COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Spottlewood Lakes # 1 – 4
Executive Summary

Spottlewood Lake # 1

Spottlewood Lake # 2

Spottlewood Lake # 3

Spottlewood Lake # 4

CWCB STAFF INSTREAM FLOW RECOMMENDATION

	Spottlewood Lake # 1	
LOCATION:	UTM North: 4524450.31	UTM East: 500088.64
RECOMMENDATION:	5,634.6 ft. (elevation)	0.19 Acre-Feet
	Spottlewood Lake # 2	
LOCATION:	UTM North: 4524806.62	UTM East: 500159.81
RECOMMENDATION:	5,645.8 ft. (elevation)	0.12 Acre-Feet
	Spottlewood Lake # 3	
LOCATION:	UTM North: 4524786.50	UTM East: 500226.24
RECOMMENDATION:	5,647.6 ft. (elevation)	0.17 Acre-Feet
	Spottlewood Lake # 4	
LOCATION:	UTM North: 4524912.38	UTM East: 500530.95
RECOMMENDATION:	5,659.2 ft. (elevation)	0.16 Acre-Feet
WATER DIVISION:	1	
WATER DISTRICT:	3	
COUNTY:	Larimer	
WATERSHED:	Cache La Poudre (HUC#: 10190007)	
RECOMMENDER	Colorado Parks and Wildlife & City of Fort Collins	

SPOTTLEWOOD LAKES # 1-4

Introduction

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 (NLL) water rights. 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.

Colorado Parks and Wildlife (CPW) and the City of Fort Collins recommended that the CWCB appropriate NLL water rights on Spottlewood Lakes # 1 – 4. These lakes are located within Larimer County about 10 miles north of the town of Wellington (See Vicinity Map). The lakes are located in the Spottlewood Creek drainage that flows in a southern direction where it joins Coal Creek, which in turn feeds into Boxelder Creek near the Town of Wellington. One hundred percent of the land the proposed natural lakes occupy is publicly owned and managed as Meadow Springs Ranch by the City of Fort Collins (See Land Ownership Map). CPW and the City of Fort Collins recommended Spottlewood Lakes # 1-4 because they have a natural environment that can be preserved to a reasonable degree with a NLL water right.

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/2015ProposedISFAppropriations.aspx) form the basis for staff's ISF recommendation to be considered by the Board. This report provides sufficient information to support the CWCB findings required by ISF Rule 5i on natural environment, water availability, and material injury.

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 ISF appropriation. This information is used to provide the Board with a basis for determining that a natural environment exists.

The Spottlewood Lakes are located in an unusual drainage that contains areas with persistent perennial lakes, perennial stream sections, and ephemeral stream sections. Portions of the drainage are likely dry during much of the year and may only have flowing water during spring runoff or storm events. The headwaters of the Spottlewood drainage are within the boundary of the Ogallala or High Plains Aquifer as defined by the U.S. Geological Survey boundaries (USGS, 2009). Most of the drainage is within the White River Formation (USGS, Geologic Units of Colorado). The primary rock type is sandstone, with

claystone and conglomerate. The lakes are located at a transition between the White River Formation and more recent surface deposits of gravels, sand, silt and clay that were deposited by surface water flows over time, resulting in the present day alluvium of the Spottlewood Creek drainage basin.

The four recommended lakes are part of a series of natural on-channel lakes. A fish survey report (Hansen and Bentley, 2008) identified 15 lakes that start at Lake 1 and end at the Lake 4. There are not distinct channels between the lakes and water appears to seep from pond to pond through wetland like areas. The lakes are likely connected during spring runoff or storm events, which would allow movement of fish and other species between lakes. The lakes vary in shape, size and depth. The average depth of the recommended lakes varies from 1.2 to 2.8 ft deep, with some measured depths over 7 ft. (See Table 1).

Hansen and Bentley (2008) identified three species of native fish in the vicinity of the 15 lakes; Iowa darter *Etheostoma exile*, fathead minnow *Pimephales promelas*, and brassy minnow *Hybognathus hankinsoni*. Total length measurements ranged between 30 – 81 mm for all species. Overall, 15 Iowa darters, 681 fathead minnows, and 180 brassy minnows were captured using a variety of methods (summed across seine haul, minnow trap, and pool). All fish species were found in recommended Lakes 3 and 4. Lake 1 did not contain Iowa darter and Lake 2 did not contain brassy minnows when sampled. Although not specifically targeted by the fish survey, Northern leopard frogs *Rana pipiens* were captured in minnow traps during the survey (See Table 1).

Insect surveys were conducted on Meadow Springs Ranch and Soapstone Prairie Natural Area in 2009, 2010, and 2011. (Stoaks and Kondratieff, 2011). The Spottlewood Lakes were not sampled, but the upper reaches of the Spottlewood drainage were, as well as a site approximately 3.5 miles to the east of the lakes. Stoaks and Kondratieff (2011) note that flowing springs and streams are unique habitats on the high plans steppe, often with distinct aquatic communities. Further, they stress that these areas are important for conservation because, "aquatic insect habitat and species have mostly disappeared on the Great Plains." Thirty-two uncommon insect species were found, with some only known to occur in Colorado on the Meadow Springs Ranch or Soapstone Prairie Natural Area (Stoaks and Kondratieff, 2012 has a full list of species).

Table 1. List of species identified in or near Spottlewood Lakes # 1-4.

Species Name	Scientific Name	Status
brassy minnows	*Hybognathus hankinsoni*	State Threatened
fathead minnows	*Pimephales promelas*	none
Iowa darter	*Etheostoma exile*	State Species of Special Concern
northern leopard frog	*Rana pipiens*	State Species of Special Concern Federal Sensitive Species

ISF Quantification

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. In natural lake level appropriations, CPW recommends that the entire volume of water in a natural lake be appropriated in order to preserve the natural environment to a reasonable degree. CPW has determined that appropriating a lesser volume would likely result in diminution of habitat to which species have become accustomed.

Standard survey methods were used to determine each lake's surface water elevation, surface area, and volume. The volume for each lake was calculated by taking several cross-sections of each lake and measuring depth across those sections. The longitudinal location of each of the sections was also measured. CPW's Engineering Section took this field data and calculated the volume using Computer-aided design (CAD) software. Water surface elevations were determined by the City of Fort Collins' surveyors using survey grade GPS and other standard surveying equipment and techniques. A local benchmark was also established in the field by the Fort Collins surveyor for future reference.

ISF Recommendation

Table 2 shows the survey measurements for the NLL quantification of the Spottlewood Lakes. CPW, CWCB, and the City of Fort Collins staff all contributed to the collection and calculation of the quantification data.

Table 2. Spottlewood Lake survey measurements.

Name	Volume, ft^3	Volume, AF	Elevation, ft	Average Depth, ft	Surface Area, ft^2
Spottlewood Lake 1	8,175	0.19	5634.6	2.81	2288.75
Spottlewood Lake 2	5,362	0.12	5645.8	2.25	1981.5
Spottlewood Lake 3	7,282	0.17	5647.6	1.19	6199.4
Spottlewood Lake 4	6,792	0.16	5659.2	1.74	3858.5

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 Spottlewood Lakes are located in an area with a 30.1 square mile drainage basin that extends north into Wyoming. The average elevation of the basin is 6,490 ft and the average annual precipitation is 16.7 inches. The City of Fort Collins has two absolute surface water rights in the drainage tributary to the lowest proposed NLL. One water right is for a spring located high in the drainage basin for 0.007 cfs. The other water right is a diversion located near proposed NNL Spottlewood Lake 2 for 0.0446 cfs.

Water Availability Summary

There is not any historic lake level or lake volume information for any of the Spottlewood Lakes. While the lakes are too small to show up on maps, a review of historical aerial photography shows the lakes are persistent features. Google Maps has complete images of the lakes for the following dates; 10/1999, 10/2004, 6/2005, 5/2006, 2/2010, 8/2010, 3/2012, 8/2012, and 6/2014. The ISFDSS GIS database contains three other aerial photos for 1995, 2009, and 2013. The City of Fort Collins found an additional aerial photograph of the area from 2002. The lakes are visible in each year and during all seasons photographed. Water is also observable in 2002 and during late summer 2012, indicating the persistence of the ponds even during extreme droughts. Two older aerial photographs were identified. An aerial photograph from November 1971 very clearly shows the lakes, and they appear to be present in a lower resolution September 1958 aerial photograph (USGS, 1972; USGS, 1975).

In addition, staff obtained anecdotal information on the persistence of the Spottlewood Lakes. The Fort Collins Water Reclamation and Biosolids Division manage the Meadow Springs Ranch. Ron Russell, Technical Services Supervisor, stated that the Division has monitored groundwater levels near the Spottlewood Lakes since 1997. Mr. Russell and other members of his staff have not seen the pools dry or significantly low at anytime.

CWCB measured streamflow on Spottlewood Creek approximately 6.5 miles upstream from the proposed natural lakes. These measurements were made between May 2013 and January 2015 and show year round streamflow. Most daily average streamflow measurements in that reach varied between 0.05 cfs and 0.4 cfs, with most measurements above 0.1 cfs (See Spottlewood Creek Executive Summary for more information. Based on the evident persistence of these lakes through time and presence of water in the system, Staff concludes that water is available for appropriation.

Material Injury

Because the proposed NLLs on Spottlewood Lakes # 1 – 4 are new junior water right, the NLLs can exist without material injury to other water rights. Under the provisions of section 37-92-102(3)(b), C.R.S. (2014), the CWCB will recognize any uses or exchanges of water in existence on the date these NLL water rights are appropriated.

Citations

Hansen, A.G., and K.T. Bentley, 2008, Inventory of fishes inhabiting Spottlewood, Graves, and Sand Creeks on Meadow Springs Ranch and Soapstone Prairie Natural Area, Larimer County, CO., Report prepared for the City of Fork Collins, and the Aquatic Research Section and Species Conservation Sections of the Colorado Division of Wildlife.

Stoaks, R.D., and B.C. Kondratieff, 2011, Interim report on insect survey of Soapstone Prairie Natural Area, Larimer, Co. and Meadow Springs Ranch, Weld, Co., Colorado. Department of Bioagricultural Sciences and Pest Management, Colorado State University.

Stoaks, R.D., and B.C. Kondratieff, 2012, Final report on insect survey of Soapstone Prairie Natural Area, Larimer, Co., Colorado. Department of Bioagricultural Sciences and Pest Management, Colorado State University.

U. S. Fish and Wildlife Service, Colorado Butterfly Plant, accessed 1/1/2015, http://www.fws.gov/mountain-prairie/species/plants/cobutterfly/.

USGS, 1972, Aerial Photo Mosaics Entity ID: ARDC1CHR000030388, taken 9/19/1958, accessed 9/29/2014, http://earthexplorer.usgs.gov/.

USGS, 1975, Aerial Single Frame Photo ID: 1SWEU00020103, taken 11/6/1971, accessed 9/30/2014, http://earthexplorer.usgs.gov/.

USGS, 2009, Digital map of aquifer boundary for the High Plains aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming, accessed 12/31/2014, http://water.usgs.gov/GIS/metadata/usgswrd/XML/ds543.xml.

USGS, Geologic Units of Colorado, Map data, accessed 12/31/2014, http://mrdata.usgs.gov/geology/state/state.php?state=CO.

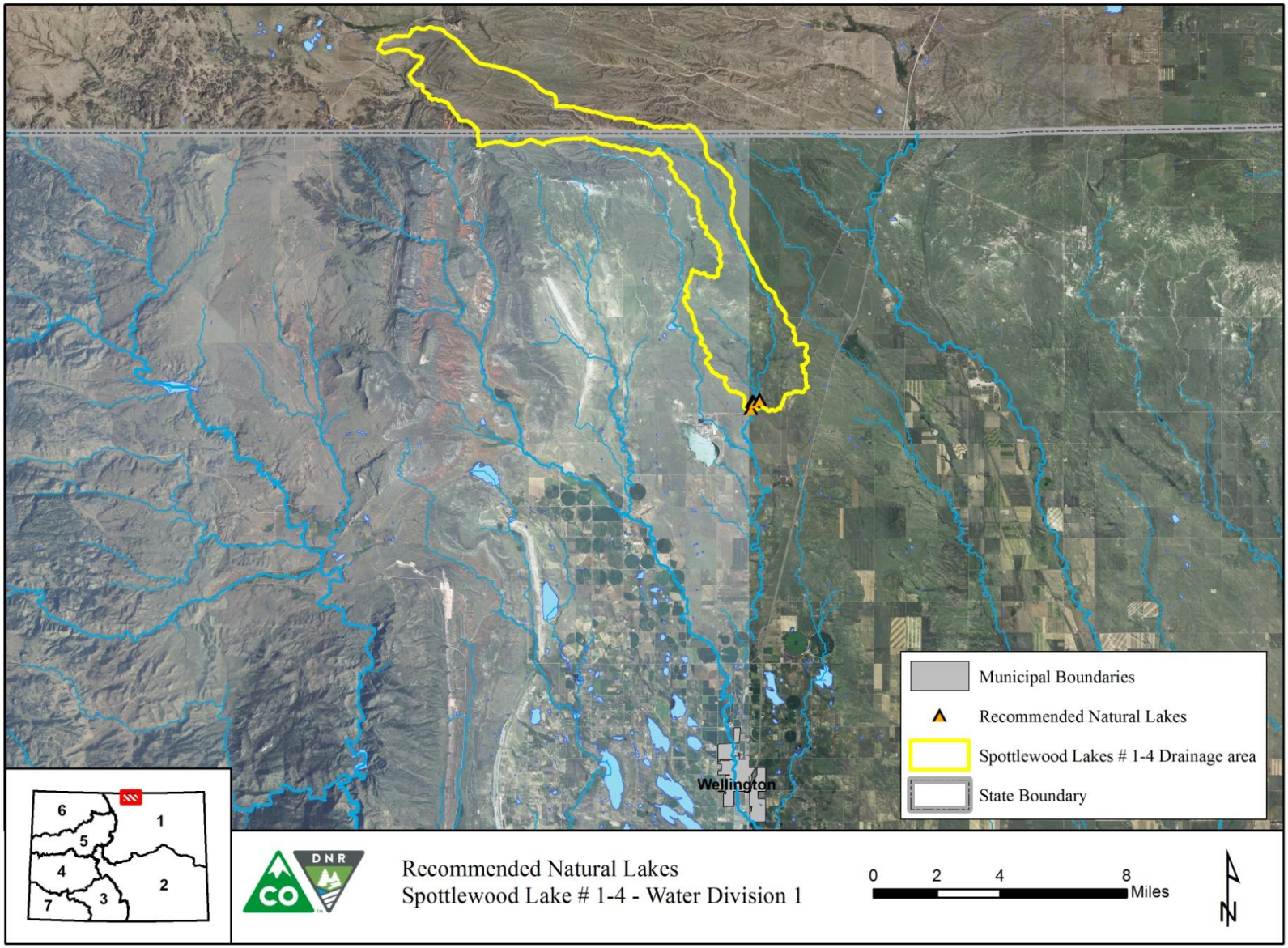
Metadata Descriptions

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

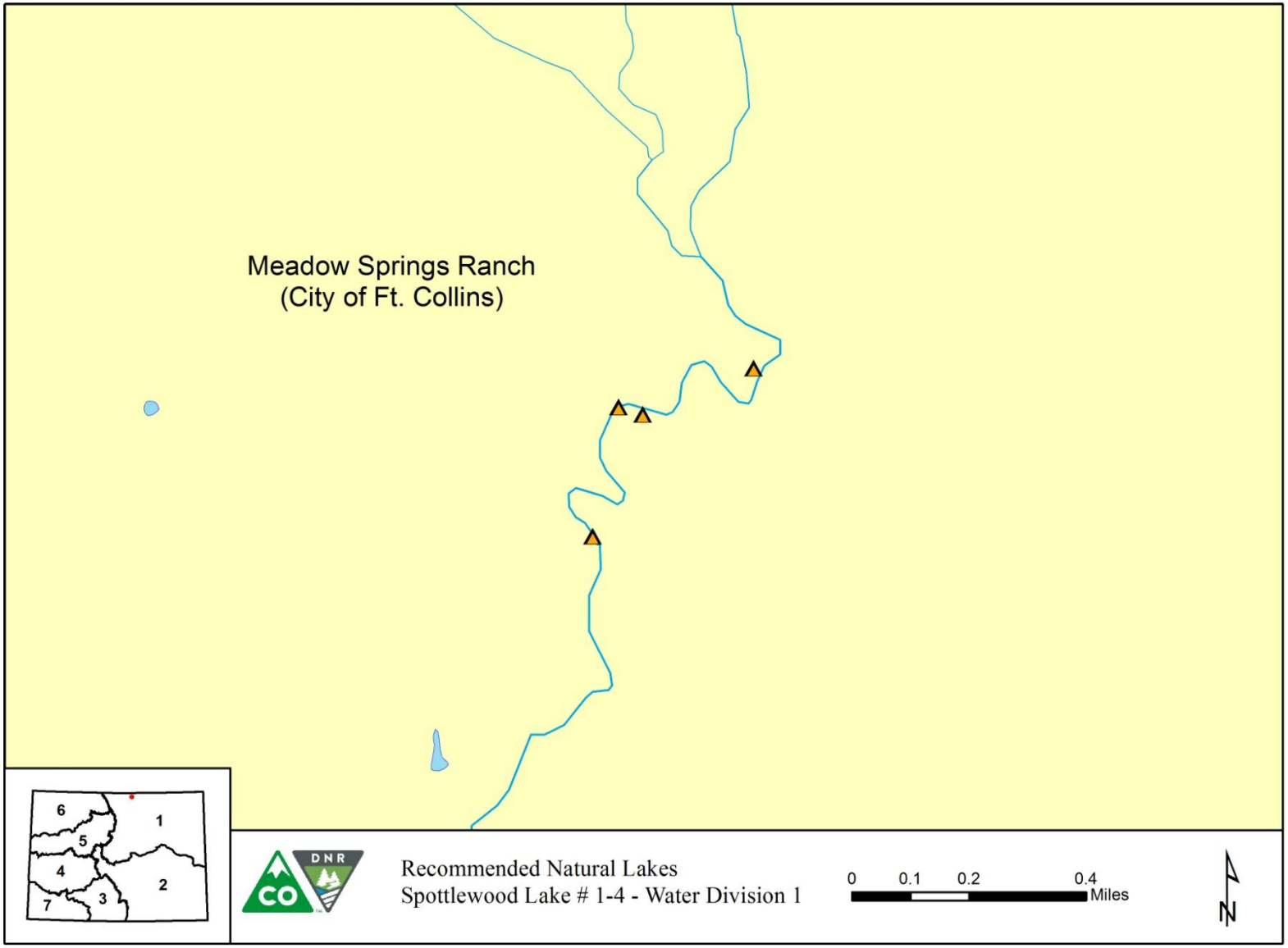
Projected Coordinate System: NAD 1983 UTM Zone 13N.

Lake Elevations: North American Vertical Datum of 1988 (NAVD 88).

Vicinity Map



Land Use Map


Meadow Springs Ranch
(City of Ft. Collins)
6
1
5
4
2
7
3
DNR
CO
Recommended Natural Lakes
Spottlewood Lake # 1-4 - Water Division 1
0
0.1
0.2
0.4
Miles
N

Water Rights Map