Stream: Middle Fork Spring Creek

Executive Summary

Water Division: 4
Water District: 68
CDOW#: 43327
CWCB ID#: 06/04/A-008

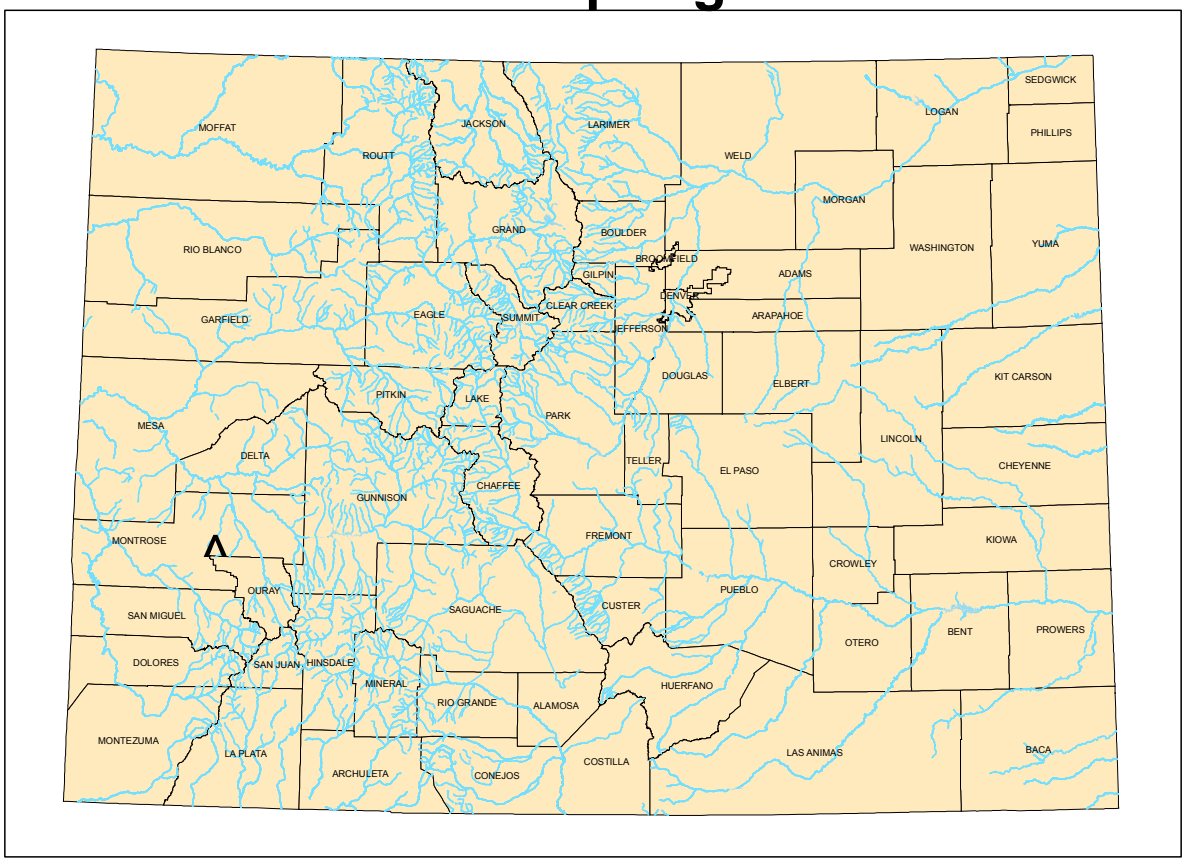
Segment: Headwaters to Spring Creek

Upper Terminus: Headwaters
Latitude: 38d17'03.99"N Longitude: 108d04'39.08"W
UTM North: 4241856.522 UTM East: 230818.456
NE1/4, SE1/4, Sctn33, T47N, R11W, NMPM
190 ft, W of the E Section Line, 2471 ft, N of the S Section Line

Lower Terminus: Spring Creek
Latitude: 38d19'38.58"N Longitude: 108d00'07.29"W
UTM North: 4246405.670 UTM East: 237578.338
NE1/4, SE1/4, Sctn18, T47N, R10W, NMPM
163 ft, W of the E Section Line, 2471 ft, N of the S Section Line

Counties: Ouray
Length: 6.04 miles
USGS Quad(s): Pryor Creek
ISF Appropriation: 3.5 cfs (04/01 – 10/31)
1.5 cfs (11/01 –03/31)

Middle Fork Spring Creek



Summary

The information contained in this report and the associated instream flow file folder 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 5.40.

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 United States Forest Service (USFS) recommended this segment of Middle Fork Spring Creek to the CWCB for inclusion into the Instream Flow Program. Middle Fork Spring Creek 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 USFS is very interested in protecting stream flows because Middle Fork Spring Creek is currently an unregulated stream for much of its length. Forest Service investigations (unpublished) have suggested that this is a fully functioning aquatic system that is contributing towards the agency stewardship mission of protecting sustainable ecosystems. This stream

provides occupied habitat for non-native brook and brown trout, providing recreational fishing opportunities on the National Forest.

Middle Fork Spring Creek is 6.04 miles long. It begins on the south end of the Uncompahgre Plateau an elevation of approximately 9,600 feet and terminates at the confluence Spring Creek at an elevation of approximately 7,400 feet. Middle Fork Spring Creek is located within Ouray County. The total drainage area of the creek is approximately 9.8 square miles. Middle Fork Spring Creek generally flows in a northerly direction.

The subject of this report is a segment of Middle Fork Spring Creek beginning at an unnamed tributary located in the southwest corner of section 35, elevation 8,800, and extending downstream to the confluence with Spring Creek elevation 7,400 feet (see Map Appendix A). The proposed segment is located 20 miles south of Montrose, and is 6.04 miles long. Approximately 96% of the 6.04-mile segment addressed by this report is located on federal lands. The staff has received only one recommendation for this segment, from the USFS. The recommendation for this segment is discussed below.

Instream Flow Recommendation(s)

USFS recommended 3.45 cfs, spring and summer; 2.25 cfs late summer and fall; based on its May 18, 2004 data collection efforts (see Appendix B). Two cross sections were surveyed on Middle Fork Spring Creek. Recommendations are based on an average of cross sections 1 and 2.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Headwaters	Spring Creek	6.04	4%	96%

8% of the public lands are owned by the BLM and 88% of the public lands are located on USFS lands.

Biological Data

The USFS and CDOW 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 USFS to the CWCB "Fishery surveys indicate that the stream environment is presently in stable condition, and supports a self-sustaining brook trout fishery. CDOW (1980) captured a total of 75 brook trout at a site near the upper terminus. USFS personnel observed an abundance of brook trout during site visits in 2004 and 2005.

Fish habitat parameters are good for salmonids providing adequate cover and good summer and winter rearing habitat. The stream has an overall stream gradient of approximately 3.5%. Accordingly, it is important to provide stream flows that protect the limited amount of available habitat if the continued existence of the fishery is to be assured". Flows in Middle Fork Spring Creek sustain a rich and diverse riparian ecosystem made up of sedge/willow plant communities and the wildlife species that depend upon that habitat type.

Field Survey Data

USFS 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. Appendix B 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 CWCB 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, 2 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. However, updates to the R2Cross program have the ability to vary Manning's n over a range of flows allowing for more accurate staging tables to be used in the prediction of hydraulic parameters when the predicted flows fall outside of the confidence intervals. These changes allow for more accurate hydraulic modeling in periods outside of the typical accuracy range of R2Cross. For this exercise the USFS chose to use Jarrett's equation in the development of flow recommendation on Middle Fork Spring Creek

Table 1: Stream flow data and R2Cross outputs from two cross sections located on Middle Fork Spring Creek.

Party	X-sec	Date	Measured Q	40%-250%	Summer (3/3)	Winter (2/3)
USFS	#1	5/18/2004	15.54 cfs	6.2 – 38.8 cfs	3.0	2.1
USFS	#2	5/18/2004	16.0 cfs	6.4 – 40 cfs	3.60	2.4

USFS = U.S. Forest Service DOW = Division of Wildlife

Biologic Flow Recommendation

Outputs from cross sections 1 and 2 were averaged to develop a spring/summer and winter flow recommendations. The spring/summer flow recommendation is 3.45 cfs; winter flow recommendation is 2.25.

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. The hydrograph below was derived from data collected by the USGS stream gage for Spring Creek near Montrose, CO (ID #09149420), which has a drainage area of 76.6 square miles (See Gage Summary in Appendix C). The total drainage area of Middle Fork Spring Creek is approximately 11.13 square miles. The period of record for this gage was 1977 to 1981, the period of record used by staff in their analysis was 1977 - 1981, or 5 years of record. Table 2 below displays the estimated flow of Middle Fork Spring Creek at the gage, in terms of a percentage of exceedence.

Table 2: Estimated Stream Flow for Middle Fork Spring Creek

Exceedences	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1%	2.6	2.2	5.7	17.9	37.9	24.2	14.0	14.6	13.3	14.0	8.6	5.4
5%	2.4	1.9	4.6	16.4	34.8	19.5	13.6	13.4	12.5	12.7	8.2	4.2
10%	2.1	1.8	2.9	12.5	32.7	17.4	13.1	12.6	12.4	11.7	5.8	2.9
20%	1.7	1.8	2.1	9.9	25.7	13.8	12.6	12.2	11.8	10.9	5.0	2.6
50%	**1.5**	**1.5**	**1.8**	**7.6**	**17.5**	**11.3**	**11.1**	**10.4**	**9.6**	**8.3**	**3.6**	**2.2**
80%	1.4	1.2	1.2	3.9	10.3	9.7	8.9	8.6	8.2	6.3	2.9	1.8
90%	1.3	1.1	1.1	2.9	9.7	9.5	8.8	8.5	7.6	5.8	2.8	1.8
95%	1.3	1.1	1.0	2.1	9.7	9.3	8.6	8.3	7.4	5.6	2.6	1.7
99%	1.3	1.1	1.0	1.8	9.3	9.1	8.5	7.5	7.1	5.2	2.4	1.7

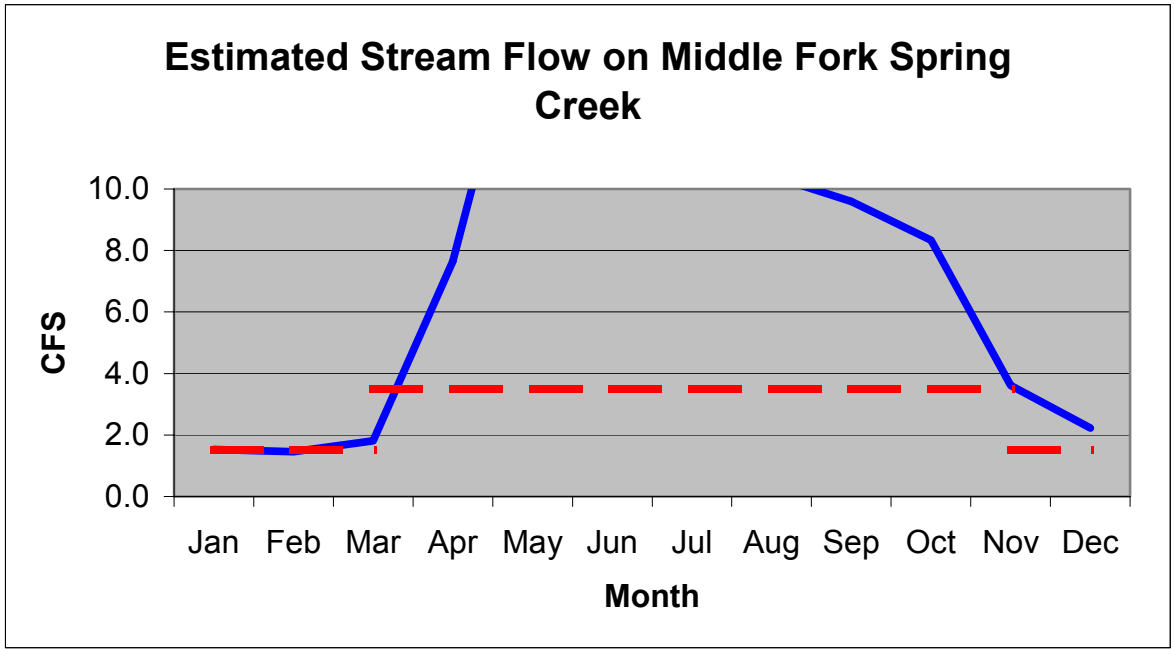


Table 2 shows that the summer flow recommendation of 3.5 cfs is available at least 50% of the time for the month of April 1st through October 31st. The winter flow recommendation of 2.25 cfs is available at least 50% of the time from November 1st through March 31st. Based on water

availability, the winter recommendation was further reduced to 1.5 cfs for the time period of November 1st through March 31st.

Precipitation Data

Staff reviewed a local precipitation data set from 1 site located around the Spring Creek Drainage (see Precipitation Data in Appendix C). Table 3 shows the water year and the percent of average precipitation recorded at each site. It is staff's opinion that the 5 years of stream-flow data analyzed is representative of slightly below average water-years.

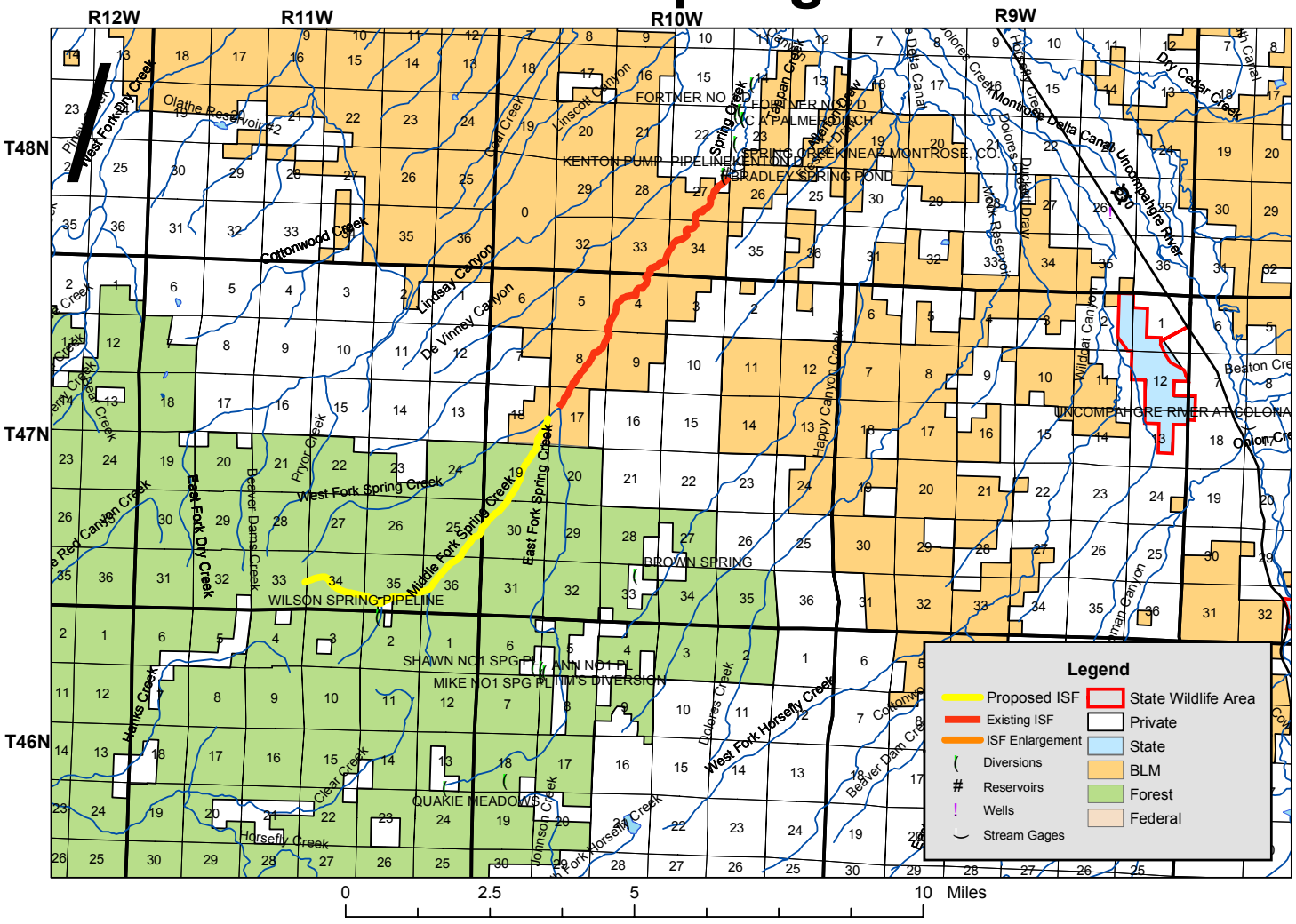
Table 3: Precipitation Data as a percentage of Average

Water Year	Elevation = 5830 Lat = 34.24 Long = -107.53 **Monterose 1**
1977	75%
1978	110%
1979	89%
1980	90%
1981	92%
Average	**91%**

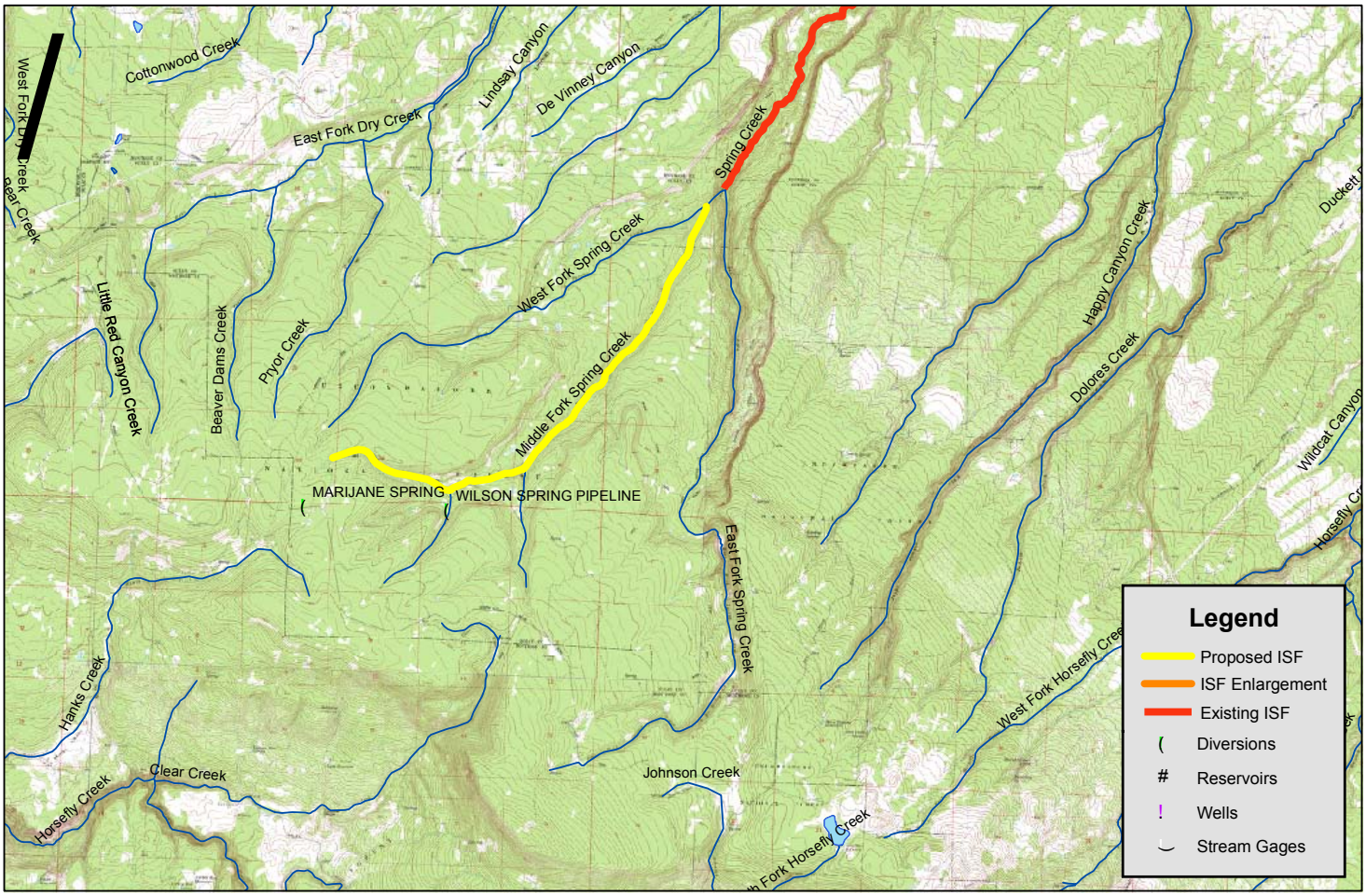
Existing Water Right Information

Staff has analyzed the water rights tabulation and consulted with the Division Engineer's Office (DEO) to identify any potential water availability problems. Records indicate that there are no surface water diversions are located within this reach of Middle Fork Spring Creek. According to the DEO, there is usually sufficient water available within this stream reach to satisfy the recommended instream flow amount. Based on this analysis, staff has determined that water is available for appropriation on Middle Fork Spring Creek, from the headwaters to the confluence with Spring Creek, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid existing water rights.

Middle Fork Spring Creek



Middle Fork Spring Creek



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:

Stream Name: Middle Fork Spring Creek

Segment: Headwaters to Spring Creek

Upper Terminus: Headwaters
Latitude: 38d17'03.99"N Longitude: 108d04'39.08"W
UTM North: 4241856.522 UTM East: 230818.456
NE1/4, SE1/4, Sctn33, T47N, R11W, NMPM
190 ft, W of the E Section Line, 2471 ft, N of the S Section Line

Lower Terminus: Spring Creek
Latitude: 38d19'38.58"N Longitude: 108d00'07.29"W
UTM North: 4246405.670 UTM East: 237578.338
NE1/4, SE1/4, Sctn18, T47N, R10W, NMPM
163 ft, W of the E Section Line, 2471 ft, N of the S Section Line

Counties: Ouray
Length: 6.04 miles
USGS Quad(s): Pryor Creek
ISF Appropriation: 3.5 cfs (04/01 – 10/31)
1.5 cfs (11/01 –03/31)

APPENDIX – A
ISF Recommendation

United States Department of Agriculture
Forest Service
Grand Mesa, Uncompahgre and Gunnison National Forests
2250 Highway 50
Delta, CO 81416
Voice: 970-874-6600
TDD: 970-874-6660

File Code: 2540
Date: December 22, 2005

Mr. Dan Merriman and Mr. Todd Doherty
Colorado Water Conservation Board - Stream and Lake Protection Section
1313 Sherman Street, Room 723
Denver, CO 80203

Dear Dan and Todd,

The Grand Mesa, Uncompahgre and Gunnison National Forest would like to recommend protection of instream flows within the National Forest for the East, Middle, and West Forks of Spring Creek. From our perspective the flow amounts and periods recommended for protection represent the minimum necessary to preserve the aquatic values associated with these streams flowing across the national forest. The streams originate on the Uncompahgre Plateau and are tributary to the Uncomaphgre River. The majority of these streams are managed by the U.S. Forest Service.

The issue of water availability and ability to provide good estimates on stream flows is a topic that concerns us. The use of existing tools may be providing inaccurate information that is then used to reduce recommended protection levels below what field based surveys have suggested are necessary to protect the environment to a reasonable degree. Given that the prior appropriation system dictates the administration of rights in priority during times of shortage, senior water rights holders would not be injured in the event the instream flow right exceeds the stream flow. We are advocating that on headwater streams located on public lands, this be given consideration in the development of recommended protection.

The Forest appreciates the opportunity for the Grand Mesa, Uncompahgre & Gunnison National Forest to cooperate in the protection of instream flows. I feel that there is much to be gained by working collaboratively with the Colorado Water Conservation Board and State of Colorado to collectively resolve water issues in Colorado.

Sincerely,

Steve Margaretta

for CHARLES S. RICHMOND
Forest Supervisor

APPENDIX – B
Field Data

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: MIDDLE FORK SPRING CREEK | CROSS-SECTION NO.: 1

CROSS-SECTION LOCATION: LAT 38° 17' 51.58" N LONG 108° 1' 22.45" W

DATE: 5/18/04 | OBSERVERS: ALM4 / JAMES / SHELLHORN

LEGAL DESCRIPTION | % SECTION: | SECTION: | TOWNSHIP: N/S | RANGE: E/W | PM

COUNTY: | WATERSHED: SPRING CREEK | WATER DIVISION: | DOW WATER CODE:

MAP(S): USGS: Ryan ck | USFS:

SUPPLEMENTAL DATA

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

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

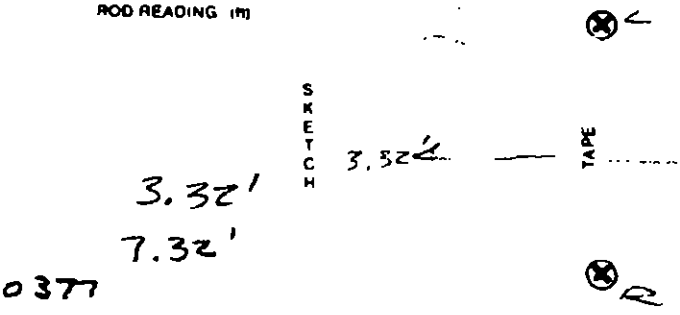
CHANNEL BED MATERIAL SIZE RANGE: | PHOTOGRAPHS TAKEN YES/NO | NUMBER OF PHOTOGRAPHS:

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	
② WS Upstream	46'	3.32'
③ WS Downstream	60'	7.32'

SLOPE | 4/106 = .0377

SKETCH



LEGEND

Stake ⊗

Station ①

Photo ◇

Direction of Flow

AQUATIC SAMPLING SUMMARY

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

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

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

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

COMMENTS

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: MIDDLE FORK SPRING CREEK | CROSS-SECTION NO: | DATE: 7/18/04 | SHEET __ OF __

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

Features: Stake (S), Grassline (G), Waterline (W), Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft²)	Discharge (cfs)
R	0		2.96								
	1.5		3.7								
	3.1		3.92								
	6.0		4.02								
	9.0		4.54								
	12.5		4.68								
B/L	15.9		5.36								
EOW	17.8		5.78								
	19.0		5.98	0.2					0		
	21.0		6.26	.5		14	43.5	0.342			
	21.5		6.40	.62		36	20.7	1.72			
	22.0		6.38	.60		50	20.4	2.422			
	22.5		6.42	.65		24	20.8	1.155			
	23.0		6.49	.60		12	25.4	.48			
	23.5		6.67	.90		17	24.7	.70			
	24.0		6.66	.88		21	28.9	.74			
	24.5		6.78	.90		54	20.4	2.614			
	25.0		6.78	.90		83	20.5	2.483			
	25.5		6.83	.85		43	20.7	2.057			
	26.0		6.77	.90		39	21.5	1.800			
	26.5		6.78	1.0		63	20.8	3.165			
	27.0		6.79	1.0		54	20.5	2.601			
	27.5		6.66	0.8		65	20.6	3.11			
	28.0		6.63	.75		55	21.6	2.515			
	28.5		6.49	.65		31	20.6	1.498			
	29.0		6.33	.60		56	20.4	2.709			
	29.5		6.42	.70		50	20.6	2.599			
	30.0		6.23	.50		38	20.9	1.804			
	30.5		6.10	.30		14	22.5	.655			
	31.0		6.13	.35		22	21.2	1.041			
	31.5		6.11	.32		18	20.5	.885			
WE	32.9		5.79	0							
B/L	33.5		5.43								
	34		4.72								
DGN	36		3.96								

TOTALS: [redacted]

CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY:

COLORADO WATER CONSERVATION BOARD

26.9 26.6 19.6 26.9 52.8 45

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

LOCATION INFORMATION

STREAM NAME: MIDDLE FORK SPRING CREEK

CROSS-SECTION NO.: 2

CROSS-SECTION LOCATION: #2 DOWN

DATE: 5/18/04 | OBSERVERS: ALMY / JAMES / SHELLHORN

LEGAL DESCRIPTION | ¼ SECTION: | SECTION: | TOWNSHIP: N/S | RANGE: E/W | PM:

COUNTY: | WATERSHED: | WATER DIVISION: | DOW WATER CODE:

MAP(S): USGS: Pryor ck
USFS:

SUPPLEMENTAL DATA

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

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

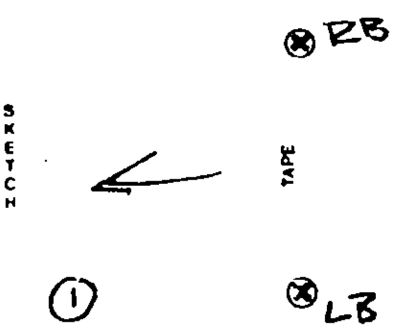
CHANNEL BED MATERIAL SIZE RANGE | PHOTOGRAPHS TAKEN YES/NO | NUMBER OF PHOTOGRAPHS

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	
② WS Upstream	45.5	4.36'
③ WS Downstream	52.8	7.78'

SLOPE: 3.42/98.3 = .0348

SKETCH



LEGEND: Stake ⊗ Station ① 4.36 Photo ◇ Direction of Flow

AQUATIC SAMPLING SUMMARY

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

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

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

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

COMMENTS

8" BROOK TROUT

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: MIDDLE FORK SPRING CREEK | CROSS-SECTION NO.: 2 | DATE: 5/18/06 | SHEET __ OF __

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading ____ ft | TIME 14:10

Features: Stake (S), Grassline (G), Waterline (W), Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec): At Point	Velocity (ft/sec): Mean in Vertical	Area (ft^2)	Discharge (cfs)
RS			11.23								
	1.0		5.42								
	4.0		5.75								
	6.1		5.4								
	10.0		5.0								
	13.5		4.95								
G/L	15.5	15.5	5.50								
	16.2		5.6								
	22.0		5.62								
	24.2		5.66								
EDGW	24.5		5.64								
	26.0		6.23		.3				0		
	27.0		6.25		.4	39		20.3	1.859		
	27.5		6.39		.5	17		24.2	.714		
	28.0		6.44		.58	31		20.9	1.411		
	28.5		6.49		.55	36		21.5	1.634		
	29.0		6.42		.55	33		20.6	1.593		
	29.5		6.31		.45	66		28.1	2.322		
	30.0		6.39		.5	56		20.1	2.749		
	30.5		6.41		.6	51		23.1	2.185		
	31.0		6.39		.62	57		20.2	2.784		
	31.5		6.40		.6	74		20.8	2.503		
	32.0		6.37		.55	60		20.1	2.944		
	32.5		6.41		.65	55		20.1	2.701		
	33.0		6.40		.6	61		20.4	2.949		
	33.5		6.45		.68	77		25.1	3.065		
	34.0		6.43		.65	69		19.9	2.415		
	34.5		6.26		.55	76		20.6	3.632		
	35.0		6.51		.7	83		20.5	3.983		
	35.5		6.41		.65	89		20.5	4.269		
	36.0		6.40		.60	72		20.8	3.409		
	36.5		6.21		.5	42		20.8	2.047		
EDGW	37.0		5.94								
G/L	37.7		5.90								
STAKE	39.3		3.32								

38 17' 53.06" N 108° 1' 27.45" W

TOTALS:

[redacted]

MEASUREMENT PERFORMED BY: [redacted] CALCULATIONS CHECKED BY:

STREAM NAME Middle Fk Spring Ck
XS LOCATION 0
XS NUMBER 0 Jarrett Variable Manning's n Correction Applied

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG DEPTH (FT)	MAX DEPTH (FT)	AREA (SQ FT)	WETTED PERIM (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG VELOCITY (FT/SEC)
"GL"	5 87	14 09	0 45	0 87	6 35	14 79	100 0%	0 43	2 92	0 46
	5 88	13 91	0 45	0 86	6 20	14 60	98 8%	0 42	2 82	0 46
	5 93	13 08	0 42	0 81	5 52	13 76	93 1%	0 40	2 40	0 43
	5 98	12 24	0 40	0 76	4 89	12 92	87 4%	0 38	2 03	0 41
	6 03	11 40	0 38	0 71	4 30	12 07	81 6%	0 36	1 69	0 39
	6 08	10 56	0 36	0 66	3 75	11 23	75 9%	0 33	1 40	0 37
	6 13	9 73	0 33	0 61	3 24	10 38	70 2%	0 31	1 15	0 35
	6 18	8 90	0 31	0 56	2 78	9 54	64 5%	0 29	0 93	0 33
"WL"	6 23	8 38	0 28	0 51	2 35	8 96	60 6%	0 26	0 72	0 31
	6 28	7 84	0 25	0 46	1 94	8 37	56 6%	0 23	0 54	0 28
	6 33	7 35	0 21	0 41	1 56	7 82	52 9%	0 20	0 38	0 24
	6 38	6 72	0 18	0 36	1 21	7 14	48 3%	0 17	0 26	0 21
	6 43	5 83	0 15	0 31	0 89	6 18	41 8%	0 14	0 17	0 19
	6 48	5 21	0 12	0 26	0 62	5 48	37 1%	0 11	0 09	0 15
	6 53	4 55	0 08	0 21	0 37	4 75	32 1%	0 08	0 04	0 11
	6 58	3 28	0 05	0 16	0 18	3 41	23 1%	0 05	0 01	0 08
	6 63	1 35	0 06	0 11	0 08	1 44	9 7%	0 06	0 01	0 09
	6 68	0 87	0 03	0 06	0 03	0 91	6 1%	0 03	0 00	0 05
	6 73	0 05	0 00	0 01	0 00	0 05	0 3%	0 00	0 00	0 01

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

LOCATION INFORMATION

STREAM NAME	Middle Fk Spring Ck
XS LOCATION	0
XS NUMBER	0
DATE	11-Jul-05
OBSERVERS	0
1/4 SEC	0
SECTION	0
TWP	0
RANGE	0
PM	0
COUNTY	0
WATERSHED	0
DIVISION	0
DOW CODE	0
USGS MAP	0
USFS MAP	0

SUPPLEMENTAL DATA

TAPE WT	0 0106
TENSION	99999

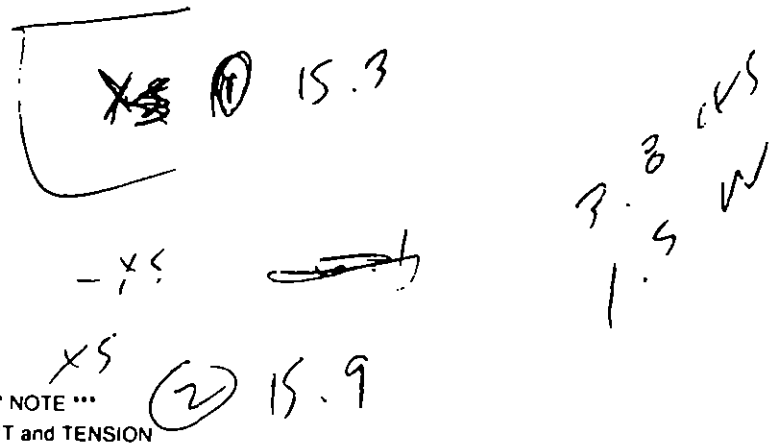
*** NOTE ***
Leave TAPE WT and TENSION at defaults for data collected with a survey level and rod

CHANNEL PROFILE DATA

SLOPE	0 03208191

INPUT DATA CHECKED BY DATE

ASSIGNED TO DATE



STREAM NAME Middle Fk Spring Ck
XS LOCATION 0
XS NUMBER 0

DATA POINTS= 29

VALUES COMPUTED FROM RAW FIELD DATA

	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
	s	0 00	4 51			0 00		0 00	0 00	0 0%
		2 00	5 54			0 00		0 00	0 00	0 0%
1	g	4 00	5 87			0 00		0 00	0 00	0 0%
	ws	6 50	6 17	0 00	0 00	0 00		0 00	0 00	0 0%
		6 70	6 24	0 05	0 00	0 21	0 05	0 02	0 00	0 0%
		7 30	6 39	0 10	0 04	0 62	0 10	0 05	0 00	0 3%
		7 70	6 46	0 10	0 22	0 41	0 10	0 04	0 01	1 3%
		8 10	6 36	0 15	0 09	0 41	0 15	0 06	0 01	0 8%
		8 50	6 50	0 25	0 17	0 42	0 25	0 10	0 02	2 5%
		8 90	6 60	0 37	0 30	0 41	0 37	0 15	0 04	6 5%
		9 30	6 60	0 40	0 39	0 40	0 40	0 16	0 06	9 1%
		9 70	6 16	0 25	0 71	0 59	0 25	0 10	0 07	10 3%
		10 10	6 52	0 20	0 35	0 54	0 20	0 08	0 03	4 1%
		10 50	6 55	0 32	0 00	0 40	0 32	0 10	0 00	0 0%
		10 70	6 55	0 24	0 00	0 20	0 24	0 10	0 00	0 0%
		11 30	6 62	0 35	0 05	0 60	0 35	0 18	0 01	1 3%
		11 70	6 74	0 40	0 20	0 42	0 40	0 16	0 03	4 7%
		12 10	6 49	0 30	0 34	0 47	0 30	0 12	0 04	5 9%
		12 50	6 70	0 30	0 59	0 45	0 30	0 12	0 07	10 3%
		12 90	6 73	0 55	0 00	0 40	0 55	0 22	0 00	0 0%
		13 30	6 59	0 32	0 00	0 42	0 32	0 13	0 00	0 0%
		13 70	6 59	0 30	0 09	0 40	0 30	0 12	0 01	1 6%
		14 10	6 58	0 28	0 31	0 40	0 28	0 10	0 03	4 4%
		14 40	6 43	0 39	1 63	0 34	0 39	0 16	0 25	37 0%
		14 90	6 29	0 20	0 00	0 52	0 20	0 10	0 00	0 0%
	ws	15 40	6 19	0 00		0 51		0 00	0 00	0 0%
1	g	18 60	5 81			0 00		0 00	0 00	0 0%
		21 00	5 30			0 00		0 00	0 00	0 0%
	s	28 10	4 30			0 00		0 00	0 00	0 0%
	TOTALS ----------					9 55	0 55 (Max)	2 35	0 69	100 0%

Manning's n = 0 3568
Hydraulic Radius= 0 245669029

STREAM NAME Middle Fk Spring Ck
XS LOCATION 0
XS NUMBER 0

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2 35	2 79	18 7%
5 93	2 35	5 53	135 8%
5 95	2 35	5 28	124 8%
5 97	2 35	5 02	114 1%
5 99	2 35	4 78	103 6%
6 01	2 35	4 54	93 5%
6 03	2 35	4 31	83 6%
6 05	2 35	4 08	74 0%
6 07	2 35	3 87	64 7%
6 09	2 35	3 65	55 7%
6 11	2 35	3 45	47 0%
6 13	2 35	3 25	38 5%
6 14	2 35	3 15	34 4%
6 15	2 35	3 06	30 4%
6 16	2 35	2 97	26 4%
6 17	2 35	2 88	22 5%
6 18	2 35	2 79	18.7%
6 19	2 35	2 70	14 9%
6 20	2 35	2 61	11 2%
6 21	2 35	2 52	7 5%
6 22	2 35	2 44	3 9%
6 23	2 35	2 35	0 3%
6 25	2 35	2 19	-6 8%
6 27	2 35	2 03	-13 7%
6 29	2 35	1 87	-20 3%
6 31	2 35	1 72	-26 9%
6 33	2 35	1 57	-33 2%
6 35	2 35	1 42	-39 4%
6 37	2 35	1 28	-45 4%
6 39	2 35	1 15	-51 1%
6 41	2 35	1 02	-56 6%
6 43	2 35	0 90	-61 7%

WATERLINE AT ZERO
AREA ERROR = 6 231

STREAM NAME Middle Fk Spring Ck
XS LOCATION 0
XS NUMBER 0

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"	5 87	14 09	0 45	0 87	6 35	14 79	100 0%	0 43	2 70	0 42
	5 88	13 91	0 45	0 86	6 20	14 60	98 8%	0 42	2 61	0 42
	5 93	13 08	0 42	0 81	5 52	13 76	93 1%	0 40	2 24	0 41
	5 98	12 24	0 40	0 76	4 89	12 92	87 4%	0 38	1 91	0 39
	6 03	11 40	0 38	0 71	4 30	12 07	81 6%	0 36	1 61	0 37
	6 08	10 56	0 36	0 66	3 75	11 23	75 9%	0 33	1 35	0 36
	6 13	9 73	0 33	0 61	3 24	10 38	70 2%	0 31	1 11	0 34
	6 18	8 90	0 31	0 56	2 78	9 54	64 5%	0 29	0 91	0 33
"WL"	6 23	8 38	0 28	0 51	2 35	8 98	60 6%	0 26	0 72	0 31
	6 28	7 84	0 25	0 46	1 94	8 37	56 6%	0 23	0 55	0 28
	6 33	7 35	0 21	0 41	1 56	7 82	52 9%	0 20	0 40	0 25
	6 38	6 72	0 18	0 36	1 21	7 14	48 3%	0 17	0 28	0 23
	6 43	5 83	0 15	0 31	0 89	6 18	41 8%	0 14	0 18	0 21
	6 48	5 21	0 12	0 26	0 62	5 48	37 1%	0 11	0 11	0 17
	6 53	4 55	0 08	0 21	0 37	4 75	32 1%	0 08	0 05	0 14
	6 58	3 28	0 05	0 16	0 18	3 41	23 1%	0 05	0 02	0 10
	6 63	1 35	0 06	0 11	0 08	1 44	9 7%	0 06	0 01	0 11
	6 68	0 87	0 03	0 06	0 03	0 91	6 1%	0 03	0 00	0 07
	6 73	0 05	0 00	0 01	0 00	0 05	0 3%	0 00	0 00	0 02

STREAM NAME	Middle Fk Spring Ck
XS LOCATION	0
XS NUMBER	0

SUMMARY SHEET

MEASURED FLOW (Qm)=	0 69	cfs
CALCULATED FLOW (Qc)=	0 72	cfs
(Qm-Qc)/Qm * 100 =	-4 4	%
MEASURED WATERLINE (WLm)=	6 18	ft
CALCULATED WATERLINE (WLc)=	6 23	ft
(WLm-WLc)/WLm * 100 =	-0 8	%
MAX MEASURED DEPTH (Dm)=	0 55	ft
MAX CALCULATED DEPTH (Dc)=	0 51	ft
(Dm-Dc)/Dm * 100	/ 4	%
MEAN VELOCITY=	0 31	ft/sec
MANNING'S N=	0 357	
SLOPE=	0 03208191	ft/ft
4 * Qm =	0 3	cfs
2 5 * Qm=	1 7	cfs

RECOMMENDED INSTREAM FLOW

FLOW (CFS)	PERIOD

RATIONALE FOR RECOMMENDATION

RECOMMENDATION BY AGENCY DATE

CWCB REVIEW BY DATE

Data Input & Proofing

STREAM NAME	Middle Spring Creek
XS LOCATION	
XS NUMBER	1
DATE	5/18/04
OBSERVERS	Almy, Shellhorn and James
1/4 SEC	
SECTION	
TWP	
RANGE	
PM	
COUNTY	
WATERSHED	
DIVISION	
DOW CODE	
USGS MAP	
USFS MAP	
	Level and Rod Survey
TAPE WT	0 0106 lbs / ft
TENSION	99999 lbs
SLOPE	0 0377 ft / ft

CHECKED BY DATE

ASSIGNED TO DATE

Total Data Points = 35

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	RBS	0 00	2 96			0 00	0 00	0 00
		1 50	3 70			0 00	0 00	0 00
		3 10	3 92			0 00	0 00	0 00
		6 00	4 42			0 00	0 00	0 00
		9 00	4 54			0 00	0 00	0 00
		12 50	4 68			0 00	0 00	0 00
1	GL	15 90	5 36			0 00	0 00	0 00
	W	17 80	5 78			0 00	0 00	0 00
		19 00	5 98	0 20	0 00	0 32	0 00	5 78
		21 00	6 26	0 50	0 34	0 63	0 21	5 76
		21 50	6 40	0 62	1 72	0 31	0 53	5 78
		22 00	6 38	0 50	2 42	0 25	0 61	5 88
		22 50	6 42	0 65	1 16	0 33	0 38	5 77
		23 00	6 49	0 60	0 48	0 30	0 14	5 89
		23 50	6 67	0 90	0 70	0 45	0 32	5 77
		24 00	6 66	0 88	0 74	0 44	0 33	5 78
		24 50	6 78	0 90	2 61	0 45	1 18	5 88
		25 00	6 78	0 90	3 98	0 45	1 79	5 88
		25 50	6 83	0 85	2 06	0 43	0 87	5 98
		26 00	6 77	0 90	1 80	0 45	0 81	5 87
		26 50	6 78	1 00	3 11	0 50	1 55	5 78
		27 00	6 79	1 00	2 60	0 50	1 30	5 79
		27 50	6 66	0 80	3 11	0 40	1 24	5 86
		28 00	6 63	0 75	2 52	0 38	0 94	5 88
		28 50	6 49	0 65	1 50	0 33	0 49	5 84
		29 00	6 33	0 60	2 71	0 30	0 81	5 73
		29 50	6 42	0 70	2 40	0 35	0 84	5 72
		30 00	6 23	0 50	1 80	0 25	0 45	5 73
		30 50	6 10	0 30	0 64	0 15	0 10	5 80
		31 00	6 13	0 35	1 04	0 18	0 18	5 78
		31 50	6 11	0 32	0 89	0 30	0 27	5 79
	W	32 90	5 79	0 00		0 00	0 00	0 00
1	GL	33 50	5 43			0 00	0 00	0 00
		35 40	4 72			0 00	0 00	0 00
	LBS	36 60	3 86			0 00	0 00	0 00

Data Input & Proofing

GL=1 FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
				Totals	8 42	15 34	

STREAM NAME	Middle Spring Creek
XS LOCATION	0
XS NUMBER	1

SUMMARY SHEET

MEASURED FLOW (Qm)=	15.34	cfs
CALCULATED FLOW (Qc)=	15.50	cfs
(Qm-Qc)/Qm * 100 =	-1.0	%
MEASURED WATERLINE (WLm)=	5.79	ft
CALCULATED WATERLINE (WLc)=	5.81	ft
(WLm-WLc)/WLm * 100 =	-0.4	%
MAX MEASURED DEPTH (Dm)=	1.00	ft
MAX CALCULATED DEPTH (Dc)=	1.02	ft
(Dm-Dc)/Dm * 100	-2.4	%
MEAN VELOCITY=	1.84	ft/sec
MANNING'S N=	0.106	
SLOPE=	0.0577	ft/ft
4 * Qm =	61	cfs
2.5 * Qm=	38.4	cfs

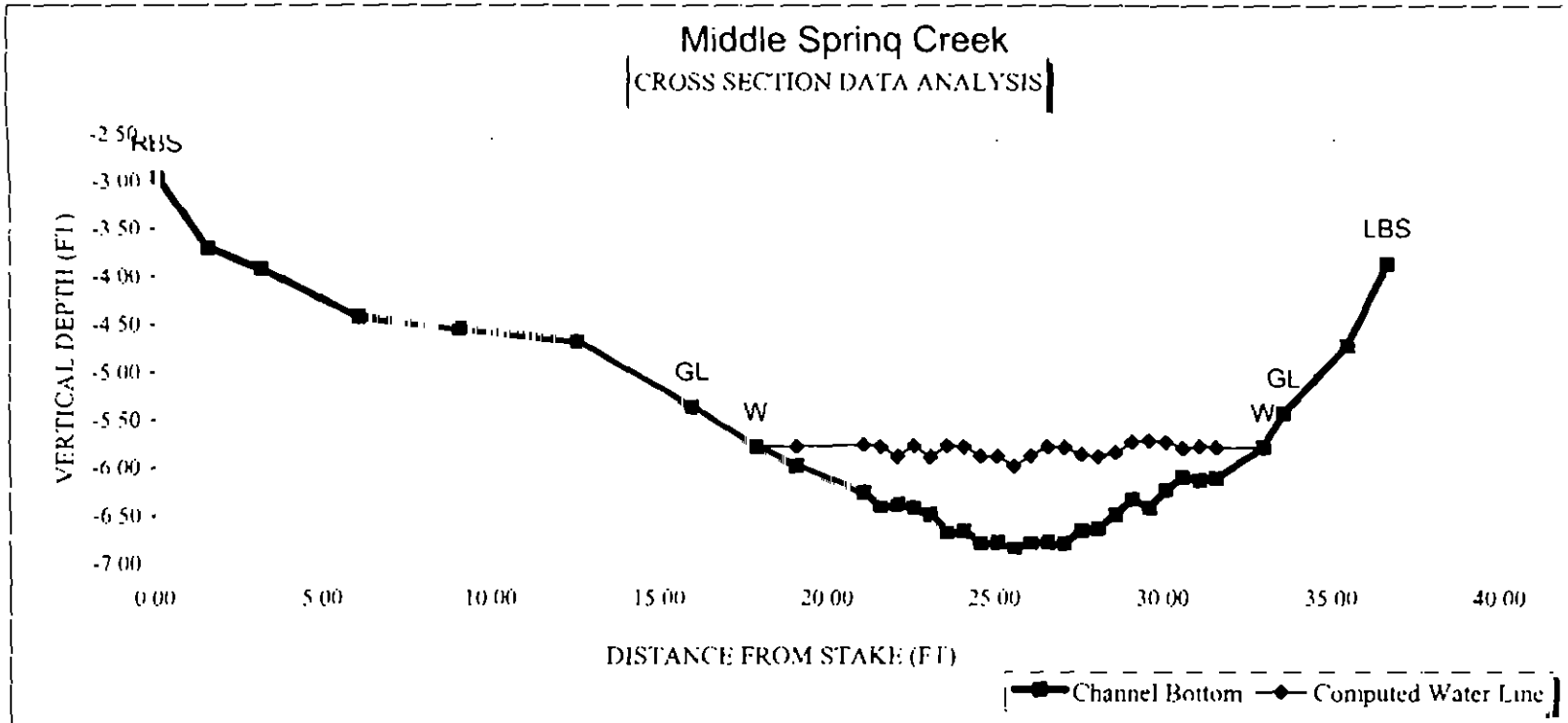
RECOMMENDED INSTREAM FLOW

FLOW (CFS)	PERIOD

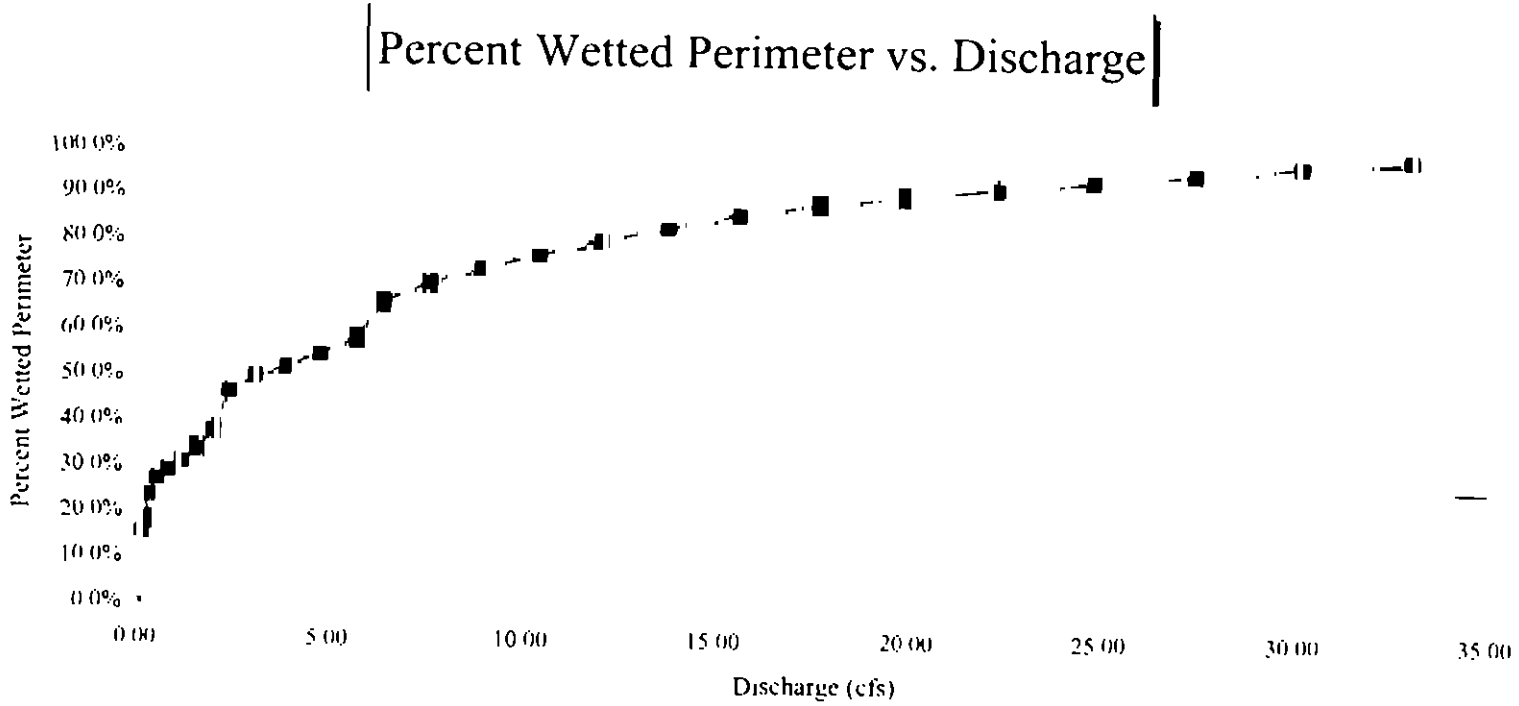
RATIONALE FOR RECOMMENDATION

RECOMMENDATION BY AGENCY DATE

CWCB REVIEW BY DATE



ChartMin	0	ChartMinY	-7
ChartMax	40	ChartMaxY	-2.5


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
Discharge (cfs)

Data Input & Proofing

STREAM NAME	Middle Fork Spring Creek
XS LOCATION	
XS NUMBER	2
DATE	5/18/04
OBSERVERS	Almy, Shellhorn and James
1/4 SEC	
SECTION	
TWP	
RANGE	
PM	
COUNTY	
WATERSHED	
DIVISION	
DOW CODE	
USGS MAP	
USFS MAP	
	Level and Rod Survey
TAPE WT	0 0106 lbs / ft
TENSION	99999 lbs
SLOPE	0 0348 ft / ft

CHECKED BY DATE

ASSIGNED TO DATE

Total Data Points = 34

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	RBS	0 00	4 23			0 00	0 00	0 00
		1 00	5 42			0 00	0 00	0 00
		4 00	5 75			0 00	0 00	0 00
		6 10	5 40			0 00	0 00	0 00
		10 00	5 00			0 00	0 00	0 00
		13 50	4 95			0 00	0 00	0 00
1	GL	15 50	5 50			0 00	0 00	0 00
		16 20	5 60			0 00	0 00	0 00
		22 00	5 62			0 00	0 00	0 00
		24 20	5 66			0 00	0 00	0 00
	W	24 50	5 94			0 00	0 00	0 00
		26 00	6 23	0 30	0 00	0 38	0 00	5 93
		27 00	6 25	0 40	1 86	0 30	0 56	5 85
		27 50	6 39	0 50	0 71	0 25	0 18	5 89
		28 00	6 44	0 58	1 48	0 29	0 43	5 86
		28 50	6 49	0 55	1 63	0 28	0 45	5 94
		29 00	6 42	0 55	1 59	0 41	0 66	5 87
		30 00	6 39	0 50	2 75	0 38	1 03	5 89
		30 50	6 41	0 60	2 19	0 30	0 66	5 81
		31 00	6 39	0 62	2 78	0 31	0 86	5 77
		31 50	6 40	0 60	3 50	0 30	1 05	5 80
		32 00	6 37	0 55	2 94	0 28	0 81	5 82
		32 50	6 44	0 65	2 70	0 33	0 88	5 79
		33 00	6 40	0 60	2 95	0 30	0 88	5 80
		33 50	6 45	0 68	3 03	0 34	1 03	5 77
		34 00	6 43	0 65	3 42	0 33	1 11	5 78
		34 50	6 26	0 55	3 63	0 28	1 00	5 71
		35 00	6 51	0 70	3 98	0 35	1 39	5 81
		35 50	6 41	0 65	4 27	0 33	1 39	5 76
		36 00	6 40	0 60	3 41	0 30	1 02	5 80
		36 50	6 21	0 50	2 05	0 25	0 51	5 71
	W	37 00	5 94			0 00	0 00	0 00
1	GL	37 70	5 40			0 00	0 00	0 00
	LBS	39 30	3 32			0 00	0 00	0 00

Data Input & Proofing	GL=1 FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
				|	Totals|	6 25|	15 90|	

STREAM NAME	Middle Fork Spring Creek
XS LOCATION	0
XS NUMBER	2

SUMMARY SHEET

MEASURED FLOW (Qm)=	15 90	cfs
CALCULATED FLOW (Qc)=	15 64	cfs
(Qm-Qc)/Qm * 100 =	1 6	%
MEASURED WATERLINE (WLm)=	5 94	ft
CALCULATED WATERLINE (WLc)=	5 84	ft
(WLm-WLc)/WLm * 100 =	1 7	%
MAX MEASURED DEPTH (Dm)=	0 70	ft
MAX CALCULATED DEPTH (Dc)=	0 67	ft
(Dm-Dc)/Dm * 100	4 1	%
MEAN VELOCITY=	2 50	ft/sec
MANNING'S N=	0 068	
SLOPE=	0 0348	ft/ft
4 * Qm =	6 4	cfs
2 5 * Qm=	39 7	cfs

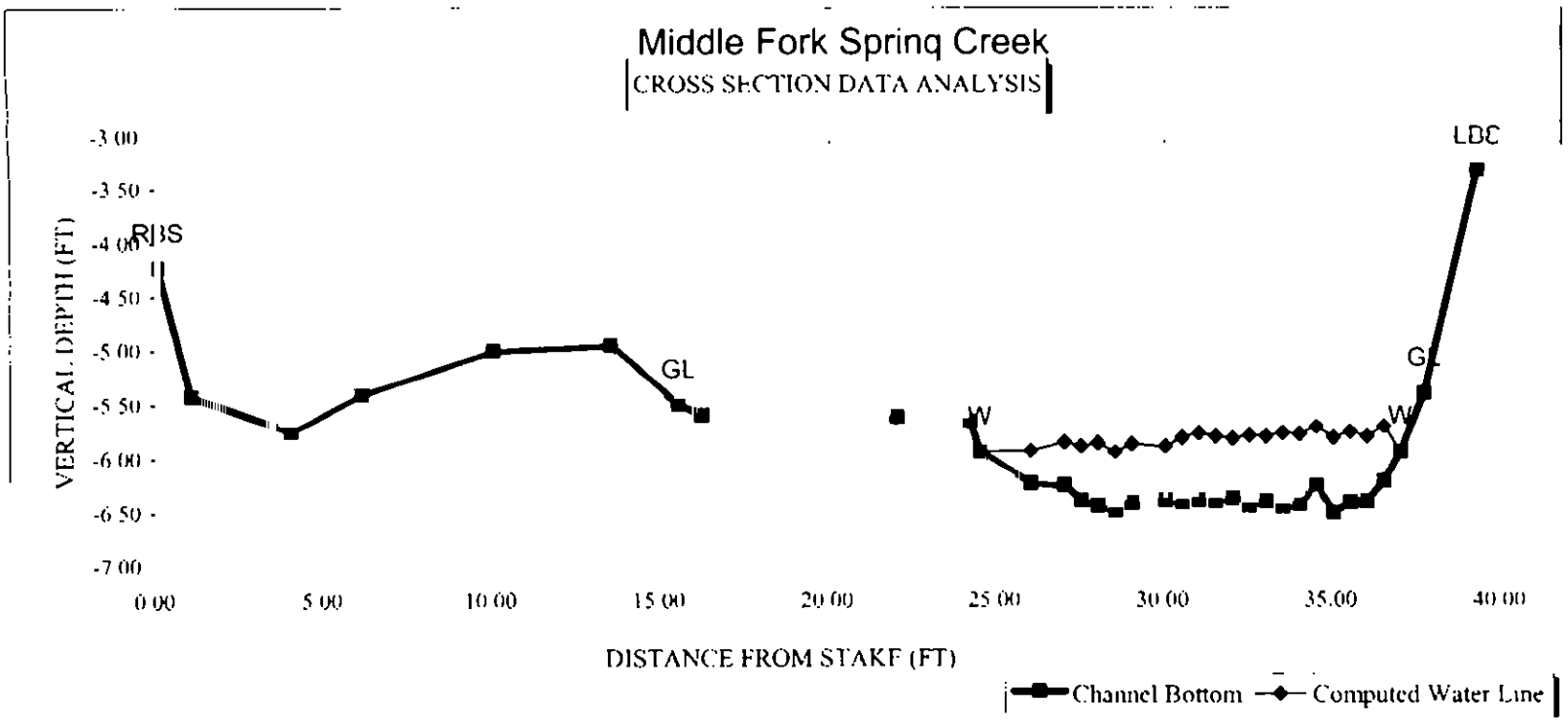
RECOMMENDED INSTREAM FLOW

FLOW (CFS)	PERIOD

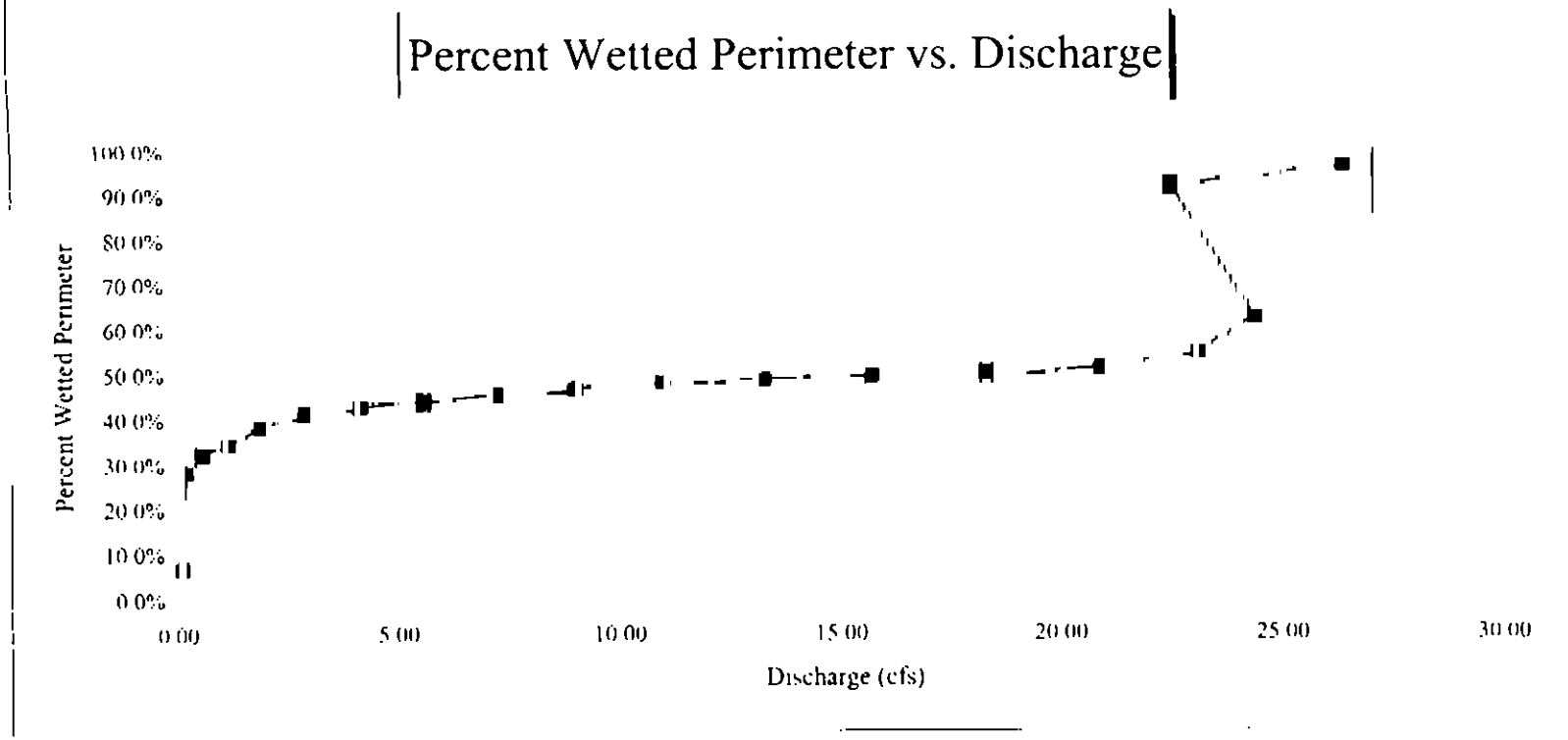
RATIONALE FOR RECOMMENDATION

RECOMMENDATION BY AGENCY DATE

CWCB REVIEW BY DATE



ChartMin	0	ChartMinY	-7
ChartMax	40	ChartMaxY	-3


Percent Wetted Perimeter vs. Discharge
Percent Wetted Perimeter
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
0.00
5.00
10.00
15.00
20.00
25.00
30.00
Discharge (cfs)

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Middle Fk Spring Creek

CROSS-SECTION NO.: 1

CROSS-SECTION LOCATION:

DATE: 7/11/05 OBSERVERS: Alves, Spears, Jones

LEGAL DESCRIPTION	¼ SECTION:	SECTION:	TOWNSHIP: N/S	RANGE: E/W	PM

COUNTY: | WATERSHED: | WATER DIVISION: 4 | DOW WATER CODE:

MAP(S): USGS: / USFS: 38° 18.507' N 108°.762' W

SUPPLEMENTAL DATA

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

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

CHANNEL BED MATERIAL SIZE RANGE: Large Gravel - Medium Cobble | PHOTOGRAPHS TAKEN: YES/NO (YES circled) | NUMBER OF PHOTOGRAPHS:

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(X) Tape @ Stake LB	0.0	
(X) Tape @ Stake RB	0.0	
(1) WS @ Tape LB/RB	0.0	
(2) WS Upstream	41.3	4.30
(3) WS Downstream	40.6	7.12
SLOPE		

SKETCH

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

AQUATIC SAMPLING SUMMARY

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

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

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

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

COMMENTS

6" - 10-12" BROOK TROUT OBSERVED IN ~10' REACH REACH

DISCHARGE/CROSS SECTION NOTES

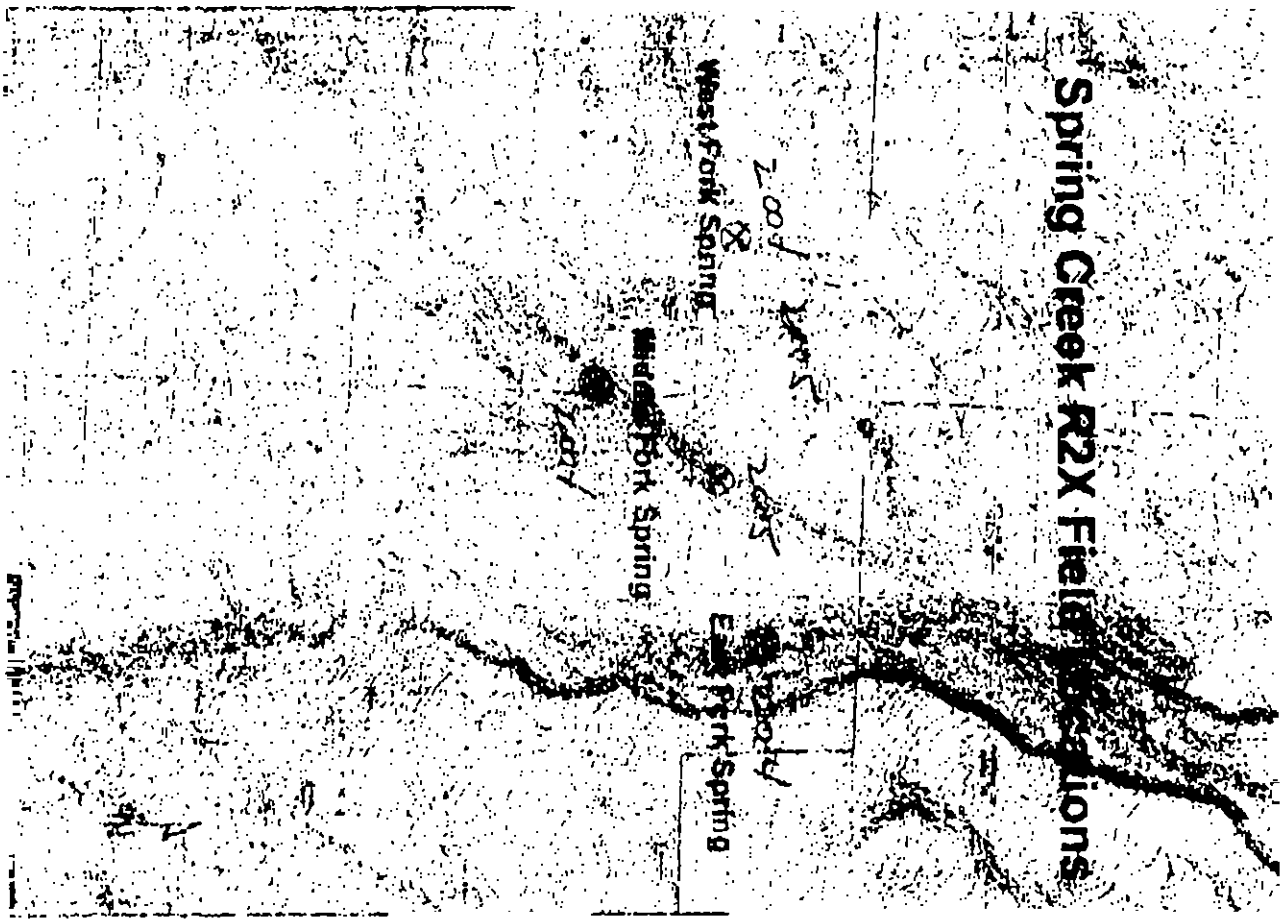
STREAM NAME: [illegible] Spring Ck | CROSS SECTION NO: 1 | DATE: 7/14/05 | SHEET ___ OF ___

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT (circled: RIGHT) | Gage Reading ___ ft | TIME 12:55 [illegible]

Stake (S) / Station (X) / 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 At Point (ft/sec)	Mean in Vertical	Area (ft²)	Discharge (cfs)
RS	0		4.51								
	2.0		5.31								
BL	4.0		5.87								
[illegible]	6.5		6.17								
	6.7		6.24	0.05				0.0			
	7.3		6.39	0.10				0.0			
	7.7		6.46	0.10				0.04			
	8.1		6.36	0.15				0.22			
	8.5		6.50	0.25				0.09			
	8.9		6.60	0.37				0.17			
	9.3		6.60	0.40				0.30			
	9.7		6.46	0.25				0.39			
	10.1		6.52	0.20				0.71			
	10.5		6.55	0.32				0.35			
	10.9		6.55	0.24				0.0			
	11.3		6.62	0.33				0.0			
	11.7		6.74	0.40				0.05			
	12.1		6.49	0.30				0.20			
	12.5		6.70	0.30				0.34			
	12.9		6.73	0.55				0.59			
	13.3		6.59	0.32				0.0			
	13.7		6.59	0.30				0.0			
	14.1		6.58	0.28				0.09			
	14.4		6.43	0.29				0.31			
	14.9		6.29	0.20				1.63			
LEW	15.4		6.19								
GL	18.0		5.81								
	21.0		5.30								
GS	28.1		4.30								

TOTALS

CALCULATIONS PERFORMED BY | CALCULATIONS CHECKED BY


Spring Creek R2X Field Locations
West Fork Spring
Middle Fork Spring
East Fork Spring

COLORADO STREAM SURVEY (1976 REVISION)

Surveyed by: Weiler and Coven

	Record Data
Code No.	43227
Date	29 July 80
Section No.	1
Stream Name:	SPRING CREEK, MIDDLE FORK
Primary Drainage:	Spring Creek
Uncompahgre River	
Major Drainage	Gunnison River 34-C
Lower terminus	FISHERY
Location:	Confluence with East Fork to form Spring Creek
T.	47 N
R.	10 W
S.	17
Width	5 ft.
Elevation	7415 ft.
Flow (c.f.s.) Est.	0.2 cfs
pH	7.4
phth	0.0 ppm
MO	48 ppm
EDTA	51 ppm
Conductivity	95 µohm/cm
X if stream profile obtained	
Upper terminus	
Location:	Headwaters
T.	46 N
R.	11 W
S.	3
Width	1 ft.
Elevation	9560 ft.
Flow	
pH	
phth	
MO	
EDTA	
Conductivity	
X if stream profile obtained	
Section Summary	
Meander factor	1.0
Length in Miles	6.3 Miles
Width in feet	3 ft.
Acreage	2.3
Observed Flow	Normal
X if inundated by reservoir	
Mileage unsectioned	
Counties where section located	
County	Ouray
Miles	6.3 Miles
County	
Miles	
County	
Miles	

(X) if stream has no fishery value

	Record Data
Region	Southwest
Beaver Dams	
Number (count or estimate)	Old
Estimated acreage	
Physical stream damage (% of section affected)	None
Bank degredation	
Channelization	
Dredging	
Mine tailing encroachment	
Road encroachment	
Accessibility (miles)	
Surfaced	
Non-Surfaced car	
4-Wheel	
Established trail	0.1 Mile
No established trail	6.2 Miles
Boat only	
No access	
Land Status and mileage	
USFS	5.3 Miles
BLM	0.7 Mile
Municipal	
Div. of Wild.	
Private, no public access	0.3 Mile
Private, open to public	
State Land Board	
County	
Mixed small tracts, open	
Mixed small tracts, closed	
Stocking	
Miles creel size	
Miles fingerling Brook	1975
Miles Fry	
Miles not stocked	
Aquatic Vegetation	
Filamentous algae (x one)	
Absent	X
Rare	
Common	
Abundant	
Watercress	
X if present	
Size Classification (X one)	
Large river > 100'	
River 60-99'	
Large stream 36-59'	
Medium 20-35'	
Small 10-19'	
Minor 4-9'	
Very small stream < 4'	X
Gradient (computer entry)	
Percent per mile	6.49

	Record Data
Fishery Value (X one)	//////////
None	
Poor	
Below average	
Average	
Above Average	
Excellent	X
Fishery Value - limiting factors	//////////
	//////////
FISH SAMPLING	//////////
Lower or only station	//////////
Elevation	8760 ft.
Describe or map station location below	
Sampling method	Electro-Fishing - 50
Length - feet	250 ft.
Sampling adequate	X
Sampling inadequate	
X if scales collected	
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	100%
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	

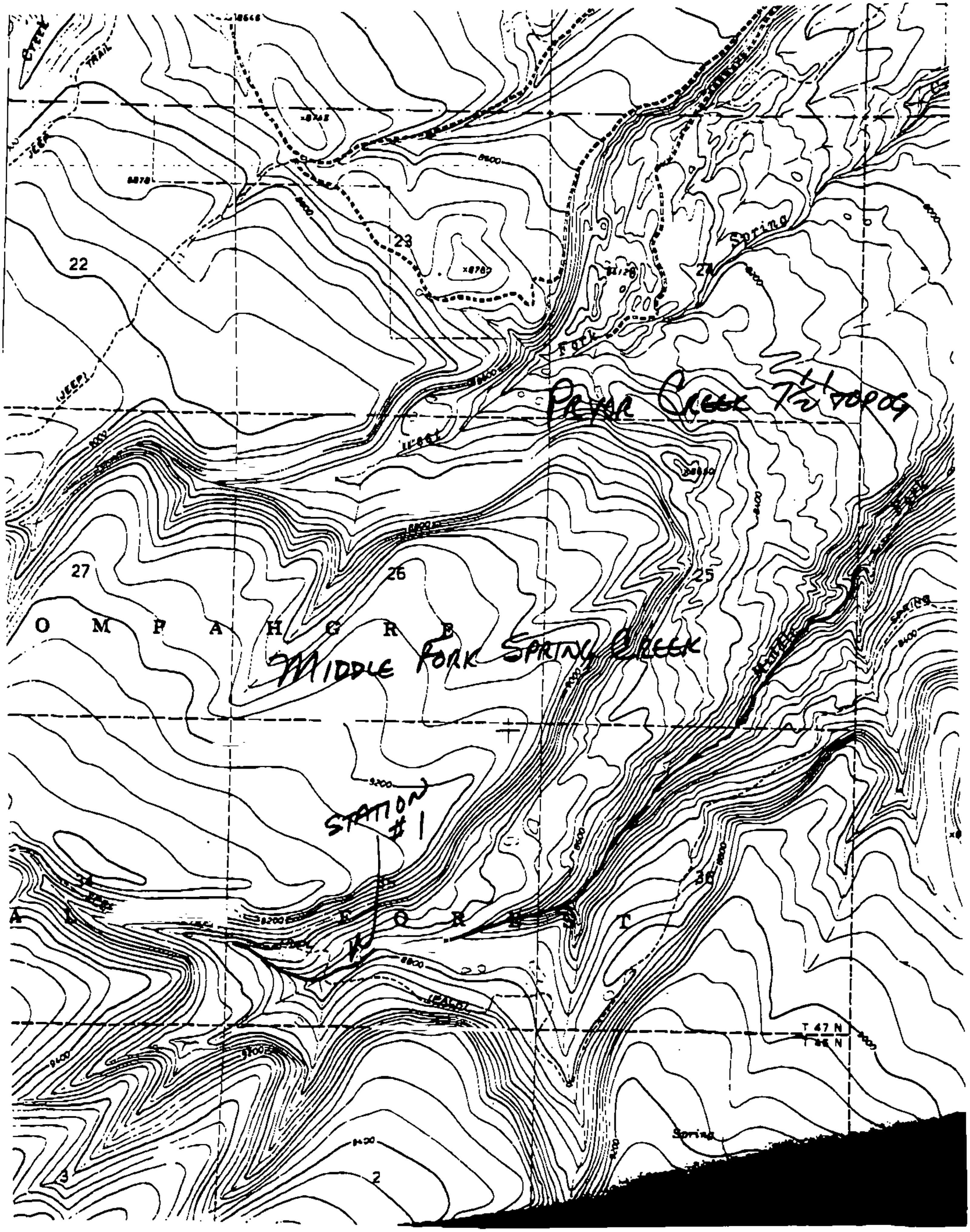
	Record Data
Upper Station	//////////
Elevation	
Describe or map station location below	
Sampling method	
Length - feet	
Sampling adequate	
Sampling inadequate	
X if scales collected	
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	
Combined stations	//////////
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	
No. of game fish 6.0 per mile.	

ELELCTRO-FISHING RECORD

Station #1: Spring Creek Trail Crossing in Section 35.
Distance: 250 ft. Width: 4 ft. Acreage: 0.0230 acre
Equipment Used: Shocker
Personnel: Weiler and Coven

		SIZE LENGTH IN INCHES															
Sta.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Tot.	Avg.
1	Brook	18	4	20	13	17	3							100		75	3.7

Comments: Sta. #1: Brook 652g ttl. wt. = 62.4 lbs./acre netted.



CO WILDLIFE HABITAT Fax:303-291-7456 Jan 6 2006 12:31 p 05

'72-'73 FISHERIES INVENTORY / 1041 RELATED DATA

Stream Code 43322

'72-'73 Inventory S - _____

Percent Open to Public ____, ('72 Inventory)

Stream Name Sonna Creek Middle Fork

1041 Form

- Quality of Water ____,
- Pool-riffle Ratio ____,
- Temperature of Water ____,
- Clarity of Water ____,
- Fish Food Supply ____,
- Condition of Fish ____,
- Legal Access ____,
- Physical Access* ____,
- Aesthetic Value ____,
- Meanders Value ____,
- Improvement Potential ____,

No Data

'72 Inventory

- Stocking Status ____, (regularly, occasionally, rarely or never)
- Population Status ____, (normal, over-populated, under-populated)

☐ MINIMUM STREAM FLOW DATA

SB-97 Computer run Step A

- Maximum Channel Width ____,
- Maximum Wetted Perimeter ____,
- Maximum Depth ____,

"Filed on" Blue book

- Decreed Flow ____,
- Initial Month ____,
- Initial Day ____,
- Initial Year ____

STOCKING AND FISH SAMPLING DATA

STREAM CODE 43327

STOCKING

STOCK 79-83 ___ YRS

STOCKYRS _ _ _ _ _ _

SPECIES-SIZE STOCKED:

_ _ _ _ _ _ _ _ _ _ _ _ _ _

_ _ _ _ _ _ _ _ _ _ _ _ _ _

FISH SAMPLING

SAMPLE DATE: 07, 29, 80

METHODS: ELEC _ _ _ _

	SPECIES	#TAKEN	AVG. LENGTH (cm)	RANGE (cm)	AVG. WT (g)	RANGE (g)	TOTAL CATCH
1.	BU	75	9.3	3-15	8		100
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

COLORADO STREAM SURVEY (1976 REVISION)

Surveyed by: Weiler and Coven

(X) if stream has no fishery value

	Record Data
Code No.	43315
Date	30 July 80
Section No.	1
Stream Name:	SPRING CREEK, EAST FORK
Primary Drainage: Spring Creek, Uncompahgre River	
Major Drainage	Gunnison River, 34-G
Lower terminus	FISHERY
Location: Confluence with Middle Fork to form Spring Creek	
T.	47 N
R.	10 W
S.	17
Width	6 ft.
Elevation	7415 ft.
Flow (c.f.s.)	Est. 0.2 cfs
pH	7.3
phth	0.0 ppm
MO	37 ppm
EDTA	43 ppm
Conductivity	85 µohm/cm
X if stream profile obtained	
Upper terminus	
Location:	Headwaters
T.	46 N
R.	11 W
S.	13
Width	1 ft.
Elevation	9460 ft.
Flow	
pH	
phth	
MO	
EDTA	
Conductivity	
X if stream profile obtained	
Section Summary	
Meander factor	1.0
Length in Miles	9.2 Miles
Width in feet	3.5 ft.
Acreage	3.9
Observed Flow	Normal
X if inundated by reservoir	
Mileage unsectioned	
Counties where section located	
County	Montrose
Miles	2.4 Miles
County	Ouray
Miles	6.8 Miles
County	
Miles	

	Record Data
Region	Southwest
Beaver Dams	
Number (count or estimate)	None
Estimated acreage	
Physical stream damage (% of section affected)	None
Bank degredation	
Channelization	
Dredging	
Mine tailing encroachment	
Road encroachment	
Accessibility (miles)	
Surfaced	
Non-Surfaced car	0.1 Mile
4-Wheel	0.2 Mile
Established trail	
No established trail	8.9 Miles
Boat only	
No access	
Land Status and mileage	
USFS	7.3 Miles
BLM	0.7 Mile
Municipal	
Div. of Wild.	
Private, no public access	1.2 Miles
Private, open to public	
State Land Board	
County	
Mixed small tracts, open	
Mixed small tracts, closed	
Stocking	
Miles creel size	
Miles fingerling	
Miles Fry Rainbow	1977
Miles not stocked	
Aquatic Vegetation	
Filamentous algae (x one)	
Absent	X
Rare	
Common	
Abundant	
Watercress	
X if present	
Size Classification (X one)	
Large river > 100'	
River 60-99'	
Large stream 36-59'	
Medium 20-35'	
Small 10-19'	
Minor 4-9'	
Very small stream < 4'	X
Gradient (computer entry)	
Percent per mile	4.2%

	Record Data
Fishery Value (X one)	//////////
None	
Poor	X
Below average	
Average	
Above Average	
Excellent	
Fishery Value - limiting factors	//////////
Excessive Siltation	E-1
FISH SAMPLING	//////////
Lower or only station	//////////
Elevation	8600 ft.
Describe or map station location below	

Comments: Heavy rain yesterday may account for flow today.

NO FISH TAKEN

	Record Data
Upper Station	//////////
Elevation	
Describe or map station location below	
Sampling method	
Length - feet	
Sampling adequate	
Sampling inadequate	
X if scales collected	
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	
Combined stations	//////////
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	
No. of game fish 6.0" per mile.	

Sampling method	Electro-Fishing - 50
Length - feet	200 ft.
Sampling adequate	X
Sampling inadequate	
X if scales collected	
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	

ELECTRO-FISHING RECORD

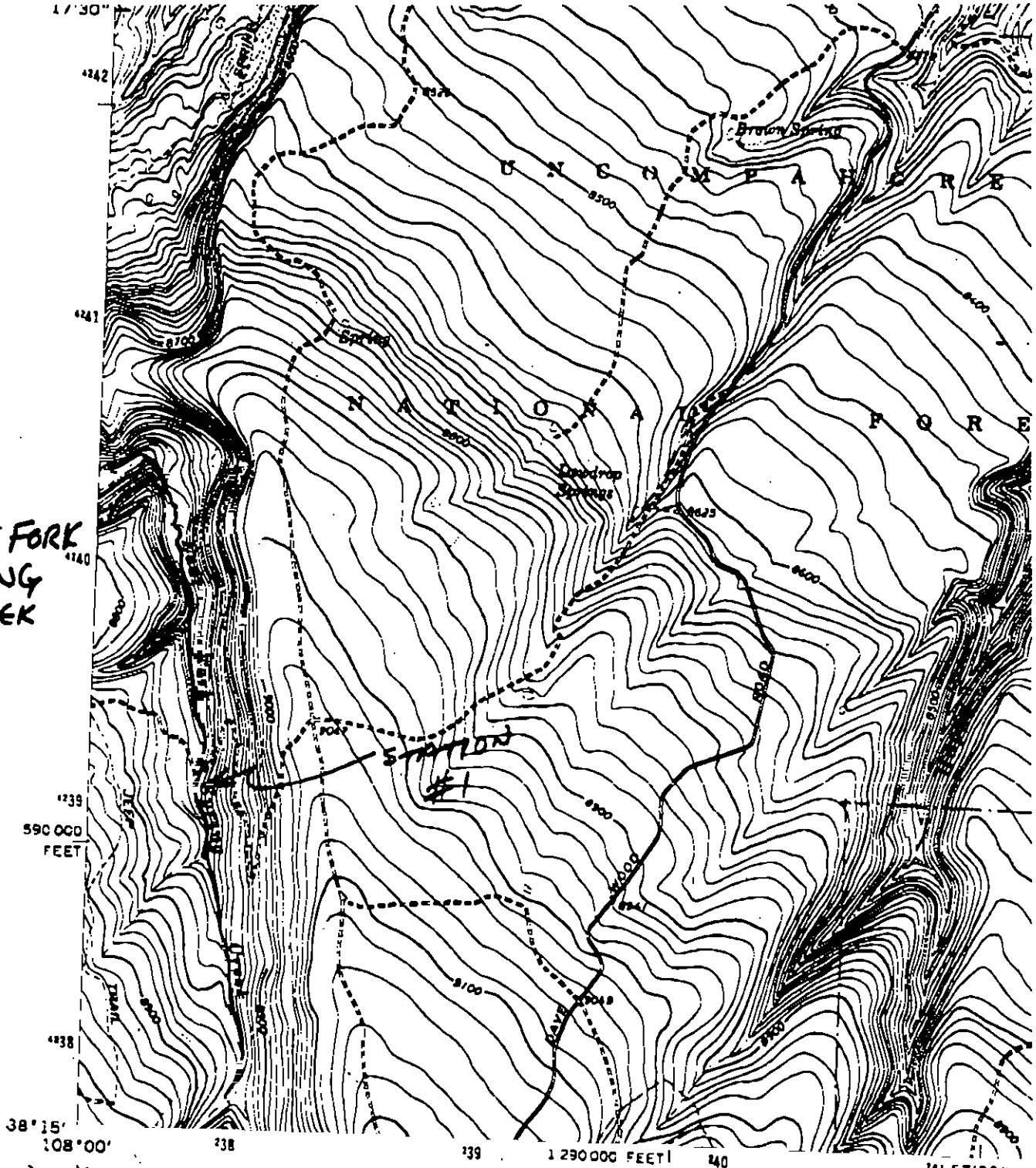
Station #1: Above Middle Fork Confluence in Section 5

Distance: 200 ft. Width: 3 ft.

Equipment Used: Shocker

Personnel: Weiler and Coven

		SIZE LENGTH IN INCHES															
Sta.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Tot.	Avg.
1	NO FISH TAKEN																



EAST FORK SPRING CREEK

(HOTCHKISS RESERVOIR) 4360 II NE

Mapped by the U. S. Forest Service
Edited and published by the Geological Survey

Control by USGS, NOS/NOAA, and U. S. Forest Service

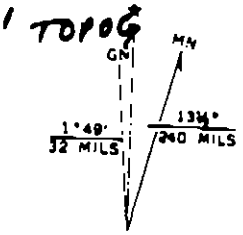
Topography by photogrammetric methods from aerial photographs taken 1964. Field checked by USGS 1973

Projection and 10,000-foot grid ticks: Colorado coordinate system, south zone (Lambert conformal conic) 1000-meter Universal Transverse Mercator grid ticks, zone 13, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines

Certain land lines are omitted because of insufficient data

GOVERNMENT SPRINGS 7½' TOPOG



UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

☒ '72-'73 FISHERIES INVENTORY / 1041 RELATED DATA

Stream Code 43315

'72-'73 Inventory S. _____

Stream Name Spring Creek East Fork

Percent Open to Public —, ('72 Inventory)

1041 Form A

- Quality of Water _____,
- Pool-riffle Ratio _____,
- Temperature of Water _____,
- Clarity of Water _____,
- Fish Food Supply _____,
- Condition of Fish _____,
- Legal Access _____,
- Physical Access* _____,
- Aesthetic Value _____,
- Meanders Value _____,
- Improvement Potential _____,

No Data

'72 Inventory

- Stocking Status —, (regularly, occasionally, rarely or never)
- Population Status —, (normal, over-populated, under-populated)

☐ MINIMUM STREAM FLOW DATA

SB-97 Computer run Step A

- Maximum Channel Width _____,
- Maximum Wetted Perimeter _____,
- Maximum Depth _____,

"Filed on" Blue book

- Decreed Flow _____,
- Initial Month _____,
- Initial Day _____,
- Initial Year _____*

STOCKING AND FISH SAMPLING DATA

STREAM CODE 43315

STOCKING

STOCK 79-83 ___ YRS

STOCKYRS _ _ _ _ _

SPECIES-SIZE STOCKED:

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

FISH SAMPLING

SAMPLE DATE: 07 / 30 / ~~80~~ 80

METHODS: EFE _____ _____ _____

	SPECIES	#TAKEN	AVG. LENGTH (cm)	RANGE (cm)	AVG. WT (g)	RANGE (g)	TOTAL CATCH
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

COLORADO STREAM SURVEY (1976 REVISION)

Surveyed by: Weiler and Coven

(X) if stream has no fishery value

	Record Data
Code No.	43339
Date	29 July 80
Section No.	1
Stream Name:	SPRING CREEK, WEST FORK
Primary Drainage:	Spring Creek, Uncompahgre River
Major Drainage	Gunnison River, 34-C
Lower terminus	FISHERY
Location:	Confluence with Middle Fork of Spring Creek
T.	47 N
R.	10 W
S.	18
Width	4 ft.
Elevation	7385 ft.
Flow (c.f.s.) Est.	0.1 cfs
pH	7.7
phth	0.0 ppm
MO	95 ppm
EDTA	120 ppm
Conductivity	225 µohm/cm
X if stream profile obtained	
Upper terminus	
Location:	Headwaters
T.	47 N
R.	11 W
S.	33
Width	1 ft.
Elevation	9435 ft.
Flow	
pH	
phth	
MO	
EDTA	
Conductivity	
X if stream profile obtained	
Section Summary	
Meander factor	1.0
Length in Miles	5.9 Miles
Width in feet	2.5 ft.
Acreage	1.8
Observed Flow	Normal
X if inundated by reservoir	
Mileage unsectioned	
Counties where section located	
County	Ouray
Miles	5.9 Miles
County	
Miles	
County	
Miles	

	Record Data
Region	Southwest
Beaver Dams	
Number (count or estimate)	Old
Estimated acreage	
Physical stream damage (% of section affected) None	
Bank degredation	
Channelization	
Dredging	
Mine tailing encroachment	
Road encroachment	
Accessibility (miles)	
Surfaced	
Non-Surfaced car	
4-Wheel	0.1 Mile
Established trail	
No established trail	5.8 Miles
Boat only	
No access	
Land Status and mileage	
USFS	4.8 Miles
BLM	1.0 Mile
Municipal	
Div. of Wild.	
Private, no public access	0.1 Mile
Private, open to public	
State Land Board	
County	
Mixed small tracts, open	
Mixed small tracts, closed	
Stocking	
Miles creel size	
Miles fingerling	
Miles Fry Rainbow	1977
Miles not stocked	
Aquatic Vegetation	
Filamentous algae (x one)	
Absent	X
Rare	
Common	
Abundant	
Watercress	
X if present	
Size Classification (X one)	
Large river > 100'	
River 60-99'	
Large stream 36-59'	
Medium 20-35'	
Small 10-19'	
Minor 4-9'	
Very small stream <4'	X
Gradient (computer entry)	
Percent per mile	6.62

	Record Data
Fishery Value (X one)	//////////
None	
Poor	X
Below average	
Average	
Above Average	
Excellent	
Fishery Value - limiting	//////////
factors	//////////
Flash Flood Area	A-3
High Temperature	A-14
FISH SAMPLING	//////////
Lower or only station	//////////
Elevation	8250 ft
Describe or map station location below	

NO FISH TAKEN

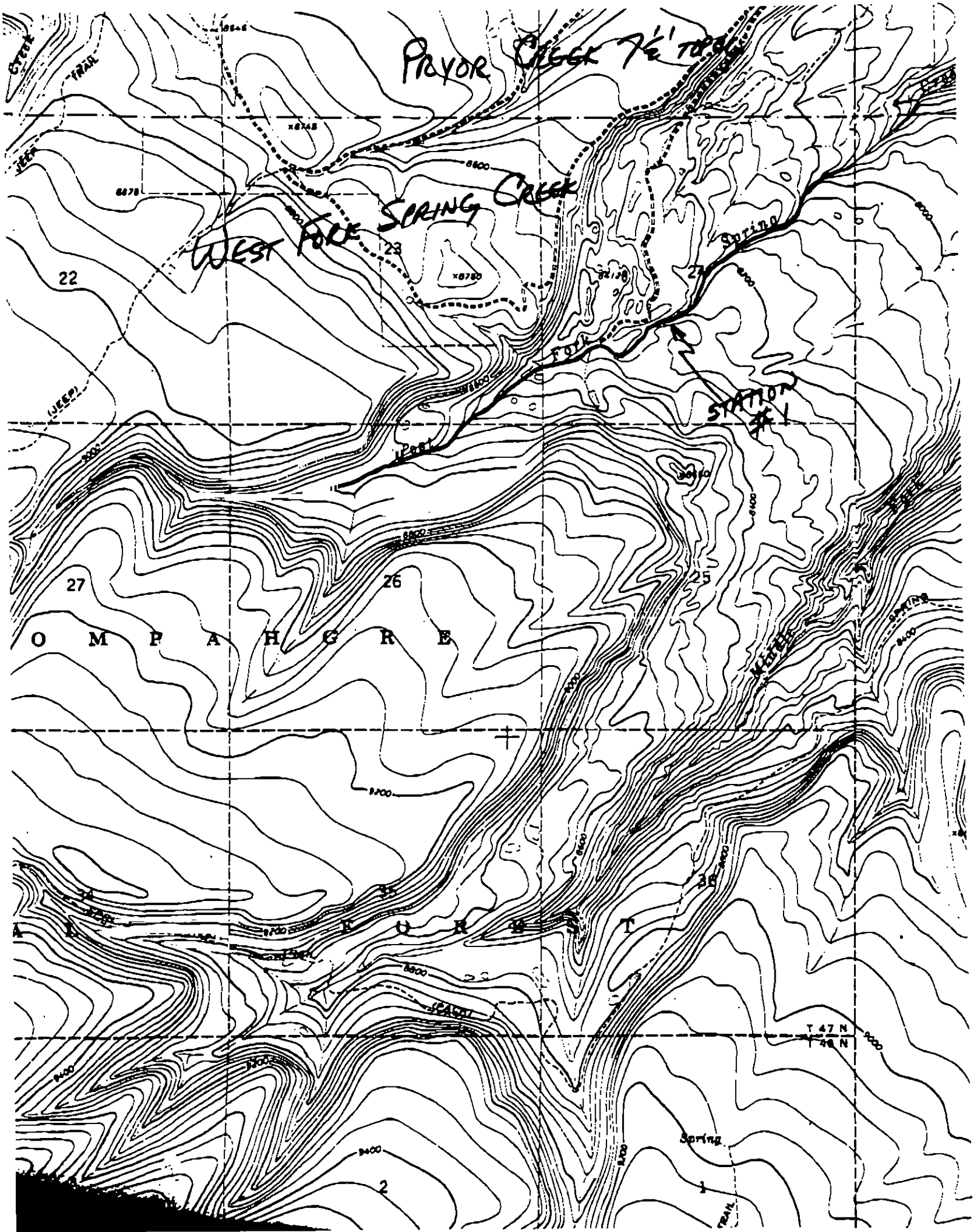
Sampling method	Electro-Fishing - 50
Length - feet	100 ft
Sampling adequate	Y
Sampling inadequate	
X if scales collected	
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	

	Record Data
Upper Station	//////////
Elevation	
Describe or map station location below	
Sampling method	
Length - feet	
Sampling adequate	
Sampling inadequate	
X if scales collected	
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	
Combined stations	//////////
Estimated % fish biomass	//////////
Rough Fish	
Game Fish	
Est. % rough fish biomass	//////////
Bullheads	
Carp	
Cottids	
Dace	
Minnows	
Suckers	
Sunfish	
No. of game fish per mile.	6.0

ELECTRO-FISHING RECORD

Station #1: Road Crossing in Section 24.
Distance: 100 ft. Width: 4 ft.
Equipment Used: Shocker
Personnel: Weiler and Coven

		SIZE LENGTH IN INCHES														
Sta.	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Tot.	Avg.
1	NO FISH TAKEN																



'72-'73 FISHERIES INVENTORY / 1041 RELATED DATA

Stream Code 43339

'72-'73 Inventory S - _____

Percent Open to Public —, ('72 Inventory)

Stream Name Spring Creek West Fork

1041 Form

Quality of Water	9
Pool-riffle Ratio	6
Temperature of Water	6
Clarity of Water	9
Fish Food Supply	6
Condition of Fish	6
Legal Access	10
Physical Access*	—
Aesthetic Value	8
Meanders Value	6
Improvement Potential	1

'72 Inventory

Stocking Status	—	(regularly, occasionally, rarely or never)
Population Status	—	(normal, over-populated, under-populated)

☐ MINIMUM STREAM FLOW DATA

SB-97 Computer run Step A

Maximum Channel Width	
Maximum Wetted Perimeter	
Maximum Depth	

"Filed on" Blue book

Decreed Flow	
Initial Month	
Initial Day	
Initial Year	

STOCKING AND FISH SAMPLING DATA

STREAM CODE 43339

STOCKING

STOCK 79-83 ___ YRS

STOCKYRS _ _ _ _ _

SPECIES-SIZE STOCKED:

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

FISH SAMPLING

SAMPLE DATE: 07 / 29 / 80

METHODS: ELEC _____ _____ _____ _____

	SPECIES	#TAKEN	AVG. LENGTH (cm)	RANGE (cm)	AVG. WT (g)	RANGE (g)	TOTAL CATCH
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

APPENDIX – C
Water Availability Analysis

Station. **SPRING CREEK NEAR MONTROSE, CO.**
Parameter STREAM FLOW CFS
Year 1977-1981
State CO
County MONTROSE

ID 09149420
Statistic Mean
Latitude 38 23 32
Longitude 107.56 40
Elevation 5570 00
Drainage Area 76 60

Monthly Statistics

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
# Days	124	113	124	120	124	120	155	155	150	129	120	124	1558
Avg Day	11 69	10 71	13 96	54 60	135 5	87 75	78 57	75 31	70 88	62 28	29 86	16 97	55 50
Max Day	19 00	16 00	41 00	129 0	274 0	176 0	101 0	106 0	96 00	102 0	62 00	39 00	274 0
Min Day	9 00	7 50	7 30	13 00	66 00	65 00	60 00	53 00	51 00	37 00	16 00	12 00	7 30
# Months	4	4	4	4	4	4	5	5	5	4	4	4	4
SDev Month	1 47	1 80	4 14	7 07	45 54	18 89	11.94	12 40	10 94	14 68	5 29	3 31	6 88
Skew Month	0 818	-0 844	-0 893	0 457	-1 15	1 81	-0 315	-0 219	-0 284	0 842	1 52	1 53	0 404
Min Month	10 15	8 29	8 37	47 07	72 10	73 90	65 58	62 06	55 63	47 10	25 93	14 13	48 73
Max Month	13 67	12 51	18 16	63 47	180 0	115 6	91 74	88 94	84 73	81 03	37 43	21.74	63 21
Exceedences													
1%	18 76	15 87	40 76	128 6	272 6	174 4	101 0	104 9	96 00	100 8	62 00	38 76	229 0
5%	17 00	14 00	33 40	118 0	250 4	140 0	98 00	96 25	90 00	91 10	59 00	30 40	125 0
10%	15 00	13 00	21 00	90 00	235 2	125 0	94 00	90 50	89 00	84 10	42 00	20 60	94 20
20%	12 00	13 00	15 20	71 00	185 0	99 00	91 00	88 00	85 00	78 20	36 00	19 00	84 00
50%	11 00	10 50	13 00	55 00	126 0	81 00	80 00	75 00	69 00	60 00	26 00	15 00	60 00
80%	10 00	8 96	8 60	28 00	74 00	70 00	64 00	62 00	59 00	45 00	21 00	13 00	13 00
90%	9 68	8 00	7 70	21 00	70 00	68 00	63 00	61 00	55 00	42 00	20 00	13 00	11 00
95%	9 50	7 70	7 50	15 00	70 00	67 00	62 00	59 50	53 00	40 00	19 00	12 00	9 60
99%	9 00	7 60	7 40	13 20	67 24	65 20	61 00	54 00	51 00	37 29	17 20	12 00	7 70

SPRING CREEK NEAR MONTROSE, CO.

ID	State	County	Agency	Hydrounit	Elevation (ft)	Drainage Basin Gage	Basin	Percent Area
9149420	CO	MONTROSE	USGS	14020006	5,570 00	70 6	11 13	15%

Start Date	End Date	Record	# Obs	Average (cfs)	Max (cfs)	Min (cfs)
1977	1981	5	1558	55 5	274	7 3

Daily Mean (cfs)

	January	February	March	April	May	June	July	August	September	October	November	December
1	13	9 55	11 43	28 25	101 8	114 8	77 8	78	79 8	64 4	44 25	18 5
2	12 5	9 55	12 43	27	98 5	105 5	79 4	78 4	78 8	65 4	44 25	18 5
3	13	9 77	12 43	26	99	97 5	81 2	76 8	78	65 8	43 75	18 25
4	11 5	10 23	11 93	29 5	96 5	95	80 8	76 0	76 8	66 6	42 5	20 25
5	11 75	10 23	11 93	30	102 5	97 25	80 6	76 6	76 6	69 6	40 75	23 25
6	11 75	10 38	12 18	33 25	109 3	93 5	80 6	74 8	76 2	66 75	40 5	23 5
7	11 5	10 15	11 9	32 5	121	93 25	80 8	73	76	66	39 75	22 5
8	11	10 15	11 93	37 25	130	101 8	80 2	70 4	76 8	63 5	39 25	21 25
9	11 75	10 18	11 63	39 75	118 8	102 5	77	70 4	77	62 5	38 5	20 5
10	12 75	10 02	11 38	43	110 3	99	77 8	68 6	78	64 5	37 5	20 5
11	12	10 02	11 63	41 75	110 8	94 25	76 6	70 6	75 4	65 25	36	19 75
12	11 75	10 07	11 68	38 25	117 3	90 75	78 2	70 8	72 8	67 5	31 5	18 75
13	12	10 35	11 68	41	122 5	89 5	80 2	73 4	71 2	70 25	28 5	18
14	12 9	10 88	11 13	43 25	133 3	90 25	78 2	74 6	71 2	67 75	28 25	17
15	13 23	11 63	10 88	48	143 3	90	78 4	77 8	70 6	68 75	27	16 25
16	13	11 5	11 6	54 75	142	86 25	78 4	74 6	67 8	67 25	26	15 75
17	12 75	11 5	12 07	60 5	155 3	81 25	82 4	73 8	66 4	66 25	26 5	15
18	13	11 5	11 1	63 5	143 3	79 75	77 6	72 4	68 4	66	26 25	15 25
19	12 75	11 18	11 68	61 5	161	80 5	76	72	68 6	65 5	24	14 75
20	12 25	10 9	12 82	57 25	179 8	78	76 4	73 8	70	65 5	23 25	14 25
21	12	11 45	13 03	60 5	181	77 75	76 2	74 6	67 6	66 75	22 25	14 25
22	11 63	11 15	13 57	66 5	182 5	75 75	75 6	77 8	66 2	69 75	22	14 25
23	10 88	10 9	13 8	73 5	182 8	76 75	77 2	77 2	64 8	60	22 25	14 75
24	10 32	10 88	16 13	87	181 8	77 25	76 8	78 6	65	57 25	21 5	14 25
25	10 35	10 93	16 4	79 75	161 8	78	76	78	62 4	53	21 5	14
26	10 18	11 2	15 4	75 5	151 8	76 75	77 8	77 4	63 2	49 5	20 75	13 75
27	10 63	11 43	16 85	79 75	139 8	76	79 4	77	64 6	49 75	20 5	14
28	10 5	11 65	19 25	89	136 3	76 25	79 8	77	65 8	49 5	19 25	13 75
29	10 25	13	21	91 5	134 5	76 75	80	77 6	65 6	49 5	18 75	14
30	9 95		25	98 75	127 8	78 75	79 8	79 6	64 8	49	18 75	13 75
31	9 7		26 25		123 8		78 6	82 4		46 5		13 5
Average (cfs)	11 69	10 77	13 96	54 60	135 49	87 75	78 57	75 31	70 88	62 11	29 86	16 97
Max (cfs)	13 23	13	26 25	98 75	182 8	114 8	82 4	82 4	79 8	70 25	44 25	23 5
Min (cfs)	9 7	9 55	10 88	26	96 5	75 75	75 6	68 6	62 4	46 5	18 75	13 5

Monthly Stats (cfs)

	January	February	March	April	May	June	July	August	September	October	November	December	Year
# Days	124	113	124	120	124	120	155	155	150	129	120	124	1558
Avg Day	11 69	10 71	13 96	54 6	135 5	87 75	78 57	75 31	70 88	62 28	29 86	16 97	55 5
Max Day	19	16	41	129	274	176	101	106	96	102	62	39	274
Min Day	9	7 5	7 3	13	66	65	60	53	51	37	16	12	7 3
# Months	4	4	4	4	4	4	5	5	5	4	4	4	4
SDev Month	1 47	1 8	4 14	7 07	45 54	18 89	11 94	12 4	10 94	14 68	5 29	3 31	6 88
Skew Month	0 818	-0 844	-0 893	0 457	-1 15	1 81	-0 315	-0 219	-0 284	0 842	1 52	1 53	0 404
Min Month	10 15	8 29	8 37	47 07	72 1	73 9	65 58	62 06	55 63	47 1	25 93	14 13	48 73
Max Month	13 67	12 51	18 16	63 47	180	115 6	91 74	88 94	84 73	81 03	37 43	21 74	63 21
Exceedences													
1%	18 76	15 87	40 76	128 6	272 6	174 4	101	104 9	96	100 8	62	38 76	229
5%	17	14	33 4	118	250 4	140	98	96 25	90	91 1	59	30 4	125
10%	15	13	21	90	235 2	125	94	90 5	89	84 1	42	20 6	94 2
20%	12	13	15 2	71	185	99	91	89	85	78 2	36	19	84
50%	11	10 5	13	55	126	81	80	75	69	60	26	16	60
80%	10	8 96	8 6	28	74	70	64	62	59	45	21	13	13
90%	9 68	8	7 7	21	70	68	63	61	55	42	20	13	11
95%	9 5	7 7	7 5	15	70	67	62	59 5	53	40	19	12	9 6
99%	9	7 6	7 4	13 2	67 24	65 2	61	54	51	37 29	17 2	12	7 7

Water Availability for Middle Fork Spring Creek Based on Stream Gage: Spring Creek NR Montrose, CO

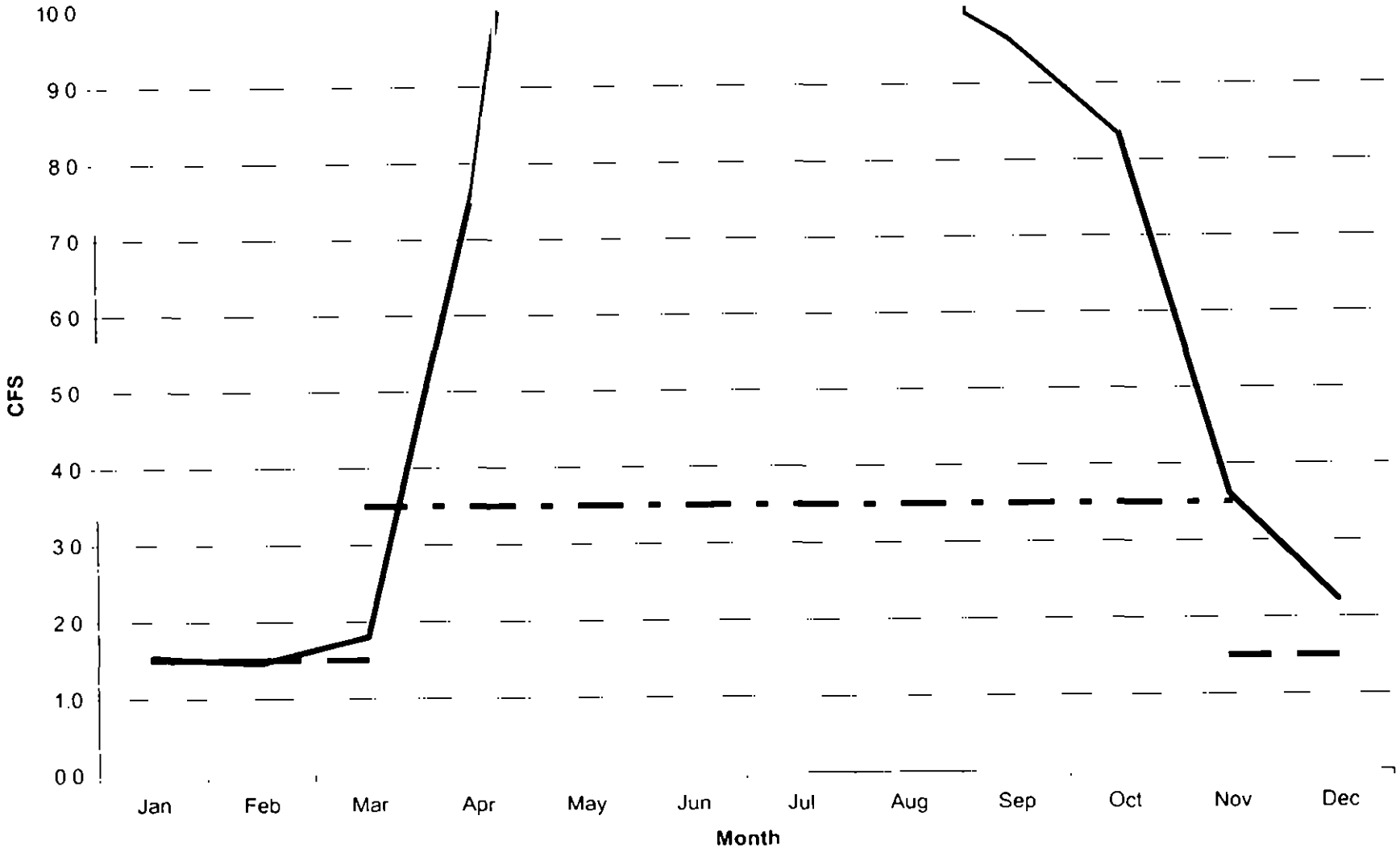
Daily Mean (cfs)

	January	February	March	April	May	June	July	August	September	October	November	December
Average (cfs)	1 70	1 56	2 03	7 93	19 69	12 75	11 42	10 94	10 30	9 03	4 34	2 47
Max (cfs)	1 92	1 89	3 81	14 35	26 56	16 68	11 97	11 97	11 59	10 21	6 43	3 41
Min (cfs)	1 41	1 39	1 58	3 78	14 02	11 01	10 98	9 97	9 07	6 76	2 72	1 96

Exceedence (cfs)

Exceedences	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1%	2 61	2 21	5 67	17 88	37 89	24 24	14 04	14 58	13 34	14 01	8 62	5 39
5%	2 36	1 95	4 64	16 40	34 81	19 46	13 62	13 38	12 51	12 66	8 20	4 23
10%	2 09	1 81	2 97	12 51	32 69	17 38	13 07	12 58	12 37	11 69	5 84	2 86
20%	1 67	1 81	2 11	9 87	25 72	13 76	12 65	12 23	11 82	10 87	5 00	2 64
50%	1 53	1 46	1 81	7 65	17 51	11 26	11 12	10 43	9 59	8 34	3 61	2 22
80%	1 39	1 25	1 20	3 89	10 29	9 73	8 90	8 62	8 20	6 26	2 92	1 81
90%	1 35	1 11	1 07	2 92	9 73	9 45	8 76	8 48	7 65	5 84	2 78	1 81
95%	1 32	1 07	1 04	2 09	9 73	9 31	8 62	8 27	7 37	5 56	2 64	1 67
99%	1 25	1 06	1 03	1 83	9 35	9 06	8 48	7 51	7 09	5 18	2 39	1 67
ISF	1 5	1 5	1 5								1 5	1 5
ISF			3 5	3 5	3 5	3 5	3 5	3 5	3 5	3 5	3 5	

Estimated Stream Flow on Middle Fork Spring Creek



Colorado Water Conservation Board
Estimation of Natural Streamflow Characteristics
Based upon USGS WRI 85-4086

By: Francis Rennicks and Mark Mitsch — Date: 03/07/2005

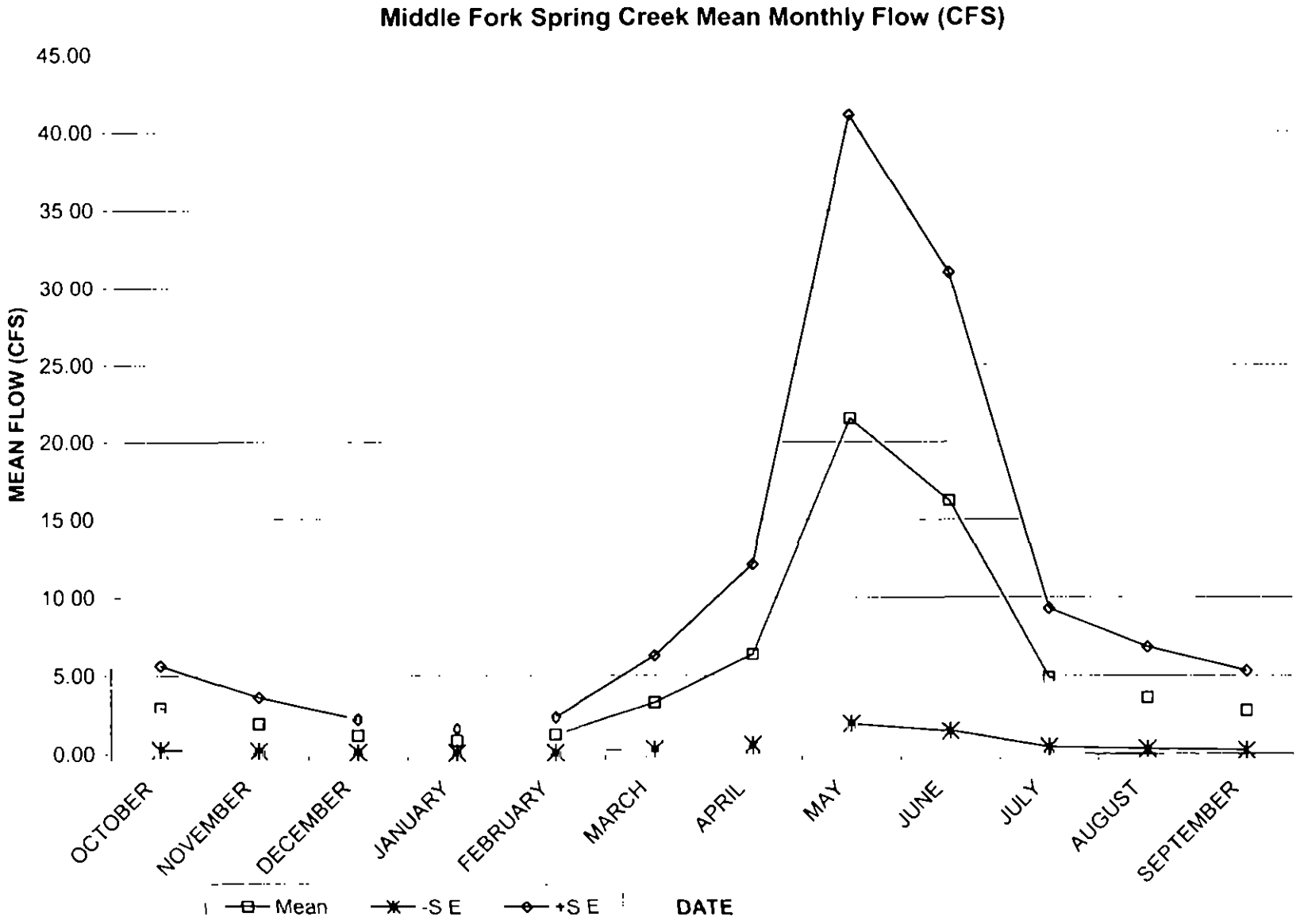
STREAM	Middle Fork Spring Creek		BASIN AREA (MI²)	11.13	11.13
COUNTY	Montrose		MEAN ELEV. (FEET)	8968	3.968
REGION	2		MEAN PPT. (INCHES)	20.9	10.9
1=MT,2=SW,3=NW,4=RG			MEAN SLOPE (FT/FT)	0.1799	0.1799
CROSS-SECTION					
LOCATION					

AVE. ANNUAL FLOW (CFS)

PERCENT DURATION	FLOW (CFS)
90	0.33
70	0.89
50	1.77
25	5.22
10	15.91

2-YR 7 DAY LOW FLOW (CFS)	0.54
10-YR 7 DAY LOW FLOW (CFS)	0.00
50-YR 7 DAY LOW FLOW (CFS)	0.00

MEAN MONTHLY FLOW	AVERAGE FLOW (CFS)	-S.E.	+S.E.
OCTOBER	2.95	0.27	5.64
NOVEMBER	1.88	0.17	3.59
DECEMBER	1.15	0.10	2.19
JANUARY	0.85	0.08	1.63
FEBRUARY	1.23	0.11	2.36
MARCH	3.28	0.29	6.26
APRIL	6.36	0.57	12.14
MAY	21.52	1.94	41.11
JUNE	16.22	1.46	30.98
JULY	4.87	0.44	9.29
AUGUST	3.58	0.32	6.83
SEPTEMBER	2.77	0.25	5.29


Middle Fork Spring Creek Mean Monthly Flow (CFS)
MEAN FLOW (CFS)
45.00
40.00
35 00
30 00
25.00
20.00
15 00
10 00
5.00
0.00
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
Mean
-S E
+S E
DATE

Precipitation Data

Monterose 1

Latitude	Longitude	Elevation (ft)	Beg	End
38 29	107 53	5830	1939	1982

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
55717	1939	TPCP	M	M	M	18	21	2	72	107	140	19	46	44	**469**
55717	1940	TPCP	M	62	99	51	61	9	21	92	222	121	71	135	**944**
55717	1941	TPCP	172	52	142	154	149	124	39	181	232	300	28	67	**1640**
55717	1942	TPCP	63	72	86	207	29	5	72	48	56	71	20	M	**729**
55717	1943	TPCP	M	63	51	5	211	122	19	334	11	66	23	27	**932**
55717	1944	TPCP	55	34	120	287	75	97	81	63	7	93	89	78	**1079**
55717	1945	TPCP	47	36	48	208	75	11	36	134	25	104	31	46	**801**
55717	1946	TPCP	30	36	63	91	148	11	144	113	70	95	96	23	**920**
55717	1947	TPCP	6	49	43	97	61	243	131	201	61	216	18	80	**1206**
55717	1948	TPCP	M	M	M	M	M	M	M	180	38	26	63	55	**362**
55717	1949	TPCP	213	26	63	91	53	117	31	83	56	105	11	12	**861**
55717	1950	TPCP	155	101	84	46	9	19	88	21	101	13	43	12	**692**
55717	1951	TPCP	114	29	9	39	47	15	17	50	23	71	55	78	**547**
55717	1952	TPCP	53	75	93	149	83	23	110	148	69	0	88	51	**942**
55717	1953	TPCP	27	47	79	158	130	67	73	152	2	143	132	73	**1083**
55717	1954	TPCP	17	9	27	26	42	37	66	131	255	53	111	38	**812**
55717	1955	TPCP	43	102	5	60	120	21	119	188	11	11	65	27	**772**
55717	1956	TPCP	79	64	60	66	17	16	18	148	7	50	52	101	**678**
55717	1957	TPCP	170	20	56	143	196	77	227	272	12	204	117	30	**1524**
55717	1958	TPCP	73	89	68	38	16	65	0	5	109	78	52	16	**609**
55717	1959	TPCP	17	57	48	81	15	27	27	173	160	195	8	78	**886**
55717	1960	TPCP	201	107	117	80	42	42	34	65	29	70	22	144	**953**
55717	1961	TPCP	18	94	171	97	80	7	21	126	259	132	39	75	**1119**
55717	1962	TPCP	5	55	15	162	49	35	27	63	139	85	81	105	**821**
55717	1963	TPCP	48	21	89	0	12	19	115	183	37	234	49	24	**831**
55717	1964	TPCP	34	61	37	121	68	49	72	315	122	0	132	69	**1080**
55717	1965	TPCP	107	54	53	93	87	65	225	94	302	153	71	49	**1353**
55717	1966	TPCP	12	28	2	90	56	38	49	73	48	107	64	60	**627**
55717	1967	TPCP	19	59	10	49	123	177	89	157	132	16	43	108	**982**
55717	1968	TPCP	9	96	15	86	54	1	0	121	32	54	42	46	**556**
55717	1969	TPCP	44	60	49	32	19	212	114	94	86	254	40	74	**1078**
55717	1970	TPCP	22	0	117	114	14	57	51	60	258	170	52	78	**993**
55717	1971	TPCP	44	40	9	48	90	0	23	76	78	146	111	129	**794**
55717	1972	TPCP	17	0	25	26	13	71	81	12	112	266	112	116	**851**

55717	1973	TPCP		51	5	43	55	155	154	43	145	30	50	72	60		863
55717	1974	TPCP		194	24	69	114	0	17	87	41	65	69	83	36		799
55717	1975	TPCP		59	22	75	25	80	65	78	42	35	104	128	17		730
55717	1976	TPCP		36	40	35	42	84	18	146	61	189	5	4	0		660
55717	1977	TPCP		60	26	37	25	M	14	109	157	106	57	24	32		647
55717	1978	TPCP		76	26	61	171	107	14	44	6	32	122	90	205		954
55717	1979	TPCP		97	19	M	58	158	138	30	82	0	108	37	44		771
55717	1980	TPCP	M		74	71	75	139	6	M	82	57	131	63	82		780
55717	1981	TPCP		33	19	26	72	64	42	166	191	36	144	M	M		793
55717	1982	TPCP	M	M	M		11	130	2	M	113	186	59	M	M		501
															Average		864

Precipitation Data

Elevation = 5830
Lat = 34 24 Long
= -107 53

Percent of Average	Water Year	Monterose 1
54%	1977	75%
109%	1978	110%
190%	1979	89%
84%	1980	90%
108%	1981	92%
125%	**Average**	**91%**
93%		
106%		
140%		
42%		
100%		
80%		
63%		
109%		
125%		
94%		
89%		
78%		
176%		
70%		
103%		
110%		
129%		
95%		
96%		
125%		
157%		
73%		
114%		
64%		
125%		
115%		
92%		
98%		
100%		
92%		
84%		
76%		
75%		
110%		
89%		
90%		
92%		
58%		

APPENDIX – D
Diversion Records