Stream: Rock Creek

Executive Summary

Water Division: 2
Water District: 11
CDOW#: 30659
CWCB ID: 09/2/A-005

Segment: Outlet of Native Lake to the Confluence with Willow Creek

Upper Terminus: OUTLET OF NATIVE LAKE
(Latitude 39° 13’ 26.66”N) (Longitude 106° 27’ 30.51”W)

Lower Terminus: CONFLUENCE WITH WILLOW CREEK
(Latitude 39° 12’ 39.72”N) (Longitude 106° 22’ 49.14”W)

Watershed: Arkansas Headwaters (HUC#: 11020001**)**
Counties: Lake County
Length: 5.0 miles
USGS Quad(s): Mount Massive
Flow Recommendation: 11.0 cfs (May 15 – August 31)
5.0 cfs (September 1 – October 31)
1.7 cfs (November 1 – May 14)

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 Colorado Division of Wildlife (CDOW) recommended this segment of Rock Creek to the CWCB for inclusion into the Instream Flow Program. Rock 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.

Rock Creek is approximately 5.0 miles long. It begins on the northeast side of Mount Massive at an elevation of approximately 11,225 feet and terminates at the confluence with Willow Creek at an elevation of approximately 9,510 feet. Of the 5.0 mile segment addressed by this report, approximately 95% of the segment, or 4.75 miles, is located on public lands. Rock Creek is located within Lake County. The total drainage area of Rock Creek is approximately 12 square miles. Rock Creek generally flows in an easterly direction.

The subject of this report is a segment of the Rock Creek beginning at the outlet of Native Lake and extending downstream to the confluence with Willow Creek. The proposed segment is located near the Town of Leadville. The staff has received only one recommendation for this segment, from the CDOW. The recommendation for this segment is discussed below.

Instream Flow Recommendation(s)

The CDOW is recommending 11.0 cfs (May 15 – August 31); 5.0 cfs (September 1 – October 31); and 1.7 cfs (November 1 – May 14) 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
Outlet of Native Lake	Confluence w/ Willow Creek	5.0	22%	78%

84% of the public lands are part of the Leadville National Fish Hatchery, 12% are part of the San Isabel National Forest and the remaining 4 % are BLM lands.

Biological Data

The CDOW, in 2003, collected stream cross-section information, natural environment data, and other data needed to quantify the instream flow needs for this reach of Rock Creek. Rock Creek is classified as a medium stream (between 20 to 35 feet wide) and fishery surveys indicate the stream environment of Rock Creek supports: brook trout (*Salvelinus fontinalis*) and greenback cutthroat trout (*Oncorhynchus clarkii stomias*). Greenback cutthroat trout are currently considered a state and federal "Threatened" species. This species inhabits cold water streams and lakes with adequate stream spawning habitat present in the spring of the year. A Greenback Cutthroat Trout Recovery Plan has been developed by an interagency group of scientists operating under the sponsorship of the U.S. Fish and Wildlife Service. Instream flow maintenance has been identified in the Recovery Plan as an important tool in the recovery of the species

Field Survey Data

CDOW 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, four 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)
CDOW	8/14/2003	7.9	19.7 – 3.2	14.8	1.5[OR]
CDOW	8/14/2003	13.1	32.8 – 5.2	7.2	4.6[OR]
CDOW	10/23/2003	5.0	12.6 – 2.0	19[OR]	1.9
CDOW	10/23/2003	3.6	8.9 – 1.4	?	1.4

CDOW = Division of Wildlife OR= Outside of the R2X Accuracy Range

The summer flow recommendation, which met 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 11.0 cfs. The flow recommendation of 5.0 cfs (September 1 – October 31) was based on water availability. The winter flow amount, which meets 2 of 3 criteria is 1.7 cfs. The summer and winter flow recommendations were 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 **Rock Creek** no such gage is available at the LT. In fact, there is no gage on Rock Creek. It is thus necessary to describe the normal flow regime at Rock Creek above the LT through a "representative" gage station. The gage station selected for this was HALFMOON CREEK

NEAR MALTA, CO. (USGS 07083000), a gage with a 61 year period of record (POR) collected between 1945 and 2007. The gage is at an elevation of 9,930 ft above mean sea level (amsl) and has a drainage area of 23.6 mi^2. The hydrograph (plot of discharge over time) produced from this gage is free from the effects of upstream consumptive diversions. Thus there is no need to make "adjustments" to the Halfmoon Creek Near Malta, CO gage record to account for consumptive losses to make the measured data from Halfmoon Creek transferrable to Rock Creek above the LT. The existing Halfmoon hydrograph was multiplied by an area ratio to create the hydrograph "representative" of Rock Creek; specifically, the area of Rock Creek above the LT (11.87 mi^2 above the LT) to Halfmoon Creek Near Malta, CO (23.6 mi^2 above the gage). Next, the resulting proportioned hydrograph was itself "adjusted" (decreased) to reflect the limited number of consumptive irrigation depletions and transbasin diversions on Rock Creek 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 Rock Creek above the LT was to compute the Geometric Mean of the area-prorated data values from the data values from the Halfmoon Creek Near Malta, 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 an enlargement displayed in figure 2. The data displayed in this hydrograph follow in Table 1.

Fig. 1. Geometric Mean Daily Discharge Rock Cr abv LT (proportioned on Halfmoon Cr nr Malta) & ISFs

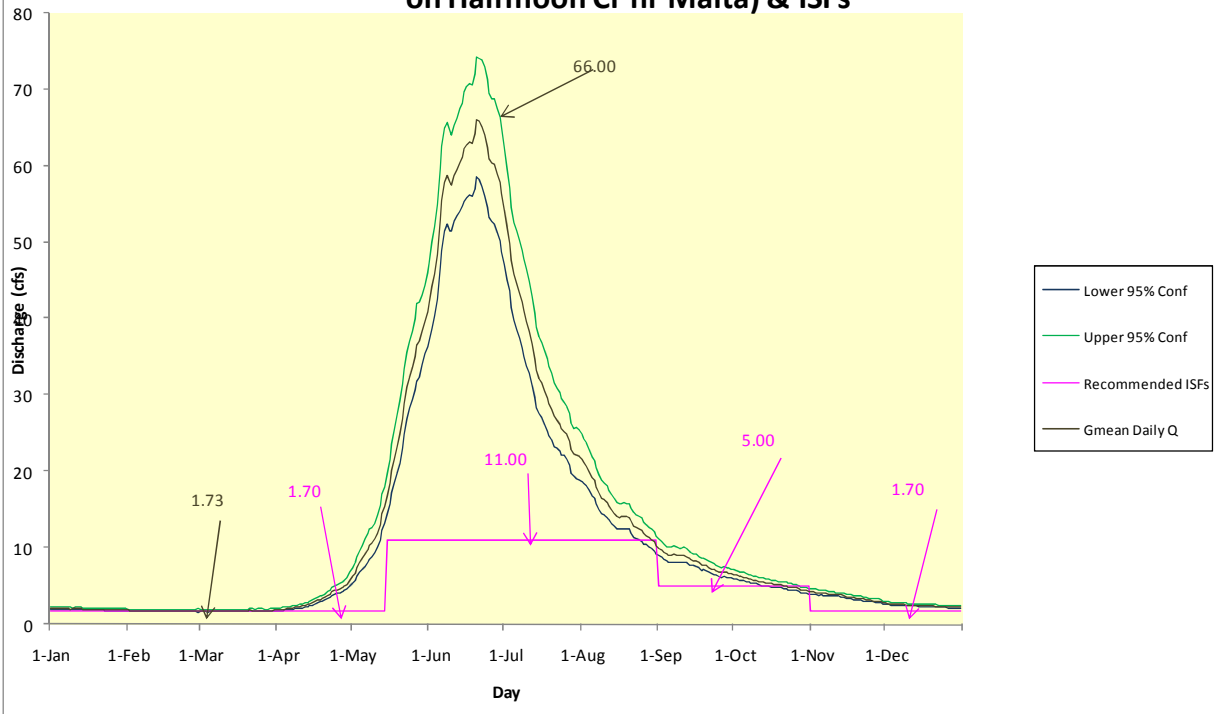


Fig. 2. Geometric Mean Daily Discharge Rock Cr abv LT (proportioned on Halfmoon Cr nr Malta) & ISFs

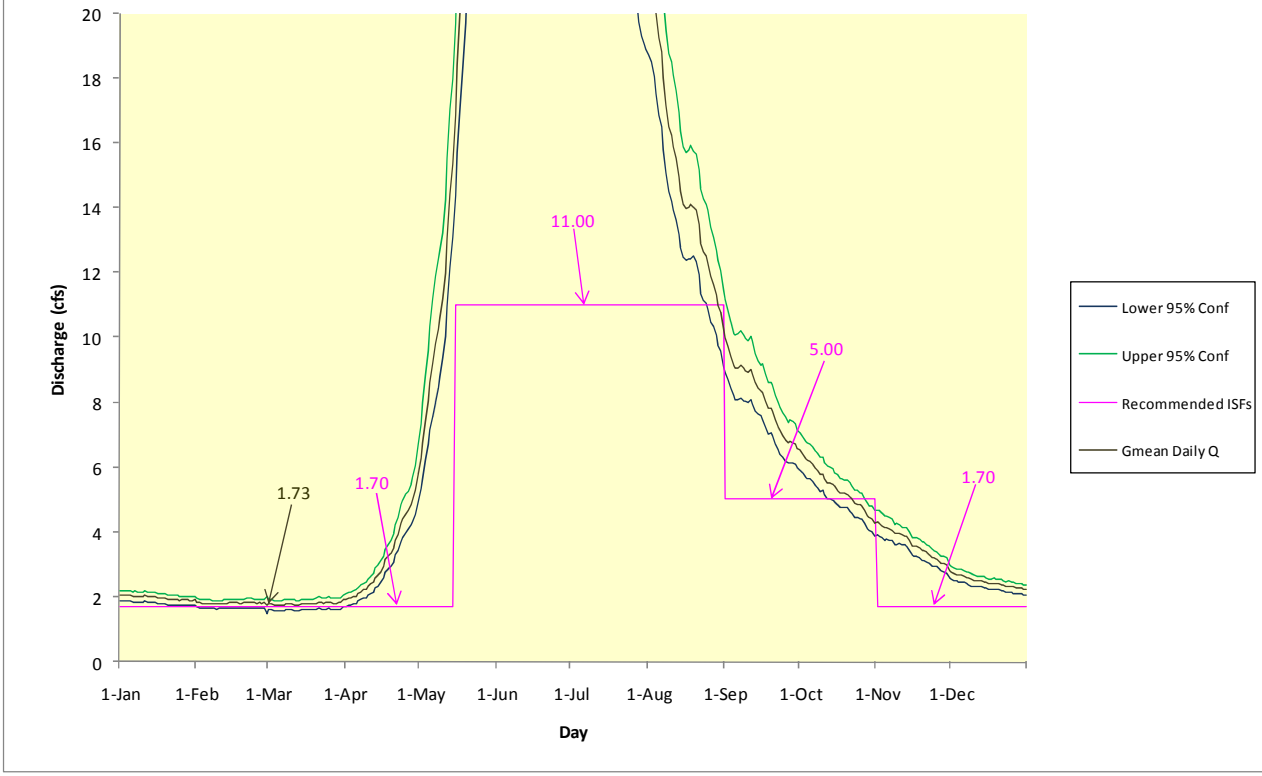


Table 1. Geometric Mean Discharge and Recommended Instream Flows		
Date	Recommended ISF	Proportioned Adjusted GM (abv gage) No Adj (-) for Irr & OoB in Rock Creek abv LT
1-Jan	1.70	2.06
2-Jan	1.70	2.03
3-Jan	1.70	2.04
4-Jan	1.70	2.02
5-Jan	1.70	2.02
6-Jan	1.70	2.02
7-Jan	1.70	2.02
8-Jan	1.70	2.01
9-Jan	1.70	2.00
10-Jan	1.70	2.01
11-Jan	1.70	2.02
12-Jan	1.70	2.02
13-Jan	1.70	2.02
14-Jan	1.70	2.00
15-Jan	1.70	2.00
16-Jan	1.70	1.95
17-Jan	1.70	1.95
18-Jan	1.70	1.94
19-Jan	1.70	1.94
20-Jan	1.70	1.92
21-Jan	1.70	1.93
22-Jan	1.70	1.92
23-Jan	1.70	1.91
24-Jan	1.70	1.90
25-Jan	1.70	1.89
26-Jan	1.70	1.90
27-Jan	1.70	1.90
28-Jan	1.70	1.89
29-Jan	1.70	1.88
30-Jan	1.70	1.89
31-Jan	1.70	1.89
1-Feb	1.70	1.83
2-Feb	1.70	1.81
3-Feb	1.70	1.78
4-Feb	1.70	1.79
5-Feb	1.70	1.79
6-Feb	1.70	1.78
7-Feb	1.70	1.78
8-Feb	1.70	1.78
9-Feb	1.70	1.77
10-Feb	1.70	1.77
11-Feb	1.70	1.78
12-Feb	1.70	1.79

13-Feb	1.70	1.79
14-Feb	1.70	1.81
15-Feb	1.70	1.82
16-Feb	1.70	1.81
17-Feb	1.70	1.81
18-Feb	1.70	1.80
19-Feb	1.70	1.79
20-Feb	1.70	1.80
21-Feb	1.70	1.81
22-Feb	1.70	1.82
23-Feb	1.70	1.82
24-Feb	1.70	1.81
25-Feb	1.70	1.80
26-Feb	1.70	1.81
27-Feb	1.70	1.79
28-Feb	1.70	1.80
29-Feb	1.70	1.74
1-Mar	1.70	1.76
2-Mar	1.70	1.76
3-Mar	1.70	1.74
4-Mar	1.70	1.73
5-Mar	1.70	1.74
6-Mar	1.70	1.75
7-Mar	1.70	1.75
8-Mar	1.70	1.78
9-Mar	1.70	1.77
10-Mar	1.70	1.76
11-Mar	1.70	1.75
12-Mar	1.70	1.75
13-Mar	1.70	1.74
14-Mar	1.70	1.76
15-Mar	1.70	1.76
16-Mar	1.70	1.78
17-Mar	1.70	1.78
18-Mar	1.70	1.78
19-Mar	1.70	1.77
20-Mar	1.70	1.79
21-Mar	1.70	1.83
22-Mar	1.70	1.81
23-Mar	1.70	1.79
24-Mar	1.70	1.81
25-Mar	1.70	1.82
26-Mar	1.70	1.81
27-Mar	1.70	1.80
28-Mar	1.70	1.78
29-Mar	1.70	1.81
30-Mar	1.70	1.80
31-Mar	1.70	1.89
1-Apr	1.70	1.92
2-Apr	1.70	1.93
3-Apr	1.70	1.95

4-Apr	1.70	2.00
5-Apr	1.70	2.02
6-Apr	1.70	2.08
7-Apr	1.70	2.15
8-Apr	1.70	2.20
9-Apr	1.70	2.23
10-Apr	1.70	2.31
11-Apr	1.70	2.38
12-Apr	1.70	2.43
13-Apr	1.70	2.57
14-Apr	1.70	2.65
15-Apr	1.70	2.77
16-Apr	1.70	2.92
17-Apr	1.70	3.13
18-Apr	1.70	3.24
19-Apr	1.70	3.33
20-Apr	1.70	3.50
21-Apr	1.70	3.75
22-Apr	1.70	3.91
23-Apr	1.70	4.25
24-Apr	1.70	4.38
25-Apr	1.70	4.54
26-Apr	1.70	4.65
27-Apr	1.70	4.84
28-Apr	1.70	4.96
29-Apr	1.70	5.27
30-Apr	1.70	5.77
1-May	1.70	6.26
2-May	1.70	6.73
3-May	1.70	7.43
4-May	1.70	8.03
5-May	1.70	8.60
6-May	1.70	9.21
7-May	1.70	9.80
8-May	1.70	10.26
9-May	1.70	10.59
10-May	1.70	11.17
11-May	1.70	11.98
12-May	1.70	13.07
13-May	1.70	14.41
14-May	1.70	15.36
15-May	11.00	16.86
16-May	11.00	18.42
17-May	11.00	20.07
18-May	11.00	21.61
19-May	11.00	23.26
20-May	11.00	24.81
21-May	11.00	26.89
22-May	11.00	28.86
23-May	11.00	30.96
24-May	11.00	32.40

25-May	11.00	33.60
26-May	11.00	35.07
27-May	11.00	36.53
28-May	11.00	36.97
29-May	11.00	38.25
30-May	11.00	39.61
31-May	11.00	40.89
1-Jun	11.00	41.92
2-Jun	11.00	44.09
3-Jun	11.00	45.84
4-Jun	11.00	48.36
5-Jun	11.00	52.84
6-Jun	11.00	55.38
7-Jun	11.00	57.87
8-Jun	11.00	58.67
9-Jun	11.00	57.73
10-Jun	11.00	57.46
11-Jun	11.00	58.76
12-Jun	11.00	59.51
13-Jun	11.00	60.39
14-Jun	11.00	61.16
15-Jun	11.00	62.09
16-Jun	11.00	62.80
17-Jun	11.00	63.16
18-Jun	11.00	62.96
19-Jun	11.00	64.15
20-Jun	11.00	66.00
21-Jun	11.00	65.75
22-Jun	11.00	65.14
23-Jun	11.00	63.99
24-Jun	11.00	62.39
25-Jun	11.00	60.93
26-Jun	11.00	60.28
27-Jun	11.00	60.10
28-Jun	11.00	58.84
29-Jun	11.00	57.75
30-Jun	11.00	56.43
1-Jul	11.00	54.25
2-Jul	11.00	51.91
3-Jul	11.00	49.88
4-Jul	11.00	47.54
5-Jul	11.00	45.79
6-Jul	11.00	44.60
7-Jul	11.00	43.30
8-Jul	11.00	42.14
9-Jul	11.00	41.03
10-Jul	11.00	39.64
11-Jul	11.00	38.40
12-Jul	11.00	36.65
13-Jul	11.00	34.76
14-Jul	11.00	33.21

15-Jul	11.00	32.19
16-Jul	11.00	31.57
17-Jul	11.00	30.58
18-Jul	11.00	29.62
19-Jul	11.00	28.92
20-Jul	11.00	28.18
21-Jul	11.00	27.16
22-Jul	11.00	26.65
23-Jul	11.00	26.18
24-Jul	11.00	25.62
25-Jul	11.00	25.30
26-Jul	11.00	24.87
27-Jul	11.00	23.93
28-Jul	11.00	22.82
29-Jul	11.00	22.25
30-Jul	11.00	22.18
31-Jul	11.00	21.96
1-Aug	11.00	21.61
2-Aug	11.00	21.25
3-Aug	11.00	20.74
4-Aug	11.00	20.00
5-Aug	11.00	19.28
6-Aug	11.00	18.83
7-Aug	11.00	18.01
8-Aug	11.00	17.17
9-Aug	11.00	16.52
10-Aug	11.00	16.24
11-Aug	11.00	15.90
12-Aug	11.00	15.52
13-Aug	11.00	14.96
14-Aug	11.00	14.49
15-Aug	11.00	14.10
16-Aug	11.00	13.98
17-Aug	11.00	14.04
18-Aug	11.00	14.10
19-Aug	11.00	14.05
20-Aug	11.00	13.92
21-Aug	11.00	13.50
22-Aug	11.00	12.92
23-Aug	11.00	12.65
24-Aug	11.00	12.51
25-Aug	11.00	12.32
26-Aug	11.00	11.88
27-Aug	11.00	11.65
28-Aug	11.00	11.33
29-Aug	11.00	11.02
30-Aug	11.00	10.78
31-Aug	11.00	10.24
1-Sep	5.00	10.01
2-Sep	5.00	9.74
3-Sep	5.00	9.41

4-Sep	5.00	9.14
5-Sep	5.00	9.06
6-Sep	5.00	9.07
7-Sep	5.00	9.13
8-Sep	5.00	9.04
9-Sep	5.00	8.97
10-Sep	5.00	8.92
11-Sep	5.00	9.03
12-Sep	5.00	8.89
13-Sep	5.00	8.59
14-Sep	5.00	8.45
15-Sep	5.00	8.36
16-Sep	5.00	8.31
17-Sep	5.00	8.03
18-Sep	5.00	7.80
19-Sep	5.00	7.80
20-Sep	5.00	7.74
21-Sep	5.00	7.47
22-Sep	5.00	7.25
23-Sep	5.00	7.13
24-Sep	5.00	6.99
25-Sep	5.00	6.84
26-Sep	5.00	6.74
27-Sep	5.00	6.78
28-Sep	5.00	6.75
29-Sep	5.00	6.69
30-Sep	5.00	6.57
1-Oct	5.00	6.50
2-Oct	5.00	6.38
3-Oct	5.00	6.24
4-Oct	5.00	6.21
5-Oct	5.00	6.18
6-Oct	5.00	6.09
7-Oct	5.00	5.95
8-Oct	5.00	5.91
9-Oct	5.00	5.79
10-Oct	5.00	5.78
11-Oct	5.00	5.64
12-Oct	5.00	5.53
13-Oct	5.00	5.50
14-Oct	5.00	5.46
15-Oct	5.00	5.40
16-Oct	5.00	5.30
17-Oct	5.00	5.20
18-Oct	5.00	5.20
19-Oct	5.00	5.18
20-Oct	5.00	5.17
21-Oct	5.00	5.08
22-Oct	5.00	5.01
23-Oct	5.00	4.88
24-Oct	5.00	4.86

25-Oct	5.00	4.82
26-Oct	5.00	4.81
27-Oct	5.00	4.67
28-Oct	5.00	4.49
29-Oct	5.00	4.43
30-Oct	5.00	4.41
31-Oct	5.00	4.27
1-Nov	1.70	4.30
2-Nov	1.70	4.27
3-Nov	1.70	4.19
4-Nov	1.70	4.11
5-Nov	1.70	4.14
6-Nov	1.70	4.10
7-Nov	1.70	4.05
8-Nov	1.70	3.93
9-Nov	1.70	3.94
10-Nov	1.70	3.94
11-Nov	1.70	3.89
12-Nov	1.70	3.88
13-Nov	1.70	3.85
14-Nov	1.70	3.73
15-Nov	1.70	3.57
16-Nov	1.70	3.56
17-Nov	1.70	3.54
18-Nov	1.70	3.50
19-Nov	1.70	3.42
20-Nov	1.70	3.40
21-Nov	1.70	3.36
22-Nov	1.70	3.29
23-Nov	1.70	3.22
24-Nov	1.70	3.18
25-Nov	1.70	3.16
26-Nov	1.70	3.09
27-Nov	1.70	3.03
28-Nov	1.70	3.01
29-Nov	1.70	2.98
30-Nov	1.70	2.80
1-Dec	1.70	2.76
2-Dec	1.70	2.72
3-Dec	1.70	2.68
4-Dec	1.70	2.65
5-Dec	1.70	2.65
6-Dec	1.70	2.64
7-Dec	1.70	2.60
8-Dec	1.70	2.57
9-Dec	1.70	2.54
10-Dec	1.70	2.51
11-Dec	1.70	2.49
12-Dec	1.70	2.49
13-Dec	1.70	2.47
14-Dec	1.70	2.46

15-Dec	1.70	2.45
16-Dec	1.70	2.41
17-Dec	1.70	2.40
18-Dec	1.70	2.41
19-Dec	1.70	2.40
20-Dec	1.70	2.38
21-Dec	1.70	2.37
22-Dec	1.70	2.35
23-Dec	1.70	2.31
24-Dec	1.70	2.32
25-Dec	1.70	2.30
26-Dec	1.70	2.29
27-Dec	1.70	2.27
28-Dec	1.70	2.26
29-Dec	1.70	2.25
30-Dec	1.70	2.22
31-Dec	1.70	2.22

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 two decreed surface diversion within this reach of stream, Rock Creek Ditch (1.56 cfs with an 1879 appropriation) and Henderson Rock Creek Ditch (3.44 cfs with an 1878 appropriation). Staff has determined that water is available for appropriation on Rock Creek, between the outlet of Native Lake and the confluence with Willow Creek, 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:

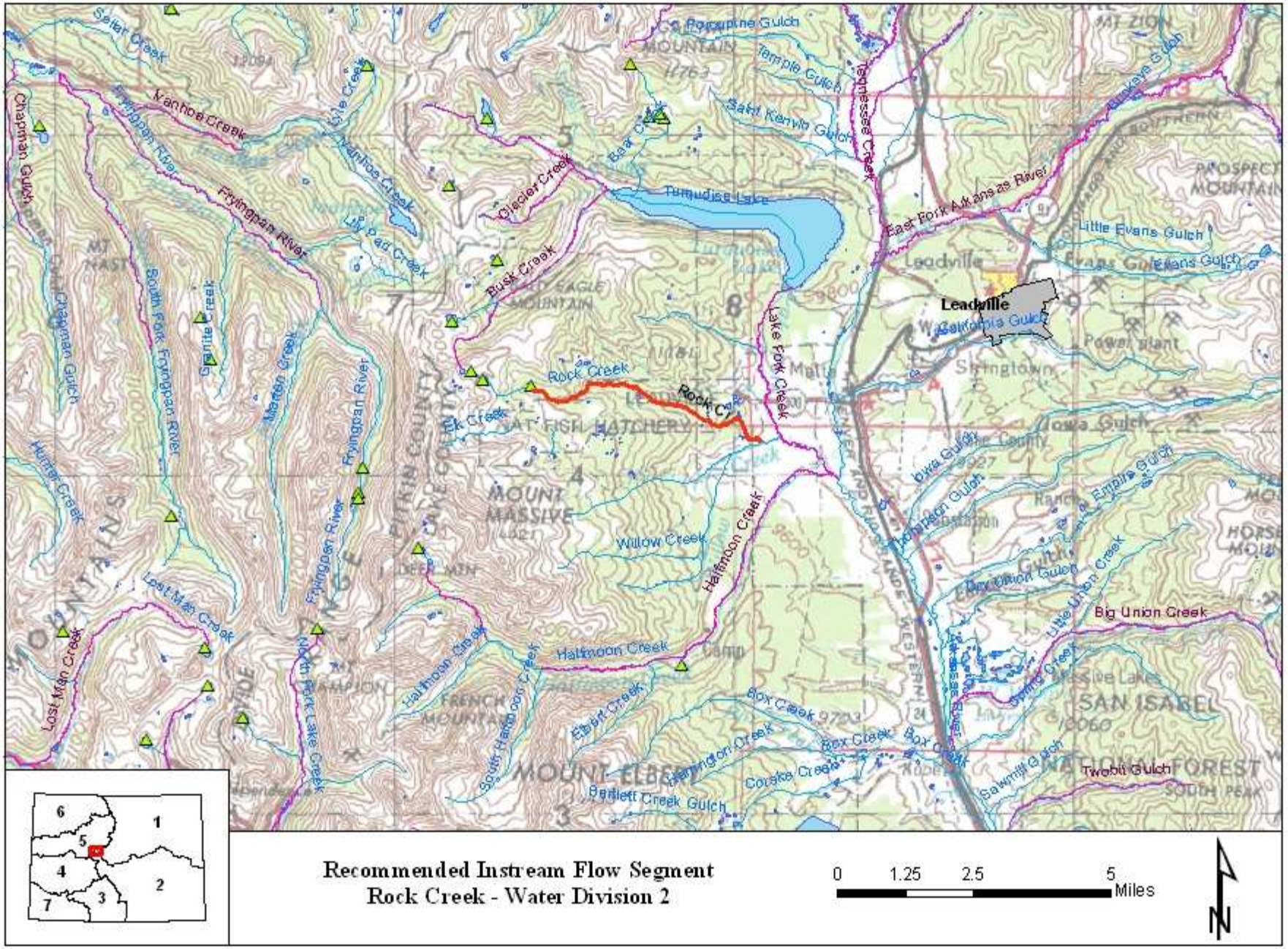
Segment: Outlet of Native Lake to the Confluence with Willow Creek

Upper Terminus: OUTLET OF NATIVE LAKE
(Latitude 39° 13' 26.66"N) (Longitude 106° 27' 30.51"W)
UTM North: 4342655.8 UTM East: 374104.6
S33 T9S R81W 6th PM
240' East of the West Section Line; 2115' South of the North Section Line

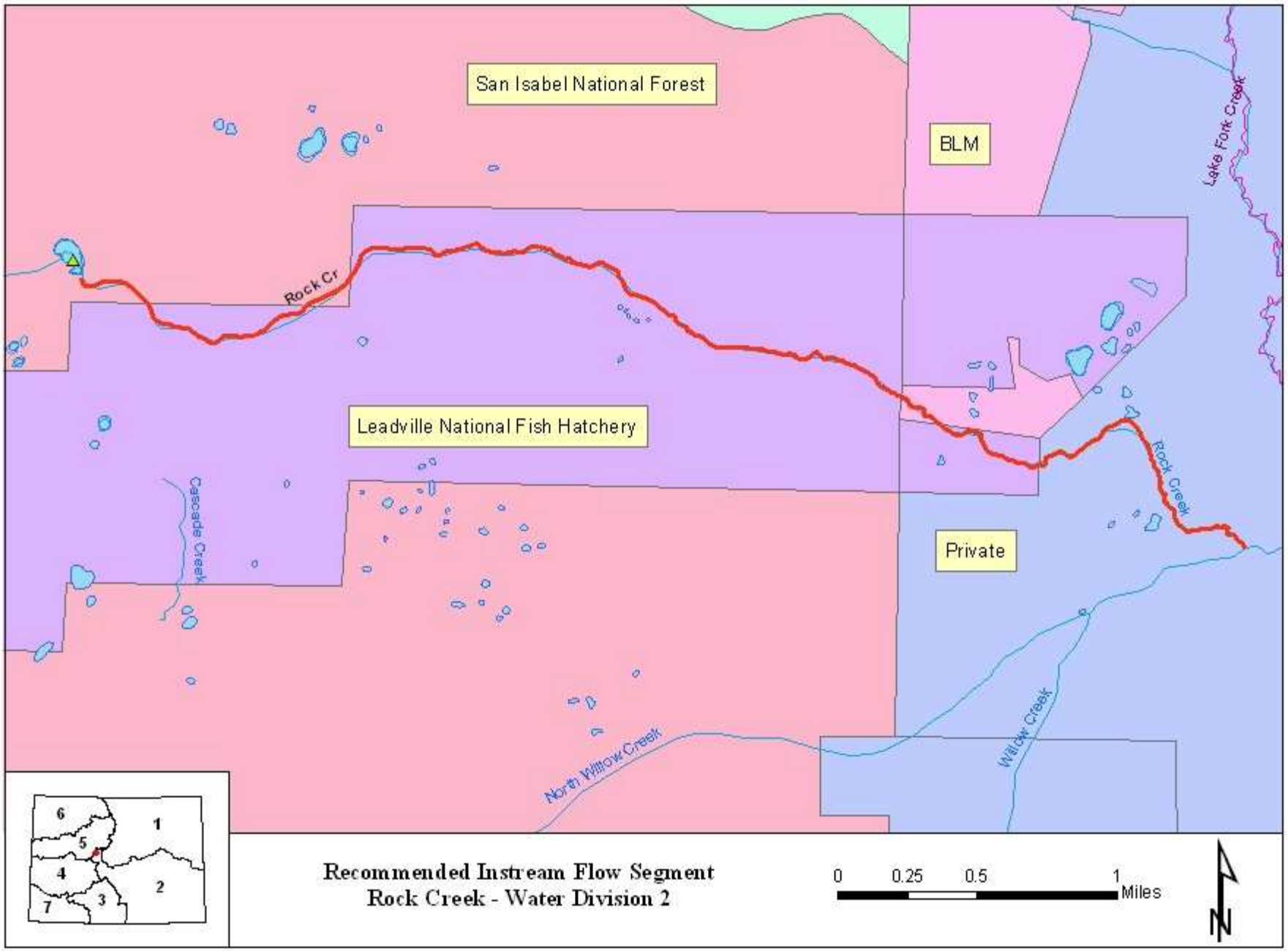
Lower Terminus: CONFLUENCE WITH WILLOW CREEK
(Latitude 39° 12' 39.72"N) (Longitude 106° 22' 49.14"W)
UTM North: 4341103.3 UTM East: 380829.5
SW NW S6 T10S R80W 6th PM
1270' East of the West Section Line; 1587' South of the North Section Line

Watershed: Arkansas Headwaters (HUC#: 11020001**)**
Counties: Lake County
Length: 5.0 miles
USGS Quad(s): Mount Massive
Flow Recommendation: 11.0 cfs (May 15 – August 31)
5.0 cfs (September 1 – October 31)
1.7 cfs (November 1 – May 14)

Vicinity Map



Land Use Map


San Isabel National Forest
BLM
Leadville National Fish Hatchery
Private
Rock Cr
Lake Fork Creek
Rock Creek
Cascade Creek
North Willow Creek
Willow Creek
Recommended Instream Flow Segment
Rock Creek - Water Division 2
0 0.25 0.5 1 Miles
N

Topographic and Water Rights Map