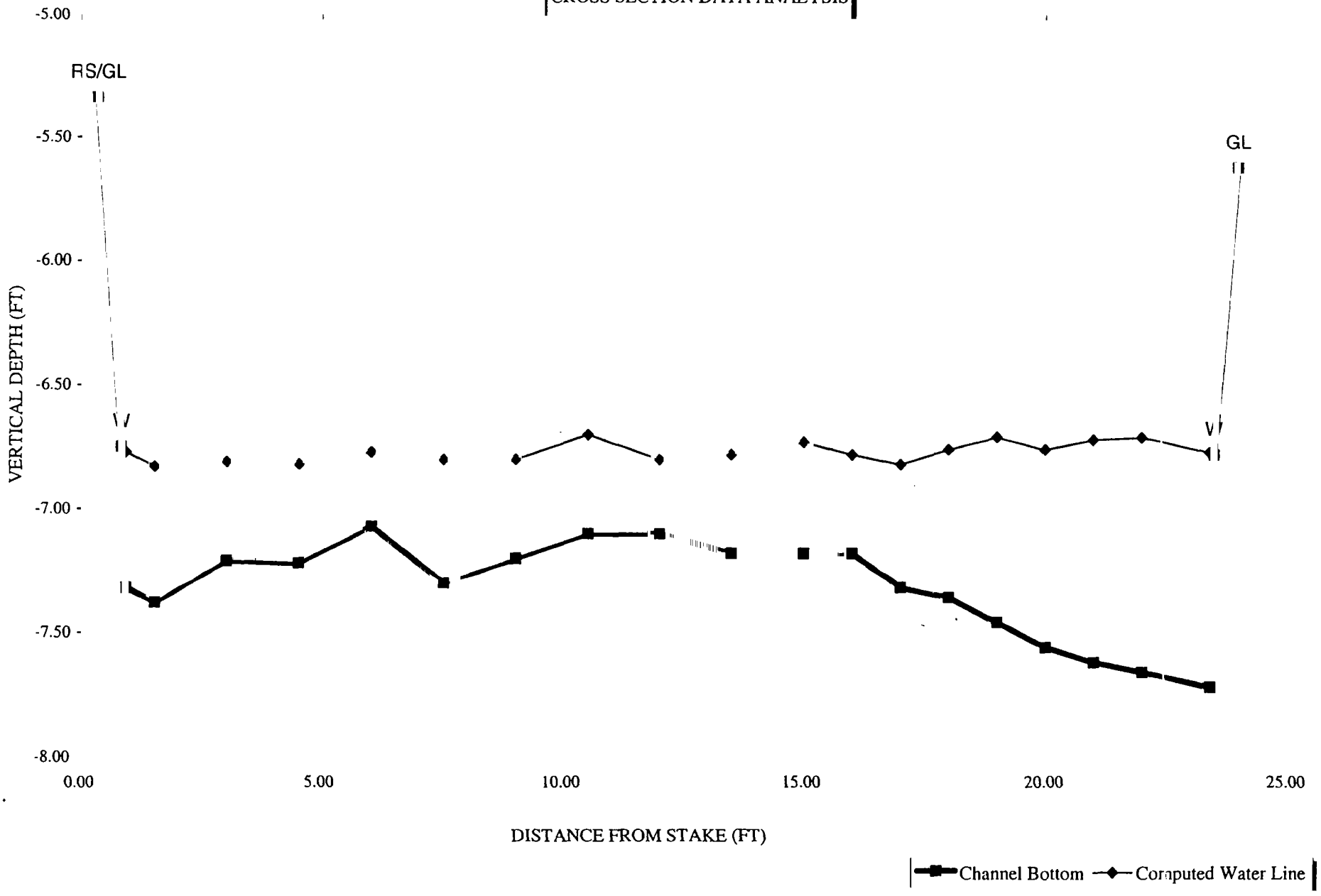
RATIONALE FOR RECOMMENDATION:

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

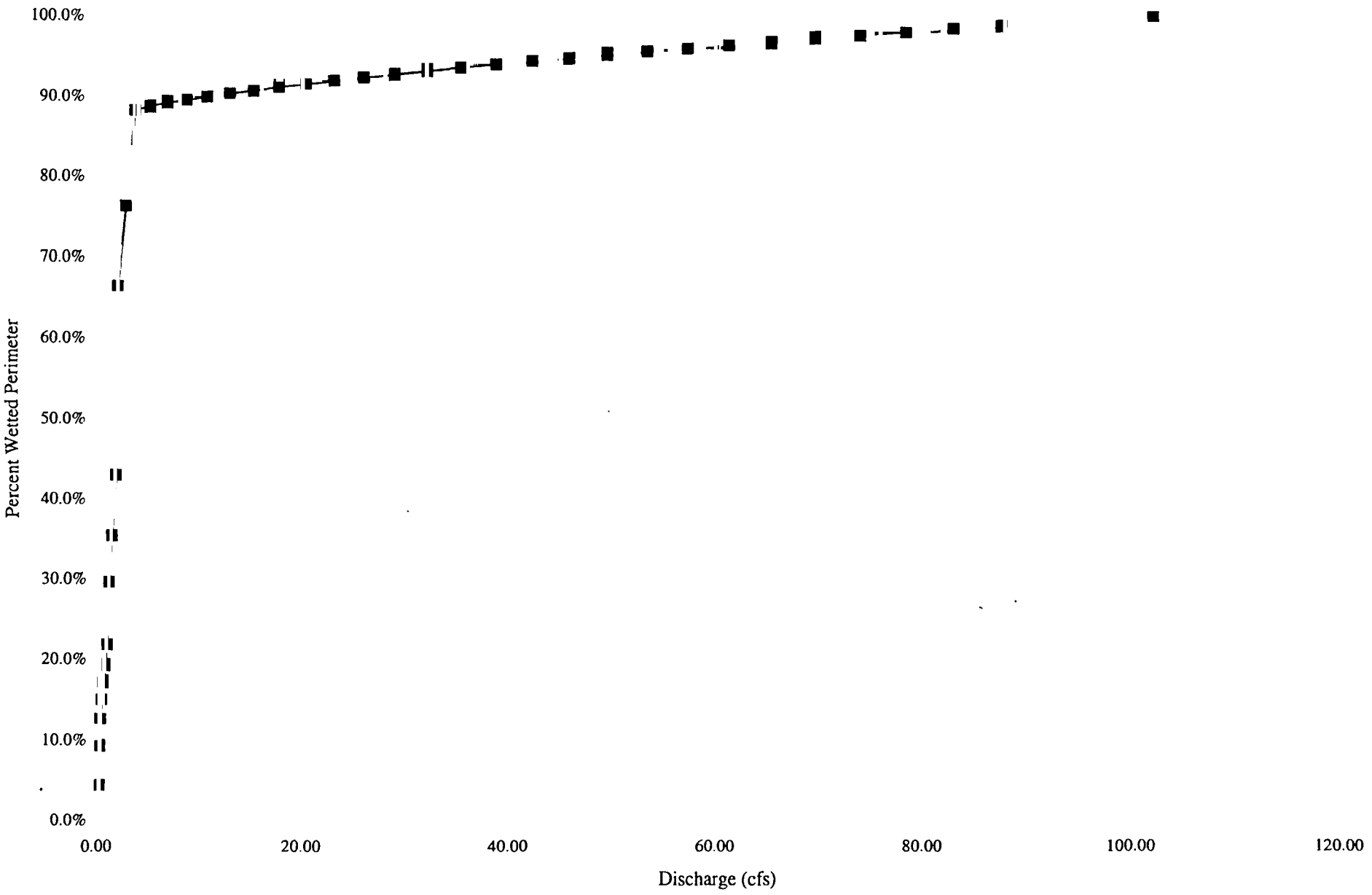
CWCB REVIEW BY: ..... DATE:.....

N. Fork N. Platte River

CROSS SECTION DATA ANALYSIS



Percent Wetted Perimeter vs. Discharge



Water: North Fork of North Platte River
Date: 08/10/2005
Location: Boetcher Ranch - BLM
Drainage: NP
Water Code: 11798
UTM Zone: 13T
UTM X: 369850
UTM Y: 4522873
Station Length = 655
Station Width = 23
Crew:K2 Crew
Notes: 1st Pass YOY Count = 4, 2nd Pass YOY Count = 1

Species	Count	Length (m	Weight (g	Status	Mark	TagID
LOC	1	440	910	1		
LOC	1	430	770	1		
LOC	1	463	1055	1		
LOC	1	540	1900	1		
LOC	1	425	800	1		
LOC	1	490	1170	1		
LOC	1	480	1150	1		
LOC	1	340	440	1		
LOC	1	440	950	1		
LOC	1	420	760	1		
LOC	1	355	500	1		
LOC	1	400	675	1		
LOC	1	470	1160	1		
LOC	1	370	580	1		
LOC	1	378	650	1		
LOC	1	280	220	1		
LOC	1	305	300	1		
LOC	1	230	140	1		
LOC	1	155	50	1		
LOC	1	111	5	1		
LOC	1	152	15	1		
LOC	1	110	5	1		
LOC	1	135	15	1		
LOC	1	105	7	1		
LOC	1	120	8	1		
LOC	1	110	7	1		
LOC	1	110	6	1		
LOC	1	110	5	1		
LOC	1	90	3	1		
BRK	1	145	30	1		
LGS	1	160	45	1		
LOC	1	470	1125	2		
LOC	1	480	1250	2		
LOC	1	460	1150	2		
LOC	1	470	1200	2		

LOC	1	365	500	2
LOC	1	220	115	2
LOC	1	210	100	2
LOC	1	125	20	2
BRK	1	315	375	2
LOC	1	195	80	2
LOC	1	105	13	2
LOC	1	115	17	2
LOC	1	110	13	2
LOC	1	105	12	2

Water Availability

StreamStats

North Fork North Platte River

Location: above confluence with Hill Creek

Streamflow Statistics Report

Date: Tue Dec 12 2006 13:25:29
Site Location: Colorado
Latitude: 40.8188
Longitude: -106.5400
Drainage Area: 31.2 mi2

Peak Flow Basin Characteristics			
100% Mountain Region Peak Flow (31.2 mi2)			
Parameter	**Value**	**Min**	**Max**
Drainage Area (square miles)	31.2	5.5	945
Mean Basin Slope ft per ft (dimensionless)	0.00 (below min value 0.126)	0.126	0.554

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Low Flow Basin Characteristics			
100% Mountain Region Low Flow (31.2 mi2)			
Parameter	**Value**	**Min**	**Max**
Drainage Area (square miles)	31.2	1	1150
Mean Basin Elevation (feet)	9430	8400	12200
Mean Annual Precipitation (inches)	22.7	17.5	39.4

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Streamflow Statistics

Statistic	Flow (ft^3/s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2	108				
PK5	184				
PK10	243				
PK25	321				
PK50	383				
PK100	448				
PK200	513				
PK500	603				

Streamflow Statistics

Statistic	Flow (ft^3/s)	Estimation Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Q1	2.78	49			
Q2	2.85	49			
Q3	4.13	43			
Q4	13	56			
Q5	56.2	58			
Q6	68.6	510			
Q7	17.1	63			
Q8	7.1	70			
Q9	5.04	63			
QA	19.4	43			
Q10	5.07	50			
Q11	4.19	43			
Q12	3.27	45			
Low-Flow Statistics					
M7D2Y	1.57	62			
M7D10Y	0.74	100			
M7D50Y	0.41	160			

StreamStats

North Fork North Platte River

Location: above confluence with Hill Creek

Basin Characteristics Report

Date: Tue Dec 12 2006 13:29:51
Latitude: 40.8188
Longitude: -106.5400

Parameter	Value
Area that drains to a point on a stream in square miles	31.2
Maximum - minimum basin elevation in feet	3830
Mean Basin Elevation in feet	9430
Maximum basin elevation in feet	12200
Minimum basin elevation in feet	8340
Mean basin slope in percent, computed from 10 m DEM	21.8
Mean annual precipitation in inches (undajusted)	24.5
Mean basin slope determined using the grid-sampling method (dimensionless)	0.20
Percent of area with slope greater than 30%	24.3
Percent of area with slope greater than 30% and facing North	8.89
Percent of area covered by forest	59.7
Mean annual precipitation in inches (adjusted)	22.7
Percentage of basin above 7500 ft elevation	100
Elevation at basin outlet in feet	8340

USGS
science for a changing world

StreamStats: A U.S. Geological Survey Web Application for Stream Information

by Kernell G. Ries III, Peter A. Steeves, Jacqueline D. Coles, Alan H. Rea, and David W. Stewart

Introduction

The U.S. Geological Survey (USGS) provides streamflow and other stream-related information needed to protect people and property from floods, to plan and manage water resources, and to protect water quality. Streamflow statistics provided by the USGS, such as the 100-year flood, the annual mean flow, and the 7-day 10-year low flow (7Q10), frequently are used by engineers, land managers, biologists, and many others to help guide decisions in their everyday work. For example, streamflow statistics are used for flood-plain mapping, which is used as the basis for setting insurance rates and zoning land use. Streamflow statistics also are used for dam, bridge, and culvert design; water-supply planning and management, and water-use appropriations and permitting; wastewater and industrial discharge permitting; hydropower facility design and regulation; and habitat preservation for protection of endangered species. In addition, researchers, planners, regulators, and others often need to know the physical and climatic characteristics (basin characteristics) of the drainage basins upstream from locations of interest to help them understand the mechanisms that control water availability and water quality at these locations.

Streamflow statistics can be needed at any location along a stream. Commonly, the statistics are computed from available data when they are needed at the locations of USGS data-collection stations, which include streamgaging stations, where streamflow data are collected continuously; partial-record stations, where streamflow measurements

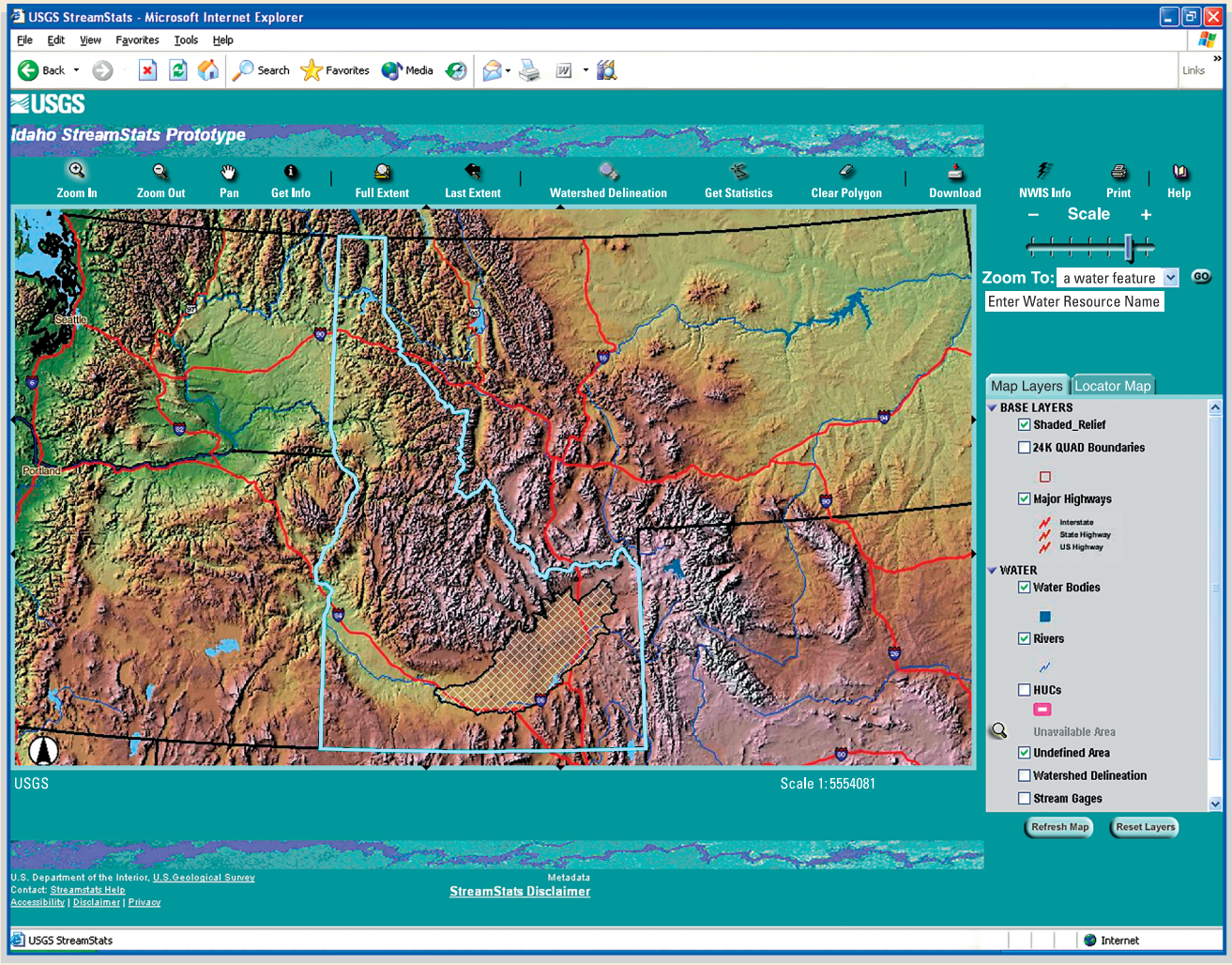


Figure 1. View of the StreamStats user interface zoomed in to Idaho.

are collected systematically over a period of years to estimate peak-flow or low-flow statistics; and miscellaneous-measurement stations, where streamflow measurements usually are collected for specific hydrologic studies with various objectives. More often, however, the statistics are needed at ungaged sites, where no observed data are available to compute the statistics.

StreamStats is a map-based Web application that makes it easy for users to obtain streamflow statistics, basin characteristics, and other information for user-selected USGS data-collection stations and ungaged sites of interest. If a user selects the location of a data-collection station, StreamStats will provide previously published information for the station from a database. If a user selects a location where no data are available (an ungaged site), StreamStats will run a Geographic Information System (GIS) program to measure basin characteristics and estimate streamflow statistics for the site. These estimates assume that natural flow conditions exist at the ungaged site. In the past, it could take an experienced person more than a day to determine the estimates. StreamStats reduces the effort to only a few minutes.

StreamStats was developed cooperatively by the USGS and the Environmental Systems Research Institute, Inc. (ESRI, *http://www.esri.com*), and was designed for national implementation. The application consists of five major components: (1) a user interface that displays maps and allows users to select stream locations where they want streamflow statistics information (fig. 1), (2) a database that contains previously published streamflow statistics and descriptive information for USGS data-collection stations, (3) an automated GIS process that determines drainage boundaries for user-selected ungaged sites and measures the basin characteristics for those sites, (4) a GIS database that stores base-map data needed for users to locate sites of interest and other map data needed for measuring basin characteristics, and (5) an automated process that takes the measured basin characteristics for ungaged sites as input, solves regression equations to estimate various streamflow statistics, and outputs the estimates for display to the user in a Web browser window. Each of these components are described below and guidance for using the application is provided.

StreamStats User Interface

The StreamStats user interface (fig. 1) allows users to navigate to areas of the map and select gaged and ungaged sites of interest. The largest part of the user interface consists of the Map Frame, which displays default and selected map layers. The Map Layers Frame, located to the right of the Map Frame, shows the layers that are or can be displayed on the Map Frame, and allows users to change the layers that are displayed. Above the Map Frame is a series of buttons that allow navigation by zooming in and out (going to a larger or smaller scale view while the map is centered on the same position), panning (moving the center of view in any direction), or returning to the previous or original map extent. Additional buttons allow the user to query for information on features in selected map layers, delineate drainage boundaries for ungaged sites, get streamflow statistics for ungaged sites, clear drainage boundaries, download drainage boundaries to a file, print the views shown in the Map Frame, retrieve information for USGS data-collection site stations from the National Water Information System (NWIS) database, and get help on using StreamStats. A "Zoom To" pull-down menu above the Map Layers Frame allows users to zoom to a named place, a water feature, an address, or a specified latitude and longitude.

The user interface is accessed initially through a Web page *(http://streamstats.usgs.gov)* that briefly describes StreamStats, provides links to documentation, and presents a map of the United States that indicates where StreamStats has been implemented. Clicking on a highlighted State on the map will take users to the user interface for that State. The initial homepage also includes a map that indicates where cooperative studies are underway to implement StreamStats for additional States.

Streamflow Statistics for Data-Collection Stations

The USGS periodically computes and publishes streamflow statistics and basin characteristics for its streamflow data-collection stations. This information typically is published in data reports prepared annually by each of the 48 USGS District offices, or in reports that are products of statewide or regional studies done in cooperation with State and local agencies. Because available streamflow statistics and basin characteristics for a given area commonly are scattered among many reports, and many older reports may not be readily available to the public, users of this information often find it difficult to obtain the information they need. StreamStats provides convenient access to a database, StreamStatsDB, that contains previously published information for data-collection stations.

The different types of data-collection stations are shown on the map in the user interface by different symbol shapes and colors. Clicking on the location of a station gives access to the available information for that station. The available information varies by station type and by the needs of local cooperators, who may have shared in the cost of computing the statistics. The information is entered into StreamStatsDB and is quality-assured by scientists in the USGS District offices where the data were collected.

StreamStats output for data-collection stations includes descriptive information, any streamflow statistics and basin characteristics that are available for the stations, and links to the homepages for the stations in NWISWeb *(http://waterdata.usgs.gov/usa/nwis/nwis)*, the online database that contains data collected for all USGS data-collection stations. Descriptive information in StreamStatsDB includes: USGS station identification number, station name, station type, period of record, latitude, longitude, hydrologic unit code, major drainage basin name, county name, U.S. Census Bureau Minor Civil Division (MCD) name, directions to locate the station, and remarks indicating any effects of human impacts or other pertinent information about the stations.

More than 165 different basin characteristics are available in StreamStatsDB, though typically there are less than one dozen available for most stations. Drainage area is the most commonly available basin characteristic. Some other widely available characteristics include stream slope, mean annual precipitation, and area of surface-water storage (lakes, ponds, and wetlands).

About 500 different streamflow statistics are available in StreamStatsDB, including peak-flow and low-flow frequencies, annual and monthly means, medians, and flow-duration percentiles.

Most stations, however, have only a small number of statistics available. Data from NWISWeb were used to determine the statistics. Though there is some overlap in the information contained in NWISWeb and StreamStatsDB, NWISWeb was not designed to store most of the streamflow statistics and many of the basin characteristics contained in StreamStatsDB.

All streamflow statistics and basin characteristics for stations in StreamStatsDB were published in previous reports, and citations for those reports are provided in the StreamStats output. Methods used to determine the information are described in the reports. A link from the StreamStats homepage provides definitions of the streamflow statistics and basin characteristics in the database.

Streamflow Statistics for Ungaged Sites

The USGS has developed numerous equations that can be used to estimate various streamflow statistics for locations on ungaged streams throughout the Nation. The equations were obtained by use of regression analysis to statistically relate the streamflow statistics to the basin characteristics of the drainage basins for a group of data-collection stations. The basin characteristics can be measured for an ungaged site and inserted into the regression equations to obtain estimates of the streamflow statistics under natural flow conditions for the site. (See box on p. 4)

Use of the regression equations has been limited in the past because measuring the basin characteristics was difficult and time-consuming, and the equations sometimes are difficult to calculate. Historically, most physical characteristics were measured by hand from various maps. This process could take from an hour to a few days to complete for a single site, depending on the size of the basin and the characteristics measured. In addition, many of the maps were not widely circulated, and many potential users did not possess the equipment or expertise necessary to measure the values from the maps. StreamStats eliminates these problems by automatically defining the drainage boundary, measuring the basin characteristics, and solving the regression equations to obtain estimates of streamflow statistics for user-selected ungaged sites in a process that takes only a few minutes. Users simply select the location of interest from the map displayed in the user interface, and StreamStats does the rest.

StreamStats determines the drainage-basin boundary for a selected site using a Digital Elevation Model (DEM), which is a regularly spaced grid of elevation points, and a digital representation of the stream network. When a user selects a site along the digital stream network, the site location is transferred to a point in the DEM, which is then used to determine the drainage boundary for the site. Usually the DEM used for delineation has been enhanced by a process that makes it conform to the stream network and a data set of pre-existing drainage boundaries. As a result, delineations obtained from StreamStats usually are of greater accuracy than delineations obtained from a standard DEM (fig. 2).

StreamStats was designed to allow use of data sets at various scales so that

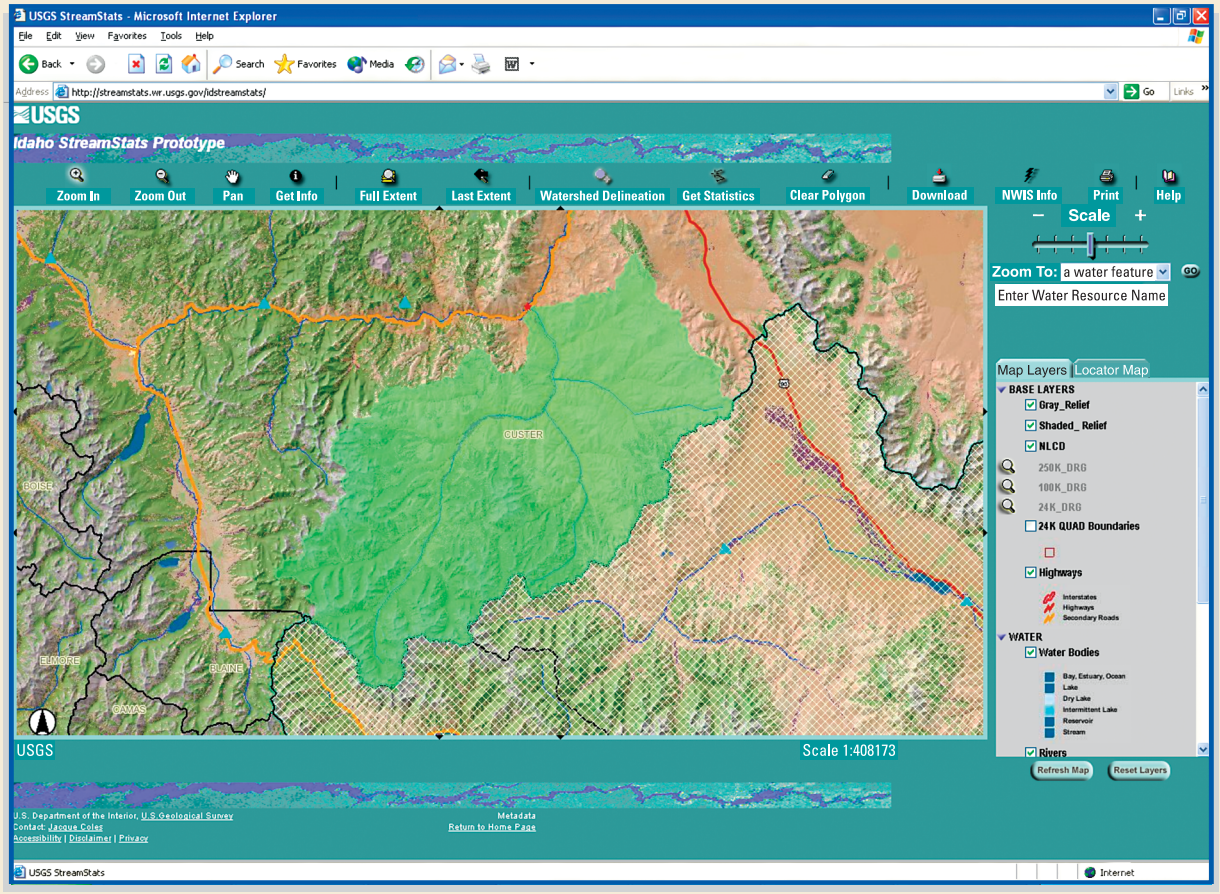


Figure 2. Drainage basin delineation for an ungaged site using StreamStats.

Regression Equations

The USGS has developed equations to estimate peak-flow frequency statistics, such as the 100-year flood, for ungaged sites in every State. Regression equations also have been developed to estimate other types of streamflow statistics for many States. As an example, the equation for estimating the 100-year flood for ungaged sites in part of northern Idaho is:

$$Q_{100} = 5.39\ A^{0.874}(E/1{,}000)^{-1.13}\ P^{1.18}$$

where

Q_{100} is the peak flow that occurs, on average, once in 100 years (1-percent chance of occurrence in any year), in cubic feet per second;

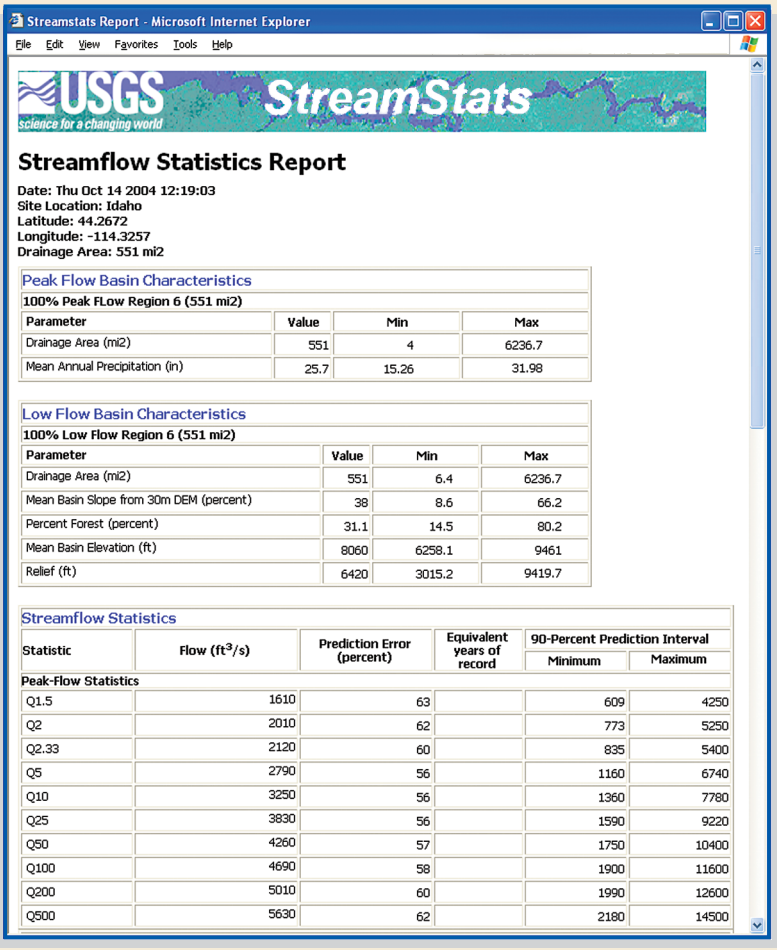
A is the drainage area, in square miles;

E is the mean basin elevation, in feet; and

P is the mean annual precipitation, in inches.

Reference

Berenbrock, Charles, 2002, *Estimating the magnitude of peak flows at selected recurrence intervals for streams in Idaho: U.S. Geological Survey Water-Resources Investigations Report 02-4170, 59 p.*



Streamstats Report - Microsoft Internet Explorer

File Edit View Favorites Tools Help

USGS science for a changing world — StreamStats

Streamflow Statistics Report

Date: Thu Oct 14 2004 12:19:03
Site Location: Idaho
Latitude: 44.2672
Longitude: -114.3257
Drainage Area: 551 mi2

Peak Flow Basin Characteristics

100% Peak FLow Region 6 (551 mi2)

Parameter	Value	Min	Max
Drainage Area (mi2)	551	4	6236.7
Mean Annual Precipitation (in)	25.7	15.26	31.98

Low Flow Basin Characteristics

100% Low Flow Region 6 (551 mi2)

Parameter	Value	Min	Max
Drainage Area (mi2)	551	6.4	6236.7
Mean Basin Slope from 30m DEM (percent)	38	8.6	66.2
Percent Forest (percent)	31.1	14.5	80.2
Mean Basin Elevation (ft)	8060	6258.1	9461
Relief (ft)	6420	3015.2	9419.7

Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Peak-Flow Statistics					
Q1.5	1610	63		609	4250
Q2	2010	62		773	5250
Q2.33	2120	60		835	5400
Q5	2790	56		1160	6740
Q10	3250	56		1360	7780
Q25	3830	56		1590	9220
Q50	4260	57		1750	10400
Q100	4690	58		1900	11600
Q200	5010	60		1990	12600
Q500	5630	62		2180	14500

Figure 3. Partial output from StreamStats for an ungaged site.

the best available local data can be used to determine drainage boundaries and to measure basin characteristics. The local USGS District offices determine the source and scale of the data layers used.

StreamStats determines what regression equations are available in the region in which the ungaged site is located, and what basin characteristics are needed to solve them. StreamStats then measures the basin characteristics and inserts them into the National Flood Frequency (NFF) program, which solves the equations. The estimated streamflow statistics, indicators of the errors associated with the estimates, and the basin characteristics for the site appear in a pop-up Web browser window (fig. 3). Documentation of the equations in NFF and the methods used to develop them is provided through links for each State on the NFF Web page at *http://water.usgs.gov/software/nff.html*.

Limitations

StreamStats provides estimates of streamflow statistics for ungaged sites assuming natural flow conditions. If human activities such as dam regulation and water withdrawals substantially affect the timing, magnitude, or duration of flows at a selected site, the estimates provided by StreamStats should be adjusted by the user to account for those activities. StreamStats can be used to obtain regression-equation-based estimates of streamflow statistics for USGS data-collection stations that are affected by human activities. Users should not assume, however, that the differences between the data-based estimates for the stations and the regression equation-based estimates are equivalent to the effects of the human activities on streamflow at the stations because there are errors associated with both sets of estimates. When StreamStats is used to obtain estimates for sites with basin characteristics outside the ranges of the basin characteristics for the sites used to develop the regression equations, the estimates are extrapolated, and the errors associated with the estimates are unknown. StreamStats provides a warning when extrapolation occurs.

Additional Information

For further information, please contact:
District Chief, MD-DE-DC District
U.S. Geological Survey
8987 Yellow Brick Road
Baltimore, Maryland 21237
http://md.water.usgs.gov
(410-238-4200)

or visit the USGS Office of Surface Water StreamStats Program homepage at:
http://water.usgs.gov/osw/programs/streamstats.html

Editor: Valerie M. Gaine
Graphics and design: Timothy W. Auer

FS 2004-3115

ESRI

USGS science for a changing world

area (sq. mile) at Little Nellie Ditch 28.8

factor 0.18

Exceedences	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1%	6.3	5.4	14.4	90	69.966	83.052	63.468	45.234	21.744	21.114	14.364	8.1	
5%	6.3	5.4	14.4	74.52	54.36	62.28	49.536	31.122	17.46	16.434	11.88	8.1	
10%	4.5	4.5	14.4	54	45	54.54	42.12	24.048	14.4	14.94	10.8	8.1	
20%	4.5	4.5	13.5	41.4	34.956	46.98	35.82	19.8	11.52	11.916	9	7.2	
50%	3.6	3.6	7.2	18	15.48	25.92	23.76	13.86	7.02	8.64	7.2	3.6	
80%	2.7	2.7	4.5	9	5.184	13.5	10.98	8.82	4.32	5.76	5.4	3.6	
90%	2.34	2.7	4.5	6.48	2.7	9.72	6.48	7.56	3.78	4.86	3.78	3.6	
95%	1.8	2.7	2.7	6.3	1.8	6.84	4.86	6.246	3.24	4.5	3.42	3.6	
99%	1.8	2.7	2.7	1.98	0.828	4.536	2.88	5.58	2.52	3.3624	2.7	3.6	
0.5	3.6	3.6	7.2	18.0	15.5	25.9	23.8	13.9	7.0	8.6	7.2	3.6	8.1
Little Nellie Ditch avg. monthly diversion (cfs)	0.0	0.0	0.0	1.1	13.4	48.3	28.0	0.0	0.1	0.4	0.0	0.0	0.0

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
StreamStats	2.8	2.9	4.1	13.0	56.2	65.6	17.1	7.1	5.0	5.1	4.2	3.3
All Diversions****	0.0	0.0	0.0	0.3	7.1	19.1	10.1	0.7	0.3	0.0	0.0	0.0
Minus Diversions	**2.8**	**2.9**	**4.1**	**12.7**	**49.1**	**46.5**	**7.0**	**6.4**	**4.7**	**5.1**	**4.2**	**3.3**
	2.8	2.8	2.8	2.8					2.8	2.8	2.8	2.8
				7.1	7.1	7.1	7.1					
							4.5	4.5	4.5			

****This includes diversion amount for Pleasant Valley Ditch and the CU (assumed 50% of diversion) for Beaver Dale Ditch and Shafer Ditch.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unadjusted Mean Monthly Stream Flow (cfs)	**2.8**	**2.9**	**4.1**	**13.0**	**56.2**	**65.6**	**17.1**	**7.1**	**5.0**	**5.1**	**4.2**	**3.3**
Mean Monthly Stream Flow Adjusted for Upstream Diversions (cfs)	**2.8**	**2.9**	**4.1**	**12.7**	**49.1**	**46.5**	**7.0**	**6.4**	**4.7**	**5.1**	**4.2**	**3.3**

	30 Nov	31 Dec	31 Jan	28 Feb	31 Mar	30 Apr	31 May	30 June	31 July	31 Aug	30 Sep	31 Oct
Pleasant Valley Ditch						6.57	323	666	347	0	0	0
Beaver Dale Ditch (CU only)	0	0	0	0	0	3.13	27.75	140	85.5	35.85	19.8	0
Shafer Ditch (CU only)	0	0	0	0	0	7.1	85	328.5	186	5.3	0	0
Total (AF)	0	0	0	0	0	16.8	435.75	1134.5	618.5	41.15	19.8	0
cfs	0.0	0.0	0.0	0.0	0.0	0.3	7.1	19.1	10.1	0.7	0.3	0.0

	30 Nov	31 Dec	31 Jan	28 Feb	31 Mar	30 Apr	31 May	30 June	31 July	31 Aug	30 Sep	31 Oct
Pleasant Valley Ditch						6.57	323	666	347	0	0	0
Little Nellie Ditch						64.5	824	2877	1723	0	8.7	21.8
Beaver Dale Ditch						6.26	55.5	280	171	71.7	39.6	
Shafer Ditch						14.2	170	657	372	10.6		
Consumptive Use												
Beaver Dale Ditch	0	0	0	0	0	3.13	27.75	140	85.5	35.85	19.8	0
Shafer Ditch	0	0	0	0	0	7.1	85	328.5	186	5.3	0	0

Station Name	NORTH FORK NORTH PLATTE RIVER NEAR WALDEN, CO.
Station ID	6614000
Param	STREAM FLOW CFS
Statistic	Mean
State	CO
County	JACKSON
Latitude	40:43:40
Longitude	106:24:41
Elevation	7972.23
Start Year	1923
End Year	1945
Num Years	16
sq miles	160

		January	February	March	April	May	June	July	August	September	October	November	December	Year
# Days		434	396	434	420	434	420	434	434	420	434	420	434	5114
Avg Day		19.5	20.72	44.29	147.1	114	167.4	135.9	85.01	45.36	50.74	41.5	26.43	74.95
Max Day		35	30	80	636	425	508	365	314	160	273	97	45	636
Min Day		10	15	15	10	2.8	18	11	28	13	18	15	20	2.8
# Months		14	14	14	14	14	14	14	14	14	14	14	14	14
SDev Month		6.17	4.75	20.74	81.52	63.09	71.31	61.93	36.79	20.92	19.19	12.04	9.69	22.92
Skew Month		1.01	0.308	0.789	0.426	0.432	-0.089	0.115	1.66	0.521	1.37	0.136	1.3	0.501
Min Month		10	15	15	35	41.82	66.2	35.58	40.26	18.77	28.29	24.07	20	46.81
Max Month		35	30	80	272.7	219.3	260.1	245.2	186	83.6	101.1	60	45	113.3
Exceedences														
	1%	35	30	80	500	388.7	461.4	352.6	251.3	120.8	117.3	79.8	45	359.9
	5%	35	30	80	414	302	346	275.2	172.9	97	91.3	66	45	247
	10%	25	25	80	300	250	303	234	133.6	80	83	60	45	180.6
	20%	25	25	75	230	194.2	261	199	110	64	66.2	50	40	111
	50%	20	20	40	100	86	144	132	77	39	48	40	20	45
	80%	15	15	25	50	28.8	75	61	49	24	32	30	20	20
	90%	13	15	25	36	15	54	36	42	21	27	21	20	20
	95%	10	15	15	35	10	38	27	34.7	18	25	19	20	15
	99%	10	15	15	11	4.6	25.2	16	31	14	18.68	15	20	10

Water Rights

Name of Structure	Typ	Name of Source	WD	- - L O C A T I O N - -	Use	Net Abs	Net Cond	AltP/Exch	U	Adj Date	P Adj Date	Appro Date	Or	AdminNumber
WEST FORK DITCH		NORTH FORK	47	NE NE 24 9 N 81 W	S I	12.000			C	09/19/1892		05/29/1884		12568.00000
LITTLE NELLIE DITCH		NORTH FORK	47	NW NW 18 10 N 81 W	S I	3.500			C	09/19/1892		04/30/1886		13269.00000
WEST FORK DITCH		NORTH FORK	47	NE NE 24 9 N 81 W	S I	7.000			C	09/19/1892		08/31/1886		13392.00000
LITTLE NELLIE DITCH		NORTH FORK	47	NW NW 18 10 N 81 W	S I	14.000			C	09/19/1892		04/30/1887		13634.00000
INDEPENDENT DITCH		NORTH FORK	47	SE NW 22 9 N 81 W	S I	33.750			C	04/23/1902		09/01/1888		14124.00000
VICTOR DITCH		NORTH FORK	47	SE SE 13 9 N 81 W	S I	19.500			C	04/23/1902		05/20/1889		14385.00000
LEGAL TENDER DITCH		NORTH FORK	47	SE NW 22 9 N 81 W	S I	7.000			C	09/19/1892		06/01/1889		14397.00000
LITTLE NELLIE DITCH		NORTH FORK	47	NW NW 18 10 N 81 W	S I	1.660			C	09/19/1892		06/20/1889		14416.00000
REITHMEYER D		NORTH FORK	47	NE NW 14 9 N 81 W	S ICD	3.340			C	09/19/1892		06/20/1889		14416.00000
LAKE JOHN CMPGRD GALLERY		NORTH FORK	47	SE SW 11 9 N 81 W	S ICD			0.500	C	09/19/1892		06/20/1889		14416.00000
PLEASANT VALLEY DITCH		NORTH FORK	47	NE SW 4 10 N 82 W	S I	36.000			C	04/23/1902		10/18/1889		14536.00000
LEGAL TENDER DITCH		NORTH FORK	47	SE NW 22 9 N 81 W	S I	10.000			C	04/23/1902		06/01/1890		14762.00000
LITTLE NELLIE DITCH		NORTH FORK	47	NW NW 18 10 N 81 W	S I	70.000			C	04/23/1902		06/05/1890		14766.00000
VICTOR DITCH		NORTH FORK	47	SE SE 13 9 N 81 W	S I	3.000			C	04/23/1902		04/25/1892		15456.00000
ULRICH DITCH		NORTH FORK	47	NE NW 14 9 N 81 W	S I	2.000			C	07/01/1908		09/19/1892		15603.00000
WATTENBERG DITCH		NORTH FORK	47	SW SE 12 9 N 81 W	S I	2.000			C	07/01/1908		09/19/1892		15603.00000
NORTH FORK DITCH		NORTH FORK	47	NE NW 31 10 N 81 W	S I	6.000			C	07/01/1908		05/01/1901		18748.00000
VICTOR DITCH		NORTH FORK	47	SE SE 13 9 N 81 W	S I	12.500			C	07/01/1908		06/30/1901		18808.00000
BRIGGS BOHN DITCH		NORTH FORK	47	SW NW 16 9 N 81 W	S I	36.000			C	01/06/1913	01/06/1913	10/14/1907		21366.21105
SHEEP MTN SPRING		NORTH FORK	47	NE NW 5 9 N 81 W	S SW	0.004			C	12/31/1970		04/17/1926		27865.00000
WEST FORK DITCH		NORTH FORK	47	NE NE 24 9 N 81 W	S I	13.100			C	06/20/1939	06/20/1939	09/10/1888		30280.14133
INDEPENDENT DITCH		NORTH FORK	47	SE NW 22 9 N 81 W	S I	36.000			C	06/20/1939	06/20/1939	09/15/1888		30280.14138
LEGAL TENDER DITCH		NORTH FORK	47	SE NW 22 9 N 81 W	S I	47.000			C	06/20/1939	06/20/1939	06/01/1889		30280.14397
VICTOR DITCH		NORTH FORK	47	SE SE 13 9 N 81 W	S I	26.400			C	06/20/1939	06/20/1939	05/01/1901		30280.18748
BRIGGS BOHN DITCH		NORTH FORK	47	SW NW 16 9 N 81 W	S I	8.000			C	01/10/1958	01/10/1958	05/31/1908		33534.21335
INDEPENDENT DITCH		NORTH FORK	47	SE NW 22 9 N 81 W	S I	43.300			C	01/10/1958	01/10/1958	05/31/1908		33534.21335
RICHARD SPG NO 1		NORTH FORK	47	SW SW 9 9 N 81 W	S D	0.027			C	12/31/1972	12/31/1972	01/15/1902		44559.19007
SHARENS SPRING		NORTH FORK	47	SE NW 5 9 N 81 W	S S	0.006			C	12/31/1982	12/31/1982	09/30/1981		48212.48120
SODA SPRING		NORTH FORK	47	SE NW 10 9 N 81 W	S D	0.033			C	12/31/2002	12/31/2002	12/31/1886		55517.13514
SHEEP MOUNTAIN SPRING NO		NORTH FORK	47	SE NW 10 9 N 81 W	S I	1.250			C	12/31/2002	12/31/2002	04/23/1902		55517.19105
SHEEP MOUNTAIN SPRING NO		NORTH FORK	47	nE SW 10 9 N 81 W	S I	0.250			C	12/31/2002	12/31/2002	04/23/1902		55517.19105
SODA SPRING		NORTH FORK	47	SE NW 10 9 N 81 W	S C		0.150		C	12/31/2002	12/31/2002	08/07/2001		55517.55371
SHEEP MOUNTAIN SPRING NO		NORTH FORK	47	SE NW 10 9 N 81 W	S N		0.900		C	12/31/2002	12/31/2002	12/30/2002		55881.00000
SHEEP MOUNTAIN SPRING NO		NORTH FORK	47	nE SW 10 9 N 81 W	S N		0.140		C	12/31/2002	12/31/2002	12/30/2002		55881.00000

STRUCTURE SUMMARY FOR: PLEASANT VALLEY DITCH

WATER DISTRICT: 47
ID NUMBER: 837
WATER SOURCE: NORTH FORK AT STREAM MILE: 61.00
LOCATION: 10N 82W 4 SW NE IN JACKSON COUNTY
TOTAL IRRIGATED ACRES: See irrigated acres summary.
STRUCTURE TYPE: Headgate
CIU (CURRENTLY IN USE): Active Structure with contemporary diversion records
IS TRANSBASIN:
ESTIMATED CAPACITY:
DECREED CAPACITY (SUM OF ABSOLUTE NET AMOUNT RIGHTS): 36.0000 CFS
MEASURING DEVICE/RECORDER: 4 FT PF METAL
CONTACT: SILVER SPUR RANCHES (OWNER)

WATER RIGHTS TRANSACTION INFORMATION

ADMIN NO	ADJ DATE	APPRO DATE	COURT NO	DECREED RATE (CFS)	DECREED VOL. (AF)	ADJUDICATION TYPE	USES	COMMENT
14536.00000	1902-04-23	1889-10-18	CA1523	36.00		O	IRR	

WATER RIGHTS NET AMOUNT INFORMATION

ADMIN NO	ADJ DATE	PADJ DATE	APRO DATE	ORDER NO	PRIOR CASE NO	ADJ TYPE	RATE ABS (CFS)	VOL ABS (AF)	RATE COND (CFS)	VOL COND (AF)	RATE APEX (CFS)	VOL APEX (AF)	USE TYPE
14536.00000	1902-04-23		1889-10-18	0	103	O	36.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR

IRRIGATED ACRES SUMMARY -- TOTALS FROM VARIOUS SOURCES

GIS Total (Acres):		Reported:
Diversion Comments Total (Acres):	169.0	Reported: 2004
Structure Total (Acres):	169.0	Reported: 1988

IRRIGATED ACRES FROM GIS DATA -- BY CROP, YEAR, AND IRRIGATION METHOD

No GIS irrigated acres records to display

DIVERSION SUMMARY IN ACRE FEET - TOTAL THROUGH STRUCTURE

YEAR	FDU	LDU	DWC	MAXQ & DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1973	05/01	07/12	73	36.0 05/01	0	0	0	0	0	0	2214	2142	857	0	0	0	5213
1974	05/01	07/08	69	36.0 05/01	0	0	0	0	0	0	2214	2142	571	0	0	0	4927

1975	05/15	07/16	63	40.0	05/15	0	0	0	0	0	0	1349	2380	1269	0	0	0	4998
1976	05/01	07/10	71	45.0	07/08	0	0	0	0	0	0	2162	595	407	0	0	0	3164
1977	05/08	06/20	44	4.70	06/01	0	0	0	0	0	0	47.6	186	0	0	0	0	234
1978	06/05	07/16	42	10.0	06/05	0	0	0	0	0	0	0	516	317	0	0	0	833
1979	06/10	07/25	46	10.0	06/10	0	0	0	0	0	0	0	417	496	0	0	0	912
1980	06/14	07/25	42	10.0	06/14	0	0	0	0	0	0	0	337	496	0	0	0	833
1981	05/28	07/07	41	10.0	05/28	0	0	0	0	0	0	79.3	496	69.4	0	0	0	645
1982	06/01	07/21	51	12.0	06/15	0	0	0	0	0	0	0	520	500	0	0	0	1020
1983	06/11	07/20	40	20.0	06/11	0	0	0	0	0	0	0	793	793	0	0	0	1587
1984	06/01	07/20	50	20.0	06/21	0	0	0	0	0	0	0	873	608	0	0	0	1480
1985	05/25	07/14	51	20.0	06/01	0	0	0	0	0	0	139	1190	333	0	0	0	1662
1986	06/01	07/14	44	20.0	06/18	0	0	0	0	0	0	0	897	555	0	0	0	1452
1987	05/13	07/05	54	6.40	05/30	0	0	0	0	0	0	160	353	39.7	0	0	0	553
1988	05/22	07/10	50	16.0	06/01	0	0	0	0	0	0	79.3	952	179	0	0	0	1210
1989	05/01	07/11	72	8.00	06/01	0	0	0	0	0	0	184	413	87.3	0	0	0	684
1990	05/08	07/14	68	12.0	06/08	0	0	0	0	0	0	286	631	250	0	0	0	1166
1991	05/11	07/15	66	10.0	06/01	0	0	0	0	0	0	167	589	179	0	0	0	934
1992	04/11	07/10	91	5.50	06/01	0	0	0	0	0	198	270	318	79.3	0	0	0	866
1993	06/15	07/14	30	12.0	06/15	0	0	0	0	0	0	0	381	298	0	0	0	678
1994	05/28	07/08	42	12.0	05/28	0	0	0	0	0	0	95.2	702	127	0	0	0	924
1995	06/23	07/20	28	12.0	06/23	0	0	0	0	0	0	0	190	476	0	0	0	666
1996	06/15	07/20	36	12.0	06/15	0	0	0	0	0	0	0	381	378	0	0	0	759
1997	06/18	07/06	19	16.0	06/18	0	0	0	0	0	0	0	413	190	0	0	0	603
1998	06/15	07/10	26	10.0	06/15	0	0	0	0	0	0	0	294	99.2	0	0	0	393
1999	06/18	07/14	27	16.0	06/18	0	0	0	0	0	0	0	397	309	0	0	0	706
2000	05/26	07/24	60	8.00	06/11	0	0	0	0	0	0	23.8	357	159	0	0	0	540
2001	04/25	07/19	86	15.0	05/15	0	0	0	0	0	11.9	569	397	188	0	0	0	1166
2002	05/01	07/01	60	10.0	06/26	0	0	0	0	0	0	256	277	12.9	0	0	0	546
2003	06/13	07/31	49	15.0	06/24	0	0	0	0	0	0	0	426	651	0	0	0	1077
2004	05/22	07/14	54	8.00	06/13	0	0	0	0	0	0	49.6	365	139	0	0	0	553
AVE:	05/24	07/14	51	15.5	06/07	0	0	0	0	0	6.57	323	666	347	0	0	0	1343

32 years with diversion records Average Flow = 13.28 CFS

Notes: The average considers all years with diversion records, even if no water is diverted.
The above summary lists total monthly diversions.
* = Infrequent data. All other values are derived from daily records.
Average values include infrequent data if infrequent data are the only data for the year.

DIVERSION COMMENTS

YEAR	COMMENTS

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

STRUCTURE SUMMARY FOR: NORTH FORK DITCH

WATER DISTRICT: 47
ID NUMBER: 797
WATER SOURCE: NORTH FORK AT STREAM MILE: 50.52
LOCATION: 10N 81W 31 NW NE IN JACKSON COUNTY
TOTAL IRRIGATED ACRES: See irrigated acres summary.
STRUCTURE TYPE: Headgate
CIU (CURRENTLY IN USE): Active Structure with contemporary diversion records
IS TRANSBASIN:
ESTIMATED CAPACITY:
DECREED CAPACITY (SUM OF ABSOLUTE NET AMOUNT RIGHTS): 6.0000 C
MEASURING DEVICE/RECORDER: 3 FT WOOD PARSHALL
CONTACT: WATTENBERG RANCH
CITY/STATE/ZIP: WALDEN CO

WATER RIGHTS TRANSACTION INFORMATION

ADMIN NO	ADJ DATE	APPRO DATE	COURT NO	DECREED RATE (CFS)	DECREED VOL. (AF)	ADJUDICATION TYPE	USES	COMMENT
18748.00000	1908-07-01	1901-05-01	CA1784	6.00		O	IRR	CHG PT OF DIVERSION W1419

WATER RIGHTS NET AMOUNT INFORMATION

ADMIN NO	ADJ DATE	PADJ DATE	APRO DATE	ORDER NO	PRIOR CASE NO	ADJ TYPE	RATE ABS (CFS)	VOL ABS (AF)	RATE COND (CFS)	VOL COND (AF)	RATE APEX (CFS)	VOL APEX (AF)	USE TYPE
18748.00000	1908-07-01		1901-05-01	0	155	O	6.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR

IRRIGATED ACRES SUMMARY -- TOTALS FROM VARIOUS SOURCES

GIS Total (Acres):	85.9	Reported: 2001
Diversion Comments Total (Acres):	28.0	Reported: 2005
Structure Total (Acres):	28.0	Reported: 2001

IRRIGATED ACRES FROM GIS DATA -- BY CROP, YEAR, AND IRRIGATION METHOD

YEAR	CROP	ACRES FLOOD	ACRES FURROW	ACRES SPRINKLER	ACRES DRIP	ACRES UNKNOWN	ACRES TOTAL (FOR CROP)	ACRES TOTAL ALL CROPS (FOR YEAR)
2001	GRASS_PASTURE	85.940	0.000	0.000	0.000	0.000	85.940	85.940

DIVERSION SUMMARY IN ACRE FEET - TOTAL THROUGH STRUCTURE

YEAR	FDU	LDU	DWC	MAXQ & DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1970	06/25	07/20	26	6.00 06/25	0	0	0	0	0	0	0	71.4	238	0	0	0	309
1971	06/01	07/20	50	5.00 06/01	0	0	0	0	0	0	0	298	198	0	0	0	496
1974	05/01	07/19	80	6.00 05/01	0	0	0	0	0	0	369	357	226	0	0	0	952
1975	05/25	07/06	43	6.00 05/25	0	0	0	0	0	0	83.3	357	71.4	0	0	0	512
1977	05/01	08/31	123	1.00 05/01	0	0	0	0	0	0	61.5	59.5	61.5	61.5	0	0	244
1978	06/15	08/31	78	2.00 06/15	0	0	0	0	0	0	0	63.5	123	123	0	0	309
1979	06/15	08/31	78	2.00 06/15	0	0	0	0	0	0	0	63.5	123	123	0	0	309
1980	06/01	08/31	92	2.00 06/01	0	0	0	0	0	0	0	119	81.3	61.5	0	0	262
1981	05/28	08/31	96	2.00 05/28	0	0	0	0	0	0	15.9	101	61.5	61.5	0	0	240
1982	06/01	08/31	92	2.00 06/01	0	0	0	0	0	0	0	119	89.3	61.5	0	0	270
1983	06/01	08/31	92	2.00 06/01	0	0	0	0	0	0	0	119	91.2	61.5	0	0	272
1984	06/01	08/31	92	2.00 06/01	0	0	0	0	0	0	0	119	75.4	61.5	0	0	256
1985	06/01	08/31	92	2.00 06/01	0	0	0	0	0	0	0	119	61.5	61.5	0	0	242
1986	06/06	08/31	87	2.00 06/06	0	0	0	0	0	0	0	99.2	75.4	61.5	0	0	236
1987	06/11	07/07	27	3.00 06/11	0	0	0	0	0	0	0	101	13.9	0	0	0	115
1988	06/01	07/07	37	3.00 06/01	0	0	0	0	0	0	0	179	27.8	0	0	0	206
1989	06/08	06/25	18	1.00 06/08	0	0	0	0	0	0	0	35.7	0	0	0	0	35.7
1990	06/08	07/07	30	2.00 06/08	0	0	0	0	0	0	0	91.2	13.9	0	0	0	105
1991	06/01	07/07	37	3.00 06/01	0	0	0	0	0	0	0	161	13.9	0	0	0	175
1992	06/01	08/13	73	3.00 07/02	0	0	0	0	0	0	0	118	83.3	25.8	0	0	227
1993	06/01	08/20	81	3.00 06/01	0	0	0	0	0	0	0	179	131	39.7	0	0	349
1994	05/26	08/14	81	2.00 05/26	0	0	0	0	0	0	23.8	119	89.3	27.8	0	0	260
1995	06/08	08/31	85	2.00 06/08	0	0	0	0	0	0	0	91.2	123	91.2	0	0	305
1996	06/11	08/31	82	2.00 06/11	0	0	0	0	0	0	0	79.3	123	61.5	0	0	264
1997	06/11	08/14	65	4.00 06/11	0	0	0	0	0	0	0	149	141	27.8	0	0	317
1998	06/12	09/13	94	5.00 06/23	0	0	0	0	0	0	0	145	159	226	51.6	0	581
1999	06/07	08/22	77	3.00 06/25	0	0	0	0	0	0	0	81.3	87.3	21.8	0	0	190
2000	05/24	09/30	130	4.00 06/09	0	0	0	0	0	0	15.9	151	123	61.5	44.6	0	396
2001	04/21	10/09	141	2.00 05/01	0	0	0	0	0	19.8	97.2	51.6	0	61.5	59.5	8.93	299
2002	06/01	06/14	14	3.50 06/01	0	0	0	0	0	0	0	79.3	0	0	0	0	79.3
2003	06/08	08/31	85	1.00 06/08	0	0	0	0	0	0	0	41.7	46.1	25.8	0	0	114
2004	06/13	08/31	80	2.00 06/22	0	0	0	0	0	0	0	53.6	54.5	21.3	0	0	129
2005	06/01	09/12	104	4.50 06/18	0	0	0	0	0	0	0	217	180	41.7	11.9	0	450
AVE:	06/01	08/15	74	2.88 06/05	0	0	0	0	0	0.60	20.2	127	90.5	44.6	5.08	0.27	288

33 years with diversion records Average Flow = 1.96 CFS

Notes: The average considers all years with diversion records, even if no water is diverted.
The above summary lists total monthly diversions.
* = Infrequent data. All other values are derived from daily records.
Average values include infrequent data if infrequent data are the only data for the year.

DIVERSION COMMENTS

YEAR	COMMENTS
2005	

KW (ACRES IRRIG = 28.000)

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

STRUCTURE SUMMARY FOR: LITTLE NELLIE DITCH

WATER DISTRICT: 47
ID NUMBER: 730
WATER SOURCE: NORTH FORK AT STREAM MILE: 55.23
LOCATION: 10N 81W 18 NW NW IN JACKSON COUNTY
TOTAL IRRIGATED ACRES: See irrigated acres summary.
STRUCTURE TYPE: Headgate
CIU (CURRENTLY IN USE): Active Structure with contemporary diversion records
IS TRANSBASIN:
ESTIMATED CAPACITY:
DECREED CAPACITY (SUM OF ABSOLUTE NET AMOUNT RIGHTS): 89.1600 CFS
MEASURING DEVICE/RECORDER: 8 FT PF METAL
CONTACT: WATTENBERG & PARK RANGE RANCH (OWNER)

WATER RIGHTS TRANSACTION INFORMATION

ADMIN NO	ADJ DATE	APPRO DATE	COURT NO	DECREED RATE (CFS)	DECREED VOL. (AF)	ADJUDICATION TYPE	USES	COMMENT
13269.00000	1892-09-19	1886-04-30	CA0922	3.50		O	IRR	
13634.00000	1892-09-19	1887-04-30	CA0922	14.00		O	IRR	
14416.00000	1892-09-19	1889-06-20	CA4185	1.66		O,TT	IRR	TF REITHMEYER D.
14766.00000	1902-04-23	1890-06-05	CA1523	70.00		O	IRR	

WATER RIGHTS NET AMOUNT INFORMATION

ADMIN NO	ADJ DATE	PADJ DATE	APRO DATE	ORDER NO	PRIOR CASE NO	ADJ TYPE	RATE ABS (CFS)	VOL ABS (AF)	RATE COND (CFS)	VOL COND (AF)	RATE APEX (CFS)	VOL APEX (AF)	USE TYPE
13269.00000	1892-09-19		1886-04-30	0	26	O	3.5000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR
13634.00000	1892-09-19		1887-04-30	0	38	O	14.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR
14416.00000	1892-09-19		1889-06-20	0	99(89)	O	1.6600	0.0000	0.0000	0.0000	0.0000	0.0000	IRR
14766.00000	1902-04-23		1890-06-05	0	115	O	70.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR

IRRIGATED ACRES SUMMARY -- TOTALS FROM VARIOUS SOURCES

GIS Total (Acres):		Reported:
Diversion Comments Total (Acres):	1031.0	Reported: 2004
Structure Total (Acres):	1031.0	Reported: 2001

IRRIGATED ACRES FROM GIS DATA -- BY CROP, YEAR, AND IRRIGATION METHOD

No GIS irrigated acres records to display

DIVERSION SUMMARY IN ACRE FEET - TOTAL THROUGH STRUCTURE

YEAR	FDU	LDU	DWC	MAXQ	& DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1970	06/25	07/20	26	91.0	06/25	0	0	0	0	0	0	0	1083	3610	0	0	0	4693
1971	05/20	07/20	62	80.0	05/20	0	0	0	0	0	0	1904	4760	3174	0	0	0	9838
1972	06/15	07/09	25	90.0	06/15	0	0	0	0	0	0	0	2460	893	0	0	0	3352
1973	05/10	07/16	68	45.0	05/10	0	0	0	0	0	0	1964	2678	1418	0	0	0	6060
1974	06/18	07/10	23	53.3	07/10	0	0	0	0	0	0	0	1289	998	0	0	0	2288
1975	06/05	07/27	53	64.0	07/16	0	0	0	0	0	0	0	2855	3308	0	0	0	6164
1976	05/14	07/20	68	80.0	05/14	0	0	0	0	0	0	2801	3094	2007	0	0	0	7902
1977	05/01	07/20	81	39.0	06/09	0	0	0	0	0	0	982	1844	793	0	0	0	3619
1978	05/20	07/20	62	45.0	05/20	0	0	0	0	0	0	1071	2678	1785	0	0	0	5534
1979	06/01	07/25	55	45.0	06/01	0	0	0	0	0	0	0	2678	2231	0	0	0	4909
1980	06/01	07/20	50	45.0	06/01	0	0	0	0	0	0	0	2678	1785	0	0	0	4463
1981	05/01	07/14	75	30.0	05/28	0	0	0	0	0	0	345	1785	555	0	0	0	2686
1982	06/01	07/21	51	45.0	06/15	0	0	0	0	0	0	0	1984	1874	0	0	0	3858
1983	06/08	07/21	44	45.0	06/08	0	0	0	0	0	0	0	2053	1874	0	0	0	3927
1984	06/06	07/17	42	45.0	06/06	0	0	0	0	0	0	0	2231	1517	0	0	0	3749
1985	05/22	07/10	50	45.0	06/01	0	0	0	0	0	0	397	2678	893	0	0	0	3967
1986	05/28	07/15	49	45.0	05/28	0	0	0	0	0	0	357	2678	1339	0	0	0	4374
1987	05/26	07/12	48	45.0	06/05	0	0	0	0	0	0	476	2596	952	0	0	0	4025
1988	05/26	07/14	50	56.0	06/01	0	0	0	0	0	0	238	3332	1250	0	0	0	4820
1989	05/08	10/31	100	50.0	05/30	0	0	0	0	0	0	897	2876	793	0	7.93	123	4697
1990	05/15	10/31	103	50.0	06/08	0	0	0	0	0	0	540	2698	1111	0	43.6	123	4514
1991	05/15	07/15	62	50.0	05/26	0	0	0	0	0	0	1031	2975	1388	0	0	0	5395
1992	04/28	07/20	84	60.0	06/25	0	0	0	0	0	107	2097	2573	1901	0	0	0	6677
1993	05/15	10/24	119	58.0	07/13	0	0	0	0	0	0	952	3273	1974	0	238	190	6627
1994	05/25	10/31	85	70.0	05/25	0	0	0	0	0	0	972	4086	1795	0	0	173	7026
1995	06/01	07/20	50	70.0	06/15	0	0	0	0	0	0	0	3193	2658	0	0	0	5851
1996	05/25	10/31	91	70.0	06/01	0	0	0	0	0	0	486	4165	2579	0	14.9	154	7398
1997	05/26	07/20	56	65.0	06/26	0	0	0	0	0	0	476	3719	2341	0	0	0	6536
1998	06/01	07/09	39	50.0	06/18	0	0	0	0	0	0	0	1542	893	0	0	0	2435
1999	05/24	07/19	57	80.0	06/09	0	0	0	0	0	0	952	4681	2499	0	0	0	8132
2000	04/20	07/24	96	70.0	06/20	0	0	0	0	0	218	2103	3739	2777	0	0	0	8836
2001	04/01	07/09	100	70.0	05/22	0	0	0	0	0	1934	3888	3541	803	0	0	0	10165
2002	05/01	07/09	70	62.0	06/17	0	0	0	0	0	0	1238	2878	343	0	0	0	4458
2003	05/09	07/20	73	70.0	06/01	0	0	0	0	0	0	1617	3888	2116	0	0	0	7621
2004	05/09	07/20	73	65.0	06/10	0	0	0	0	0	0	1051	3422	2083	0	0	0	6555
AVE:	05/20	08/01	64	58.4	06/08	0	0	0	0	0	64.5	824	2877	1723	0	8.70	21.8	5519

35 years with diversion records Average Flow = 43.47 CFS

Notes: The average considers all years with diversion records, even if no water is diverted.
The above summary lists total monthly diversions.
* = Infrequent data. All other values are derived from daily records.
Average values include infrequent data if infrequent data are the only data for the year.

DIVERSION COMMENTS

YEAR	COMMENTS

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

STRUCTURE SUMMARY FOR: BEAVERDALE DITCH

WATER DISTRICT: 47
ID NUMBER: 507
WATER SOURCE: GOOSE CK AT STREAM MILE: 58.65
LOCATION: 11N 82W 36 SW NW IN JACKSON COUNTY
TOTAL IRRIGATED ACRES: See irrigated acres summary.
STRUCTURE TYPE: Headgate
CIU (CURRENTLY IN USE): Active Structure with contemporary diversion records
IS TRANSBASIN:
ESTIMATED CAPACITY:
DECREED CAPACITY (SUM OF ABSOLUTE NET AMOUNT RIGHTS): 12.0000 CFS
MEASURING DEVICE/RECORDER: NONE
CONTACT: PARK RANGE RANCH (OWNER)
ADDRESS 1: 1 RIVERFRONT PLZ S1404 40202

WATER RIGHTS TRANSACTION INFORMATION

ADMIN NO	ADJ DATE	APPRO DATE	COURT NO	DECREED RATE (CFS)	DECREED VOL. (AF)	ADJUDICATION TYPE	USES	COMMENT
15603.00000	1908-07-01	1892-09-19	CA1784	3.00		O	IRR	
30280.14528	1939-06-20	1889-10-10	CA0286	9.00		S	IRR	

WATER RIGHTS NET AMOUNT INFORMATION

ADMIN NO	ADJ DATE	PADJ DATE	APRO DATE	ORDER NO	PRIOR CASE NO	ADJ TYPE	RATE ABS (CFS)	VOL ABS (AF)	RATE COND (CFS)	VOL COND (AF)	RATE APEX (CFS)	VOL APEX (AF)	USE TYPE
15603.00000	1908-07-01		1892-09-19	0	131	O	3.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR
30280.14528	1939-06-20	1932-11-26	1889-10-10	0	662	S	9.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR

IRRIGATED ACRES SUMMARY -- TOTALS FROM VARIOUS SOURCES

GIS Total (Acres):		Reported:
Diversion Comments Total (Acres):	100.0	Reported: 2004
Structure Total (Acres):	226.0	Reported: 1987

IRRIGATED ACRES FROM GIS DATA -- BY CROP, YEAR, AND IRRIGATION METHOD

No GIS irrigated acres records to display

DIVERSION SUMMARY IN ACRE FEET - TOTAL THROUGH STRUCTURE

YEAR	FDU	LDU	DWC	MAXQ & DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL

1972	06/15	07/09	25	3.00	06/15	0	0	0	0	0	0	0	91.2	44.6	0	0	0	136
1973	06/15	09/20	98	12.0	06/15	0	0	0	0	0	0	0	381	738	738	464	0	2321
1974	06/10	09/20	103	5.00	06/10	0	0	0	0	0	0	0	208	307	307	198	0	1022
1975	06/10	06/10	1	12.0	06/10	0	0	0	0	0	0	0	23.8	0	0	0	0	23.8
1976	05/15	07/11	58	12.0	05/15	0	0	0	0	0	0	387	179	65.5	0	0	0	631
1978	05/25	07/15	52	12.0	05/25	0	0	0	0	0	0	167	714	357	0	0	0	1238
1979	06/01	07/20	50	12.0	06/01	0	0	0	0	0	0	0	714	317	0	0	0	1031
1980	06/01	07/21	51	12.0	06/01	0	0	0	0	0	0	0	714	236	0	0	0	950
1981	05/28	07/07	41	6.00	05/28	0	0	0	0	0	0	47.6	303	41.7	0	0	0	393
1982	06/01	07/18	48	8.00	06/11	0	0	0	0	0	0	0	397	286	0	0	0	682
1983	06/08	09/30	115	8.00	06/08	0	0	0	0	0	0	0	365	254	61.5	59.5	0	740
1984	06/08	09/30	115	8.00	06/08	0	0	0	0	0	0	0	365	131	61.5	59.5	0	617
1985	05/26	09/30	128	8.00	06/08	0	0	0	0	0	0	35.7	407	89.3	61.5	59.5	0	653
1986	06/08	09/30	115	8.00	06/08	0	0	0	0	0	0	0	365	236	61.5	59.5	0	722
1987	07/16	09/30	77	1.00	07/16	0	0	0	0	0	0	0	0	31.7	61.5	59.5	0	153
1988	06/08	08/31	85	3.00	06/08	0	0	0	0	0	0	0	137	151	61.5	0	0	349
1989	06/01	08/15	76	3.00	06/01	0	0	0	0	0	0	0	179	99.2	29.8	0	0	307
1990	06/01	08/31	92	6.00	06/11	0	0	0	0	0	0	0	268	153	61.5	0	0	482
1991	06/01	09/30	122	6.00	06/01	0	0	0	0	0	0	0	357	214	123	102	0	796
1992	04/21	08/31	66	4.00	04/21	0	0	0	0	0	79.3	159	0	19.8	123	0	0	381
1993	05/26	07/15	51	6.00	05/26	0	0	0	0	0	0	71.4	357	89.3	0	0	0	518
1994	05/22	07/12	52	6.00	06/01	0	0	0	0	0	0	59.5	357	64.5	0	0	0	481
1995	06/11	09/30	112	8.00	06/11	0	0	0	0	0	0	0	317	424	117	59.5	0	918
1996	06/11	09/30	112	8.00	06/11	0	0	0	0	0	0	0	317	365	89.3	59.5	0	831
1997	06/01	06/24	24	8.00	06/01	0	0	0	0	0	0	0	282	0	0	0	0	282
1998	06/11	08/31	82	6.00	07/01	0	0	0	0	0	0	0	119	292	123	0	0	534
1999	06/01	09/19	111	12.0	06/18	0	0	0	0	0	0	0	512	208	61.5	18.8	0	800
2000	04/16	06/25	71	4.00	05/22	0	0	0	0	0	59.5	204	149	0	0	0	0	413
2001	04/12	08/31	81	1.00	04/12	0	0	0	0	0	37.7	24.8	0	5.95	30.7	0	0	99.2
2002	05/01	05/21	21	5.00	05/01	0	0	0	0	0	0	208	0	0	0	0	0	208
2003	04/25	09/17	146	3.00	05/01	0	0	0	0	0	23.8	184	161	123	123	67.4	0	682
2004	05/01	07/31	92	4.50	05/17	0	0	0	0	0	0	229	228	127	0	0	0	584
AVE:	05/28	08/16	77	6.89	06/01	0	0	0	0	0	6.26	55.5	280	171	71.7	39.6	0	624

32 years with diversion records Average Flow = 4.09 CFS

Notes: The average considers all years with diversion records, even if no water is diverted.
The above summary lists total monthly diversions.
* = Infrequent data. All other values are derived from daily records.
Average values include infrequent data if infrequent data are the only data for the year.

DIVERSION COMMENTS

YEAR	COMMENTS
2003	Structure is not usable

Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.

STRUCTURE SUMMARY FOR: SHAFER DITCH

WATER DISTRICT: 47
ID NUMBER: 871
WATER SOURCE: SHAFER CK AT STREAM MILE: 57.73
LOCATION: 10N 82W 1 SW SW IN JACKSON COUNTY
TOTAL IRRIGATED ACRES: See irrigated acres summary.
STRUCTURE TYPE: Headgate
CIU (CURRENTLY IN USE): Active Structure with contemporary diversion records
IS TRANSBASIN:
ESTIMATED CAPACITY:
DECREED CAPACITY (SUM OF ABSOLUTE NET AMOUNT RIGHTS):   48.0000 C
MEASURING DEVICE/RECORDER: 2 FT PF METAL
CONTACT: PARK RANGE RANCH (OWNER)
ADDRESS 1: 1 RIVERFRONT PLZ S1404 40202

WATER RIGHTS TRANSACTION INFORMATION

ADMIN NO	ADJ DATE	APPRO DATE	COURT NO	DECREED RATE (CFS)	DECREED VOL. (AF)	ADJUDICATION TYPE	USES	COMMENT
15603.00000	1908-07-01	1892-09-19	CA1784	8.00		O	IRR	
30280.14436	1939-06-20	1889-07-10	CA0286	40.00		S	IRR	

WATER RIGHTS NET AMOUNT INFORMATION

ADMIN NO	ADJ DATE	PADJ DATE	APRO DATE	ORDER NO	PRIOR CASE NO	ADJ TYPE	RATE ABS (CFS)	VOL ABS (AF)	RATE COND (CFS)	VOL COND (AF)	RATE APEX (CFS)	VOL APEX (AF)	USE TYPE
15603.00000	1908-07-01		1892-09-19	0	129	O	8.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR
30280.14436	1939-06-20	1932-11-26	1889-07-10	0	659	S	40.0000	0.0000	0.0000	0.0000	0.0000	0.0000	IRR

IRRIGATED ACRES SUMMARY -- TOTALS FROM VARIOUS SOURCES

GIS Total (Acres):	379.4	Reported: 2001
Diversion Comments Total (Acres):	401.0	Reported: 2005
Structure Total (Acres):	401.0	Reported: 1987

IRRIGATED ACRES FROM GIS DATA -- BY CROP, YEAR, AND IRRIGATION METHOD

YEAR	CROP	ACRES FLOOD	ACRES FURROW	ACRES SPRINKLER	ACRES DRIP	ACRES UNKNOWN	ACRES TOTAL (FOR CROP)	ACRES TOTAL ALL CROPS (FOR YEAR)
2001	GRASS_PASTURE	379.355	0.000	0.000	0.000	0.000	379.355	379.355

DIVERSION SUMMARY IN ACRE FEET - TOTAL THROUGH STRUCTURE

YEAR	FDU	LDU	DWC	MAXQ	& DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
1970	06/25	08/03	40	48.0	06/25	0	0	0	0	0	0	0	571	2951	286	0	0	3808
1971	05/01	07/20	81	5.00	05/01	0	0	0	0	0	0	307	298	198	0	0	0	803
1972	06/15	07/09	25	8.00	06/15	0	0	0	0	0	0	0	230	89.3	0	0	0	319
1973	06/15	07/17	33	35.0	06/15	0	0	0	0	0	0	0	1111	1141	0	0	0	2251
1974	06/18	07/10	23	10.0	06/18	0	0	0	0	0	0	0	258	189	0	0	0	447
1975	06/23	07/16	24	8.00	07/16	0	0	0	0	0	0	0	79.3	165	0	0	0	244
1976	05/15	07/11	58	24.0	05/15	0	0	0	0	0	0	781	595	218	0	0	0	1595
1977	05/08	06/25	44	4.50	05/17	0	0	0	0	0	0	166	223	0	0	0	0	389
1978	05/25	07/15	52	20.0	05/25	0	0	0	0	0	0	278	1190	595	0	0	0	2063
1979	06/01	07/20	50	20.0	06/01	0	0	0	0	0	0	0	1190	793	0	0	0	1984
1980	06/01	07/21	51	20.0	06/01	0	0	0	0	0	0	0	1190	500	0	0	0	1690
1981	05/28	07/14	48	8.00	05/28	0	0	0	0	0	0	63.5	476	111	0	0	0	651
1982	06/01	07/18	48	15.0	06/11	0	0	0	0	0	0	0	754	536	0	0	0	1289
1983	06/08	07/18	41	20.0	06/08	0	0	0	0	0	0	0	912	536	0	0	0	1448
1984	06/05	07/16	42	20.0	06/05	0	0	0	0	0	0	0	1031	545	0	0	0	1577
1985	06/01	07/10	40	20.0	06/08	0	0	0	0	0	0	0	1023	298	0	0	0	1321
1986	06/06	07/12	37	20.0	06/06	0	0	0	0	0	0	0	992	476	0	0	0	1468
1987	05/25	07/12	46	8.00	05/25	0	0	0	0	0	0	111	428	151	0	0	0	690
1988	05/26	07/10	46	12.0	06/06	0	0	0	0	0	0	71.4	655	198	0	0	0	924
1989	05/11	07/13	64	12.0	06/08	0	0	0	0	0	0	182	639	218	0	0	0	1039
1990	05/15	07/14	61	12.0	06/01	0	0	0	0	0	0	202	714	278	0	0	0	1194
1991	05/16	07/14	60	15.0	06/08	0	0	0	0	0	0	274	821	278	0	0	0	1373
1992	04/01	07/02	93	7.00	06/23	0	0	0	0	0	357	369	373	25.8	0	0	0	1125
1993	05/22	07/15	55	8.00	05/22	0	0	0	0	0	0	159	476	238	0	0	0	873
1994	05/22	07/12	52	15.0	05/22	0	0	0	0	0	0	298	839	161	0	0	0	1297
1995	06/08	07/19	42	15.0	06/08	0	0	0	0	0	0	0	684	565	0	0	0	1250
1996	06/06	07/19	44	15.0	06/06	0	0	0	0	0	0	0	744	565	0	0	0	1309
1997	05/22	06/25	35	5.00	05/22	0	0	0	0	0	0	99.2	248	0	0	0	0	347
1998	05/10	07/05	57	12.0	06/09	0	0	0	0	0	0	286	651	79.3	0	0	0	1016
1999	05/19	06/30	43	15.0	06/14	0	0	0	0	0	0	175	764	0	0	0	0	938
2000	04/17	06/30	75	15.0	06/01	0	0	0	0	0	73.4	452	708	0	0	0	0	1234
2001	04/17	06/30	75	8.00	05/11	0	0	0	0	0	79.3	452	317	0	0	0	0	849
2002	05/01	06/14	36	15.0	06/07	0	0	0	0	0	0	432	278	0	0	0	0	710
2003	05/11	08/14	96	22.0	06/24	0	0	0	0	0	0	159	870	799	95.2	0	0	1923
2004	05/07	07/22	77	15.0	06/12	0	0	0	0	0	0	223	724	290	0	0	0	1237
2005	05/07	07/22	77	15.0	05/18	0	0	0	0	0	0	591	603	218	0	0	0	1412
AVE:	05/22	07/13	51	15.2	06/04	0	0	0	0	0	14.2	170	657	372	10.6	0	0	1225

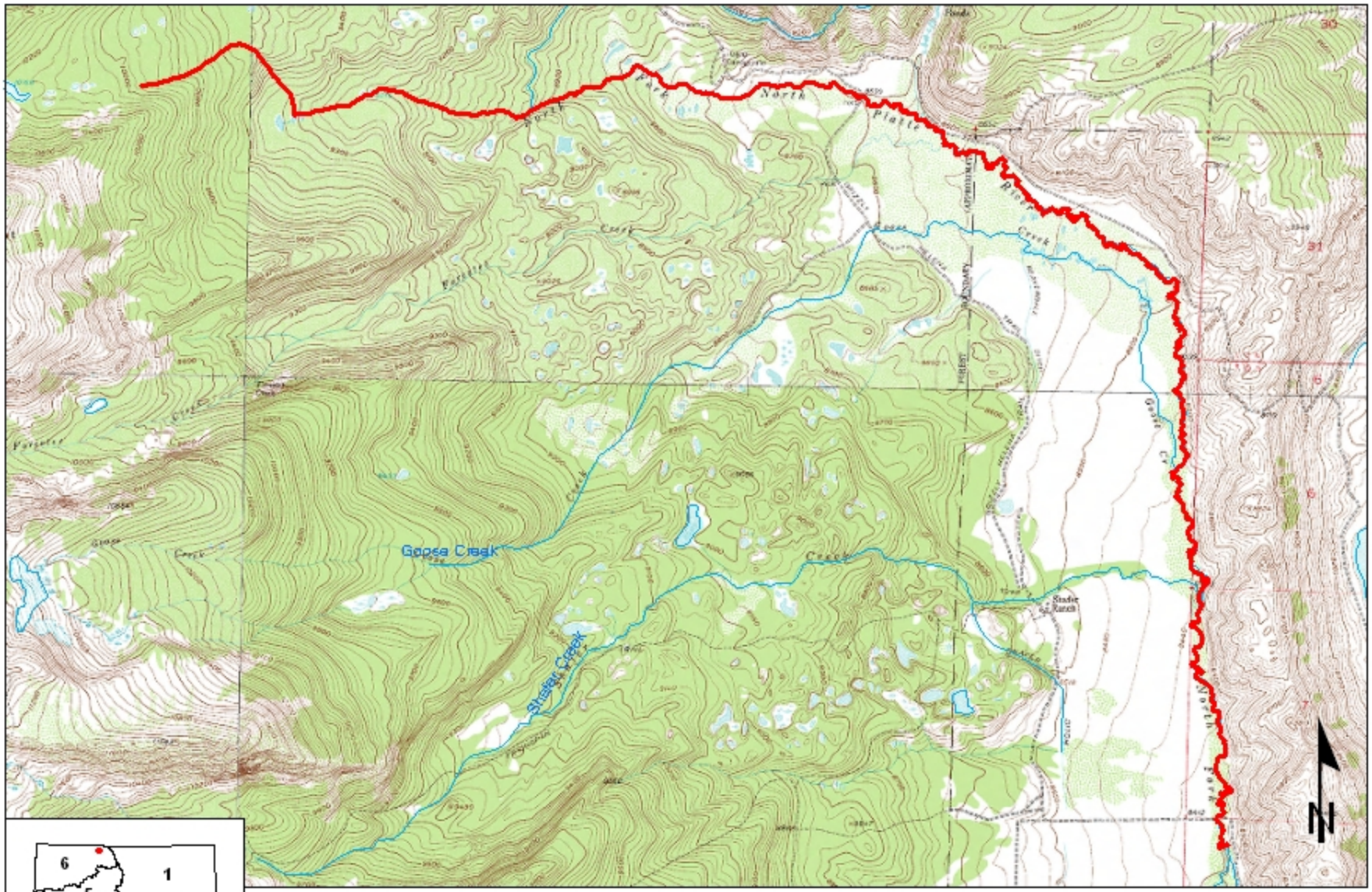
36 years with diversion records Average Flow = 12.11 CFS

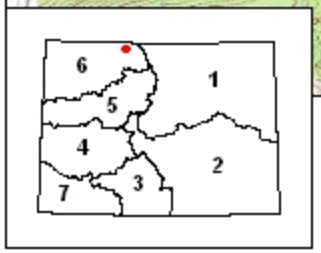
Notes: The average considers all years with diversion records, even if no water is diverted.
The above summary lists total monthly diversions.
* = Infrequent data. All other values are derived from daily records.
Average values include infrequent data if infrequent data are the only data for the year.

DIVERSION COMMENTS

YEAR	COMMENTS
2005	KW (ACRES IRRIG = 401.000)

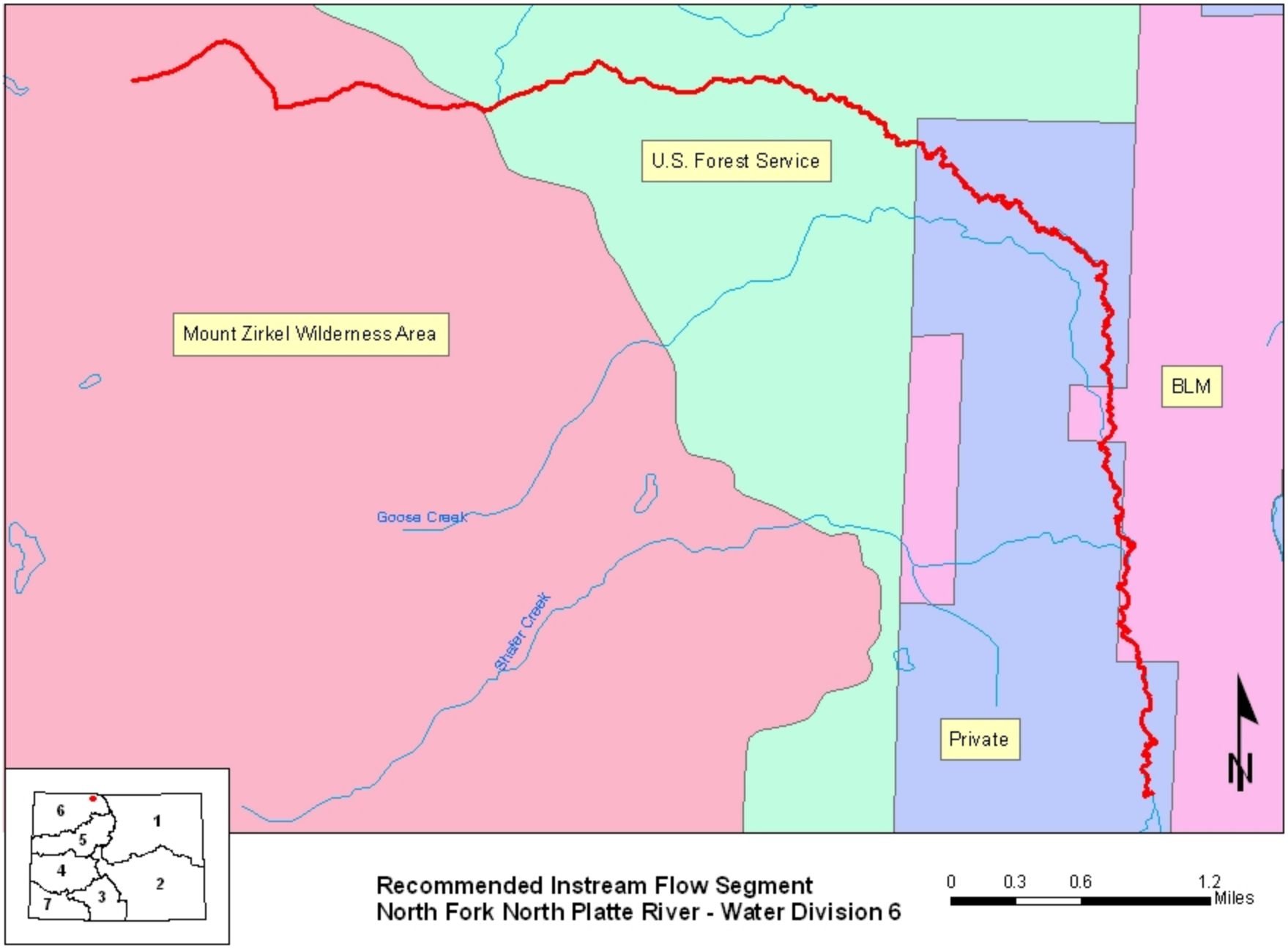
Note: Diversion comments and reservoir comments may be shown for a structure, if both are available.



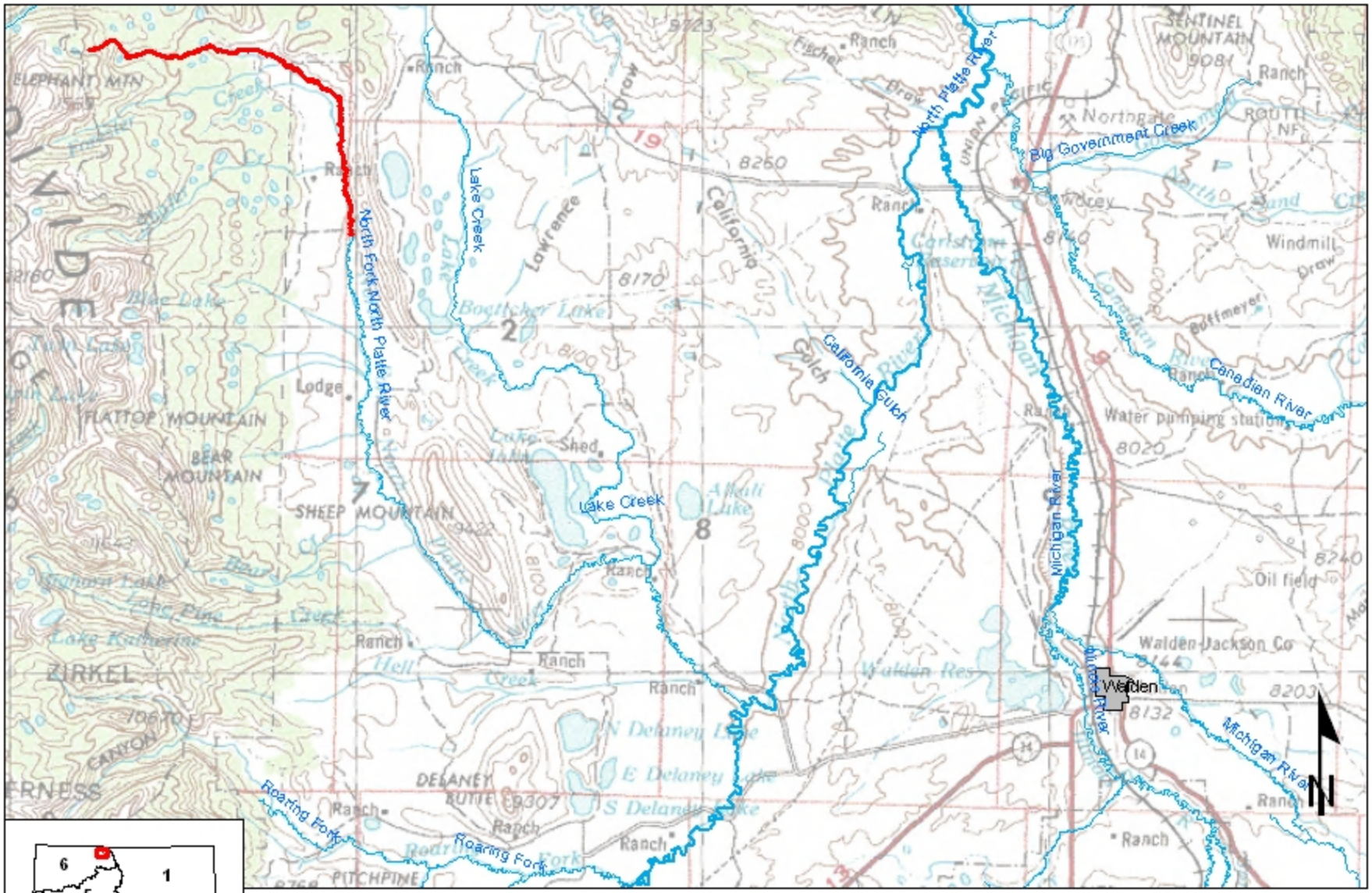


Recommended Instream Flow Segment
North Fork North Platte River - Water Division 6

0 0.3 0.6 1.2 Miles



Recommended Instream Flow Segment
North Fork North Platte River - Water Division 6



Recommended Instream Flow Segment
North Fork North Platte River - Water Division 6