Stream: Indian Creek

Executive Summary

Water Division: 6
Water District: 47
CDOW#: 11229
CWCB ID: 07/6/A-008

Segment: Headwaters to West Arapahoe Feeder Ditch No. 2

Upper Terminus: HEADWATERS IN THE VICINTY OF
(Latitude 40° 20’ 56.7”N) (Longitude 106° 24’ 25.5”W)

Lower Terminus: WEST ARAPAHOE FEEDER DITCH NO. 2
(Latitude 40° 25’ 35.35”N) (Longitude 106° 27’ 23.59”W)

Watershed: North Platte Headwaters (HUC#: 118001)
Counties: Jackson
Length: 7.7 miles
USGS Quad(s): Spicer Peak, Whiteley Peak
Flow Recommendation: 4.0 cfs (April 1 – July 15)
0.7 cfs (July 16 - March 31)

Staff Analysis and Recommendation

Summary

The information contained in this report and the associated appendix 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.i.

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 Indian Creek to the CWCB for a water right under the Instream Flow Program. Indian Creek is being considered for an instream flow water right because it has a natural environment that can be preserved to a reasonable degree. The BLM is very interested in protecting this stream because Indian Creek is one of the few fisheries that it manages in the North Park area. An Instream Flow Appropriation will help it to maintain the health of Indian Creek's diverse fishery and riparian environment.

Located within Jackson County, Indian Creek is approximately 8.7 miles long and generally flows in a northwesterly direction. It begins on the north flank of the Rabbit Ears Range in the Routt National Forest at an elevation of approximately 12,200 feet and terminates at its confluence with Arapaho Creek at an elevation of approximately 8,400 feet. Of the approximately 7.7 mile segment addressed in this report, approximately 71% percent is on federal lands with the remaining 29% on private. At the lower terminus, the creek's drainage area is approximately 11.92 square miles.

The subject of this report is the segment of Indian Creek beginning at its headwaters and extending downstream to the headgate of the West Arapaho Feeder Ditch No. 2. The lower terminus is roughly one and a half miles upstream of the Arapahoe Creek - Indian Creek confluence. The proposed segment is approximately 19 miles west of the Steamboat Ski Area and seven miles northeast of Muddy Pass. The BLM has recommended to the CWCB staff that an instream flow be established for this segment. That recommendation is discussed below.

Instream Flow Recommendation

The BLM is recommending 4.0 cfs (April 1 – July 15) and 0.7 cfs (July 16 - March 31) based on their data collection efforts and staff's water availability analysis.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Headwaters	West Arapaho Feeder Ditch No. 2	7.7	29 %	71 %

77% of the public lands are managed by the US Forest Service and the remaining 23% are managed by the BLM.

Biological Data

The BLM has conducted field surveys of the fishery resources in this stream and have found a natural environment that can be preserved. As reported in the letter from BLM to the CWCB "Indian Creek is a moderate gradient stream with small substrate size. The creek has a high number of beaver ponds that retain water and support an extensive riparian community that covers the creek valley floor. Fishery surveys have indicated populations of white suckers, creek chub, long nose dace, brown trout, and brook trout." However, the 2002 drought had a severe impact on this creek, and physical repopulation of some of these species may be required.

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. R2Cross requires that stream discharge and channel profile data be collected in a riffle stream habitat type. Riffles can be visualized as the stream habitat types that first dry up as streamflow diminishes. This collection of this data requires selecting a transect, surveying the channel geometry, and measuring discharge. The appendix contains copies of the 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 by 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, 3 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	6/20/2005 (lower)	4.97	2.0 – 12.4	3.9	N/A
BLM	6/20/2005 (upper)	5.89	2.4 – 14.7	4.0	N/A
BLM	9/27/2005	0.48	0.2 – 1.2	N/A	0.7

The summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model is 4.0 cfs. The winter flow recommendation, which meets 2 or 3 criteria and is within the accuracy range of the R2Cross model is 0.7 cfs.

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 **Indian Creek** no such gage is available at the LT. In fact, there is no gage on Willow Creek. It is thus necessary to describe the normal flow regime at Indian Creek above the LT through a "representative" gage station. The gage station selected for this purpose was ILLINOIS CREEK NEAR RAND, CO. (USGS 06617500/DWR ILLRANCO); it has a period of record (POR) of 22 years collected (10 of which are partial) between 1931 and 2007. The gage is at an elevation of 8550.93 ft above mean sea level (amsl) and has a drainage area of 70.6 mi^2. The hydrograph (plot of discharge over time) produced from this gage includes the consumptive uses of some diversions. However, the existence of these diversions does not preclude use of the data from the gage. To make the measured data transferable to Indian Creek 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 Indian Creek above the LT by multiplying the "adjusted" gage discharge values by an area ratio; specifically, the area of Indian Creek above the LT (11.92 mi^2) to Illinois Creek near Rand, CO (70.6 mi^2). The resulting proportioned hydrograph was itself "adjusted" (decreased) to reflect consumptive irrigation depletions 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 Indian Creek is to compute the Geometric Mean of the area-prorated "adjusted" data values from the Illinois Creek near Rand, 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 2.

Figure 1

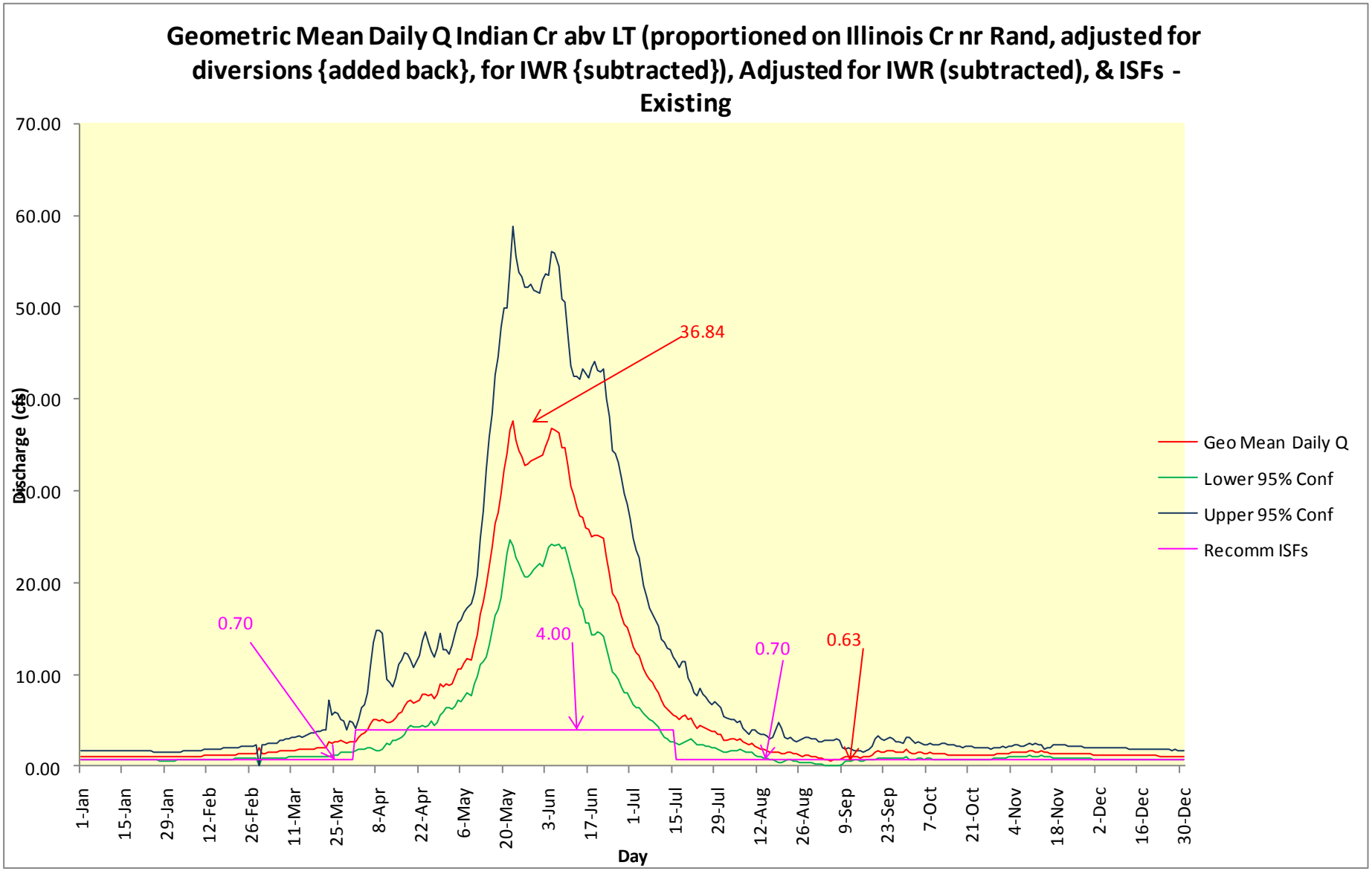

Geometric Mean Daily Q Indian Cr abv LT (proportioned on Illinois Cr nr Rand, adjusted for diversions {added back}, for IWR {subtracted}), Adjusted for IWR (subtracted), & ISFs - Existing
Discharge (cfs)
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
36.84
0.70
4.00
0.70
0.63
Geo Mean Daily Q
Lower 95% Conf
Upper 95% Conf
Recomm ISFs
1-Jan
15-Jan
29-Jan
12-Feb
26-Feb
11-Mar
25-Mar
8-Apr
22-Apr
6-May
20-May
3-Jun
17-Jun
1-Jul
15-Jul
29-Jul
12-Aug
26-Aug
9-Sep
23-Sep
7-Oct
21-Oct
4-Nov
18-Nov
2-Dec
16-Dec
30-Dec
Day

Table 2. Geometric Mean Discharge and Recommended Instream Flows			
Date	Existing	Recommended	Proportioned Adjusted GM (abv gage)
	ISF	ISF	Adj (-) for Irr & OoB in Indian Creek Cr abv LT
1-Jan		0.7	1.06
2-Jan		0.7	1.06
3-Jan		0.7	1.05
4-Jan		0.7	1.05
5-Jan		0.7	1.05
6-Jan		0.7	1.04
7-Jan		0.7	1.04
8-Jan		0.7	1.04
9-Jan		0.7	1.04
10-Jan		0.7	1.04
11-Jan		0.7	1.04
12-Jan		0.7	1.03
13-Jan		0.7	1.03
14-Jan		0.7	1.03
15-Jan		0.7	1.03
16-Jan		0.7	1.02
17-Jan		0.7	1.02
18-Jan		0.7	1.02
19-Jan		0.7	1.02
20-Jan		0.7	1.02
21-Jan		0.7	1.02
22-Jan		0.7	1.01
23-Jan		0.7	1.01
24-Jan		0.7	1.01
25-Jan		0.7	1.01
26-Jan		0.7	1.01
27-Jan		0.7	1.00
28-Jan		0.7	1.00
29-Jan		0.7	1.00
30-Jan		0.7	1.00
31-Jan		0.7	1.00
1-Feb		0.7	0.99
2-Feb		0.7	1.01
3-Feb		0.7	1.02
4-Feb		0.7	1.03
5-Feb		0.7	1.05
6-Feb		0.7	1.07
7-Feb		0.7	1.07
8-Feb		0.7	1.09
9-Feb		0.7	1.11
10-Feb		0.7	1.12
11-Feb		0.7	1.13
12-Feb		0.7	1.14
13-Feb		0.7	1.16
14-Feb		0.7	1.17
15-Feb		0.7	1.18
16-Feb		0.7	1.20
17-Feb		0.7	1.21
18-Feb		0.7	1.24

19-Feb		0.7	1.26
20-Feb		0.7	1.27
21-Feb		0.7	1.28
22-Feb		0.7	1.29
23-Feb		0.7	1.34
24-Feb		0.7	1.34
25-Feb		0.7	1.36
26-Feb		0.7	1.37
27-Feb		0.7	1.38
28-Feb		0.7	1.42
29-Feb		0.7	2.03
1-Mar		0.7	1.43
2-Mar		0.7	1.44
3-Mar		0.7	1.49
4-Mar		0.7	1.50
5-Mar		0.7	1.54
6-Mar		0.7	1.56
7-Mar		0.7	1.63
8-Mar		0.7	1.64
9-Mar		0.7	1.68
10-Mar		0.7	1.69
11-Mar		0.7	1.73
12-Mar		0.7	1.74
13-Mar		0.7	1.78
14-Mar		0.7	1.79
15-Mar		0.7	1.83
16-Mar		0.7	1.87
17-Mar		0.7	1.92
18-Mar		0.7	1.92
19-Mar		0.7	1.96
20-Mar		0.7	1.97
21-Mar		0.7	2.01
22-Mar		0.7	2.02
23-Mar		0.7	2.73
24-Mar		0.7	2.57
25-Mar		0.7	2.60
26-Mar		0.7	2.59
27-Mar		0.7	2.76
28-Mar		0.7	2.71
29-Mar		0.7	2.52
30-Mar		0.7	2.69
31-Mar		0.7	2.74
1-Apr		4.0	2.62
2-Apr		4.0	3.09
3-Apr		4.0	3.48
4-Apr		4.0	3.57
5-Apr		4.0	4.01
6-Apr		4.0	4.67
7-Apr		4.0	5.08
8-Apr		4.0	5.11
9-Apr		4.0	4.96
10-Apr		4.0	5.13
11-Apr		4.0	4.80

12-Apr		4.0	4.70
13-Apr		4.0	4.91
14-Apr		4.0	5.20
15-Apr		4.0	5.76
16-Apr		4.0	5.97
17-Apr		4.0	6.49
18-Apr		4.0	7.07
19-Apr		4.0	7.21
20-Apr		4.0	6.81
21-Apr		4.0	7.04
22-Apr		4.0	7.23
23-Apr		4.0	7.77
24-Apr		4.0	7.89
25-Apr		4.0	7.71
26-Apr		4.0	7.80
27-Apr		4.0	7.30
28-Apr		4.0	7.82
29-Apr		4.0	9.04
30-Apr		4.0	8.67
1-May		4.0	9.02
2-May		4.0	8.79
3-May		4.0	8.98
4-May		4.0	9.72
5-May		4.0	10.60
6-May		4.0	10.59
7-May		4.0	11.23
8-May		4.0	11.69
9-May		4.0	11.62
10-May		4.0	13.07
11-May		4.0	14.25
12-May		4.0	16.60
13-May		4.0	17.82
14-May		4.0	19.56
15-May		4.0	21.75
16-May		4.0	23.82
17-May		4.0	26.43
18-May		4.0	27.56
19-May		4.0	29.61
20-May		4.0	32.26
21-May		4.0	34.03
22-May		4.0	36.59
23-May		4.0	37.56
24-May		4.0	35.52
25-May		4.0	34.42
26-May		4.0	33.73
27-May		4.0	32.78
28-May		4.0	32.84
29-May		4.0	33.22
30-May		4.0	33.33
31-May		4.0	33.48
1-Jun		4.0	33.69
2-Jun		4.0	33.92
3-Jun		4.0	34.85

4-Jun		4.0	35.72
5-Jun		4.0	36.84
6-Jun		4.0	36.61
7-Jun		4.0	36.29
8-Jun		4.0	34.71
9-Jun		4.0	34.67
10-Jun		4.0	32.73
11-Jun		4.0	30.56
12-Jun		4.0	29.45
13-Jun		4.0	28.27
14-Jun		4.0	27.19
15-Jun		4.0	27.15
16-Jun		4.0	25.91
17-Jun		4.0	25.78
18-Jun		4.0	24.91
19-Jun		4.0	25.07
20-Jun		4.0	25.14
21-Jun		4.0	24.94
22-Jun		4.0	24.80
23-Jun		4.0	22.71
24-Jun		4.0	21.00
25-Jun		4.0	18.83
26-Jun		4.0	18.40
27-Jun		4.0	17.66
28-Jun		4.0	16.46
29-Jun		4.0	15.47
30-Jun		4.0	15.09
1-Jul		4.0	14.09
2-Jul		4.0	13.00
3-Jul		4.0	12.33
4-Jul		4.0	12.09
5-Jul		4.0	10.59
6-Jul		4.0	10.00
7-Jul		4.0	9.47
8-Jul		4.0	9.08
9-Jul		4.0	8.50
10-Jul		4.0	8.04
11-Jul		4.0	7.14
12-Jul		4.0	6.62
13-Jul		4.0	6.14
14-Jul		4.0	5.90
15-Jul		4.0	5.62
16-Jul		0.7	5.37
17-Jul		0.7	5.10
18-Jul		0.7	5.40
19-Jul		0.7	5.50
20-Jul		0.7	5.15
21-Jul		0.7	5.20
22-Jul		0.7	4.64
23-Jul		0.7	4.18
24-Jul		0.7	4.52
25-Jul		0.7	4.27
26-Jul		0.7	4.14

27-Jul		0.7	3.88
28-Jul		0.7	3.73
29-Jul		0.7	3.75
30-Jul		0.7	3.55
31-Jul		0.7	3.39
1-Aug		0.7	2.90
2-Aug		0.7	2.88
3-Aug		0.7	2.92
4-Aug		0.7	2.95
5-Aug		0.7	2.85
6-Aug		0.7	2.98
7-Aug		0.7	2.63
8-Aug		0.7	2.46
9-Aug		0.7	2.30
10-Aug		0.7	2.43
11-Aug		0.7	2.21
12-Aug		0.7	2.02
13-Aug		0.7	1.91
14-Aug		0.7	1.84
15-Aug		0.7	1.68
16-Aug		0.7	1.52
17-Aug		0.7	1.51
18-Aug		0.7	1.46
19-Aug		0.7	1.55
20-Aug		0.7	1.44
21-Aug		0.7	1.42
22-Aug		0.7	1.49
23-Aug		0.7	1.48
24-Aug		0.7	1.37
25-Aug		0.7	1.29
26-Aug		0.7	1.19
27-Aug		0.7	1.10
28-Aug		0.7	1.14
29-Aug		0.7	1.16
30-Aug		0.7	1.09
31-Aug		0.7	0.99
1-Sep		0.7	0.80
2-Sep		0.7	0.81
3-Sep		0.7	0.65
4-Sep		0.7	0.64
5-Sep		0.7	0.63
6-Sep		0.7	0.64
7-Sep		0.7	0.68
8-Sep		0.7	0.66
9-Sep		0.7	0.83
10-Sep		0.7	1.07
11-Sep		0.7	1.08
12-Sep		0.7	1.06
13-Sep		0.7	1.09
14-Sep		0.7	1.11
15-Sep		0.7	0.96
16-Sep		0.7	0.98
17-Sep		0.7	1.06

18-Sep		0.7	1.08
19-Sep		0.7	1.28
20-Sep		0.7	1.50
21-Sep		0.7	1.66
22-Sep		0.7	1.60
23-Sep		0.7	1.54
24-Sep		0.7	1.66
25-Sep		0.7	1.68
26-Sep		0.7	1.65
27-Sep		0.7	1.59
28-Sep		0.7	1.57
29-Sep		0.7	1.56
30-Sep		0.7	1.89
1-Oct		0.7	1.48
2-Oct		0.7	1.44
3-Oct		0.7	1.40
4-Oct		0.7	1.50
5-Oct		0.7	1.46
6-Oct		0.7	1.38
7-Oct		0.7	1.42
8-Oct		0.7	1.46
9-Oct		0.7	1.35
10-Oct		0.7	1.35
11-Oct		0.7	1.31
12-Oct		0.7	1.33
13-Oct		0.7	1.37
14-Oct		0.7	1.27
15-Oct		0.7	1.25
16-Oct		0.7	1.24
17-Oct		0.7	1.24
18-Oct		0.7	1.24
19-Oct		0.7	1.16
20-Oct		0.7	1.22
21-Oct		0.7	1.20
22-Oct		0.7	1.21
23-Oct		0.7	1.21
24-Oct		0.7	1.23
25-Oct		0.7	1.26
26-Oct		0.7	1.23
27-Oct		0.7	1.27
28-Oct		0.7	1.18
29-Oct		0.7	1.26
30-Oct		0.7	1.32
31-Oct		0.7	1.31
1-Nov		0.7	1.41
2-Nov		0.7	1.33
3-Nov		0.7	1.44
4-Nov		0.7	1.46
5-Nov		0.7	1.54
6-Nov		0.7	1.51
7-Nov		0.7	1.50
8-Nov		0.7	1.52
9-Nov		0.7	1.55

10-Nov		0.7	1.68
11-Nov		0.7	1.63
12-Nov		0.7	1.60
13-Nov		0.7	1.60
14-Nov		0.7	1.64
15-Nov		0.7	1.46
16-Nov		0.7	1.45
17-Nov		0.7	1.44
18-Nov		0.7	1.41
19-Nov		0.7	1.40
20-Nov		0.7	1.40
21-Nov		0.7	1.39
22-Nov		0.7	1.38
23-Nov		0.7	1.35
24-Nov		0.7	1.34
25-Nov		0.7	1.34
26-Nov		0.7	1.34
27-Nov		0.7	1.33
28-Nov		0.7	1.30
29-Nov		0.7	1.29
30-Nov		0.7	1.28
1-Dec		0.7	1.28
2-Dec		0.7	1.28
3-Dec		0.7	1.28
4-Dec		0.7	1.26
5-Dec		0.7	1.25
6-Dec		0.7	1.24
7-Dec		0.7	1.23
8-Dec		0.7	1.23
9-Dec		0.7	1.22
10-Dec		0.7	1.21
11-Dec		0.7	1.21
12-Dec		0.7	1.20
13-Dec		0.7	1.19
14-Dec		0.7	1.19
15-Dec		0.7	1.18
16-Dec		0.7	1.17
17-Dec		0.7	1.17
18-Dec		0.7	1.15
19-Dec		0.7	1.15
20-Dec		0.7	1.15
21-Dec		0.7	1.14
22-Dec		0.7	1.12
23-Dec		0.7	1.12
24-Dec		0.7	1.11
25-Dec		0.7	1.10
26-Dec		0.7	1.10
27-Dec		0.7	1.09
28-Dec		0.7	1.08
29-Dec		0.7	1.08
30-Dec		0.7	1.07
31-Dec		0.7	1.06

Existing Water Right Information

Staff has analyzed the water rights tabulation to identify any potential water availability problems. There is one decreed surface diversions within the reach of stream, the McIssaac Ditch. Upon review of the diversion records and consultation with the DEO, staff moved the downstream terminus upstream from the Lawrence Ditch to the Indian Creek West Arapahoe Feeder Ditch No. 2 to ensure sufficient water availability. From its analysis, staff determined that water is available for appropriation on Indian Creek, between its headwaters and the headgate of the Indian Creek West Arapahoe Feeder Ditch No. 2, to preserve the natural environment to a reasonable degree without limiting or foreclosing the exercise of valid water rights.

CWCB Staff's Instream Flow Recommendation

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

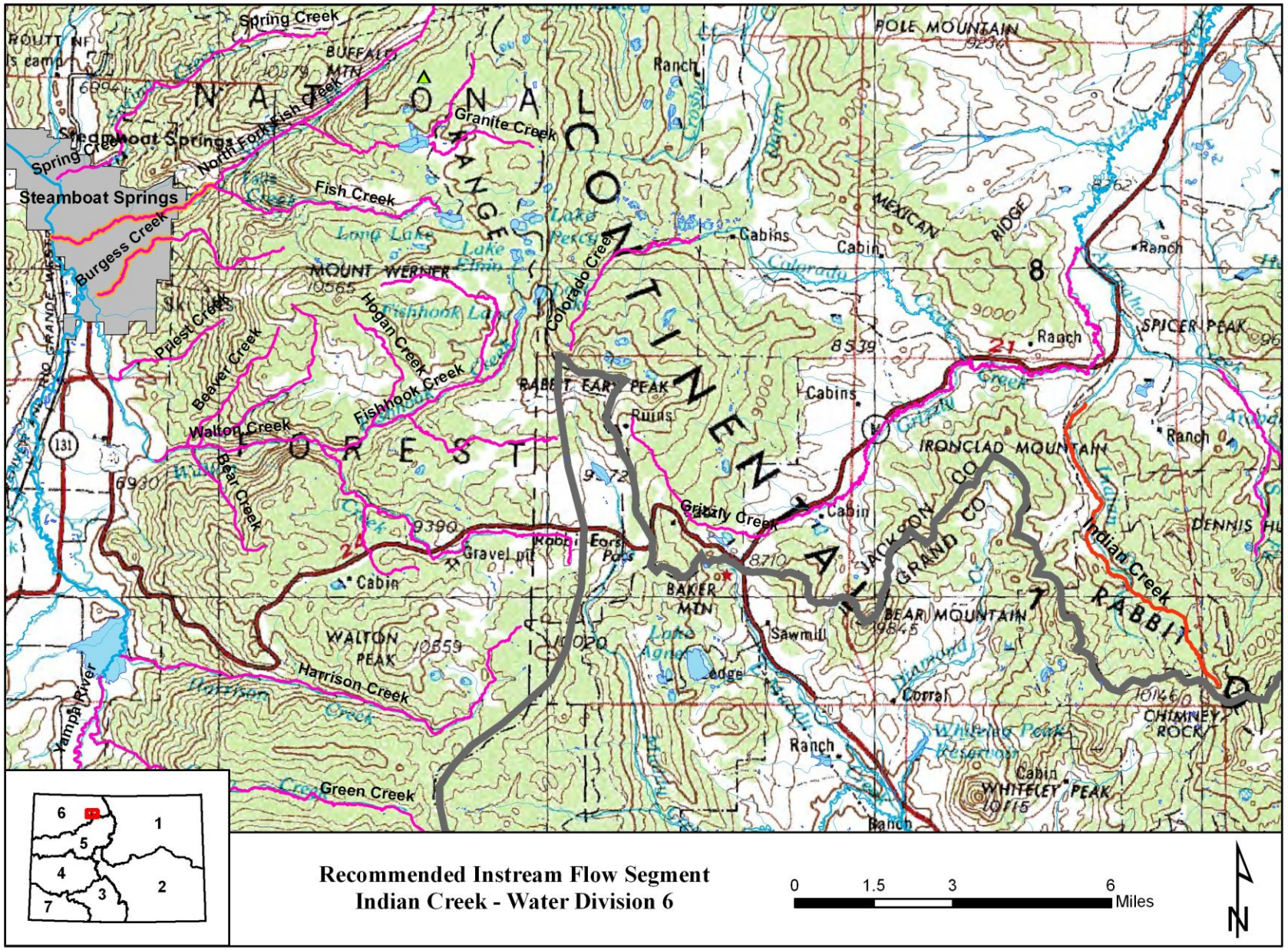
Segment: Headwaters to West Arapahoe Feeder Ditch No. 2

Upper Terminus: HEADWATERS INDIAN CREEK
(Latitude 40° 20' 56.7"N) (Longitude 106° 24' 25.5"W)
UTM North: 4467454.7 UTM East: 380504.1
NE SW S31 T5N R80W 6PM
2361' East of West Section Line; 1574' North of South Section Line

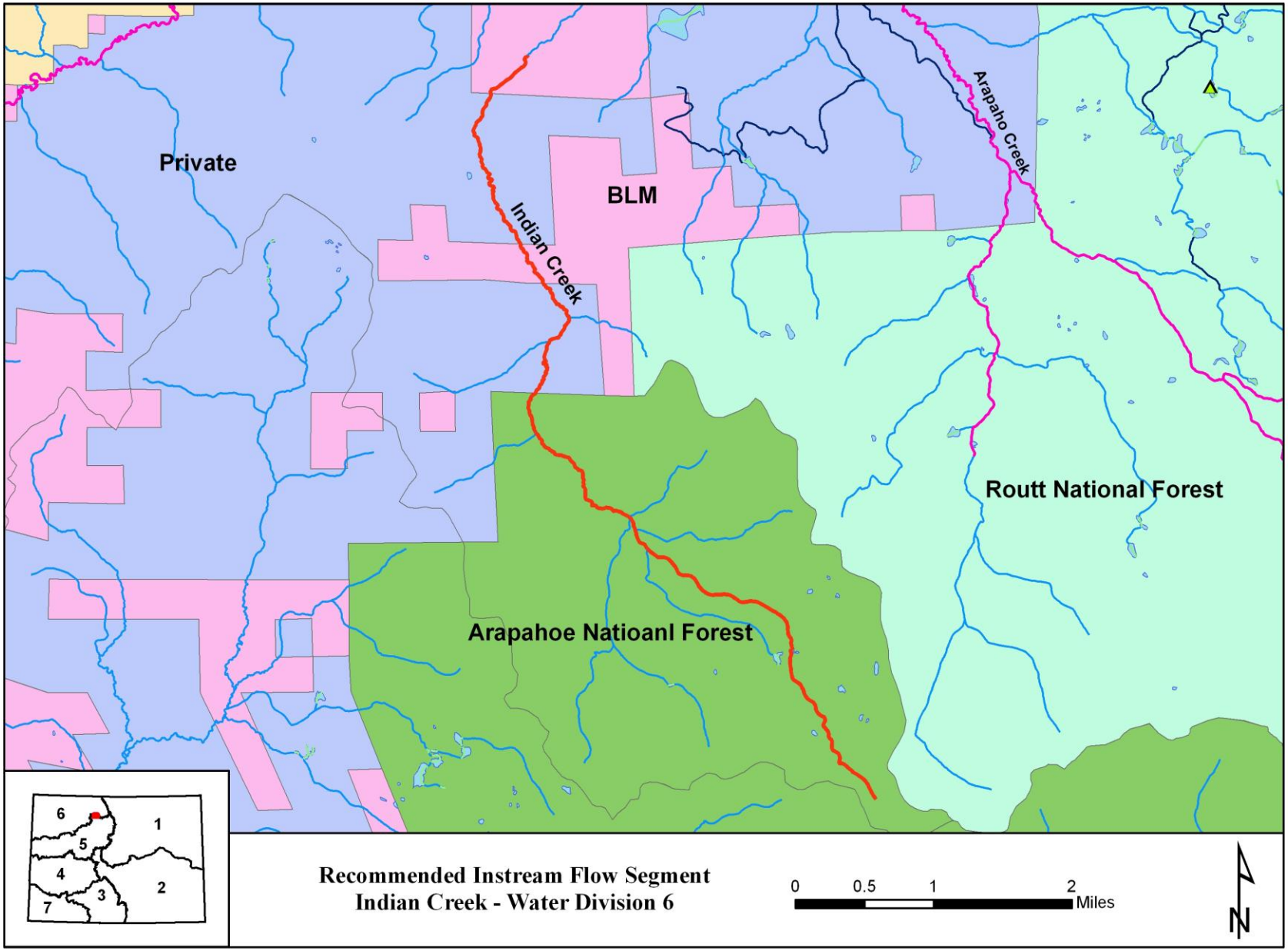
Lower Terminus: WEST ARAPAHOE FEEDER DITCH 2
(Latitude 40° 25' 35.35"N) (Longitude 106° 27' 23.59"W)
UTM North: 4476113.3 UTM East: 376444.0
NE SW S2 T5N R81W 6PM
2196' East of West Section Line; 1484' North of South Section Line

Watershed: North Platte Headwaters (HUC#: 118001)
Counties: Jackson
Length: 7.7 miles
USGS Quad(s): Spicer Peak, Whiteley Peak
Flow Recommendation: 4.0 cfs (April 1 – July 15)
0.7 cfs (July 16 – March 31)

Vicinity Map



Land Use Map


Private
BLM
Indian Creek
Arapaho Creek
Routt National Forest
Arapahoe Natioanl Forest
6
1
5
4
2
3
7
Recommended Instream Flow Segment
Indian Creek - Water Division 6
0
0.5
1
2
Miles
N

Topographic & Water Rights Map