

# Level 4 Potential Conservation Area (PCA) Report

Name Arapahoe Lakes

Site Code S.USCOHP\*28174

## IDENTIFIERS

Site ID 2706 Site Class PCA  
 Site Alias None

### Network of Conservation Areas (NCA)

<u>NCA Site ID</u>	<u>NCA Site Code</u>	<u>NCA Site Name</u>
-		No Data

## LOCATORS

Nation United States Latitude 395438N  
 State Colorado Longitude 1054034W

Quad Code Quad Name  
 39105-H6 East Portal

County  
 Grand (CO)  
 Gilpin (CO)

Watershed Code Watershed Name  
 10190005 St. Vrain  
 14010001 Colorado headwaters

## SITE DESCRIPTION

Minimum Elevation 10,240.00 Feet 3,121.15 Meters  
 Maximum Elevation 12,110.00 Feet 3,691.13 Meters

### Site Description

The Arapahoe Lakes site is located on the east side of the Continental Divide in the Front Range Mountains of Gilpin County, Colorado in the James Peak Wilderness. The site encompasses complexly sculpted glacial cirques and also steep slopes below an ice-scoured ridge which delineates the eastern boundary of the cirques. High, steep ridges along the Continental Divide form the western border of the site and east-west trending ridges delineate the north and south boundaries of the site. Valley trend is generally to the east but complex topography within the cirque additionally results in north- and south-trending hillslopes, ridges, and rocky outcrops. Ecosystems in the site include alpine tundra at the highest elevations, transitioning at lower elevations to krummholz and down to subalpine systems at the lower limits of the site. Glacial activity also created the template for the formation of the numerous tarns and wetlands that are scattered throughout the site and which are the source headwaters for numerous streams that are tributary to South Boulder Creek. Geology of the surrounding ridges is composed of Precambrian age (1,700 to 1,800 m.y.) metamorphic rocks composed of biotitic gneiss, schist and migmatite. These rocks are derived principally from sedimentary rocks and locally contain minor hornblende gneiss, calc-silicate rock, quartzite, and marble. Geology of the eastern portion of the site, on steep, east-facing slopes below the cirque, is composed of Quaternary age younger alluvium and surficial deposits that are derived from glacial drift from the Pinedale and Bull Lake Glaciations (Tweto 1979). Soils in the site vary from talus and scree on high ridges and steep slopes to deep peat in depressions, swales and low slopes. Soils on the ridge of the Continental Divide are categorized as Bross-Matcher families-Lithic Cryorthents complex, 40 to 75 percent slopes. Cirque wall soils are categorized as Cirque land, 40 to 150 percent slopes. Soils on the floor of the cirque are Matcher family-Cryaquepts-Rock outcrop complex, 5 to 25 percent slopes. Steep east-facing slopes to the east of and below the cirque are Leighcan family, till substratum-Cryaquolls complex, 5 to 40 percent slopes; southeast-facing slopes are Bross family-Rubble land-Matcher family complex, 40 to 150 percent slopes (USDA 2010). Several types of wetlands occur in the site and are located on one of two types of soil units: 1) Matcher family-Cryaquepts-Rock outcrop complex, 5 to 25 percent slopes. Matcher family components occur on solifluction lobes; parent material consists of glaciofluvial deposits and/or residuum weathered from igneous and metamorphic rock; the natural drainage class is excessively drained; and organic matter content in the surface horizon is about 85 percent. Cryaquepts components occur on glacial-valley floors; parent material consists of glaciofluvial deposits derived from igneous and metamorphic rock; the natural drainage class is poorly drained; the soil is occasionally flooded and organic matter content in the surface horizon is about 85 percent. 2) Leighcan family, till substratum-Cryaquolls complex, 5 to 40 percent slopes. The Leighcan family, till substratum component occurs on moraines; parent material consists of residuum and/or till derived from igneous and metamorphic rock. The natural drainage class is somewhat excessively drained; this soil is not flooded; and organic matter content in the surface horizon is about 1 percent. The Cryaquolls component occurs on flood plains; parent

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material consists of gravelly alluvium and/or gravelly glaciofluvial deposits derived from igneous and metamorphic rock; the natural drainage class is poorly drained; this soil is rarely flooded; and organic matter content in the surface horizon is about 85% (USDA 2010). Local wetland hydrology is strongly influenced by the interaction of climate and geomorphology. Wetland hydrology in this site is strongly connected to shallow ground and surface water flow and snowmelt contributes the largest proportion of water to these wetlands through its influence on ground and surface water dynamics. Snowmelt interacts with local geomorphology to maintain high water tables in wet meadows, marshes and fens and also exerts major control over riparian wetlands by influencing soil saturation characteristics (flooding frequency, duration, timing and depth) that results from groundwater flow and out-of-bank flooding in the riparian zone (Rocchio 2005). Additionally, by releasing water throughout the growing season, these high altitude headwater wetlands make an important contribution to late summer flows in lower elevation streams. Late summer precipitation may also be important to the fen wetlands in this site by replenishing local aquifers thereby maintaining sufficiently high water tables to support fen development (Cooper 1990). Ecosystems and habitats in this site are diverse, responding to wide elevational gradients, differing aspects and slope, soil and hydrology. Upland ecosystems in the alpine zone, from tree limit to the Continental Divide, include snowfields, boulder fields, scree and talus slopes, fellfields, turf meadows, and willow carrs. Fellfields are characterized by cushion plants including moss campion (*Silene acaulis*), alpine nailwort (*Paronychia pulvinata*) and alpine sandwort (*Arenaria obtusiloba*). Turf meadows are characterized by a variety of forbs and graminoids including tufted hairgrass (*Deschampsia caespitosa*) superturf (*Kobresia myosuroides*), alpine harebell (*Campanula uniflora*), and old-man-of-the-mountain (*Rydbergia grandiflora*) and, together with upland willow carrs, create a complex patchwork of plant communities that covers steep hillslopes. Upland willow carrs are typified by dense stands of bareground willow (*Salix brachycarpa*) with an understory characterized by a mix of graminoids and forbs including tufted hairgrass, superturf, alpine pussytoes (*Antennaria alpina*), and field chickweed (*Cerastium arvense*). Large patches of superturf occupy openings in the shrub canopy and increase patch diversity. Decreasing elevation is marked by a transition from alpine tundra ecosystems to krummholz stands of Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*) which then transitions to Engelmann spruce - subalpine fir forest lower down in the subalpine zone. A variety of wetland systems with diverse plant communities and species occur in the alpine and subalpine zones of this site. Wetlands occupy depressions, swales, low slopes, and lake and stream margins. Wetlands are typically characterized by an intricate mosaic of plant communities including willow shrublands, graminoid wet meadows, and fens and forb or graminoid dominated riparian habitat. Shrub dominated wetlands are characterized by planeleaf willow (*Salix planifolia*) with a forb-dominated understory. Fens occur on low slopes and depressions and are characterized by graminoid vegetation dominated by few-flower spikerush (*Eleocharis quinqueflora*), intermixed with other graminoids including water sedge (*Carex aquatilis*), small-head sedge (*Carex illota*) and black alpine sedge (*Carex nigricans*) and forbs such as elephantella (*Pedicularis groenlandica*), marsh marigold (*Caltha leptosepala*), star gentian (*Swertia perennis*) and queen's crown (*Sedum rhodanthum*). A lush and diverse cover of forbs is found along stream margins characterized by tall fringed bluebells (*Mertensia ciliata*), arrowleaf ragwort (*Senecio triangularis*), heartleaf bittercress (*Cardamine cordifolia*), bog saxifrage (*Saxifraga oregana*), globe flower (*Trollius albiflorus*), saffron ragwort (*Senecio crocatus*) and marsh marigold. A diverse mosaic of upland and wetland, alpine and subalpine plant communities in this site provides high quality breeding and foraging habitat for several avian and mammal species. Observed bird species included Lincoln's Sparrow (*Melospiza lincolni*), White-crowned Sparrow (*Zonotrichia leucophrys*), Golden-crowned Kinglet (*Regulus satrapa*), Hairy Woodpecker (*Picoides villosus*), Red-breasted Nuthatch (*Sitta canadensis*), Dark-eyed Junco (*Junco hyemalis*), Pine Grosbeak (*Pinicola enucleator*) and White-tailed Ptarmigan (*Lagopus leucurus*). Observed mammal species included pika (*Ochotona princeps*), yellow-bellied marmot (*Marmota flaviventris*), chickaree (*Tamiasciurus hudsonicus*), least chipmunk (*Tamias minimus*), elk (*Cervus elaphus*) and northern pocket gopher (*Thomomys talpoides*).

## **Key Environmental Factors**

Climate, hydrology, and geology are key driving factors that have enabled the development and maintenance of the element plant communities and animal species present in the site.

## **Climate Description**

Climate in Gilpin County varies dramatically with elevation, aspect and time of year. Higher elevations to the north and west are colder and wetter than lower elevations to the east and south. Temperature and precipitation varies from east to west corresponding to elevation change. Average annual temperature and length of the growing season decrease as elevation increases while average annual precipitation increases. In general, temperatures decrease at a rate of approximately 3 °F for every thousand feet of elevation gain. Additionally, the pattern of precipitation distribution varies from the eastern to the western parts of the county.

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Western locations at higher elevations receive the majority of their precipitation during late winter and early spring while eastern locations receive the majority of their moisture during early spring and summer (Siemer 1977). The Arapahoe Lakes site is located in the most western part of the county at elevations between approximately 10,000 and 12,000 feet elevation. Here, average annual precipitation from 1971 through 2000 was 34.51 inches; coldest temperatures occurred in January with an average maximum temperature of 23.95 °F and an average minimum of 4.55 °F; warmest temperatures occurred in July with an average maximum of 64.45 °F and an average minimum temperature of 39.02 °F (Prism 2010).

## Land Use History

Although much of Gilpin County was impacted by mining exploration, most of the high elevations landscape near the Continental Divide, including this site, did not see mining exploration (Gilpin County 2010). The first humans to use the land in this site were likely Native Americans. Numerous sites in alpine ecosystems along the Continental Divide of the Front Range, including near the Rollins Pass area, have been identified as Paleoindian and Prehistoric age game drive sites (Benedict 2005).

## Cultural Features

Paleoindian to Prehistoric age Native American artifacts are potentially present (Gellhorn 2002).

### SITE DESIGN

Site Map Y - Yes

Mapped Date 11/29/2010

Designer Malone, D.G.

## Boundary Justification

The site was delineated to include ecological systems and processes that are essential to maintaining the community occurrences as well as to provide a buffer against disturbance. Climate change was also considered in boundary delineation; alpine ecosystems are especially vulnerable and species that depend on tundra may disappear as alpine tundra diminishes with the advance of trees and shrubs (USFWS 2010). Hydrology is the primary process essential to long-term wetland plant community viability. Alpine/subalpine wetlands are often isolated hydrologically from other wetlands, and easily impacted by surrounding land use (Rondeau 2001). Thus maintaining an intact and unfragmented hydrologic regime is essential to element viability. The alpine and subalpine element wetland plant communities in this site are reliant on water levels at or near the surface for much or all of the growing season (Rondeau 2001). Snowmelt from nearby surrounding ridges and slopes maintains abundant shallow ground and surface flow which contributes the primary source of water to depressional, slope and riparian wetlands.

Primary Area 572.37 Acres

231.63 Hectares

### SITE SIGNIFICANCE

Biodiversity Significance Rank B4: Moderate Biodiversity Significance

## Biodiversity Significance Comments

This site is drawn to encompass three fens which are dominated by excellent (A-ranked) occurrences of the globally apparently secure (G4) but vulnerable in Colorado (S3/S4) few-flower spikerush (*Eleocharis quinqueflora*) herbaceous vegetation.

Other Values Rank No Data

## Other Values Comments

No Data

### LAND MANAGEMENT ISSUES

## Land Use Comments

No Data

## Natural Hazard Comments

No Data

## Exotics Comments

No Data

## Offsite

No Data

## Information Needs

No Data

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## ASSOCIATED ELEMENTS OF BIODIVERSITY

<u>Element</u>			<u>Global</u>	<u>State</u>	<u>Driving</u>
<u>State ID</u>	<u>State Scientific Name</u>	<u>State Common Name</u>	<u>Rank</u>	<u>Rank</u>	<u>Site Rank</u>
23155	<i>Eleocharis quinqueflora</i> Herbaceous Vegetation	Alpine Wetlands	G4	S3S4	Yes
23155	<i>Eleocharis quinqueflora</i> Herbaceous Vegetation	Alpine Wetlands	G4	S3S4	Yes
23155	<i>Eleocharis quinqueflora</i> Herbaceous Vegetation	Alpine Wetlands	G4	S3S4	Yes

## REFERENCES

<u>Reference ID</u>	<u>Full Citation</u>
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## ADDITIONAL TOPICS

### Additional Topics

No Data

## VERSION

<b>Version Date</b>	11/29/2010
<b>Version Author</b>	Malone, D.G.

## Disclaimer

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