

# Titan Lake Executive Summary

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## CWCB STAFF INSTREAM FLOW RECOMMENDATION January 29-30, 2024

LAKE CENTERPOINT: UTM North: 4356622 UTM East: 377505  
WATER DIVISION/DISTRICT: 2/11  
COUNTY: Lake  
WATERSHED: Arkansas Headwaters  
CWCB ID: 24/2/A-003  
RECOMMENDER: Colorado Parks and Wildlife (CPW)  
RECOMMENDED SURFACE ELEVATION: 11,560.0 feet  
RECOMMENDED VOLUME: 2.3 acre feet



**COLORADO**

**Colorado Water  
Conservation Board**

Department of Natural Resources

## **BACKGROUND**

Colorado's General Assembly created the Instream Flow and Natural Lake Level Program in 1973, recognizing "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 Colorado Water Conservation Board (CWCB or Board) with the exclusive authority to appropriate and acquire instream flow (ISF) and natural lake level water rights (NLL). Before initiating a water right filing, the Board must determine that: 1) there is a natural environment that can be preserved to a reasonable degree with the Board's water right if granted, 2) the natural environment will be preserved to a reasonable degree by the water available for the appropriation to be made, and 3) such environment can exist without material injury to water rights.

The information contained in this Executive Summary and the associated supporting data and analyses form the basis for staff's ISF recommendation to be considered by the Board. This Executive Summary provides sufficient information to support the CWCB findings required by ISF Rule 5i on natural environment, water availability, and material injury. Additional supporting information is located at: <https://cwcb.colorado.gov/2024-isf-recommendations>.

## **RECOMMENDED NLL**

CPW recommended that the CWCB appropriate a NLL water right on Titan Lake at the January 2023 ISF workshop. Titan Lake is located within Lake County (See Vicinity Map), and is approximately 10 miles northwest of Leadville, CO. Titan Lake is located completely on public lands managed by the San Isabel National Forest as Holy Cross Wilderness (See Land Ownership Map). This lake is located at high elevation near the headwaters of West Tennessee Creek, which is a tributary to Tennessee Creek, a tributary of the Arkansas River. The proposed NLL has a surface area of approximately 1 acre.

CPW is interested in protecting this lake to preserve suitable habitat for boreal toads which are a state endangered species and Colorado's only alpine species of toad. A NLL water right on Titan Lake supports CPW's conservation strategies to recover the species which includes translocating boreal toads to suitable habitats to establish new breeding populations. CPW has evidence of toadlets overwintering in this lake, further confirming the suitability of this lake for boreal toad conservation efforts.

## **OUTREACH**

Stakeholder input is a valued part of the CWCB staff's analysis of ISF and NLL recommendations. Currently, more than 1,100 people subscribe to the ISF mailing list. Notice of the potential appropriation of an NLL water right on Titan Lake was sent to the mailing list in November 2023 and March 2023. A public notice about this recommendation was also published in the Herald Democrat on December 14, 2023.

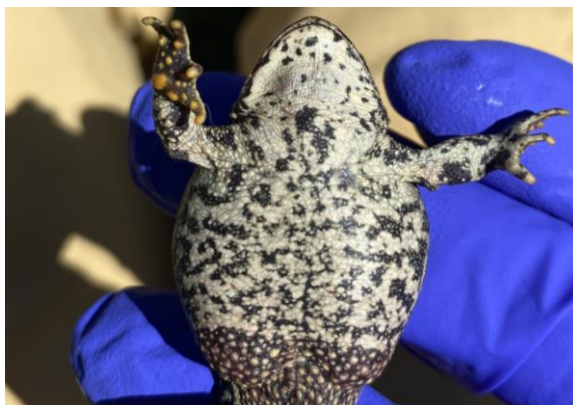
Staff presented information about the ISF program and this NLL recommendation to the Lake County Board of County Commissioners on November 30, 2023. In addition, staff spoke with Willem Scott, District 11 Water Commissioner, on October 16, 2023 confirming staff's understanding of the administration of and surrounding Titan Lake.

## NATURAL ENVIRONMENT

CWCB staff relies on the recommending entity to provide information about the natural environment. In addition, staff reviews information and conducts site visits for each recommended NLL appropriations. This information provides the Board with a basis for determining that a natural environment exists.

### Boreal Toad Conservation Goals and Translocation Project

Boreal toads (*Anaxyrus boreas*) were historically common in the Southern Rocky Mountains but have experienced rapid population declines in the last two decades. A boreal toad recovery team was formed in 1994 to respond to the significant declines in boreal toad distributions. The cause of declines appears to be related to an infection called chytrid fungus (*Batrachochytrium dendrobatidis*, or “Bd”), which has a very high mortality rate. Habitat loss is another major contributing factor to declines. Currently, boreal toads are listed as an endangered species by the states of Colorado and New Mexico and are a protected species in Wyoming. They have been petitioned for federal listing in the past. The boreal toad recovery team is working to expand populations by translocating toads into unoccupied habitats. The goal of the boreal toad translocation project is to stock new populations of boreal toad into suitable habitat with the goal of establishing new breeding populations. Establishing new breeding populations of boreal toad and protecting the habitat where translocated populations reside are both critical steps to the successful recovery of the species. CPW believes that securing a lake level protection on waterbodies that support populations of boreal toad, such as Titan Lake, is critically important to the recovery of boreal toads in Colorado.



Titan Lake: yearling toadlet found in 2022 (left) and adult boreal toad found in 2023 (right).

### Titan Lake and Translocation Efforts

Titan Lake is a high-elevation natural lake located near the Continental Divide in the West Tennessee Creek watershed. The alpine lake is relatively shallow with depths between 1 to 3 feet on average. The contributing drainage basin is approximately 3.9 square miles at and above tree line, surrounded by coniferous forest. The lake supports a fair amount of emergent grasses and aquatic vegetation which serves as habitat for boreal toads. Colorado wood-rush is one type of aquatic vegetation that has been observed in the area. Rare fens called the Homestake peak fen complex, have also been observed by the Colorado Natural Heritage Program surrounding Titan Lake.



From 2021 through 2023, CPW biologists translocated boreal toad tadpoles with the goal of establishing a population at Titan Lake (Table 1). Yearling toadlets were first found at Titan Lake in June of 2022 following the 2021 stocking effort. Yearling toads serve as evidence of successful overwintering and initial establishment of a new population of boreal toads in Lake County. This was a historic first in the Arkansas River Basin. Since then, successful overwintering has been documented in large numbers of toads of two distinct age classes. Additionally, in 2023 CPW found two adult toads that previously went undetected and were not part of the stocking efforts.

**Table 1. List of species identified in Titan Lake.**

Species Name	Scientific Name	Status
boreal toad	<i>Bufo boreas boreas</i>	State - Endangered Species

#### **NLL QUANTIFICATION**

CWCB staff relies on the biological expertise of the recommending entity to quantify the amount of water required to preserve the natural environment to a reasonable degree. CWCB staff performs a thorough review of the quantification analyses completed by the recommending entity to ensure consistency with accepted standards.

#### **Quantification Methodology**

CWCB staff relies upon the biological expertise of the recommending entity to quantify the amount of water required to preserve the natural environment to a reasonable degree. CPW recommends that the entire volume of water in a natural lake be appropriated to preserve the natural environment to a reasonable degree. CPW has determined that appropriating a lesser volume would likely result in a reduction of available habitat required for the discrete life cycles of the boreal toad in Titan Lake. Full pool at Titan Lake also provides gradual sloping shallows along the shoreline that supports a temperature gradient ideal for both egg and tadpole development.

#### **Data Collection and Analysis**

CPW staff conducted a topographic survey of Titan Lake on June 13, 2023. This included a bathymetric survey of the lake, the perimeter of the lake at the time of the survey, and the perimeter of the lake at full pool. This survey data was used to determine the surface water elevation, surface area, and volume when Titan Lake is full (See Table 2). The appendices include a report produced by CPW that provides additional detail about survey methods and data processing.

**Table 2. Titan Lake measurements at full pool.**

Volume (acre-feet)	Elevation (feet)	Average Depth (feet)	Surface Area (acres)
2.3	11,560	2.0	1.0

#### **NLL Recommendation**

CPW recommends that Titan Lake be protected at an elevation of 11,560 feet and a volume of 2.3 acre-feet based on survey results and biological expertise.

## **WATER AVAILABILITY**

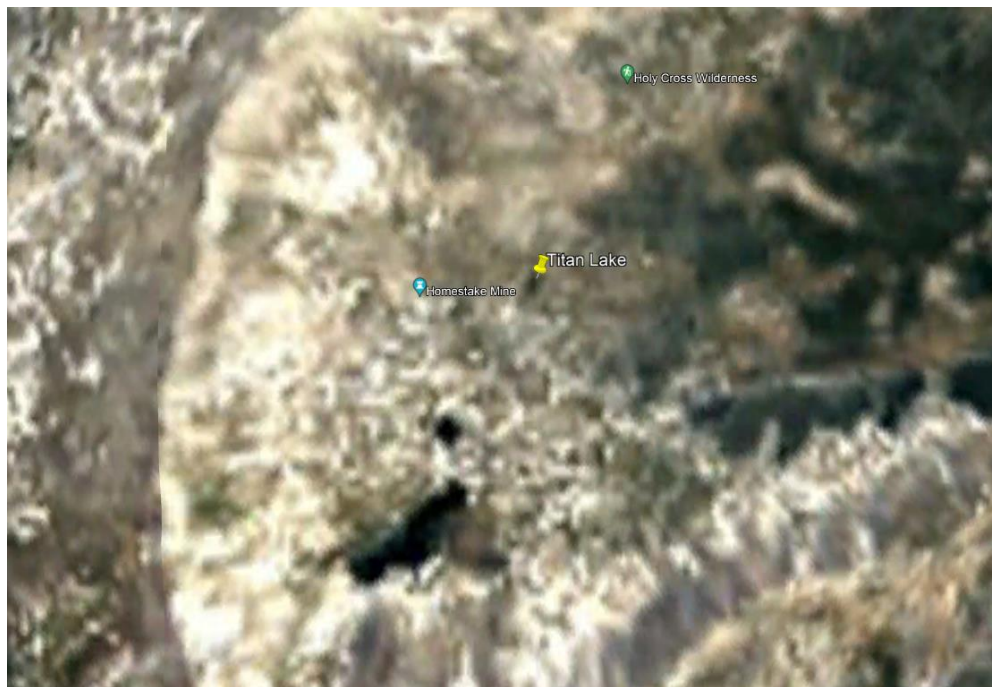
CWCB staff conducts hydrologic analyses for each recommended ISF appropriation to provide the Board with a basis for making the determination that water is available.

### **Basin Characteristics**

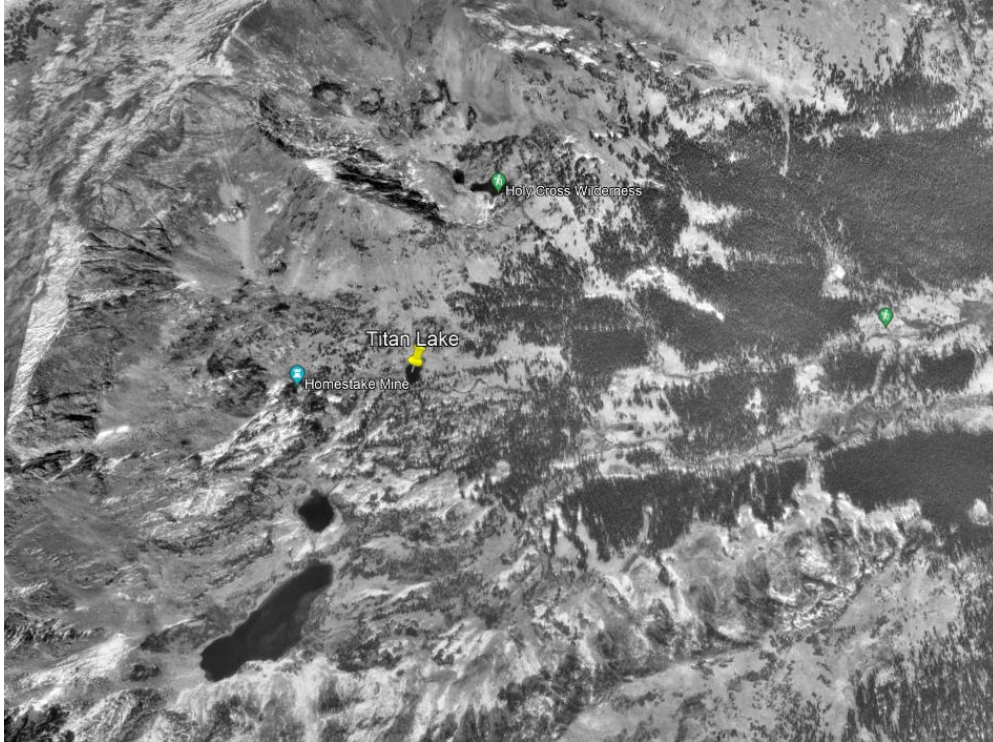
The drainage basin of the proposed NLL on Titan Lake is 0.4 square miles, with an average elevation of 12,177 feet and average annual precipitation of 32.1 inches (See the Vicinity Map). Titan Lake is a high alpine lake, located directly below Homestake Peak and the mountain divide separating Lake and Eagle County. As such, inflows to the lake include snowmelt from the high alpine ridges as overland or sheet flow, transitioning to groundwater inflow as the snowmelt season progresses. There are no water diversions in the basin tributary to Titan Lake, therefore the hydrology reflects natural conditions.

### **Data Collection and Analysis**

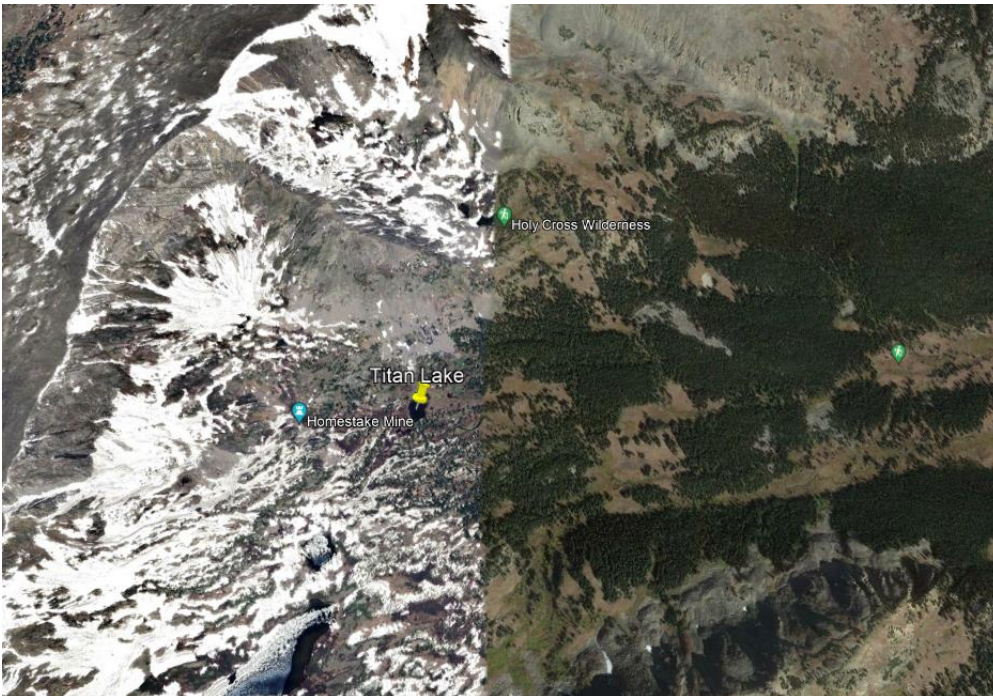
There is no historic lake level or lake volume information for Titan Lake. Titan Lake also does not show up as named feature on most maps, but a review of historical aerial photography shows the lake is a persistent feature. The website “Historical Aerials” has imagery showing the lake’s presence in 1944, 1951, 1968, 1983, 1999, 2005, 2009, 2011, 2013, 2015, 2017, 2019, and 2021 (*Nationwide Environmental Title Research, 2023*). In addition, Google Earth Pro has imagery showing the lake for the years 1985, 1999, 2005, 2006, 2011, 2012, 2015, 2018, 2019, and 2023 (see examples below). Although the image from 1985 is of lower quality than years after, the lake is still visible. The USGS National Map also shows an unnamed water feature in the location of Titan Lake (USGS, 2023). CWCB staff made one site visit to Titan Lake on 9/21/2023.



Google Earth Pro Historical Imagery 1985, Titan Lake label added by CWCB staff.



Google Earth Pro Historical Imagery 1999, Titan Lake label added by CWCB staff.



Google Earth Pro Historical Imagery 2023, Titan Lake label added by CWCB staff.





USGS National Map, Titan Lake label added by CWCB staff.

### **Water Availability Summary**

Based on the evident persistence of this lake through time, the presence of water in the system, and multiple years of documented use by boreal toads, staff concludes that water is available for appropriation.

### **MATERIAL INJURY**

As a new junior water right, the proposed NLL on Titan Lake can exist without material injury to other water rights. Under the provisions of section 37-92-102(3)(b), C.R.S., the CWCB will recognize any uses or exchanges of water in existence on the date this NLL water right is appropriated.

### **ADDITIONAL INFORMATION**

#### **Citations**

Google Earth Pro 7.3.6.9345, Titan Lake 39°21'01.18"N, 106°25'18.33"W. Historical Imagery, accessed December 22, 2023.

*Nationwide Environmental Title Research, LLC*. Historical Aerials, Retrieved from URL: <https://www.historicaerials.com/viewer>. Accessed December 12, 2023.

USGS National Map, Titan Lake 39°21'01.18"N, 106°25'18.33"W. National Boundaries Dataset, accessed December 22, 2023, Retrieve from

URL: <https://apps.nationalmap.gov/viewer/>.

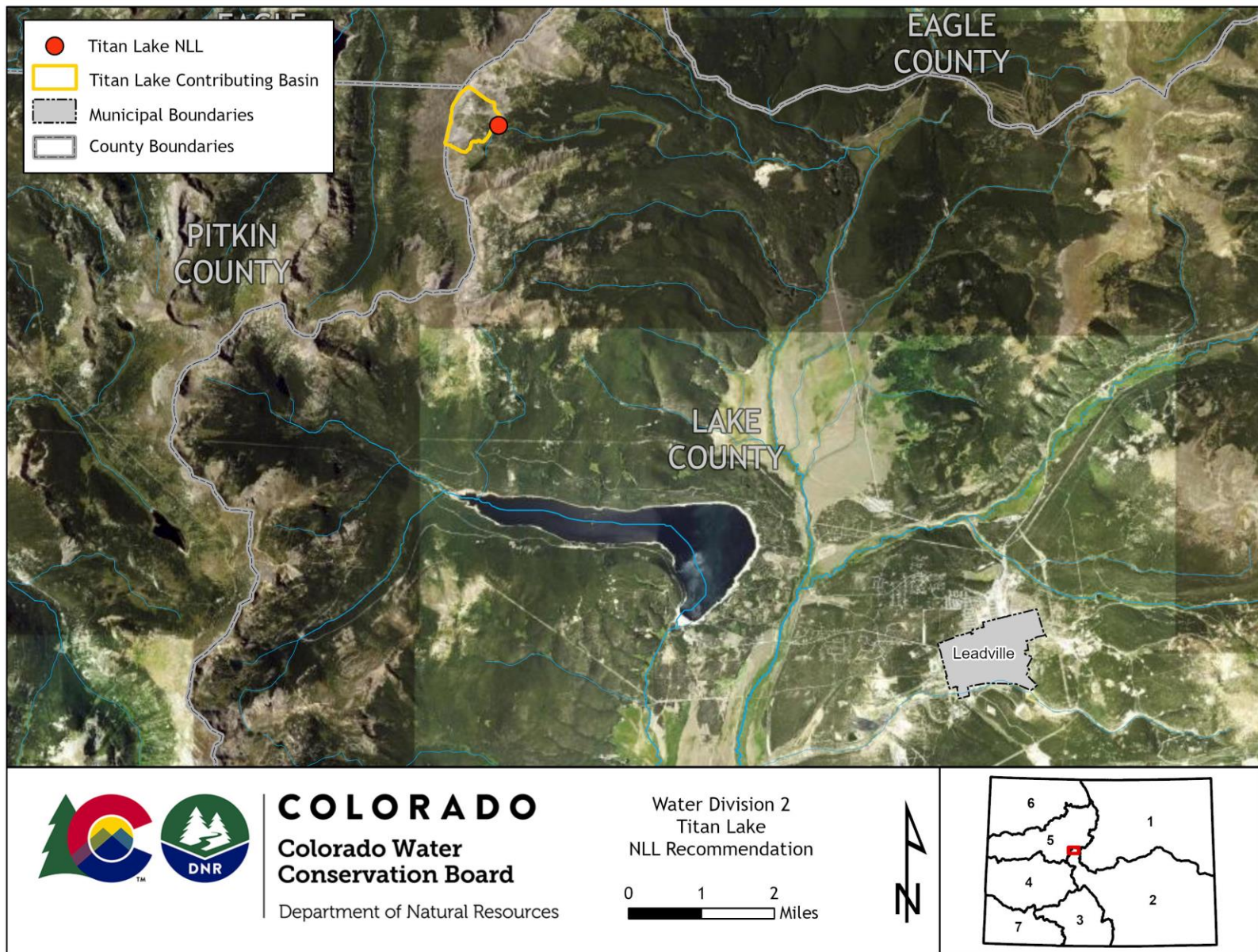
**Metadata Descriptions**

The UTM locations for the upstream and downstream termini were derived from CWCB GIS using the National Hydrography Dataset (NHD).

Projected Coordinate System: NAD 1983 UTM Zone 13N.



## VICINITY MAP



## LAND OWNERSHIP MAP

