

Stream: Chaparral Creek

Executive Summary

Water Division: 2

Water District: 16

CDOW#: 32146

CWCB ID: 10/2/A-006

Segment: Headwaters to U.S. Forest Service Boundary

Upper Terminus: HEADWATERS IN THE VICINITY OF
(Latitude 37° 20' 40.05"N) (Longitude 105° 01' 50.43"W)

Lower Terminus: USFS BOUNDARY

(Latitude 37° 22' 58.34"N) (Longitude 105° 3' 21.70"W)

Watershed: Huerfano (HUC#: 11020006)

Counties: Huerfano

Length: 3.11 miles

USGS Quad(s): Cuchara, Cucharas Pass

Flow Recommendation: 2.50 cfs (May 1 – June 30)

1.0 cfs (July 1 – August 15)

0.45 cfs (August 16 – March 31)

0.85 cfs (April 1 – April 30)



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

Chaparral Creek originates just west of Cordova Pass at an elevation of 8,680 feet and flows generally northwesterly for 5.6 miles through the San Isabel National Forest as it drops to an elevation of 8,000 feet at its confluence with the Cucharas River. One hundred percent of the land on the 3.11 mile segment addressed by this report is publicly owned. Chaparral Creek is located within Huerfano County and the total drainage area of the creek is approximately 5.5 square miles.

The subject of this report is a segment of Chaparral Creek beginning at the headwaters and extending downstream to U.S. Forest Service (USFS) boundary. The proposed segment is located approximately 10 miles southwest of the town of La Veta. Staff has received one recommendation for this segment from the CDOW. The recommendation for this segment is discussed below.

Instream Flow Recommendation

The CDOW recommended 2.50 cfs (May 1 – June 30), 1.0 cfs (July 1 – August 15), 0.45 cfs (August 16 – March 31) and 0.85 cfs (April 1 – April 30). These recommendations were based on USFS data collection efforts on August 12, 1992 and staff's water availability analyses.

Land Status Review

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			% Private	% Public
Headwaters	USFS Boundary	3.11	0%	100%

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

Biological Data

The USFS, in August of 1992, collected stream cross section information, natural environment data, and other data needed to quantify the instream flow needs for this reach of the Chaparral Creek. Chaparral Creek is classified as a small stream (between 10 to 19 feet wide) and fishery surveys indicate the stream environment of the Chaparral Creek supports brook trout (*Salvelinus fontinalis*) and rainbow trout (*Oncorhynchus mykiss*)

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 will result in the maintenance of aquatic habitat in pools and runs for most life stages of fish and aquatic invertebrates (Nehring 1979; Espegren 1996).

For this segment of stream, one set of data was 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)
USFS	8/12/1992	1.5	3.6 – 0.6	2.5	2.0

The summer flow recommendation, which meets 3 of 3 criteria and is within the accuracy range of the R2CROSS model, is 2.5 cfs. The winter flow recommendation, which meets 2 of 3 criteria and is within the accuracy range of the R2CROSS model is 2.0 cfs but was lowered to 0.45 cfs due to water availability constraints.

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.

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.

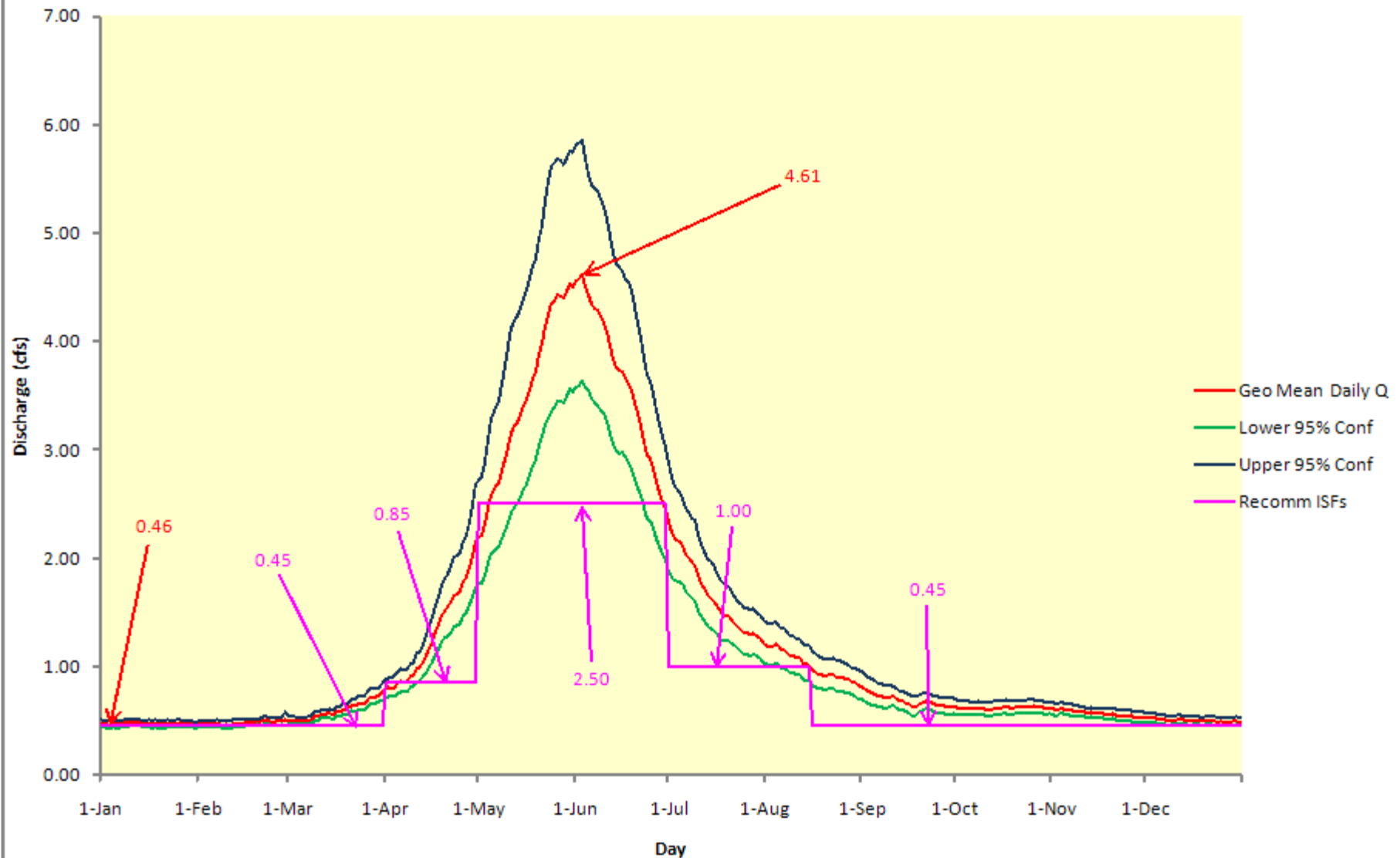
The first step required in determining water availability is a determination of the hydrologic regime at the Lower Terminus (LT) of the recommended ISF reach. In the best case this means looking at the data from a gage at the LT. Further, this data, in the best case, has been collected for a long period of time (the longer the better) including wet and dry periods. In the case of **Chaparral Creek** no such gage is available at the LT. In fact, there is no gage on Chaparral Creek. It is thus necessary to describe the normal flow regime at Chaparral Creek above the LT through a "representative" gage station. The gage station selected for this purpose was CUCHARAS RIVER AT BOYD RANCH NR LAVETA, CO (USGS 07114000), a gage with a 66 year period of record (POR) collected between 1934 and 2007. The gage is at an elevation of 7,781 ft above mean sea level (amsl) and has a drainage area of 56 mi². The hydrograph (plot of discharge over time) produced from this gage includes the effects of about thirteen upstream diversions three of which are transbasin diversions. The transbasin diversions were 100% consumptive to the basin because of their transbasin character while the other ten were partially consumptive. To make the measured data from Cucharas River transferrable to Chaparral Creek above the LT, the transbasin diversions and the consumptive portion of the other diversions were added back to the measured Cucharas River hydrograph. The resulting "adjusted" hydrograph could then be used on Chaparral Creek above the LT by multiplying the "adjusted" hydrograph by an area ratio; specifically, the area of Chaparral Creek above the LT (12.94 mi² above the LT) to Cucharas River at Boyd Ranch nr LaVeta, CO (56 mi² above the gage). Next, the resulting proportioned "adjusted" hydrograph would itself be "adjusted" (decreased) to reflect the existing depletions on Chaparral Creek above the LT resulting from upstream consumptive irrigation

uses. The final hydrograph represents a distribution of flow over time that has been reduced to reflect existing human uses. In the case of Chaparral Creek there are no existing diversions and thus no need to make adjustment for depletions.

{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 Chaparral Creek is to compute the Geometric Mean of the area-prorated “adjusted” data values from the Cucharas River at Boyd Ranch nr LaVeta, 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. In this particular case, even with the long period of record, there is still merit in the use of this statistical tool. 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.

Geometric Mean Daily Q Chaparral Cr abv LT (proportioned on Cucharas R at Boyd Ranch nr La Veta, adjusted for diversions and IWR depletions {added back}), Adjusted for Chaparral Cr IWR (subtracted), and ISFs - Existing



**Table 2. Geometric Mean Existing Cond (IWR or div subtracted) Chaparral Cr
abv LT Prop on Cuchara R at Boyd Ranch abv Gage Baseline Cond with IWR**

Date	GM (abv LT) Prorated by 6.93%	Lower 95% Conf Prorated by 6.93%	Upper 95% Conf Prorated by 6.93%	Recommended ISF (cfs)
1-Jan	0.4732	0.440488	0.50834	0.45
2-Jan	0.467848	0.435619	0.502463	0.45
3-Jan	0.463307	0.432475	0.496337	0.45
4-Jan	0.460141	0.427724	0.495015	0.45
5-Jan	0.468462	0.437269	0.501879	0.45
6-Jan	0.463655	0.433459	0.495955	0.45
7-Jan	0.469354	0.438426	0.502464	0.45
8-Jan	0.479094	0.445766	0.514913	0.45
9-Jan	0.478509	0.446798	0.512471	0.45
10-Jan	0.479795	0.448392	0.513396	0.45
11-Jan	0.481936	0.449999	0.516141	0.45
12-Jan	0.484173	0.452596	0.517953	0.45
13-Jan	0.479849	0.449033	0.512779	0.45
14-Jan	0.475238	0.447411	0.504795	0.45
15-Jan	0.473369	0.445478	0.503006	0.45
16-Jan	0.473819	0.443712	0.505969	0.45
17-Jan	0.466193	0.432112	0.502961	0.45
18-Jan	0.469742	0.434393	0.507968	0.45
19-Jan	0.462945	0.430616	0.4977	0.45
20-Jan	0.463735	0.430358	0.499701	0.45
21-Jan	0.464107	0.430719	0.500083	0.45
22-Jan	0.471814	0.437885	0.508373	0.45
23-Jan	0.464543	0.434566	0.496588	0.45
24-Jan	0.467882	0.436024	0.502067	0.45
25-Jan	0.475873	0.44447	0.509495	0.45
26-Jan	0.476617	0.446554	0.508703	0.45
27-Jan	0.473247	0.444242	0.504145	0.45
28-Jan	0.469475	0.44139	0.499348	0.45
29-Jan	0.465962	0.438048	0.495654	0.45
30-Jan	0.463128	0.43422	0.493961	0.45
31-Jan	0.459481	0.431323	0.489478	0.45
1-Feb	0.465042	0.434802	0.497385	0.45
2-Feb	0.463636	0.43438	0.494862	0.45
3-Feb	0.465525	0.4368	0.49614	0.45
4-Feb	0.464902	0.43512	0.496723	0.45
5-Feb	0.468918	0.438008	0.50201	0.45
6-Feb	0.471703	0.440863	0.5047	0.45
7-Feb	0.470706	0.43805	0.505797	0.45
8-Feb	0.465841	0.434415	0.49954	0.45
9-Feb	0.461401	0.430361	0.494679	0.45

10-Feb	0.462371	0.430236	0.496907	0.45
11-Feb	0.460957	0.428591	0.495768	0.45
12-Feb	0.475116	0.443377	0.509127	0.45
13-Feb	0.474523	0.444661	0.506391	0.45
14-Feb	0.476177	0.447014	0.507244	0.45
15-Feb	0.474	0.444273	0.505714	0.45
16-Feb	0.48529	0.456381	0.51603	0.45
17-Feb	0.484728	0.456188	0.515054	0.45
18-Feb	0.48295	0.45426	0.513452	0.45
19-Feb	0.486669	0.458548	0.516516	0.45
20-Feb	0.489896	0.463322	0.517994	0.45
21-Feb	0.49111	0.461885	0.522183	0.45
22-Feb	0.500713	0.469212	0.534328	0.45
23-Feb	0.505412	0.475107	0.53765	0.45
24-Feb	0.498158	0.468057	0.530196	0.45
25-Feb	0.488691	0.45456	0.525385	0.45
26-Feb	0.49342	0.460397	0.528812	0.45
27-Feb	0.494304	0.460801	0.530243	0.45
28-Feb	0.497205	0.463358	0.533526	0.45
1-Mar	0.514528	0.45424	0.582816	0.45
2-Mar	0.503742	0.473689	0.535701	0.45
3-Mar	0.504184	0.474151	0.53612	0.45
4-Mar	0.503394	0.473274	0.535431	0.45
5-Mar	0.500177	0.469991	0.532303	0.45
6-Mar	0.498058	0.466536	0.53171	0.45
7-Mar	0.49856	0.466579	0.532734	0.45
8-Mar	0.504686	0.472936	0.538567	0.45
9-Mar	0.517281	0.480712	0.556633	0.45
10-Mar	0.536247	0.496739	0.578899	0.45
11-Mar	0.544166	0.504759	0.58665	0.45
12-Mar	0.557682	0.519442	0.598736	0.45
13-Mar	0.56098	0.52264	0.602133	0.45
14-Mar	0.562579	0.523874	0.604143	0.45
15-Mar	0.563479	0.523654	0.606333	0.45
16-Mar	0.555845	0.517557	0.596964	0.45
17-Mar	0.580316	0.541447	0.621976	0.45
18-Mar	0.585336	0.541777	0.632397	0.45
19-Mar	0.598166	0.550331	0.650159	0.45
20-Mar	0.609453	0.561742	0.661215	0.45
21-Mar	0.623638	0.576098	0.675101	0.45
22-Mar	0.643551	0.591776	0.699857	0.45
23-Mar	0.642165	0.587555	0.70185	0.45
24-Mar	0.655572	0.595838	0.721294	0.45
25-Mar	0.656932	0.594368	0.726082	0.45
26-Mar	0.658615	0.594731	0.729362	0.45
27-Mar	0.689401	0.62309	0.762768	0.45
28-Mar	0.721647	0.654914	0.795181	0.45
29-Mar	0.718365	0.651045	0.792647	0.45

30-Mar	0.727391	0.66729	0.792905	0.45
31-Mar	0.738611	0.677031	0.805792	0.45
1-Apr	0.764513	0.688885	0.848442	0.85
2-Apr	0.791741	0.707372	0.886172	0.85
3-Apr	0.80503	0.72811	0.890076	0.85
4-Apr	0.801022	0.72048	0.890568	0.85
5-Apr	0.817605	0.72548	0.92143	0.85
6-Apr	0.849301	0.758667	0.950763	0.85
7-Apr	0.870116	0.775629	0.976114	0.85
8-Apr	0.858853	0.765566	0.963508	0.85
9-Apr	0.873858	0.775047	0.985266	0.85
10-Apr	0.915381	0.813711	1.029754	0.85
11-Apr	0.92495	0.819382	1.044119	0.85
12-Apr	0.980619	0.856971	1.122107	0.85
13-Apr	0.997077	0.868837	1.144244	0.85
14-Apr	1.045873	0.909271	1.202997	0.85
15-Apr	1.10201	0.943064	1.287745	0.85
16-Apr	1.169276	0.996112	1.372543	0.85
17-Apr	1.229895	1.041696	1.452095	0.85
18-Apr	1.3183	1.113214	1.56117	0.85
19-Apr	1.375912	1.156205	1.637369	0.85
20-Apr	1.466627	1.22686	1.753253	0.85
21-Apr	1.513276	1.263369	1.812617	0.85
22-Apr	1.545414	1.285662	1.857646	0.85
23-Apr	1.592178	1.315835	1.926557	0.85
24-Apr	1.654809	1.362373	2.010015	0.85
25-Apr	1.670093	1.380434	2.020531	0.85
26-Apr	1.691462	1.397832	2.046771	0.85
27-Apr	1.77616	1.46806	2.14892	0.85
28-Apr	1.821474	1.49885	2.213543	0.85
29-Apr	1.905406	1.560316	2.326819	0.85
30-Apr	2.011293	1.635844	2.472913	0.85
1-May	2.150782	1.727744	2.677401	2.50
2-May	2.189095	1.765449	2.714402	2.50
3-May	2.207777	1.772441	2.750037	2.50
4-May	2.302766	1.841426	2.879689	2.50
5-May	2.449355	1.947957	3.079812	2.50
6-May	2.585019	2.042252	3.272037	2.50
7-May	2.658284	2.082001	3.394079	2.50
8-May	2.698892	2.108696	3.454276	2.50
9-May	2.80286	2.18176	3.600773	2.50
10-May	2.906005	2.248998	3.754944	2.50
11-May	3.026755	2.320172	3.948521	2.50
12-May	3.152889	2.414666	4.116805	2.50
13-May	3.215966	2.468848	4.189176	2.50
14-May	3.253533	2.504351	4.226834	2.50
15-May	3.323942	2.567606	4.303071	2.50
16-May	3.399978	2.63248	4.391239	2.50

17-May	3.465205	2.681857	4.477363	2.50
18-May	3.549166	2.757736	4.567723	2.50
19-May	3.657292	2.846672	4.698744	2.50
20-May	3.717381	2.902949	4.760305	2.50
21-May	3.871889	3.032043	4.944363	2.50
22-May	3.975219	3.123782	5.05873	2.50
23-May	4.133228	3.227771	5.292684	2.50
24-May	4.24246	3.287755	5.474393	2.50
25-May	4.339041	3.353414	5.614361	2.50
26-May	4.372798	3.385855	5.647427	2.50
27-May	4.42711	3.445381	5.688572	2.50
28-May	4.420911	3.443399	5.675918	2.50
29-May	4.400662	3.437207	5.634175	2.50
30-May	4.45595	3.493845	5.682991	2.50
31-May	4.524029	3.557906	5.752497	2.50
1-Jun	4.504125	3.533755	5.740959	2.50
2-Jun	4.55654	3.572813	5.811123	2.50
3-Jun	4.57313	3.5846	5.834268	2.50
4-Jun	4.609139	3.628022	5.855577	2.50
5-Jun	4.506383	3.571642	5.685758	2.50
6-Jun	4.432796	3.543176	5.545782	2.50
7-Jun	4.345374	3.473694	5.43579	2.50
8-Jun	4.308471	3.432637	5.407773	2.50
9-Jun	4.282134	3.405208	5.384891	2.50
10-Jun	4.229873	3.364893	5.317206	2.50
11-Jun	4.180309	3.333309	5.242533	2.50
12-Jun	4.089653	3.26247	5.126564	2.50
13-Jun	3.95895	3.151054	4.97398	2.50
14-Jun	3.83597	3.05493	4.816695	2.50
15-Jun	3.758064	2.992682	4.719193	2.50
16-Jun	3.727414	2.964506	4.686655	2.50
17-Jun	3.715521	2.971389	4.646006	2.50
18-Jun	3.662025	2.934408	4.570064	2.50
19-Jun	3.609725	2.871281	4.538084	2.50
20-Jun	3.549849	2.818572	4.470854	2.50
21-Jun	3.435773	2.732689	4.319752	2.50
22-Jun	3.327	2.653204	4.17191	2.50
23-Jun	3.221954	2.576061	4.029791	2.50
24-Jun	3.081631	2.46794	3.847925	2.50
25-Jun	2.952417	2.360335	3.693021	2.50
26-Jun	2.919593	2.344139	3.636313	2.50
27-Jun	2.834003	2.278962	3.524224	2.50
28-Jun	2.707471	2.18155	3.360179	2.50
29-Jun	2.610772	2.107129	3.234794	2.50
30-Jun	2.517431	2.035572	3.113355	2.50
1-Jul	2.448899	1.981722	3.02621	1.0
2-Jul	2.330396	1.883456	2.883393	1.0
3-Jul	2.239552	1.826077	2.746649	1.0

4-Jul	2.18263	1.787504	2.665097	1.0
5-Jul	2.156861	1.786539	2.603945	1.0
6-Jul	2.115827	1.760046	2.543527	1.0
7-Jul	2.039403	1.688142	2.463752	1.0
8-Jul	2.004672	1.664402	2.414506	1.0
9-Jul	1.963513	1.63133	2.363338	1.0
10-Jul	1.940373	1.606086	2.344237	1.0
11-Jul	1.832441	1.51448	2.217156	1.0
12-Jul	1.766306	1.465284	2.129168	1.0
13-Jul	1.71635	1.426766	2.064709	1.0
14-Jul	1.659834	1.376944	2.000843	1.0
15-Jul	1.643371	1.35932	1.986779	1.0
16-Jul	1.608871	1.33982	1.93195	1.0
17-Jul	1.560212	1.303918	1.866883	1.0
18-Jul	1.516978	1.269181	1.813155	1.0
19-Jul	1.484987	1.243523	1.773339	1.0
20-Jul	1.472242	1.235715	1.754043	1.0
21-Jul	1.461059	1.232434	1.732097	1.0
22-Jul	1.428455	1.21263	1.682692	1.0
23-Jul	1.397035	1.191088	1.638592	1.0
24-Jul	1.365531	1.166583	1.598408	1.0
25-Jul	1.343274	1.146181	1.574258	1.0
26-Jul	1.303656	1.109357	1.531986	1.0
27-Jul	1.303486	1.107716	1.533854	1.0
28-Jul	1.29651	1.102659	1.52444	1.0
29-Jul	1.312213	1.119626	1.537927	1.0
30-Jul	1.276737	1.089444	1.496229	1.0
31-Jul	1.268116	1.081349	1.487141	1.0
1-Aug	1.228132	1.045909	1.442101	1.0
2-Aug	1.198891	1.022892	1.405171	1.0
3-Aug	1.188462	1.016313	1.38977	1.0
4-Aug	1.184597	1.00586	1.395095	1.0
5-Aug	1.208705	1.030698	1.417454	1.0
6-Aug	1.189162	1.018878	1.387905	1.0
7-Aug	1.150393	0.980792	1.349321	1.0
8-Aug	1.159048	0.988843	1.358549	1.0
9-Aug	1.126043	0.968434	1.309304	1.0
10-Aug	1.098165	0.941819	1.280466	1.0
11-Aug	1.098338	0.946247	1.274876	1.0
12-Aug	1.080605	0.930013	1.255581	1.0
13-Aug	1.078629	0.926536	1.255689	1.0
14-Aug	1.031001	0.883293	1.20341	1.0
15-Aug	1.020005	0.869599	1.196425	1.0
16-Aug	1.012825	0.862497	1.189353	0.45
17-Aug	0.964642	0.821208	1.133128	0.45
18-Aug	0.953649	0.806607	1.127497	0.45
19-Aug	0.932346	0.790837	1.099177	0.45
20-Aug	0.926555	0.790768	1.085658	0.45

21-Aug	0.914757	0.788629	1.061057	0.45
22-Aug	0.923338	0.794178	1.073503	0.45
23-Aug	0.920914	0.793498	1.068789	0.45
24-Aug	0.93138	0.802446	1.081031	0.45
25-Aug	0.901748	0.771449	1.054055	0.45
26-Aug	0.894769	0.764359	1.047429	0.45
27-Aug	0.891994	0.763873	1.041604	0.45
28-Aug	0.876906	0.752872	1.021373	0.45
29-Aug	0.877055	0.758053	1.014739	0.45
30-Aug	0.8533	0.736817	0.988197	0.45
31-Aug	0.848573	0.730449	0.985799	0.45
1-Sep	0.819621	0.69885	0.961262	0.45
2-Sep	0.810179	0.690196	0.951021	0.45
3-Sep	0.782965	0.670775	0.91392	0.45
4-Sep	0.769784	0.659751	0.898167	0.45
5-Sep	0.753087	0.647194	0.876307	0.45
6-Sep	0.745531	0.641936	0.865845	0.45
7-Sep	0.724456	0.626084	0.838285	0.45
8-Sep	0.721886	0.622932	0.836558	0.45
9-Sep	0.714807	0.616133	0.829284	0.45
10-Sep	0.714265	0.622774	0.819197	0.45
11-Sep	0.728085	0.644478	0.822538	0.45
12-Sep	0.7201	0.638308	0.812373	0.45
13-Sep	0.702407	0.617903	0.798469	0.45
14-Sep	0.679263	0.595941	0.774235	0.45
15-Sep	0.679989	0.600182	0.770407	0.45
16-Sep	0.661255	0.58265	0.750464	0.45
17-Sep	0.651565	0.570434	0.744235	0.45
18-Sep	0.630904	0.544937	0.730433	0.45
19-Sep	0.632219	0.552552	0.723372	0.45
20-Sep	0.66019	0.588014	0.741225	0.45
21-Sep	0.673771	0.603492	0.752234	0.45
22-Sep	0.678426	0.607593	0.757515	0.45
23-Sep	0.674385	0.605901	0.750611	0.45
24-Sep	0.667985	0.599924	0.743767	0.45
25-Sep	0.655709	0.587658	0.731641	0.45
26-Sep	0.642582	0.573794	0.719617	0.45
27-Sep	0.636732	0.566877	0.715194	0.45
28-Sep	0.633969	0.564213	0.71235	0.45
29-Sep	0.627368	0.557162	0.706421	0.45
30-Sep	0.62693	0.556458	0.706326	0.45
1-Oct	0.63053	0.562667	0.706577	0.45
2-Oct	0.62525	0.560204	0.69785	0.45
3-Oct	0.618892	0.559256	0.684887	0.45
4-Oct	0.610419	0.550757	0.676543	0.45
5-Oct	0.617226	0.555845	0.685384	0.45
6-Oct	0.612129	0.553284	0.677232	0.45
7-Oct	0.60955	0.552501	0.672491	0.45

8-Oct	0.612113	0.554396	0.675838	0.45
9-Oct	0.611938	0.551614	0.678858	0.45
10-Oct	0.607335	0.548866	0.672031	0.45
11-Oct	0.607111	0.549274	0.671037	0.45
12-Oct	0.603397	0.543436	0.669974	0.45
13-Oct	0.604355	0.546414	0.668441	0.45
14-Oct	0.616406	0.55706	0.682075	0.45
15-Oct	0.618137	0.558597	0.684022	0.45
16-Oct	0.618253	0.561813	0.680363	0.45
17-Oct	0.624531	0.565458	0.689776	0.45
18-Oct	0.629148	0.568274	0.696543	0.45
19-Oct	0.620564	0.561352	0.686022	0.45
20-Oct	0.616906	0.558109	0.681898	0.45
21-Oct	0.620571	0.563952	0.682873	0.45
22-Oct	0.620804	0.564211	0.683075	0.45
23-Oct	0.625239	0.569113	0.6869	0.45
24-Oct	0.62887	0.573206	0.689941	0.45
25-Oct	0.630322	0.573657	0.692585	0.45
26-Oct	0.625648	0.566477	0.691	0.45
27-Oct	0.633759	0.576015	0.697292	0.45
28-Oct	0.625654	0.571917	0.684441	0.45
29-Oct	0.623274	0.568366	0.683487	0.45
30-Oct	0.622808	0.567984	0.682924	0.45
31-Oct	0.61289	0.559921	0.67087	0.45
1-Nov	0.613752	0.562991	0.669089	0.45
2-Nov	0.608495	0.557629	0.664	0.45
3-Nov	0.597626	0.545924	0.654224	0.45
4-Nov	0.616582	0.567599	0.669792	0.45
5-Nov	0.618552	0.570033	0.671202	0.45
6-Nov	0.60162	0.552675	0.6549	0.45
7-Nov	0.60324	0.555223	0.655409	0.45
8-Nov	0.59665	0.547201	0.650568	0.45
9-Nov	0.587679	0.53972	0.6399	0.45
10-Nov	0.584162	0.537944	0.634351	0.45
11-Nov	0.580535	0.536986	0.627615	0.45
12-Nov	0.5769	0.53379	0.623492	0.45
13-Nov	0.571974	0.530965	0.616151	0.45
14-Nov	0.57877	0.534728	0.626439	0.45
15-Nov	0.568582	0.526979	0.613469	0.45
16-Nov	0.572588	0.530437	0.618088	0.45
17-Nov	0.571092	0.529202	0.616299	0.45
18-Nov	0.566603	0.524314	0.612304	0.45
19-Nov	0.561736	0.519191	0.607766	0.45
20-Nov	0.561361	0.518045	0.608297	0.45
21-Nov	0.569252	0.525907	0.616169	0.45
22-Nov	0.559337	0.512796	0.610102	0.45
23-Nov	0.542787	0.495579	0.594493	0.45
24-Nov	0.543312	0.496704	0.594292	0.45

25-Nov	0.546091	0.499381	0.59717	0.45
26-Nov	0.547404	0.500229	0.599027	0.45
27-Nov	0.549694	0.500689	0.603494	0.45
28-Nov	0.53242	0.487528	0.581446	0.45
29-Nov	0.529422	0.479503	0.584537	0.45
30-Nov	0.532498	0.485376	0.584195	0.45
1-Dec	0.530746	0.485522	0.580183	0.45
2-Dec	0.525453	0.482861	0.571802	0.45
3-Dec	0.525889	0.483221	0.572325	0.45
4-Dec	0.525321	0.482274	0.57221	0.45
5-Dec	0.523352	0.478873	0.571962	0.45
6-Dec	0.513593	0.471316	0.559662	0.45
7-Dec	0.507594	0.467794	0.550781	0.45
8-Dec	0.513103	0.471047	0.558915	0.45
9-Dec	0.501347	0.461015	0.545207	0.45
10-Dec	0.502213	0.462324	0.545543	0.45
11-Dec	0.502778	0.463727	0.545118	0.45
12-Dec	0.506668	0.466955	0.549758	0.45
13-Dec	0.508462	0.47155	0.548264	0.45
14-Dec	0.508635	0.473067	0.546877	0.45
15-Dec	0.503252	0.466852	0.54249	0.45
16-Dec	0.497334	0.461364	0.536107	0.45
17-Dec	0.499054	0.46505	0.535545	0.45
18-Dec	0.501443	0.468025	0.537246	0.45
19-Dec	0.504164	0.469839	0.540996	0.45
20-Dec	0.495519	0.461421	0.532137	0.45
21-Dec	0.504374	0.468623	0.542851	0.45
22-Dec	0.499327	0.464579	0.536674	0.45
23-Dec	0.502622	0.467463	0.540424	0.45
24-Dec	0.497406	0.461828	0.535725	0.45
25-Dec	0.48847	0.453195	0.52649	0.45
26-Dec	0.491372	0.455294	0.530308	0.45
27-Dec	0.490164	0.453607	0.529667	0.45
28-Dec	0.487959	0.452035	0.526738	0.45
29-Dec	0.489721	0.453677	0.528629	0.45
30-Dec	0.493927	0.457984	0.532691	0.45
31-Dec	0.496936	0.462304	0.534163	0.45

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 no decreed surface diversions within this reach of stream. Staff has determined that water is available for appropriation on Chaparral Creek, between the headwaters and the USFS boundary, 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: Headwaters to U.S. Forest Service Boundary

Upper Terminus: HEADWATERS IN THE VICINITY OF

(Latitude 37° 20' 40.05"N) (Longitude 105° 01' 50.43"W)

UTM North: 4133085.93 UTM East: 497282.98

NE SE S18 T31S R68W 6th PM

495' West of the East Section Line; 1898' North of the South Section Line

Lower Terminus: USFS BOUNDARY

(Latitude 37° 22' 58.34"N) (Longitude 105° 3' 21.70"W)

UTM North: 4137348.62 UTM East: 495039.93

NE NW S1 T31S R69W 6th PM

2558' East of the West Section Line; 1711' South of the North Section Line

Watershed: Huerfano (HUC#: 11020006)

Counties: Huerfano

Length: 3.11 miles

USGS Quad(s): Cuchara, Cucharas Pass

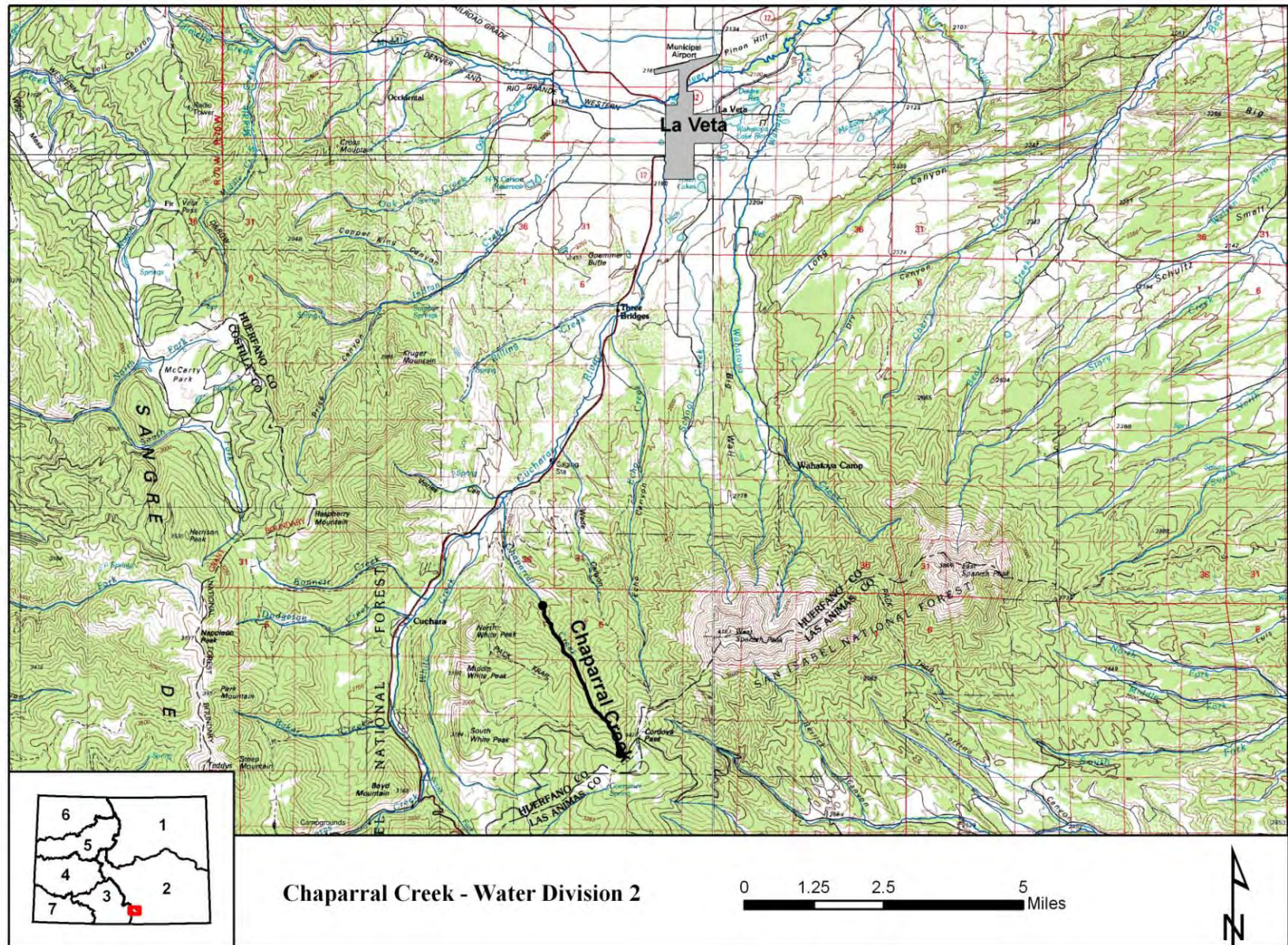
Flow Recommendation: 2.50 cfs (May 1 – June 30)

1.0 cfs (July 1 – August 15)

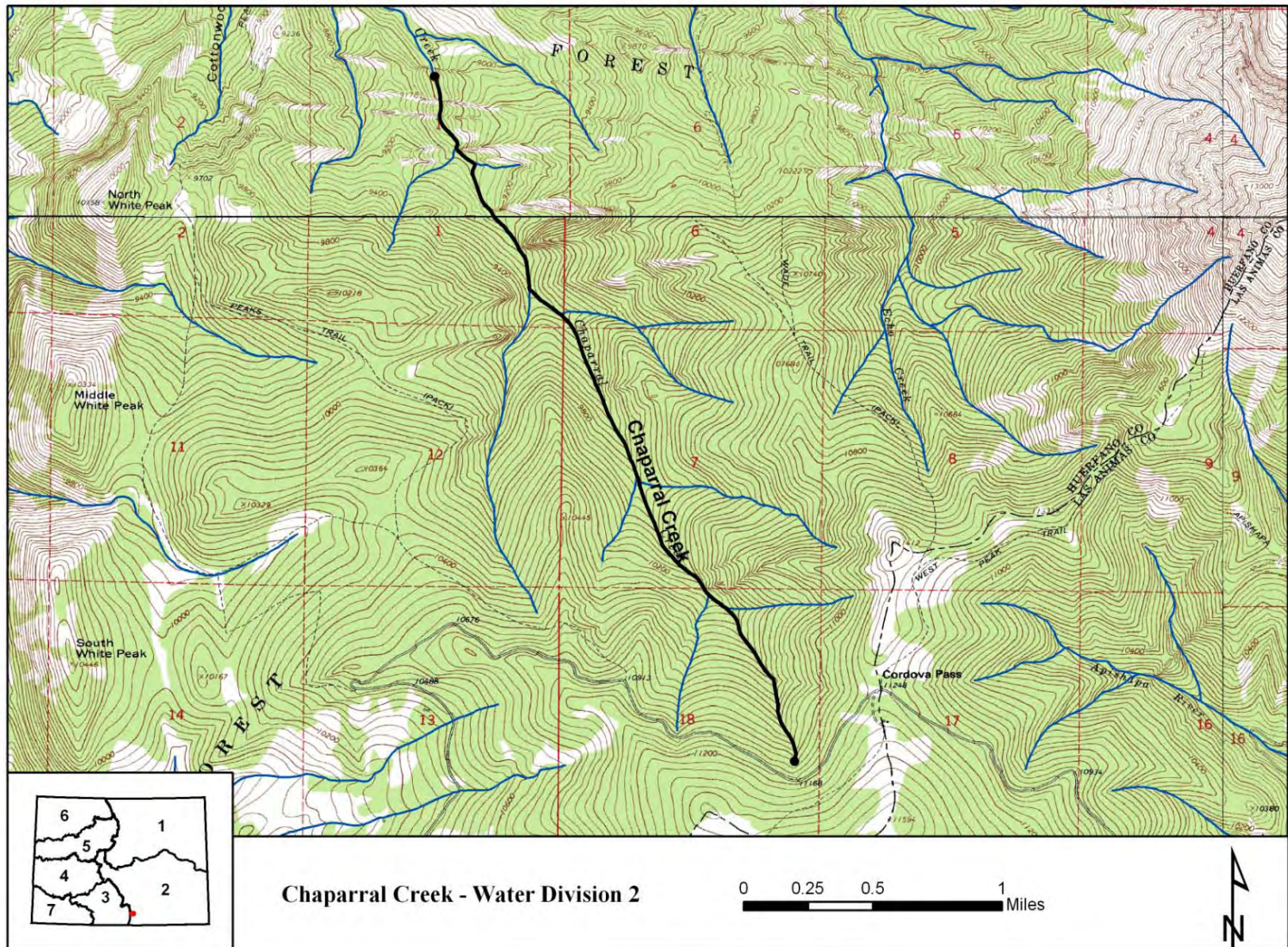
0.45 cfs (August 16 – March 31)

0.85 cfs (April 1 – April 30)

Vicinity Map



Water Rights Map



Land Use Map

