Stream: Yellow Jacket Canyon Creek

Executive Summary

Water Division: 7
Water District: 32
CDOW#: 38442
CWCB ID#: 06/07/A-016

Segment:

Upper Terminus: Confluence with Dawson Draw
Latitude: 37d28'18.53"N Longitude: 108d44'07.04"W
UTM North: 4153770.707 UTM East: 169652.269
SW1/4, SW1/4, Sctn9, T37N, R17W
668 ft, E of the W Section Line, 412 ft, N of the S Section Line

Lower Terminus: Confluence with Sandstone Canyon
Latitude: 37d25'09.06"N Longitude: 108d54'01.41"W
UTM North: 4148521.088 UTM East: 154802.587
NW1/4, SW1/4, Sctn36, T37N, R19W
937 ft, E of the W Section Line, 2126 ft, N of the S Section Line

Counties: Montezuma
Length: 12.58 miles
USGS Quad(s): Arriola, Woods Canyon, Negro Canyon
ISF Appropriation: 3.2 cfs (05/16 – 10/31), 2.5 cfs (11/01- 05/15)

Executive Summary

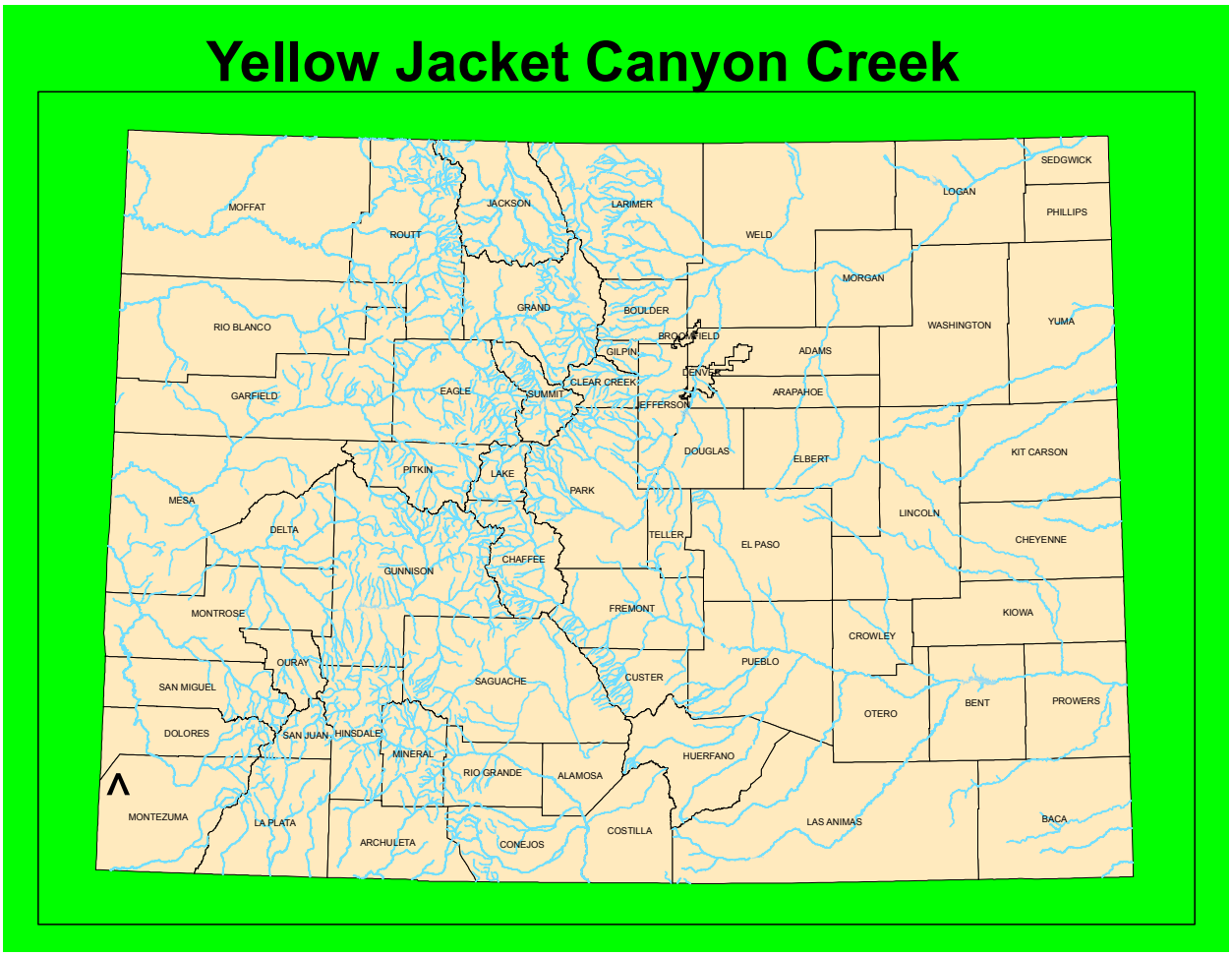
Water Division: 7
Water District: 32
CDOW#: 38442
CWCB ID#: 06/07/A-017

Segment:

Upper Terminus: Sandstone Canyon
Latitude: 37d21'00.87"N Longitude: 108d59'47.6"W
UTM North: 4141224.864 UTM East: 145963.442
SW1/4, NE1/4, Sctn25, T36N, R20W
1353 ft, W of the E Section Line, 2108 ft, S of the N Section Line

Lower Terminus: Ismay Ditch
Latitude: 37d25'09.06"N Longitude: 108d54'01.41"W
UTM North: 4148521.088 UTM East: 154802.587
NW1/4, SW1/4, Sctn36, T37N, R19W
937 ft, E of the W Section Line, 2126 ft, N of the S Section Line

Counties: Montezuma
Length: 10.64 miles
USGS Quad(s): Negro Canyon, Bowdish Canyon
ISF Appropriation: 2.1 cfs (01/01 – 12/31)



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 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 Yellow Jacket Canyon Creek to the CWCB for inclusion into the Instream Flow Program. Yellow Jacket Canyon 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 BLM is very interested in protecting stream flows because Yellow Jacket Canyon

Creek is the only perennial stream flowing through Canyons of the Ancients National Monument, and the stream supports sensitive fish species.

Yellow Jacket Canyon Creek is 33.8 miles long. The creek begins on a ridge approximately two miles west of McPhee Dam at an elevation of approximately 7, 640 feet and terminates at the Colorado-Utah border at an elevation of approximately 4,900 feet. Approximately 52% of the upper reach is located on federal lands, while 29% of the lower reach is located on federal lands. Yellow Jacket Canyon Creek is located within Montezuma County. The total drainage area of the creek is approximately 196 square miles. Yellow Jacket Canyon Creek generally flows in a southwesterly direction.

This report addresses two segments of Yellow Jacket Canyon Creek. The first segment commences at the confluence with Dawson Draw and extends downstream to the confluence with Sandstone Canyon. The second segment commences at the confluence with Sandstone Canyon and extends downstream to the headgate of the Ismay Ditch. The proposed segment is located west of the City of Cortez. The staff has received one recommendation for this segment from the BLM. The recommendation for this segment is discussed below.

Instream Flow Recommendation(s)

For the upper reach, BLM recommended 3.2 cfs (May 16 – October 31), 2.5 cfs (November 1 – May 15), based on data collection efforts on April 11, 2001. For the lower reach, BLM recommended 2.3 cfs (May 16 to October 31), 2.1 cfs (November 1 to May 15) based on data collection efforts on April 12, 2001. 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
Dawson Draw	Sandstone Canyon	12.58	48%	52%
Sandstone Canyon	Ismay Ditch	10.64	71%	29%

100% of the public land is owned by the Bureau of Land Management.

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 "Yellow Jacket Canyon Creek is a low gradient stream with small substrate size. This stream experiences large flash flood events but the channel is remarkably stable in most locations because of well established riparian vegetation. Vegetative cover, water quality, and food supplies are suitable for native species. Fisheries surveys indicate self-sustaining populations of flannelmouth sucker, bluehead sucker, and fathead minnows. (See BLM Fish Survey in Appendix B). Riparian surveys indicate an improving cottonwood-willow plant community.

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. 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 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 the upper stream segment, 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	04/11/2001	3.77	9.4 – 1.5	4.5	2.7
BLM	04/11/2001	4.61	11.5 – 1.8	3.5	2.0

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.

For the lower stream segment, 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 2: Data

Party	Date	Q	250%-40%	Summer (3/3)	Winter (2/3)
BLM	04/12/2001	4.51	11.3 – 1.8	5.7	2.0
BLM	04/12/2001	4.56	11.4 – 1.8	3.3	2.9

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.

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.

Biologic Flow Recommendation

For the upper reach, the summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 3.8 cfs (See Table 1). The winter recommendation, which meets 2 of 3 criteria and is within the accurancy range of the R2Cross model, is 2.5 cfs. For the lower reach, the summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 4.2 cfs (See Table 1). The winter recommendation, which meets 2 of 3 criteria and is within the accurancy range of the R2Cross model, is 2.3 cfs. The summer and winter biological recommendations for both reaches were derived by averaging the data sets available for that reach. However, the summer and winter flow recommendations for both reaches were reduced because of water availability issues, as described in the following section.

Hydrologic Data

Since Yellowjacket is primarily fed by irrigation return flows, traditional methods of assessing water availability for an instream flow appropriation do not provide an accurate assessment. There is no historic stream gage data available for Yellowjacket Creek, nor do traditional methods of establishing synthetic hydrographs apply to a basin fed by return flows. Given the lack of water availability data, the BLM installed pressure transducers on the creek to assess water availability.

Pressure transducers are hydrologic instruments that are anchored on the bottom of the stream channel. Every hour, the instrument logs the amount of pressure that the water column is placing on the instrument. The pressure recorded by the instrument is directly related to the depth of water above the instrument. Stream discharge measurements are taken periodically while the instrument is operating. These discharge measurements are correlated with various pressures to develop a relationship between pressure readings and discharge rates. This relationship is then applied to all the pressure readings recorded by the instrument to display discharge rates over time.

BLM operated pressure transducers on Yellowjacket Creek during 2003, 2004, and 2005. BLM was not able to contain a continuous record for the entire three-year period because of vandalism, minor equipment malfunctions, and flash flood events. However, a significant amount of data was collected. The data collection period coincided with a large variation in water deliveries by the Montezuma Valley Irrigation Company. In 2003, MVIC delivered 90% of normal water

allocations, in 2004 MVIC delivered 100% of normal water allocations, and in 2005, MVIC delivered 115% of normal water allocations.

The CWCB staff and BLM staff consulted with the Division Engineer's Office staff to identify which data from the available data set best represented average conditions in Yellowjacket Canyon Creek. Analysis of these data sets revealed that average flow rates in the upper reach are as follows:

May 16 to October 31 – 3.2 cfs
November 1 to May 15 – 2.5 cfs

BLM also cooperated with the Division 7 staff to conduct a one-time gain-loss study during early June 2005. The objective of this study was to develop an approximation of the change in flow rates between the upper and lower reaches, recognizing that gain and loss rates change over the various times of the year, and recognizing that gain and loss rates changes with prevailing hydrologic conditions in the region. After conducting this study and examining historic water delivery practices, CWCB staff, BLM staff, and the Division Engineer's staff agreed that the creek typically losses between 30% and 35% of its flow between the upper and lower reaches during the growing season. These flow losses occur because of seepage, water surface evaporation, and transpiration of water by riparian plants. The staff members also agreed that the loss rate should be reduced to 15% during the non-growing season, because losses due to evaporation and plant transpiration are minimized.

If the 30% growing season loss rate and the 15% non-growing loss rate are applied to the water availability calculated for the upper reach, water availability in the lower reach is as follows:

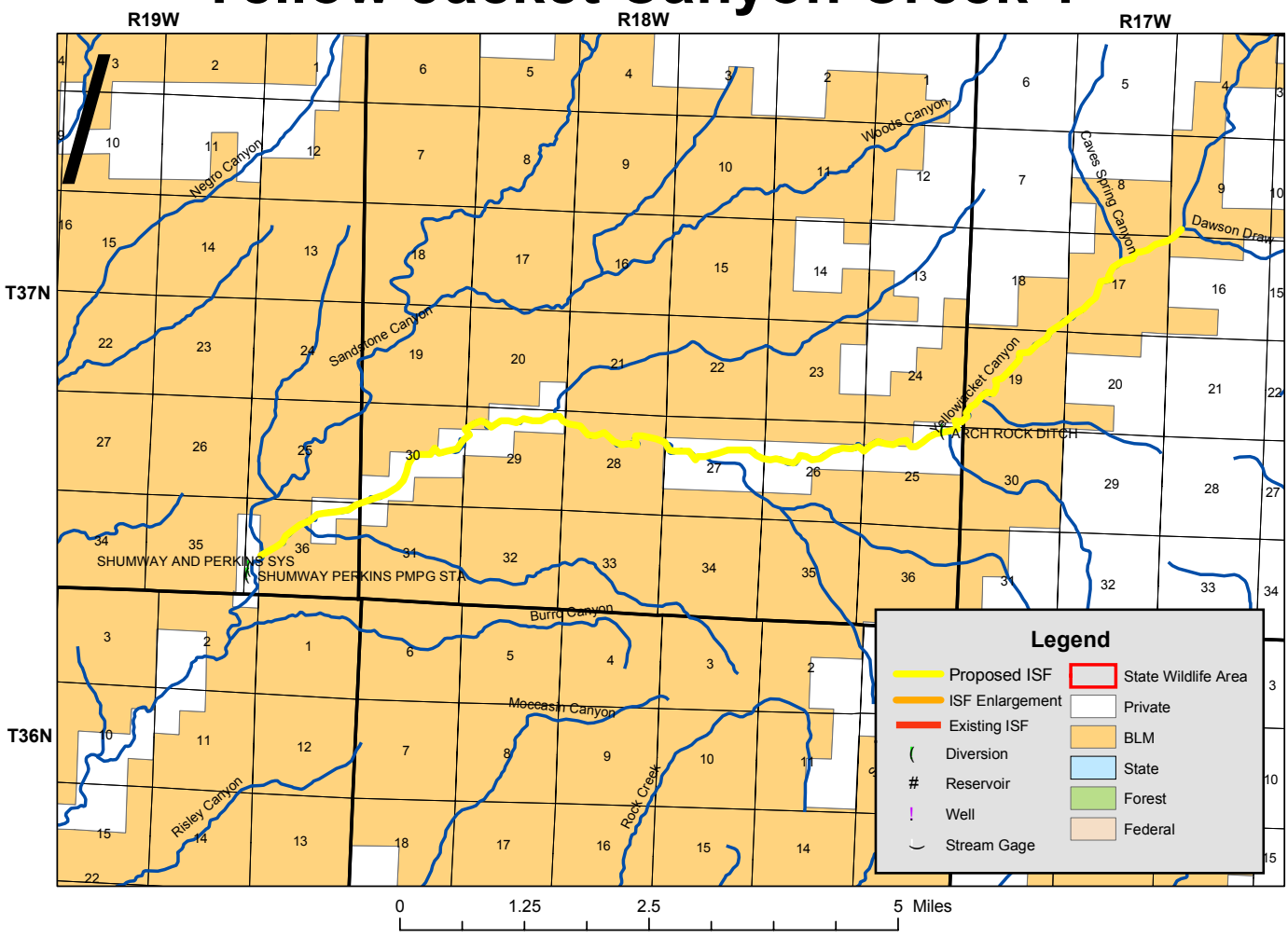
May 16 to October 31 – 2.1 to 2.2 cfs
November 1 to May 15 – 2.1 cfs

Since the water availability in the summer is approximately that of the water available in the winter months, Staff recommends a year-round recommendation of 2.1 cfs for the lower segment of Yellowjacket Canyon Creek.

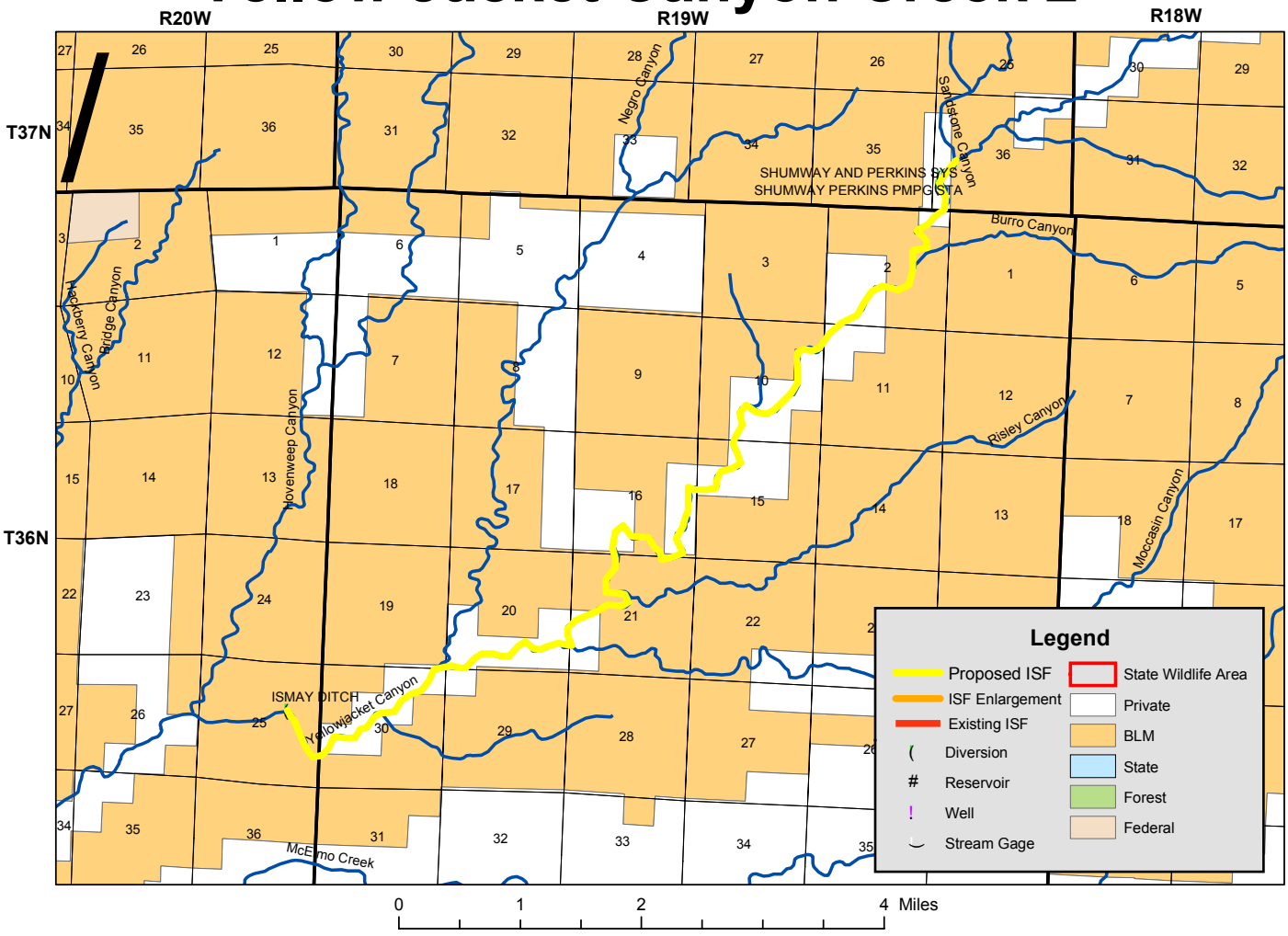
Existing Water Right Information
Staff has analyzed the water rights tabulation and consulted with the Division Engineer's Office (DEO) to identify any potential water availability problems associated with operation of diversions in the proposed reaches. There are three decreed diversions within the proposed reach, including the Shumway and Perkins Pump and Ditch System, the Arch Rock Ditch, and the Ismay Ditch. Of these three diversions, the Ismay Ditch, which holds water rights totaling 6.2 cfs, is the most senior water right. This is proposed as the lower terminus of the lower instream flow reach, since the ditch has reliably diverted since 1955. Based on this analysis, staff has determined that water is available for appropriation on Yellow Jacket Canyon Creek, from the confluence of Dawson Draw to the headgate of the Ismay Ditch, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid existing water rights. In addition to this analysis, Staff has been working with the SWCD to develop terms and conditions to include in the application to protect existing water right holders in the

basin. At the time this memo was written the terms and conditions were not yet finalized but expect to present them at the January 2006 CWCB meeting.

Yellow Jacket Canyon Creek 1



Yellow Jacket Canyon Creek 2



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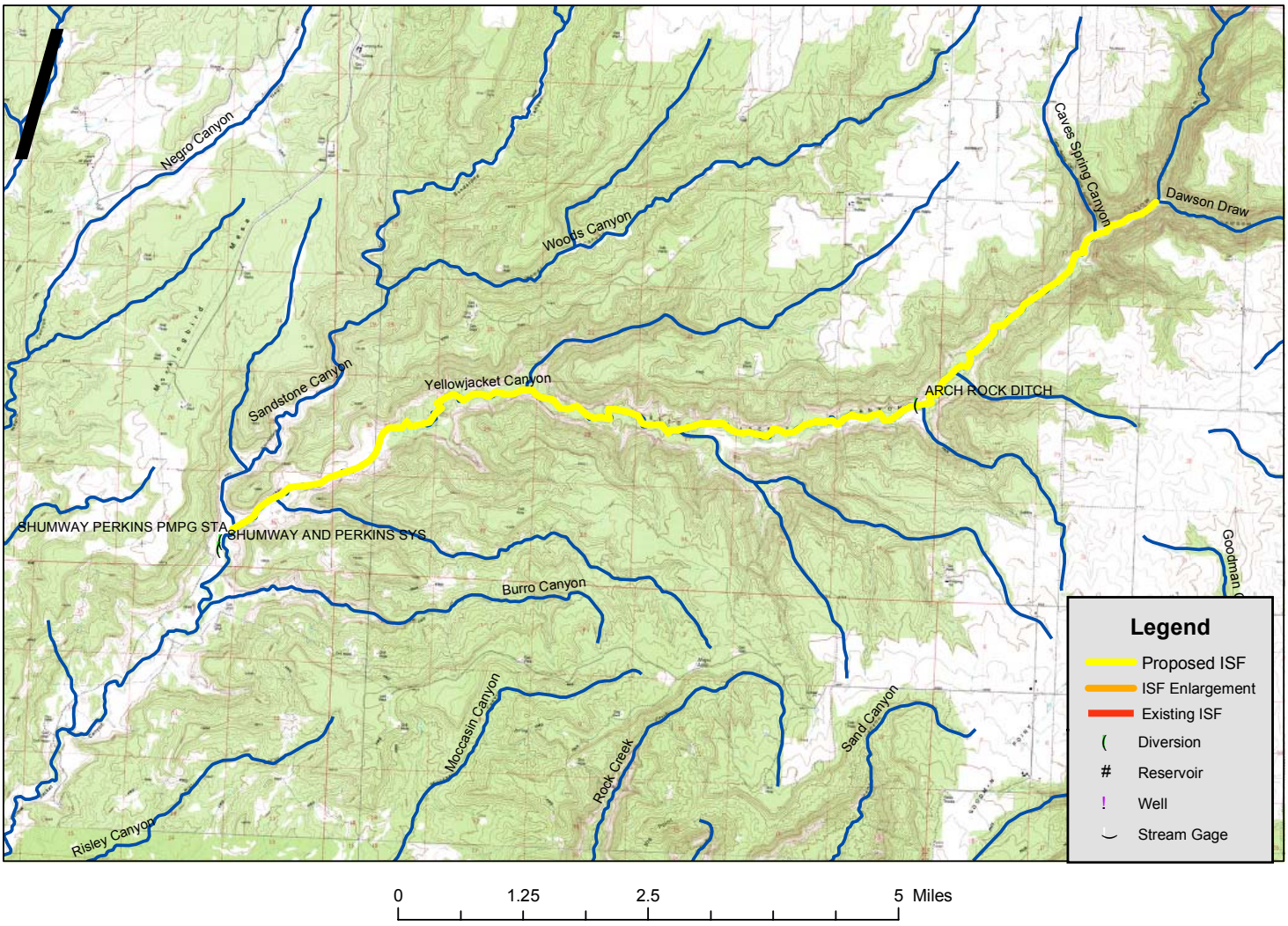
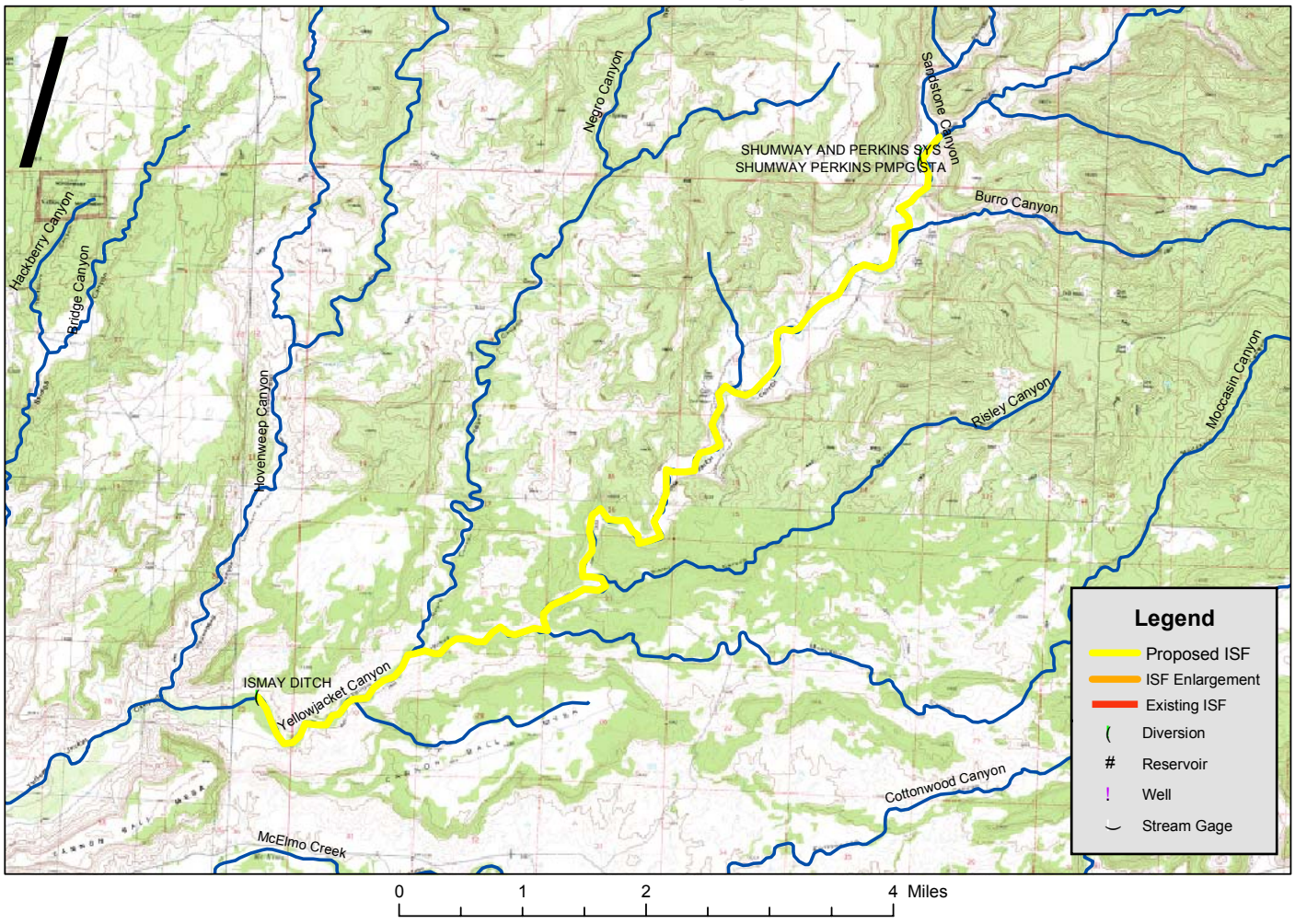


Yellow Jacket Canyon Creek 2



CWCB Staff's Instream Flow Recommendation
Based on the BLM recommendation, staff recommends the Board form its intent to appropriate on the following stream reach:

Stream Name: Yellow Jacket Canyon Creek

Segment:

Upper Terminus: Confluence with Dawson Draw
Latitude: 37d28'18.53"N Longitude: 108d44'07.04"W
UTM North: 4153770.707 UTM East: 169652.269
SW1/4, SW1/4, Sctn9, T37N, R17W
668 ft, E of the W Section Line, 412 ft, N of the S Section Line

Lower Terminus: Confluence with Sandstone Canyon
Latitude: 37d25'09.06"N Longitude: 108d54'01.41"W
UTM North: 4148521.088 UTM East: 154802.587
NW1/4, SW1/4, Sctn36, T37N, R19W
937 ft, E of the W Section Line, 2126 ft, N of the S Section Line

Counties: Montezuma
Length: 12.58 miles
USGS Quad(s): Arriola, Woods Canyon, Negro Canyon
ISF Appropriation: 3.2 cfs (05/16 – 10/31), 2.5 cfs (11/01- 05/15)

Segment:

Upper Terminus: Sandstone Canyon
Latitude: 37d21'00.87"N Longitude: 108d59'47.6"W
UTM North: 4141224.864 UTM East: 145963.442
SW1/4, NE1/4, Sctn25, T36N, R20W
1353 ft, W of the E Section Line, 2108 ft, S of the N Section Line

Lower Terminus: Ismay Ditch
Latitude: 37d25'09.06"N Longitude: 108d54'01.41"W
UTM North: 4148521.088 UTM East: 154802.587
NW1/4, SW1/4, Sctn36, T37N, R19W
937 ft, E of the W Section Line, 2126 ft, N of the S Section Line

Counties: Montezuma
Length: 10.64 miles
USGS Quad(s): Negro Canyon, Bowdish Canyon
ISF Appropriation: 2.1 cfs (01/01 – 12/31)

APPENDIX – A
ISF Recommendation

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7093
www.co.blm.gov

IN REPLY REFER TO:
CO-931
7250

DEC 22 2005

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 Yellowjacket Creek, located in Water Division 7

Location and Land Status. Yellowjacket Creek is tributary to McElmo Creek near the Colorado-Utah border, approximately 25 miles west of the City of Cortez. This recommendation covers two reaches of the stream. The upper reach runs from the confluence with Dawson Draw to the confluence with Sandstone Canyon. The lower reach runs from the confluence with Sandstone Draw to the headgate of the Ismay Ditch. For the 12.58-mile upper reach, 52% is located on federal lands, while 48% is privately owned. For the 10.64-mile lower reach, 29% is located on federals lands, while the remaining 71% is privately owned.

Biological Summary. Yellow Jacket Canyon Creek is a low gradient stream with small substrate size. This stream experiences large flash flood events but the channel is remarkably stable in most locations because of well established riparian vegetation Vegetative cover, water quality, and food supplies are suitable for native species. Fisheries surveys indicate self-sustaining populations of flannelmouth sucker, bluehead sucker, and fathead minnows. (See BLM Fish Survey in Appendix B). Flannelmouth sucker and bluehead sucker are sensitive species in decline. BLM is working to keep these species off the list of threatened and endangered species by protecting suitable habitat. Riparian surveys indicate an improving cottonwood-willow plant community.

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

Upper Reach – Dawson Draw to confluence with Sandstone Canyon

3.2 cubic feet per second is recommended for the high temperature period from April 16 to October 31 This recommendation is driven by the average velocity criteria. Many

portions of this reach are low gradient, and it is important to provide adequate velocity for fish spawning and incubation of eggs. During late summer and early fall, maintenance of velocity is important for maintaining suitable stream temperatures for native fishes.

2.5 cubic feet per second is recommended for the low temperature period from November 1 through April 15. This recommendation is driven by the average depth criteria. This flow rate will maintain adequate physical habitat for overwintering fish populations.

Lower Reach – Confluence with Sandstone Canyon to headgate of Ismay Ditch

2.3 cubic feet per second is recommended for the high temperature period from May 16 to October 31. This recommendation is driven by the average depth criteria, but it also provides an average velocity of 0.7 feet per second and 85% wetted perimeter. This flow rate should provide adequate physical habitat for fish spawning and egg incubation purposes, and it should maintain stream temperatures in suitable ranges for native species.

2.1 cubic feet per second is recommended for the cold temperature period from November 1 to May 15. This flow rate will provide velocities, depths, and wetted perimeter that are only slightly less than during the high temperature period, and should provide a suitable environment for overwintering the fish population.

Water Availability. In pre-European settlement conditions, BLM believes that Yellowjacket Creek was an intermittent stream with perhaps some short perennial reaches and pools. The modern flow regime is created by return flows from irrigation practices implemented by Montezuma Valley Irrigation Company and Dolores Water Conservancy District. BLM recognizes that if the Colorado Water Conservation Board appropriates an instream flow water right, it cannot force these entities to continue to import water to the Yellowjacket Creek watershed. However, BLM believes it is important to protect the return flow regime that has developed, because a substantial natural environment has developed over the last 100 years in response to the modified flow regime. BLM has worked extensively with Southwestern Water Conservation District and local water users to develop terms and conditions for the instream flow water right that will allow waters users flexibility to change their water use practices to meet future needs and to make their water uses more efficient.

For the water availability analysis, BLM installed pressure transducers on Yellowjacket Creek and has made that information available to the CWCB staff. In addition, BLM has cooperated with the Division of Water Resources to conduct a gain-loss study on Yellowjacket Creek. Based on these data collection efforts, BLM identified the average amount of water available during water years 2003 and 2004, when Montezuma Valley Irrigation Company delivered 90 to 100 percent of normal water supply. The proposed instream flow amounts above are based upon the combination of the R2Cross modeling effort and the water availability analysis. The results of the R2Cross modeling suggested slightly higher flows than the flow rates recommended above, but these rates were adjusted downward by BLM to correspond to the water availability identified during the 2003-2004 data collection period.

Relationship to Management Plans. Yellowjacket Creek is the only perennial stream that flows through Canyons of the Ancient National Monument. BLM is in the process of developing a comprehensive management plan for the monument, and a significant portion of the plan focuses on maintaining and improving the health of aquatic and riparian resources. BLM believes that protecting flows in Yellowjacket Creek will be strongly supportive of long-term efforts to improve fishery and riparian habitat. In addition, Yellowjacket Creek is considered a significant recreation feature of the monument. The creek is relatively easy to access, and recreational users are attracted to the water-dependent values in an overall environment that is extremely arid. Finally, BLM recognizes that successful management of the monument entails developing close working relationships with surrounding communities and resource users, because the monument contains numerous private inholdings and is bordered by private lands. BLM believes that appropriating an instream flow water right will be strong evidence of collaborative efforts to manage and protect values in the monument.

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: Lou Ann Jacobsen, Anasazi Heritage Center
Mark Stiles, San Juan Public Lands Center
Shauna Jensen, Dolores Field Office

RSmith:jm:12/21/05:yellowjacket creek letter

APPENDIX – B
Field Data

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellowjacket Creek | CROSS-SECTION NO: 5

CROSS SECTION LOCATION: 0.5 miles upstream from confluence w/ McElmo Creek

DATE: 4-12-01 | OBSERVERS: R. Smith, M. Janowiak, G. Thrash

LEGAL DESCRIPTION: SECTION NE SW | SECTION 34 | TOWNSHIP 36 (N)S | RANGE 20 E(W) | PM N.M.

COUNTY: Montezuma | WATERSHED: McElmo | WATER DIVISION: 7 | DOW WATER CODE:

MAP(S): USGS Wickiup Canyon 7.5' | USFS | UTM 673700 4133651

SUPPLEMENTAL DATA

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

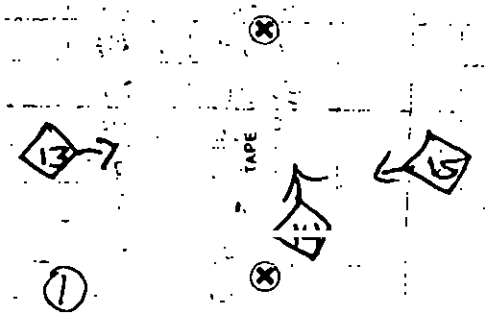
METER NUMBER: | DATE RATED: | CALIB/SPIN ____ sec | TAPE WEIGHT surveyed lbs/foot | TAPE TENSION surveyed lbs

CHANNEL BED MATERIAL SIZE-RANGE: sand to gravel | 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	4.72 / 4.72
(2) WS Upstream	12.0'	4.70
(3) WS Downstream	12.0'	4.74
SLOPE	0.04/24.0' =	0.0017

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 survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

see survey - caddisfly, mayfly

COMMENTS

Stream Temp = 10° C

very straight channel

STREAM NAME Yellowjacket Creek | CROSS-SECTION NO 1 | DATE 4-[redacted]12-04 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading .45 ft | TIME 12:55 pm

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)
S	0.0		3.09								
G	1.6		4.22								
W	2.0	.25	4.92	.22				0.37		.055	.020
	2.5	.50	5.10	.38				0.127		.190	.241
	3.0		5.11	.40				1.40		.200	.280
	3.5		5.18	.47				1.50		.235	.353
	4.0		5.20	.48				1.49		.240	.358
	4.5		5.22	.49				1.47		.245	.360
	5.0		5.23	.50				1.24		.250	.310
	5.5		5.20	.48				1.20		.240	.288
	6.0		5.17	.45				1.01		.225	.227
	6.5		5.14	.42				0.84		.210	.176
	7.0		5.10	.38				0.81		.190	.154
	7.5		5.10	.37				0.82		.185	.152
	8.0		5.09	.37				0.71		.185	.131
	8.5		5.02	.30				0.64		.150	.096
	9.0		5.04	.32				[redacted]	0.70	.160	.112
	9.5		4.98	.27				0.90		.135	.122
	10.0		4.98	.26				0.73		.130	.095
	10.5		5.00	.27				0.91		.135	.123
	11.0		4.99	.27				0.84		.135	.113
	11.5		5.01	.29				0.93		.145	.135
	12.0		5.00	.28				0.94		.140	.132
	12.5		4.93	.22				0.92		.110	.101
	13.0		4.93	.21				0.79		.105	.097
	13.5		4.96	.24				0.73		.120	.088
	14.0		4.99	.27				0.70		.135	.095
	14.5		5.00	.27				0.54		.135	.073
	15.0		4.98	.25				0.70		.125	.088
	15.5		4.94	.22				0.75		.110	.083
	16.0		4.98	.25				0.58		.125	.073
	16.5		4.94	.22				0.44		.111	.049
	17.0	✓.75	4.87	.15				0.05		.025	.001
											14.726
W	17.5	[redacted]	4.72	0							
G	18.8		4.28								
S	22.5		3.22								
TOTALS											

End of Measurement | Time 1:20 | Gage Reading .45 ft | CALCULATIONS PERFORMED BY | CALCULATIONS CHECKED BY

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

LOCATION INFORMATION

STREAM NAME	Yellowjacket Creek
XS LOCATION	0.5 miles us from confluence with McElmo Creek
XS NUMBER	5
DATE	4/12/01
OBSERVERS	Smith, Janowiak and Thrash
1/4 SEC	NESW
SECTION	34
TWP	36N
RANGE	20W
PM	NM
COUNTY	Montezuma
WATERSHED	McElmo
DIVISION	7
DOW CODE	38442
USGS MAP	Widkiup Canyon 7.5' quad
USFS MAP	

SUPPLEMENTAL DATA

TAPE WT	0.0001
TENSION	99999

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

CHANNEL PROFILE DATA

SLOPE	0.0017

INPUT DATA CHECKED BY Ed Rumbold DATE 11/4/01

ASSIGNED TO ..... DATE

STREAM NAME Yellowjacket Creek
XS LOCATION 0 5 miles us from confluence with McElmo Creek
XS NUMBER 5

INPUT DATA # DATA POINTS= 36 VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM	WATER DEPTH	AREA (Ai)	Q (Qi)	% Q CELL
S	0	3 09	0	0	0	0	0	0	0 00%
G	1 6	4 22	0	0	0	0	0	0	0 00%
W	2	4 92	0 22	0 37	0 81	0 22	0 1	0 04	0 80%
	2 5	5 1	0 38	0 13	0 53	0 38	0 19	0 02	0 50%
	3	5 11	0 4	1 4	0 5	0 4	0 2	0 28	6 20%
	3 5	5 18	0 47	1 5	0 5	0 47	0 24	0 35	7 80%
	4	5 2	0 48	1 49	0 5	0 48	0 24	0 36	7 90%
	4 5	5 22	0 49	1 47	0 5	0 49	0 25	0 36	8 00%
	5	5.23	0.5	1 24	0 5	0 5	0 25	0 31	6 90%
	5 5	5 2	0 48	1 2	0 5	0 48	0 24	0 29	6 40%
	6	5 17	0 45	1 01	0 5	0 45	0 23	0 23	5 00%
	6 5	5 14	0 42	0 84	0 5	0 42	0 21	0 18	3 90%
	7	5 1	0 38	0 81	0 5	0 38	0 19	0 15	3 40%
	7 5	5 1	0 37	0 82	0.5	0 37	0 19	0 15	3 40%
	8	5 09	0 37	0 71	0 5	0 37	0 19	0 13	2 90%
	8.5	5 02	0 3	0 64	0.5	0 3	0 15	0 1	2 10%
	9	5 04	0 32	0 7	0 5	0 32	0 16	0 11	2 50%
	9 5	4 98	0 27	0 9	0 5	0.27	0 14	0 12	2 70%
	10	4 98	0 26	0 73	0 5	0.26	0 13	0 09	2 10%
	10 5	5	0.27	0 91	0 5	0 27	0 14	0 12	2.70%
	11	4 99	0.27	0 84	0.5	0 27	0 14	0 11	2 50%
	11 5	5 01	0 29	0 93	0 5	0 29	0 15	0 13	3 00%
	12	5	0 28	0 94	0 5	0 28	0 14	0 13	2 90%
	12 5	4 93	0 22	0 92	0 5	0 22	0 11	0 1	2 20%
	13	4 93	0.21	0 79	0 5	0 21	0 11	0 08	1 80%
	13 5	4 96	0 24	0 73	0 5	0 24	0 12	0 09	1.90%
	14	4 99	0 27	0 7	0 5	0 27	0 14	0 09	2 10%
	14 5	5	0 27	0 54	0 5	0 27	0 14	0 07	1 60%
	15	4 98	0 25	0 7	0 5	0 25	0 13	0 09	1 90%
	15 5	4 94	0 22	0 75	0 5	0 22	0 11	0 08	1 80%
	16	4 98	0 25	0 58	0 5	0 25	0 13	0 07	1 60%
	16 5	4 94	0 22	0 44	0 5	0 22	0 11	0 05	1 10%
	17	4 87	0 15	0 05	0 5	0 15	0 08	0	0 10%
W	17 5	4 72	0	0	0 52	0	0	0	0 00%
G	18 8	4 28	0	0	0	0	0	0	0 00%
S	22 5	3 22	0	0	0	0	0	0	0 00%
TOTALS ----------					16 4	0 5 (Max)	4 97	4 51	100 00%

Manning's n = 0 0305

PROOF SHEET

INPUT DATA # DATA POINTS= 36

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	TAPE TO WATER
S	0	3.09	0	0	0	0	0
G	1.6	4.22	0	0	0	0	0
W	2	4.92	0.22	0.37	0.1	0.04	4.7
	2.5	5.1	0.38	0.13	0.19	0.02	4.72
	3	5.11	0.4	1.4	0.2	0.28	4.71
	3.5	5.18	0.47	1.5	0.24	0.35	4.71
	4	5.2	0.48	1.49	0.24	0.36	4.72
	4.5	5.22	0.49	1.47	0.25	0.36	4.73
	5	5.23	0.5	1.24	0.25	0.31	4.73
	5.5	5.2	0.48	1.2	0.24	0.29	4.72
	6	5.17	0.45	1.01	0.23	0.23	4.72
	6.5	5.14	0.42	0.84	0.21	0.18	4.72
	7	5.1	0.38	0.81	0.19	0.15	4.72
	7.5	5.1	0.37	0.82	0.19	0.15	4.73
	8	5.09	0.37	0.71	0.19	0.13	4.72
	8.5	5.02	0.3	0.64	0.15	0.1	4.72
	9	5.04	0.32	0.7	0.16	0.11	4.72
	9.5	4.98	0.27	0.9	0.14	0.12	4.71
	10	4.98	0.26	0.73	0.13	0.09	4.72
	10.5	5	0.27	0.91	0.14	0.12	4.73
	11	4.99	0.27	0.84	0.14	0.11	4.72
	11.5	5.01	0.29	0.93	0.15	0.13	4.72
	12	5	0.28	0.94	0.14	0.13	4.72
	12.5	4.93	0.22	0.92	0.12	0.1	4.71
	13	4.93	0.21	0.79	0.11	0.08	4.72
	13.5	4.96	0.24	0.73	0.12	0.09	4.72
	14	4.99	0.27	0.7	0.14	0.09	4.72
	14.5	5	0.27	0.54	0.14	0.07	4.73
	15	4.98	0.25	0.7	0.13	0.09	4.73
	15.5	4.94	0.22	0.75	0.11	0.08	4.72
	16	4.98	0.25	0.58	0.13	0.07	4.73
	16.5	4.94	0.22	0.44	0.11	0.05	4.72
	17	4.87	0.15	0.05	0.08	0	4.72
W	17.5	4.72	0	0	0	0	0
G	18.8	4.28	0	0	0	0	0
S	22.5	3.22	0	0	0	0	0
				TOTALS	4.97	4.51	

STREAM NAME Yellowjacket Creek
XS LOCATION 0 5 miles us from confluence with McElmo Creek
XS NUMBER 5

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
4 22	4 97	13 2	165 40%
4 24	4 97	12 85	158 40%
4 26	4 97	12 51	151 50%
4 28	4.97	12 16	144 50%
4 3	4 97	11 82	137 60%
4 32	4 97	11 48	130 80%
4.34	4 97	11.14	124 00%
4 36	4 97	10 8	117 20%
4 38	4 97	10 46	110 40%
4 4	4 97	10 13	103 60%
4 42	4 97	9 79	96 90%
4 43	4 97	9 63	93 60%
4 44	4 97	9 46	90 20%
4 45	4 97	9 3	86 90%
4 46	4 97	9 13	83 60%
4 47	4 97	8 97	80 20%
4 48	4 97	8 8	76 90%
4 49	4 97	8 64	73 60%
4 5	4 97	8 47	70 30%
4 51	4 97	8 31	67 00%
4 52	4 97	8 14	63 70%
4 54	4 97	7 82	57 20%
4 56	4 97	7 49	50 70%
4 58	4 97	7 17	44 20%
4 6	4 97	6 85	37 70%
4 62	4 97	6 53	31 30%
4 64	4 97	6 21	24 90%
4 66	4 97	5 89	18 50%
4 68	4 97	5 58	12 20%
4 7	4 97	5 26	5 80%
4 72	4 97	4 95	-0 50%
WATERLINE AT ZERO			
AREA ERROR =			4 719

STREAM NAME: Yellowjacket Creek
XS LOCATION: 0.5 miles us from confluence with McElmo Creek
XS NUMBER: 5

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)	Ave. Depth (ft)	Max Depth (ft)	Area (sq.ft)	Wetted Perim (ft)	Wetted Perim (%)	Hydr Radius (ft)	Flow (cfs)	Ave. Velocity (ft/sec)	
GL	4 28	17.17	0.71	0 95	12.16	17.7	100 00%	0.69	19.02	1 56	
	4.32	17 03	0 68	0 91	11 5	17.54	99 10%	0 66	17.45	1.52	-0 4
	4.37	16.85	0 63	0 86	10 66	17.32	97.90%	0.62	15.48	1 45	-0.35
	4.42	16.68	0.59	0 81	9.82	17.11	96.70%	0.57	13.62	1.39	-0.3
	4 47	16 5	0 54	0.76	8.99	16.89	95 50%	0 53	11 86	1.32	-0.25
	4 52	16.32	0 5	0.71	8.17	16 68	94.20%	0.49	10 19	1.25	-0.2
	4 57	16 15	0.46	0.66	7.36	16 47	93 00%	0.45	8.63	1.17	-0 15
	4 62	15 97	0 41	0 61	6 55	16 25	91 80%	0 4	7 18	1.1	-0.1
	4.67	15.8	0 36	0 56	5 76	16 04	90 60%	0 36	5 84	1.01	-0 05
WL	4 72	15 62	0.32	0 51	4 97	15 83	89 40%	0.31	4.62	0.93	0
	4.77	15.42	0 27	0 46	4 2	15 6	88 10%	0.27	3 51	0 84	0 05
	4.82	15.23	0 23	0 41	3.43	15 36	86 80%	0.22	2 54	0 74	0 1
	4.87	15.03	0 18	0 36	2 67	15 13	85 50%	0 18	1.69	0 63	0 15
	4.92	14 65	0 13	0 31	1 93	14 72	83 20%	0.13	1	0 52	0 2
	4.97	11 88	0 11	0 26	1 26	11 92	67 40%	0 11	0.57	0 45	0.25
	5.02	6 9	0 12	0 21	0 81	6.94	39 20%	0.12	0.39	0.48	0 3
	5 07	5.74	0 09	0 16	0 5	5 76	32 50%	0 09	0.2	0.39	0 35
	5 12	3.71	0 07	0 11	0 25	3 72	21 00%	0 07	0.08	0.33	0 4
	5 17	2.61	0 04	0 06	0 09	2 61	14.70%	0 04	0 02	0 22	0.45
	5.22	0.73	0 01	0 01	0	0 73	4 10%	0 01	0	0 07	0.5

STREAM NAME: Yellowjacket Creek
XS LOCATION: 0.5 miles us from confluence with McElmo Creek
XS NUMBER: 5

Summary Sheet

MEASURED FLOW (Qm)=	4 51	cfs
CALCULATED FLOW (Qc)=	4 62	cfs
(Qm-Qc)/Qm * 100 =	-2.4	%
MEASURED WATERLINE (WLm)=	4 47	ft
CALCULATED WATERLINE (WLc)=	4.72	ft
(WLm-WLc)/WLm * 100) =	-5.6	%
MAX MEASURED DEPTH (Dm)=	0.5	ft
MAX CALCULATED DEPTH (Dc)=	0.51	ft
(Dm-Dc)/Dm * 100	-2.3	%
MEAN VELOCITY=	0.93	ft/sec
MANNING'S N=	0 031	
SLOPE=	0 0017	ft/ft
4 * Qm =	1 8	cfs
2 5 * Qm=	11.3	cfs

Recommended instream flow:

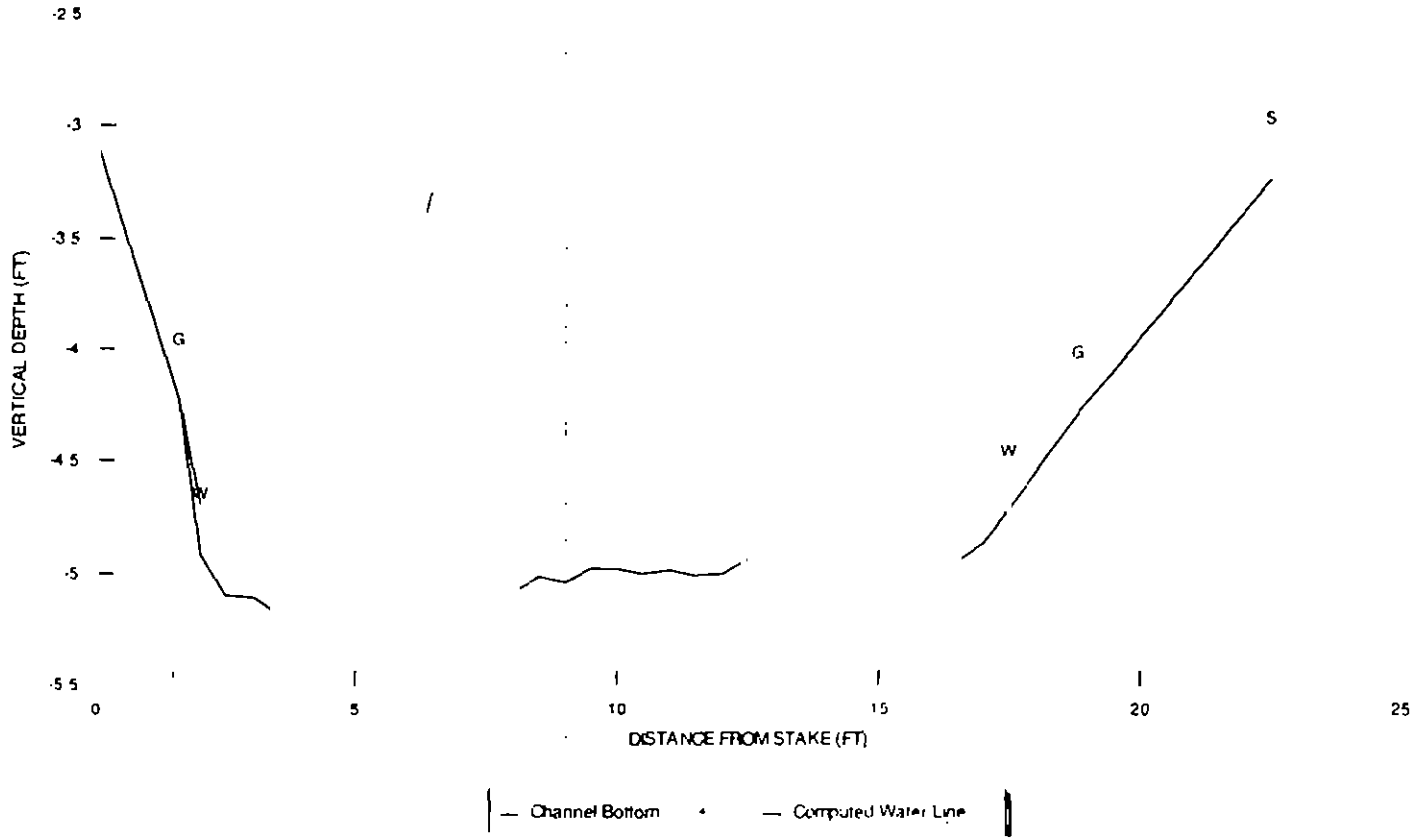
FLOW (CFS)	PERIOD
2.03 cfs	winter
5.69	summer

Rationale for recommendation:

Winter and summer instream needs would be met at 2.03 and 5.69 cfs, respectively. The depth and wetted perimeter hydraulic criteria were used for assessing winter in-stream flow needs, while ^average velocity of 1 feet/second was met at 5.69 cfs and identified summer instream flow needs.

Yellowjacket Creek

CROSS SECTION DATA ANALYSIS



COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellowjacket Creek | CROSS-SECTION NO: 4

CROSS-SECTION LOCATION: Approx. 1/4 mile downstream from confluence with Risley Canyon

DATE: 4-12-01 | OBSERVERS: M. Janowiak, R. Smith, G. Thrash

LEGAL DESCRIPTION: SECTION NW | SECTION 21 | TOWNSHIP 36 (N)S | RANGE 19 E/(W) PM N.M.

COUNTY: Montezuma | WATERSHED: McElmo | WATER DIVISION: 7 | DOW WATER CODE: 38442

MAP(S): USGS Bowdish Canyon 7.5' | 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

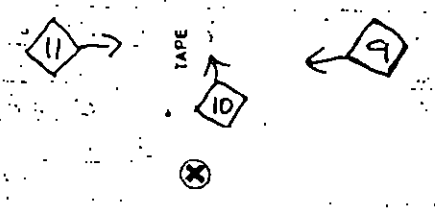
CHANNEL BED MATERIAL SIZE RANGE: silt to 8" cobbles | PHOTOGRAPHS TAKEN (YES)/NO | NUMBER OF PHOTOGRAPHS: 3

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	6.91 / 6.91
② WS Upstream	15.0	6.98
③ WS Downstream	15.0	6.81

SLOPE: ΔH 0.17 / 30.0 = 0.0057

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 fish survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

see survey

COMMENTS

extensive willow - salt cedar community

DISCHARGE/CROSS SECTION NOTES

STREAM NAME Yellowjacket Creek | CROSS-SECTION NO 1-1 | DATE 4-17-01 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading 0.3 ft | TIME 10:45 am

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)
S	0.0		5.38								
G	1.00		6.45								
W	1.05		6.91								
	1.10	.25	6.29	0.38				1.40		.095	.133
	1.50	.50	6.31	0.40				1.49		.200	.298
	2.0		6.31	0.40				1.66		.200	.332
	2.5		6.34	0.42				1.67		.210	.351
	3.0		6.30	0.38				1.62		.190	.308
	3.5		7.26	0.35				1.60		.175	.280
	4.0		7.24	0.33				1.70		.165	.281
	4.5		7.23	0.32				1.49		.160	.238
	5.0		7.23	0.32				0.94		.160	.150
	5.5		7.25	0.33				1.22		.165	.201
	6.0		7.21	0.30				1.32		.150	.198
	6.5		7.21	0.30				1.31		.150	.197
	7.0		7.22	0.31				1.50		.155	.233
	7.5		7.15	0.25				1.60		.125	.200
	8.0		7.16	0.26				1.44		.130	.187
	8.5		7.11	0.20				1.22		.100	.122
	9.0		7.11	0.20				1.32		.100	.132
	9.5		7.20	0.28				1.24		.140	.174
	10.0		7.16	0.25				0.90		.125	.113
	10.5		7.10	0.20				0.73		.100	.073
	11.0		7.12	0.21				0.28		.105	.029
	11.5		7.18	0.27				0.89		.135	.120
	12.0		7.05	0.15				0.45		.075	.034
	12.5		7.15	0.24				0.65		.120	.078
	13.0		7.19	0.28				0.63		.140	.088
	13.5		7.13	0.22				0.32		.110	.035
	14.0		7.14	0.23				0.08		.115	.009
	14.5		7.09	0.18				0.10		.090	.009
	15.0		7.08	0.17				ϕ		.085	
	15.5		7.00	0.10				ϕ		.050	
	16.0		6.99	0.08				ϕ		.040	
	16.5		6.94	0.03				ϕ		.015	
											4.60
W	16.75		6.91								
G	17.1		6.40								
S	19.1		5.72								
TOTALS											

End of Measurement | Time 11:05 | Gage Reading 0.3 ft | CALCULATIONS PERFORMED BY | CALCULATIONS CHECKED BY

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

LOCATION INFORMATION

=

STREAM NAME	Yellowjacket creek
XS LOCATION	approx 1/4 mile ds from confluence with Risley creek
XS NUMBER.	4
DATE	4/12/01 .
OBSERVERS.	Janowiak, Smith and Thrash
1/4 SEC	NW
SECTION	21
TWP	36N
RANGE	9W
PM	NM
COUNTY:	Montezuma
WATERSHED	McElmo
DIVISION	7
DOW CODE	38442
USGS MAP.	Bowdish Canyon 7 5' quad
USFS MAP.	

SUPPLEMENTAL DATA

TAPE WT	0 0001
TENSION	99999

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

CHANNEL PROFILE DATA

SLOPE: 0 0057

INPUT DATA CHECKED BY Ed. Rumbold. DATE 11/14/01

ASSIGNED TO ... . DATE .

PROOF SHEET

INPUT DATA # DATA POINTS= 38

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	TAPE TO WATER
S	0	5 38	0	0	0	0	0
G	1	6 45	0	0	0	0	0
W	1 05	6 91	0	0	0	0	0
	1 1	7 29	0 38	1 4	0 09	0 12	6 91
	1 5	7 31	0 4	1 49	0 18	0 27	6 91
	2	7 31	0 4	1 66	0 2	0 33	6 91
	2 5	7 34	0 42	1 67	0 21	0 35	6 92
	3	7.3	0.38	1 62	0 19	0 31	6 92
	3 5	7 26	0 35	1 6	0 18	0 28	6 91
	4	7.24	0 33	1 7	0 17	0 28	6 91
	4 5	7 23	0 32	1 49	0 16	0 24	6 91
	5	7 23	0 32	0 94	0 16	0 15	6 91
	5 5	7 25	0 33	1 22	0 17	0 2	6 92
	6	7 21	0 3	1 32	0 15	0 2	6 91
	6 5	7 21	0 3	1 31	0 15	0 2	6 91
	7	7 22	0 31	1 5	0 16	0 23	6 91
	7.5	7 15	0 25	1 6	0 13	0 2	6 9
	8	7 16	0 26	1 44	0 13	0 19	6 9
	8 5	7 11	0 2	1 22	0 1	0 12	6 91
	9	7 11	0 2	1 32	0 1	0 13	6 91
	9 5	7 2	0 28	1 24	0 14	0 17	6 92
	10	7 16	0 25	0 9	0 13	0 11	6 91
	10 5	7 1	0 2	0 73	0 1	0 07	6 9
	11	7 12	0 21	0 28	0 11	0 03	6 91
	11.5	7 18	0 27	0 89	0 14	0 12	6 91
	12	7 05	0 15	0 45	0 08	0 03	6 9
	12.5	7 15	0 24	0 65	0 12	0 08	6 91
	13	7 19	0.28	0 63	0 14	0 09	6.91
	13 5	7 13	0 22	0 32	0 11	0 04	6 91
	14	7 14	0 23	0 08	0 12	0.01	6.91
	14.5	7 09	0 18	0 1	0 09	0 01	6 91
	15	7 08	0 17	0	0 09	0	6 91
	15 5	7	0 1	0	0 05	0	6 9
	16	6 99	0 08	0	0 04	0	6 91
	16 5	6 94	0 03	0	0 01	0	6 91
W	16 75	6 91	0	0	0	0	0
G	17 1	6 4	0	0	0	0	0
S	19 1	5 72	0	0	0	0	0
				TOTALS	4 04	4 56	

STREAM NAME Yellowjacket creek
XS LOCATION approx 1/4 mile ds from confluence with Risley creek
XS NUMBER 4

INPUT DATA # DATA POINTS= 38 VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
S	0	5 38	0	0	0	0	0	0	0 00%
G	1	6 45	0	0	0	0	0	0	0 00%
W	1 05	6 91	0	0	0	0	0	0	0 00%
	1.1	7 29	0 38	1 4	0 38	0 38	0 09	0 12	2 60%
	1 5	7 31	0 4	1 49	0 4	0 4	0 18	0 27	5 90%
	2	7 31	0 4	1 66	0 5	0 4	0 2	0 33	7 30%
	2.5	7.34	0 42	1 67	0 5	0 42	0 21	0 35	7 70%
	3	7 3	0 38	1 62	0 5	0 38	0 19	0 31	6.80%
	3 5	7 26	0.35	1 6	0 5	0 35	0 18	0 28	6 10%
	4	7 24	0 33	1 7	0 5	0 33	0 17	0 28	6 20%
	4 5	7 23	0 32	1 49	0 5	0 32	0 16	0 24	5 20%
	5	7 23	0 32	0 94	0 5	0 32	0 16	0 15	3 30%
	5 5	7 25	0 33	1 22	0 5	0 33	0 17	0 2	4 40%
	6	7 21	0 3	1 32	0 5	0 3	0 15	0 2	4 30%
	6 5	7 21	0 3	1 31	0 5	0 3	0 15	0 2	4 30%
	7	7 22	0 31	1 5	0 5	0 31	0 16	0 23	5 10%
	7 5	7 15	0 25	1 6	0 5	0 25	0 13	0 2	4 40%
	8	7 16	0 26	1 44	0 5	0 26	0 13	0 19	4 10%
	8 5	7.11	0 2	1.22	0 5	0 2	0 1	0 12	2 70%
	9	7 11	0.2	1 32	0 5	0 2	0 1	0 13	2 90%
	9.5	7 2	0 28	1 24	0 51	0 28	0 14	0 17	3 80%
	10	7 16	0 25	0 9	0 5	0 25	0 13	0 11	2 50%
	10 5	7 1	0 2	0 73	0 5	0 2	0 1	0 07	1 60%
	11	7 12	0 21	0 28	0 5	0 21	0 11	0 03	0 60%
	11 5	7 18	0 27	0 89	0 5	0 27	0 14	0 12	2 60%
	12	7 05	0 15	0 45	0 52	0 15	0 08	0 03	0 70%
	12 5	7 15	0 24	0 65	0 51	0 24	0 12	0 08	1 70%
	13	7 19	0 28	0 63	0 5	0 28	0 14	0 09	1 90%
	13 5	7 13	0 22	0 32	0 5	0 22	0 11	0 04	0 80%
	14	7 14	0 23	0 08	0 5	0 23	0 12	0 01	0 20%
	14 5	7 09	0 18	0 1	0 5	0 18	0 09	0 01	0 20%
	15	7 08	0 17	0	0 5	0 17	0 09	0	0 00%
	15 5	7	0 1	0	0 51	0 1	0 05	0	0 00%
	16	6 99	0 08	0	0 5	0 08	0 04	0	0 00%
	16 5	6 94	0 03	0	0 5	0 03	0.01	0	0 00%
W	16.75	6 91	0	0	0 25	0	0	0	0 00%
G	17 1	6 4	0	0	0	0	0	0	0 00%
S	19 1	5.72	0	0	0	0	0	0	0 00%
TOTALS ----------					16 11	0 42 (Max)	4 04	4 56	100 00%

Manning's n = 0 0396

STREAM NAME Yellowjacket creek
XS LOCATION approx 1/4 mile ds from confluence with Risley creek
XS NUMBER. 4

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
6 66	4 04	7 99	97.60%
6 68	4 04	7.67	89 70%
6 7	4 04	7 35	81 90%
6 72	4 04	7.03	74 00%
6 74	4 04	6.72	66 20%
6.76	4 04	6 4	58 40%
6 78	4.04	6 08	50.50%
6 8	4 04	5 77	42 70%
6.82	4 04	5 45	34 90%
6 84	4.04	5 14	27 10%
6 86	4 04	4.82	19 30%
6 87	4 04	4 67	15 40%
6.88	4.04	4 51	11 50%
6.89	4 04	4 35	7 60%
6 9	4 04	4 19	3 80%
6 91	4 04	4 04	-0 10%
6.92	4 04	3 88	-4 00%
6 93	4 04	3 72	-7 90%
6 94	4 04	3 57	-11 70%
6 95	4 04	3 42	-15 50%
6.96	4 04	3 26	-19 30%
6.98	4 04	2 96	-26 80%
7	4 04	2 66	-34 10%
7 02	4 04	2 38	-41 20%
7 04	4 04	2 09	-48 30%
7 06	4 04	1 81	-55 30%
7 08	4 04	1 53	-62 10%
7 1	4 04	1 27	-68 60%
7 12	4 04	1 03	-74 60%
7.14	4 04	0 82	-79 80%
7 16	4 04	0 64	-84 20%
WATERLINE AT ZERO AREA ERROR =			6 91

STREAM NAME: Yellowjacket creek
XS LOCATION: approx. 1/4 mile ds from confluence with Risley creek
XS NUMBER: 4

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

Staging Table

	Dist to Water (ft)	Top Width (ft)	Ave. Depth (ft)	Max. Depth (ft)	Area (sq.ft)	Wetted Perim (ft)	Wetted Perim (%)	Hydr Radius (ft)	Flow (cfs)	Ave. Velocity (ft/sec)	
GL	6 45	16.07	0 71	0.89	11.34	17.13	100.00%	0 66	24 44	2.15	
	6.46	16.06	0.7	0 88	11.19	17.11	99.90%	0 65	23.9	2 14	-0 45
	6.51	16 02	0.65	0.83	10.39	17	99 20%	0.61	21 21	2 04	-0 4
	6 56	15.98	0 6	0.78	9.59	16.89	98.60%	0 57	18.64	1.94	-0.35
	6 61	15.94	0 55	0.73	8 79	16.78	97.90%	0 52	16 19	1 84	-0.3
	6.66	15.9	0 5	0 68	7.99	16 67	97.30%	0.48	13.88	1.74	-0 25
	6.71	15.86	0.45	0.63	7.2	16 55	96.60%	0.43	11 71	1 63	-0 2
	6 76	15 82	0 4	0 58	6 41	16 44	96.00%	0 39	9.69	1.51	-0.15
	6.81	15.78	0 36	0.53	5.62	16.33	95.30%	0 34	7 82	1 39	-0 1
	6 86	15 74	0 31	0.48	4 83	16 22	94 70%	0.3	6 1	1 26	-0 05
WL	6.91	15 7	0 26	0 43	4 04	16 11	94.10%	0.25	4 56	1 13	0
	6.96	15 25	0 21	0.38	3.27	15.61	91 10%	0 21	3.27	1	0 05
	7 01	14 38	0 18	0 33	2 52	14 69	85.80%	0 17	2 21	0 88	0 1
	7 06	13.97	0 13	0 28	1.81	14 24	83 10%	0.13	1 3	0 72	0 15
	7 11	11 88	0 1	0 23	1 15	12 09	70.60%	0.09	0.68	0.59	0.2
	7 16	7 96	0 08	0 18	0 64	8 09	47.20%	0.08	0 34	0.52	0 25
	7 21	5 5	0 06	0 13	0 31	5 58	32 60%	0 05	0 13	0 41	0 3
	7 26	2 41	0.05	0 08	0 11	2.44	14 20%	0.05	0.04	0 37	0 35
	7 31	0 88	0 02	0 03	0 01	0.89	5 20%	0 02	0	0.17	0 4

STREAM NAME: Yellowjacket creek
XS LOCATION: approx. 1/4 mile ds from confluence with Risley creek
XS NUMBER: 4

Summary Sheet

MEASURED FLOW (Qm)=	4.56	cfs
CALCULATED FLOW (Qc)=	4.56	cfs
(Qm-Qc)/Qm * 100 =	0	%
MEASURED WATERLINE (WLm)=	6 91	ft
CALCULATED WATERLINE (WLc)=	6.91	ft
(WLm-WLc)/WLm * 100 =	0	%
MAX MEASURED DEPTH (Dm)=	0.42	ft
MAX CALCULATED DEPTH (Dc)=	0.43	ft
(Dm-Dc)/Dm * 100	-2.5	%
MEAN VELOCITY=	1.13	ft/sec
MANNING'S N=	0 04	
SLOPE=	0.0057	ft/ft
.4 * Qm =	1 8	cfs
2.5 * Qm=	11 4	cfs

Recommended instream flow:

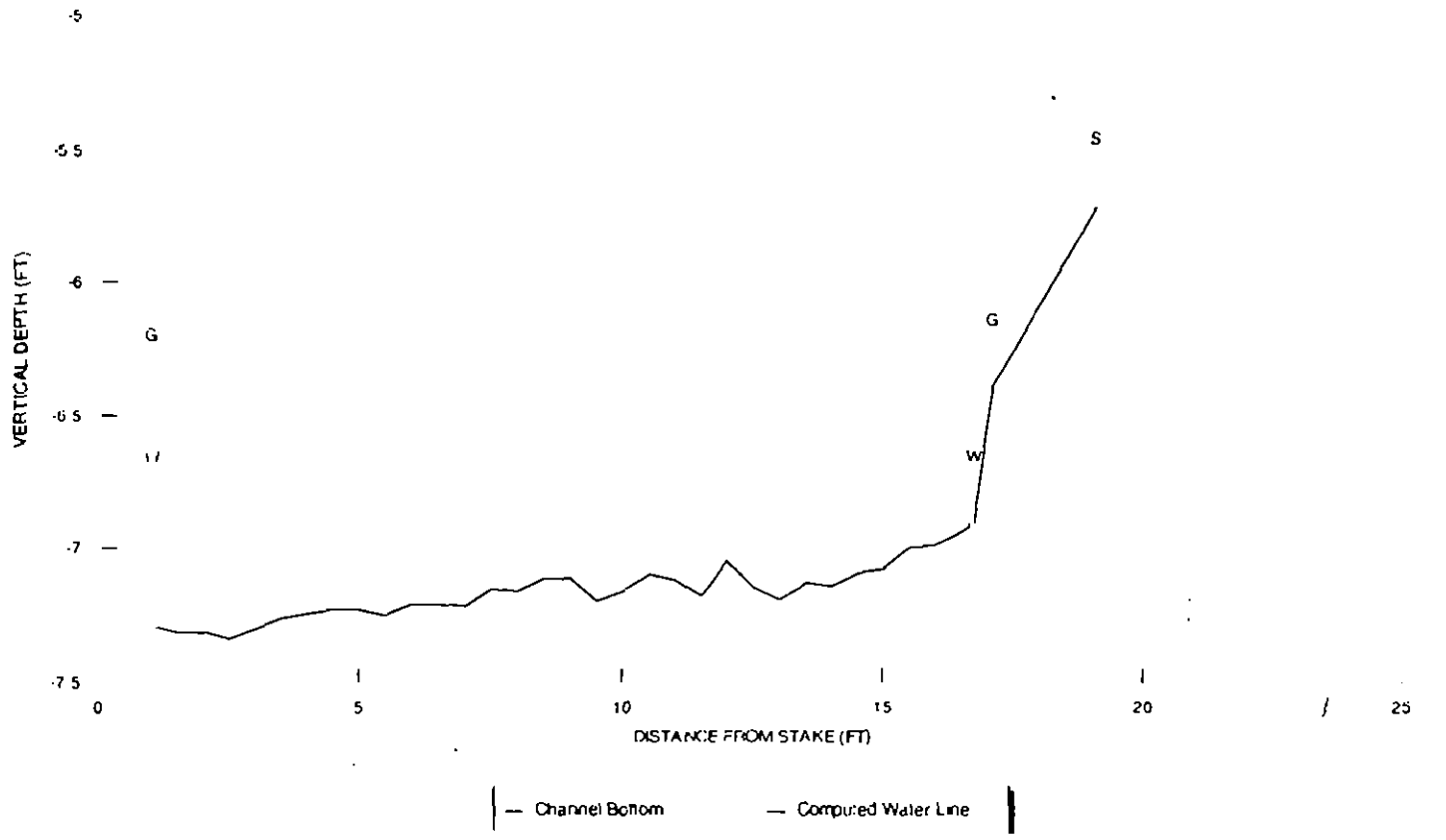
FLOW (CFS)	PERIOD
2.92	winter
3.27	Summer

Rationale for recommendation:

Winter and Summer instream flows would be met at 2.92 and 3.27 cfs, respectively. The hydraulic criteria of 0.2 foot average depth and a 50% wetted perimeter were used in determing a winter instream flow and an average velocity of 1 ft/sec was met at 3.27 cfs.

Yellowjacket creek

CROSS SECTION DATA ANALYSIS



COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellowjacket Creek | CROSS-SECTION NO: 1

CROSS SECTION LOCATION: Approx 1/4 mile upstream from BLM-private boundary

DATE: 4-11-01 | OBSERVERS: R. Smith, D. Murphy, M. Janowiak

LEGAL DESCRIPTION: SECTION: SW | SECTION: 19 | TOWNSHIP: 37 (N)S | RANGE: 17 E/(W) | PM: N.M.

COUNTY: Montezuma | WATERSHED: McElmo | WATER DIVISION: 7 | DOW WATER CODE: 38442

MAP(S): USGS: Woods Canyon 7.5' UTM 696988 | USFS: 4146223

SUPPLEMENTAL DATA

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

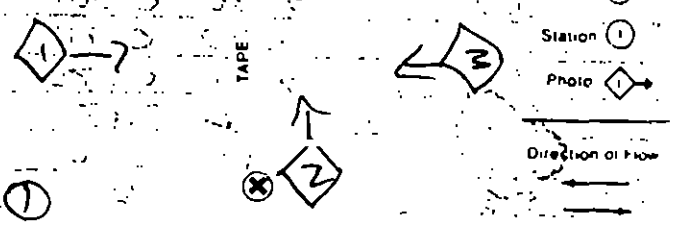
METER NUMBER | DATE RATED | CALIB/SPIN ____ sec | TAPE WEIGHT surveyed ____ lbs/foot | TAPE TENSION surveyed ____ lbs

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

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (in)
⊗ Tape & Stake LB	0.0	surveyed
⊗ Tape & Stake RB	0.0	surveyed
① WS & Tape LB/RB	0.0	5.50 / 5.51
② WS Upstream	12.0'	5.43
③ WS Downstream	12.0'	5.71
SLOPE	0.28 / 24.0' =	0.012

SKETCH



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 fish survey																	

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

mayfly, caddisfly, ephemeroptera

COMMENTS

Extensive beaver activity - most of stream dammed / flooded

Noted several species of waterfowl + amphibians

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME Yellowjacket Creek | CROSS-SECTION NO 0 | DATE 4-11-a | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading 0.25 ft | TIME 12:35 pm

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)
S	21.0		3.90								
G	19.9		4.90								
W	18.0		5.50								
	17.0	0.75	5.60	0.1				Ø			Ø
	16.5	0.5	5.65	0.15				0.99		0.075	.074
	16.0		5.65	0.15				0.88		0.075	.066
	15.5		5.60	0.10				0.81		0.050	.041
	15.0		5.60	0.10				0.75		0.050	.038
	14.5		5.60	0.10				0.70		0.050	.035
	14.0		5.65	0.15				0.72		0.075	.054
	13.5		5.60	0.10				0.70		0.050	.035
	13.0		5.65	0.15				0.66		0.075	.050
	12.5		5.60	0.10				0.56		0.050	.028
	12.0		5.60	0.10				0.43		0.050	.022
	11.5		5.70	0.20				0.96		0.10	.096
	11.0		5.80	0.30				0.95		0.15	.143
	10.5		5.80	0.30				1.06		0.15	.159
	10.0		5.90	0.40				0.83		0.20	.166
	9.5		5.85	0.35				0.93		0.175	.163
	9.0		5.80	0.30				1.25		0.150	.188
	8.5		5.85	0.35				1.44		0.175	.252
	8.0		5.80	0.30				1.05		0.150	.158
	7.5		5.70	0.20				0.38		0.10	.038
	7.0	~1	5.70	0.20				0.42		0.10	.042
	6.5		5.65	0.15				0.18		0.075	.014
	6.0		5.60	0.10				Ø		0.05	
W	5.5		5.50	Ø				Ø			
G	5.0		4.86								= 1.862 cfs
S	4.1		3.89								

TOTALS

End of Measurement | Time 1:10 | Gage Reading 0.25 ft | CALCULATIONS PERFORMED BY | CALCULATIONS CHECKED BY

1.86

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

LOCATION INFORMATION

STREAM NAME.	Yellowjacket Creek
XS LOCATION	approx 1/4 mile us from BLM/pvt boundary
XS NUMBER	1
DATE:	4/11/01
OBSERVERS	Smith, Murphy and Janowiak
1/4 SEC:	SW
SECTION:	19
TWP.	37N
RANGE	17W
PM	NM
COUNTY:	Montezuma
WATERSHED:	McElmo
DIVISION:	7
DOW CODE:	38442
USGS MAP:	Woods Canyon
USFS MAP:	

SUPPLEMENTAL DATA

TAPE WT	0.0001
TENSION	99999

CHANNEL PROFILE DATA

SLOPE: 0.012

CHECKED BY: Ed Rumbold DATE: 11/14/01

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

INPUT DATA

DATA POINTS= 29

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL 0	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
						VALUES COMPUTED FROM RAW FIELD DATA			
S	4.1	3.89	0	0	0	0	0	0	0.00%
G	5	4.86	0	0	0	0	0	0	0.00%
W	5 5	5.5	0	0	0	0	0	0	0 00%
	6	5.6	0.1	0 18	0 51	0 1	0 05	0	0 00%
	6 5	5.65	0.15	0 42	0 5	0 15	0 08	0 01	0 70%
	7	5 7	0.2	0.38	0.5	0 2	0 1	0 04	2 30%
	7.5	5.7	0 2	1.05	0.5	0 2	0 1	0 04	2 00%
	8	5.8	0 3	1 44	0 51	0 3	0 15	0.16	8 50%
	8.5	5.85	0.35	1.25	0.5	0 35	0 18	0 25	13 60%
	9	5 8	0 3	0.93	0.5	0 3	0 15	0 19	10 10%
	9.5	5 85	0.35	0.83	0.5	0 35	0 18	0 16	8 80%
	10	5.9	0.4	1 06	0 5	0.4	0 2	0.17	8 90%
	10.5	5 8	0.3	0.95	0.51	0 3	0 15	0 16	8 60%
	11	5 8	0 3	0.96	0 5	0 3	0.15	0 14	7 70%
	11 5	5.7	0.2	0 43	0 51	0 2	0 1	0 1	5 20%
	12	5 6	0 1	0 56	0 51	0 1	0 05	0 02	1 20%
	12 5	5.6	0.1	0 66	0 5	0 1	0 05	0 03	1 50%
	13	5 65	0.15	0 7	0 5	0 15	0 08	0 05	2.70%
	13 5	5.6	0.1	0 72	0.5	0 1	0 05	0 04	1 90%
	14	5.65	0 15	0 7	0 5	0 15	0.08	0 05	2 90%
	14.5	5.6	0 1	0.75	0.5	0 1	0.05	0 04	1 90%
	15	5.6	0 1	0 81	0 5	0 1	0 05	0 04	2 00%
	15.5	5.6	0.1	0 88	0.5	0 1	0.05	0 04	2.20%
	16	5.65	0.15	0.99	0 5	0 15	0 08	0.07	3.60%
	16.5	5.65	0.15	0	0.5	0.15	0.08	0 07	4.00%
	17	5 6	0 1	0	0 5	0 1	0.08	0	0 00%
W	18	5.5	0	0	1	0	0	0	0 00%
G	19.9	4.9	0	0	0	0	0	0	0 00%
S	21	3.9	0		0	0	0	0	0.00%
TOTALS	----------				12 58	0 4 (Max)	2.25	1.86	100.00%

Manning's n = 0.0626

PROOF SHEET

NPUT DATA # DATA POINTS= 29

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	TAPE TO WATER
S	4.1	3.89	0	0	0	0	0
G	5	4 86	0	0	0	0	0
W	5.5	5.5	0	0	0	0	0
	6	5.6	0 1	0	0.05	0	5 5
	6.5	5.65	0.15	0.18	0 08	0 01	5 5
	7	5.7	0 2	0 42	0.1	0.04	5.5
	7.5	5.7	0.2	0.38	0.1	0 04	5.5
	8	5.8	0 3	1 05	0.15	0.16	5.5
	8.5	5 85	0.35	1 44	0 18	0 25	5.5
	9	5.8	0 3	1.25	0 15	0.19	5 5
	9.5	5.85	0.35	0.93	0 18	0 16	5 5
	10	5.9	0 4	0.83	0.2	0.17	5 5
	10.5	5 8	0 3	1.06	0 15	0.16	5.5
	11	5.8	0.3	0 95	0.15	0.14	5.5
	11.5	5.7	0 2	0.96	0 1	0.1	5 5
	12	5.6	0.1	0 43	0 05	0.02	5.5
	12.5	5 6	0 1	0.56	0 05	0.03	5 5
	13	5.65	0.15	0 66	0 08	0.05	5.5
	13.5	5 6	0.1	0.7	0.05	0.04	5 5
	14	5 65	0 15	0.72	0 08	0 05	5.5
	14.5	5.6	0.1	0.7	0 05	0.04	5 5
	15	5.6	0.1	0.75	0.05	0 04	5.5
	15.5	5 6	0 1	0 81	0 05	0 04	5 5
	16	5.65	0 15	0.88	0.08	0.07	5 5
	16.5	5.65	0.15	0.99	0 08	0 07	5.5
	17	5.6	0.1	0	0.08	0	5.5
W	18	5.5	0	0	0	0	0
G	19 9	4.9	0	0	0	0	0
S	21	3.9	0	0	0	0	0
				TOTALS	2.25	1.86	

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
5.25	2.25	5.5	144.40%
5.27	2.25	5.23	132 40%
5.29	2.25	4 96	120.50%
5.31	2.25	4.7	108 70%
5.33	2.25	4.43	97 00%
5.35	2.25	4.17	85 30%
5.37	2.25	3 91	73.70%
5.39	2 25	3.65	62.20%
5.41	2.25	3.39	50.70%
5.43	2.25	3.13	39 30%
5.45	2 25	2.88	28 00%
5.46	2 25	2.75	22 40%
5.47	2.25	2.63	16.70%
5.48	2.25	2.5	11.10%
5 49	2.25	2.38	5.60%
5.5	2 25	2 25	0 00%
5.51	2.25	2.13	-5.50%
5.52	2.25	2	-11.00%
5 53	2.25	1 88	-16 40%
5.54	2.25	1.76	-21 70%
5.55	2.25	1 64	-26.90%
5 57	2.25	1 41	-37.30%
5.59	2.25	1.19	-47.30%
5.61	2.25	0 98	-56.30%
5.63	2.25	0.82	-63 40%
5.65	2.25	0.69	-69.20%
5 67	2.25	0 59	-73.70%
5.69	2.25	0 5	-78.00%
5.71	2.25	0 41	-81.80%
5.73	2.25	0 33	-85.10%
5 75	2.25	0.26	-88.30%
	WATERLINE AT ZERO AREA ERROR =		5 5

STREAM NAME: Yellowjacket Creek
XS LOCATION: approx. 1/4 mile us from BLM/pvt. boundary
XS NUMBER: 1

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)	Ave. Depth (ft)	Max Depth (ft)	Area (sq.ft)	Wetted Perim (ft)	Wetted Perim (%)	Hydr Radius (ft)	Flow (cfs)	Ave. Velocity (ft/sec)	
GL	4.9	14.87	0.7	1	10 46	15 34	100.00%	0.68	21 09	2.02	
	4.9	14 87	0.7	1	10 46	15.34	100 00%	0.68	21.09	2 02	-0.6
	4.95	14.67	0.66	0.95	9.72	15 11	98.50%	0.64	18.86	1.94	-0 55
	5	14.47	0.62	0.9	8.99	14 88	97.00%	0.6	16.73	1.86	-0.5
	5.05	14.28	0.58	0.85	8 27	14.65	95 50%	0.56	14.71	1.78	-0 45
	5 1	14.08	0 54	0 8	7.57	14.42	94.00%	0.52	12 81	1.69	-0 4
	5.15	13.88	0 49	0.75	6.87	14 19	92.50%	0 48	11 01	1.6	-0 35
	5.2	13.68	0.45	0.7	6 18	13.96	91.00%	0 44	9.33	1 51	-0 3
	5 25	13 49	0.41	0 65	5.5	13.73	89 50%	0.4	7 77	1 41	-0 25
	5.3	13 29	0 36	0.6	4.83	13 5	88.00%	0.36	6 33	1.31	-0 2
	5.35	13.09	0 32	0 55	4 17	13.27	86.50%	0 31	5.01	1.2	-0 15
	5.4	12 89	0.27	0.5	3.52	13 04	85.00%	0.27	3 82	1.09	-0.1
	5.45	12.7	0 23	0 45	2 88	12 81	83.50%	0.22	2 77	0 96	-0 05
WL	5 5	12.5	0 18	0 4	2 25	12.58	82 00%	0.18	1 86	0 83	0
	5.55	11 75	0 14	0 35	1.64	11 83	77.10%	0.14	1 15	0 7	0 05
	5.6	9.5	0.11	0.3	1 08	9.57	62.40%	0 11	0 65	0 61	0 1
	5 65	5 25	0 13	0 25	0 69	5 3	34.50%	0.13	0 47	0.67	0 15
	5 7	4	0.11	0 2	0.45	4 04	26.30%	0 11	0 27	0 6	0 2
	5.75	3 5	0 08	0 15	0 26	3.53	23 00%	0.07	0 12	0 46	0 25
	5 8	2 5	0.04	0 1	0.1	2 52	16.40%	0.04	0 03	0 3	0 3
	5 85	0 75	0 03	0 05	0.02	0 76	4 90%	0 02	0	0 22	0 35
	5.9	0	ERR	0	0	0	0.00%	ERR	ERR	ERR	0 4

STREAM NAME: Yellowjacket Creek
XS LOCATION: approx. 1/4 mile us from BLM/pvt. boundary
XS NUMBER: 1

Summary Sheet

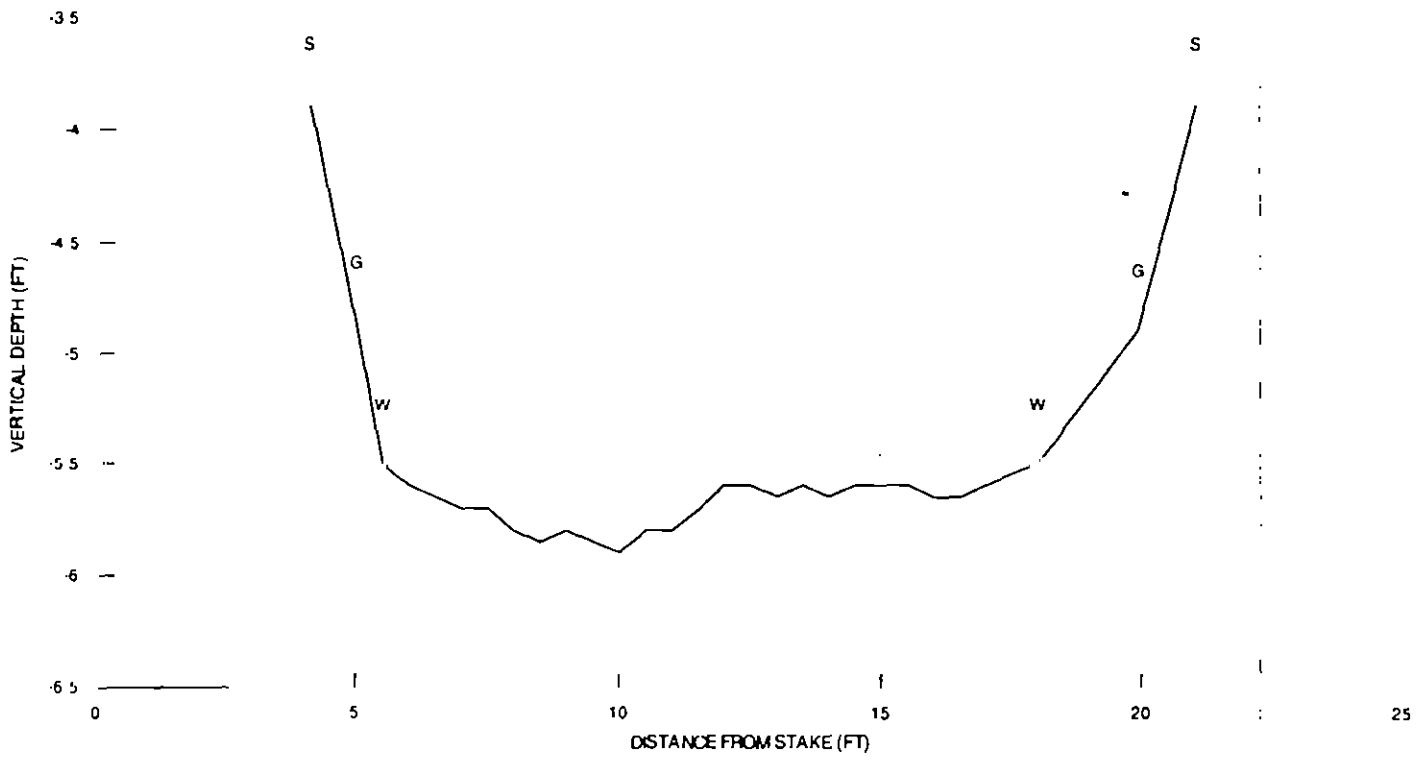
MEASURED FLOW (Qm)=	1.86 cfs	**Recommended instream flow:**
CALCULATED FLOW (Qc)=	1.86 cfs	==========
(Qm-Qc)/Qm * 100 =	0 %	
		FLOW (CFS) PERIOD
MEASURED WATERLINE (WLm)=	5 5 ft	========== ======
CALCULATED WATERLINE (WLc)=	5.5 ft	
(WLm-WLc)/WLm * 100 =	0 %	2.22 Winter
MAX MEASURED DEPTH (Dm)=	0 4 ft	3.10 Summer
MAX CALCULATED DEPTH (Dc)=	0 4 ft	
(Dm-Dc)/Dm * 100	0 %	
MEAN VELOCITY=	0 83 ft/sec	
MANNING'S N=	0 063	
SLOPE=	0.012 ft/ft	
.4 * Qm =	0 7 cfs	
2.5 * Qm=	4.6 cfs	

Rationale for recommendation:
==========

Winter and summer in-stream flows would be met at 2.22 and 3.10 cfs, respectively. The average depth and 50% wetted perimeter hydraulic criteria were used to asses winter flow needs.

Yellowjacket Creek

CROSS SECTION DATA ANALYSIS



FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO WATER CONSERVATION BOARD

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellowjacket Creek

CROSS-SECTION NO: 3

CROSS SECTION LOCATION: Approx. 1/4 mile downstream from confluence w/ Risley Canyon

DATE: 4-12-01 | OBSERVERS: R. Smith, M. Janowiak, G. Thrash

LEGAL DESCRIPTION: ¼ SECTION: NW | SECTION: 21 | TOWNSHIP: 36 (N)S | RANGE: 19E(W) | PM: N.M.

COUNTY: Montezuma | WATERSHED: McElmo | WATER DIVISION: 7 | DOW WATER CODE: 38442

MAP(S): USGS: Bowdish Canyon 7.5'

USFS:

SUPPLEMENTAL DATA

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

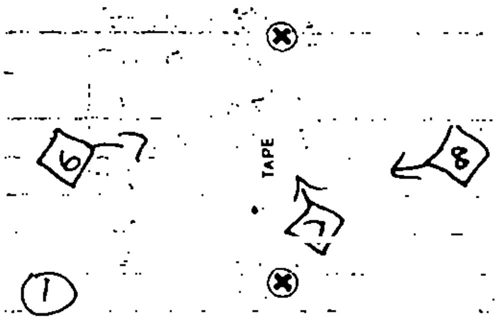
METER NUMBER: | DATE RATED: | CALIB/SPIN: ___ sec | TAPE WEIGHT: surveyed lbs/foot | TAPE TENSION: surveyed lbs

CHANNEL BED MATERIAL SIZE RANGE: sand to 8" 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	6.95/6.94
② WS Upstream	15.0'	6.88
③ WS Downstream	15.0'	6.98
SLOPE	0.10/30.0' =	0.0033

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 fish survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

see survey

COMMENTS

extensive willow-salt cedar community

FORM #135 ED 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME Yellowjacket Creek | CROSS-SECTION NO (2) | DATE 4-12-01 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading 0.2 ft | TIME 10:10 am

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 (m^2)	Discharge (cfs)
S	0.0		5.30								
G	1.15		6.15								
W	1.30		6.95								
	1.50	0.45	7.15	0.18				0.38		.081	.031
	2.00	0.50	7.15	0.20				0.69		.100	.069
	2.50		7.06	0.12				0.42		.060	.025
	3.00		7.16	0.22				1.05		.011	.012
	3.50		7.22	0.27				0.88		.135	.119
	4.0		7.35	0.40				1.23		.200	.246
	4.5		7.39	0.45				1.16		.225	.261
	5.0		7.32	0.38				1.58		.190	.300
	5.5		7.35	0.40				1.16		.200	.232
	6.0		7.28	0.33				1.36		.165	.224
	6.5		7.33	0.37				1.42		.185	.263
	7.0		7.33	0.38				1.56		.190	.296
	7.5		7.35	0.40				1.20		.200	.240
	8.0		7.30	0.35				1.63		.175	.285
	8.5		7.37	0.42				1.16		.210	.244
	9.0		7.38	0.43				1.26		.215	.271
	9.5		7.29	0.35				1.48		.175	.259
	10.0		7.37	0.42				1.33		.210	.279
	10.5		7.36	0.40				0.56		.200	.112
	11.0		7.23	0.28				0.67		.140	.186
	11.5		7.30	0.35				1.22		.175	.214
	12.0		7.24	0.30				1.16		.150	.174
	12.5		7.26	0.30				1.00		.150	.150
	13.0		7.23	0.28				0.81		.140	.113
	13.5		7.25	0.30				0.35		.150	.053
	14.0		7.05	0.11				0		.055	
	14.5	V	7.02	0.07				0		.035	
											14.66 cfs
W	14.9		6.95	0				0			
G	15.7		6.18								
S	17.8		4.98								
TOTALS											

End of Measurement | Time 10:45 | Gage Reading 0.2 ft | CALCULATIONS PERFORMED BY | CALCULATIONS CHECKED BY

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

LOCATION INFORMATION

STREAM NAME:	Yellowjacket Creek
XS LOCATION	approx 1/4 mile ds from confluence with Risley Canyon
XS NUMBER	3
DATE	4/12/01
OBSERVERS:	Smith, Janowiak and Thrash
1/4 SEC:	NW
SECTION	21
TWP:	36N
RANGE:	19W
PM	NM
COUNTY	Montezuma
WATERSHED.	McElmo
DIVISION	7
DOW CODE	38442
USGS MAP	Bowdish Canyon 7 5" quad
USFS MAP	

SUPPLEMENTAL DATA

TAPE WT	0 0001
TENSION	99999

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

CHANNEL PROFILE DATA

SLOPE:	0 0033

INPUT DATA CHECKED BY Ed Rumbold DATE 11/14/01

ASSIGNED TO . . . . . DATE

PROOF SHEET

INPUT DATA # DATA POINTS= 33

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	TAPE TO WATER
S	0	5 3	0	0	0	0	0
G	1 15	6 15	0	0	0	0	0
W	1.3	6 95	0	0	0	0	0
	1 5	7 13	0 18	0 38	0 06	0 02	6 95
	2	7 15	0 2	0 69	0 1	0 07	6 95
	2 5	7 06	0 12	0 42	0 06	0 03	6 94
	3	7 16	0 22	1 05	0 11	0 12	6 94
	3 5	7 22	0 27	0 88	0 14	0 12	6 95
	4	7 35	0 4	1 23	0 2	0 25	6 95
	4 5	7 39	0 45	1 16	0 23	0 26	6 94
	5	7 32	0 38	1 58	0 19	0 3	6 94
	5 5	7 35	0 4	1 16	0 2	0 23	6 95
	6	7 28	0 33	1 36	0 17	0 22	6 95
	6 5	7 33	0 37	1 42	0 19	0 26	6 96
	7	7 33	0 38	1 56	0 19	0 3	6 95
	7 5	7 35	0 4	1 2	0 2	0 24	6 95
	8	7 3	0 35	1 63	0 18	0 29	6 95
	8 5	7 37	0 42	1 16	0 21	0 24	6 95
	9	7 38	0 43	1 26	0 22	0 27	6 95
	9 5	7 29	0 35	1 48	0 18	0 26	6 94
	10	7 37	0 42	1 33	0 21	0 28	6 95
	10 5	7 36	0 4	0 56	0 2	0 11	6 96
	11	7 23	0 28	0 33	0 14	0 05	6 95
	11 5	7 3	0 35	1 22	0 18	0 21	6 95
	12	7 24	0 3	1 16	0 15	0 17	6 94
	12 5	7 26	0 3	1	0 15	0 15	6 96
	13	7 23	0 28	0 81	0 14	0 11	6 95
	13 5	7 25	0 3	0 35	0 15	0 05	6 95
	14	7.05	0 11	0	0 06	0	6 94
	14 5	7 02	0 07	0	0 03	0	6 95
W	14 9	6 95	0	0	0	0	0
G	15 7	6 18	0	0	0	0	0
S	17 8	4 98	0	0	0	0	0
				TOTALS	4 2	4 61	

INPUT DATA # DATA POINTS= 33 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	5 3	0	0	0	0	0	0	0 00%
G	1 15	6 15	0	0	0	0	0	0	0 00%
W	1.3	6 95	0	0	0	0	0	0	0 00%
	1 5	7 13	0 18	0 38	0 27	0 18	0 06	0 02	0 50%
	2	7 15	0 2	0 69	0 5	0 2	0 1	0 07	1 50%
	2 5	7 06	0 12	0 42	0 51	0 12	0 06	0 03	0 50%
	3	7 16	0 22	1 05	0 51	0 22	0 11	0 12	2 50%
	3.5	7 22	0 27	0 88	0 5	0 27	0 14	0 12	2 60%
	4	7 35	0 4	1 23	0 52	0 4	0 2	0 25	5 30%
	4.5	7 39	0 45	1 16	0 5	0 45	0 23	0 26	5 70%
	5	7 32	0 38	1 58	0 5	0 38	0 19	0 3	6 50%
	5 5	7 35	0 4	1 16	0 5	0 4	0 2	0 23	5 00%
	6	7 28	0 33	1 36	0 5	0 33	0 17	0 22	4 90%
	6 5	7 33	0 37	1 42	0 5	0 37	0 19	0 26	5 70%
	7	7 33	0 38	1 56	0 5	0 38	0 19	0 3	6 40%
	7 5	7 35	0 4	1 2	0 5	0 4	0 2	0 24	5 20%
	8	7 3	0 35	1 63	0 5	0 35	0 18	0 29	6 20%
	8 5	7 37	0 42	1 16	0 5	0 42	0 21	0 24	5 30%
	9	7 38	0 43	1 26	0 5	0 43	0 22	0 27	5 90%
	9 5	7 29	0 35	1 48	0 51	0 35	0 18	0 26	5 60%
	10	7 37	0 42	1 33	0 51	0 42	0 21	0 28	6 10%
	10.5	7 36	0 4	0 56	0 5	0 4	0 2	0 11	2 40%
	11	7 23	0 28	0 33	0 52	0 28	0 14	0 05	1 00%
	11 5	7 3	0 35	1 22	0 5	0 35	0 18	0 21	4 60%
	12	7 24	0 3	1 16	0 5	0 3	0 15	0 17	3 80%
	12 5	7 26	0 3	1	0 5	0 3	0 15	0 15	3 30%
	13	7 23	0 28	0 81	0 5	0 28	0 14	0 11	2 50%
	13 5	7 25	0 3	0.35	0 5	0 3	0 15	0 05	1 10%
	14	7 05	0 11	0	0 54	0 11	0 06	0	0 00%
	14 5	7 02	0 07	0	0 5	0 07	0 03	0	0 00%
W	14 9	6 95	0	0	0 41	0	0	0	0 00%
G	15 7	6 18	0	0	0	0	0	0	0 00%
S	17.8	4 98	0	0	0	0	0	0	0 00%
TOTALS ----------					13 82	0 45	4 2	4 61	100 00%
						(Max)			

Manning's n = 0 0351

STREAM NAME Yellowjacket Creek
XS LOCATION approx 1/4 mile ds from confluence with Risley Canyon
XS NUMBER 3

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
6 7	4 2	7 62	81 40%
6 72	4.2	7 34	74 80%
6 74	4 2	7 06	68 20%
6 76	4.2	6 79	61 60%
6 78	4 2	6 51	55 00%
6 8	4.2	6 23	48 40%
6 82	4 2	5 96	41 90%
6 84	4 2	5 68	35 30%
6 86	4 2	5 41	28 80%
6 88	4 2	5 13	22 30%
6 9	4 2	4 86	15 80%
6 91	4 2	4 72	12 50%
6 92	4 2	4 59	9 30%
6 93	4 2	4 45	6 00%
6 94	4 2	4 32	2 80%
6 95	4 2	4 18	-0 50%
6 96	4 2	4 04	-3 70%
6 97	4 2	3 91	-6 90%
6 98	4 2	3 77	-10 10%
6 99	4 2	3 64	-13 30%
7	4 2	3 51	-16 50%
7 02	4 2	3 24	-22 70%
7 04	4 2	2 99	-28 90%
7 06	4 2	2 73	-34 90%
7 08	4 2	2 48	-40 80%
7 1	4 2	2 24	-46 60%
7 12	4 2	2 01	-52 30%
7 14	4 2	1 78	-57 70%
7.16	4 2	1 56	-62 90%
7.18	4 2	1 35	-68 00%
7 2	4 2	1 14	-72 90%

WATERLINE AT ZERO

AREA ERROR = 6 949

STREAM NAME. Yellowjacket Creek
XS LOCATION: approx. 1/4 mile ds from confluence with Risley Canyon
XS NUMBER. 3

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)	Ave. Depth (ft)	Max. Depth (ft)	Area (sq.ft)	Wetted Perim (ft)	Wetted Perim (%)	Hydr. Radius (ft)	Flow (cfs)	Ave Velocity (ft/sec)	
GL	6 18	14.54	1.03	1.21	15.02	15.71	100.00%	0.96	35 42	2.36	
	6.2	14.52	1.02	1 19	14.75	15.67	99.70%	0 94	34.43	2 33	-0.75
	6 25	14.46	0.97	1.14	14 02	15 54	98.90%	0.9	31 82	2 27	-0.7
	6 3	14.4	0.92	1 09	13.3	15.42	98 10%	0.86	29.3	2 2	-0.65
	6.35	14.34	0.88	1.04	12 58	15 3	97 40%	0 82	26 85	2.13	-0.6
	6 4	14 28	0.83	0.99	11.87	15.17	96 60%	0.78	24 48	2 06	-0 55
	6.45	14.22	0.78	0 94	11 15	15 05	95.80%	0.74	22.2	1 99	-0.5
	6 5	14.15	0.74	0 89	10 44	14 93	95 00%	0 7	20 01	1.92	-0.45
	6 55	14 09	0 69	0 84	9.74	14.8	94 20%	0.66	17 91	1 84	-0 4
	6 6	14.03	0 64	0 79	9 04	14 68	93 40%	0.62	15.89	1 76	-0 35
	6 65	13.97	0.6	0 74	8.34	14.56	92 70%	0 57	13.97	1 68	-0 3
	6 7	13 91	0 55	0 69	7.64	14.44	91 90%	0.53	12 15	1.59	-0 25
	6.75	13 85	0 5	0.64	6 94	14.31	91 10%	0.49	10 42	1 5	-0 2
	6 8	13.79	0 45	0 59	6 25	14 19	90 30%	0.44	8.8	1 41	-0 15
	6 85	13 72	0 41	0 54	5.57	14 07	89 50%	0 4	7 29	1 31	-0 1
	6 9	13.66	0.36	0 49	4.88	13.94	88 80%	0.35	5.89	1 21	-0 05
WL	6 95	13.6	0 31	0 44	4 2	13 82	88 00%	0 3	4 61	1 1	0
	7	13.27	0.27	0 39	3.53	13 46	85 70%	0 26	3 51	1	0 05
	7 05	12.62	0 23	0 34	2 88	12 79	81 40%	0 22	2.59	0.9	0 1
	7 1	12 01	0.19	0 29	2.26	12.14	77 30%	0.19	1 79	0 79	0 15
	7 15	10.86	0.15	0.24	1.68	10 96	69 80%	0 15	1 17	0 7	0 2
	7 2	10.31	0 11	0.19	1 15	10 4	66 20%	0.11	0 65	0 56	0 25
	7 25	8.63	0 08	0 14	0.66	8 71	55 40%	0 08	0 29	0 43	0 3
	7 3	6.54	0.04	0.09	0 28	6 59	41 90%	0 04	0 08	0 3	0.35
	7.35	2.39	0 02	0 04	0 04	2.41	15 30%	0.02	0 01	0 17	0 4

STREAM NAME: Yellowjacket Creek
XS LOCATION: approx. 1/4 mile ds from confluence with Risley Canyon
XS NUMBER: 3

Summary Sheet

MEASURED FLOW (Qm)=	4.61	cfs
CALCULATED FLOW (Qc)=	4.61	cfs
(Qm-Qc)/Qm * 100 =	0	%
MEASURED WATERLINE (WLm)=	6.95	ft
CALCULATED WATERLINE (WLc)=	6.95	ft
(WLm-WLc)/WLm * 100 =	0	%
MAX MEASURED DEPTH (Dm)=	0 45	ft
MAX CALCULATED DEPTH (Dc)=	0.44	ft
(Dm-Dc)/Dm * 100	1.9	%
MEAN VELOCITY=	1 1	ft/sec
MANNING'S N=	0 035	
SLOPE=	0 0033	ft/ft
4 * Qm =	1 8	cfs
2 5 * Qm=	11 5	cfs

Recommended instream flow:

FLOW (CFS)	PERIOD
1.99	winter
3.51	summer

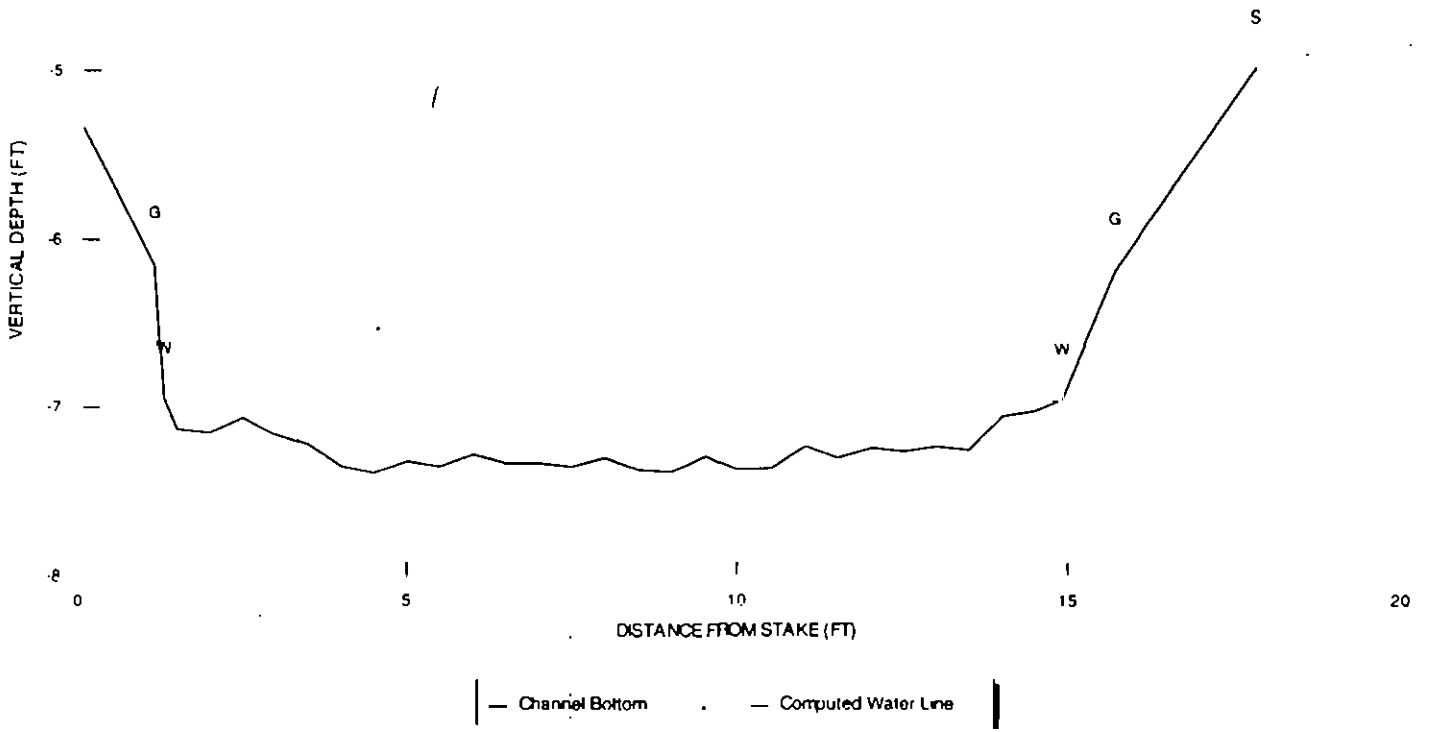
50% WP value (0.2 cfs)

Rationale for recommendation:

The 50% wetted perimeter and 0.1 average depth were used to calculate a winter instream flow of 1.99 cfs. A summer instream flow of 3.51 cfs meets all three hydraulic criteria.

Yellowjacket Creek

CROSS SECTION DATA ANALYSIS



COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Yellowjacket Creek | CROSS-SECTION NO: 2

CROSS SECTION LOCATION: 1000' feet downstream from BLM-private boundary

DATE: 4-11-0 | OBSERVERS: R. Smith, B. Murphy, M. Janowiak

LEGAL DESCRIPTION: ¼ SECTION: NW | SECTION: 25 | TOWNSHIP: 37 (N)S | RANGE: 18 E(W) | PM: N.M.

COUNTY: Montezuma | WATERSHED: McElmo | WATER DIVISION: 7 | DOW WATER CODE: 38442

MAP(S): USGS: Woods Canyon 7.5' | USFS:

SUPPLEMENTAL DATA

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

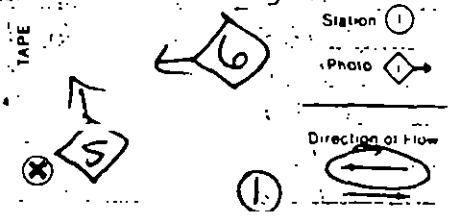
METER NUMBER: | DATE RATED: | CALIB/SPIN: surveyed ___ sec | TAPE WEIGHT: surveyed ___ lbs/100' | TAPE TENSION: surveyed ___ lbs

CHANNEL BED MATERIAL SIZE RANGE: gravel to 6" 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	6.67 / 6.68
② WS Upstream	18.0'	6.23
③ WS Downstream	3.0	6.70
SLOPE	0.37 / 21.0' =	0.018

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 fish survey																	

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

mayfly, caddisfly

COMMENTS

Stream Temp = 80° at 2 pm — UTM 695885 4145642

Rocks + beaver ponds present.

Temp Probe = Yellowjacket 2

DISCHARGE/CROSS SECTION NOTES

STREAM NAME Yellowjacket Creek | CROSS-SECTION NO 2 | DATE 4-11-01 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | LEFT / RIGHT | Gage Reading 0.2 ft | TIME 2:00 pm

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	Velocity (ft/sec) Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft²)	Discharge (cfs)
S	2.0		4.57								
G	3.25		5.58								
W	3.45		6.62	0				0			
	4.0	.55	6.86	0.2				Ø		.11	Ø
	4.5	.50	6.82	0.2				Ø		.1	Ø
	5.0		6.73	0.05				Ø		.025	Ø
	5.5		6.77	0.10				Ø		.05	Ø
	6.0		6.73	0.05				Ø		.025	Ø
	6.5		6.78	0.10				Ø		.05	Ø
	7.0		6.78	0.10				.38		.05	.019
R	7.5			Ø				Ø			Ø
R	8.0			Ø				Ø			Ø
	8.5		6.82	0.15				0.67		.075	.050
	9.0		6.81	0.15				1.23		.075	.092
	9.5		6.86	0.20				1.10		.100	.110
	10.0		6.81	0.15				1.16		.075	.087
	10.5		6.81	0.15				1.42		.075	.107
	11.0		6.87	0.20				1.61		.10	.161
	11.5		6.87	0.20				1.63		.10	.163
	12.0		6.88	0.20				1.58		.10	.158
	12.5		6.93	0.25				1.67		.125	.209
	13.0		6.87	0.20				1.33		.10	.133
	13.5		6.95	0.30				1.17		.15	.176
	14.0		6.86	0.20				1.14		.10	.114
	14.5		6.92	0.25				0.71		.125	.089
	15.0		6.97	0.30				1.18		.150	.177
	15.5		6.93	0.25				0.99		.125	.124
	16.0		6.87	0.20				1.22		.10	.122
	16.5		6.96	0.30				1.39		.15	.209
	17.0		7.06	0.40				2.19		.20	.438
	17.5		6.95	0.30				2.05		.15	.308
	18.0		6.97	0.30				1.78		.15	.267
	18.5		6.86	0.20				1.47		.10	.147
	19.0		6.77	0.10				1.41		.05	.071
	19.5		6.82	0.15				0.70		.075	.053
	20.0		6.87	0.20				0.20		.10	.020
	20.5		6.98	0.30				0.70		.15	.105
	21.0		7.02	0.35				0.24		.175	.042
	21.5		6.97	0.30				0.16		.15	.024
	22.0		6.91	0.25				Ø		.125	Ø
	22.5	.60	6.76	0.10				Ø		.05	Ø
W	23.2		6.64					Ø			
G	24.6		5.60								3.775 cfs
S	26.6		4.01								
TOTALS											

End of Measurement | Time 2:25 | Gage Reading 0.2 ft | CALCULATIONS PERFORMED BY | CALCULATIONS CHECKED BY

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

LOCATION INFORMATION

STREAM NAME. Yellowjacket Creek
XS LOCATION: 1000' ds from BLM/pvt. boundary
XS NUMBER: 2

DATE: 4/11/01
OBSERVERS. SMith, Murphy and Janowiak

1/4 SEC: NW
SECTION: 25
TWP: 37N
RANGE: 8W
PM: NM

COUNTY. Montezuma
WATERSHED: McElmo
DIVISION: 7
DOW CODE: 38442

USGS MAP: Woods Canyon 7.5" quad
USFS MAP.

SUPPLEMENTAL DATA

TAPE WT: 0 0001
TENSION: 99999

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

CHANNEL PROFILE DATA

SLOPE: 0.018

INPUT DATA CHECKED BY: Ed Rumbold ..... DATE 11/14/01

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

PROOF SHEET

INPUT DATA # DATA POINTS= 44

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	TAPE TO WATER
S	2	4.57	0	0	0	0	0
G	3.25	5.58	0	0	0	0	0
W	3.65	6.67	0	0	0	0	0
	4	6.86	0.2	0	0.09	0	6 66
	4.5	6.87	0.2	0	0.1	0	6.67
	5	6.73	0 05	0	0 03	0	6 68
	5.5	6.77	0.1	0	0 05	0	6 67
	6	6.73	0.05	0	0 03	0	6 68
	6.5	6.78	0.1	0	0.05	0	6.68
	7	6.78	0.1	0.38	0 05	0 02	6 68
R	7 5	4	0	0	0	0	0
R	8	4	0	0	0	0	0
	8.5	6.82	0 15	0.67	0 08	0.05	6 67
	9	6 81	0.15	1.23	0.08	0.09	6.66
	9.5	6.86	0.2	1 1	0 1	0 11	6 66
	10	6.81	0.15	1 16	0.08	0 09	6 66
	10.5	6.81	0.15	1 42	0 08	0 11	6 66
	11	6 87	0 2	1 61	0 1	0 16	6 67
	11.5	6 87	0.2	1 63	0 1	0 16	6 67
	12	6.88	0 2	1.58	0 1	0 16	6 68
	12.5	6 93	0 25	1 67	0 13	0 21	6 68
	13	6 87	0 2	1 33	0 1	0 13	6 67
	13.5	6 95	0.3	1.17	0 15	0 18	6 65
	14	6.86	0.2	1 14	0 1	0.11	6 66
	14 5	6.92	0 25	0.71	0 13	0 09	6 67
	15	6 97	0.3	1 18	0 15	0 18	6 67
	15.5	6 93	0.25	0 99	0 13	0 12	6 68
	16	6 87	0 2	1 22	0.1	0 12	6 67
	16.5	6 96	0.3	1 39	0 15	0 21	6 66
	17	7.06	0 4	2 19	0.2	0 44	6 66
	17.5	6.95	0 3	2.05	0 15	0 31	6 65
	18	6 97	0.3	1 78	0 15	0 27	6 67
	18.5	6.86	0.2	1 47	0.1	0 15	6 66
	19	6 77	0 1	1 41	0 05	0 07	6 67
	19 5	6.82	0.15	0 7	0.08	0 05	6.67
	20	6.87	0.2	0.2	0.1	0.02	6 67
	20.5	6.98	0 3	0 7	0 15	0 11	6 68
	21	7.02	0 35	0 24	0 18	0 04	6 67
	21.5	6.97	0.3	0.16	0 15	0.02	6.67
	22	6.91	0 25	0	0 13	0	6 66
	22 5	6.76	0 1	0	0 06	0	6 66
W	23.2	6.67	0	0	0	0	0
G	24.6	5.6	0	0	0	0	0
S	26.6	4.01	0	0	0	0	0
					=	=	=
				TOTALS	3.7	3.77	

INPUT DATA # DATA POINTS= 44 VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM.	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
S	2	4.57	0	0	0	0	0	0	0.00%
G	3.25	5 58	0	0	0	0	0	0	0 00%
W	3 65	6.67	0	0	0	0	0	0	0 00%
	4	6 86	0.2	0	0 4	0 2	0 09	0	0 00%
	4.5	6.87	0.2	0	0 5	0.2	0 1	0	0 00%
	5	6 73	0 05	0	0.52	0 05	0 03	0	0 00%
	5.5	6.77	0.1	0	0 5	0.1	0 05	0	0 00%
	6	6 73	0 05	0	0 5	0 05	0 03	0	0 00%
	6 5	6.78	0.1	0	0 5	0 1	0 05	0	0 00%
	7	6.78	0 1	0 38	0 5	0 1	0 05	0 02	0 50%
R	7.5	4	0	0	2 82	0	0	0	0 00%
R	8	4	0	0	0	0	0	0	0.00%
	8.5	6 82	0 15	0 67	2 86	0.15	0 08	0.05	1 30%
	9	6.81	0.15	1 23	0 5	0 15	0 08	0 09	2 40%
	9.5	6.86	0.2	1.1	0 5	0 2	0 1	0 11	2 90%
	10	6.81	0.15	1 16	0 5	0 15	0 08	0 09	2 30%
	10.5	6.81	0.15	1 42	0 5	0 15	0 08	0 11	2 80%
	11	6.87	0.2	1 61	0 5	0 2	0 1	0 16	4 30%
	11.5	6.87	0 2	1.63	0.5	0 2	0 1	0 16	4 30%
	12	6.88	0.2	1 58	0.5	0.2	0.1	0 16	4 20%
	12 5	6 93	0.25	1 67	0 5	0 25	0 13	0 21	5 50%
	13	6.87	0 2	1.33	0.5	0 2	0 1	0 13	3 50%
	13.5	6.95	0.3	1 17	0 51	0.3	0 15	0.18	4.70%
	14	6.86	0 2	1.14	0.51	0 2	0 1	0.11	3 00%
	14.5	6.92	0.25	0 71	0 5	0 25	0.13	0 09	2 40%
	15	6.97	0 3	1.18	0.5	0 3	0 15	0.18	4.70%
	15.5	6.93	0.25	0 99	0.5	0 25	0 13	0 12	3 30%
	16	6.87	0 2	1 22	0 5	0 2	0 1	0 12	3 20%
	16 5	6.96	0.3	1.39	0.51	0 3	0 15	0.21	5.50%
	17	7 06	0.4	2 19	0 51	0 4	0 2	0 44	11.60%
	17.5	6.95	0 3	2.05	0.51	0.3	0 15	0 31	8 20%
	18	6.97	0.3	1.78	0.5	0 3	0.15	0.27	7 10%
	18 5	6.86	0.2	1 47	0 51	0 2	0.1	0 15	3.90%
	19	6.77	0 1	1.41	0.51	0 1	0 05	0 07	1.90%
	19.5	6 82	0 15	0 7	0.5	0 15	0.08	0.05	1.40%
	20	6.87	0.2	0.2	0.5	0 2	0 1	0.02	0.50%
	20.5	6 98	0.3	0.7	0 51	0.3	0 15	0 11	2.80%
	21	7.02	0 35	0 24	0 5	0.35	0.18	0 04	1 10%
	21.5	6 97	0 3	0 16	0 5	0 3	0 15	0 02	0 60%
	22	6.91	0 25	0	0.5	0 25	0 13	0	0.00%
	22 5	6.76	0.1	0	0 52	0 1	0.06	0	0.00%
W	23.2	6.67	0	0	0.71	0	0	0	0 00%
G	24.6	5.6	0	0	0	0	0	0	0 00%
S	26.6	4.01	0	0	0	0	0	0	0.00%
					23.96	0 4 (Max.)	3 7	3.77	100.00%

TOTALS ----------

Manning's n = 0 0562

STREAM NAME: Yellowjacket Creek
XS LOCATION: 1000' ds from BLM/pvt boundary
XS NUMBER: 2

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
6.42	3.7	8.19	121.50%
6.44	3 7	7.81	111 50%
6 46	3.7	7 44	101.40%
6.48	3.7	7.07	91.40%
6.5	3 7	6.7	81.40%
6.52	3.7	6.34	71.50%
6.54	3.7	5.97	61.50%
6.56	3.7	5.6	51.60%
6 58	3.7	5 23	41.70%
6.6	3.7	4.87	31.80%
6.62	3.7	4.51	21.90%
6.63	3.7	4.32	17.00%
6.64	3.7	4 14	12.10%
6.65	3.7	3.96	7 20%
6.66	3.7	3.78	2 30%
6 67	3 7	3.6	-2 60%
6.68	3.7	3.42	-7 50%
6.69	3 7	3.24	-12 40%
6.7	3.7	3.06	-17.20%
6 71	3.7	2 88	-22.00%
6.72	3.7	2 71	-26.80%
6.74	3 7	2 36	-36 20%
6 76	3.7	2 03	-45 10%
6 78	3 7	1.71	-53 60%
6.8	3.7	1 42	-61.50%
6.82	3.7	1.15	-68.80%
6 84	3.7	0 91	-75.30%
6.86	3.7	0 7	-81.20%
6 88	3.7	0 51	-86 10%
6.9	3 7	0.37	-90 10%
6.92	3.7	0 25	-93.30%

WATERLINE AT ZERO AREA ERROR = 6 665

STREAM NAME: Yellowjacket Creek
XS LOCATION: 1000' ds from BLM/pvt boundary
XS NUMBER: 2

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)	Ave. Depth (ft)	Max. Depth (ft)	Area (sq.ft)	Wetted Perim (ft)	Wetted Perim (%)	Hydr. Radius (ft)	Flow (cfs)	Ave. Velocity (ft./sec)	
GL	5.6	20.27	1.19	1.46	24 12	23 61	100 00%	1 02	86.87	3.6	
	5.66	20 14	1.13	1.4	22.82	23.3	98.70%	0 98	79.87	3 5	-1
	5.71	20.04	1 09	1.35	21 81	23 06	97.70%	0.95	74 6	3.42	-0 95
	5 76	19.94	1.04	1.3	20.81	22.83	96.70%	0 91	69.47	3 34	-0 9
	5.81	19.83	1	1 25	19.82	22.59	95 70%	0 88	64 48	3.25	-0 85
	5 86	19.73	0 95	1.2	18 83	22 35	94.70%	0.84	59.62	3 17	-0 8
	5 91	19 63	0 91	1.15	17.85	22.11	93.70%	0.81	54.91	3 08	-0.75
	5.96	19 53	0 86	1.1	16.87	21 88	92 70%	0 77	50.34	2 98	-0 7
	6 01	19 43	0.82	1.05	15 89	21 64	91.70%	0.73	45.92	2 89	-0 65
	6.06	19 33	0 77	1	14.93	21.4	90.70%	0 7	41 66	2.79	-0.6
	6 11	19.23	0.73	0 95	13.96	21.17	89 70%	0.66	37.55	2.69	-0 55
	6 16	19 12	0 68	0.9	13	20.93	88.70%	0.62	33 6	2 58	-0.5
	6 21	19 02	0 63	0 85	12.05	20.69	87.60%	0 58	29 82	2 48	-0 45
	6 26	18 92	0.59	0 8	11 1	20.45	86 60%	0 54	26 21	2 36	-0 4
	6 31	18 82	0.54	0 75	10.16	20.22	85 60%	0.5	22 78	2 24	-0 35
	6 36	18.72	0 49	0.7	9.22	19 98	84.60%	0.46	19.54	2 12	-0.3
	6 41	18 62	0 45	0 65	8 29	19.74	83.60%	0 42	16.48	1 99	-0 25
	6.46	18 51	0.4	0.6	7 36	19 5	82 60%	0 38	13.63	1 85	-0 2
	6 51	18 41	0 35	0 55	6 43	19 27	81.60%	0 33	10.99	1 71	-0 15
	6 56	18 31	0.3	0 5	5 52	19.03	80 60%	0 29	8.57	1 55	-0 1
	6 61	18 21	0 25	0 45	4 6	18 79	79 60%	0 24	6 39	1 39	-0 05
WL	6 66	18 11	0 2	0.4	3.69	18.56	78 60%	0 2	4.47	1 21	0
	6 71	17.65	0.16	0.35	2.8	18	76.20%	0.16	2 87	1 03	0 05
	6 76	15 84	0 12	0 3	1.95	16.07	68 10%	0 12	1.7	0 87	0 1
	6 81	13 04	0 09	0 25	1 22	13.19	55 90%	0 09	0 89	0 73	0 15
	6 86	9 95	0 07	0 2	0.65	10.05	42 60%	0 06	0 37	0 57	0 2
	6 91	5 63	0 05	0.15	0.28	5 69	24 10%	0.05	0.13	0 47	0 25
	6 96	2 3	0 03	0 1	0 08	2 33	9 90%	0.03	0 03	0 37	0 3
	7 01	0 55	0 02	0 05	0 01	0.56	2 40%	0.02	0	0 24	0 35

STREAM NAME: Yellowjacket Creek
XS LOCATION: 1000' ds from BLM/pvt. boundary
XS NUMBER: 2

Summary Sheet

MEASURED FLOW (Qm)=	3.77	cfs
CALCULATED FLOW (Qc)=	4 47	cfs
(Qm-Qc)/Qm * 100 =	-18 6	%
MEASURED WATERLINE (WLm)=	6.67	ft
CALCULATED WATERLINE (WLc)=	6.66	ft
(WLm-WLc)/WLm * 100 =	0.1	%
MAX MEASURED DEPTH (Dm)=	0.4	ft
MAX CALCULATED DEPTH (Dc)=	0 4	ft
(Dm-Dc)/Dm * 100	1.2	%
MEAN VELOCITY=	1.21	ft/sec
MANNING'S N=	0.056	
SLOPE=	0 018	ft/ft
.4 * Qm =	1 5	cfs
2.5 * Qm=	9 4	cfs

Recommended instream flow:

FLOW (CFS)	PERIOD
> 6.5	winter
4.47	summer

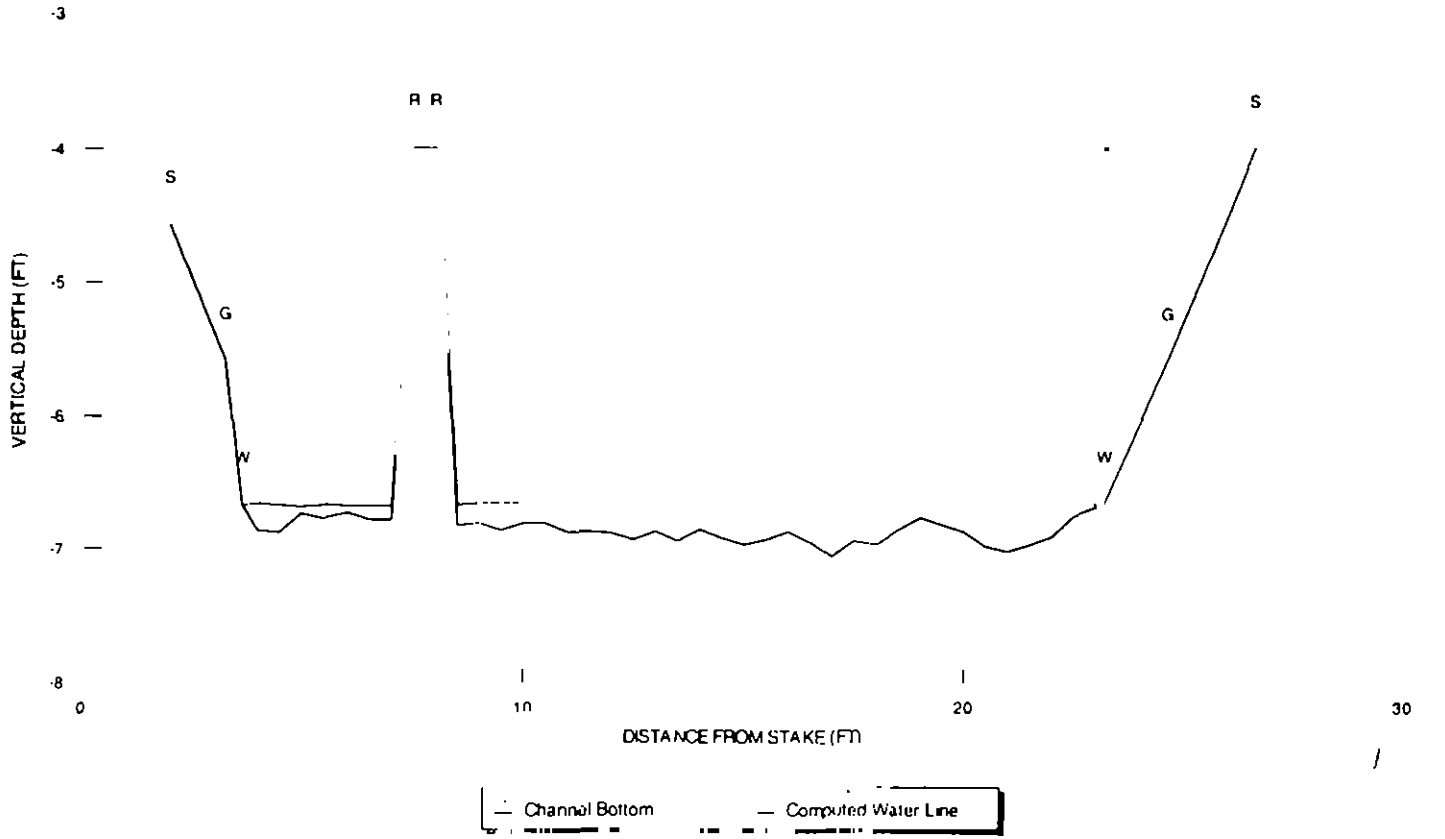
The flow at which the 50% wetted perimeter is met at 0.66 cfs.

Rationale for recommendation:

The winter flow of 2.65 cfs was based upon the 50% wetted perimeter and 1 foot per second average velocity hydraulic criteria.

Yellowjacket Creek

CROSS SECTION DATA ANALYSIS



CDOW STREAM SURVEY (1991 REVISION)

LEVEL 2: FIELD SURVEY SUMMARY

STREAM: Yellowjacket Creek SEC#: ________ WATER CODE: 38442 CDOW REGION: SW

SURVEYORS: D. Smith, G. Thrach DATE OF SURVEY: 4-10-2001

SURVEY LOCATION: T 36N R 19W S 21 ELEVATION: ________ STATION #:

UTM ZONE: 12 UTM X: 672110 UTM Y: 4149535

LOCATION DESCRIPTION:

STREAM FLOW PROFILE (Y or N): Y IF YES-DATE AND TYPE

HABITAT EVALUATION (Y or N): N IF YES-DATE AND TYPE

WATER CHEMISTRY ANALYSIS (Y or N): Y [illegible] IF YES-ATTACH SEPARATE ANALYSIS SHEET

FISH PRESENT (Y or N): Y POP. EST. METHOD: — STATION LENGTH: 80 (FEET)

AVG. WIDTH: 8' (FEET) TOTAL STATION AREA: .012 (ACRES)

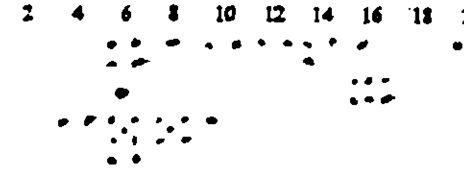
FLOW (CFS) AT TIME OF SURVEY: 4.5 cfs METHOD: flow meter

LIMITING FACTORS TO FISHERY: 1/6, BS, F1

COMMENTS: Macros taken

LENGTH FREQUENCY RECORD (CM)

SPECIES	0↓2	2↓4	4↓6	6↓8	8↓10	10↓12	12↓14	14↓16	16↓18	18↓20	20↓22	22↓24	24↓26	26↓28	28↓30	30↓32	32↓34	34↓36	36↓38	38↓40	40↓42	42↓44	44↓46	46↓48	48↓50	50↓UP
FMS																										
BHS																										
FMW																										



SUMMARY INFORMATION

SPECIES	NO. FISH CAUGHT	AVG. LENGTH (CM)	LENGTH RANGE (CM)	AVG. WEIGHT (Grams)	WEIGHT RANGE (Grams)	% TOTAL CATCH	BIOMASS lb/Acre	DENSITY No./Acre	DENSITY Conf. Int.
FMS	15	12	6-35	15	1-435	41%		1250	
BHS	7	14	5-15	20	1-20	18%		583	
FMW	15	5	2-8	2	1-4	41%		1250	

COLORADO DIVISION OF WILDLIFE

Length-Weight Data File

Stream Name Yellowjacket Creek CDOW Water Code 38447 Date 4-10-2001

Gear Electroshocker Effort 80' Station No. 1

Species Code	Total Length	Weight	Species Code	Total Length	Weight	Species Code	Total Length	Weight
FMS	35	435	BHS	15	30	FNW	8	4
	15	30		15	26		6	3
	20	52		14	24		7	3
	14	33		15	24		6	2
	13	20		14	20		6	2
	12	21		14	20		6	4
	11	17		5	1		5	2
	11	12					4	1
	9	3					4	1
	9	3					4	1
	8	4					4	1
	6	3					4	1
	6	2					4	1
	7	3					3	<1
	6	1					2	<1

Comments:

CDOW STREAM SURVEY (1991 REVISION)

LEVEL 2: FIELD SURVEY SUMMARY

STREAM: Yellowjacket Cr. SEC#: — WATER CODE: ____ CDOW REGION: SW

SURVEYORS: David Smith, D. Murphy, D Smith, G Theel DATE OF SURVEY: 11 Apr 01

SURVEY LOCATION: T 37N R 18W S 25 ELEVATION: ____ STATION #: 2

UTM ZONE: ____ UTM X: UTM Y:

LOCATION DESCRIPTION: In Cy. headwaters of Yellowjacket Cr. (~3rd order)

STREAM FLOW PROFILE (Y or N): Y IF YES-DATE AND TYPE

HABITAT EVALUATION (Y or N): N IF YES-DATE AND TYPE

WATER CHEMISTRY ANALYSIS (Y or N): N IF YES-ATTACH SEPARATE ANALYSIS SHEET

FISH PRESENT (Y or N): Y POP. EST. METHOD: — STATION LENGTH: ~3' (FEET)

AVG. WIDTH: ~12' (FEET) TOTAL STATION AREA: .0008ac (ACRES)

FLOW (CFS) AT TIME OF SURVEY: 3.77 METHOD: Flow meter

LIMITING FACTORS TO FISHERY: Siltation A11, B1, E1

COMMENTS: Caddis. ephemeroptera.
Some new algal growth 50% of stream covered in some places. One 4" flannelmouth observed, but not captured. Many large pools. Recommend shocking the area.

LENGTH FREQUENCY RECORD (CM)

SPECIES	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	24-26	26-28	28-30	30-32	32-34	34-36	36-38	38-40	40-42	42-44	44-46	46-48	48-50	50-UP
FHM		••																								

SUMMARY INFORMATION

SPECIES	NO. FISH CAUGHT	AVG. LENGTH (CM)	LENGTH RANGE (CM)	AVG. WEIGHT (Grams)	WEIGHT RANGE (Grams)	% TOTAL CATCH	BIOMASS lb/Acre	DENSITY No./Acre	DENSITY Conf. Int.
FHM	2	2.3	—	2	—	100			

COLORADO DIVISION OF WILDLIFE

Length-Weight Data File

Stream Name Yellowjacket Cr

CDOW Water Code _____ Date 11 Aug 01

Gear Dip Net Only

Effort — Station No. 2

Species Code	Total Length	Weight	Species Code	Total Length (cm)	Weight	Species Code	Total Length	Weight
FHM	2 5/16"	2g	=	2.3				
"	"	"	=	2.3				

Comments:

CDOW STREAM SURVEY (1991 REVISION)
LEVEL 2: FIELD SURVEY SUMMARY

STREAM: Yellow Creek SEG#: _____ WATER CODE: _____ CDOW REGION: NW
SURVEYORS: D Smith, L. Belmonte DATE OF SURVEY: 9-9-04
SURVEY LOCATION: T 2N R 98W S 26 ELEVATION: _____ STATION #:
UTM ZONE: 12T UTM X: 0729062 UTM Y: 4444041
LOCATION DESCRIPTION: downstream from confluence w/ Barous Creek

STREAM FLOW PROFILE (Y or N): N IF YES-DATE AND TYPE
HABITAT EVALUATION (Y or N): N IF YES-DATE AND TYPE
WATER CHEMISTRY ANALYSIS (Y or N): N IF YES-ATTACH SEPARATE ANALYSIS SHEET

FISH PRESENT (Y or N): Y POP. EST. METHOD: STATION LENGTH: 150 (FEET)
AVG. WIDTH: 3 (FEET) TOTAL STATION AREA: .01 (ACRES)
FLOW (CFS) AT TIME OF SURVEY: 0.75 cfs METHOD: visual
LIMITING FACTORS TO FISHERY: A1, B1, 9.
COMMENTS: Macros mainly consisted of snails, mayfly

LENGTH FREQUENCY RECORD (CM)

SPECIES	0↓2	2↓4	4↓6	6↓8	8↓10	10↓12	12↓14	14↓16	16↓18	18↓20	20↓22	22↓24	24↓26	26↓28	28↓30	30↓32	32↓34	34↓36	36↓38	38↓40	40↓42	42↓44	44↓46	46↓48	48↓50
	2↓4	4↓6	6↓8	8↓10	10↓12	12↓14	14↓16	16↓18	18↓20	20↓22	22↓24	24↓26	26↓28	28↓30	30↓32	32↓34	34↓36	36↓38	38↓40	40↓42	42↓44	44↓46	46↓48	48↓50	50 UP
WHS																									
SPD																									

SUMMARY INFORMATION

SPECIES	NO. FISH CAUGHT	AVG. LENGTH (CM)	LENGTH RANGE (CM)	AVG. WEIGHT (Grams)	WEIGHT RANGE (Grams)	% TOTAL CATCH	BIOMASS lb/Acre	DENSITY No./Acre	Conf. Int.
SPD	14	9	6-11	7	3-13	54%	9800g	1400	
WHS	12	14	10-17	26.8	11-56	46%	32160g	1200	

COLORADO DIVISION OF WILDLIFE

Page __ of __

Length-Weight Data File

Stream Name YELLOW CREEK

CDOW Water Code 25242 Date 09 09 04

Gear Electroshocker

Effort 150' Station No. _____

Species Code	Total Length (cm)	Weight (gms)	Species Code	Total Length (cm)	Weight (gms)	Species Code	Total Length	Weight
WHS	17.7	56	SPD	10.9	13			
	13.0	19	SPD	10.5	12			
	15.2	35	SPD	10.6	12			
	14.0	30	SPD	9.4	7			
	14.6	31	SPD	9.6	7			
	15.5	33	SPD	9.0	7			
	16.0	39	SPD	8.7	6			
	13.6	33	SPD	9.0	7			
	11.1	14	SPD	9.1	6			
	14.6	33	SPD	8.2	5			
	11.2	14	SPD	8.0	6			
✓	10.2	11	SPD	7.4	3			
			SPD	7.4	4			
			SPD	6.9	3			

Comments:


4/11/2001 14:02


4/11/2001 14:02


4/10/2001 11:29


4/11/2001 11:08


4/11/2001 11:08


4/11/2001 11:41


4/11/2001 11:41


4/10/2001 11:32


4/11/2001 13:50


4/10/2001 14:47


4/12/2001 13:06


4/12/2001 13:05


4/12/2001 13:05


4/12/2001 10:47


4/12/2001 10:46


4/11/2001 12:49


4/12/2001 10:46


4/12/2001 10:21


4/11/2001 12:49

4/12/2001 10:21


4/11/2001 12:50


4/12/2001 10:22


4/11/2001 12:53

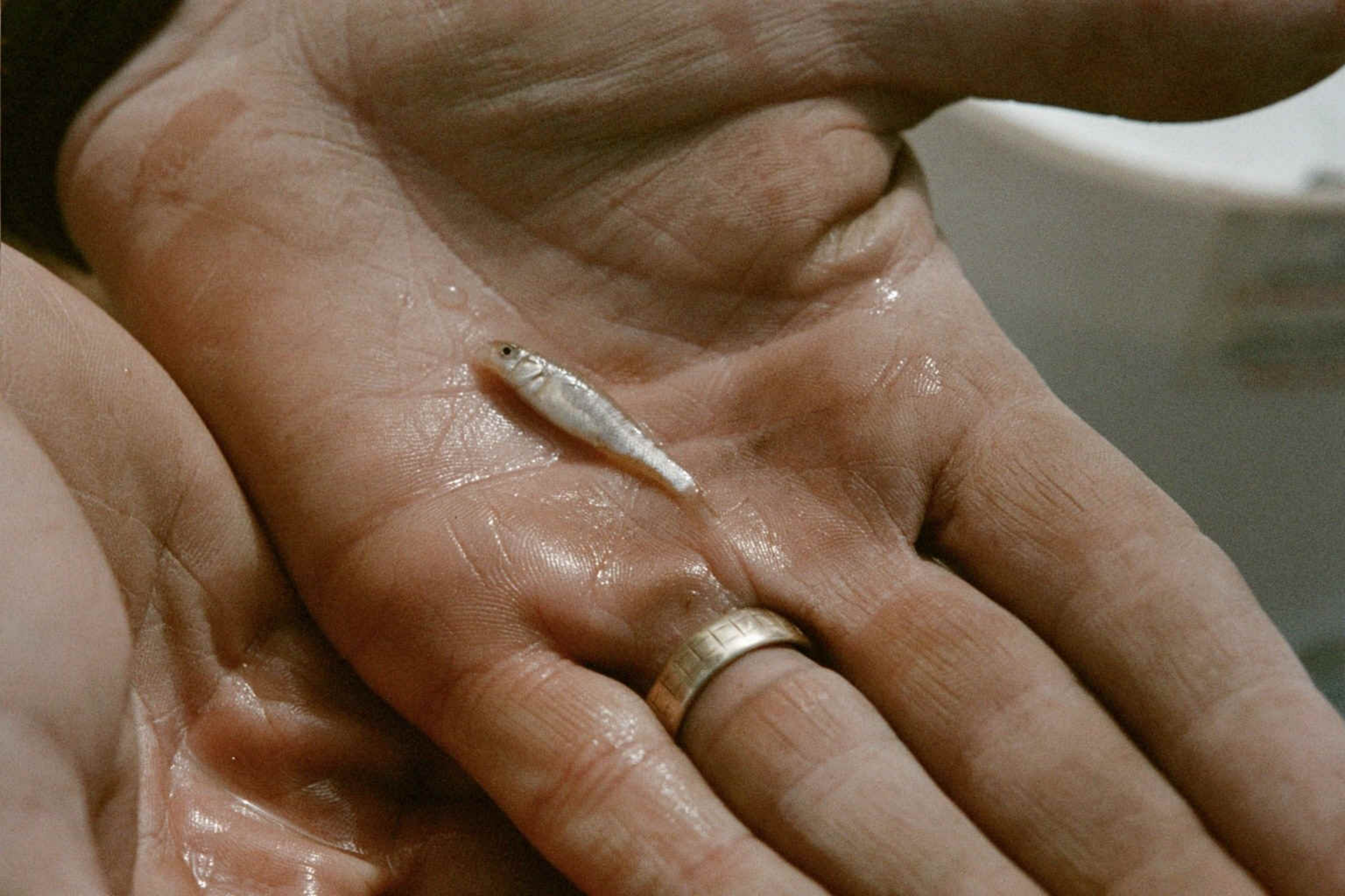
4/12/2001 11:14


4/12/2001 10:26


Cabel
4/10/2001 14:47


4/11/2001 14:10


4/11/2001 12:39



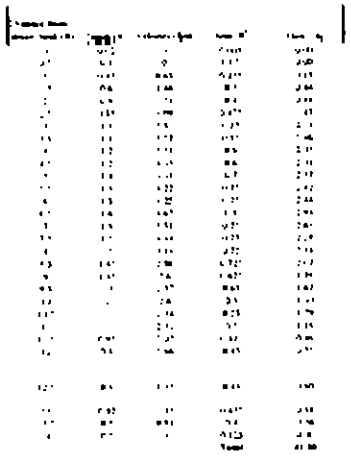

LASTICAN INC.
LEOMINSTER, MA.
DALLAS, TX.
MACON, GA.
PHOENIX, AZ.
2 US GAL

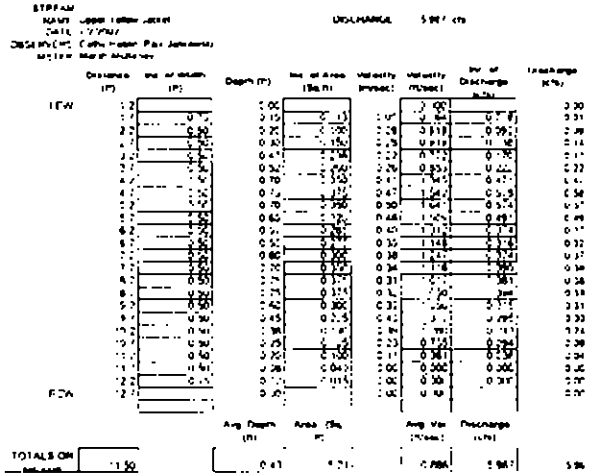

IN GOD WE TRUST

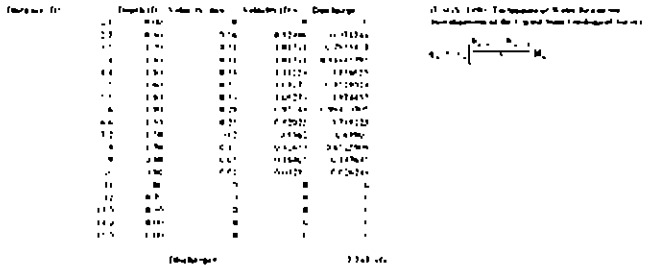

LIBERTY
2000

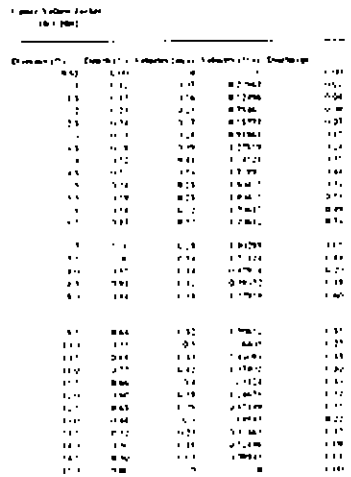

4/11/2001 14:01

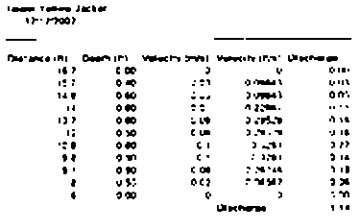
APPENDIX – C
Water Availability Analysis

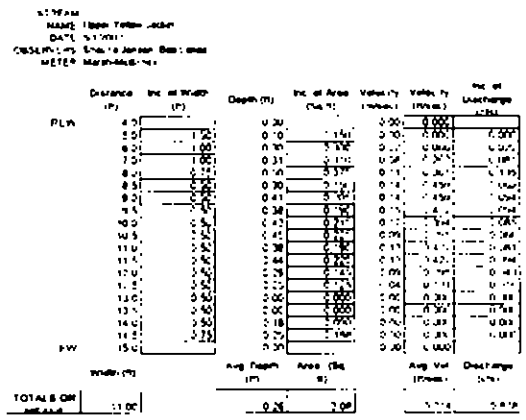


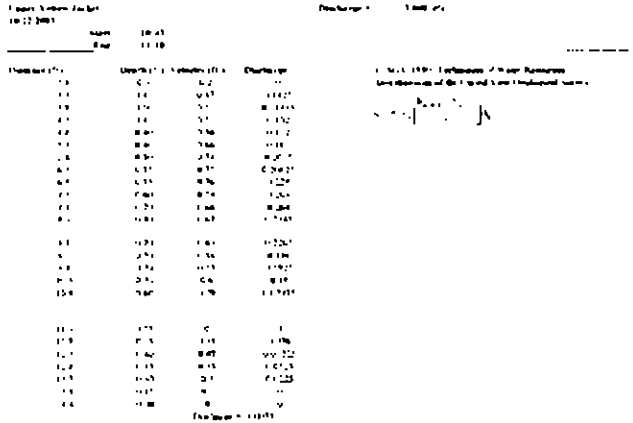


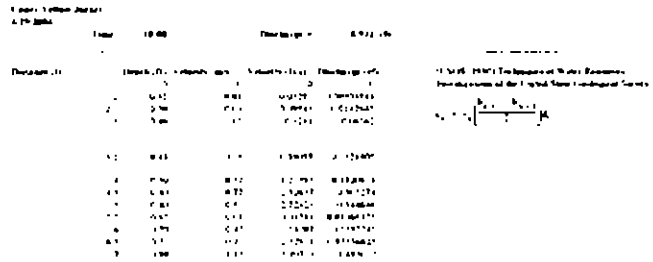


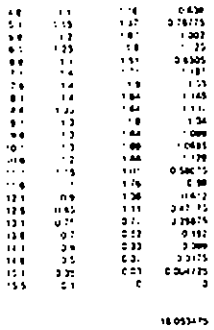


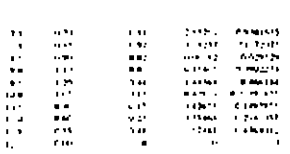


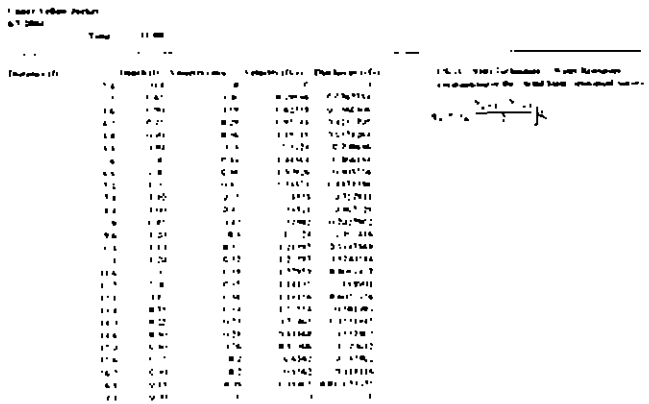


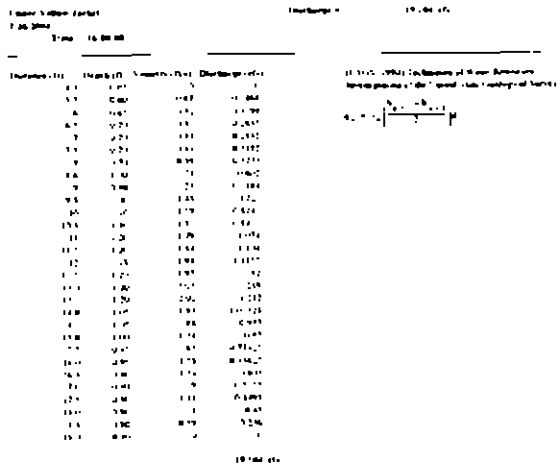


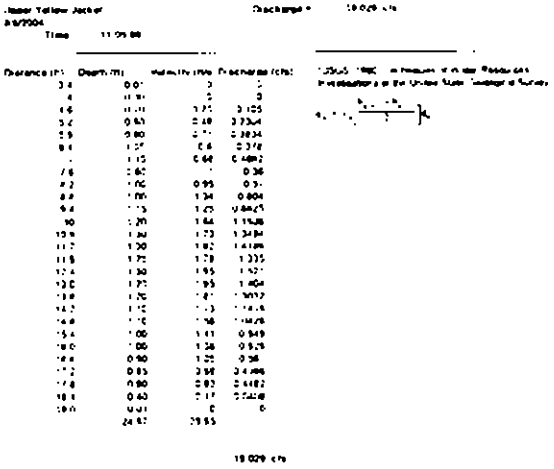












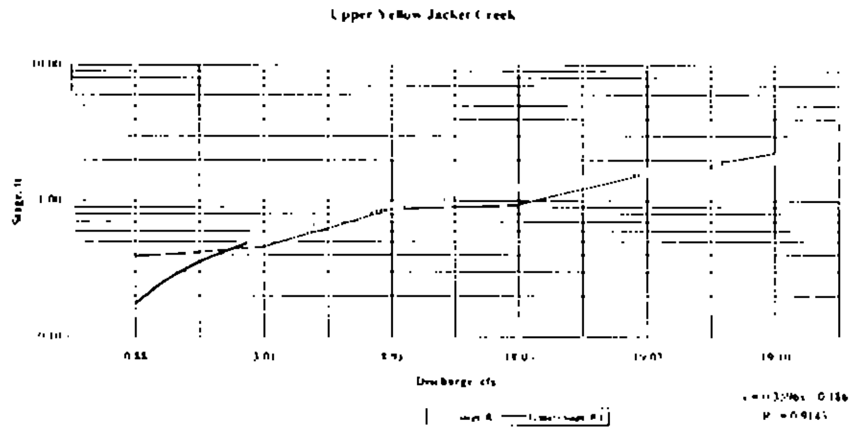
Upper Yellow Jacket Creek

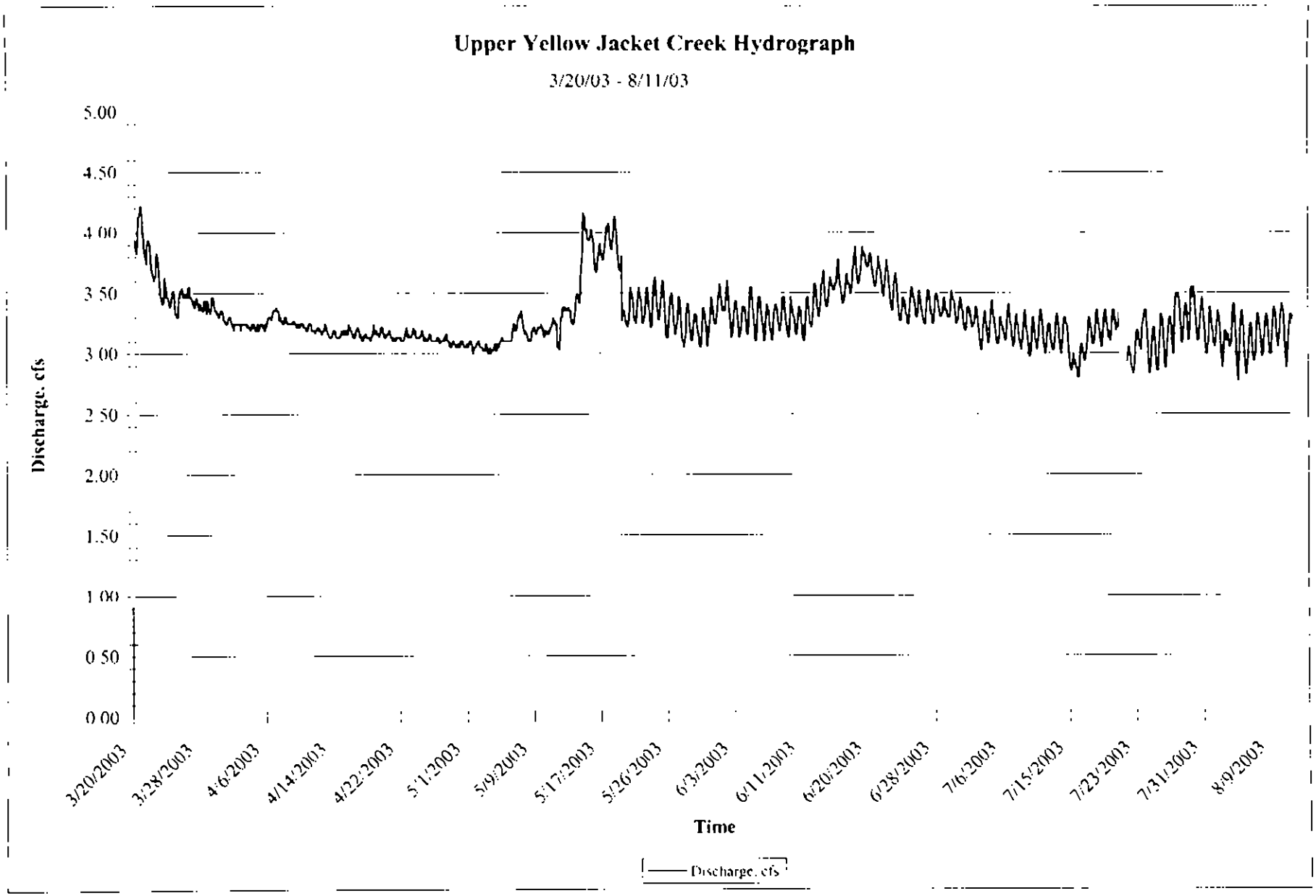
Date	Stage, ft	Discharge, cfs	Time
5/1/02	0.3550	0.809	1130
10/22/03	0.1600	3.078	
4/2/04	0.8600	8.932	1000
9/15/03	0.9400	18.053	
9/8/2004	1.57	19.029	1100
7/26/04	2.2200	19.104	0930

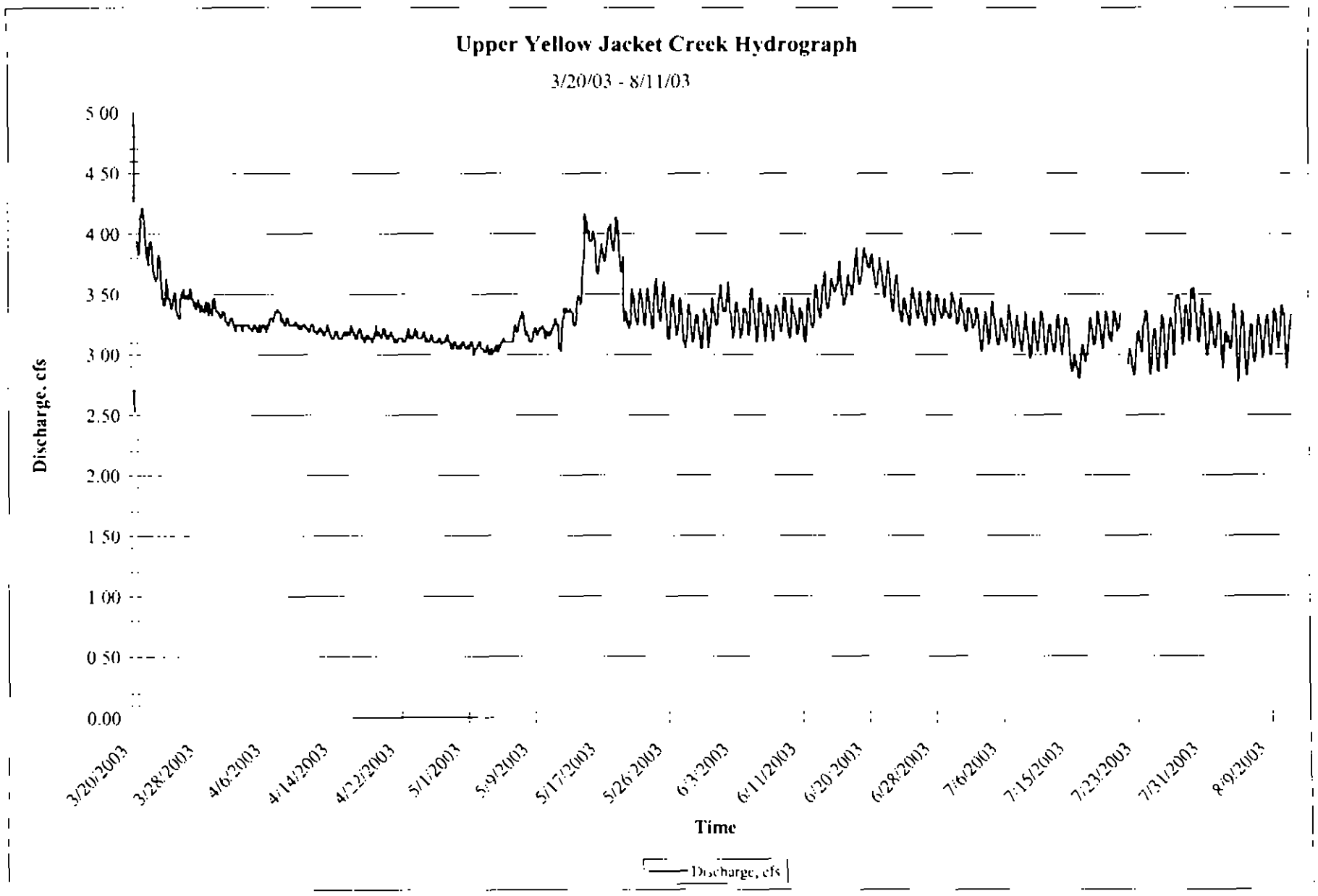
outlier points

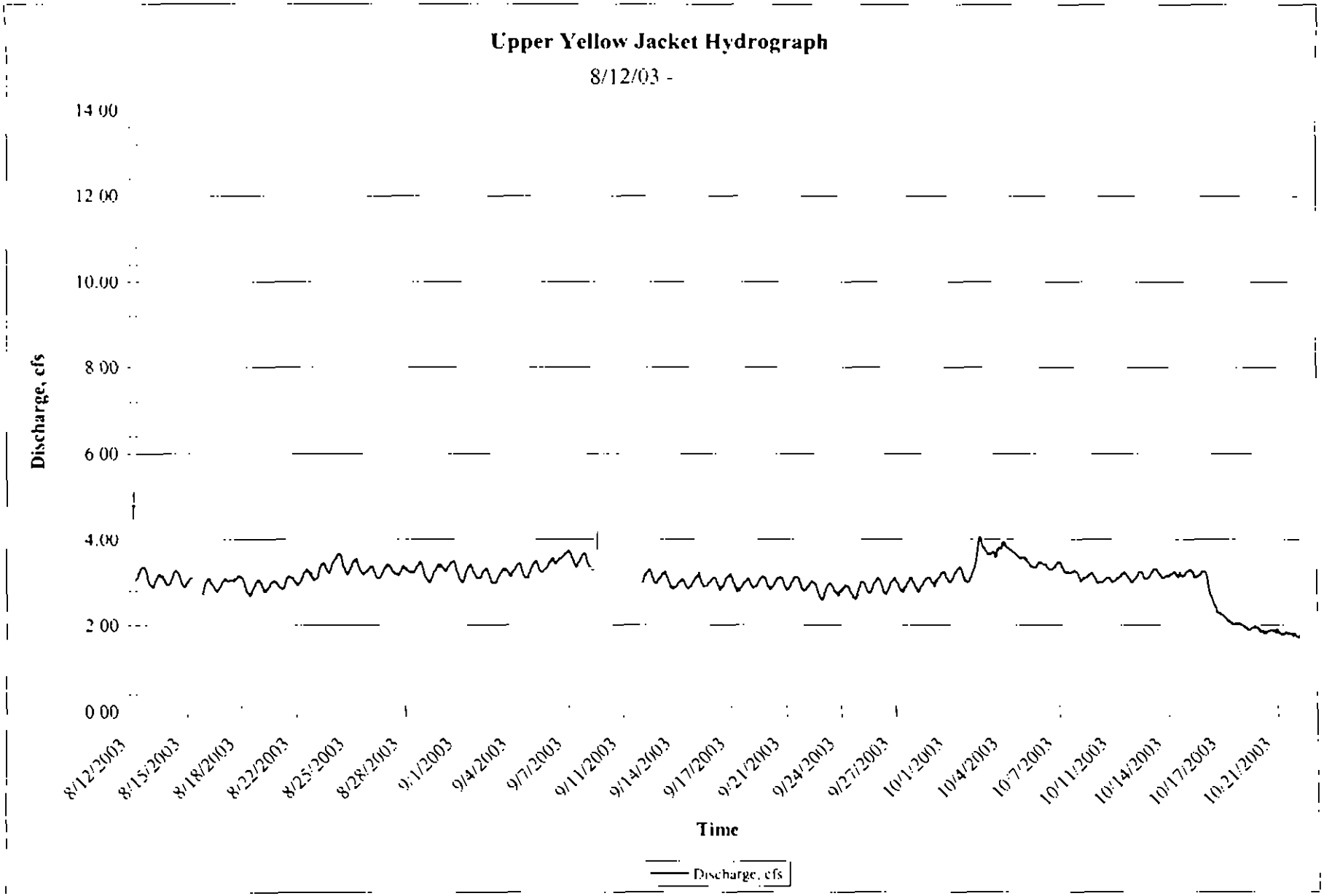
10/5/02		9.722	
12/17/02		3.14	
6/7/04	1.1600	13.315	1100

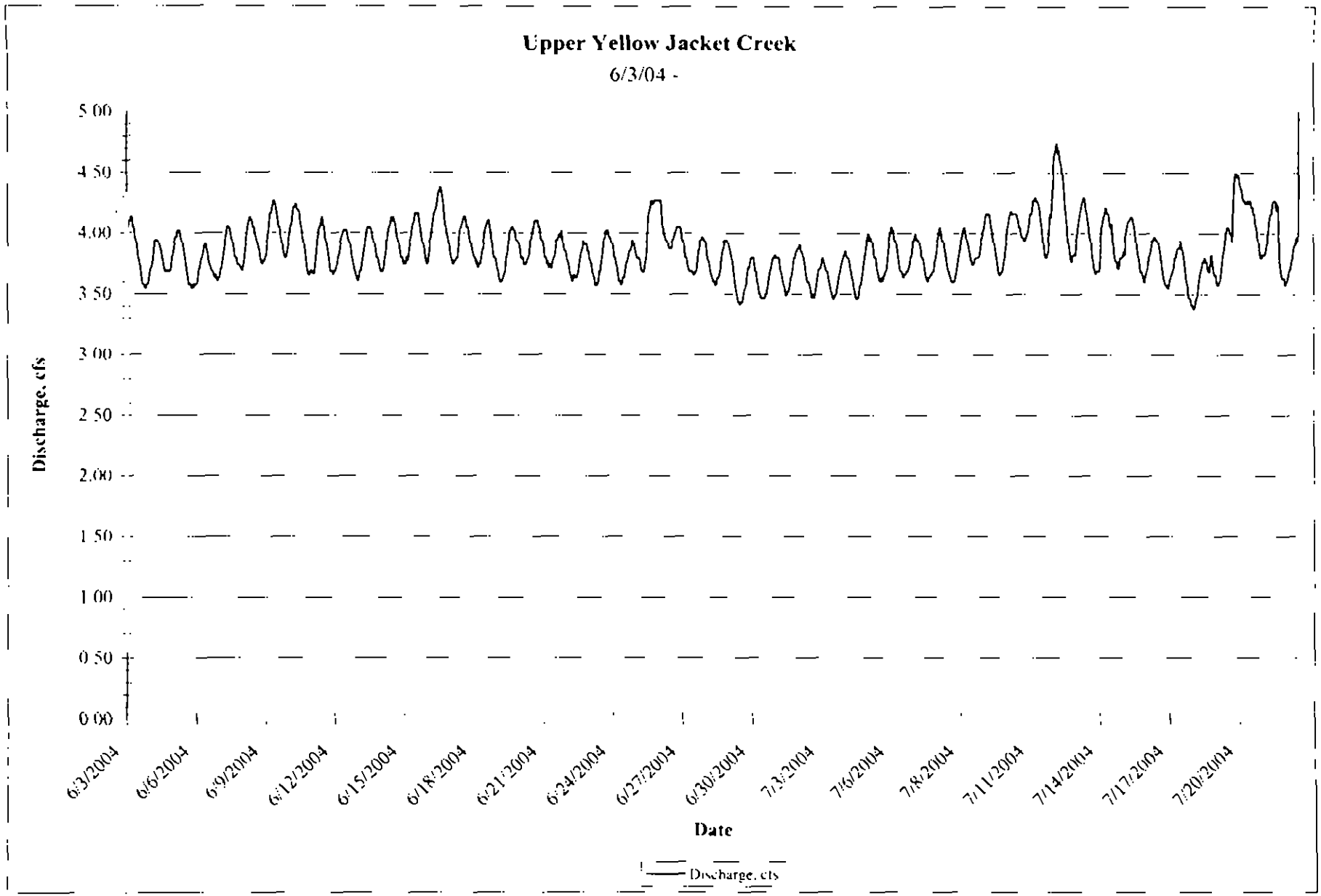
Date	Discharge, cfs

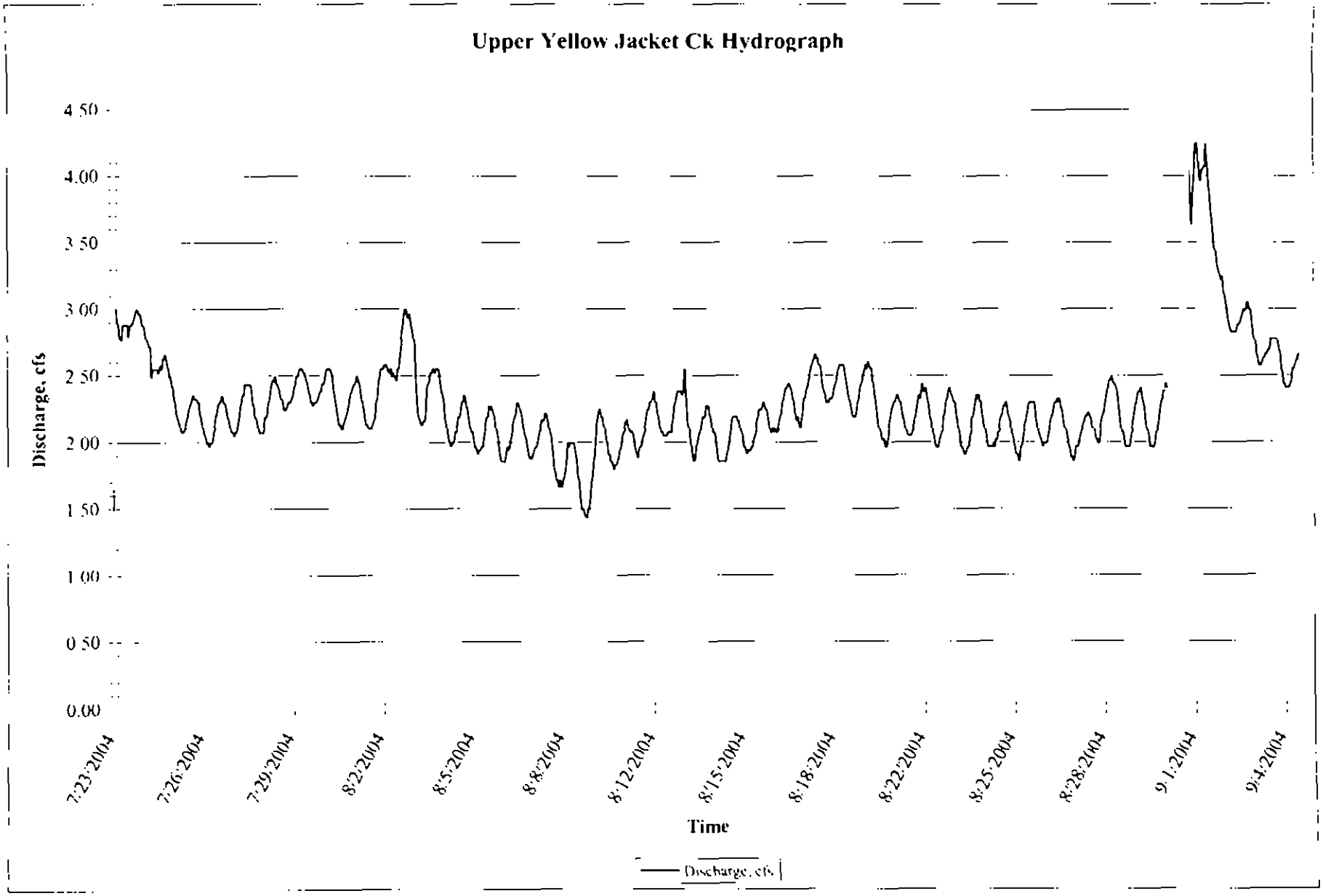



Upper Yellow Jacket Creek Hydrograph
3/20/03 - 8/11/03
Discharge, cfs
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
3/20/2003
3/28/2003
4/6/2003
4/14/2003
4/22/2003
5/1/2003
5/9/2003
5/17/2003
5/26/2003
6/3/2003
6/11/2003
6/20/2003
6/28/2003
7/6/2003
7/15/2003
7/23/2003
7/31/2003
8/9/2003
Time
Discharge, cfs


Upper Yellow Jacket Creek Hydrograph
3/20/03 - 8/11/03
Discharge, cfs
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
3/20/2003
3/28/2003
4/6/2003
4/14/2003
4/22/2003
5/1/2003
5/9/2003
5/17/2003
5/26/2003
6/3/2003
6/11/2003
6/20/2003
6/28/2003
7/6/2003
7/15/2003
7/23/2003
7/31/2003
8/9/2003
Time
Discharge, cfs


Upper Yellow Jacket Hydrograph
8/12/03 -
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Discharge, cfs
8/12/2003
8/15/2003
8/18/2003
8/22/2003
8/25/2003
8/28/2003
9/1/2003
9/4/2003
9/7/2003
9/11/2003
9/14/2003
9/17/2003
9/21/2003
9/24/2003
9/27/2003
10/1/2003
10/4/2003
10/7/2003
10/11/2003
10/14/2003
10/17/2003
10/21/2003
Time
Discharge, cfs


Upper Yellow Jacket Creek
6/3/04 -
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Discharge, cfs
6/3/2004
6/6/2004
6/9/2004
6/12/2004
6/15/2004
6/18/2004
6/21/2004
6/24/2004
6/27/2004
6/30/2004
7/3/2004
7/6/2004
7/8/2004
7/11/2004
7/14/2004
7/17/2004
7/20/2004
Date
Discharge, cfs


Upper Yellow Jacket Ck Hydrograph
Discharge, cfs
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
7/23/2004
7/26/2004
7/29/2004
8/2/2004
8/5/2004
8/8/2004
8/12/2004
8/15/2004
8/18/2004
8/22/2004
8/25/2004
8/28/2004
9/1/2004
9/4/2004
Time
Discharge, cfs

Lower Yellow Jacket
6/19/2003
14:30

Discharge = **8.039 cfs**

Distance (ft)	Depth (ft)	Velocity (m/s)	Velocity (ft/s)	Discharge
1 9	0 00	0	0	0
2	0 80	0 14	0 45934	0 1102416
2 5	0 90	0 19	0 62339	0.2805255
3	1 50	0 26	0 85306	0 639795
3 5	1.50	0 26	0 85306	0 639795
4	1 50	0.38	1.24678	0 935085
4 5	1 50	0 43	1 41083	1 0581225
5	1 20	0 56	1 83736	1 102416
5 5	1 20	0 57	1 87017	1.122102
6	1 00	0 38	1 24678	0.62339
6 5	0 90	0 25	0 82025	0 3691125
7	0 80	0 27	0 88587	0 354348
7 5	0.70	0 3	0 9843	0 344505
8	0 70	0 26	0 85306	0 298571
8 5	0 70	0 12	0 39372	0 137802
9	0 70	0 02	0 06562	0 022967
9 5	0.60	0	0	0
10 0	0.60	0	0	0
10 5	0 50	0	0	0
11 0	0 30	0	0	0
11 5	0 20	0	0	0
12.1	0 00	0	0	0
	Discharge=			**8.039 cfs**

(USGS, 1980) Techniques of Water Resources

Investigations of the United State Geological Survey

$$q_n = v_n\left[\frac{b_{n+1} - b_{n-1}}{2}\right]d_n$$

Lower Yellow Jacket
3/20/2002

Discharge = 11.112 cfs

Distance (ft)	Depth (ft)	Velocity (m/s)	Velocity (ft/s)	Discharge
2 7	0.00	0	0	0
3 5	0 25	0 21	0 68901	0 11196413
4	0 20	0 43	1 41083	0 2116245
5	0 50	0 45	1 47645	0 55366875
5.5	0 65	0 38	1 24678	0 4052035
6	0 70	0 5	1 6405	0 574175
6 5	0.70	0 58	1 90298	0 666043
7	0.70	0 47	1 54207	0 5397245
7 5	0 70	0 53	1 73893	0 6086255
8	0 65	0.68	2 23108	0 725101
8 5	0 65	0.57	1.87017	0.60780525
9	0 65	0 51	1 67331	0 54382575
9 5	0 65	0 74	2 42794	0 7890805
10	0 70	0 55	1 80455	0 6315925
10 5	0 60	0 64	2 09984	0.629952
11 0	0.75	0 67	2 19827	0 82435125
11 5	0 60	0.55	1 80455	0 541365
12 0	0 60	0 51	1 67331	0 501993
12 5	0 50	0 56	1 83736	0 45934
13.0	0 55	0 44	1 44364	0 397001
13 5	0 45	0 46	1 50926	0 3395835
14 0	0 50	0 48	1 57488	0 39372
14.5	0 50	0 42	1 37802	0 413406
15 2	0 30	0 05	0.16405	-0 3568088
	Discharge=			**11.112 cfs**

(USGS, 1980) Techniques of Water Resources Investigations of the United State Geological Survey

$$q_n \quad v_n\left[\frac{b_{n+1} - b_{n-1}}{2}\right]d_n$$

Lower Yellow Jacket
7/26/2004
Time: **11:30**

Discharge = **13.710 cfs**

Distance (ft)	Depth (ft)	Velocity (ft/s)	Discharge (cfs)
10 8	0 4	0 26	0 0312
11 4	0 60	1 25	0 45
12	0 50	1 3	0 39
12 6	0 40	1 87	0 4488
13 2	0 60	1 84	0 6624
13 8	0.60	1 64	0 492
14 2	0.60	2 21	0 663
14 8	0 70	2 2	0.924
15 4	0 65	2 25	0 8775
16	0 70	2 19	0 9198
16 6	0 75	2 24	0 84
17	0 75	1 93	0 651375
17.5	0 80	2 31	0 924
18	0 75	2 45	0 91875
18 5	0 65	2 99	0 97175
19 0	0 70	2 98	1 043
19 5	0 70	2 19	0 7665
20 0	0 60	2 16	0.648
20 5	0 60	1 85	0 555
21 0	0 50	1.79	0 4475
21 5	0 40	0 13	0 026
22 0	0.30	0 22	0 0594
23 3	0 00	0	0

(USGS, 1980) Techniques of Water Resources Investigations of the United State Geological Survey

$$q_n = v_n\left[\frac{b_{n+1} - b_{n-1}}{2}\right]d_n$$

13.710 cfs

Lower Yellow Jacket
9/11/2003
16:15:00 PM

Discharge = 25.251 cfs

Distance (ft)	Depth (ft)	Velocity (ft/s)	Discharge
1 1	0 00	0	0
1 2	0 60	0.9	0.162
1 7	0 70	1.31	0 4585
2 2	0 75	1 79	0 67125
2 7	0 70	2 31	0 8085
3 2	0 70	2 34	0 819
3 7	0 80	2 66	1 064
4 2	0 85	2 64	1.122
4 7	0 90	2 54	1 143
5 2	0 90	3 21	1 4445
5 7	1.00	3 1	1.55
6 2	1 00	2 43	1 215
6.7	0 95	2 71	1 28725
7 2	1 00	2 64	1 32
7 7	1 05	2 85	1 49625
8 2	1 00	2 94	1 47
8 7	1 00	3 09	1.545
9 2	0 95	3 17	1 50575
9 7	0 95	2.59	1 23025
10 2	0 95	2 73	1 29675
10.7	1 00	2 91	1 455
11 2	0.90	2	0.9
11 7	0 80	1 69	0 676
12 2	0 50	1 65	0 4125
12 7	0.35	0 7	0 1225
13 2	0 25	0.61	0 07625
13 7	0 10	0	0
14 1	0.00	0	0
			25.251 cfs

(USGS, 1980) Techniques of Water Resources

Investigations of the United State Geological Survey

$$q_n = v_n\left[\frac{b_{n+1} - b_{n-1}}{2}\right]d_n$$

MARTY ROBBINS

Yellowjacket
GAIN - Loss Study

FACSIMILE TRANSMITTAL SHEET

TO
Roy Smith

COMPANY:
B.L.M.

FAX NUMBER:
303-239-3933

PHONE NUMBER
303-239-3940

RE:
YellowJacket In-Stream Flow

FROM
Marty Robbins

DATE
June 14, 2005

TOTAL NO. OF PAGES INCLUDING COVER:
5

SENDER'S REFERENCE NUMBER
[Click here and type reference number]

YOUR REFERENCE NUMBER
970-533-1333

☐ URGENT X FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS

Roy,

Here are the GPS'ed points on YellowJacket.

Thank You,
Marty W. Robbins

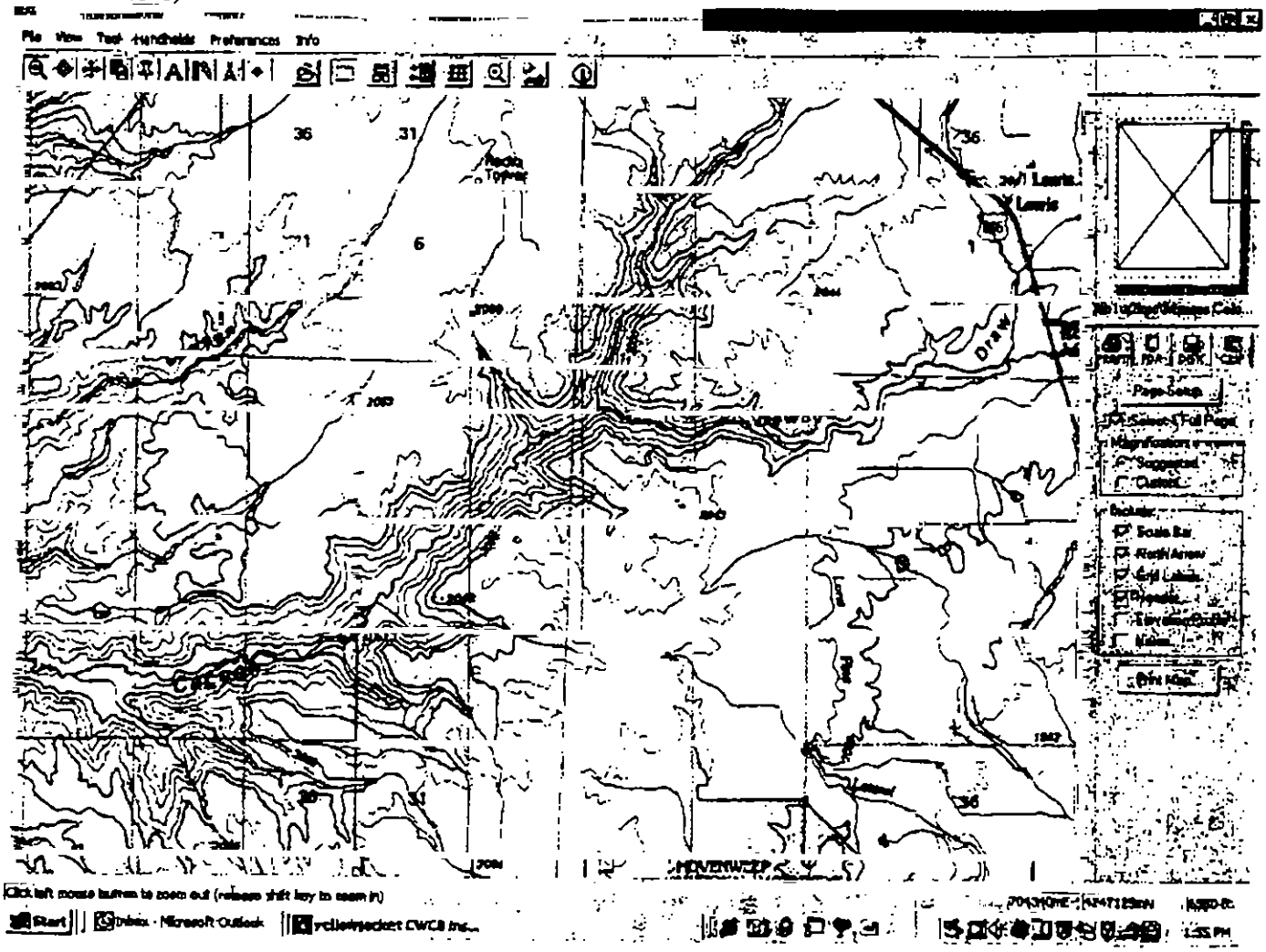
MARTY ROBBINS
307 S. PARK
CORTEZ, CO 81321
HOME: 970-565-4429 WORK: 970-533-1333 FAX 970-533-1333
E-MAIL: MARTY.ROBBINS@STATE.CO.US

Proposed
YellowJacket In-stream Flow

The proposed YellowJacket in-stream flow starts at the confluence of YellowJacket Canyon and Dawson Draw to a point above the Ismay Ditch heading close to the Utah/Colorado State Line. No water was being diverted (except approx. 0.2 cfs in Johnson's) between point YJISF1, 14.2 cfs and YJISF3, 8.99 cfs at the time of measurements.

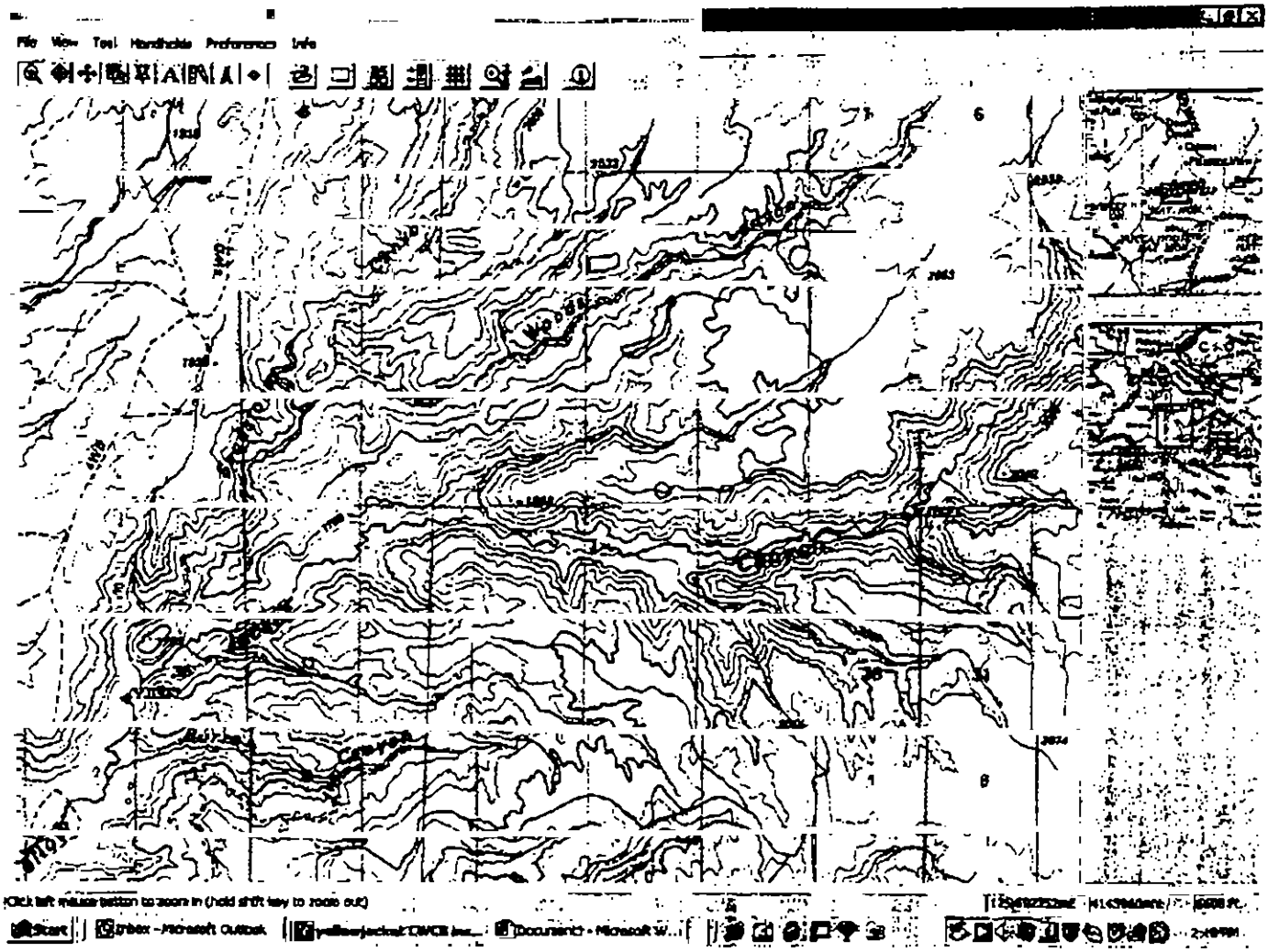
GPS'ed in NAD83, Zone 12

Topo picture of confluence and measured point no. YJISF1 around the B.L.M./ Harris property line. 14.2 cfs Measured on 06/02/05 by Scott Brintin (Division 7, Hydro) Roy Smith (B.L.M.) & Marty Robbins (Water Commissioner).



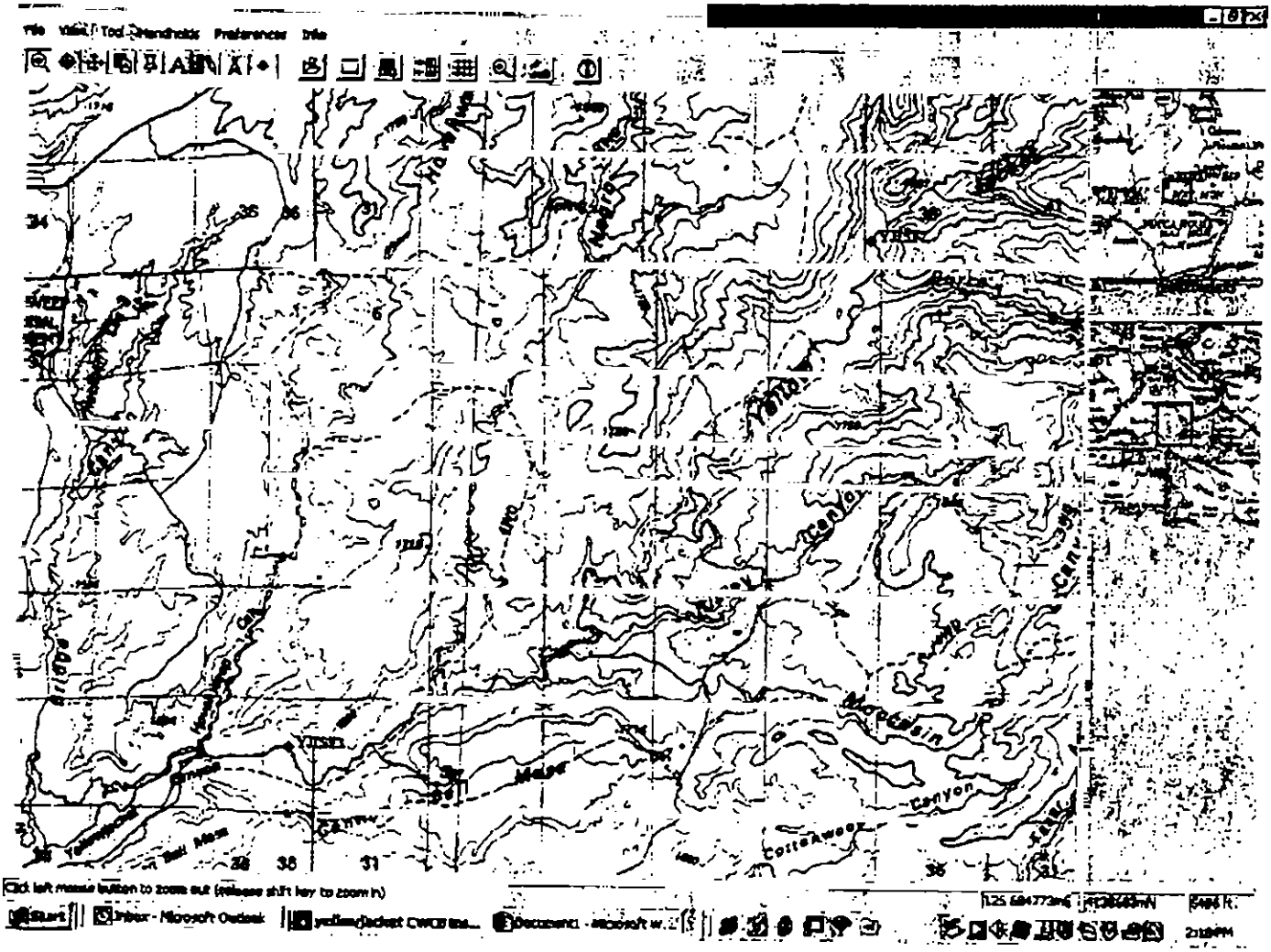
Proposed
YellowJacket In-stream Flow

Topo picture of GPS'ed points no. YJISF1 & YJISF2. Point No. YJISF1, 14.2 cfs being around the B.L.M./ Harris property line and Point No. YJISF2, 10.6 cfs being below Johnson Dam on Bob Johnson's property. Measured on 06/02/05 by Scott Brintin (Division 7, Hydro) Roy Smith (B.L.M.) & Marty Robbins (Water Commissioner).



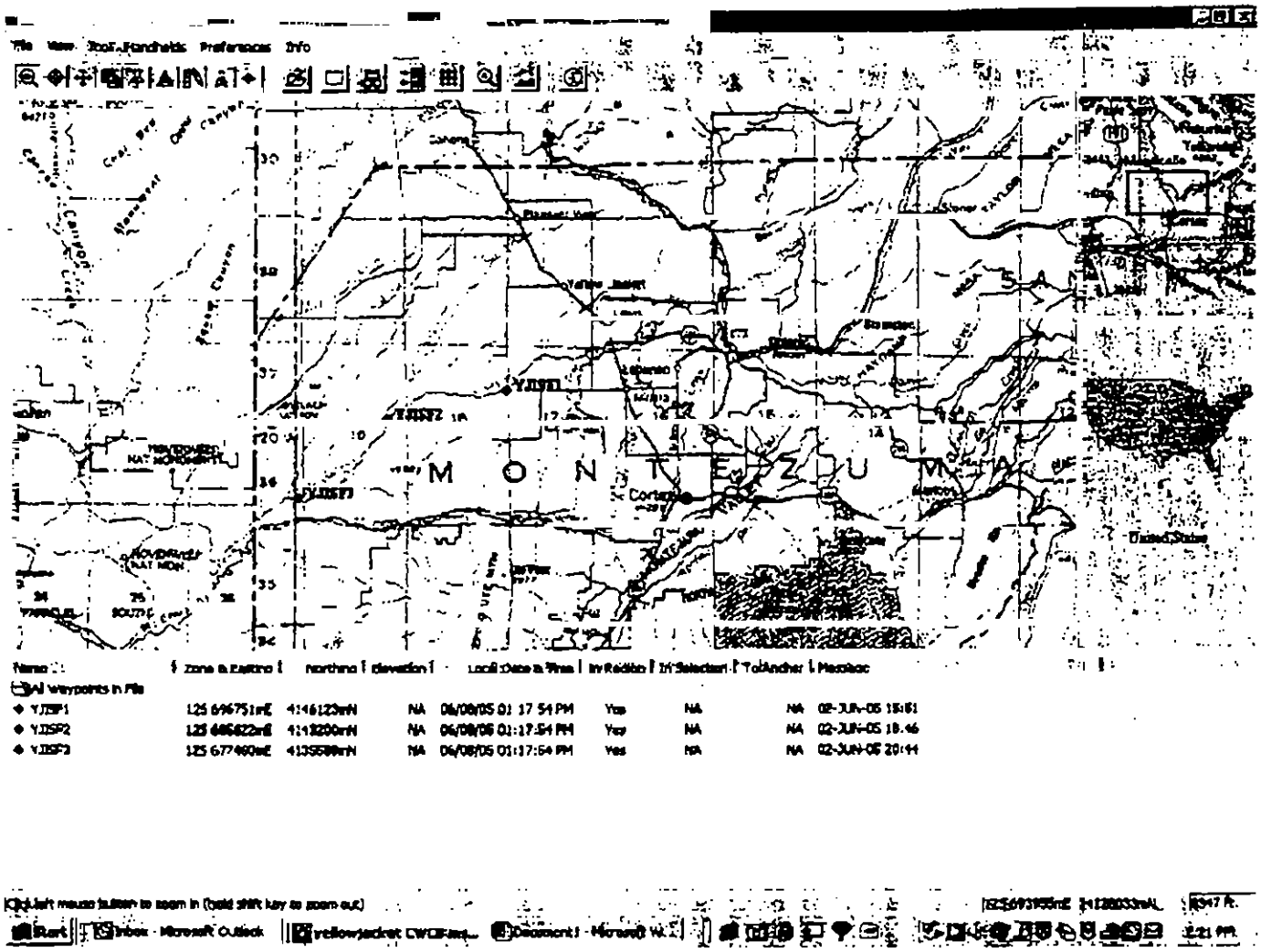
Proposed
YellowJacket In-stream Flow

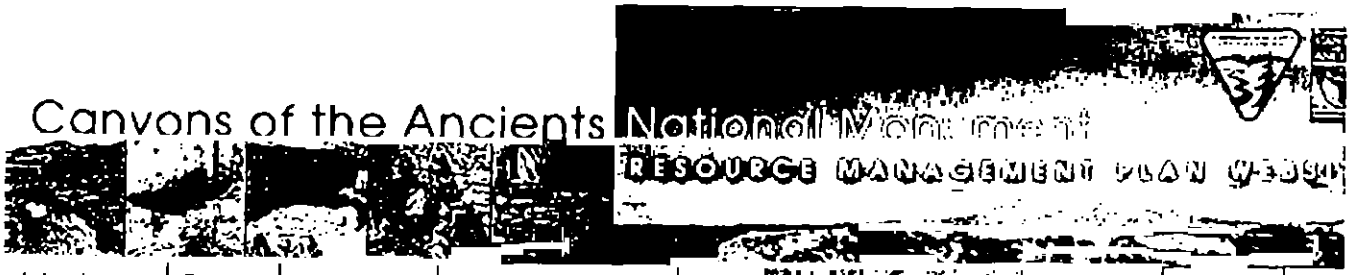
Topo picture of GPS,ed points no. YJISF2 & YJISF3. Point No. YJISF2, 10.6 cfs being below Johnson Dam on Bob Johnson's property and Point no. YJISF3, 8.99 cfs being a point above the Ismay Ditch Diversion on YellowJacket Canyon. Measured on 06/02/05 by Scott Brintin (Division 7, Hydro) Roy Smith (B.L.M.) & Marty Robbins (Water Commissioner).



Proposed
YellowJacket In-stream Flow

GPS'ed and Measured points for YellowJacket In-stream Flow w/ UTM's





Advisory Committee

In accordance with a directive from the Secretary of the Interior, a Monument Advisory Committee (committee) was established in May 2003. Members were selected based on their knowledge and special expertise in the category of interest they were nominated for, and will serve for four years. The 11 committee members and the category of interest they represent are as follows:

- Category 1, Montezuma County Commission Representative - Glenn (Kelly) Wilson
- Category 2, Dolores County Commission Representative - Duane Gerren
- Category 3, Two Tribal/Pueblo Representatives - Tito Naranjo and Selwyn Whiteskunk
- Category 4, Two Cultural Resources Representatives (one representing regional interests and one whom resides in and represents the local area) - William Lipe and Mark Varien
- Category 5, Livestock Grazing Permittee in the Monument Representative - Chris Majors
- Category 6, Fluid Minerals Development Representative - Robert Clayton
- Category 7, Three people representing any of the following: private landowners in or adjacent to the Monument, recognized national or regional environmental or resource conservation organizations, off-road vehicle use, commercial recreation, and/or representing statewide perspectives with no financial interest in the Monument - Elizabeth Tozer, Chuck McAfee, and Howard Poe

The Committee will advise the Secretary and BLM on development and implementation of a resource management plan for the Monument. The Committee will, among other tasks:

- gather and analyze information,
- conduct studies and field examinations,
- hear public testimony,
- advise BLM in establishing Monument management priorities, goals and objectives,
- develop recommendations for ecosystem approaches to management in the Monument, and
- advise BLM on local collaborative approaches to Monument management

Additional Advisory Committee Information

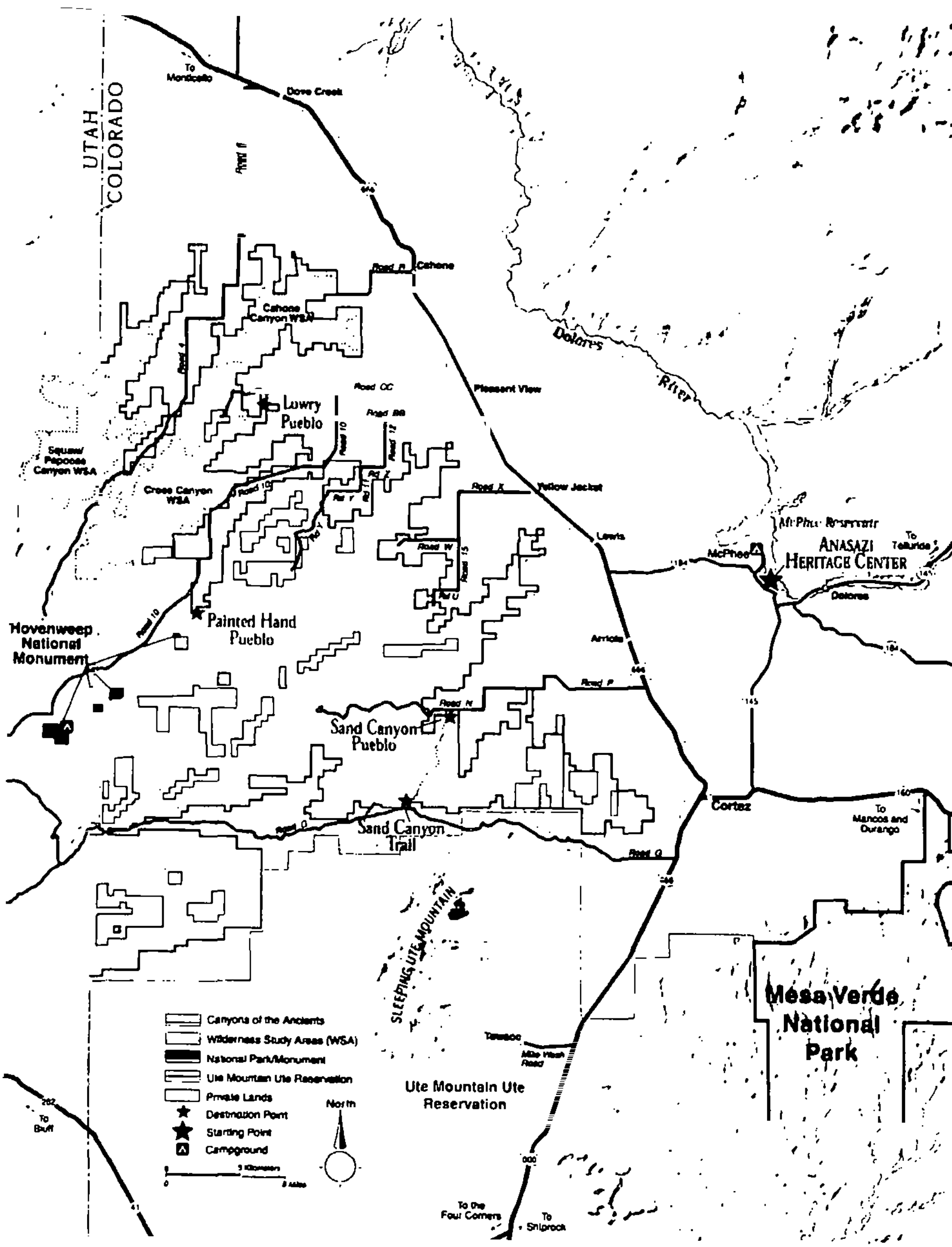
- Monument Advisory Committee Members' Biographical Information (pdf)
- Monument Advisory Committee Charter
- Schedule of Proposed Advisory Committee Meetings (additional meeting dates will be posted as they are determined)

Meeting Date and Location	Time
January 6, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
January 27, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
February 17, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
March 9, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
March 30, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
April 13, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
May 19, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
July 6, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm
August 10, 2004, Anasazi Heritage Center, Dolores, Colorado	9:00am - 3:30pm

September 14, 2004, Anasazi Heritage Center, Dolores Colorado 9 00am - 3 30pm

November 9, 2004, Anasazi Heritage Center, Dolores, Colorado 9 00am - 3 30pm

- Monument Advisory Committee Meeting Minutes
  - July 6, 2004 (pdf)
  - May 19, 2004 (pdf)
  - April 13, 2004 (pdf)
  - March 30, 2004 (pdf)
  - March 9, 2004 (pdf)
  - February 17, 2004 (pdf)
  - January 27, 2004 (pdf)
  - January 6, 2004 (pdf)
  - December 9, 2003 (pdf)
  - July 29, 2003 (pdf)
  - October 21, 2003 (pdf)
  - November 14, 2003 (pdf)


UTAH
COLORADO
To Monticello
Dove Creek
Cahone
Road R
Cahone Canyon WSA
Dolores River
Pleasant View
Road CC
Lowry Pueblo
Road BB
Road 10
Squaw/Papoose Canyon WSA
Cross Canyon WSA
Road X
Yellow Jacket
Road W
Road 15
Lewis
McPhee Reservoir
McPhee
To Telluride
Anasazi Heritage Center
Dolores
Painted Hand Pueblo
Hovenweep National Monument
Arriola
Road P
Road N
Sand Canyon Pueblo
Cortez
To Mancos and Durango
Road G
Sand Canyon Trail
Sleeping Ute Mountain
Mesa Verde National Park
Towaoc
Ute Mountain Ute Reservation
To Bluff
To the Four Corners
To Shiprock
Canyons of the Ancients
Wilderness Study Areas (WSA)
National Park/Monument
Ute Mountain Ute Reservation
Private Lands
Destination Point
Starting Point
Campground
North

APPENDIX – D
Diversion Records

Structure Name: ARCH ROCK DITCH **Water District:** 32 **ID Number:** 503

Source	YELLOWJACKET CANYON @ Mile 22 2									Acres Irrigated	0
Location	Q160	Q40	Q10	Section	Twnshp		Range		PM	CIU	H
	NE	NE	NW	25	37	N	18	W	N		

Distance from section lines: From N/S line. From E/W line

UTM Coordinates (NAD 83): Northing (UTM y). 4150522 5 Easting (UTM x) 165812 5 Spotted from PLSS quarters

Latitude/Longitude (decimal degrees): 37 4412 -108.7771

Measuring Device/Recorder.

Contact: HARRIS, GLENNA(OWNER) Phone

Address: PO BOX 237 Cell Phone.

LEWIS CO 81327 E-mail

Water Rights Summary							
Total Decreed Rate(s)	Abs	0 0000	Cond	3.5000	AP/EX	0 0000
Total Decreed Volume(s)	Abs	0 0000	Cond	0 0000	AP/EX	0 0000

Water Rights -- Transactions

Seq #	Case Number	Adjudication Date	Appropriation Date	Admin Number	O #	Priority Number	Decreed Amount		Adj Type	Uses	Comments
1	CA1077	8/14/1962	7/10/1916	24297 00000	0	62-41	7 4	C	O	18	
2	CA1077	8/14/1962	7/10/1916	24297 00000	0	62-41	3	C	O	89	DCRD 3 0000 CFS TO RUN NOV 1 TO MAY 1?
3	91CW0065	8/14/1962	7/10/1916	24297 00000	0	62-41	7 4	C	O,AB	18	
4	91CW0065	8/14/1962	7/10/1916	24297 00000	0		3	C	O,AB	89	
5	98CW0032	12/31/1998	6/4/1998	54211 00000	0		3 5	C	S,C	1	DD JUN 2005, AP AT YELLOW JACKET PUMP ID# 503 F 3 5 CFS, 150 AC
6	98CW0032	12/31/1998	6/4/1998	54211 00000	0		0	C	S,C,AP	1	DD JUN 2005, AP FROM ARCH ROCK DITCH ID #503 F CFS

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1975	Structure not usable		
1976	Structure not usable		
1977	Structure not usable		
1978	Structure not usable		
1979	Structure not usable		
2001	Water available, but not taken	0	
2002	Structure not usable	0	
2003	Structure not usable	0	

Structure Name: GASOHOL DITCH **Water District:** 32 **ID Number:** 778

Source	YELLOWJACKET CANYON								*Acres Irrigated*	0
Location	Q160	Q40	Q10	Section	Twnshp		Range	PM	*CIU*	H
	SW	NW	SW	26	38	N	17 W	N		

Distance from section lines *From N/S line* *From E/W line*

UTM Coordinates (NAD 83) *Northing (UTM y)* 4158957 6 *Easting (UTM x)* 172969 5 *Spotted from PLSS quarters*

Latitude/Longitude (decimal degrees) 37 5196 -108 7002

Measuring Device/Recorder CONDITIONAL

Contact COOP DEV INDUSTRIES(OWNER) *Phone*

Address BX 241 *Cell Phone*

E-mail

YELLOW JACKET, CO 81335

Water Rights Summary *Total Decreed Rate(s)* *Abs* *Cond* *AP/EX*

Total Decreed Volume(s) *Abs* *Cond* *AP/EX*

Water Rights -- Transactions

Seq #	Case Number	Adjudication Date	Appropriation Date	Admin Number	O #	Priority Number	Decreed Amount	Adj Type	Uses	Comments
1	81CW0035	12/31/1981	9/1/1979	47847 47360	0		0 75 C	S,C	148	
2	85CW0030	12/31/1981	9/1/1979	47847 47360	0		0 75 C	S,CA	148	LIM TO 2 5 AF/A, 37 5 AF TOTAL DIVERSION
3	01CW0107	12/31/1981	9/1/1979	47847 47360	0		0 75 C	S,AB	148	

Diversion Summary in Acre-Feet - Total Water through Structure

IYR	FDU	LDU	DWC	Max Q	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Total
1985*																	10 00
	Minimum																10 00
	Maximum																10 00
	Average																10 00

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1983	Structure not usable		
1984	Structure not usable		
1985		10	
1986	Water available, but not taken		
1987	Structure not usable	0	
1988	Water available, but not taken	0	
1989	Water available, but not taken	0	
1990	Water available, but not taken	0	
1991	Water available, but not taken	0	
1992	Water available, but not taken	0	
1993	Structure not usable	0	
1994	Structure not usable	0	
1995	Structure not usable	0	
1996	Structure not usable	0	
1997	Structure not usable	0	
1998	Structure not usable	0	
1999	Structure not usable	0	PUMP REMOVED
2000	Structure not usable	0	
2001	Structure not usable	0	
2002	Structure not usable	0	

Structure Name: GASOHOL DITCH ***Water District:*** 32 ***ID Number:*** 778

2003 Structure not usable 0

Structure Name: ISMAY DITCH **Water District:** 32 **ID Number:** 590

Source	YELLOWJACKET CANYON @ Mile 3 6									*Acres Irrigated*	0
Location	Q160	Q40	Q10	Section	Twnshp		Range		PM	*CIU*	A
	SE	NE	NW	25	36	N	20	W	N		

Distance from section lines. *From N/S line* *From E/W line*

UTM Coordinates (NAD 83) *Northing (UTM y)* 4141239 0 *Easting (UTM x)* 145953.8 *GPS*

Latitude/Longitude (decimal degrees). 37 3504 -108 9967

Measuring Device/Recorder

Contact	ISMAY, EUGENE(OWNER)	*Phone*	
Address	391 CNTY RD G	*Cell Phone*	
	CORTEZ CO 81321	*E-mail*	

Water Rights Summary	*Total Decreed Rate(s)*	*Abs*	5 0000	*Cond.*	0 0000	*AP/EX*	0 0000
	Total Decreed Volume(s):	*Abs*	0 0000	*Cond*	0 0000	*AP/EX*	0 0000

Water Rights -- Transactions

Seq #	Case Number	Adjudication Date	Appropriation Date	Admin Number	O #	Priority Number	Decreed Amount	Adj Type	Uses	Comments
1	W0238	12/31/1970	1/1/1955	41133 38351	0		5 C	S	19	DECREED LOCATION R19W

.45 .04 .01 .25 7.52 2.84 3.12 2.33 1.93 0.72

Diversion Summary in Acre-Feet - Total Water through Structure

IYR	FDU	LDU	DWC	Max Q	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Total
1971	05/01	09/21	89	6 5	0	0	0	0	0	0	269	126	253	119	69 4	0	839
1972	05/01	09/24	83	5	0	0	0	0	0	0	204	122	188	33 7	27 8	0	577
1973	06/09	09/24	81	6	0	0	0	0	0	0	0	208	210	178	113	0	710
1974	04/28	09/04	105	5	0	0	0	0	0	17 9	238	182	192	166	23 8	0	821
1975	05/13	09/30	116	5	0	0	0	0	0	0	126	170	238	200	119	0	854
1976	05/06	09/26	79	5	0	0	0	0	0	0	175	84 3	158	134	41 7	0	595
1977	03/27	08/25	89	40	0	0	0	0	29 8	92 8	662	79 3	45 6	7 93	0	0	917
1978	05/01	08/16	89	5	0	0	0	0	0	0	178	277	220	68 4	0	0	744
1979	05/01	10/08	72	5	0	0	0	0	0	0	35 7	35 7	87 3	76 6	87 3	15 9	338
1980	05/20	10/01	97	4	0	0	0	0	0	0	95 2	56 5	178	96 2	88 3	5 95	520
1981	04/24	10/07	145	5	0	0	0	0	0	48 6	160	191	126	162	249	69 4	1009
1982	04/20	08/23	82	5 6	0	0	0	0	0	15 9	176	119	158	63.5	0	0	533
1983	05/23	09/20	86	5	0	0	0	0	0	0	53 6	218	206	79 3	111	0	668
1984	05/08	09/10	87	4	0	0	0	0	0	0	142	130	112	150	47 6	0	584
1985	05/20	09/24	110	4	0	0	0	0	0	0	95 2	206	107	202	190	0	801
1986	05/04	09/02	109	5	0	0	0	0	0	0	214	218	190	212	15 9	0	850
1987	05/08	10/05	94	5	0	0	0	0	0	0	210	126	158	0	230	39 7	765
1988	05/08	09/27	105	5	0	0	0	0	0	0	148	158	230	166	214	0	918
1989	04/17	10/18	141	5	0	0	0	0	0	111	220	190	162	140	206	95 2	1126
1990	04/11	10/10	152	5	0	0	0	0	0	39 7	192	194	238	307	113	63 5	1148
1991	04/26	10/24	130	6	0	0	0	0	0	29 8	301	226	164	154	126	168	1172
1992	04/27	09/22	91	6	0	0	0	0	0	31 7	162	148	224	158	148	0	874
1993	05/25	10/13	100	8	0	0	0	0	0	0	111	281	214	95 2	136	103	942
1994	04/18	10/27	139	5	0	0	0	0	0	103	259	184	247	79 3	138	138	1152
1995	05/25	10/09	71	5	0	0	0	0	0	0	69 4	9 92	267	138	128	89 3	704
1996	06/13	10/21	76	6	0	0	0	0	0	0	0	55 5	206	226	107	249	844
1997	05/10	09/23	76	6	0	0	0	0	0	0	261	47 6	214	154	226	0	904
1998	05/22	10/04	136	6	0	0	0	0	0	0	119	357	368	368	357	47 6	1618
1999	06/01	07/29	59	6	0	0	0	0	0	0	0	357	345	0	0	0	702
2000	05/29	10/31	132	6	0	0	0	0	0	0	35 7	357	154	297	357	368	1570
2001	11/01	09/05	95	6	83 3	0	0	0	0	0	0	249	328	355	59 5	0	1076

Yellow Jacket

Ismay Ditch on ~~Deep Creek~~--WD 32

	30	31	31	28	31	30	31	30	31	31	30	31
	nov	**dec**	**jan**	**feb**	**mar**	**apr**	**may**	**jun**	**jul**	**aug**	**sep**	**oct**
AF	2.52	0	0	0	0.9	14.9	155	167	192	143	115	44.1
cfs	**0.04**	**0.00**	**0.00**	**0.00**	**0.01**	**0.25**	**2.52**	**2.81**	**3.12**	**2.33**	**1.93**	**0.72**

Structure Name: SHUMWAY PERKINS PMPG STA **Water District:** 32 **ID Number:** 665

Source	YELLOWJACKET CANYON @ Mile 10 2							Acres Irrigated	0
Location	Q160	Q40	Q10	Section	Twnshp	Range	PM	CIU	A
	SW	NW	SW	36	37 N	19 W	N		
Distance from section lines	From N/S line			From E/W line					
UTM Coordinates (NAD 83)	Northing (UTM y)		4148317 1	Easting (UTM x)		154613 6	GPS		
Latitude/Longitude (decimal degrees)			37 4173			-108 9024			
Measuring Device/Recorder									

Contact	JOHNSON, BOB(OWNER)	Phone	
Address	PO BOX 2401	Cell Phone	
	DURANGO CO 81302	E-mail	

Water Rights Summary	Total Decreed Rate(s)	Abs	5 0000	Cond	5 0000	AP/EX	0 0000
	Total Decreed Volume(s)	Abs	0 0000	Cond	0 0000	AP/EX	0 0000

Water Rights -- Transactions

Seq #	Case Number	Adjudication Date	Appropriation Date	Admin Number	O #	Priority Number	Decreed Amount	Adj Type	Uses	Comments
1	W0457	12/31/1972	1/18/1972	44577 00000	0		10 C	S,C	1589	DD DEC 2009,PT NO 1, W-1751,80CW179,84CW134,88CW94,94CW81,02CW122
2	W0457	12/31/1972	1/18/1972	44577 00000	0		0 C	S,AP	1589	DIV POINT NO 2 AP
3	W0457	12/31/1972	1/18/1972	44577 00000	0		0 C	S,AP	1589	DIV POINT NO 3 AP
4	W0457	12/31/1972	1/18/1972	44577 00000	0		0 C	S,AP	1589	DIV POINT NO 4 AP
5	W0457	12/31/1972	1/18/1972	44577 00000	0		0 C	S,AP	1589	DIV POINT NO 5 AP
6	W0457	12/31/1972	1/18/1972	44577 00000	0		1 C	S,CA	1589	STATION NO 1
7	80CW0179	12/31/1972	1/18/1972	44577 00000	0		1 C	S,CA	1589	
8	84CW0133	12/31/1972	1/18/1972	44577 00000	0		1 C	S,CA	1	
9	88CW0094	12/31/1972	1/18/1972	44577 00000	0		2 C	S,CA	1589	

Diversion Summary in Acre-Feet - Total Water through Structure

IYR	FDU	LDU	DWC	Max Q	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Total
1975*																	
1976*					0.03	~	~	~	0.03	0.29	.88	1.19	1.39	1.31	1.24	0.55	80 0
1977*																	60 0
1978*																	25 0
1979*																	29 8
1980	05/16	10/31	163	2	0	0	0	0	0	0	31 7	59 5	101	59 5	59 5	109	119
1981																	420
1982	06/15	09/14	70	2	0	0	0	0	0	0	0	63 5	71 4	57 5	43 6	0	236
1983	06/03	09/17	64	1 5	0	0	0	0	0	0	0	44 4	29 8	17 9	33 7	0	125
1984	05/20	09/17	83	3	0	0	0	0	0	0	47 6	65 5	143	53 6	101	0	411
1985	05/13	09/24	118	3	0	0	0	0	0	0	56 5	114	91 2	130	142	0	535
1986	05/17	09/06	83	3	0	0	0	0	0	0	65 5	119	105	103	23 8	0	416
1987	05/08	07/27	67	3	0	0	0	0	0	0	95 2	115	119	0	0	0	329
1988	05/01	10/15	143	5	0	0	0	0	0	0	152	146	119	95 2	202	61 5	777
1989	04/15	09/25	149	5	0	0	0	0	0	158	184	136	136	220	148	0	985
1990	05/06	09/11	94	5	0	0	0	0	0	0	154	160	65 5	120	109	0	610
1991																	
1992																	
1993																	
1994																	
1995																	
1996	06/25	10/21	119	2	0	0	0	0	0	0	0	23 8	122	122	119	83 3	472

Structure Name: SHUMWAY PERKINS PMPG STA **Water District: 32** **ID Number: 665**

1997	03/27	10/31	219	2	0	0	0	0	9 92	59 5	61 5	75 4	122	122	119	122	694
1998	04/23	08/26	126	1 5	0	0	0	0	0	15 9	61 5	59 5	61 5	73 4	0	0	271
1999	04/15	10/31	157	1	0	0	0	0	0	31 7	9 92	25 8	61 5	61 5	59 5	61 5	311
2000	06/29	10/31	125	2	0	0	0	0	0	0	0	7 93	122	122	119	122	495
2001	11/01	10/31	168	2	27 8	0	0	0	0	0	3 17	11 9	12 3	12 3	11 9	12 3	91 6
2002	03/29	10/31	161	1	0	0	0	0	1 79	17 9	18 4	17 9	18 4	40 5	0	5 95	120
2003	03/15	10/30	230	0 5	0	0	0	0	16 9	29 8	30 7	29 8	30 7	30 7	29 8	29 8	228
		Minimum		0 5	0	0	0	0	0	0	0	7 93	12 3	0	0	0	25 0
		Maximum		5	27 8	0	0	0	16 9	158	184	160	143	220	202	122	985
		Average		2 4722	1 54	0	0	0	1 59	17 4	54 1	71 0	85 3	80 3	73 5	33 9	364

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1975		800	
1976		800	
1977	No water available	800	
1978		30	
1979		30	
1980		30	
1981	Water available, but not taken		
1982		50	
1983		30	
1984		30	
1985		30	
1987		50	
1988		80	
1989	Structure not usable	0	
1990		80	
1991	Water available but not taken	0	
1992	Water available, but not taken	0	
1993	Water available, but not taken	0	
1994	Water available, but not taken	0	
1995	Water available, but not taken	0	
1996		80	
1997		80	
1998		60	
1999		80	SPRINKLER SYSTEM IS IN PLACE FOR ALT PUMP SITES
2000		60	
2001		10	PIPE PLUGGED. DID NOT CARRY AS MUCH WATER THIS YEAR
2002		10	PIPE PLUGGED, DID NOT CARRY AS MUCH WATER THIS YEAR
2003		50	USER SUPPLIED INFORMATION

Shumway Perkins Pmpg station on YellowJacket Canyon Creek--WD 32

	30	31	31	28	31	30	31	30	31	31	30	31
	nov	**dec**	**jan**	**feb**	**mar**	**apr**	**may**	**jun**	**jul**	**aug**	**sep**	**oct**
AF	1.54	0	0	0	1.59	17.4	54.1	71	85.3	80.3	73.5	33.9
cfs	**0.03**	**0.00**	**0.00**	**0.00**	**0.03**	**0.29**	**0.88**	**1.19**	**1.39**	**1.31**	**1.24**	**0.55**

Structure Name: SHUMWAY AND PERKINS SYS **Water District:** 32 **ID Number:** 737

Source	YELLOWJACKET CANYON @ Mile 13 4									*Acres Irrigated*	0
Location	Q160	Q40	Q10	Section	Twnshp		Range		PM	*CIU*	A
	SW	SW	NW	36	37	N	19	W	N		

Distance from section lines *From N/S line* *From E/W line*

UTM Coordinates (NAD 83) *Northing (UTM y)* 4148196 9 *Easting (UTM x)* 154586 4 *Spotted from PLSS quarters*

Latitude/Longitude (decimal degrees) 37 4162 -108 9027

Measuring Device/Recorder

Contact JOHNSON, BOB(OWNER) *Phone*

Address PO BOX 2401 *Cell Phone*

DURANGO CO 81302 *E-mail*

Water Rights Summary	*Total Decreed Rate(s)*	*Abs*	0 0000	*Cond*	30 0000	*AP/EX*	0 0000
	Total Decreed Volume(s)	*Abs*	0 0000	*Cond*	0 0000	*AP/EX*	0 0000

Water Rights -- Transactions

Seq #	Case Number	Adjudication Date	Appropriation Date	Admin Number	O #	Priority Number	Decreed Amount	Ad. Type	Uses	Comments
1	W1751	12/31/1977	5/1/1977	46507 00000	0		30 C	S,C	4	DD DEC 1988 SEE W-1751,81CW133,85CW126 NON-C POWER TURBINE

Diversion Comments

YR	NCC Code	Acres Irrigated	Comments
1979		30	
1989		80	
1990	Structure not usable	0	
1991	Structure not usable	0	
1992	Water available, but not taken	0	
1993	Water available, but not taken	0	
1994	Water available, but not taken	0	
1995	Water available, but not taken	0	
1996		0	
1997	Water available, but not taken	0	
1998	Water available, but not taken	0	
1999	Water available, but not taken	0	POWER GENERATING SYSTEM NOT BUILT
2000	Structure not usable	0	POWER GENERATING SYSTEM NOT BUILT
2001	Structure not usable	0	POWER GENERATING SYSTEM NOT BUILT
2002	Structure not usable	0	POWER GENERATING SYSTEM NOT BUILT
2003	Structure not usable	0	POWER GENERATING SYSTEM NOT BUILT

Structure Name: ISMAY DITCH **Water District:** 32 **ID Number:** 590

Source	YELLOWJACKET CANYON @ Mile 3.6		*Acres Irrigated* 0
Location	Q160 Q40 Q10 Section Twnshp Range PM		*CIU.* A
	SE NE NW 25 36 N 20 W N		
Distance from section lines	*From N/S line*	*From E/W line.*	
UTM Coordinates (NAD 83)	*Northing (UTM y)* 4141239 0	*Easting (UTM x)* 145953 8	*GPS*
Latitude/Longitude (decimal degrees)	37 3504	-108 9967	
Measuring Device/Recorder			

Contact.	ISMAY, EUGENE(OWNER)	*Phone*	
Address	391 CNTY RD G	*Cell Phone*	
	CORTEZ CO 81321	*E-mail*	

Water Rights Summary	*Total Decreed Rate(s)*	*Abs..*	5 0000	*Cond*	0 0000	*AP/EX*	0.0000	
	Total Decreed Volume(s)	*Abs*	0 0000	*Cond*	0 0000	*AP/EX*	0 0000	

Water Rights -- Transactions

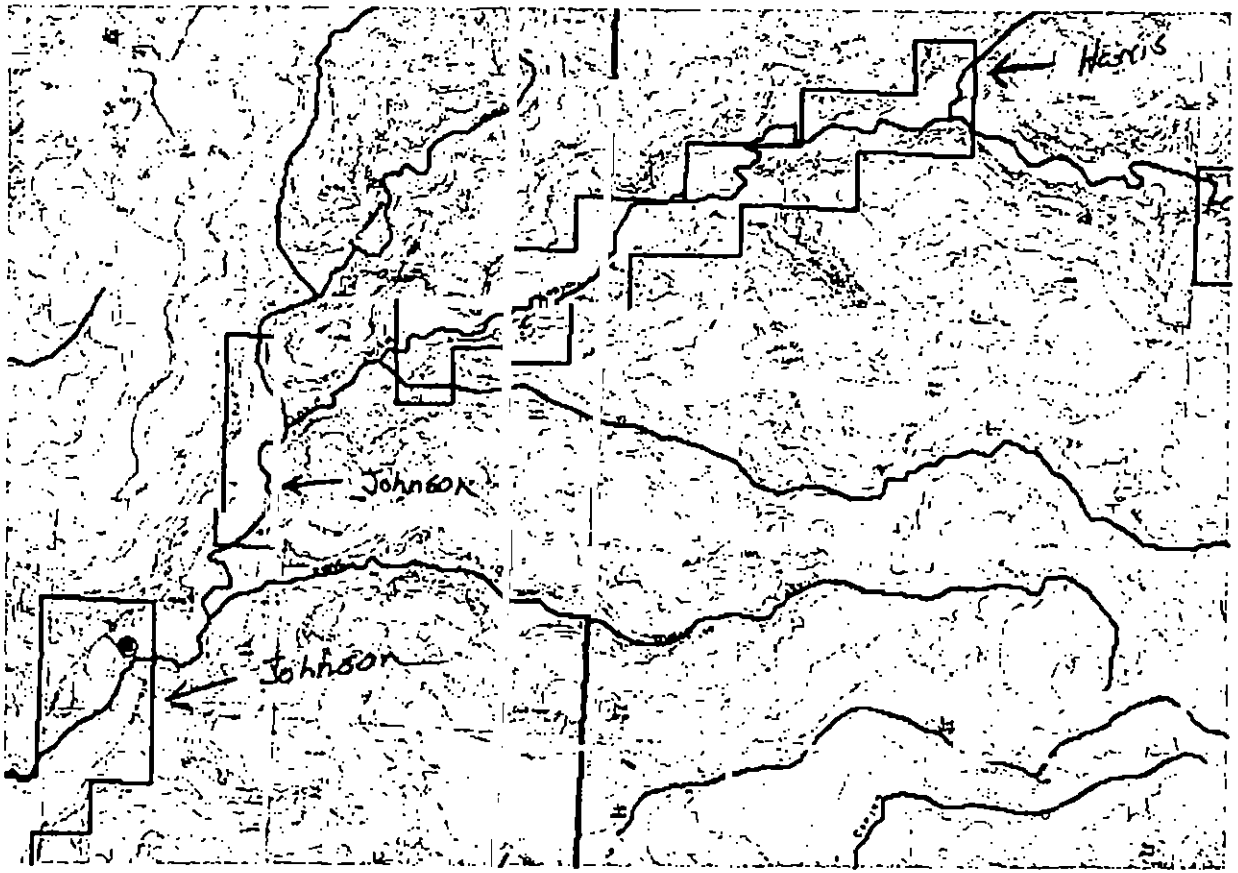
Seq #	Case Number	Adjudication Date	Appropriation Date	Admin Number	O #	Priority Number	Decreed Amount	Adj Type	Uses	Comments
1	W0238	12/31/1970	1/1/1955	41133 38351	0		5 C	S	19	DECREED LOCATION R19W

Diversion Summary in Acre-Feet - Total Water through Structure

IYR	FDU	LDU	DWC	Max Q	Nov	Dec	Jan	Feb	Mar	Apr.	May	June	July	Aug	Sept	Oct.	Total
1971	05/01	09/21	89	6 5	0	0	0	0	0	0	269	126	253	119	69 4	0	839
1972	05/01	09/24	83	5	0	0	0	0	0	0	204	122	188	33 7	27 8	0	577
1973	06/09	09/24	81	6	0	0	0	0	0	0	0	208	210	178	113	0	710
1974	04/28	09/04	105	5	0	0	0	0	0	17 9	238	182	192	166	23 8	0	821
1975	05/13	09/30	116	5	0	0	0	0	0	0	126	170	238	200	119	0	854
1976	05/06	09/26	79	5	0	0	0	0	0	0	175	84 3	158	134	41 7	0	595
1977	03/27	08/25	89	40	0	0	0	0	29 8	92 8	662	79 3	45 6	7 93	0	0	917
1978	05/01	08/16	89	5	0	0	0	0	0	0	178	277	220	68 4	0	0	744
1979	05/01	10/08	72	5	0	0	0	0	0	0	35 7	35 7	87 3	76 6	87 3	15 9	338
1980	05/20	10/01	97	4	0	0	0	0	0	0	95 2	56 5	178	96 2	88 3	5 95	520
1981	04/24	10/07	145	5	0	0	0	0	0	48 6	160	191	126	162	249	69 4	1009
1982	04/20	08/23	82	5 6	0	0	0	0	0	15 9	176	119	158	63 5	0	0	533
1983	05/23	09/20	86	5	0	0	0	0	0	0	53 6	218	206	79 3	111	0	668
1984	05/08	09/10	87	4	0	0	0	0	0	0	142	130	112	150	47 6	0	584
1985	05/20	09/24	110	4	0	0	0	0	0	0	95 2	206	107	202	190	0	801
1986	05/04	09/02	109	5	0	0	0	0	0	0	214	218	190	212	15 9	0	850
1987	05/08	10/05	94	5	0	0	0	0	0	0	210	126	158	0	230	39 7	765
1988	05/08	09/27	105	5	0	0	0	0	0	0	148	158	230	166	214	0	918
1989	04/17	10/18	141	5	0	0	0	0	0	111	220	190	162	140	206	95 2	1126
1990	04/11	10/10	152	5	0	0	0	0	0	39 7	192	194	238	307	113	63 5	1148
1991	04/26	10/24	130	6	0	0	0	0	0	29.8	301	226	164	154	126	168	1172
1992	04/27	09/22	91	6	0	0	0	0	0	31 7	162	148	224	158	148	0	874
1993	05/25	10/13	100	8	0	0	0	0	0	0	111	281	214	95 2	136	103	942
1994	04/18	10/27	139	5	0	0	0	0	0	103	259	184	247	79 3	138	138	1152
1995	05/25	10/09	71	5	0	0	0	0	0	0	69 4	9 92	267	138	128	89 3	704
1996	06/13	10/21	76	6	0	0	0	0	0	0	0	55 5	206	226	107	249	844
1997	05/10	09/23	76	6	0	0	0	0	0	0	261	47 6	214	154	226	0	904
1998	05/22	10/04	136	6	0	0	0	0	0	0	119	357	368	368	357	47 6	1618
1999	06/01	07/29	59	6	0	0	0	0	0	0	0	357	345	0	0	0	702
2000	05/29	10/31	132	6	0	0	0	0	0	0	35 7	357	154	297	357	368	1570
2001	11/01	09/05	95	6	83 3	0	0	0	0	0	0	249	328	355	59 5	0	1076

ESRI ArcExplorer 2.0

Harris



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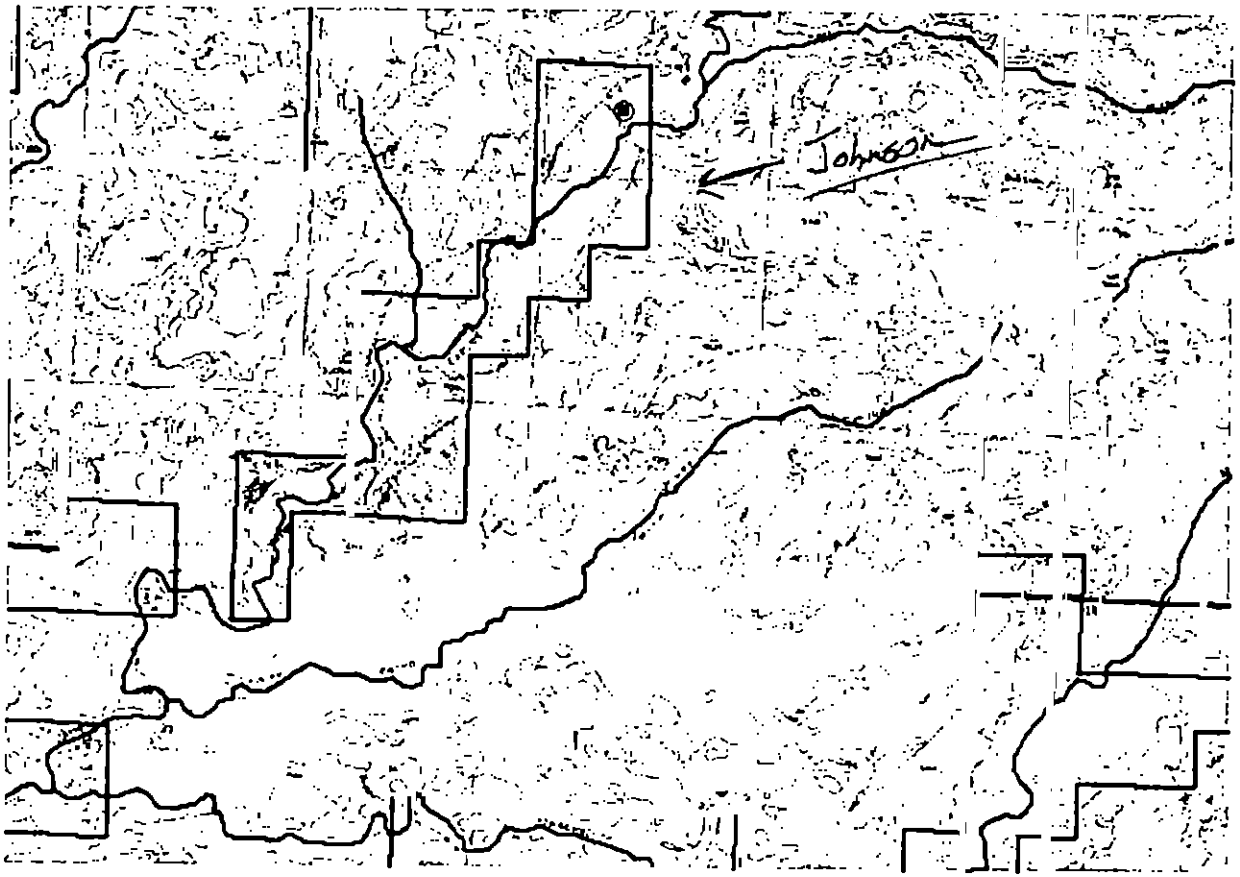
- rivers83
- secdiv783adj
- wells83adj
- comp_yield2
- expired
- roads83
- quad83div7adj
- highways83
- distdiv783

N

Wednesday, Nov 10 2004

ESRI ArcExplorer 2.0

Johnson



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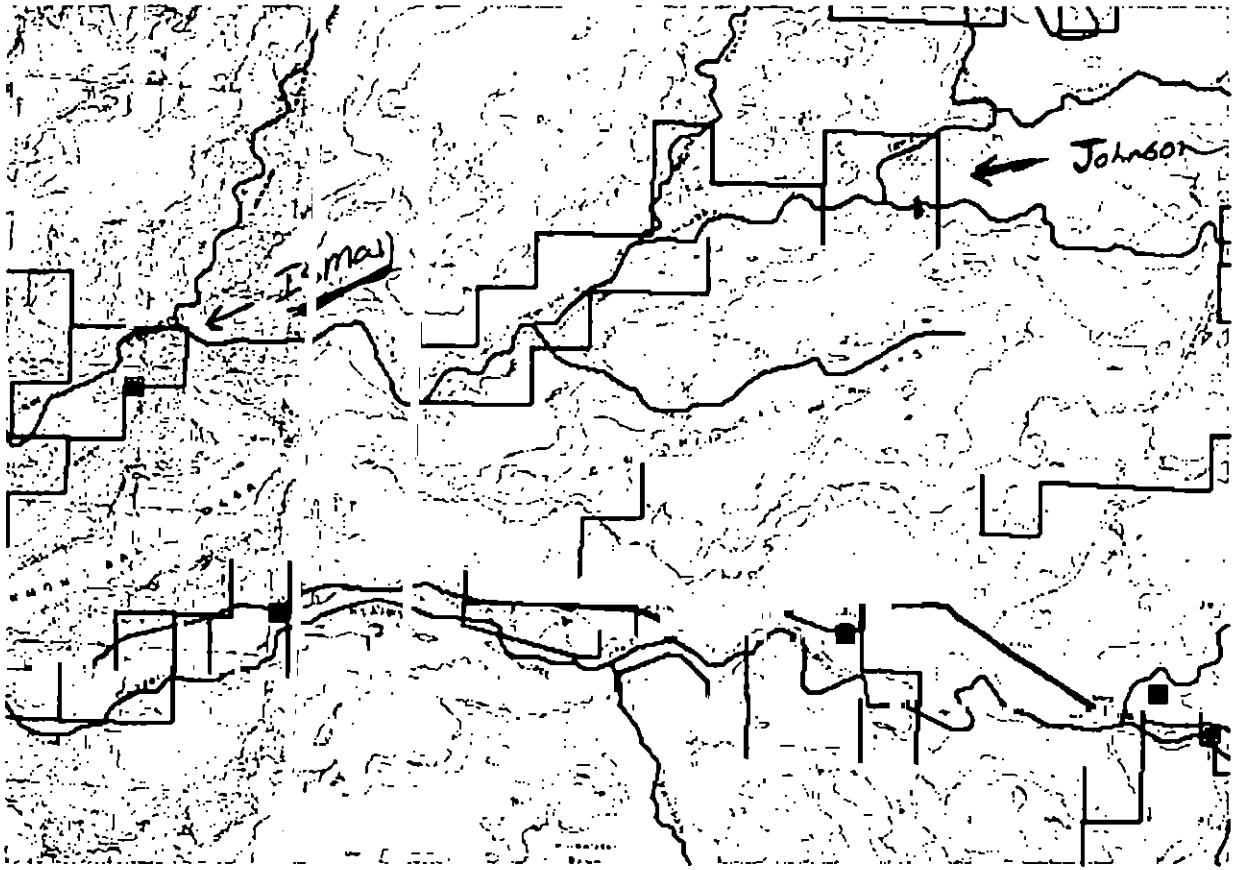

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Wednesday, Nov 10 2004

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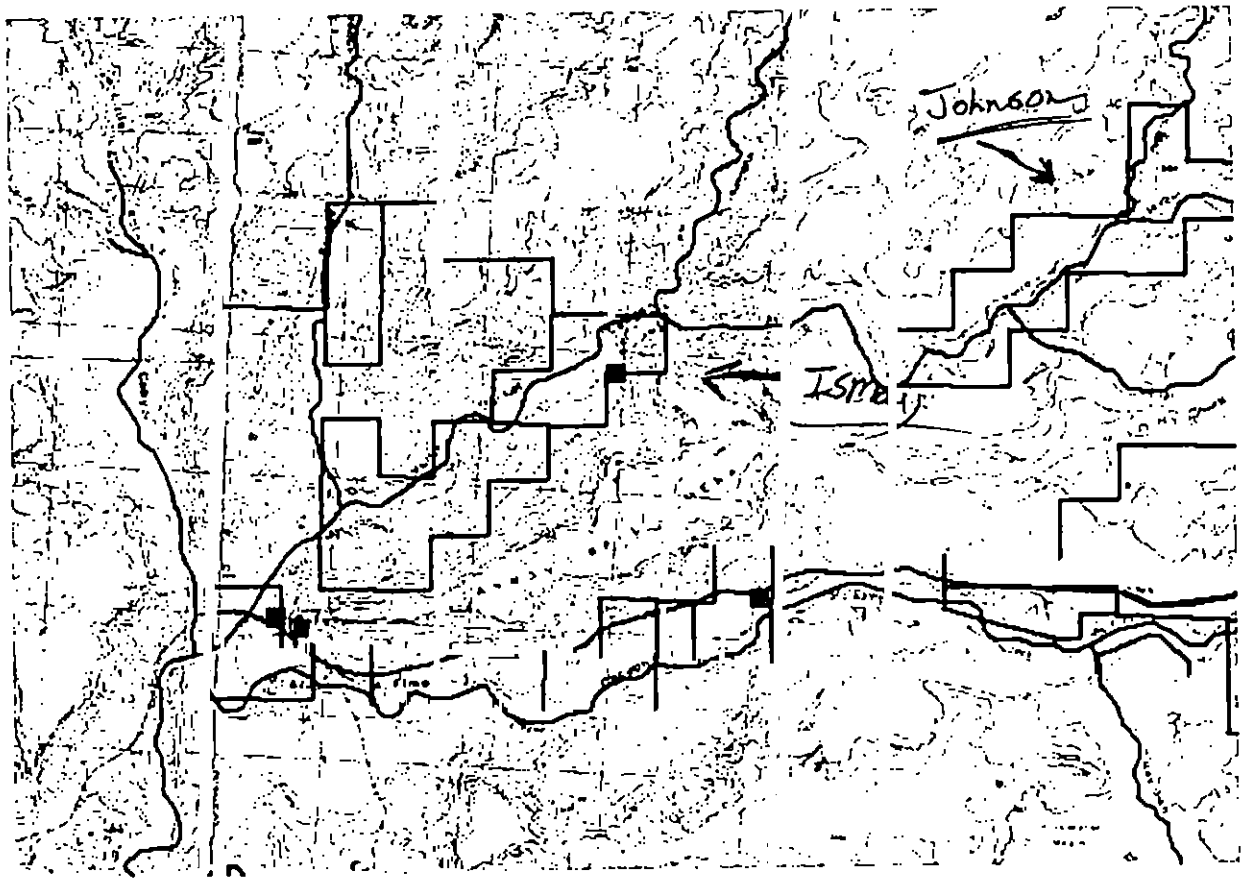

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