

Stream: North Fork Mesa Creek

Executive Summary

Water Division: 4
Water District: 63
CDOW#: 41537
CWCB ID#: 06/04/A-005

Segment:

Upper Terminus: Cedar Tree Ditch

Latitude: 38d29'43"N Longitude: 108d47'42.34"W
UTM North: 4267598.388 UTM East: 168999.228
NE1/4, SE1/4, Sctn19, T49N, R17W
53 ft. W of the E Section Line, 2230 ft. N of the S Section Line

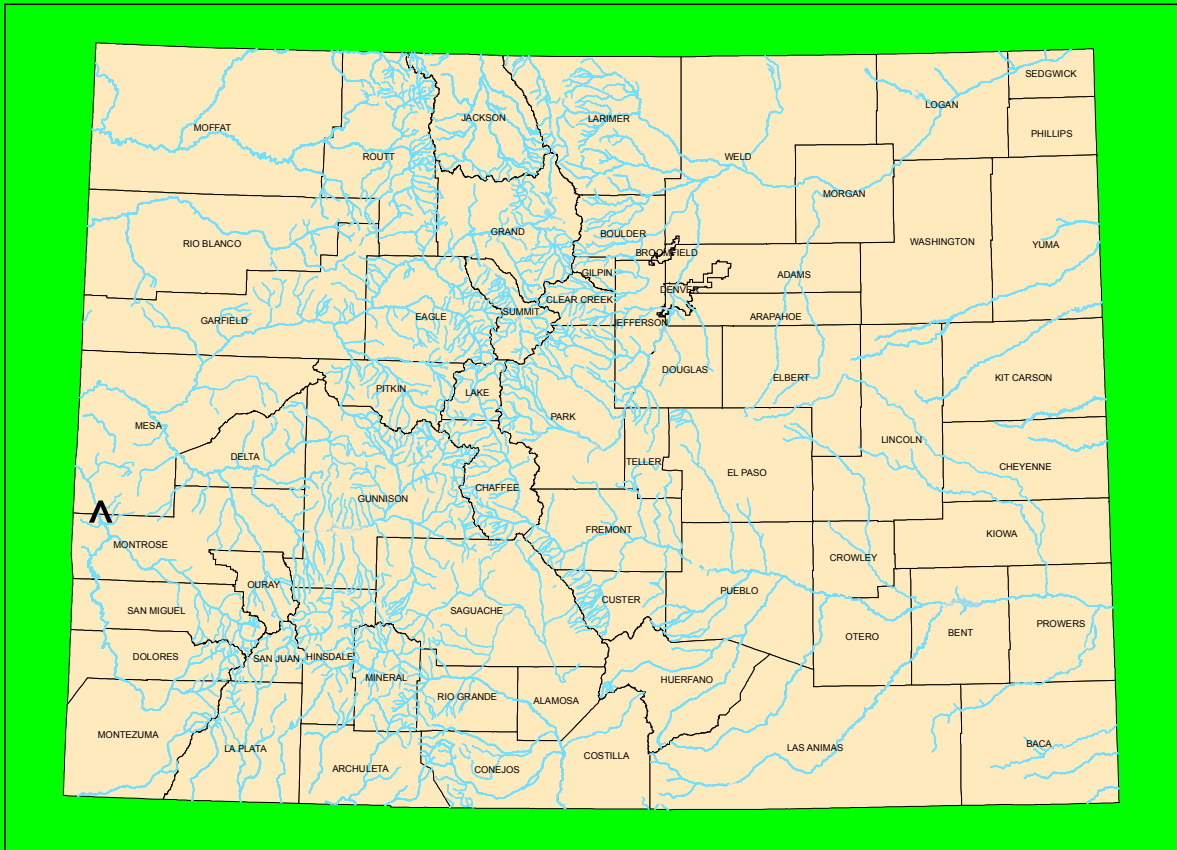
Lower Terminus: South Fork Mesa Creek

Latitude: 38d27'09.88"N Longitude: 108d49'02.11"W
UTM North: 4262956.580 UTM East: 166869.953
SE1/4, NE1/4, Sctn2, T48N, R18W
625 ft. W of the E Section Line, 2500 ft. S of the N Section Line

Counties: Montrose
Length: 3.90 miles
USGS Quad(s): Red Canyon
ISF Appropriation: 2.1 cfs (April 1 – May 31)



North Fork Mesa Creek



Summary

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

Colorado's Instream Flow Program was created in 1973 when the Colorado State Legislature recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment" (see 37-92-102 (3) C.R.S.). The statute vests the CWCB with the exclusive authority to appropriate and acquire instream flow and natural lake level water rights. In order to encourage other entities to participate in Colorado's Instream Flow Program, the statute directs the CWCB to request instream flow recommendations from other state and federal agencies. The Bureau of Land Management recommended this segment of North Fork Mesa Creek to the CWCB for inclusion into the Instream Flow Program. North Fork Mesa 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. An existing instream flow water right extends from the headwaters of North Fork Mesa Creek down to the Cedar Tree Ditch. BLM is interested in protecting the connectivity between the fishery in North Fork Mesa Creek and the fisheries in South Fork Mesa Creek and the Dolores River.

Connectivity occurs during the annual period when snowmelt runoff produces a wetted channel from the Cedar Tree Ditch to the Dolores River.

In addition, BLM is seeking to protect spawning habitat for sensitive fish species. BLM believes this can be accomplished with a seasonal instream flow appropriation. North Fork Mesa Creek provides habitat for sensitive fish species that live in cool-water and warm-water habitats. These species are among three species (flannelmouth sucker, bluehead sucker, and roundtail chub) that are the focus of a multi--state, coordinated conservation effort. State wildlife agencies for all states located within the Colorado River basin have signed a range-wide conservation strategy with the objective of preventing a listing of these species under the federal Endangered Species Act. Under this comprehensive strategy, each state will develop an individual conservation plan that contains specific, on-the-ground conservation objectives, including protection of flow through stream reaches that support the species. The Bureau of Land Management is a cooperating agency in this effort throughout the Colorado River basin. BLM Colorado intends to be a signatory to the Colorado plan that is under development by the Colorado Division of Wildlife.

North Fork Mesa Creek is 13.2 miles long. It begins at its headwaters on the southwestern flank of the Uncompahgre Butte at an elevation of approximately 8,900 feet. It terminates at the confluence with South Fork Mesa Creek at an elevation of approximately 4,900 feet. Approximately 42% of the 3.9-mile segment addressed by this report is located on federal lands. North Fork Mesa Creek is located within Montrose and Mesa Counties. The total drainage area of the creek is approximately 54.8 square miles. North Fork Mesa Creek generally flows in a southwesterly direction.

The subject of this report is a segment of the North Fork Mesa Creek beginning at the headgate of the Cedar Tree Ditch and extending downstream to the confluence with South Fork Mesa Creek. The proposed segment is located northwest of the town of Naturita. The staff has received one recommendation for this segment from the BLM. The recommendation for this segment is discussed below.

Instream Flow Recommendation(s)

BLM recommended 2.1 cfs (April 1 to May 31) based on data collection efforts on April 19, 2002 and March 17, 2005. The modeling results from these survey efforts are within the confidence interval produced by the R2Cross model.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Cedar Tree Ditch	South Fork Mesa Creek	3.90	58	42

100% of the public lands are owned by the BLM.

Biological Data

The BLM has conducted field surveys of the fishery resources on this stream and have found a natural environment that can be preserved. As reported in the letter from BLM to the CWCB “North Fork Mesa Creek is a moderate gradient stream with suitable substrate for both salmonids and sensitive fish species. Because of naturally low streamflows in late summer and agricultural diversions, the stream typically has sufficient water for fish habitat only during the snowmelt runoff season. During the snowmelt runoff period, rainbow trout can pass through this reach to create connectivity with other trout populations in South Fork Mesa Creek and the Dolores River. In addition, flannelmouth suckers and bluehead suckers can utilize this habitat for spawning purposes.” (See BLM Fish Survey in Appendix B).

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

Table 1: Data

Party	Date	Q	250%-40%	Summer (3/3)	Winter (2/3)
BLM	04/09/2002	0.7	1.7 – 0.3	⁽¹⁾	0.7
BLM	03/17/2005	3.86	9.7 – 1.5	2.1	⁽¹⁾

BLM = Bureau of Land Management

DOW = Division of Wildlife

(1) Predicted flow outside of the accuracy range of Manning’s Equation.

? = Criteria never met in R2CROSS Staging Table.

Biologic Flow Recommendation

BLM's flow recommendation for the snowmelt runoff period, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 2.1 cfs (See Table 1). It is our belief that recommendations that fall outside of the accuracy range of the model, over 250% of the measured discharge or under 40% of the measured discharge may not give an accurate estimate of the necessary instream flow required.

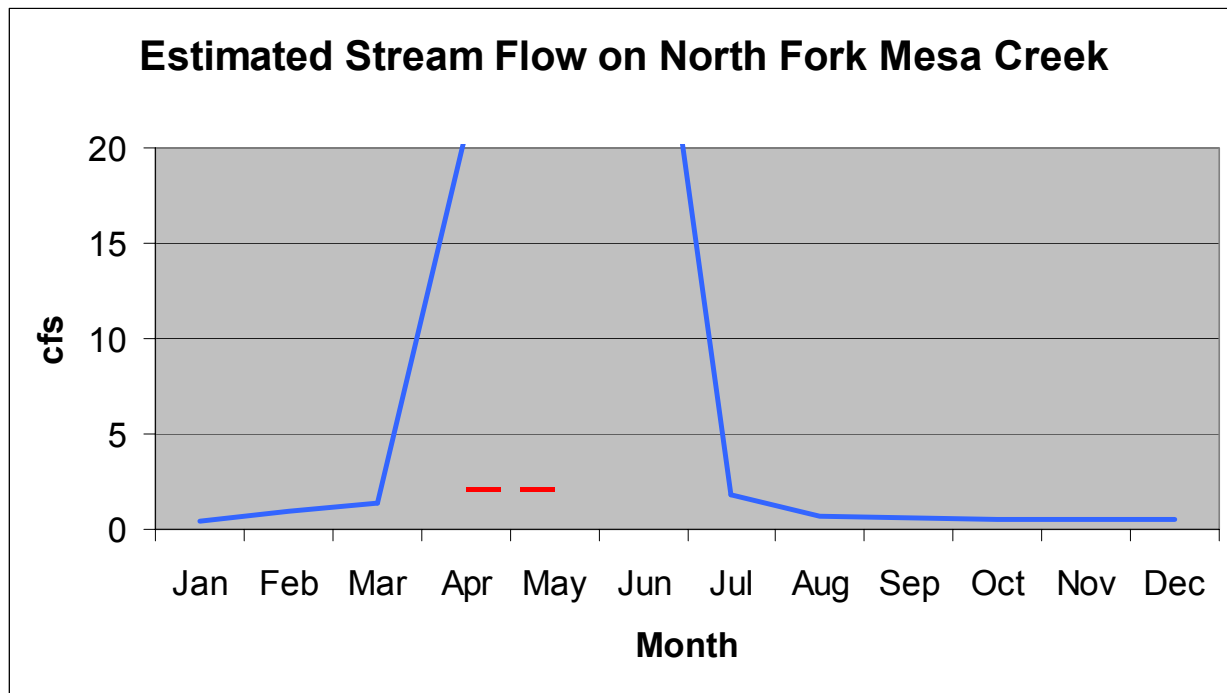
Hydrologic Data

After receiving the cooperating agency's biologic recommendation, the CWCB and BLM staff conducted an evaluation of the stream hydrology to determine if water was physically available for an instream flow appropriation. Although there is a substantial amount of streamflow gage data available for the Uncompahgre Plateau and Glade Park, most of this data is severely impacted by diversions and irrigation use. This situation makes it difficult to estimate the natural flow regime for the watersheds on the Plateau. Without specific gage data to evaluate, the next best approach is a regional equation that estimates annual flow characteristics. The USGS has developed regional equations (Estimation of Natural Streamflow Characteristics in Western Colorado, Water Resources Investigations Report 85-4086, 1985) that apply to the Uncompahgre Plateau and Glade Park based on basin drainage area, mean annual precipitation, mean basin elevation and mean basin slope. The report "Uncompahgre Plateau and Glade Park Annual Hydrograph Estimation" in Appendix C, explains staff's water availability analysis in more detail. Table 2 below displays the estimated stream flow of North Fork Mesa Creek.

For this reach, the synthetic hydrograph shows that the summer flow recommendation of 2.1 cfs is available from April 1st to May 31st.

Table 2: Estimated Average Stream Flow on North Fork Mesa Creek:

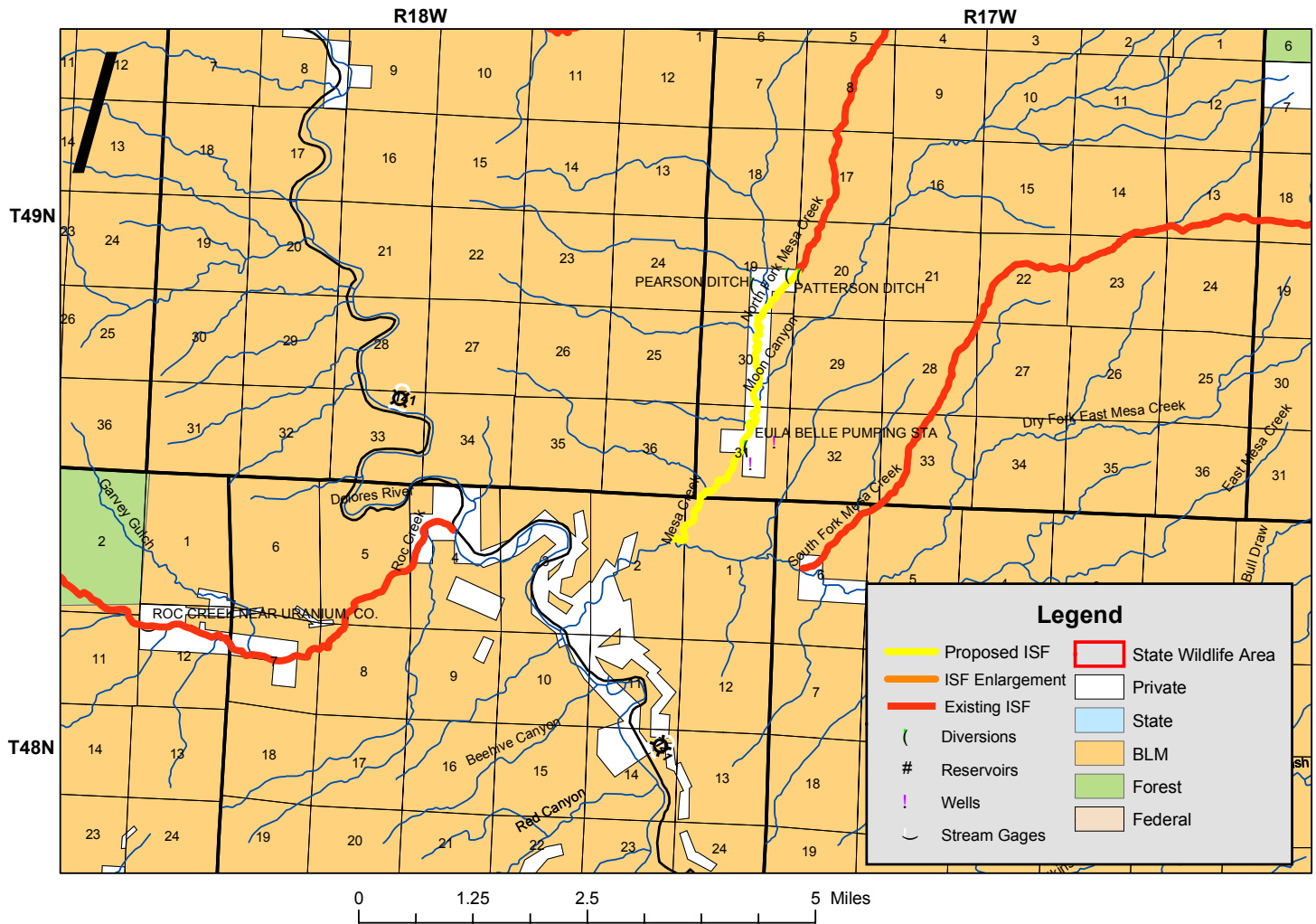
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(cfs)	0.44	0.95	1.37	20.85	76.06	34.90	1.78	0.69	0.57	0.54	0.52	0.48



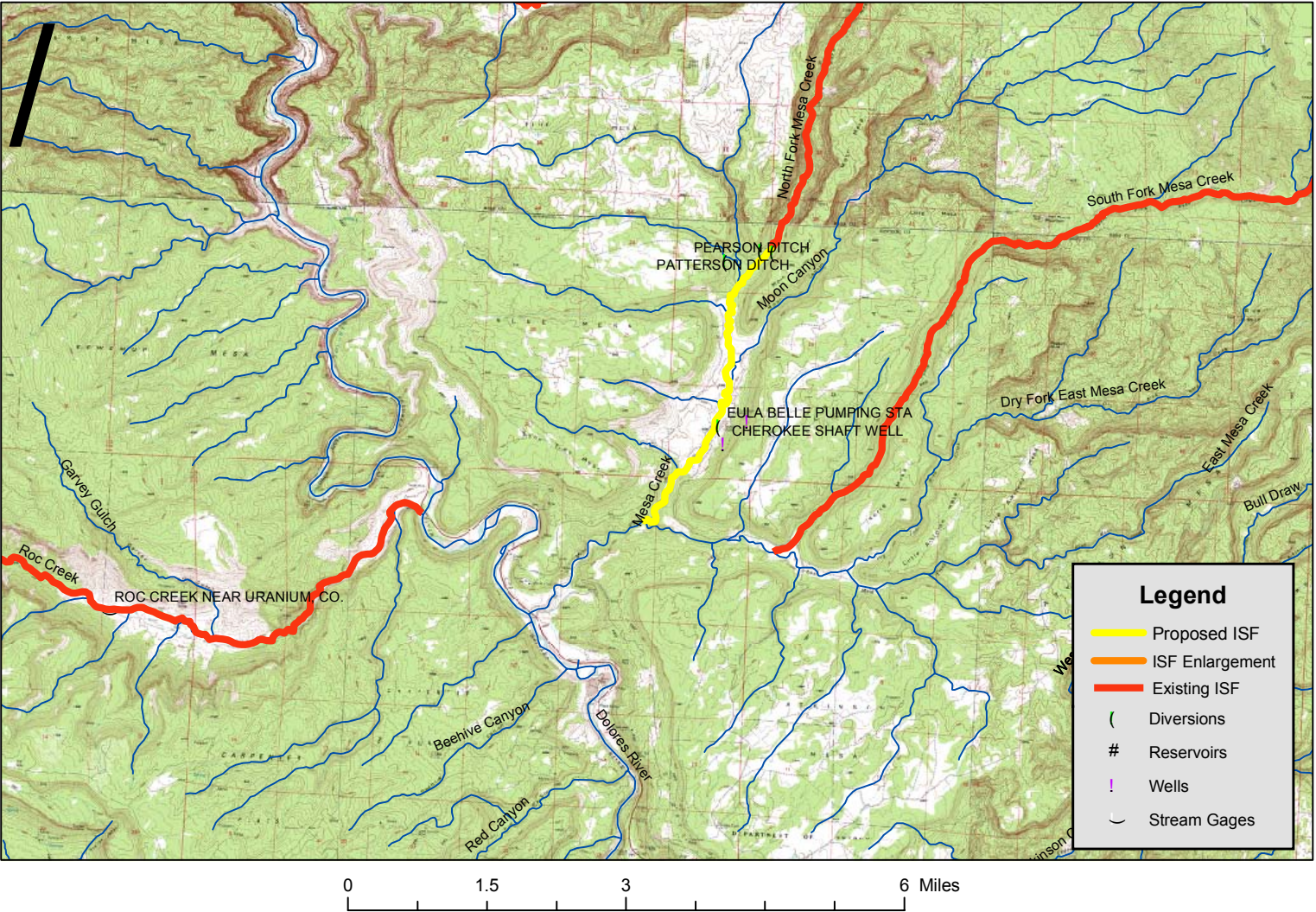
Existing Water Right Information

Staff has analyzed the water rights tabulation and consulted with the Division Engineer Office (DEO) to identify any potential water availability problems. There are two other decreed water rights within this reach of stream, the Patterson Ditch and the Pearson Ditch. Based on this analysis and conversations with the DEO, Staff has determined that water is available for appropriation on North Fork Mesa Creek, from the Cedar Tree Ditch to the confluence with South Fork Mesa Creek, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid existing water rights.

North Fork Mesa Creek



North Fork Mesa Creek



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: North Fork Mesa Creek

Segment:

Upper Terminus: Cedar Tree Ditch

Latitude: 38d29'43"N Longitude: 108d47'42.34"W

UTM North: 4267598.388 UTM East: 168999.228

NE1/4, SE1/4, Sctn19, T49N, R17W

53 ft, W of the E Section Line, 2230 ft, N of the S Section Line

Lower Terminus: South Fork Mesa Creek

Latitude: 38d27'09.88"N Longitude: 108d49'02.11"W

UTM North: 4262956.580 UTM East: 166869.953

SE1/4, NE1/4, Sctn2, T48N, R18W

625 ft, W of the E Section Line, 2500 ft, S of the N Section Line

Counties: Montrose

Length: 3.90 miles

USGS Quad(s): Red Canyon

ISF Appropriation: 2.1 cfs (April 1 – May 31)

APPENDIX – A

ISF Recommendation



IN REPLY REFER TO
CO-932
7250

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Colorado State Office
2850 Youngfield Street
Lakewood, Colorado 80215-7093



www.co.blm.gov

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

DEC 14 2005

Dear Mr. Merriman:

The Bureau of Land Management (BLM) is writing this letter to formally communicate its instream flow recommendation for North Fork Mesa Creek, located in Water Division 4.

Location and Land Status. North Fork Mesa Creek is tributary to Mesa Creek approximately 20 miles northwest of Naturita. The stream reach covered by the surveys conducted on BLM lands runs from the headgate of Cedar Tree Ditch to the confluence with South Fork Mesa Creek. Approximately 42% of the 3.9 mile reach is located on BLM lands

Biological Summary. North Fork Mesa Creek is a moderate gradient stream with suitable substrate for both salmonids and sensitive fish species. Because of naturally low streamflows in late summer and agricultural diversions, this stream reach typically has sufficient water for fish habitat only during the snowmelt runoff season. During the snowmelt runoff period, rainbow trout can pass through this reach to create connectivity with other trout populations in South Fork Mesa Creek and the Dolores River. In addition, flannelmouth suckers and bluehead suckers can utilize this habitat for spawning purposes. BLM is working to keep these species off the list of threatened and endangered species by protecting suitable habitat.

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

2.10 cubic feet per second is recommended for the snowmelt runoff period from April 1 to May 31. This recommendation is driven by the average depth criteria, because the stream channel is wide. Maintaining the average depth criteria is important for spawning and for providing additional physical habitat for sensitive species that move up into the creek from the Dolores River during snowmelt runoff. Protecting snowmelt runoff flows is also important for recharging the alluvial aquifer, which provides groundwater supplies to the riparian community during the late summer.

BLM is not making an instream flow recommendation for the remainder of the year. Naturally low flows, combined with upstream irrigation diversion, results in extremely low flows during the remainder of the year. Accordingly, BLM recommends that the Colorado Water Conservation Board (CWCB) make an appropriation only for the snowmelt runoff season, and that CWCB appropriate additional water at other times of the year only if additional flows become available.

Water Availability. BLM is aware of three decreed diversions in this reach, including the Cedar Tree Ditch, Pearson Ditch, and Patterson Ditch. BLM is not aware of any historic gaging data for this stream reach. As an alternative, BLM recommends using the synthetic hydrograph methodology developed by BLM for the Uncompahgre Plateau to obtain an estimate of water availability. The Colorado Water Conservation Board holds an existing, year-round instream flow water right on this creek that extends from the headwaters to the headgate of the Cedar Tree Ditch. The existing instream flow water right will help insure water availability for this reach.

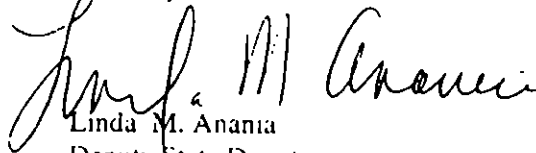
Relationship to Management Plans. This stream segment is important to BLM because it is located in a watershed for which BLM has created a coordinated resource management plan. The goals of this plan include improving both aquatic habitat and riparian habitat along streams via improved grazing management and transportation route management. BLM is also working with numerous stakeholders in an effort to improve overall wildlife habitat on the Uncompahgre Plateau for both terrestrial and aquatic species.

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

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

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

Sincerely,



Linda M. Anania
Deputy State Director
Resources and Fire

/s/ Linda M. Anania

4 Enclosures

cc: Jim Ferguson, Uncompahgre Field Office
Dennis Murphy, Uncompahgre Field Office
Barb Sharrow, Uncompahgre Field Office

APPENDIX – B

Field Data



COLORADO WATER
CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



LOCATION INFORMATION

STREAM NAME: North Fork Mesa Creek CROSS-SECTION NO: 1
CROSS-SECTION LOCATION: 250' upstream from confluence w/ South Fork

DATE: 3-17-05 OBSERVERS: R. Smith, D. Murphy
LEGAL DESCRIPTION: NE SECTION: 2 TOWNSHIP: 48N RANGE: 18E PM: N.M.
COUNTY: Montrose WATERSHED: Dolores WATER DIVISION: 4 DOW WATER CODE: 4706D
MAP(S): USGS Red Canyon 7.5' GPS: 690552
4258329

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: (YES) NO METER TYPE: Marsh-McBirney
METER NUMBER: DATE RATED CALIB/SPIN: SEC TAPE WEIGHT: sumeyed 100/100: sumeyed
CHANNEL BED MATERIAL SIZE RANGE: GRAVEL / Cobble PHOTOGRAPHS TAKEN: YES/NO NUMBER OF PHOTOGRAPHS: 3

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)	LEGEND
☒ Tape @ Stake LB	0.0	<u>sumeyed</u>	Stake ☒
☒ Tape @ Stake RB	0.0	<u>sumeyed</u>	Station ☐
☐ WS @ Tape LB/RB	0.0	<u>6.62/6.61</u>	Photo ☐
☐ WS Upstream	<u>15'</u>	<u>6.59</u>	Direction of Flow ☒
☐ WS Downstream	<u>5'</u>	<u>6.70</u>	
SLOPE	<u>0.11/20.0' = 0.06</u>		

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES ☒ NO ☐ DISTANCE ELECTROFISHED: ft FISH CAUGHT: YES/NO WATER CHEMISTRY SAMPLED: YES ☒ NO ☐

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

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

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

caddisfly, mayfly, beetles - early in season

COMMENTS

TVS 30(1)

8°C stream temp

DISCHARGE/CROSS SECTION NOTES

STREAM NAME:

N.F.K. MSA CREEK

CROSS-SECTION NO

1

DATE

3/17/05

SHEET 1 OF 1

BEGINNING OF MEASUREMENT

EDGE OF WATER LOOKING DOWNSTREAM
(0.0 AT STAKE)

LEFT / RIGHT

Gage Reading

0.3

TIME

4:15 PM

Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inal (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec)	Area (ft ²)	Discharge (cfs)
S		0.0		4.58							
G		3.2		5.16							
		4.0		6.05							
		5.0		10.34							
W		5.5		10.102							
		6.0		6.71	0.10				0.53		
		6.5		6.83	0.20				0.87		
		7.0		6.87	0.25				1.40		
		7.5		6.88	0.25				1.49		
		8.0		6.88	0.25				1.63		
		8.5		6.94	0.30				1.55		
		9.0		6.94	0.30				1.67		
		9.5		6.98	0.40				1.71		
		10.0		6.97	0.25				1.33		
		10.5		6.83	0.15				1.67		
		11.0		6.92	0.25				1.05		
		11.5		6.87	0.25				1.60		
		12.0		6.94	0.30				1.65		
		12.5		7.00	0.35				0.67		
		13.0		6.94	0.40				1.88		
		13.5		7.00	0.40				1.64		
		14.0		7.03	0.40				1.45		
		14.5		6.92	0.30				1.01		
		15.0		6.91	0.30				1.16		
		15.5		6.87	0.25				0.59		
W		16.0		6.61							
G		17.6		5.70							
S		19.0		4.29							

TOTALS

End of Measurement

Time 4:30 PM

Gage Reading

0.3

CALCULATIONS PERFORMED BY

CALCULATIONS CHECKED BY

GL-1 FEATURE

GL-1 FEATURE

DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
Total Data Points = 28						
0	4.58			0.00	0.00	0.00
3.2	5.66			0.00	0.00	0.00
4	6.05			0.00	0.00	0.00
5	6.38			0.00	0.00	0.00
5.5	6.62			0.00	0.00	0.00
6	6.71	0.01	0.53	0.01	0.00	6.70
6.5	6.83	0.20	0.87	0.10	0.09	6.63
7	6.87	0.25	1.40	0.13	0.18	6.62
7.5	6.88	0.25	1.49	0.13	0.19	6.63
8	6.88	0.25	1.63	0.13	0.20	6.63
8.5	6.94	0.30	1.55	0.15	0.23	6.64
9	6.94	0.30	1.67	0.15	0.25	6.64
9.5	6.98	0.40	1.71	0.20	0.34	6.58
10	6.91	0.25	1.33	0.13	0.17	6.66
10.5	6.83	0.15	1.67	0.08	0.13	6.68
11	6.92	0.25	1.05	0.13	0.13	6.67
11.5	6.87	0.25	1.60	0.13	0.20	6.62
12	6.94	0.30	1.65	0.15	0.25	6.64
12.5	7.00	0.35	0.67	0.18	0.12	6.65
13	6.99	0.40	1.88	0.20	0.38	6.59
13.5	7.00	0.40	1.64	0.20	0.33	6.60
14	7.03	0.40	1.45	0.20	0.29	6.63
14.50	6.92	0.30	1.01	0.15	0.15	6.62
15.00	6.91	0.30	1.16	0.15	0.17	6.61
15.50	6.87	0.25	0.59	0.13	0.07	6.62
16.00	6.61			0.00	0.00	0.00
17.60	5.70			0.00	0.00	0.00
19.00	4.29			0.00	0.00	0.00

Totals	2 78	3 86
--------	------	------

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

LOCATION INFORMATION

STREAM NAME: NORTH FORK MESA CREEK
XS LOCATION 250' UPSTREAM FROM CONFL W/ S FORK
XS NUMBER 1

DATE: 17-Mar-05
OBSERVERS: R SMITH, D MURPHY

1/4 SEC NE
SECTION 2
TWP 48 N
RANGE 18 W
PM. N.M.

COUNTY: MONTROSE
WATERSHED: DOLORES
DIVISION: 4
DOW CODE: 47060

USGS MAP: RED CANYON 7.5
USFS MAP 0

SUPPLEMENTAL DATA

*** NOTE ***

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

TAPE WT: 0 0106
TENSION: 99999

CHANNEL PROFILE DATA

SLOPE: 0 06

INPUT DATA CHECKED BY DATE

ASSIGNED TO DATE

STREAM NAME NORTH FORK MESA CREEK
 XS LOCATION 250' UPSTREAM FROM CONFL W/ S FORK
 XS NUMBER 1

DATA POINTS=

28

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
S	0.00	4.58			0.00		0.00	0.00	0.0%
1 GL	3.20	5.66			0.00		0.00	0.00	0.0%
	4.00	6.05			0.00		0.00	0.00	0.0%
	5.00	6.38			0.00		0.00	0.00	0.0%
W	5.50	6.62			0.00		0.00	0.00	0.0%
	6.00	6.71	0.01	0.53	0.51	0.01	0.01	0.00	0.1%
	6.50	6.83	0.20	0.87	0.51	0.20	0.10	0.09	2.3%
	7.00	6.87	0.25	1.40	0.50	0.25	0.13	0.18	4.5%
	7.50	6.88	0.25	1.49	0.50	0.25	0.13	0.19	4.8%
	8.00	6.88	0.25	1.63	0.50	0.25	0.13	0.20	5.3%
	8.50	6.94	0.30	1.55	0.50	0.30	0.15	0.23	6.0%
	9.00	6.94	0.30	1.67	0.50	0.30	0.15	0.25	6.5%
	9.50	6.99	0.40	1.71	0.50	0.40	0.20	0.34	8.9%
	10.00	6.91	0.25	1.33	0.50	0.25	0.13	0.17	4.3%
	10.50	6.83	0.15	1.67	0.51	0.15	0.08	0.13	3.2%
	11.00	6.82	0.25	1.05	0.51	0.25	0.13	0.13	3.4%
	11.50	6.87	0.25	1.60	0.50	0.25	0.13	0.20	5.2%
	12.00	6.94	0.30	1.65	0.50	0.30	0.15	0.25	6.4%
	12.50	7.00	0.35	0.67	0.50	0.35	0.18	0.12	3.0%
	13.00	6.99	0.40	1.88	0.50	0.40	0.20	0.38	9.7%
	13.50	7.00	0.40	1.64	0.50	0.40	0.20	0.33	8.5%
	14.00	7.03	0.40	1.45	0.50	0.40	0.20	0.29	7.5%
	14.50	6.92	0.30	1.01	0.51	0.30	0.15	0.15	3.9%
	15.00	6.91	0.30	1.16	0.50	0.30	0.15	0.17	4.5%
	15.50	6.87	0.25	0.59	0.50	0.25	0.13	0.07	1.9%
W	16.00	6.61			0.56		0.00	0.00	0.0%
1 GL	17.60	5.70			0.00		0.00	0.00	0.0%
S	19.00	4.29			0.00		0.00	0.00	0.0%

TOTALS

10.64

0.4

(Max.)

2.78

3.86

100.0%

Manning's n =

0.1071

Hydraulic Radius =

0.26133572

STREAM NAME	NORTH FORK MESA CREEK
XS LOCATION	250' UPSTREAM FROM CONFL W/ S FORK
XS NUMBER	1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	2.78	2.96	6.5%
6.37	2.78	5.71	105.2%
6.39	2.78	5.48	97.0%
6.41	2.78	5.25	88.9%
6.43	2.78	5.02	80.7%
6.45	2.78	4.80	72.7%
6.47	2.78	4.58	64.7%
6.49	2.78	4.36	56.8%
6.51	2.78	4.14	48.9%
6.53	2.78	3.92	41.0%
6.55	2.78	3.70	33.3%
6.57	2.78	3.49	25.5%
6.58	2.78	3.38	21.7%
6.59	2.78	3.28	17.9%
6.60	2.78	3.17	14.1%
6.61	2.78	3.07	10.3%
6.62	2.78	2.96	6.5%
6.63	2.78	2.86	2.7%
6.64	2.78	2.75	-1.0%
6.65	2.78	2.65	-4.8%
6.66	2.78	2.55	-8.4%
6.67	2.78	2.44	-12.1%
6.69	2.78	2.24	-19.3%
6.71	2.78	2.04	-26.5%
6.73	2.78	1.85	-33.5%
6.75	2.78	1.66	-40.5%
6.77	2.78	1.46	-47.3%
6.79	2.78	1.28	-54.1%
6.81	2.78	1.09	-60.8%
6.83	2.78	0.91	-67.4%
6.85	2.78	0.73	-73.8%
6.87	2.78	0.56	-79.9%

WATERLINE AT ZERO	
AREA ERROR =	6.632

STREAM NAME NORTH FORK MESA CREEK
 XS LOCATION 250' UPSTREAM FROM CONFL W/ S FORK
 XS NUMBER 1

Constant Manning's n

GL = lowest Grassline elevation corrected for sag

STAGING TABLE

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

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG DEPTH (FT)	MAX DEPTH (FT)	AREA (SQ FT)	WETTED PERIM (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG VELOCITY (FT/SEC)
GL	5.70	14.32	1.00	1.33	14.34	14.88	100.0%	0.96	47.50	3.31
	5.73	14.20	0.98	1.30	13.88	14.75	99.1%	0.94	45.27	3.26
	5.78	14.00	0.94	1.25	13.17	14.53	97.6%	0.91	41.91	3.18
	5.83	13.81	0.90	1.20	12.48	14.32	96.2%	0.87	38.67	3.10
	5.88	13.62	0.87	1.15	11.79	14.10	94.7%	0.84	35.55	3.02
	5.93	13.43	0.83	1.10	11.11	13.88	93.3%	0.80	32.55	2.93
	5.98	13.24	0.79	1.05	10.45	13.67	91.8%	0.76	29.67	2.84
	6.03	13.05	0.75	1.00	9.79	13.45	90.4%	0.73	26.90	2.75
	6.08	12.83	0.71	0.95	9.14	13.21	88.7%	0.69	24.30	2.66
	6.13	12.59	0.68	0.90	8.51	12.95	87.0%	0.66	21.84	2.57
	6.18	12.35	0.64	0.85	7.88	12.69	85.2%	0.62	19.50	2.47
	6.23	12.11	0.60	0.80	7.27	12.43	83.5%	0.59	17.28	2.38
	6.28	11.87	0.56	0.75	6.67	12.17	81.7%	0.55	15.18	2.28
	6.33	11.63	0.52	0.70	6.08	11.91	80.0%	0.51	13.21	2.17
	6.38	11.40	0.48	0.65	5.51	11.65	78.3%	0.47	11.36	2.06
	6.43	11.20	0.44	0.60	4.94	11.43	76.8%	0.43	9.60	1.94
	6.48	11.01	0.40	0.55	4.39	11.21	75.3%	0.39	7.98	1.82
	6.53	10.82	0.36	0.50	3.84	11.00	73.9%	0.35	6.48	1.69
	6.58	10.63	0.31	0.45	3.31	10.78	72.4%	0.31	5.11	1.54
WL	6.63	10.39	0.27	0.40	2.78	10.52	70.7%	0.26	3.89	1.40
	6.68	10.02	0.23	0.35	2.27	10.13	68.1%	0.22	2.84	1.25
	6.73	9.67	0.18	0.30	1.78	9.77	65.6%	0.18	1.94	1.09
	6.78	9.37	0.14	0.25	1.30	9.45	63.5%	0.14	1.18	0.91
	6.83	9.02	0.09	0.20	0.84	9.08	61.0%	0.09	0.59	0.70
	6.88	6.50	0.07	0.15	0.43	6.54	43.9%	0.07	0.24	0.55
	6.93	3.91	0.04	0.10	0.17	3.93	26.4%	0.04	0.07	0.42
	6.98	1.87	0.02	0.05	0.04	1.87	12.6%	0.02	0.01	0.24

5/11/2014 10:20:00 AM

STREAM NAME	NORTH FORK MESA CREEK
XS LOCATION	250' UPSTREAM FROM CONFL W/ S FORK
XS NUMBER	1

SUMMARY SHEET

MEASURED FLOW (Qm)=	3.86 cfs
CALCULATED FLOW (Qc)=	3.89 cfs
(Qm-Qc)/Qm * 100 =	-0.7 %
MEASURED WATERLINE (Wlm)=	6.62 ft
CALCULATED WATERLINE (Wlc)=	6.63 ft
(Wlm-Wlc)/Wlm * 100 =	-0.3 %
MAX MEASURED DEPTH (Dm)=	0.40 ft
MAX CALCULATED DEPTH (Dc)=	0.40 ft
(Dm-Dc)/Dm * 100	0.6 %
MEAN VELOCITY=	1.40 ft/sec
MANNING'S N=	0.107
SLOPE=	0.06 ft/ft
4 * Qm =	1.5 cfs
2.5 * Qm=	9.7 cfs

RECOMMENDED INSTREAM FLOW

=====

FLOW (CFS)

PERIOD

=====

=====

RATIONALE FOR RECOMMENDATION

=====

RECOMMENDATION BY

AGENCY

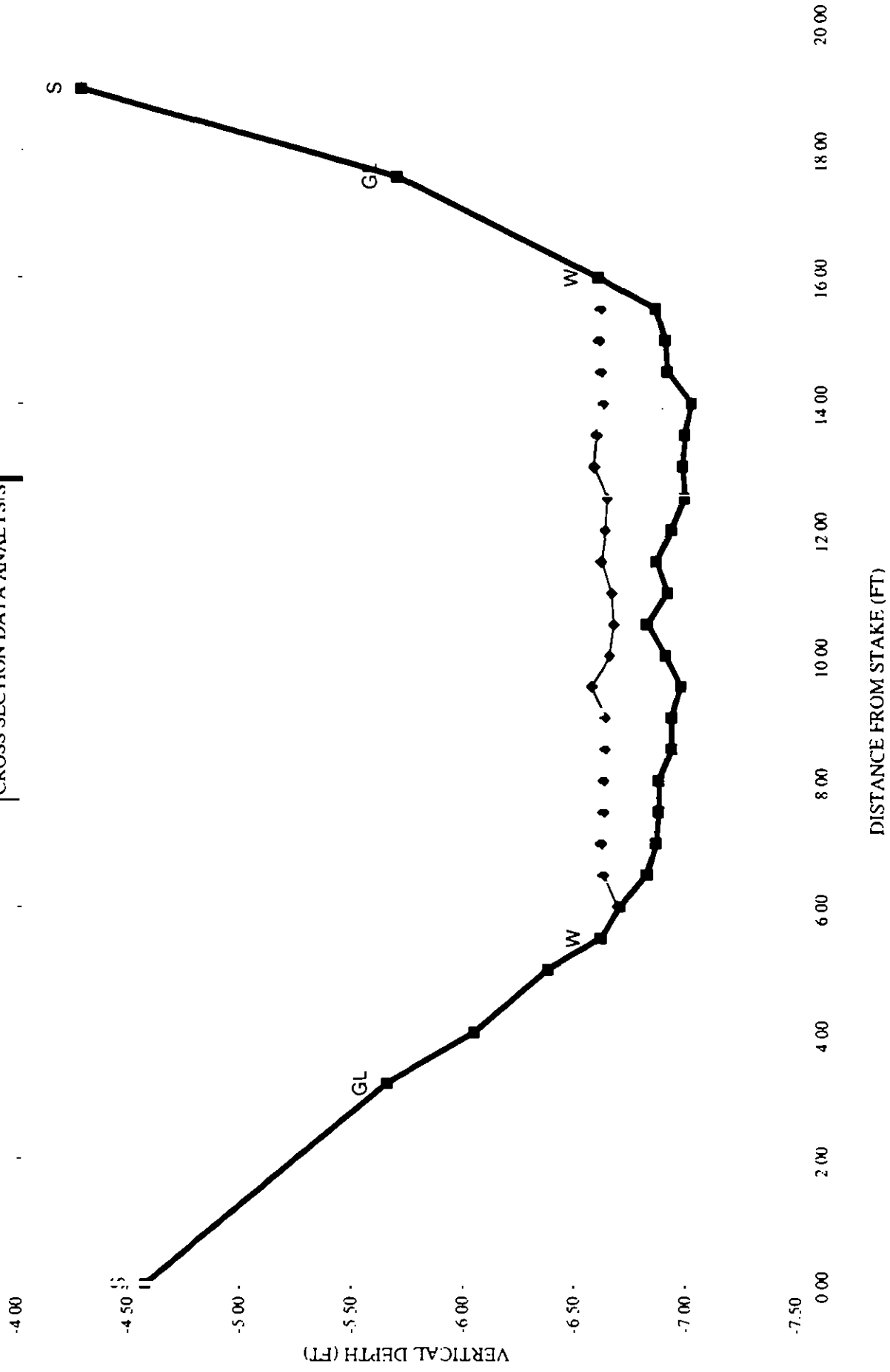
DATE

CWCB REVIEW BY

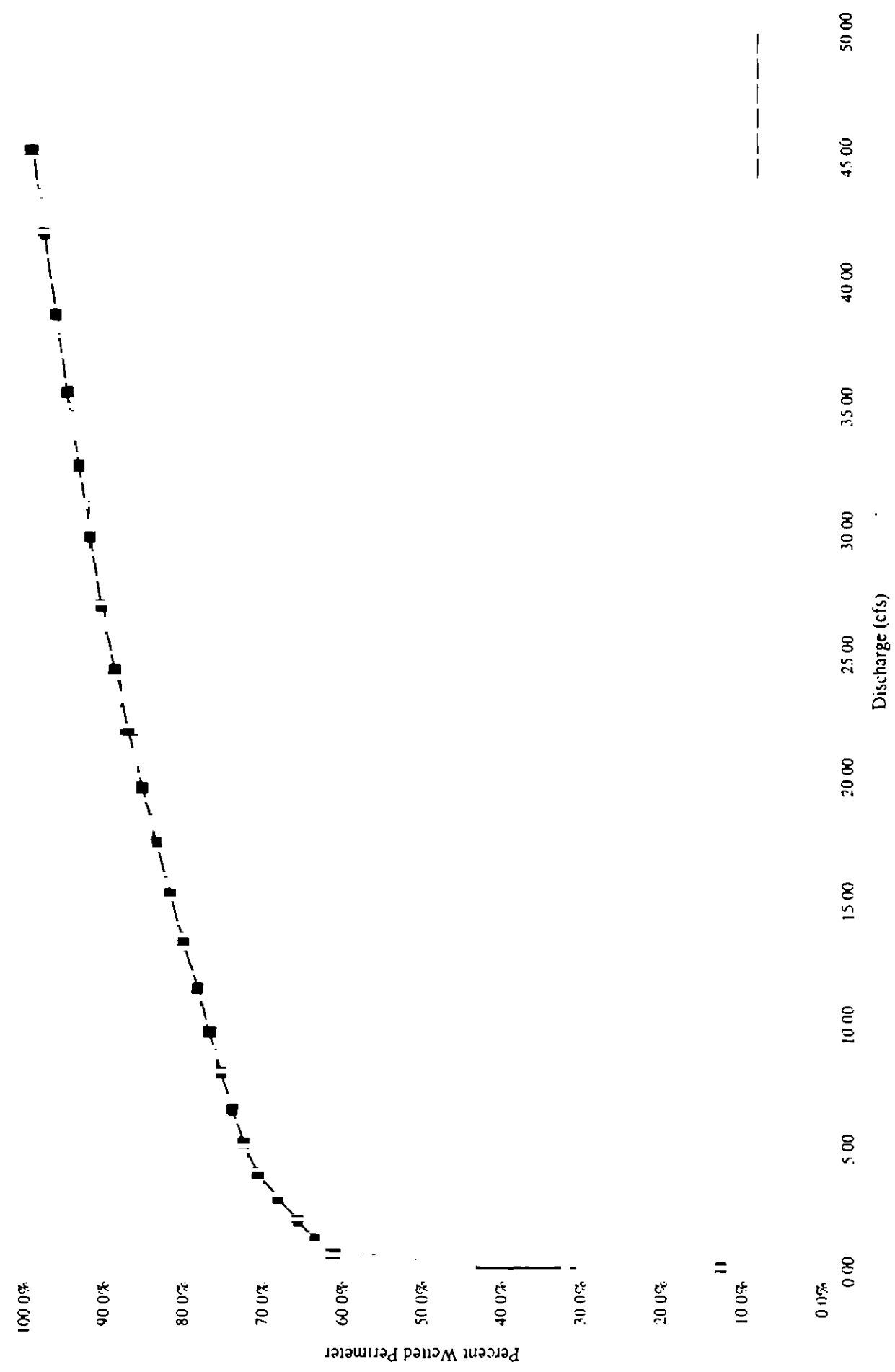
DATE

NORTH FORK MESA CREEK

CROSS SECTION DATA ANALYSIS



Percent Wetted Perimeter vs. Discharge





FIELD DATA FOR INSTREAM FLOW DETERMINATIONS



COLORADO WATER
CONSERVATION BOARD

LOCATION INFORMATION

STREAM NAME

N. Fk. Mesa Creek

CROSS-SECTION NO. 1

CROSS SECTION LOCATION

500' upstream from confluence w/ South Fork

DATE 3-26-04 OBSERVERS

R. Smith, M. Potter

LEGAL
DESCRIPTION

SECTION

NE

SECTION

2

TOWNSHIP

480S

RANGE

18

E/W

N.M.

COUNTY

Montrose

WATERSHED

Dolores

WATER DIVISION

4

DOW WATER CODE

47060

MAPS:

USGS

USFS

Ken Canyon

SUPPLEMENTAL DATA

SAC TAPE SECTION SAME AS
DISCHARGE SECTION

(YES) NO

METER TYPE

Marsh-McBirney

METER NUMBER

DATE RATED

CALIB/SPIN

sec

TAPE WEIGHT

100/1001

TAPE TENSION

lbs

CHANNEL BED MATERIAL SIZE RANGE

gravel to 4" cobbles

PHOTOGRAPHS TAKEN (YES) NO

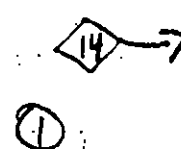
NUMBER OF PHOTOGRAPHS

3

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
(X) Tape + Stake LB	0.0	surveied
(X) Tape + Stake RB	0.0	surveied
(1) WS + Tape LB/RB	0.0	7.22/7.22
(2) WS Upstream	15.0	7.11
(3) WS Downstream	15.0	7.43
SLOPE	0.32 / 30.0 =	0.01067

SKETCH



(X)

TAPE



LEGEND

Stake (X)

Station (1)

Photo (1)

Direction of flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED (YES) NO

DISTANCE ELECTROFISHED ft

FISH CAUGHT YES/NO

WATER CHEMISTRY SAMPLED (YES) NO

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

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

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME

addictfly + mayfly + beetles - small

COMMENTS

TDS = 340 Ph = 8.1 Temp = 11°C

DISCHARGE/CROSS SECTION NOTES

STREAM NAME

North Fork Mesa Creek

CROSS-SECTION NO

1

DATE

3-26-04

SHEET — OF —

BEGINNING OF MEASUREMENT

EDGE OF WATER LOOKING DOWNSTREAM
(0.0 AT STAKE)

LEFT / RIGHT

Gage Reading:

0.5 ft

TIME

11:40

Features	Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observ- ation (ft)	Revolutions	Velocity (ft/sec)			Area (ft ²)	Discharge (cfs)
								Time (sec)	At Point	Mean in Vertical		
RS		0.0		5.90								
G		2.0		6.87								
W		4.0		7.22	0							
		4.5		7.35	0.10							
		5.0		7.57	0.3							
		5.5		7.57	0.35							
		6.0		7.55	0.35							
		6.5		7.70	0.50							
		7.0		7.68	0.50							
		7.5		7.68	0.50							
		8.0		7.58	0.40							
		8.5		7.67	0.45							
		9.0		7.67	0.45							
		9.5		7.68	0.45							
		10.0		7.62	0.40							
		10.5		7.62	0.40							
		11.0		7.61	0.40							
		11.5		7.55	0.30							
		12.0		7.49	0.25							
W		12.5		7.22	0							
G		13.4		6.79								
LS		13.6		6.24								

TOTALS

End of Measurement

Time

1:00 PM

Gage Reading

0.5 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: North Fork Mesa Creek
XS LOCATION: 500 ft. us from confluence with S. Fork
XS NUMBER: 1

DATE: 26-Mar-04
OBSERVERS: R Smith and M Potter

1/4 SEC: NE
SECTION: 2
TWP: 48N
RANGE: 18W
PM: in M.

COUNTY: Montrose
WATERSHED: Dolores
DIVISION: 4
DOW CODE: 47060

USGS MAP: Red Canyon
USFS MAP: 0

SUPPLEMENTAL DATA

*** NOTE ***

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

TAPE WT: 0.0106
TENSION: 99999

CHANNEL PROFILE DATA

SLOPE: 0.01067

INPUT DATA CHECKED BY: DATE:

ASSIGNED TO: DATE:

STREAM NAME: North Fork Mesa Creek
 XS LOCATION: 500 ft us from confluence with S. Fork
 XS NUMBER: 1

DATA POINTS= 22

VALUES COMPUTED FROM RAW FIELD DATA

FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	WETTED PERIM	WATER DEPTH	AREA (Am)	Q (Qm)	% Q CELL
RS	0.00	5.90			0.00		0.00	0.00	0.0%
1 G	2.00	6.87			0.00		0.00	0.00	0.0%
W	4.00	7.22			0.00		0.00	0.00	0.0%
	4.50	7.35	0.10	1.03	0.52	0.10	0.05	0.05	1.1%
	5.00	7.52	0.30	1.34	0.53	0.30	0.15	0.20	4.1%
	5.50	7.57	0.35	0.72	0.50	0.35	0.18	0.13	2.6%
	6.00	7.55	0.35	1.62	0.50	0.35	0.18	0.28	5.8%
	6.50	7.70	0.50	1.78	0.52	0.50	0.25	0.45	9.1%
	7.00	7.68	0.50	2.51	0.50	0.50	0.25	0.63	12.8%
	7.50	7.68	0.50	2.01	0.50	0.50	0.25	0.50	10.3%
	8.00	7.58	0.40	2.31	0.51	0.40	0.20	0.46	9.4%
	8.50	7.67	0.45	1.40	0.51	0.45	0.23	0.32	6.4%
	9.00	7.67	0.45	1.41	0.50	0.45	0.23	0.32	6.5%
	9.50	7.68	0.45	1.73	0.50	0.45	0.23	0.39	8.0%
	10.00	7.62	0.40	2.08	0.50	0.40	0.20	0.42	8.5%
	10.50	7.62	0.40	1.52	0.50	0.40	0.20	0.30	6.2%
	11.00	7.61	0.40	1.34	0.50	0.40	0.20	0.27	5.5%
	11.50	7.55	0.30	1.04	0.50	0.30	0.15	0.16	3.2%
	12.00	7.49	0.25	0.24	0.50	0.25	0.13	0.03	0.6%
W	12.50	7.22			0.57		0.00	0.00	0.0%
1 G	13.40	6.79			0.00		0.00	0.00	0.0%
LS	13.60	6.24			0.00		0.00	0.00	0.0%

TOTALS

8.67 0.5 3.05 4.89 100.0%

(Max)

Manning's n = 0.0477
 Hydraulic Radius = 0.351902073

STREAM NAME: North Fork Mesa Creek
 XS LOCATION: 500 ft us from confluence with S Fork
 XS NUMBER: 1

WATER LINE COMPARISON TABLE

WATER LINE	MEAS AREA	COMP AREA	AREA ERROR
	3.05	3.01	-1.3%
6.97	3.05	5.38	76.4%
6.99	3.05	5.17	69.6%
7.01	3.05	4.97	62.9%
7.03	3.05	4.77	56.3%
7.05	3.05	4.57	49.8%
7.07	3.05	4.37	43.4%
7.09	3.05	4.18	37.1%
7.11	3.05	3.99	30.9%
7.13	3.05	3.81	24.8%
7.15	3.05	3.62	18.8%
7.17	3.05	3.44	12.3%
7.18	3.05	3.36	10.0%
7.19	3.05	3.27	7.2%
7.20	3.05	3.18	4.3%
7.21	3.05	3.10	1.5%
7.22	3.05	3.01	-1.3%
7.23	3.05	2.93	-4.1%
7.24	3.05	2.84	-6.8%
7.25	3.05	2.76	-9.6%
7.26	3.05	2.67	-12.3%
7.27	3.05	2.59	-15.0%
7.29	3.05	2.43	-20.4%
7.31	3.05	2.27	-25.6%
7.33	3.05	2.11	-30.8%
7.35	3.05	1.95	-36.0%
7.37	3.05	1.80	-41.0%
7.39	3.05	1.65	-46.0%
7.41	3.05	1.50	-50.9%
7.43	3.05	1.35	-55.8%
7.45	3.05	1.20	-60.6%
7.47	3.05	1.06	-65.4%

WATERLINE AT ZERO
 AREA ERROR = 7.215

STREAM NAME North Fork Mesa Creek
 XS LOCATION 500 ft us from confluence with S Fork
 XS NUMBER 1

Constant Manning's n

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)	AVG DEPTH (FT)	MAX DEPTH (FT)	AREA (SQ FT)	WETTED PERIM (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG VELOCITY (FT/SEC)
GL	6.87	11.23	0.58	0.83	6.46	11.51	100.0%	0.56	14.16	2.19
	6.92	10.88	0.55	0.78	5.96	11.14	96.8%	0.54	12.65	2.12
	6.97	10.49	0.52	0.73	5.43	10.74	93.3%	0.51	11.09	2.04
	7.02	10.10	0.49	0.68	4.91	10.33	89.7%	0.48	9.64	1.96
	7.07	9.71	0.46	0.63	4.42	9.92	86.2%	0.45	8.29	1.88
	7.12	9.32	0.42	0.58	3.94	9.52	82.7%	0.41	7.05	1.79
	7.17	8.93	0.39	0.53	3.49	9.11	79.2%	0.38	5.92	1.70
WL	7.22	8.54	0.36	0.48	3.05	8.71	75.6%	0.35	4.88	1.60
	7.27	8.24	0.32	0.43	2.63	8.39	72.9%	0.31	3.91	1.49
	7.32	7.96	0.28	0.38	2.23	8.09	70.3%	0.28	3.03	1.36
	7.37	7.69	0.24	0.33	1.83	7.80	67.7%	0.24	2.25	1.23
	7.42	7.45	0.20	0.28	1.45	7.54	65.5%	0.20	1.57	1.00
	7.47	7.21	0.15	0.23	1.09	7.28	63.2%	0.15	0.99	0.91
	7.52	6.80	0.11	0.18	0.74	6.86	59.6%	0.11	0.54	0.73
	7.57	5.49	0.08	0.13	0.42	5.53	48.0%	0.08	0.24	0.58
	7.62	4.14	0.04	0.08	0.18	4.17	36.2%	0.04	0.07	0.39
	7.67	2.34	0.01	0.03	0.03	2.35	20.4%	0.01	0.01	0.18

Criteria

Flow Range: 2.0 - 12.2 cfs

1. 0.2 Ave. depth: 1.57 cfs

2. 50% wetted perimeter: 48% 0.24
 50% 11.6 = $\frac{x}{0.3} = 0.05$
 50% WP = 0.29 cfs 59.6% 0.54

3. 1 ft/sec $\bar{V}$: 0.91 0.99
 1 1.08 1.57
 1 ft/sec $\bar{V} = 1.30$ cfs
 $\frac{0.09}{0.17} = \frac{x}{0.58}$
 $x = 0.31$

3 criteria out of range

STREAM NAME North Fork Mesa Creek
 XS LOCATION 500 ft us from confluence with S Fork
 XS NUMBER 1

SUMMARY SHEET

MEASURED FLOW (Qm)=	4.89 cfs
CALCULATED FLOW (Qc)=	4.88 cfs
$(Qm - Qc) / Qm * 100 =$	0.3 %
MEASURED WATERLINE (Wlm)=	7.22 ft
CALCULATED WATERLINE (Wlc)=	7.22 ft
$(Wlm - Wlc) / Wlm * 100 =$	0.1 %
MAX MEASURED DEPTH (Dm)=	0.50 ft
MAX CALCULATED DEPTH (Dc)=	0.48 ft
$(Dm - Dc) / Dm * 100 =$	3.1 %
MEAN VELOCITY=	1.60 ft/sec
MANNING'S N=	0.048
SLOPE=	0.01067 ft/m
4 * Qm =	2.0 cfs
2.5 * Qm=	12.2 cfs

RECOMMENDED INSTREAM FLOW

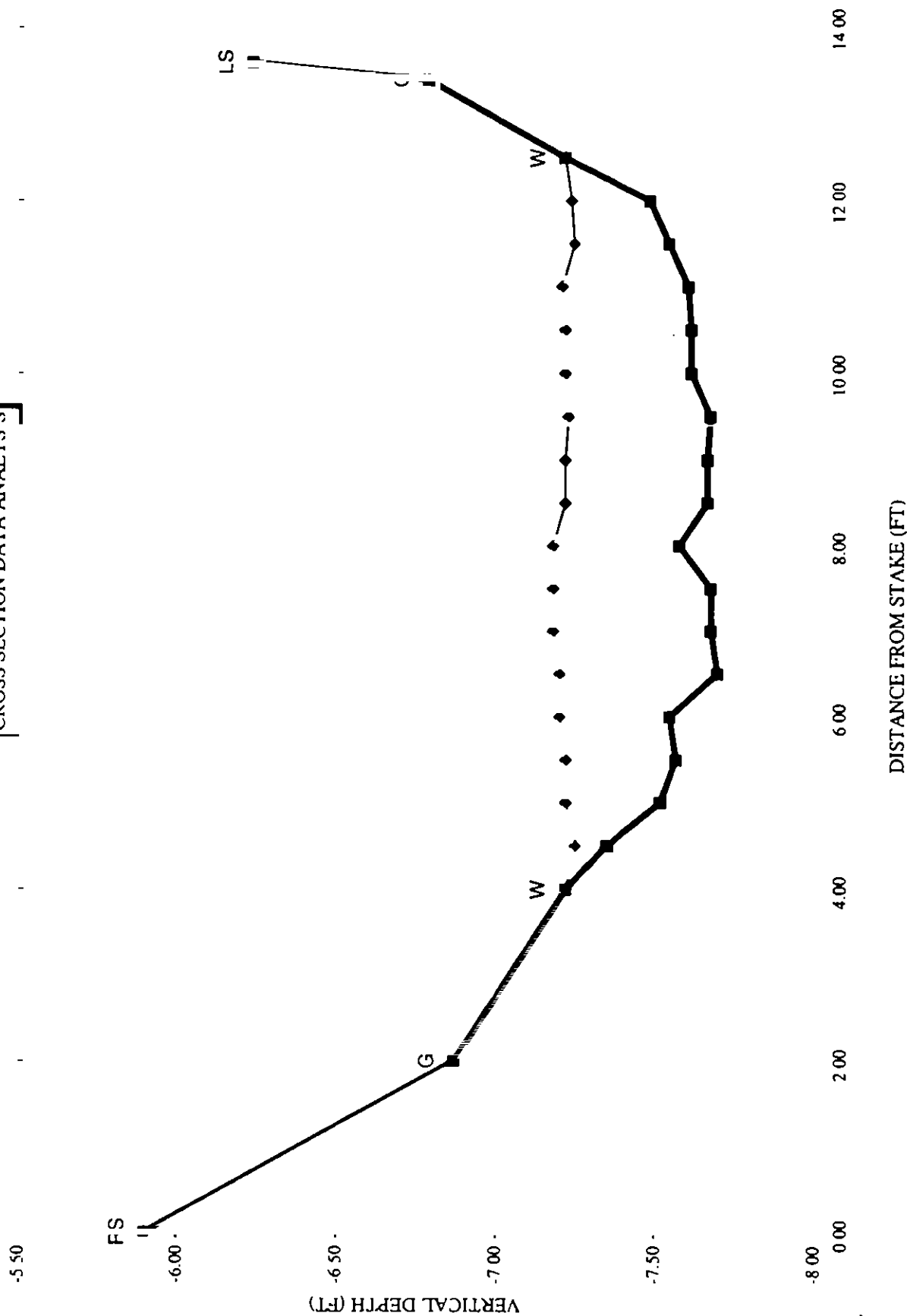
FLOW (CFS)	PERIOD

RATIONALE FOR RECOMMENDATION

RECOMMENDATION BY	AGENCY	DATE
CWCB REVIEW BY		DATE

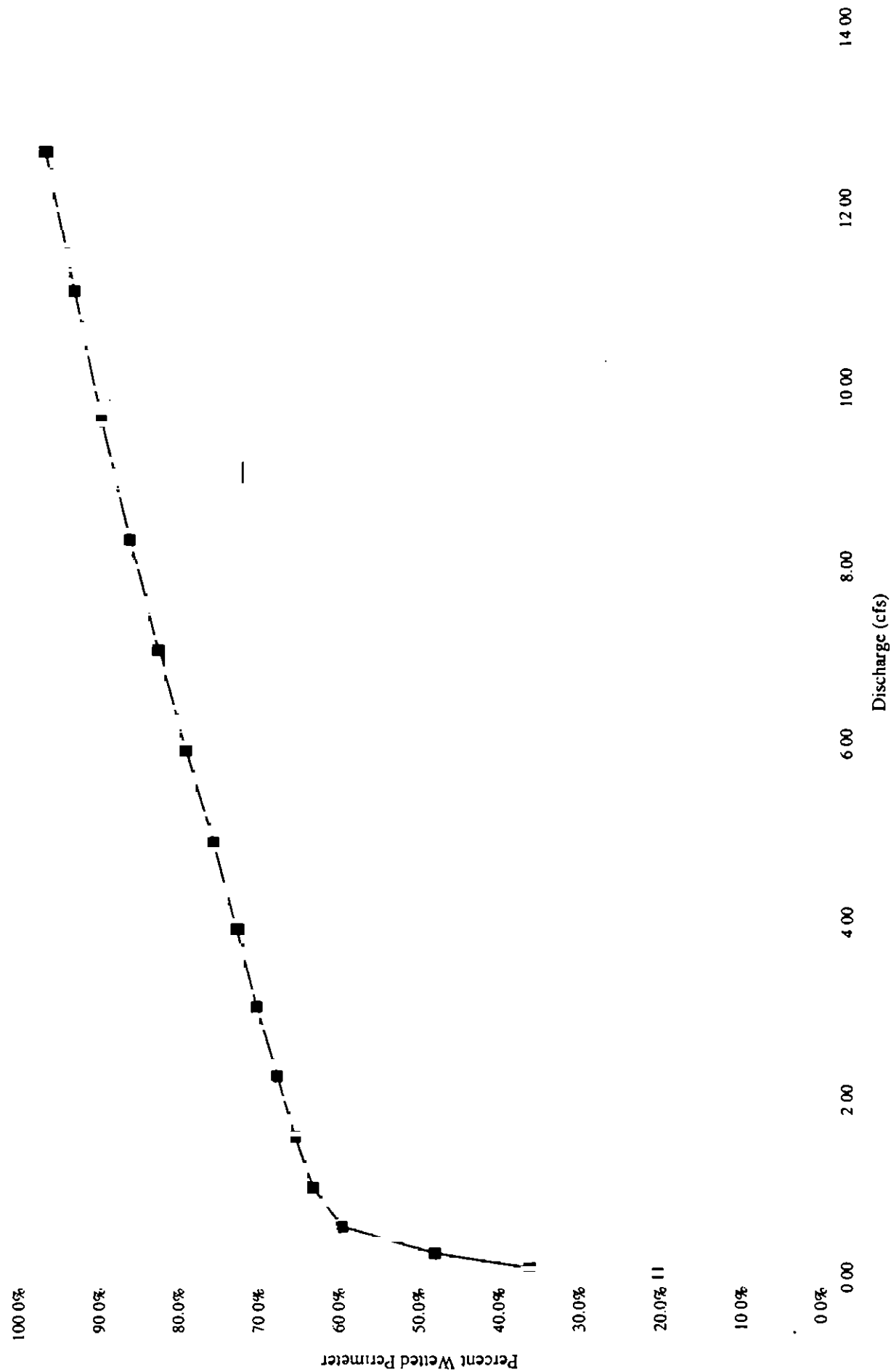
North Fork Mesa Creek

[CROSS SECTION DATA ANALYSIS]



Channel Bottom — Computed Water Line

Percent Wetted Perimeter vs. Discharge



CROW STREAM SURVEY (1991 REVIST)

LEVEL 2: FIELD SURVEY SUMMARY

Calemitz Mesa Quad

STREAM: Mesa Cr. N. FK. SEC#: — WATER CODE: 41537 CROW REGION: S-W
 SURVEYORS: David Smith Dennis Mearns DATE OF SURVEY: 22 June 94
 SURVEY LOCATION: T 49N R 17W S 4 ELEVATION: 6028 STATION #: 1
 UTM ZONE: 12 UTM X: 694445 UTM Y: 4264300

LOCATION DESCRIPTION: Sampling began about 10 yards upstream of road crossing and continued upstream.

STREAM FLOW PROFILE (Y or N): Y IF YES-DATE AND TYPE 22 June 94, Sag tank
 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: ~250 (FEET)
 AVG. WIDTH: 6.5 (FEET) TOTAL STATION AREA: .037 (ACRES)
 FLOW (CFS) AT TIME OF SURVEY: 2.02 METHOD: McBurney
 LIMITING FACTORS TO FISHERY: A-6, 10, 11, 16, B-4, C-12
 COMMENTS: Few macroinvertebrates were seen.

LENGTH FREQUENCY RECORD (CM)

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

SUMMARY INFORMATION

SPECIES	NO. FISH CAUGHT	AVG. LENGTH (CM)	LENGTH RANGE (CM)	AVG. WEIGHT (Grams)	WEIGHT RANGE (Grams)	% TOTAL CATCH	BIOMASS lb/Acre	No./Acre	DENSITY	Conf. Int.
RBT	2	19.75	19.5-20	77	76-78	9	9.2	54		
RXN	2	20.13	20-22	95.3	76-108	13	17.0	54		
FMS	3	17.5	15-19	56.6	37-74	13	10.1	54		
SPDI	5	8.04	6-11.7	7.6	3-21	65	6.8	405		

COLORADO DIVISION OF WILDLIFE

Page 2 of 2

Length-Weight Data File

Stream Name Mesa Cr., N. FK.

CDOW

Water Code 41537 Date 22 June 94

Gear Electroshocker

Effort 396 Sec. Station No. 1

Species Code	Total Length	g. Weight	Species Code	Total Length	Weight	Species Code	Total Length	Weight
RBT	19.5	76	SPD	6	3			
"	20	78						
RXN	20	76						
"	22	102						
"	22	108						
FMS	18.5	59						
"	19	74						
"	15	37						
SPD	11.5	15						
"	11.7	21						
"	10.5	13						
"	10.2	11						
"	9	7						
"	8.5	7						
"	9	7						
"	4.5	7						
"	8.3	5						
"	7.7	4						
"	7.5	5						
"	7.7	4						
"	6.5	2						
"	6.5	2						

Comments: See attached limiting factors. Several lace and at least 1 trout escaped.
 0922
 340V
 250 PPS





1.5.2001













1.5.2001



1.5.2001



1.5.2001





APPENDIX – C
Water Availability Analysis

Colorado Water Conservation Board
[Estimation of Natural Streamflow Characteristics
Based upon USGS WRI 85-4086
F. Curtis Hargrett and Mark Mitschuk]

By _____

Date

1,300,000

STREAM	COUNTY	REGION	STREAM NAME	COUNTY NAME	BASIN AREA (MI ²)	MEAN ELEV (FEET)	MEAN PPT (INCHES)	MEAN SLOPE (FT/MI)
					55.18	7020	19.4	0.216
					55.18	7020	19.4	0.216

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

MEAN MONTHLY FLOW

AVERAGE FLOW (CFS)

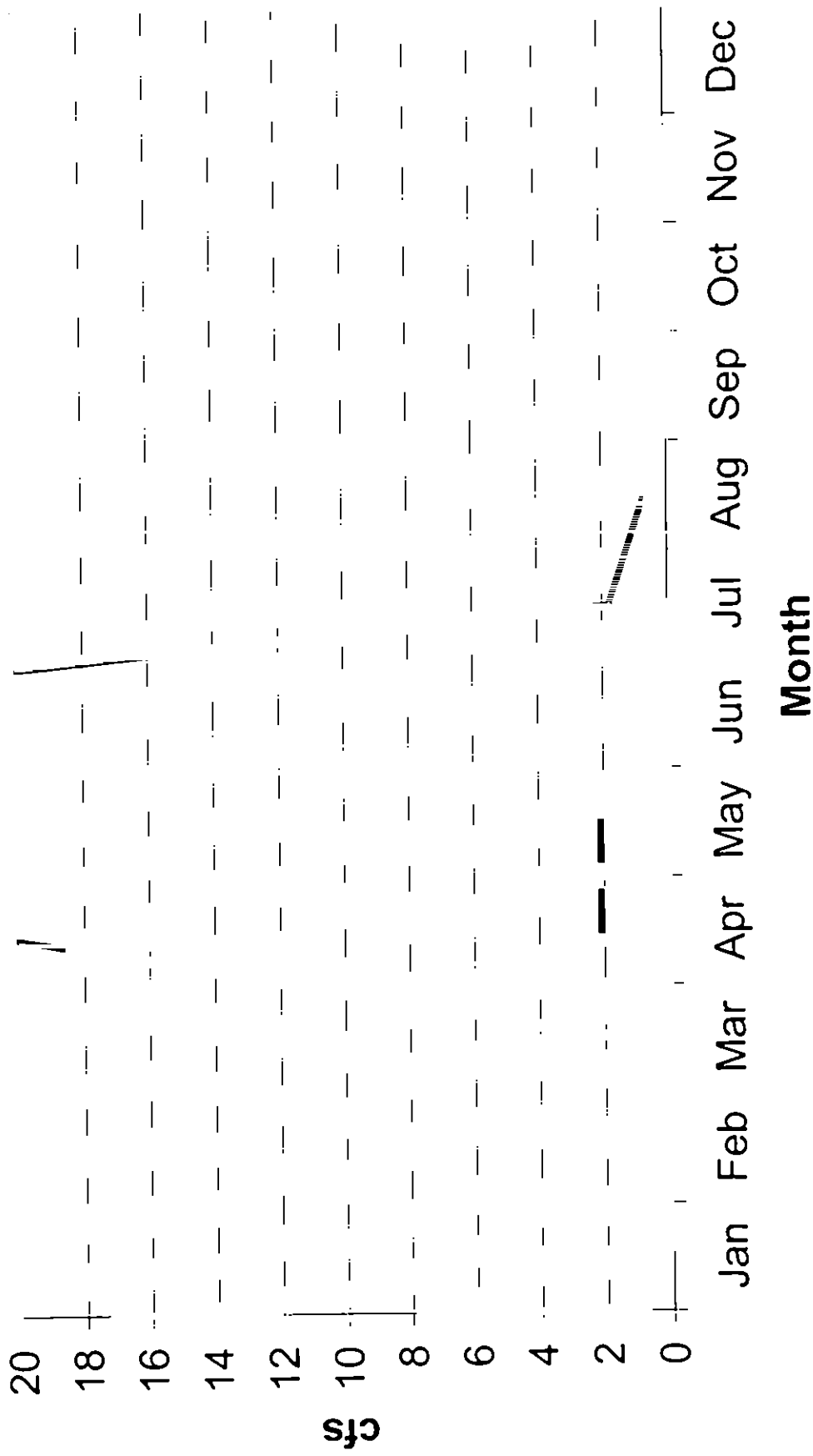
35

Σ

OCTOBER _____
NOVEMBER _____
DECEMBER _____
JANUARY _____
FEBRUARY _____
MARCH _____
APRIL _____
MAY _____
JUNE _____
JULY _____
AUGUST _____
SEPTEMBER _____

25 09
16 25
11 16
9 01
12 00
23 05
47 84
41 33
24 21
49 28
30 81
24 59

Estimated Stream Flow on North Fork Mesa Creek



Uncompahgre Plateau and Glade Park Annual Hydrograph Estimation

Although there is a substantial amount of streamflow gage data available for the Uncompahgre Plateau and Glade Park, most of this data is severely impacted by diversions and irrigation use. This situation makes it difficult to estimate the natural flow regime for the watersheds on the Plateau. Without specific gage data to evaluate the next best approach is a regional equation that estimates annual flow characteristics. The USGS has developed regional equations (Estimation of Natural Streamflow Characteristics in Western Colorado, Water Resources Investigations Report 85-4086, 1985) that apply to the Uncompahgre Plateau and Glade Park. The equation that applies is as follows:

$$Q_{ann} = 9.7 \times 10^{-2} (A^{0.388})(E_p^{1.74})(1.98)(365)$$

Q_{ann} = mean annual volume in acre - feet

A = drainage area in square miles

E_p = (mean basin elevation - 5000)/1000

In order to verify the validity of this equation, the results were checked against gages that provided estimates of the natural annual discharge. Three gages were located that provide a diversion free estimate of a natural hydrograph.

Spring Creek near Beaver Hill: Period of record; 1978 -1980

Potter Creek near Olathe: Period of record; 1980

Hay Press Creek above Fruita Reservoir #3: Period of record; 1984 - 1987

Using the period of record for each of the gages a mean annual volume was calculated and compared to the results obtained using the regional equation.

Spring Creek near Beaver Hill.

Mean annual gage volume. 11,100 ac-ft

Annual volume regional equation: 11,300 ac-ft

Potter Creek near Olathe.

Mean annual gage volume: 5,000 ac-ft

Annual volume regional equation: 6,000 ac-ft

Hay Press Creek above Fruita Reservoir #3.

Mean annual gage volume: 575 ac-ft

Annual volume regional equation: 625 ac-ft

The largest comparative difference in these gages is Potter Creek at about 17%. This is well within the standard error of the regional equation. However, the gage record for each of these creeks is limited. Therefore, two other creeks with a longer representative period of record were chosen to compare with the regional equations.

Escalante Creek near Delta. Period of record, 1977 - 1988

Tabeguache Creek near Nucla. Period of record; 1947 - 1952

Both of these gages are affected by diversions and irrigation. Using data obtained from Colorado River Decision Support Systems (Colorado Water Conservation Board, Department of Water Resources) that reflects diversion volumes, along with local estimates of irrigated acreage and return flows, the annual gage volumes were adjusted for these variations to estimate a natural annual volume.

Escalante Creek near Delta.

Mean annual adjusted gage volume: 84,000 ac-ft

Annual volume regional equation: 75,000 ac-ft

Tabeguache Creek near Nucla:

Mean annual adjusted gage volume: 15,000 ac-ft

Annual volume regional equation: 13,900 ac-ft

The gage data-regional equation comparison between these two gages coupled with the results from Potter Creek, Hay Creek, and Spring Creek indicates that the regional

equations apparently provide a reasonably accurate estimate of the total annual flow volume.

Once total annual volumes can be estimated, the question then becomes how to allocate this volume over a 12-month period. A mean annual monthly distribution was calculated using the annual hydrographs from Potter Creek, Spring Creek, and Hay Press Creek. These three creeks were used since they are the best unaltered representations of a natural plateau flow regime. The monthly distribution of volume based on a percentage of annual total volume is as follows:

January: 0.32

February: 0.6

March: 1.0

April: 14.7

May: 55.4

June: 24.6

July: 1.3

August: 0.55

September: 0.45

October: 0.39

November: 0.35

December: 0.34

The regional equation with the proper input values was used to generate estimates of annual volumes for the following Uncompahgre Plateau and Glade Park watersheds. These annual volumes were then distributed according to the monthly distributions above. The distribution of water volumes across the months of the year was translated into mean monthly flows in the following spreadsheets.

APPENDIX – D
Diversion Records

Type	#	Name	Strct	Stream
63	691	AMES BENCH SPG AND RES	4	6 MESA CREEK
63	615	CAMPBELL PT C SYS P SPGS	5	6 MESA CREEK
COLLECTION OF THREE SPGS TO ONE PT				
63	516	CEDAR TREE DITCH	1	6 MESA CREEK
MESA CR				
63	516	CEDAR TREE DITCH	1	6 MESA CREEK
MESA CR COND DCR P184				
63	516	CEDAR TREE DITCH	1	6 MESA CREEK
MESA CR TRIB DOLORES RIVER				
63	516	CEDAR TREE DITCH	1	6 MESA CREEK
MESA CR SEE CA4952 FOR STIP FLOOD WATER DECREE P184				
63	516	CEDAR TREE DITCH	1	6 MESA CREEK
EXCESS WATER WHEN AVAILABLE MESA CR TRIB DOLORES RIVER				
63	516	CEDAR TREE DITCH	1	6 MESA CREEK
FLOOD WATER DECREE P184				
63	503	CHEROKEE SHAFT WELL	2	6 MESA CREEK
63	580	CLUB SPRING PIPELINE	4	6 MESA CREEK
63	521	CRAIG DITCH	1	6 MESA CREEK
MESA CR				
63	521	CRAIG DITCH	1	6 MESA CREEK
MESA CR COND DCR P169				
63	521	CRAIG DITCH	1	6 MESA CREEK
4952				
63	521	CRAIG DITCH	1	6 MESA CREEK
MESA CR COND DCR SEE CA 4952 FOR STIP FLOOD WATER DECREE				
63	521	CRAIG DITCH	1	6 MESA CREEK
MESA CR SEE CA4952 FOR STIP FLOOD WATER DECREE P169				
63	521	CRAIG DITCH	1	6 MESA CREEK
MESA CR COND DCR SEE CA4952 FOR STIP FLOOD WATER DECREE				
63	719	DRY FORK MESA CR SPRING	4	6 MESA CREEK
FILING				
63	757	EARLY SPRING	4	6 MESA CREEK
FILING				
63	720	EAST MESA CREEK SPRING	4	6 MESA CREEK
63	5004	EULA BELLE MINE WELL	2	6 MESA CREEK
WELL NO 7667				
63	582	EULA BELLE PUMPING STA	6	6 MESA CREEK
63	718	GOOD SHERI SPRING	4	6 MESA CREEK
FILING				
63	689	LA LUNA SPRING	4	6 MESA CREEK
FILING				
63	758	LOWER ANTHILL SPRING	4	6 MESA CREEK
FILING				
63	542	MESA CREEK DITCH	1	6 MESA CREEK
MESA CR LEGAL IN ERROR				
63	542	MESA CREEK DITCH	1	6 MESA CREEK
CA4952 FOR STIP EXCESS WATER ONLY P131, P231				
63	716	MOON CANYON SPRING	4	6 MESA CREEK
FILING				
63	717	MOONY SPRING	4	6 MESA CREEK
63	673	NORTH FORK MESA CREEK	0	6 MESA CREEK
19CFS MARCH 1 - MARCH 31, 0 SOFS JUNE 1 - FEB 29 LONG CAN 5 9M				
63	550	PATTERSON DITCH	1	6 MESA CREEK
MESA CR P163 P231				
63	550	PATTERSON DITCH	1	6 MESA CREEK
MESA CR PATTERSON LONE TREE ENLT OF PATTERSON				
63	550	PATTERSON DITCH	1	6 MESA CREEK
MESA CR COND PATTERSON LONE TREE ENLT OF PATTERSON				
63	550	PATTERSON DITCH	1	6 MESA CREEK
MESA CR PATTERSON LONE TREE ENLT OF PATTERSON DITCH				
63	550	PATTERSON DITCH	1	6 MESA CREEK

WATER RIGHTS REPORT													Monday.
Adjudicatn	Prev Adj	Date	Appropn	O	Admin	Prior	Court	Segt P	Alter				
Date	Date	Date	Date	#	Number	Number	Case	Case	ID#				
12/31/1987	12/31/1986	01/26/1967	0	50038 42759	81	CA4952	1	0					
12/31/1987	12/31/1979	06/01/1935	0	47401 31197	81	CA4952	1	0					
02/11/1935	05/09/1932	03/19/1918	0	30079 24914	81	CA4952	1	0					
02/11/1935	05/09/1932	03/19/1918	0	30079 24914	81	CA4952	2	0					
02/11/1935	05/09/1932	03/19/1918	0	30079 24914	81	CA4952	4	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	76	CA4952	3	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	5	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	6	0					
12/31/1971	12/31/1970	01/01/1954	0	44194 37586	76	CA4952	1	0					
12/31/1971	12/31/1975	04/01/1973	0	46020 45016	76	CA4952	1	0					
02/11/1935	05/09/1932	11/24/1915	0	30079 24068	94	CA4952	1	0					
02/11/1935	05/09/1932	04/01/1932	0	30079 30041	94	CA4952	2	0					
02/11/1935	05/09/1932	04/01/1932	0	30079 30041	94	CA4952	5	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	6	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	3	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	4	0					
12/31/1987	12/31/1987	07/01/1987	0	52230 50220	94	CA4952	1	0					
12/31/1987	12/31/1986	06/17/1986	0	53325 49841	94	CA4952	1	0					
12/31/1987	12/31/1987	07/01/1987	0	52230 50220	94	CA4952	1	0					
12/31/1987	12/31/1987	07/01/1987	0	40557 00000	94	CA4952	1	0					
12/31/1971	12/31/1975	03/10/1976	0	46090 00000	94	CA4952	1	0					
12/31/1987	12/31/1987	07/01/1987	0	52230 50220	94	CA4952	1	0					
12/31/1987	12/31/1987	07/01/1987	0	50220 00000	94	CA4952	1	0					
12/31/1987	12/31/1986	06/17/1986	0	53325 49841	94	CA4952	1	0					
02/11/1935	05/09/1932	05/01/1909	0	30079 21670	94	CA4952	1	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	2	0					
12/31/1987	12/31/1987	07/01/1987	0	52230 50220	94	CA4952	1	0					
12/31/1987	12/31/1987	07/01/1987	0	52230 50220	94	CA4952	1	0					
12/31/2001	12/31/2001	01/23/2002	0	55540 00000	94	CA4952	1	0					
02/11/1935	05/09/1932	03/01/1915	0	30079 23809	94	CA4952	1	0					
02/11/1935	05/09/1932	03/10/1915	0	30079 23809	94	CA4952	2	0					
02/11/1935	05/09/1932	03/10/1915	0	30079 23809	94	CA4952	3	0					
02/11/1935	05/09/1932	03/10/1915	0	30079 23809	94	CA4952	6	0					
02/11/1935	05/09/1932	02/10/1939	0	32547 00000	94	CA4952	5	0					

COND PATTERSON LONE TREE ENL OF PATTERSON EXCESS ONLY P163.231
 63 550 PATTERSON DITCH 1 6 MESA CREEK
 PATTERSON LONE TREE ENL OF PATTERSON DITCH EXCESS ONLY P163.231
 63 550 PATTERSON DITCH 1 6 MESA CREEK
 EXCESS WATER WHEN AVAILABLE MESA CR TRIB DOLORES RIVER
 63 551 PEARSON DITCH 1 6 MESA CREEK
 MESA CR COND DCR P205
 63 551 PEARSON DITCH 1 6 MESA CREEK
 MESA CR TRIB DOLORES RIVER
 63 551 PEARSON DITCH 1 6 MESA CREEK
 MESA CR COND DCR SEE CA4952 FOR STIP EXCESS ONLY P205
 63 551 PEARSON DITCH 1 6 MESA CREEK
 MESA CR TRIB DOLORES RIVER EXCESS WATER WHEN AVAILABLE
 63 692 SOUTH FORK MESA CREEK 0 6 MESA CREEK
 MAR 1-31, 0 30FS JUNE-FEB 29, 10.4 MILES DOWNSTREAM

43 NE NE SE 19	49 N	17 W	N 1	7 3000	CS	02/11/1931	05/09/1932	02/10/1939	0	32547 00000	CA4952	4	0
43 NE NE SE 19	49 N	17 W	N 1	2 0600	C.S.CA	02/11/1931	05/09/1932	02/10/1939	0	32547 00000	W0140	7	0
43 SW NW SE 19	49 N	17 W	N 1	0 3900	C.S.C	02/11/1931	05/09/1932	04/15/1933	0	30420 00000	CA4952	1	0
43 SW NW SE 19	49 N	17 W	N 1	0 3900	C.S.CA	02/11/1931	05/09/1932	04/15/1933	0	30420 00000	W0140	4	0
43 SW NW SE 19	49 N	17 W	N 1	0 7800	C.S.C	02/11/1931	05/09/1932	02/10/1939	0	32547 00000	CA4952	2	0
43 SW NW SE 19	49 N	17 W	N 1	0 7800	C.S.CA	02/11/1931	05/09/1932	02/10/1939	0	32547 00000	W0140	3	0
39 SW SW 10	49 N	16 W	N M	2 0000	CS	12/31/2001	12/31/2001	01/23/2002	0	55540 00000	02CWO278	1	0 1.25

Structure Name: MESA CREEK DITCH**Water District: 63 ID Number: 542****Source:** MESA CREEK**Acres Irrigated:** 86

Location: Q160 Q40 Q10 Section Township Range PM
NE SW NW 2 49 N 18 W N

CIU A**Distance from section lines** From N/S line

From E/W line:

UTM Coordinates (NAD 83) Northing (UTM y) 4273088.7 Easting (UTM x) 165310.3 Spotted from PLSS quarters**Latitude/Longitude (decimal degrees)** 38.5433 -108.8399**Measuring Device/Recorder:****Contact:** CURT W. WEIMER (AGENT)**Phone:****Address:** 16825 P8 ROAD**Cell Phone:****E-mail:**

NATURITA, CO 81422

Water Rights Summary	Total Decreed Rate(s)	Abs.	7.5000	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	CA4952	2/11/1939	5/1/1909	30079.21670	0	57	2.5 C	S	1	MESA CR. LEGAL IN ERROR
2	CA4952	2/11/1939	2/10/1939	32547.00000	0		5 C	S	1	SEE CA4952 FOR STIP. EXCESS WATER ONLY P131, I

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
1978	04/18	10/15	181	3	0	0	0	0	0	70.9	176	157	122	95.2	66.3	25.3	714
1979	04/29	10/02	157	2.95	0	0	0	0	0	10.9	171	129	85.3	61.5	91.0	6.67	557
1980	05/09	10/07	152	3.25	0	0	0	0	0	0	139	148	111	66.6	66.2	14.6	548
1981	04/10	10/06	180	3.5	0	0	0	0	0	114	179	147	136	171	74.6	13.7	837
1982	05/03	10/28	179	3.75	0	0	0	0	0	0	203	141	172	126	99.0	91.6	836
1983	04/29	10/31	186	5	0	0	0	0	0	11.9	259	215	171	155	126	141	1082
1984	11/22	10/17	331	5	28.6	98.4	98.4	92.0	98.4	98.0	260	223	183	137	139	70.2	1528
1985	11/23	09/19	287	5	25.4	98.4	98.4	88.9	98.4	56.3	261	228	184	182	53.1	0	1378
1986	04/22	10/18	180	3.1	0	0	0	0	0	53.6	185	180	141	129	124	71.4	886
1987	04/28	08/27	122	3	0	0	0	0	0	17.9	184	177	182	160	0	0	724
1988	05/10	09/07	121	3.6	0	0	0	0	0	0	139	158	142	147	31.2	0	619
1989	04/19	08/27	131	4	0	0	0	0	0	92.2	183	165	207	51.2	0	0	700
1990	04/06	06/17	73	4.3	0	0	0	0	0	201	178	37.6	0	0	0	0	418
1991	04/27	07/22	87	4	0	0	0	0	0	23.8	224	138	72.4	0	0	0	459
1992	04/27	08/30	117	5	0	0	0	0	0	39.7	268	107	156	52.4	0	0	625
1993	04/07	09/27	162	5	0	0	0	0	0	214	305	255	198	156	130	0	1262
1994	04/06	07/04	76	5	0	0	0	0	0	205	307	93.2	15.9	0	0	0	622
1995	04/17	08/29	135	5	0	0	0	0	0	117	307	264	214	149	0	0	1053
1996	04/15	08/25	133	5	0	0	0	0	0	144	307	241	208	103	0	0	1007
1997	04/14	09/22	162	5	0	0	0	0	0	120	297	297	215	184	110	0	1225
1998	04/17	09/20	157	5	0	0	0	0	0	97.2	295	297	243	173	79.3	0	1187
1999	05/03	09/21	142	5	0	0	0	0	0	0	285	245	201	156	83.3	0	973
2000	05/02	08/10	101	4	0	0	0	0	0	0	238	215	139	19.8	0	0	613
2001	04/27	08/05	101	4	0	0	0	0	0	31.7	244	197	161	24.8	0	0	661
2002	05/01	06/02	33	2	0	0	0	0	0	0	120	3.97	0	0	0	0	125
2003	04/21	06/27	68	3	0	0	0	0	0	59.5	165	120	0	0	0	0	346
2004	04/26	07/04	70	4	0	0	0	0	0	34.7	238	133	14.7	0	0	0	421
Minimum				2	0	0	0	0	0	0	120	3.97	0	0	0	0	124
Maximum				5	28.6	98.4	98.4	92.0	98.4	214	307	297	243	184	139	141	1528
Average				4.0907	2.00	7.29	7.29	6.70	7.29	67.2	227	174	136	92.9	47.2	16.1	792

Structure Name: MESA CREEK DITCH

Water District: 63 ID Number: 542

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1996		86	
1997		86	
1998		86	
1999		86	
2000		86	
2001		86	
2002		86	
2003		86	
2004		86	

Structure Name: PATTERSON DITCH**Water District: 63 ID Number: 550****Source:** MESA CREEK**Acres Irrigated:**

Location Q160 Q40 Q10 Section Township Range PM
SE NE NE 19 49 N 17 W N

CIU: A

Distance from section lines: From N/S line

From E/W line.

UTM Coordinates (NAD 83) Northing (UTM y) 4267622.6 Easting (UTM x): 168918.1 Spotted from PLSS quarters**Latitude/Longitude (decimal degrees)** 38 4955 -108 7960**Measuring Device/Recorder****Contact:** CURT W. WEIMER(OWNER)**Phone****Address** 16825 P8 ROAD**Cell Phone****E-mail:**

NATURITA, CO 81422

Water Rights Summary	Total Decreed Rate(s)	Abs	14.1200	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	CA4952	2/11/1939	3/1/1915	30079 23800	0	73	2.5 C	S	1	MESA CR P163, P231
2	CA4952	2/11/1939	3/10/1915	30079 23809	0	74	1.2 C	S	1	MESA CR PATTERSON LONE TREE ENLT OF PATTERSON
3	CA4952	2/11/1939	3/10/1915	30079 23809	0	74	1.04 C	S.C	1	MESA CR COND PATTERSON LONE TREE ENLT OF PATTERSON
6	W0140	2/11/1939	3/10/1915	30079 23809	0		1.04 C	S.CA	1	MESA CR PATTERSON LONE TREE ENLT OF PATTERSON DITCH
5	CA4952	2/11/1939	2/10/1939	32547 00000	0		2.08 C	S.C	1	COND PATTERSON LONE TREE ENLT OF PATTERSON EXCESS ONLY P163,231
7	W0140	2/11/1939	2/10/1939	32547 00000	0		2.08 C	S.CA	1	EXCESS WATER WHEN AVAILABLE MESA CR TRIB DOLORES RIVER
4	CA4952	2/11/1939	2/10/1939	32547 00000	0		7.3 C	S	1	PATTERSON LONE TREE ENLT OF PATTERSON DITCH EXCESS ONLY P163,231

Diversion Summary in Acre-Feet - Total Water through Structure

YR	FDU	LDU	DWC	Max Q	Nov	Dec.	Jan	Feb	Mar	Apr.	May	June	July	Aug	Sept.	Oct.	Total
1978	04/19	07/10	83	2.5	0	0	0	0	0	59.5	138	94.4	12.9	0	0	0	306
1979	05/04	08/30	119	2.75	0	0	0	0	0	0	152	108	49.2	35.7	0	0	346
1980	05/23	08/21	91	2.8	0	0	0	0	0	0	46.4	133	49.0	26.4	0	0	255
1981	04/10	08/03	55	2.1	0	0	0	0	0	87.5	103	2.98	0	0	0	0	194
1982	05/03	08/05	88	2.15	0	0	0	0	0	0	115	60.5	60.7	7.93	0	0	245
1983	04/29	08/01	95	5	0	0	0	0	0	7.93	277	258	213	4.58	0	0	762
1984	04/30	08/06	99	5	0	0	0	0	0	3.97	179	252	190	17.9	0	0	645
1985	04/29	09/29	154	2.75	0	0	0	0	0	7.93	122	119	122	122	145	0	641
1986	04/22	09/11	143	3.25	0	0	0	0	0	53.8	191	176	143	90.5	20.7	0	675
1987	04/28	08/27	122	3.15	0	0	0	0	0	17.9	191	169	137	107	0	0	624
1988	05/10	08/14	97	4	0	0	0	0	0	0	140	144	99.5	27.8	0	0	412
1989	04/25	08/27	125	3.6	0	0	0	0	0	41.7	218	182	138	60.6	0	0	641
1990	04/03	06/24	83	4.5	0	0	0	0	0	230	193	58.6	0	0	0	0	482
1991	05/06	08/18	105	4.25	0	0	0	0	0	0	212	231	185	75.4	0	0	705
1992	04/17	08/30	128	5	0	0	0	0	0	138	271	112	139	87.1	0	0	750
1993	05/03	05/10	8	2.5	0	0	0	0	0	0	39.7	0	0	0	0	0	39.7
1994	04/08	07/10	83	4	0	0	0	0	0	167	245	75.4	22.3	0	0	0	511
1995	04/17	08/29	135	5	0	0	0	0	0	117	307	236	183	120	0	0	965
1996	04/15	08/25	133	4	0	0	0	0	0	99.2	245	210	148	90.2	0	0	795
1997	04/21	09/21	154	3.5	0	0	0	0	0	40.7	153	194	152	165	83.6	0	790
1998	04/20	09/21	155	3.5	0	0	0	0	0	49.1	181	181	152	157	89.6	0	813

Structure Name: PATTERSON DITCH**Water District: 63****ID Number: 550**

1999	04/19	09/21	158	3	0	0	0	0	0	47.8	151	156	140	146	83.3	0	726
2000	04/24	07/10	78	3	0	0	0	0	0	41.7	158	119	39.7	0	0	0	359
2001	04/27	07/19	84	3	0	0	0	0	0	23.8	154	119	57.5	0	0	0	355
2003	05/05	07/10	67	3.5	0	0	0	0	0	0	183	142	34.7	0	0	0	361
2004	04/19	06/06	49	3	0	0	0	0	0	53.6	169	11.9	0	0	0	0	235
<i>Minimum</i>			2.1	0	0	0	0	0	0	0	39.7	0	0	0	0	0	39.7
<i>Maximum</i>			5	0	0	0	0	0	0	230	307	258	213	165	145	0	964
<i>Average</i>			3.4846	0	0	0	0	0	0	49.6	174	136	95.1	51.7	16.2	0	524

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1996		86	
1997		86	
1998		86	
1999		86	
2000		86	
2001		86	
2002	No water available	86	
2003		86	
2004		86	

Structure Name: PEARSON DITCH**Water District: 63 ID Number: 551****Source:** MESA CREEK**Acres Irrigated:** 0**Location:** Q160 Q40 Q10 Section Township Range PM
SE NW SW 19 49 N 17 W N**CIU:** H**Distance from section lines:** From N/S line From E/W line**UTM Coordinates (NAD 83)** Northing (UTM y): 4267446 1 Easting (UTM x): 168298 5 Spotted from PLSS quarters**Latitude/Longitude (decimal degrees):** 38.4936 -108.8030**Measuring Device/Recorder****Contact:** CURT W. WEIMER(OWNER)**Phone****Address:** 16825 P8 ROAD**Cell Phone****E-mail:**

NATURITA, CO 81422

Water Rights Summary	Total Decreed Rate(s):	Abs.:	1 1700	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	CA4952	2/11/1939	4/15/1933	30420 00000	0	96	0.39 C	S.C.	1	MESA CR COND DCR P205
4	W0140	2/11/1939	4/15/1933	30420 00000	0		0.39 C	S.C.A	1	MESA CR TRIB DOLORES RIVER
3	W0140	2/11/1939	2/10/1938	32547 00000	0		0.78 C	S.C.A	1	MESA CR TRIB DOLORES RIVER EXCESS WATER WH AVAILABLE
2	CA4952	2/11/1939	2/10/1939	32547 00000	0		0.78 C	S.C	1	MESA CR COND DCR SEE CA4952 FOR STIP EXCES: ONLY P205

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
1978	04/19	07/05	78	0.75	0	0	0	0	0	17.9	46.1	35.1	4.96	0	0	0	104
1979	05/04	07/05	63	1	0	0	0	0	0	0	49.1	39.2	2.48	0	0	0	90.7
1980	05/23	07/02	41	1	0	0	0	0	0	0	17.9	50.6	0.99	0	0	0	69.4
1981	04/10	05/31	52	1	0	0	0	0	0	41.7	37.9	0	0	0	0	0	79.5
1982	05/02	06/30	60	1.35	0	0	0	0	0	0	45.8	60.6	0	0	0	0	106
1983	05/06	08/01	88	2.5	0	0	0	0	0	0	128	133	104	1.98	0	0	369
1984	05/01	08/08	98	2.5	0	0	0	0	0	0	153	133	120	17.3	0	0	425
1985	05/10	07/07	59	5	0	0	0	0	0	0	183	141	13.9	0	0	0	339
1986	04/22	08/07	108	2	0	0	0	0	0	32.1	114	97.0	70.4	13.2	0	0	328
1987	04/28	08/17	94	2	0	0	0	0	0	9.52	119	102	53.4	15.9	0	0	300
1988	05/10	06/23	45	2	0	0	0	0	0	0	72.9	47.9	0	0	0	0	121
Minimum					0.75	0	0	0	0	0	17.9	0	0	0	0	0	69.4
Maximum					5	0	0	0	0	41.7	183	141	120	17.3	0	0	425
Average					1.9182	0	0	0	0	9.20	88.1	76.5	33.7	4.39	0	0	212

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1996	Water available, but not taken	0	
1997	Structure not usable	0	
1998	Structure not usable	0	
1999	Structure not usable	0	
2000	Structure not usable	0	
2001	Structure not usable	0	
2002	Structure not usable	0	
2003	Structure not usable	0	

Structure Name: PEARSON DITCH

Water District: 63 **ID Number:** 551

Structure Name: EULA BELLE PUMPING STA**Water District: 63 ID Number: 582**

Source: MESA CREEK

Acres Irrigated: 0

Location Q160 Q40 Q10 Section Township Range PM
NE SW SW 31 49 N 17 W N

CIU 1

Distance from section lines From N/S line.

From E/W line

UTM Coordinates (NAD 83) Northing (UTM y) 4264585.6 Easting (UTM x) 168180.7 Spotted from PLSS quarters

Latitude/Longitude (decimal degrees): 38 4679 -108.8030

Measuring Device/Recorder

Contact: CURT W. WEIMER(OWNER)

Phone.

Address 16825 P8 ROAD

Cell Phone

E-mail

NATURITA, CO 81422

Water Rights Summary	Total Decreed Rate(s)	Abs	2.0000	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	W2782	12/31/1976	3/10/1976	46090	00000	0		2 C S	1	

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1996	Water available, but not taken	0	
1997	Water available, but not taken	0	
1998	Water available, but not taken	0	
1999	Water available, but not taken	0	
2000	Water available, but not taken	0	
2001	Water available, but not taken	0	
2002	Water available, but not taken	0	
2003	Water available, but not taken	0	

Structure Name: CEDAR TREE DITCH**Water District: 63 ID Number: 516**

Source MESA CREEK

Acres Irrigated:

Location: Q160 Q40 Q10 Section Township Range PM
SW NW NW 20 49 N 17 W N

CIU U

Distance from section lines From N/S line

From E/W line

UTM Coordinates (NAD 83): Northing (UTM y) 4267597 6 Easting (UTM x) 169120 5 Spotted from PLSS quarters

Latitude/Longitude (decimal degrees): 38.4953 -108.7937

Measuring Device/Recorder

Contact: CURT W. WEIMER(OWNER)

Phone:

Address: 16825 P8 ROAD

Cell Phone:

E-mail:

NATURITA, CO 81422

Water Rights Summary	Total Decreed Rate(s)	Abs	5.4600	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	Admn. Number	O #	Priority Number	Decreed Amount	Adj. Type	Uses	Comments
1	CA4952	2/11/1939	3/19/1918	30079 24914	0	81	0.26 C	S	1	MESA CR
2	CA4952	2/11/1939	3/19/1918	30079 24914	0	81	1.56 C	S,C	1	MESA CR COND DCR P184
4	W0140	2/11/1939	3/19/1918	30079 24914	0		1.56 C	S,CA	1	MESA CR TRIB DOLORES RIVER
3	CA4952	2/11/1939	2/10/1939	32547.00000	0		0.52 C	S	1	MESA CR SEE CA4952 FOR STIP FLOOD WATER DEC P184
5	W0140	2/11/1939	2/10/1939	32547.00000	0		3.12 C	S,CA	1	EXCESS WATER WHEN AVAILABLE MESA CR TRIB DOLORES RIVER
6	CA4952	2/11/1939	2/10/1939	32547.00000	0		3.12 C	S,C	1	FLOOD WATER DECREE P184

Diversion Summary in Acre-Feet - Total Water through Structure

YR	FDU	LDU	DWC	Max Q	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Total
1978	04/19	07/05	78	3.25	0	0	0	0	0	47.6	182	121	4.96	0	0	0	357
1979	04/27	09/06	133	4	0	0	0	0	0	24.6	213	111	54.0	36.9	7.14	0	448
1980	05/22	09/04	106	2.1	0	0	0	0	0	0	41.7	114	59.9	27.0	3.57	0	246
1981	04/10	06/03	55	2	0	0	0	0	0	47.9	76.7	1.19	0	0	0	0	128
1982	05/01	07/29	75	2	0	0	0	0	0	0	105	14.9	57.5	0	0	0	178
1983	04/29	08/01	62	3	0	0	0	0	0	7.54	124	27.8	99.3	3.67	0	0	263
1984	04/30	07/31	78	3	0	0	0	0	0	3.77	124	69.4	173	0	0	0	371
1985	04/29	07/07	70	2.9	0	0	0	0	0	7.54	121	140	25.7	0	0	0	295
1986	04/22	08/07	108	2.2	0	0	0	0	0	35.7	126	97.8	85.9	13.9	0	0	360
1987	04/20	08/09	112	2	0	0	0	0	0	43.6	122	105	70.2	17.9	0	0	360
1988	04/13	06/08	34	2.5	0	0	0	0	0	55.5	69.4	29.8	0	0	0	0	155
	Minimum			2	0	0	0	0	0	0	41.7	1.19	0	0	0	0	125
	Maximum			4	0	0	0	0	0	55.5	213	140	173	36.9	7.14	0	448
	Average			2.6318	0	0	0	0	0	24.9	119	75.8	57.3	9.03	0.97	0	287

Diversion Comments

IYR NUC Code

Acres
Irrigated

IYR	NUC Code	Acres Irrigated	Comments
1998	Water available, but not taken	0	
1997	Water taken in another structure	0	WATER TAKEN IN THE PATTERSON DITCH
1998	Water taken in another structure	0	WATER TAKEN IN THE PATTERSON DITCH
1999	Water taken in another structure	0	WATER TAKEN IN THE PATTERSON DITCH
2000	Water taken in another structure	0	WATER TAKEN IN THE PATTERSON DITCH
2001	Water taken in another structure	0	WATER TAKEN IN THE PATTERSON DITCH

Structure Name: CEDAR TREE DITCH

Water District: 63 ID Number: 516

2002 Water taken in another structure

2003 Water taken in another structure

2004 Water taken in another structure

0 WATER TAKEN IN THE PATTERSON DITCH

0 WATER TAKEN IN THE PATTERSON DITCH

0 WATER TAKEN IN THE PATTERSON DITCH ID 550

Structure Name: CRAIG DITCH**Water District: 63 ID Number: 521**

Source MESA CREEK
 Location Q160 Q40 Q10 Section Township Range PM
 NW NW NW 5 49 N 17 W N

Acres Irrigated: 0
 CIU H

Distance from section lines: From N/S line. From E/W line.
 UTM Coordinates (NAD 83) Northing (UTM y). 4273181.7 Easting (UTM x) 169369.9 Spotted from PLSS quarters
 Latitude/Longitude (decimal degrees): 38.5456 -108.7935

Measuring Device/Recorder

Contact: CURT W. WEIMER (OWNER)
 Address: 16825 P8 ROAD

Phone:
 Cell Phone
 E-mail

NATURITA, CO 81422

Water Rights Summary	Total Decreed Rate(s)	Abs	5.0700	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	CA4952	2/11/1939	11/24/1915	30079 24006	0	70	0.52 C	S	1	MESA CR
2	CA4952	2/11/1939	4/1/1932	30079 30041	0	94	1.17 C	S,C	1	MESA CR COND DCR P169
5	W2505	2/11/1939	4/1/1932	30079 30041	0		1.17 C	S,CA	1	CA 4952
6	W2506	2/11/1939	2/10/1939	32547.00000	0		2.34 C	S,CA	1	MESA CR COND DCR SEE CA 4952 FOR STIP FLOOD WATER DECREE
3	CA4952	2/11/1939	2/10/1939	32547.00000	0		1.04 C	S	1	MESA CR SEE CA4952 FOR STIP FLOOD WATER DE P169
4	CA4952	2/11/1939	2/10/1939	32547.00000	0		2.34 C	S,C	1	MESA CR COND DCR SEE CA4952 FOR STIP FLOOD WATER DECREE

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
1978	04/18	07/10	84	1.65	0	0	0	0	0	31.8	101	66.5	12.9	0	0	0	213
1979	04/27	07/19	84	2.05	0	0	0	0	0	11.9	122	71.8	15.7	0	0	0	222
1980	05/23	07/21	60	2.05	0	0	0	0	0	0	36.6	104	25.0	0	0	0	166
1981	05/01	05/18	18	1	0	0	0	0	0	0	32.7	0	0	0	0	0	32.7
1982	05/03	05/25	23	0.75	0	0	0	0	0	0	34.2	0	0	0	0	0	34.2
1983	05/24	08/07	15	1	0	0	0	0	0	0	15.9	13.9	0	0	0	0	29.8
1984	05/21	05/31	11	1	0	0	0	0	0	0	21.8	0	0	0	0	0	21.8
1985	05/17	06/13	28	1	0	0	0	0	0	0	29.8	22.3	0	0	0	0	52.1
1986	05/05	06/10	37	2	0	0	0	0	0	0	104	17.9	0	0	0	0	122
1987	05/04	05/27	24	2	0	0	0	0	0	0	95.2	0	0	0	0	0	95.2
	Minimum			0.75	0	0	0	0	0	0	15.9	0	0	0	0	0	21.8
	Maximum			2.05	0	0	0	0	0	31.8	122	104	25.0	0	0	0	222
	Average			1.45	0	0	0	0	0	4.37	59.5	29.7	5.36	0	0	0	98.9

Diversion Comments

IYR	NUC Code	Acres Irrigated	Comments
1996	Water available, but not taken	0	
1997	Water available, but not taken	0	
1998	Water available, but not taken	0	
1999	Water available, but not taken	0	
2000	Water available, but not taken	0	
2001	Water available, but not taken	0	

Structure Name: CRAIG DITCH

Water District: 63 ID Number: 521

2002	Water available, but not taken	0
2003	Water available, but not taken	0