# <u>Stream:</u> Ute Creek

## Executive Summary

Water Division: 4
Water District: 63
CPW#: 45953
CWCB ID: 12/4/A-001

**Segment:** HEADWATERS TO CONFLUENCE WEST CREEK

**Upper Terminus**: HEADWATERS IN THE VICINITY OF
UTM North: 4291009.53 UTM East: 170604.11

**Lower Terminus**: CONFLUENCE WITH WEST CREEK AT
UTM North: 4293476.82 UTM East: 160049.97

**Watershed:** Lower Dolores (HUC #: 14030004)
**Counties**: Mesa
**Length**: 7.87 miles
**USGS Quad(s)**: Gateway, Pine Mountain
**Flow Recommendation:** 2.0 cfs (4/1 – 6/15)
0.3 cfs (6/16 – 3/31)

# Staff Analysis and Recommendation

## Summary

The information contained in this report and the associated supporting data and analyses (located at http://cwcb.state.co.us/environment/instream-flow-program/Pages/2014ProposedInstreamFlowAppropriations.aspx) form 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 by ISF 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 Ute Creek to the CWCB for a water right under the Instream Flow Program. Ute Creek is being considered because it has a natural environment that can be preserved to a reasonable degree with an instream flow water right.

Ute Creek is approximately 7.87 miles long and originates in the Uncompahgre National Forest at an elevation of 8,500 feet. It flows in a northwesterly direction as it drops to an elevation of 5,060 feet where it joins West Creek. One-hundred percent of the land on the 7.87 mile segment addressed by this report is publicly owned (see Table 1). Ute Creek is located within Mesa County and the total drainage area of the creek is approximately 15.6 square miles.

The subject of this report is a segment of Ute Creek from the headwaters extending downstream to the confluence with West Creek. The proposed segment is located approximately 4.5 miles northeast of the town of Gateway. Staff has received one recommendation for this segment from the BLM, which is discussed below.

## Instream Flow Recommendation

BLM recommended flows of 2.0 cfs (4/1 – 6/15) and 0.3 cfs (6/16 – 3/31), based on its May 21, 2010 data collection efforts and staff's water availability analyses.

## Land Status Review

Table 1. Summary of land ownership data in the vicinity of the proposed ISF on Ute Creek.

| Upper Terminus | Lower Terminus | Total Length (miles) | Land Ownership | |
|---|---|---|---|---|
| | | | % Private | % Public |
| Headwaters | Confluence West Creek | 7.87 | 0% | 100% |

Breakdown of public lands by managing entity: 55% BLM and 45% U.S. Forest Service.

## Biological Data

Ute Creek is a cold-water stream with a high gradient in a narrow canyon. The stream is confined by bedrock and generally has large substrate. The stream has an adequate mix of riffle, run, and deep pool habitats to support a salmonid fishery. Intensive macro-invertebrate surveys have not been conducted, but spot samples have revealed various species of mayfly and caddisfly.

Fish surveys revealed populations of rainbow trout and brown trout. The stream appears to be used for spawning by rainbow trout and brown trout. The creek is likely a significant nursery habitat area for small fish spawned from parent fish that reside primarily in West Creek. Nursery habitat is critical because much of West Creek is characterized by high gradient and velocities that are not suitable for young-of-the-year trout.

The riparian community along Ute Creek is notable. The riparian community contains extremely healthy cottonwood galleries with all age classes present, and willow communities are robust where soil depths are insufficient for cottonwoods. BLM considers Ute Creek to be one of the best examples of a completely natural and intact riparian community on the Uncompahgre Plateau.

## 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 BLM 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. Colorado Parks and Wildlife has determined that maintaining these three hydraulic parameters at adequate levels across riffle habitat types also will maintain aquatic habitat in pools and runs 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 2 below. Table 2 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 (250% 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. 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 rate required.

Table 2. Summary of R2Cross measurements and analysis for Ute Creek.

| Party | Date | Q (cfs) | Accuracy Range (cfs) | Winter (2/3) (cfs) | Summer(3/3) (cfs) |
|---|---|---|---|---|---|
| BLM | 5/21/2010 | 1.37 | 0.5 – 3.4 | 1.70 | 2.04 |
| BLM | 5/21/2010 | 1.28 | 0.5 – 3.2 | 0.98 | 1.96 |
| | | | Averages | 1.34 | 2.00 |

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

2.0 cubic feet per second is recommended for the snowmelt runoff period from April 1 through June 15. This recommendation is driven by the average velocity and wetted perimeter criteria. This creek experiences consistently low flows during late summer and fall, so it is important to protect as much physical habitat as possible during the limited time when snowmelt runoff flows are available.

0.3 cubic feet per second is recommended for the remainder of the year from June 16 to March 31. This recommendation is driven by limited water availability. 0.3 cfs will provide approximately 30 percent wetted perimeter and an average velocity of 0.7 feet per second. This flow rate is capable of maintaining pool habitat in the creek and preventing excessively high water temperatures.

## Hydrologic Data and Analysis

CWCB staff conducts hydrologic analyses for each recommended instream flow (ISF) appropriation to provide the Board with a basis for making the determination that water is available. Each recommended ISF reach has a unique flow regime that depends on variables such as the timing, magnitude, and location of water inputs (such as rain, snow, and snowmelt) and water losses (such as diversions, reservoirs, evaporation and transpiration, groundwater recharge, etc). Although extensive and time consuming investigations of all variables may be possible, staff takes a pragmatic and cost-effective approach to analyze water availability that focuses on stream flows and the influence of flow alterations, such as diversions, to understand how much water is physically available in the recommended reach.

Staff's hydrologic analysis is data-driven, meaning that staff gathers and evaluates the best available data and uses the best available analysis method for that data. Whenever possible, long-term stream gage data (period of record 20 or more years) will be used to evaluate streamflow. Other streamflow information such as short-term gages, temporary gages, spot streamflow measurements, diversion records, and StreamStats will be used when long-term gage data is not available. StreamStats, a statistical hydrologic program, uses regression equations developed by the USGS (Capesius and Stephens, 2009) to estimate mean flows for each month based on drainage basin area and average

drainage basin precipitation. Diversion records will also be used to evaluate the effect of surface water diversions when necessary. Interviews with water commissioners, landowners, and ditch or reservoir operators can provide additional information. A range of analytical techniques may be employed to extend gage records, estimate stream flow in ungaged locations, and estimate the effects of diversions. The goal is to obtain the most detailed and reliable estimate of actual hydrology using the most efficient analysis technique.

The final product of the hydrologic analysis to determine water availability is the hydrograph, which shows stream flow and the proposed ISF rate over the course of one year. The hydrograph will show median daily values when daily data is available; otherwise, mean-monthly stream flow values will be presented.

**Background Information**

The proposed instream flow on Ute Creek has a 15.6 square mile drainage basin. The average elevation of the basin is 7,450 ft and the average precipitation is 19.09 inches. There are two small spring water rights within the drainage basin, however these likely have minimal impact and streamflow is essentially natural.

There is very little information available in the vicinity of this proposed instream flow. There are no streamflow gages on Ute Creek or any nearby creek that would be representative. In general there is very little streamflow information for the entire Uncompaghre Plateau. There are also no diversions near the lower terminus to indicate possible streamflow conditions. StreamStats provides another possible source of streamflow information. StreamStats, a statistical hydrologic program, uses regression equations developed by the USGS (Capesius and Stephens, 2009) to estimate mean flows for each month based on drainage basin area and average drainage basin precipitation. There are also a number of spot measurements that have been collected by the BLM and CWCB staff.

**Data Analysis**

There are 46 spot discharge measurements on Ute Creek spanning 1981 to 2013. These measurements were not made on a consistent basis and there are more measurements in late fall and early winter than late winter and spring. The measurements show that streamflow is quite variable. The highest measured flow was 12.2 cfs on 5/24/1983. However, the lowest portion of the stream near its confluence with West Creek was observed to be dry in late summer in 2012 and 2013.

The hydrograph (Figure 1) shows the StreamStats results as well as all 46 spot measurements. The proposed instream flow rate is below the StreamStats mean-monthly streamflow for all months except September, when the ISF rate is 0.02 cfs higher. The spot measurements are both above and below the proposed instream flow during the summer and fall months. Based on the available data, staff determines water is available for appropriation on Ute Creek.

**Citations**

Capesius, J.P. and V.C. Stephens, 2009, Regional regression equations for estimation of natural streamflow statistics in Colorado, Scientific Investigations Report 2009-5136.

Espegren, G.D., 1996, Development of Instream Flow Recommendations in Colorado Using R2CROSS, Colorado Water Conservation Board.

Nehring, B.R., 1979, Evaluation of Instream Flow Methods and Determination of Water Quantity Needs for Streams in the State of Colorado, Colorado Division of Wildlife.

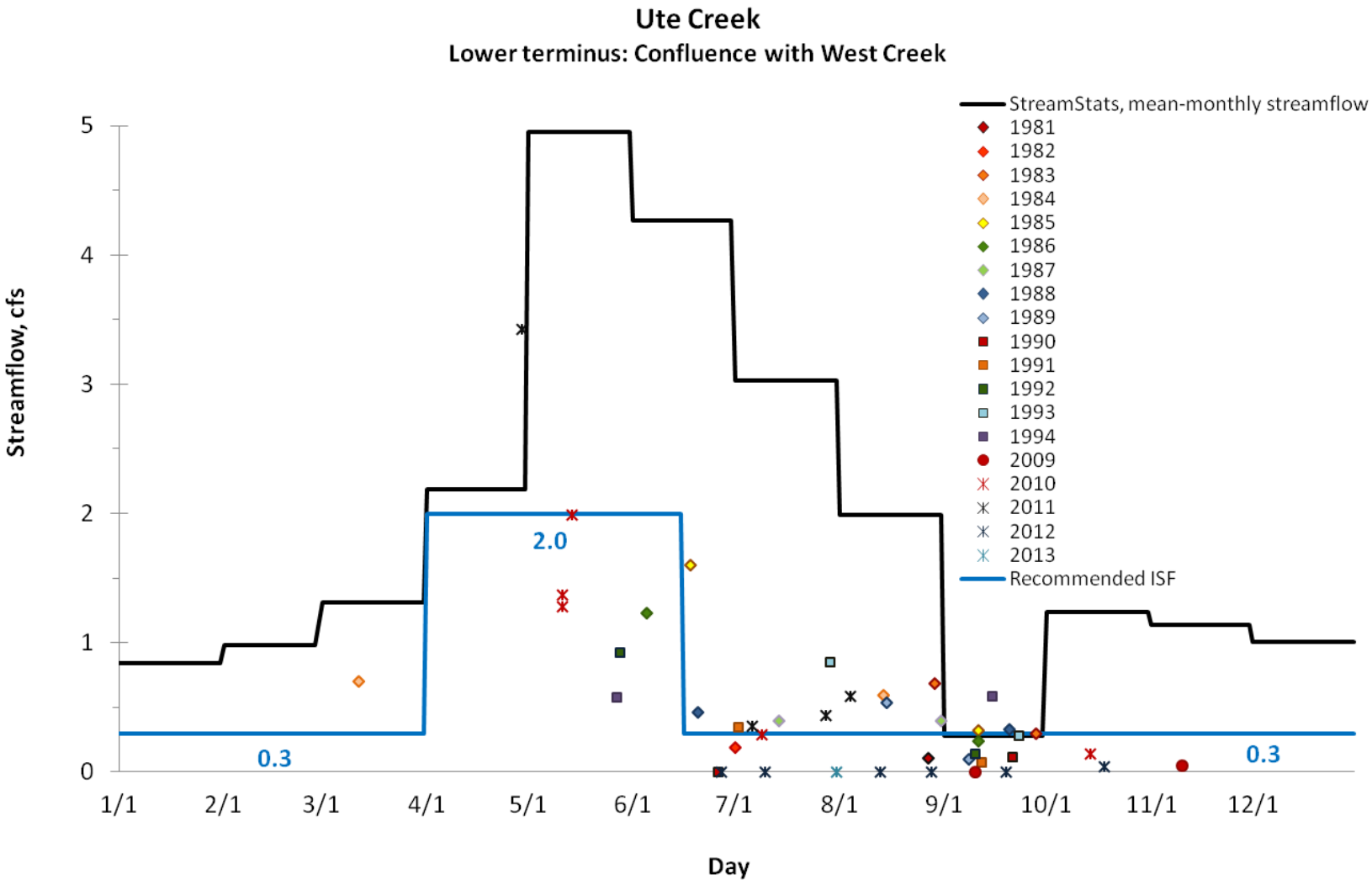



Figure 1. Hydrograph showing streamflow data and the proposed ISF rate on Ute Creek

## Existing Water Rights

Staff has analyzed the water rights tabulation and determined that there are no decreed absolute surface diversions within this reach of stream. Staff has concluded that a new junior appropriation of water rights on Ute Creek can exist 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 that the Board form its intent to appropriate on the following stream reach:

**Segment:** HEADWATERS TO CONFLUENCE WEST CREEK

**Upper Terminus**: HEADWATERS IN THE VICINITY OF
UTM North: 4291009.53 UTM East: 170604.11
(Latitude 38° 42' 23.01"N) (Longitude 108° 47' 16.07"W)
SW NW Section 34, Township 15 South, Range 102 West 6th PM
285' East of the West Section Line; 2,168' South of the North Section Line

**Lower Terminus**: CONFLUENCE WITH WEST CREEK AT
UTM North: 4293476.82 UTM East: 160049.97
(Latitude 38° 43' 28.5"N) (Longitude 108° 54' 36.4"W)
NW NE Section 28, Township 15 South, Range 103 West 6th PM
2,473' West of the East Section Line; 915' South of the North Section Line

**Watershed:** Lower Dolores (HUC #: 14030004)
**Counties**: Mesa
**Length**: 7.87 miles
**USGS Quad(s)**: Gateway, Pine Mountain
**Flow Recommendation:** 2.0 cfs (4/1 – 6/15)
0.3 cfs (6/16 – 3/31)

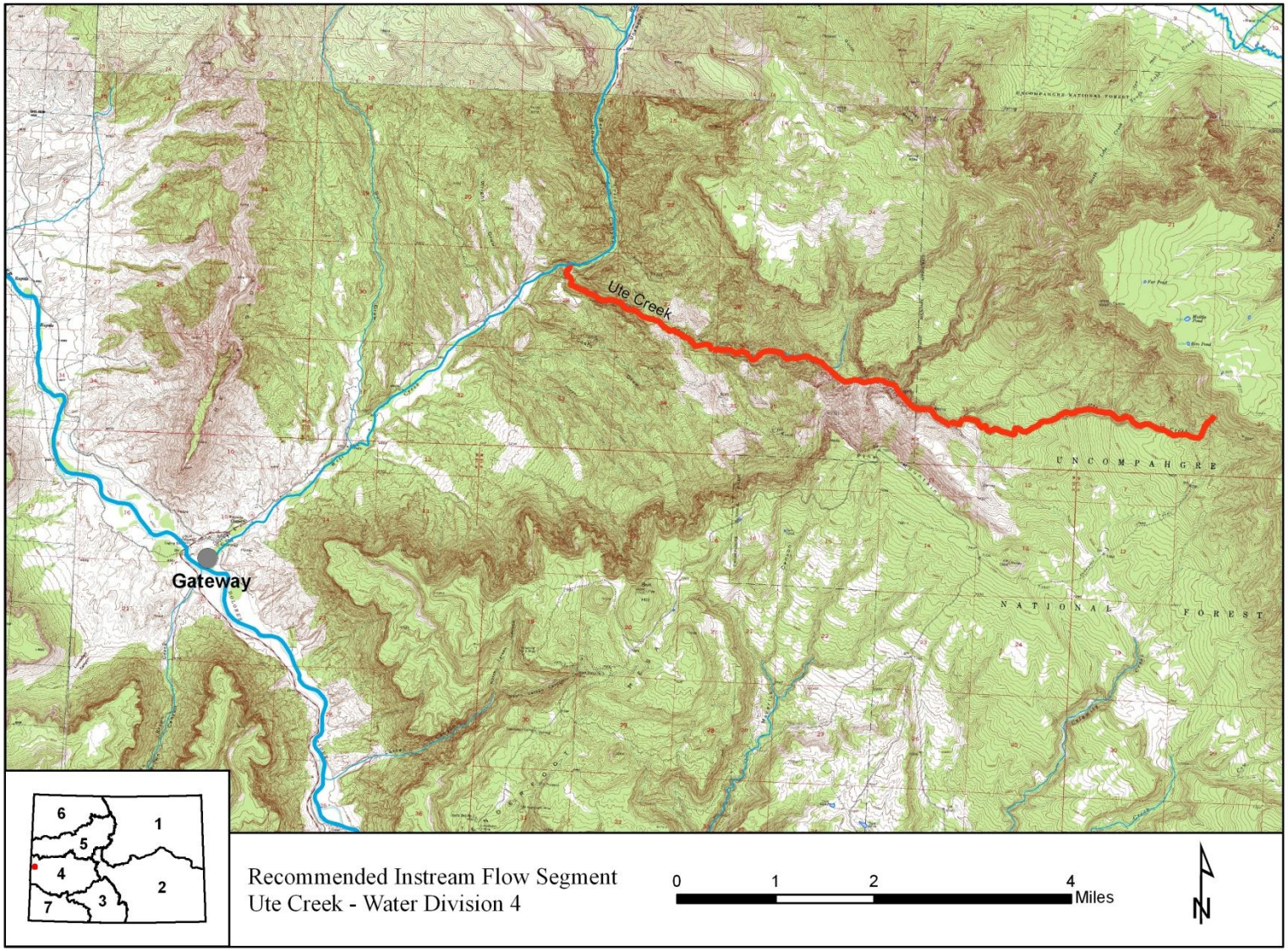
Metadata Descriptions:

a) The UTM, PLSS and Lat/Long locations for the upstream and downstream termini were derived from CWCB GIS using the National Hydrography Dataset (NHD).

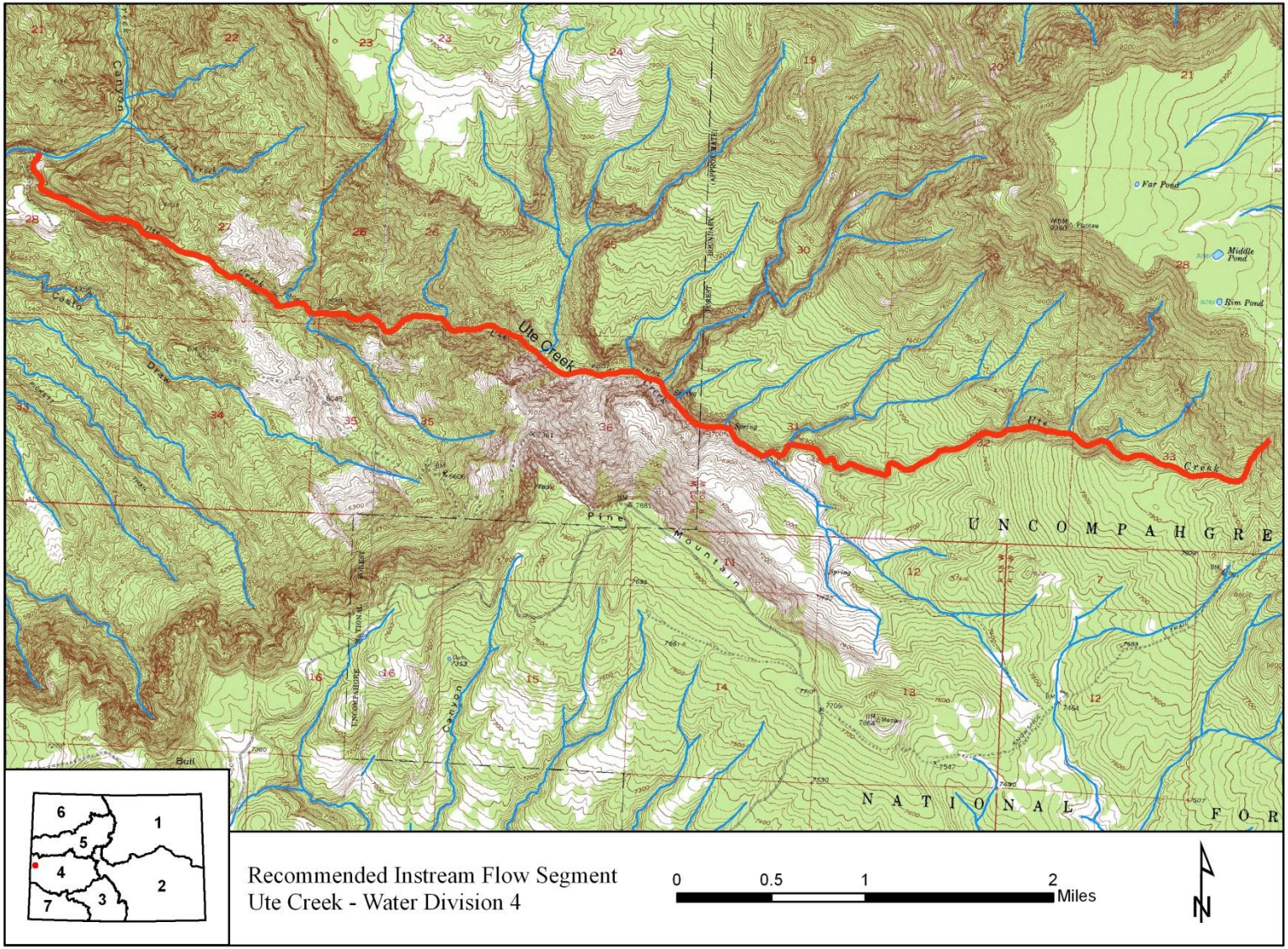
b) The PLSS locations were derived from CWCB GIS using 2005 PLSS data from the U.S. Bureau of Land Management's Geographic Coordinate Database

c) Projected Coordinate System: NAD 1983 UTM Zone 13N

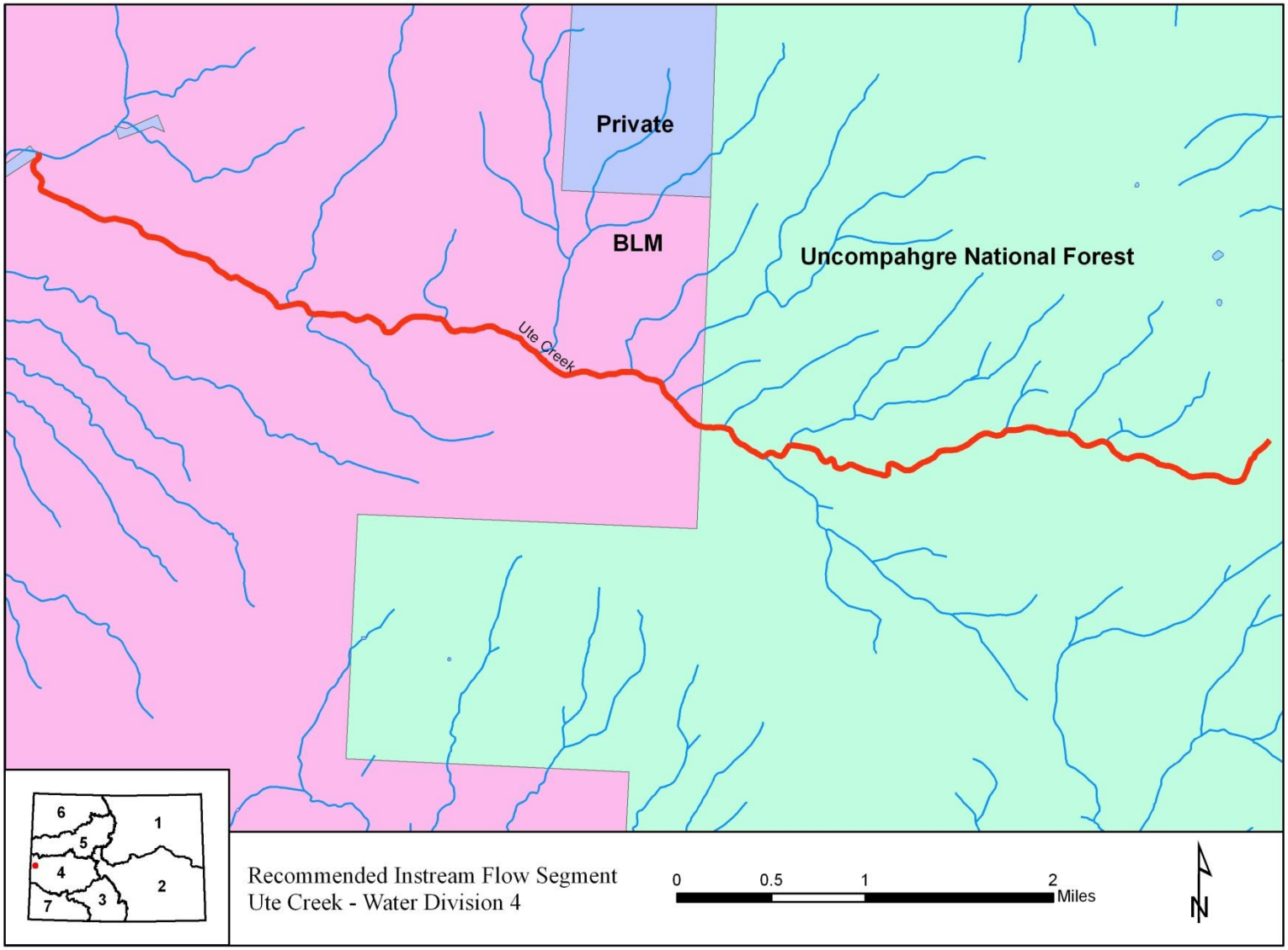
# Vicinity Map



# Water Rights Map



# Land Use Map


Private
BLM
Uncompahgre National Forest
Ute Creek
6
1
5
4
2
7
3
Recommended Instream Flow Segment
Ute Creek - Water Division 4
0
0.5
1
2
Miles
N