Level 4 Potential Conservation Area (PCA) Report

Name Mammoth Gulch **Site Code** S.USCOHP*28182

IDENTIFIERS

Site ID 2714 **Site Class** PCA

Site Alias None

Network of Conservation Areas (NCA)

NCA Site ID	NCA Site Code	NCA Site Name
-		No Data

LOCATORS

Nation United States **Latitude** 395238N

State Colorado **Longitude** 1053759W

Quad Code	Quad Name
39105-H5	Nederland
39105-G6	Empire
39105-H6	East Portal
39105-G5	Central City

County

Gilpin (CO)

Watershed Code	Watershed Name
10190005	St. Vrain
10190004	Clear

SITE DESCRIPTION

Minimum Elevation	9,040.00	**Feet**	2,755.39	**Meters**
Maximum Elevation	10,800.00	**Feet**	3,291.84	**Meters**

Site Description

This site is located on the east side of the Continental Divide, in the Front Range Mountains of Gilpin County. Lands are publicly owned in much of this site, with management by the Arapaho Roosevelt National Forest; however, numerous private parcels and mining claims are scattered throughout the site in both upland and riparian habitat. This site occurs in a northeast trending valley that is drained by a first order stream and encompasses ecological zones from the upper subalpine down to the upper montane. Steep gradient slopes characterize northwest-facing valley walls while slopes on the southeast-facing side of the valley typically have a moderate-gradient and the valley floor topography alternates between wide, low-gradient reaches and narrow, moderate-gradient reaches. Site geology is characterized primarily by two types of geologic units. The northwest-facing side of the valley and the valley floor are predominantly Precambrian age metamorphic rocks derived principally from sedimentary rocks with a composition of biotitic gneiss, schist, and migmatite and that locally contains minor hornblende gneiss, calc-silicate rock, quartzite, and marble (Tweto 1979). The southeast-facing side of the valley is mainly composed of quaternary age, unconsolidated surficial deposits and rocks from glacial drift of the Pinedale and Bull Lake glaciations and also includes some unclassified glacial deposits (Tweto 1979). At elevations above these alluvial deposits, geology is similar to geology on the north-facing valley wall with Precambrian age metamorphic rocks. Additionally, at higher elevations on the perimeter of the site, there are several areas with Precambrian age felsic and hornblendic gneisses derived principally from volcanic rocks (Tweto 1979). Soils in the upper reaches of the valley bottom and up onto south-facing toeslopes are characterized by Leighcan family, till substratum-Cryaquolls complex, 5 to 40 percent slopes, and Leighcan-Catamount families, moist complex, 5 to 40 percent slopes. In the lower reaches of the site below the now-drained Mammoth Creek reservoir, soils on the valley bottom and up onto toeslopes on both sides of the valley are characterized by Cryaquolls-Typic Cryohemists complex, 0 to 15 percent slopes; Leighcan family, till substratum, 5 to 40 percent slopes; and Cryaquolls-Gateview complex, 0 to 15 percent slopes (USDA 2010). Soils on south-facing valley wall mid- and high-slopes are characterized by a mosaic of soils including: Bross family-Rubble land-Matcher family complex, 40 to 150 percent slopes; Leighcan family, warm-Rock outcrop complex, 40 to 150 percent slopes; Leighcan family, till substratum-Cryaquolls complex, 5 to 40 percent slopes; Rogert family, 40 to 75 percent slopes; and Leighcan family, till substratum, 40 to 75 percent slopes. Soils on north-facing valley wall mid-slopes include: Leighcan family, 40 to 75 percent slopes; Leighcan family-Rock outcrop complex, 40 to 150 percent slopes; Goosepeak-Catamount families, moist complex, 5 to 40 percent slopes; Leighcan-Catamount families, moist-Rock outcrop complex, 40 to 150 percent slopes; and on high slopes Goosepeak-Catamount families,

moist complex, 5 to 40 percent slopes. Fens occur throughout this site and are located on both toeslopes and on the valley floor. Fens occupy a variety of soil types including: Leighcan family, till substratum-Cryaquolls complex, 5 to 40 percent slopes; Leighcan-Catamount families, moist complex, 5 to 40 percent slopes; Leighcan family, till substratum-Cryaquolls complex, 5 to 40 percent slopes; Cryaquolls-Typic Cryohemists complex, 0 to 15 percent slopes; and Cryaquolls-Gateview complex, 0 to 15 percent slopes (USDA 2010). Cryaquolls occur on flood plains; parent material consists of gravelly alluvium and/or gravelly glaciofluvial deposits and organic matter in the surface horizon is about 85%. The Gateview family component consists of gravelly alluvium and/or gravelly glaciofluvial deposits and has organic matter content in the surface horizon of about 2%. Cryohemists occur on basin floors; parent material consists of organic material and organic matter content in the surface horizon is about 85 percent. Leighcan family till substratum occurs on moraines and is derived from igneous and metamorphic rock; organic matter content is about 1%. Catamount family moist components occur on mountain slopes; parent material is residuum weathered from igneous and metamorphic rock and organic matter content in the surface horizon is about 85% (USDA 2010). Mammoth Gulch is drained by a first order stream which has its headwaters at James Peak Lake. James Peak Lake is located in the James Peak Wilderness Area on the Continental Divide. Snowmelt is the primary source of water that supplies both the lake and stream and also results in abundant shallow ground water flow. Shallow ground and surface water discharge from adjacent slopes has created extensive wetland complexes on slopes, benches and on the valley bottom of Mammoth Gulch. Water from these wetlands eventually flows into the stream that drains the gulch. Local wetland hydrology in this site is strongly influenced by the interaction of climate and geomorphology. Here wetland hydrology is strongly connected to shallow ground and surface water flow. Snowmelt likely 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 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 in the site are diverse and vary with elevation, gradient, aspect, soil moisture, and geology. Uplands are a mosaic of slope fens, subalpine grass and forb meadows, aspen (*Populus tremuloides*) woodlands, lodgepole (*Pinus contorta*) forests, limber (*Pinus flexilis*) forests, coniferous forests that are co-dominated by Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and lodgepole pine and mixed deciduous / coniferous forests that are co-dominated by the aforementioned tree species. Valley floor ecosystems are characterized by a diverse mosaic of wetland communities that vary with reach gradient and topographic position. Wetland systems include subalpine/montane riparian shrublands, forests and woodlands, and fens and wet meadows. Forested riparian wetlands are characterized by subalpine fir - Engelmann spruce forests with a shrub layer consisting of willow and non-willow species including especially planeleaf willow (*Salix planifolia*), red-osier dogwood (*Cornus sericea*), and thinleaf alder (*Alnus incana*) with an herbaceous layer characterized by mix of forbs and graminoids. Shrub dominated wetlands are characterized by either planeleaf willow or bog birch (*Betula nana*) with a graminoid-dominated herbaceous layer that includes species such as bluejoint reedgrass (*Calamagrostis canadensis*), water sedge (*Carex aquatilis*), and beaked sedge (*Carex utriculata*), and also forbs such as marsh marigold (*Caltha leptosepala*), elephantella (*Pedicularis groenlandica*) and queen's crown (*Sedum rhodanthum*). Fens occur throughout the site, occupying slopes, swales and the valley floor. Fens are characterized by both tree- and shrub-dominated communities. Forested fens are characterized by a tree canopy dominated by Engelmann spruce and/or subalpine fir, often with lodgepole pine intermixed and with an understory of willow such as planeleaf willow and/or non-willow shrubs such as bog birch and shrubby cinquefoil (*Dasiphora floribunda*). The herbaceous layer is always graminoid-dominated but a diverse cover of forbs is also present. Shrub fens are characterized by a shrub canopy dominated by either planeleaf willow or bog birch with an herbaceous layer dominated by graminoids but that includes a diverse cover of forbs. Dominant graminoids in fen wetlands include water sedge, beaked sedge, ebony sedge (*Carex ebenea*), silvery sedge (*Carex canescens*), golden sedge (*Carex aurea*), soft-leaved sedge (*Carex disperma*), and poor sedge (*Carex paupercula*). Common forbs include bunchberry (*Cornus canadensis),* green bog orchid (*Platanthera huronensis),* white bog orchid (*P. dilatata),* northern twayblade (*Listera convallarioides)*, marsh marigold (*Caltha leptosepala*)*,* elephantella*,* queen's crown*,* star gentian (*Swertia perennis*)*,* hemlock parsley (*Conioselinum scopulorum*)*,* arrowleaf ragwort (*Senecio triangularis),* pink pyrola *(Pyrola asarifolia),* alpine speedwell (*Veronica wormskjoldii*), and Hornemann willowherb *(Epilobium hornemannii),* mountain parsley (*Cymopterus lemmonii*)*,* monkshood

(*Aconitum columbianum),* common miterwort *(Mitella pentandra),* bittercress (*Cardamine cordifolia*) and twisted-stalk (*Streptopus amplexifolius*). Soils in these fens are hummocky and the ground layer is characterized by a dense cover of mosses dominated by *Sphagnum* spp., while depressions between hummocks are typically inundated and have a dense litter layer. Native wildlife is abundant and includes coyote (*Canis latrans),* American marten (*Martes americana),* long-tailed weasel (*Mustela frenata),* short-tailed weasel *(Mustela erminea),* elk *(Cervus elaphus),* moose (*Alces alces),* mule deer (*Odocoileus hemionus*), snowshoe hare *(Lepus americanus),* common porcupine (*Erethizon dorsatum),* pine squirrel *(Tamiasciurus hudsonicus),* golden-mantled ground squirrel (*Spermophilus lateralis*), least chipmunk (*Tamias minimus*), deer mouse *(Peromyscus maniculatus*) and western jumping mouse (*Zapus princeps*).

Key Environmental Factors

Hydrology and soils are key environmental factors influencing site biota. Specifically, shallow ground and surface water flow from adjacent slopes maintains wetland hydrology and enables the development of peat soils. Peat soils increase residence time of water and enable the development of wetland vegetation which provides the material for and enables the maintenance of peat soils.

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 degrees 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. 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 site is located in the western part of the county at elevations between approximately 9,000 and 10,800 feet elevation. Here, average annual precipitation from 1971 through 2000 was 30.99 inches; coldest temperatures occurred in January with an average maximum temperature of 29.59 °F and an average minimum of 10.4 °F; warmest temperatures occurred in July with an average maximum of 70.32 °F and an average minimum temperature of 43.11 °F (Prism 2010).

Land Use History

With the discovery of native gold in Gilpin County 1858, much of the County, including the area in and surrounding the Mammoth Gulch site was extensively mined for gold and other ore minerals. To support the infrastructure and development that accompanied mining, other land uses including grazing and clearcut logging occurred throughout this site and throughout much of the County (Petersen and Borchert 2010). Additionally, a reservoir was constructed in this valley in 1932 but was deemed unsafe and was breached in 1986.

Cultural Features

No Data

SITE DESIGN

Site Map P - Partial **Mapped Date** 11/29/2010

Designer Malone, D.G.

Boundary Justification

The boundary was drawn to encompass the ecological and hydrological processes essential to ecosystem maintenance and sustainability of the element occurrences. This wetland complex of fens, peatlands, and riparian habitat is sustained by groundwater inflows that maintain a water table at or near the ground surface for much of the year. These processes include abundant shallow surface and groundwater flow from surrounding hillslopes to enable wetland recharge with a sufficiently high water table and hydroperiod that promotes the ongoing development and maintenance of peat soils. The delineated area is likely sufficient to allow for the functioning of ecological and hydrological process that support the wetland communities and provide a buffer against direct disturbance.

Primary Area 2,873.63 **Acres** 1,162.92 **Hectares**

SITE SIGNIFICANCE

Biodiversity Significance Rank B2: Very High Biodiversity Significance

Biodiversity Significance Comments

This site is drawn for a good (B-ranked) occurrence of the globally imperiled (G2/S2) iron fen, Engelmann spruce / bog birch / water sedge / sphagnum spp. (*Picea engelmannii / Betula nana / Carex aquatilis /*

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Sphagnum spp). Other community occurrences within the site include excellent and good occurrences (A and B-ranked) of the state imperiled (GNR/S2) diamondleaf willow / beaked sedge (*Salix planifolia* / *Carex utriculata*) shrubland, and good (B-ranked) and fair (C-ranked) occurrences of the state rare (G4/S2S3) diamondleaf willow / bluejoint reedgrass (*Salix planifolia / Calamagrostis canadensis*).

Other Values Rank No Data

Other Values Comments

Additionally, there is a historic occurrence of the critically imperiled and state threatened, boreal toad (*Bufo boreas boreas*).

LAND MANAGMENT ISSUES

Land Use Comments

No Data

Natural Hazard Comments

No Data

Exotics Comments

No Data

Offsite

No Data

Information Needs

Additional inventories are needed to identify and update the status of the historic and general records within and near this site.

ASSOCIATED ELEMENTS OF BIODIVERSITY

Element State ID	State Scientific Name	State Common Name	Global Rank	State Rank	Driving Site Rank
24805	*Salix planifolia / Calamagrostis canadensis* Shrubland	Subalpine Riparian Willow Carr	G4	S2S3	No
24576	*Salix planifolia / Carex utriculata* Shrubland	Diamondleaf Willow / Beaked Sedge	GNR	S2	No
24847	*(Picea engelmannii) / Betula nana / Carex aquatilis - Sphagnum angustifolium Woodland*	Iron Fen	G2	S2	Yes
24805	*Salix planifolia / Calamagrostis canadensis* Shrubland	Subalpine Riparian Willow Carr	G4	S2S3	No
24576	*Salix planifolia / Carex utriculata* Shrubland	Diamondleaf Willow / Beaked Sedge	GNR	S2	No

REFERENCES

Reference ID	Full Citation
172094	Cooper, D.J. 1990. Ecology of wetlands in Big Meadows, Rocky Mountain National Park, Colorado. Biological report 90(15). Unpublished report prepared for the US Fish and Wildlife Service, Denver, CO.
198653	Petersen, M. and J. Borchert (Web Page). Accessed 2010. Soil Survey of Georgetown Area, Colorado, Parts of Clear Creek, Gilpin, and Park Counties. U.S. Department of Agriculture, Natural Resources Conservation Service. http://soils.usda.gov/survey/printed surveys
198649	Prism Climate Group (Web Page). Accessed 2010. Spatial Climate Analysis. htttp://www.prism.oregonstate.edu/
198650	Rocchio, J. 2005. Rocky Mountain Subalpine-Montane Fen Ecological System: Ecological Integrity Assessment. Colorado Natural Heritage Program, Colorado State University. Fort Collins, Colorado.
198318	Siemer, E. 1977. Colorado Climate. Colorado Experiment Station, Colorado State University.
198683	Stevens, J. E., D.R. Culver and D.G. Malone. 2011. CNHP Final Report: Survey of Critical Biological Resources in Gilpin County, Colorado. Colorado Natural Heritage Program, Fort Collins, CO.
192747	Tweto, O. 1979. Geologic Map of Colorado, 1:500,000. United States Geological Survey, Department of Interior, and Geologic Survey of Colorado, Denver, CO.
198651	U.S. Department of Agriculture (Web Page). Accessed 2010. Natural Resource Conservation Service, Soil Data Mart. http://soils.usda.gov/survey/

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ADDITIONAL TOPICS

Additional Topics

No Data

VERSION

Version Date 11/29/2010

Version Author Malone, D.G.

Disclaimer

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