Stream: Cochetopa Creek (Lower Segment)

Executive Summary

Water Division: 4
Water District: 28
CDOW#: 39188
CWCB ID: 10/4/A-015

Segment: Confluence with Alkali Creek to Headgate of the South Krueger Ditch

Upper Terminus: CONFLUENCE WITH ALKALI CREEK
(Latitude 38° 17’ 35.08”N) (Longitude 106° 45’ 36.33”W)

Lower Terminus: HEADGATE OF THE SOUTH KRUEGER DITCH
(Latitude 38° 31’ 10.79”N) (Longitude 106° 47’ 20.01”W)

Watershed: Tomichi (HUC#: 14020003)
Counties: Saguache
Length: 12.92 miles
USGS Quad(s): Sawtooth Mountain, Iris
Existing ISF: 4-84CW375, 8.5 cfs (January 1 – December 31)
Flow Recommendation (Increase): 6.8 cfs (May 1 – November 15)

Staff Analysis and Recommendation

Summary

The information contained in this report and the associated instream flow file folder forms the basis for staff's instream flow recommendation to be considered by the Board. It is staff's opinion that the information contained in this report is sufficient to support the findings required in Rule 5.40.

Colorado's Instream Flow Program was created in 1973 when the Colorado State Legislature recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment" (see 37-92-102 (3) C.R.S.). The statute vests the CWCB with the exclusive authority to appropriate and acquire instream flow and natural lake level water rights. In order to encourage other entities to participate in Colorado's Instream Flow Program, the statute directs the CWCB to request instream flow recommendations from other state and federal agencies. The Bureau of Land Management (BLM) recommended this segment of Cochetopa Creek to the CWCB for an increased water right under the Instream Flow Program. Cochetopa Creek is being considered for an increase because it has a natural environment that can be preserved to a reasonable degree with an increased instream flow water right.

Cochetopa Creek is approximately 52.5 miles long. Cochetopa Creek originates on the eastern flank of San Luis Peak at an elevation of 12,500 feet and flows generally north as it drops to an elevation of 7,660 feet at its confluence with Tomichi Creek. Approximately 60 percent of the land on the 12.92 mile segment addressed by this report is on federal lands. Cochetopa Creek is located within Saguache County.

The subject of this report is a segment of Cochetopa Creek beginning at the confluence with Alkali Creek and extending downstream to the headgate of the South Krueger Ditch. The proposed segment is located approximately 8 miles southeast of Gunnison. Staff has received one recommendation for this segment, from the BLM. The recommendation for this segment is discussed below.

Justification for Instream Flow Increase

The Cochetopa Creek channel is large, with riffles typically ranging from 30 to 40 feet in width. The channel is also characterized by medium to large size substrate, which tends to reduce water velocities. Substantial flow rates are required to maintain sufficient depth and velocity for salmonids in this type of environment.

BLM believes the reason that the creek supports a healthy and productive fishery is that the creek very consistently experiences significantly more water than the current instream flow appropriation. During the warm weather period of May through mid-November, gage data reveal the creek experiences flows that are typically three to ten times the current insteam flow water right.

According to the data collected by BLM, the current instream flow water rights is capable of meeting two of the three instream flow criteria during the winter. However, the current instream flow water right is not capable of meeting three of three instream flow criteria during summer,

when the fish population requires more physical habitat for foraging, weight gain, and preparation for the fall spawning period. If the current instream flow water right were to be experienced during snowmelt runoff, less than 2/3 of the active stream channel would be wetted. With this reduction in physical habitat, the creek would not be able to sustain the fish biomass it sustains today.

Instream Flow Recommendation

The BLM recommended 6.8 cfs (May 1 to November 15). This recommendation was based on their data collection efforts and staff's water availability analyses.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Confluence w/ Alkali Creek	Headgate of South Krueger Ditch	12.92	40%	60%

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

Biological Data

This segment of Cochetopa Creek is a moderate to high gradient stream, with moderate to large substrate size, punctuated by large boulders. Most of the proposed reach is confined by a narrow canyon, and is further confined by the construction and maintenance of State Highway 114. The riparian community is in good condition and diverse, composed of alder, willow, and red osier dogwood. The riparian community often provides good shading for the water column. The presence of alder indicates a very reliable flow regime and consistent groundwater level in the alluvial aquifer. The creek provides an excellent mix of pools, riffles, and runs for fish habitat. BLM has invested in fisheries habitat improvement projects in this section of the creek, just downstream from Alkali Creek. Fishery surveys indicate that the creek supports a self-sustaining population of brown trout. The survey revealed a variety of age classes and individual specimens up to 12 inches in length.

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.

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. It is believed 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.

Table 1: Data

Party	Date	Q	250%-40%	Summer (3/3)	Winter (2/3)
BLM	10/07/2008	31.70	79.2 – 12.7	14.68	Out of Range
BLM	10/07/2008	24.48	61.2 – 9.8	16.06	Out of Range

The summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model, is 15.3 cfs. The recommended flow of 6.8 cfs, when added to the existing ISF flow of 8.5 cfs equals 15.3cfs. The summer flow recommendation was derived by averaging the results of the data sets.

Hydrologic Data and Analysis

After receiving the cooperating agency's biologic recommendation, the CWCB staff conducted an evaluation of the stream hydrology to determine if water was physically available for an instream flow appropriation. This evaluation was done through a computation that is, in essence, a "water balance". In concept a "water balance" computation can be viewed as an accounting exercise. When done in its most rigorous form, the water balance parses precipitation into all the avenues water pursues after it is deposited as rain, snow, or ice. In other words, given a specified amount of water deposition (input), the balance tries to account for all water depletions (losses) until a selected end point is reached. Water losses include depletions due to evaporation and transpiration, deliveries into ground water storage, temporary surface storage, incorporations into plant and animal tissue and so forth. These losses are individually or collectively subtracted from the input to reveal the net amount of stream runoff as represented by the discharge measured by stream gages. Of course, the measured stream flow need not be the end point of interest; indeed, when looking at issues of water use to extinction stream flow measurements may only describe intermediate steps in the complex accounting process that is a water balance carried out to a net value of zero.

In its analysis, CWCB staff has attempted to use this idea of balancing inputs and losses to determine if water is available for the recommended Instream Flow Appropriation. Of course, this analysis must be a practical exercise rather than a lengthy, and costly, scientific investigation. As a result, staff has simplified the process by lumping together some variables and employing certain rational and scientifically supportable assumptions. The process may be

described through the following description of the steps used to complete the evaluation for this particular stream.

The first step required in determining water availability is a determination of the hydrologic regime at the Lower Terminus (LT) of the recommended ISF reach. In the best case this means looking at the data from a gage at the LT. Further, this data, in the best case, has been collected for a long period of time (the longer the better) including wet and dry periods. In the case of **Cochetopa Creek – Lower** there is a USGS gage record of discharge on the stream. However, the gage station is upstream from the LT. The USGS gage is COCHETOPA CREEK BELOW ROCK CREEK NR PARLIN, CO. (USGS 09118450); it has a period of record (POR) of 28 years collected between 1981 and 2009. The gage is at an elevation of 8,470 ft above mean sea level (amsl) and has a drainage area of 334 mi^2. The hydrograph (plot of discharge over time) produced from this gage includes the consumptive uses and out-of-basin transfers of several diversions. However, the existence of these diversions does not preclude use of the data from the gage. To make the measured data transferable to Cochetopa Creek – Lower above the LT, the consumptive portions of these diversions were added back to the measured hydrograph. The resulting "adjusted" hydrograph could then be used on Cochetopa Creek – Lower above the LT by multiplying the "adjusted" gage discharge values by an area ratio; specifically, the area of Cochetopa Creek – Lower above the LT (373.48 mi^2) to Cochetopa Creek near Parlin, CO (334 mi^2). The resulting proportioned hydrograph was itself "adjusted" (decreased) to reflect the consumptive irrigation depletions and out-of-basin diversions upstream of the LT. The final hydrograph thus represents a distribution of flow over time that has been reduced to reflect existing human uses.

{The Following discussion is based upon the US Geological Survey's *Techniques of Water-Resources Investigations* Series, *Book 4: Hydrologic Analysis and Interpretation, Chapter A3: Statistical Methods in Water Resources* (Chapter 3: Describing Uncertainty) by D.R. Helsel and R. M. Hirsch. This technical reference provides the scientific background and guidance important to the systematic interpretation of hydrologic data. The document is available online and is a valuable aid to understanding and interpreting the analyses described here.}

The next step in producing a representation of the discharge at Cochetopa Creek – Lower is to compute the Geometric Mean of the area-prorated "adjusted" data values from the Cochetopa Creek near Parlin, CO hydrograph. This step is of value because of the inherent statistical weaknesses found in any collection of data intended to measure natural stream discharge. Without getting into the details of statistical theory, it is worth noting that a set of discharge measurements is inherently inaccurate, no matter how well collected, due to the difficulties attendant to data collection, especially hydrologic data. To give deference to this fact and to increase the value of the hydrograph product of this analysis, the Geometric Means of the data were computed and plotted along with the 95% Confidence Intervals about the data. The resultant hydrograph, including recommended Instream Flow values, is displayed in figure 1 with the data displayed in Table 1.

Figure 1

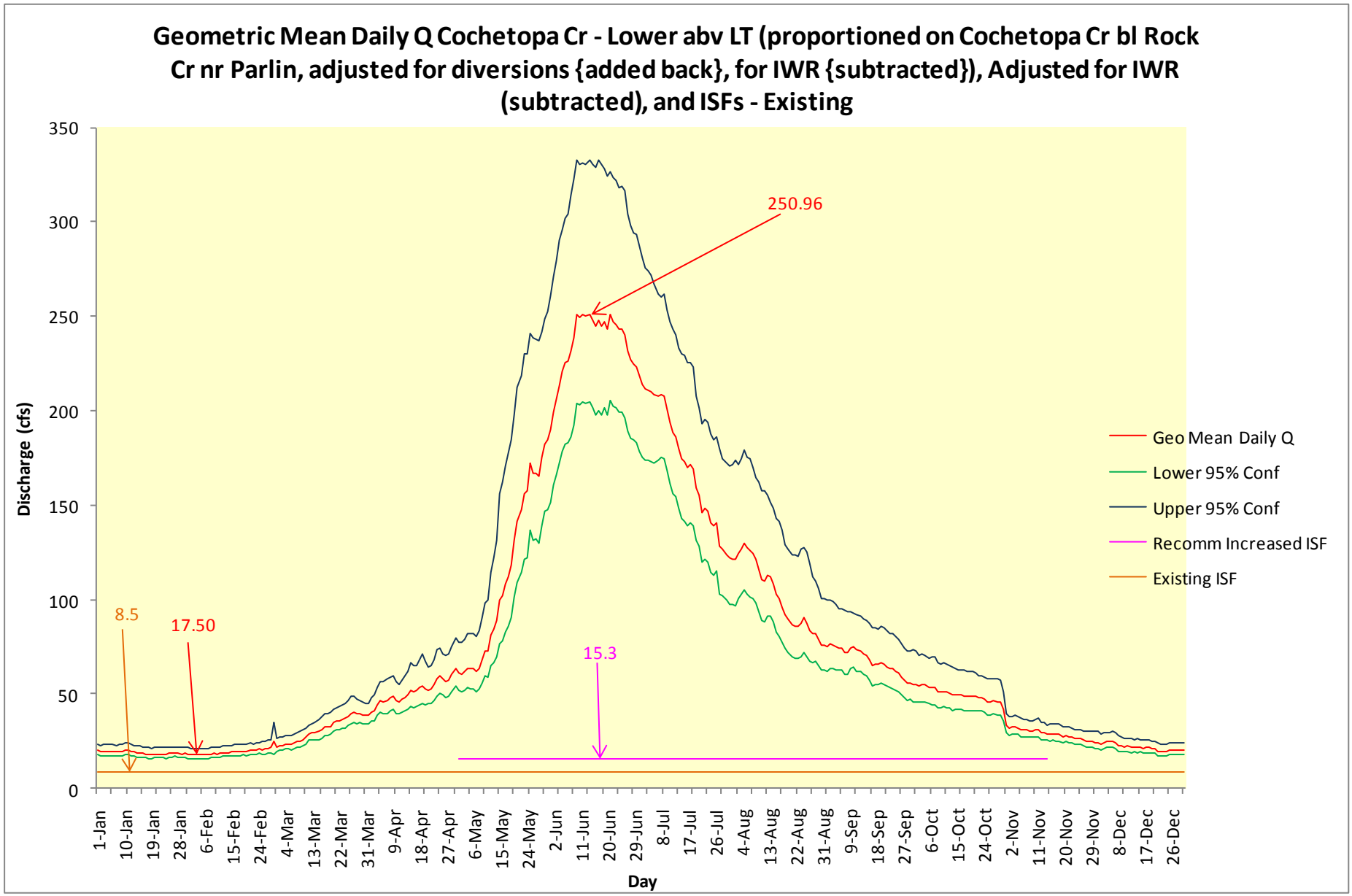

Geometric Mean Daily Q Cochetopa Cr - Lower abv LT (proportioned on Cochetopa Cr bl Rock Cr nr Parlin, adjusted for diversions {added back}, for IWR {subtracted}), Adjusted for IWR (subtracted), and ISFs - Existing
Discharge (cfs)
350
300
250
200
150
100
50
0
250.96
8.5
17.50
15.3
Geo Mean Daily Q
Lower 95% Conf
Upper 95% Conf
Recomm Increased ISF
Existing ISF
1-Jan
10-Jan
19-Jan
28-Jan
6-Feb
15-Feb
24-Feb
4-Mar
13-Mar
22-Mar
31-Mar
9-Apr
18-Apr
27-Apr
6-May
15-May
24-May
2-Jun
11-Jun
20-Jun
29-Jun
8-Jul
17-Jul
26-Jul
4-Aug
13-Aug
22-Aug
31-Aug
9-Sep
18-Sep
27-Sep
6-Oct
15-Oct
24-Oct
2-Nov
11-Nov
20-Nov
29-Nov
8-Dec
17-Dec
26-Dec
Day

Table 1. Geometric Mean Discharge and Recommended Instream Flows			
Date	Existing	Recommended	Proportioned Adjusted GM (abv gage)
	ISF	ISF	Adj (-) for Irr & OoB in Cochetopa Cr – Lower abv LT
1-Jan	6.8		19.91
2-Jan	6.8		19.36
3-Jan	6.8		19.43
4-Jan	6.8		19.72
5-Jan	6.8		19.57
6-Jan	6.8		19.46
7-Jan	6.8		19.26
8-Jan	6.8		19.28
9-Jan	6.8		19.74
10-Jan	6.8		20.39
11-Jan	6.8		20.07
12-Jan	6.8		19.28
13-Jan	6.8		19.19
14-Jan	6.8		18.75
15-Jan	6.8		18.74
16-Jan	6.8		18.61
17-Jan	6.8		18.18
18-Jan	6.8		17.93
19-Jan	6.8		17.64
20-Jan	6.8		18.13
21-Jan	6.8		18.24
22-Jan	6.8		18.25
23-Jan	6.8		18.22
24-Jan	6.8		17.90
25-Jan	6.8		18.29
26-Jan	6.8		18.53
27-Jan	6.8		18.83
28-Jan	6.8		18.61
29-Jan	6.8		18.20
30-Jan	6.8		18.27
31-Jan	6.8		17.95
1-Feb	6.8		17.62
2-Feb	6.8		17.64
3-Feb	6.8		17.54
4-Feb	6.8		17.50
5-Feb	6.8		17.80
6-Feb	6.8		17.62
7-Feb	6.8		17.90
8-Feb	6.8		18.08
9-Feb	6.8		18.26
10-Feb	6.8		18.11
11-Feb	6.8		18.50
12-Feb	6.8		18.86
13-Feb	6.8		19.00
14-Feb	6.8		18.89
15-Feb	6.8		19.13
16-Feb	6.8		19.35
17-Feb	6.8		19.38
18-Feb	6.8		19.62

19-Feb	6.8		19.66
20-Feb	6.8		19.65
21-Feb	6.8		20.14
22-Feb	6.8		20.06
23-Feb	6.8		20.47
24-Feb	6.8		20.63
25-Feb	6.8		20.55
26-Feb	6.8		20.71
27-Feb	6.8		21.21
28-Feb	6.8		21.51
29-Feb	6.8		24.77
1-Mar	6.8		22.08
2-Mar	6.8		22.70
3-Mar	6.8		22.66
4-Mar	6.8		23.46
5-Mar	6.8		23.56
6-Mar	6.8		23.34
7-Mar	6.8		23.98
8-Mar	6.8		24.67
9-Mar	6.8		24.87
10-Mar	6.8		25.82
11-Mar	6.8		26.95
12-Mar	6.8		28.43
13-Mar	6.8		29.16
14-Mar	6.8		29.48
15-Mar	6.8		30.00
16-Mar	6.8		30.65
17-Mar	6.8		32.16
18-Mar	6.8		32.38
19-Mar	6.8		32.88
20-Mar	6.8		34.61
21-Mar	6.8		35.43
22-Mar	6.8		35.75
23-Mar	6.8		36.53
24-Mar	6.8		37.02
25-Mar	6.8		38.25
26-Mar	6.8		39.62
27-Mar	6.8		39.89
28-Mar	6.8		39.34
29-Mar	6.8		39.65
30-Mar	6.8		38.86
31-Mar	6.8		38.43
1-Apr	6.8		38.46
2-Apr	6.8		40.27
3-Apr	6.8		41.26
4-Apr	6.8		44.26
5-Apr	6.8		46.59
6-Apr	6.8		45.63
7-Apr	6.8		46.54
8-Apr	6.8		47.71
9-Apr	6.8		48.45
10-Apr	6.8		46.15
11-Apr	6.8		45.64

12-Apr	6.8		47.15
13-Apr	6.8		48.06
14-Apr	6.8		49.62
15-Apr	6.8		51.94
16-Apr	6.8		50.99
17-Apr	6.8		51.49
18-Apr	6.8		53.21
19-Apr	6.8		54.45
20-Apr	6.8		52.54
21-Apr	6.8		52.18
22-Apr	6.8		52.28
23-Apr	6.8		54.94
24-Apr	6.8		58.04
25-Apr	6.8		59.52
26-Apr	6.8		57.75
27-Apr	6.8		56.61
28-Apr	6.8		57.52
29-Apr	6.8		60.21
30-Apr	6.8		63.71
1-May	6.8	15.30	61.12
2-May	6.8	15.30	60.51
3-May	6.8	15.30	61.88
4-May	6.8	15.30	63.48
5-May	6.8	15.30	63.06
6-May	6.8	15.30	63.30
7-May	6.8	15.30	61.62
8-May	6.8	15.30	63.74
9-May	6.8	15.30	67.87
10-May	6.8	15.30	72.61
11-May	6.8	15.30	72.85
12-May	6.8	15.30	80.86
13-May	6.8	15.30	84.20
14-May	6.8	15.30	88.49
15-May	6.8	15.30	99.62
16-May	6.8	15.30	101.77
17-May	6.8	15.30	108.06
18-May	6.8	15.30	112.21
19-May	6.8	15.30	118.03
20-May	6.8	15.30	131.20
21-May	6.8	15.30	141.22
22-May	6.8	15.30	147.37
23-May	6.8	15.30	156.22
24-May	6.8	15.30	157.33
25-May	6.8	15.30	172.13
26-May	6.8	15.30	166.95
27-May	6.8	15.30	166.89
28-May	6.8	15.30	165.13
29-May	6.8	15.30	174.92
30-May	6.8	15.30	182.58
31-May	6.8	15.30	184.50
1-Jun	6.8	15.30	189.76
2-Jun	6.8	15.30	199.43
3-Jun	6.8	15.30	205.94

4-Jun	6.8	15.30	213.44
5-Jun	6.8	15.30	220.59
6-Jun	6.8	15.30	225.14
7-Jun	6.8	15.30	226.13
8-Jun	6.8	15.30	231.59
9-Jun	6.8	15.30	238.85
10-Jun	6.8	15.30	250.78
11-Jun	6.8	15.30	249.26
12-Jun	6.8	15.30	250.96
13-Jun	6.8	15.30	250.08
14-Jun	6.8	15.30	250.79
15-Jun	6.8	15.30	248.14
16-Jun	6.8	15.30	244.64
17-Jun	6.8	15.30	247.47
18-Jun	6.8	15.30	245.08
19-Jun	6.8	15.30	247.36
20-Jun	6.8	15.30	243.21
21-Jun	6.8	15.30	250.55
22-Jun	6.8	15.30	247.15
23-Jun	6.8	15.30	245.89
24-Jun	6.8	15.30	242.91
25-Jun	6.8	15.30	243.00
26-Jun	6.8	15.30	240.23
27-Jun	6.8	15.30	231.44
28-Jun	6.8	15.30	226.95
29-Jun	6.8	15.30	224.84
30-Jun	6.8	15.30	223.44
1-Jul	6.8	15.30	218.27
2-Jul	6.8	15.30	214.21
3-Jul	6.8	15.30	211.43
4-Jul	6.8	15.30	210.93
5-Jul	6.8	15.30	209.98
6-Jul	6.8	15.30	208.19
7-Jul	6.8	15.30	207.67
8-Jul	6.8	15.30	208.29
9-Jul	6.8	15.30	207.96
10-Jul	6.8	15.30	200.89
11-Jul	6.8	15.30	194.14
12-Jul	6.8	15.30	188.73
13-Jul	6.8	15.30	186.46
14-Jul	6.8	15.30	180.02
15-Jul	6.8	15.30	174.77
16-Jul	6.8	15.30	173.05
17-Jul	6.8	15.30	169.94
18-Jul	6.8	15.30	171.29
19-Jul	6.8	15.30	169.28
20-Jul	6.8	15.30	159.00
21-Jul	6.8	15.30	155.39
22-Jul	6.8	15.30	146.20
23-Jul	6.8	15.30	148.07
24-Jul	6.8	15.30	146.60
25-Jul	6.8	15.30	140.58
26-Jul	6.8	15.30	138.65

27-Jul	6.8	15.30	140.63
28-Jul	6.8	15.30	127.93
29-Jul	6.8	15.30	126.37
30-Jul	6.8	15.30	123.77
31-Jul	6.8	15.30	121.71
1-Aug	6.8	15.30	121.42
2-Aug	6.8	15.30	121.59
3-Aug	6.8	15.30	124.72
4-Aug	6.8	15.30	127.06
5-Aug	6.8	15.30	129.98
6-Aug	6.8	15.30	127.31
7-Aug	6.8	15.30	125.88
8-Aug	6.8	15.30	124.10
9-Aug	6.8	15.30	120.93
10-Aug	6.8	15.30	116.01
11-Aug	6.8	15.30	110.84
12-Aug	6.8	15.30	110.04
13-Aug	6.8	15.30	113.05
14-Aug	6.8	15.30	112.25
15-Aug	6.8	15.30	108.23
16-Aug	6.8	15.30	102.55
17-Aug	6.8	15.30	100.16
18-Aug	6.8	15.30	95.97
19-Aug	6.8	15.30	91.88
20-Aug	6.8	15.30	89.62
21-Aug	6.8	15.30	86.57
22-Aug	6.8	15.30	86.15
23-Aug	6.8	15.30	85.73
24-Aug	6.8	15.30	87.24
25-Aug	6.8	15.30	90.11
26-Aug	6.8	15.30	87.33
27-Aug	6.8	15.30	83.67
28-Aug	6.8	15.30	81.61
29-Aug	6.8	15.30	82.12
30-Aug	6.8	15.30	78.98
31-Aug	6.8	15.30	75.71
1-Sep	6.8	15.30	75.46
2-Sep	6.8	15.30	74.89
3-Sep	6.8	15.30	76.18
4-Sep	6.8	15.30	76.04
5-Sep	6.8	15.30	74.65
6-Sep	6.8	15.30	74.44
7-Sep	6.8	15.30	74.40
8-Sep	6.8	15.30	72.05
9-Sep	6.8	15.30	71.63
10-Sep	6.8	15.30	74.44
11-Sep	6.8	15.30	74.88
12-Sep	6.8	15.30	73.08
13-Sep	6.8	15.30	72.71
14-Sep	6.8	15.30	71.32
15-Sep	6.8	15.30	70.45
16-Sep	6.8	15.30	68.14
17-Sep	6.8	15.30	65.18

18-Sep	6.8	15.30	65.36
19-Sep	6.8	15.30	65.72
20-Sep	6.8	15.30	66.35
21-Sep	6.8	15.30	65.41
22-Sep	6.8	15.30	64.54
23-Sep	6.8	15.30	63.76
24-Sep	6.8	15.30	63.22
25-Sep	6.8	15.30	61.89
26-Sep	6.8	15.30	60.87
27-Sep	6.8	15.30	58.91
28-Sep	6.8	15.30	57.38
29-Sep	6.8	15.30	55.62
30-Sep	6.8	15.30	56.03
1-Oct	6.8	15.30	55.21
2-Oct	6.8	15.30	55.06
3-Oct	6.8	15.30	54.21
4-Oct	6.8	15.30	54.95
5-Oct	6.8	15.30	54.59
6-Oct	6.8	15.30	53.34
7-Oct	6.8	15.30	53.09
8-Oct	6.8	15.30	53.07
9-Oct	6.8	15.30	50.89
10-Oct	6.8	15.30	51.02
11-Oct	6.8	15.30	51.40
12-Oct	6.8	15.30	50.86
13-Oct	6.8	15.30	50.38
14-Oct	6.8	15.30	49.24
15-Oct	6.8	15.30	49.62
16-Oct	6.8	15.30	49.44
17-Oct	6.8	15.30	49.22
18-Oct	6.8	15.30	49.02
19-Oct	6.8	15.30	48.76
20-Oct	6.8	15.30	48.85
21-Oct	6.8	15.30	48.89
22-Oct	6.8	15.30	48.61
23-Oct	6.8	15.30	48.04
24-Oct	6.8	15.30	48.05
25-Oct	6.8	15.30	47.30
26-Oct	6.8	15.30	45.98
27-Oct	6.8	15.30	45.72
28-Oct	6.8	15.30	46.29
29-Oct	6.8	15.30	45.93
30-Oct	6.8	15.30	45.68
31-Oct	6.8	15.30	41.56
1-Nov	6.8	15.30	33.43
2-Nov	6.8	15.30	31.79
3-Nov	6.8	15.30	32.18
4-Nov	6.8	15.30	32.72
5-Nov	6.8	15.30	32.10
6-Nov	6.8	15.30	31.07
7-Nov	6.8	15.30	31.01
8-Nov	6.8	15.30	30.92
9-Nov	6.8	15.30	30.56

10-Nov	6.8	15.30	30.27
11-Nov	6.8	15.30	30.62
12-Nov	6.8	15.30	30.72
13-Nov	6.8	15.30	29.19
14-Nov	6.8	15.30	29.33
15-Nov	6.8	15.30	28.52
16-Nov	6.8		28.59
17-Nov	6.8		28.91
18-Nov	6.8		28.71
19-Nov	6.8		28.70
20-Nov	6.8		27.28
21-Nov	6.8		27.72
22-Nov	6.8		27.25
23-Nov	6.8		27.02
24-Nov	6.8		26.46
25-Nov	6.8		26.35
26-Nov	6.8		26.66
27-Nov	6.8		25.42
28-Nov	6.8		24.99
29-Nov	6.8		24.76
30-Nov	6.8		24.70
1-Dec	6.8		24.13
2-Dec	6.8		24.10
3-Dec	6.8		23.53
4-Dec	6.8		24.21
5-Dec	6.8		24.67
6-Dec	6.8		24.58
7-Dec	6.8		24.70
8-Dec	6.8		24.04
9-Dec	6.8		22.67
10-Dec	6.8		22.60
11-Dec	6.8		21.92
12-Dec	6.8		22.21
13-Dec	6.8		21.73
14-Dec	6.8		21.73
15-Dec	6.8		21.65
16-Dec	6.8		21.84
17-Dec	6.8		21.11
18-Dec	6.8		21.39
19-Dec	6.8		21.48
20-Dec	6.8		21.01
21-Dec	6.8		20.92
22-Dec	6.8		19.71
23-Dec	6.8		19.62
24-Dec	6.8		19.66
25-Dec	6.8		19.71
26-Dec	6.8		20.22
27-Dec	6.8		20.52
28-Dec	6.8		20.23
29-Dec	6.8		20.34
30-Dec	6.8		20.51
31-Dec	6.8		20.16

Existing Water Right Information

Staff has analyzed the water rights tabulation and contacted the Division Engineer Office (DEO) to identify any potential water availability problems. There are ten decreed surface diversions within this reach of stream: Eastside Ditch (6.0 cfs, 1891/1903 appropriation), Home Ditch No. 182 (10.6 cfs, 1891/1903/1943 appropriation), Mitchell Ditch (3.0 cfs, 1891/1943 appropriation), Japeck Ditches Nos. 1-5 (6.5 cfs, 1890/1927 appropriation), Norman Ditch (12.0 cfs, 1903/1910/1925 appropriation), and Sharp Ditch (8.0 cfs, 1903/1910/1925 appropriation). Staff has determined that water is available for appropriation on Cochetopa Creek, between the confluence with Alkali Creek and the head gate of the South Krueger Ditch, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid existing water rights.

CWCB Staff's Instream Flow Recommendation

Staff recommends the Board form its intent to appropriate on the following stream reach:

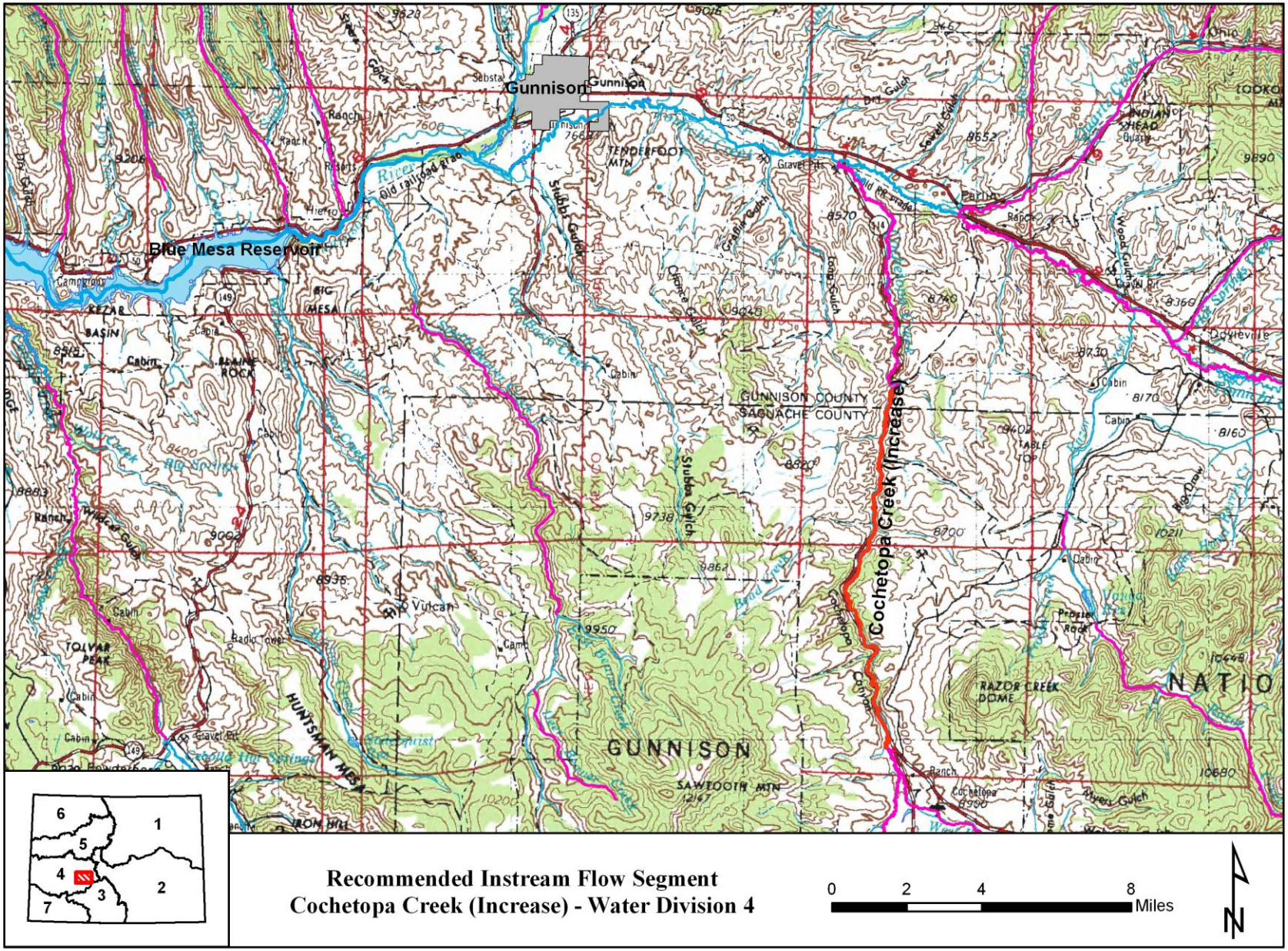
Segment: Confluence with Alkali Creek to Headgate of the South Krueger Ditch

Upper Terminus: CONFLUENCE WITH ALKALI CREEK
(Latitude 38° 17' 35.08"N) (Longitude 106° 45' 36.33"W)
UTM North: 4239798.60 UTM East: 346079.99
NW NW S33 T47N R2E NMPM
1290' East of the West Section Line; 1210' South of the North Section Line

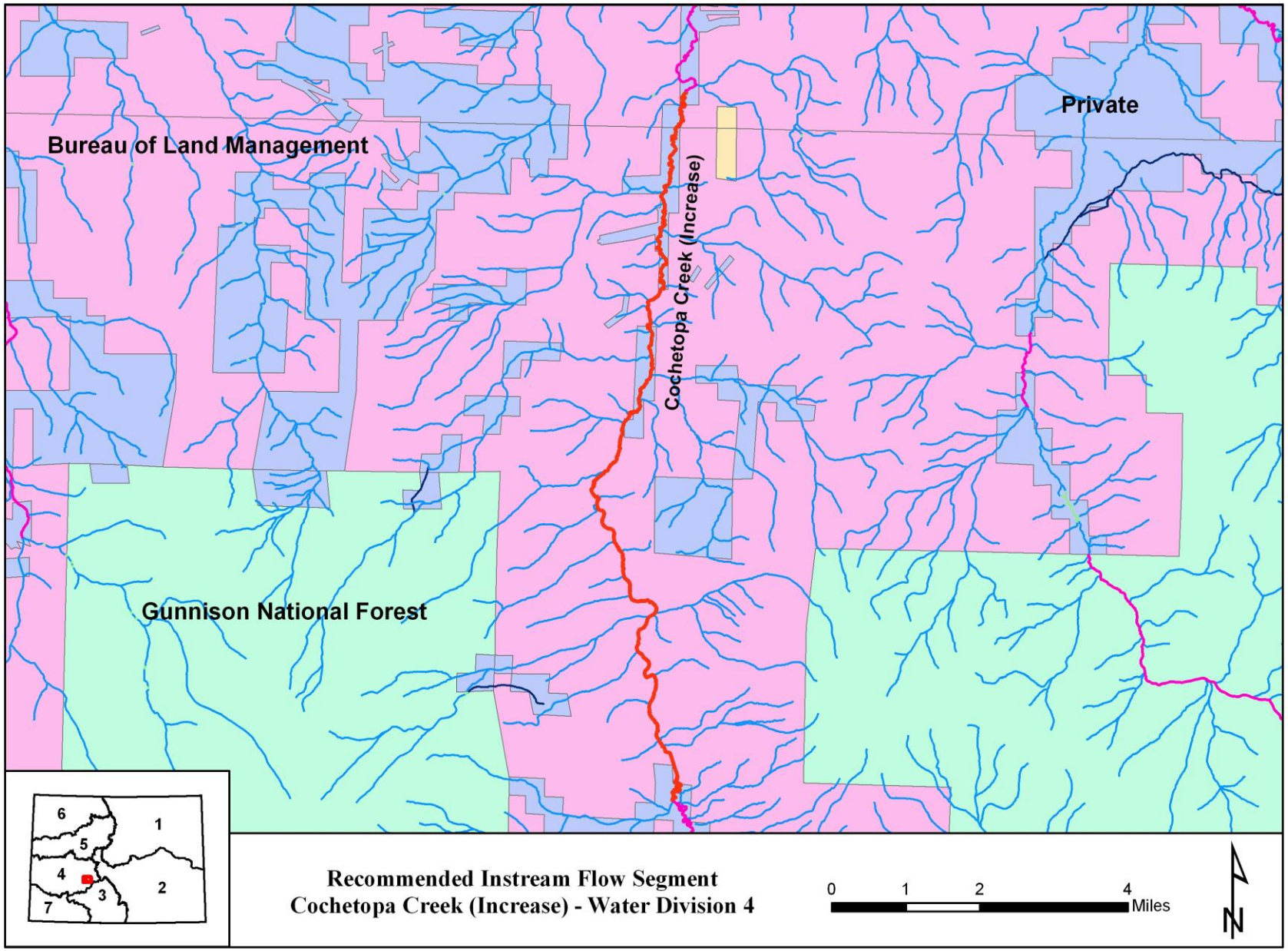
Lower Terminus: HEADGATE OF THE SOUTH KRUEGER DITCH
(Latitude 38° 31' 10.79"N) (Longitude 106° 47' 20.01"W)
UTM North: 4264991.75 UTM East: 344049.12
SE SW S9 T48N R2E NMPM
1690' East of the West Section Line; 930' South of the North Section Line

Watershed: Tomichi (HUC#: 14020003)
Counties: Saguache
Length: 12.92 miles
USGS Quad(s): Sawtooth Mountain, Iris
Existing ISF: 4-84CW375, 8.5 cfs (January 1 – December 31)
Flow Recommendation (Increase): 6.8 cfs (May 1 – November 15)

Vicinity Map



Land Use Map


Bureau of Land Management
Private
Cochetopa Creek (Increase)
Gunnison National Forest
6
1
5
4
2
3
7
Recommended Instream Flow Segment
Cochetopa Creek (Increase) - Water Division 4
0
1
2
4
Miles
N

Topographic & Water Rights Map