

Boulder County Nature Association

Butterfly Research in Boulder County 2004 - 2007



Moss' Elfin

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&
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Photographs are by Janet Chu and Cathy Cook.

Butterfly Research in Boulder County 2004 - 2007

I. Abstract

In 2007, surveys recording the numbers of butterfly species and individuals were performed on a total of 39 survey-days in 15 different locations within Boulder County. These surveys were conducted in a variety of habitats, ranging from prairie grasslands to upper montane forests. In addition to extending previous multi-year studies in areas such as Heil Valley, Caribou Ranch, and Cal-Wood Education Center, this year's research included butterfly inventories in an area not previously surveyed by our team, the productive Southeast Buffer prairies managed by Boulder County Parks and Open Space (BCPOS). Specifically, this year's research was conducted to extend the county butterfly database generated in previous years, determining butterfly species' locations and population numbers, flight periods, and host or food plant interactions. Locating rare or uncommon butterfly species for this county was an additional objective of our group.



Variegated Fritillary

A notable phenomenon this year was the appearance of many migrant species that took advantage of the county's wealth of rich nectar sources resulting from heavy rainfall in April and plentiful groundwater. Three migrant butterfly species not previously reported by our team were observed in 2007, including: Southern Dogface (*Zerene cesonia*), Sleepy Orange (*Abaeis nicippe*), and Common Buckeye (*Junonia coenia*). The Mylitta Crescent (*Phyciodes mylitta*), a county record discovered in 2005 by this research team, was again located in 2007. Two rare skippers – Arogos (*Atrytone arogos*) and Ottoe (*Hesperia ottoe*) - remain elusive, providing a compelling reason to continue the search in 2008.

Some of the significant trends observed from this year's surveys include an increase in the number of Variegated (*Euptoieta claudia*) and Aphrodite (*Speyeria aphrodite*) Fritillaries, as well as Black Swallowtails (*Papilio polyxenes*), in a variety of locations and habitats; a decrease in the number of Hoary Commas (*Polygonia gracilis*), Field Crescents (*Phyciodes pulchella*), and Western Pine Elfins (*Callophrys eryphon*) in appropriate habitats; and a record high number of butterfly species and individuals reported at the annual Cal-Wood 4th of July butterfly count, along with a record number of human participants in this public educational event.

II. Introduction

Boulder County's varied natural geography, consisting of grasslands in the east rising to meet pine-covered foothills, followed by forested mountains and, on the western boundary, high alpine peaks, provides a variety of ecosystems and habitats supporting a great diversity and abundance of creatures, including butterflies. In addition to their ethereal beauty and enchanting behavior, butterflies are an important ecosystem indicator, providing a readily observable invertebrate measure of local habitat vitality and diversity. Our county shares the distinction of supporting some of the greatest species diversities of butterflies found anywhere in the United States, with Gilpin County, Colorado, and the southern tier of states.

Published research on butterflies in the Front Range area dates back to the 19th century. Tryon Reakirt's 1866 "Coloradian Butterflies," published when Colorado was still a territory, listed 72 species. *Butterflies of the Rocky Mountain States* (1980), by Ferris and Brown, contained individual county maps, including one for Boulder County based on Ray Stanford's collected distribution data. To date, Boulder County has recorded 198 species of butterflies in the "Western Counties, Regional USA Report." Our team has reported 106 species during our six years of performing butterfly surveys in the county. This means that 54% of butterflies on record in the county have been observed by our research team during the six-year duration of our inventories. Many of the unobserved butterflies live in the alpine life zone (which our group has not yet surveyed), may seldom be seen in the county, or simply may be extremely difficult to identify, as is the case, for example, with many of the skipper species.

In the past several years, there have been other studies conducted on butterflies in our county, including research by Simonson and Pineda in 1995 in which they reported observing two rare and imperiled butterfly species, the Arogos Skipper and the Ottoe Skipper, in two areas of Heil Valley Ranch. One of our objectives is to locate appropriate habitat for these skippers (primarily grasslands containing big and small bluestem), as well as, if possible, locating the skippers themselves.

III. Objectives

- A.** Continue to build the ongoing database of butterfly species and population numbers in Boulder County, focusing on three BCPOS properties representing a variety of life zones found throughout the County. In addition, correlate butterfly species observations with a general inventory of pertinent flora;
- B.** Continue the search for rare and uncommon butterflies. Identify county habitat most likely to support the Arogos and the Ottoe Skippers, two locally rare grassland butterfly species previously found in 1995, but not recently in BCPOS properties;
- C.** Increase information about the natural history of butterflies and flora in Boulder County to benefit conservation of these resources;

- D. Teach one free public class for the Boulder County Nature Association (BCNA) to heighten popular awareness of butterflies and their host plants, and, more broadly, our county's natural resources in general.

IV. Research Methods and Locations

A. Methodology

The methodology used in 2007 was similar to that described in the "2006 - Five Year Butterfly Inventory for BCPOS" (Chu).

"Butterfly surveys were conducted by walking on trails, near waterways, and other areas where butterflies congregate, rather than within strictly measured transects. Butterflies shift locations based on the availability of host plants, nectar and moisture. Therefore while inventorying large areas, researchers moved along trails, streams and roadways to observe as many different plant communities and habitats as possible. However, the tendency was to repeatedly survey productive habitats over the course of the research, within a field season as well as from one year to the next. As butterflies were sighted, they were identified on the wing either by the unaided eye or by close-focusing binoculars, and additionally in the hand using a 'net and release' procedure. Site locations, species and numbers (clearly identified at close range) were listed. These records also include the date, time in the field, temperature and useful notes about butterfly activities and blossoms. Digital photos were made in order to assist in identification."

B. Habitats

Habitats and pertinent plants that were in bloom are listed in each "Notes" section of this report. The "Colorado Breeding Bird Atlas," 1990, pp. 11-13, is the primary source for the habitat classification scheme. Habitats explored were mainly midgrass prairie grasslands, former agricultural lands, mountain shrublands, riparian deciduous woodlands, ponderosa pine forest, mixed conifer and aspen forest, and montane carr, within the following properties:

Midgrass Prairie Grasslands

- BCPOS: Southeast Buffer
- Rabbit Mountain
- Meyers Gulch
- Heil Valley – Geer Creek watershed
- Plumely Canyon
- Red Hill and North Heil
- Cal-Wood Education Center (Private Non-Profit)
- City of Boulder Open Space and Mountain Parks: Douby Draw

Former Agricultural Lands

- BCPOS: Carolyn Holmberg Preserve at Rock Creek
- Heil Valley – Geer Creek watershed
- Caribou Ranch

Mountain Shrublands

BCPOS: Steamboat Mountain
Heil Valley – Red Hill

Riparian Deciduous Woodlands

BCPOS: Southeast Buffer
Four Mile Canyon - Anne U. White Trail
Heil Valley – Geer Creek watershed
Plumely Canyon
Cal-Wood Education Center (Private)
Roosevelt National Forest: Deadman’s Gulch
City of Lafayette Open Space: Coal Creek

Ponderosa Pine Forest

BCPOS: Hall Ranch – Antelope Trail
Steamboat Mountain
Meyers Gulch
Heil Valley – Geer Creek watershed
Plumely Canyon
Red Hill
Cal-Wood Education Center (Private)

Mixed Conifer and Aspen Forest

BCPOS: Caribou Ranch
Roosevelt National Forest: Reynold’s Ranch area
Cal-Wood Education Center (Private)

Montane Carr

BCPOS: Caribou Ranch

C. Life Zones

A variety of life zones, from plains to upper montane, were surveyed as follows:

Plains – Carolyn Holmberg Preserve at Rock Creek

Southeast Buffer
Doudy Draw

Foothills and Montane – Hall Ranch - Antelope Trail

Four Mile Canyon - Anne U. White Trail
Deadman’s Gulch
Steamboat Mountain
Rabbit Mountain

Foothills / Montane Transition - Heil Valley – Geer Creek watershed

Plumely Canyon
Red Hill and North Heil

Montane – Walker Ranch - Meyers Gulch
Roosevelt National Forest: Reynolds’s Ranch
Cal-Wood Education Center (private-non-profit)

Upper Montane – Caribou Ranch

D. GPS Coordinates

GPS coordinates were at times used to specify locations of butterfly populations or attendant host or food plant species. Coordinates were also determined for some of the significant locations along the survey path, such as starting and ending points for the day’s survey. Some GPS coordinates are listed for the beginning and ending of ‘transects,’ listed in Table IX, as well as some special notations for certain butterfly colonies and plant populations in the Notes sections in Tables II – VIII. The word ‘transect’ is used to mean a meandering pathway, rather than a specific distance and width of a survey trail

V. Results and Discussion

This research continued to build the existing database of butterfly species in BCPOS, (especially Heil Valley and Caribou Ranch) and began records on a newly visited property, the Southeast Buffer (SE Buffer) area. In addition, butterflies on ten other Boulder County properties were inventoried. Coulson Gulch and Tolland Marsh were also visited by our team. Tolland Marsh is a small ancient Pleistocene lake remnant with violets and willows supporting two uncommon butterflies. Pyle (2002)

A. Data for Life Zones

The Data for each life zone, followed by narrative Notes for 2007, are located in Tables II – VIII. Tables contain scientific and common names of butterfly species, tallies of number of species and individuals observed, location and date. The total numbers of individuals and species observed per year, and the individuals per research hour, are summarized for 2004-07. The Notes describe the habitat, special butterfly observations, elevation, GPS locations and the names of researchers. Some host plants, considered pertinent flora, are also listed on the Notes pages. This report contains only the nectar and host plants which were notable in numerous patches. However, in the “Butterfly Inventory and Research on Open Space Properties” 2006 (Chu), many more plants were recorded as they began blooming.

In general, habitats between the plains and the montane were surveyed April through August, 2002 - 2007. However, in 2007 the survey began in March in an attempt to locate early-season butterflies. The years listed in this report are during the seasons in which Small Grants were awarded and the research was more consistent. Years 2002 and 2003 were exploratory and researchers were becoming more proficient in identification.

Life Zone	Location	Data Recorded
Table II. Plains	Carolyn Holmberg Preserve	2005 – 2007
	SE Buffer	2007
	Doudy Draw	2007
Table III. Foothills & Montane	Hall Ranch - Antelope Trail	2007
	Deadman’s Gulch	2007
	Anne U. White Trail	2005-2007
	Steamboat Mountain	2005-2007
	Rabbit Mountain	2005-2007
Tables IV-VI. Foothills / Montane Transition:		
Table IV. Heil Valley	Geer Creek watershed	2004 – 2007
Table V. Heil Valley	Plumely Canyon	2004 – 2007
Table VI. Heil Valley	Red Hill and North Heil	2004 – 2007
Table VII. Upper Montane	Caribou Ranch	2004 – 2007

B. BCNA Butterfly Walk



Some of the participants paused at Solitude Point
 Donn Cook (left), Bob Pyle, Kathy and Jim Snow; Emi Lehman with forward net.
 (Front left) Marina hiding Darryl Dargita, Julia and Lauren (pink) Tracey,
 Bay Roberts (yellow), Carrie Evans (blue), Lewis Taylor

A second type of research has been conducted for 24 consecutive years at the Cal-Wood Education Center near Jamestown, CO. This is part of a national day-long event of the North American Butterfly Association (NABA) This year, the BCNA Butterfly Walk coincided with this 4th of July Butterfly Count (4JBC), which was free to the public. The educational component consisted of the identification of butterflies, along

with explanations of their habits, host plants and life cycle, all discussed while these insects were netted live and made available for closer examination. Some were photographed and all were released alive. It was well-advertised and attended by an all-time high of 38 people, many coming for the first time to a butterfly event. During Cal-Wood counts, 1984 – 2006, attendees usually numbered from 18 to 26 people, with 38 to 42 butterfly species observed. This year’s 4JBC recorded an all-time record of 61 species at Cal-Wood.

Count records are sent to NABA in New Jersey and published with all of the national counts. The count at Cal-Wood is one of four in Colorado, and one of 438 counts within the 48 states, and has 113 species on record with NABA. The complete list is available upon request; however, only a two-year sample, 2006 - 2007, is presented in Table VIII, Montane - Cal-Wood Education Center.

C. Cumulative Numbers of Species

The cumulative numbers of species observed in each life zone, referred to in this report, are recorded during 2004-07 and listed in the table below:

Life Zone	Cumulative # of Species
Plains	33
Foothills and Montane	75
Foothills/ Montane Transition (Geer)	82
Foothills/ Montane Transition (Plumely)	84
Foothills/ Montane Transition (Red Hill/North Heil)	53
Upper Montane (Caribou Ranch)	75
Total number of species recorded	106

The total number of butterfly species recorded by our team on Boulder County properties during this six-year inventory is 106. In the historical records maintained by Ray Stanford, “Western Counties, Regional USA Report,” 198 species have been reported in the county.

D. Research Hours Correlated with Numbers of Butterfly Individuals

Research hours were recorded in the Notes for each life zone. For example, one group surveying for one hour equals one research hour (a group is an unspecified number of people). If two groups surveyed one location independently on one day, each for two hours, then two groups for two hours would equal four research hours. The number of butterflies correlated with research hours is listed below:

Life Zone	# Individual Butterflies per Research Hour - 2007
Plains	22.0
Foothills and Montane	25.8
Foothills/ Montane Transition (Geer)	36.7
Foothills/ Montane Transition (Plumely)	45.6
Foothills/ Montane Transition (Red Hill/North)	72.4
Upper Montane (Caribou)	35.8

E. The Largest Cumulative Populations 2004 - 2007

The largest cumulative populations of butterflies for each life zone, recorded during the 2004 through the 2007 seasons are listed.

Scientific Name	Common Name	Total # 2004-07
Plains		
<i>Pontia protodice</i>	Checkered White	263
<i>Pieris rapae</i>	Cabbage White	117
<i>Euptoieta claudia</i>	Variegated Fritillary	106
<i>Colias philodice</i>	Clouded Sulphur	38
Foothills and Montane		
<i>Papilio rutulus</i>	Western Tiger Swallowtail	105
<i>Pieris rapae</i>	Cabbage White	105
<i>Euphyes vestris</i>	Dun Skipper	91
<i>Euptoieta claudia</i>	Variegated Fritillary	70
<i>Polygonia gracilis zephyrus</i>	Hoary Comma	66
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	64
Foothills/ Montane Transition (Geer watershed)		
<i>Pieris rapae</i>	Cabbage White	331
<i>Plebejus icarioides</i>	Boisduval's Blue	189
<i>Vanessa cardui</i>	Painted Lady	182
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	144
<i>Phyciodes pulchella</i>	Field Crescent	138
<i>Papilio multicaudata</i>	Two-tailed Swallowtail	95
Foothills/ Montane Transition (Plumely Canyon)		
<i>Vanessa cardui</i>	Painted Lady	384*
<i>Pieris rapae</i>	Cabbage White	199
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	141
<i>Hesperia colorado</i>	Common Branded Skipper	131*
<i>Phyciodes pulchella</i>	Field Crescent	89
<i>Callophrys eryphon</i>	Western Pine Elf	81
<i>Euphyes vestris</i>	Dun Skipper	77

<i>Scientific Name</i>	<i>Common Name</i>	Total # 2004-07
Foothills/ Montane Transition (Red Hill/North)		
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	194
<i>Cercyonis pegala</i>	Common Wood-nymph	84
<i>Colias philodice</i>	Clouded Sulphur	70
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	55
<i>Plebejus melissa</i>	Melissa Blue	51
Upper Montane (Caribou Ranch)		
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	190
<i>Colias alexandra</i>	Queen Alexandra's Sulphur	184
<i>Vanessa cardui</i>	Painted Lady	99*
<i>Cercyonis oetus</i>	Small Wood-nymph	85
<i>Plebejus icarioides</i>	Boisduval's Blue	80
<i>Erebia epipsodea</i>	Common Alpine	75

* These butterflies fly in great numbers, but, unlike most other species, they are not seen every year. The introduced cabbage white clearly outnumbers all residents.

F. Butterfly Migrants

Notable in 2007 were the numerous butterfly migrants from the south that flew into Boulder County for the summer. The Monarch individuals may or may not stay within the county to reproduce; however, their descendents are known to return to Mexico in the early fall. Three species were added this year to the cumulative list:

New in 2007:

<i>Zerene cesonia</i>	Southern Dogface
<i>Abaeis nicippe</i>	Sleepy Orange
<i>Cyllopsis pertepida</i>	Canyonland Satyr

Uncommon migrants:

<i>Eurema mexicana</i>	Mexican Sulphur
<i>Nymphalis californica</i>	California Tortoiseshell
<i>Vanessa virginiensis</i>	American Lady
<i>Junonia coenia</i>	Common Buckeye

Annual migrants:

<i>Nathalis iole</i>	Dainty Sulphur
<i>Vanessa cardui</i>	Painted Lady
<i>Echinargus isola</i>	Reakirt's Blue
<i>Euptoieta claudia</i>	Variegated Fritillary
<i>Danaus plexippus</i>	Monarch

Rare and uncommon species:

The rare Moss' Elfin (*Callophrys mossii schryveri*) seen below was found in Deadman's Gulch - Roosevelt National Forest, April 9.



S2 & S3



S2 = Butterfly is imperiled due to a restricted range or populations, and in steep decline in Colorado. S3 = Vulnerable in Colorado.

S2



A Hops Azure colony (*Celestrina humulus*) found on Hops vines in Plumely Canyon - Heil Ranch.

S3



Snow's Skipper (*Paratrytone snowi*) at Coulson Gulch and Cal-Wood.



Another rare species, the Dusted Skipper (*Atrytonopsis hianna*) was seen on the Anne U. White Trail May 15 and 29, 2006.



On April 15, 2007 the uncommon Brown Elfin (*Callophrys augustinus*) was sighted in Deadman's Gulch.



The first butterfly observed in the 2006 season at Heil Valley – Geer Creek was the California Tortoiseshell (*Nymphalis californica*).

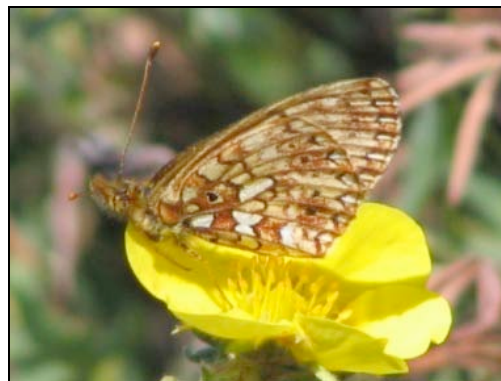


The Canyonland Satyr (*Cyllopsis pertepida*) was observed in Coulson Gulch and added as a first sighting. Photograph by Cathy Cook July 10, 2007.

Both of the following uncommon circumpolar species were found by lepidopterist Charles Slater on July 11, 2006 at an ancient remnant Tolland Bog



Edith's Copper (*Lycaena editha*)



Silver-bordered fritillary (*Boloria selene*)



Sleepy orange (*Abaeis nicippe*)
The first sighting in our 2007 inventory was at Caribou Ranch June 19, and then July 4, Cal-Wood.



Southern Dogface (*Zerene cesonia*) and Sothie Krauth, July 4, 2007 at Cal-Wood.



Mexican Sulphur (*Eurema mexicana*)
Recorded May 18, 2005 at Caribou Ranch
and June 18, 2007, near Geer Creek .



Mylitta Crescent (*Phyciodes mylitta*)
was a Boulder County record found by this
team, for the first time in the county,
on June 14, 2005 on Anne U. White Trail,
then again at Heil Valley – Geer Creek.



Common Buckeye (*Junonia coenia*)
Photographed on the 4th of July, 2007
Butterfly Count at Cal-Wood.
Photograph by Cathy Cook



Hackberry Emperor (*Asterocampa celtis*)
July 20, 2007 in North Heil Valley.



Young netters at the 4th of July Cal-Wood Count

G. Species of Special Concern

Boulder County is fortunate to have species of special concern among the many species that are more commonly found. Species of special concern are on the “Colorado Natural Heritage (CNH) Watch List.” The following butterflies are of special interest to the Colorado Natural Heritage Program, the Bureau of Land Management and the U.S. Forest Service. Each of the following butterflies has been classified by a Global and State rank. It has been a challenge for our group to identify the BCPOS habitat most likely to support the two rare skippers, Arogos and Ottoe. Searches were made in the area of Red Hill and North Heil where these two skippers were reported in 1995 (Simonson and Pineda). The search continues for big bluestem (*Andropogon gerardii*), one of the primary host plants of these skippers.

Definitions used in the “CNH Watch List”:

G = global

S = state

G1 - critically imperiled globally

S1 - critically imperiled in the nation or Colorado

G2 - imperiled

S2 - imperiled due to a restricted range, populations, and steep decline in Colorado

G3 - vulnerable to extirpation or extinction

S3 - vulnerable in the state of Colorado

G4 - apparently secure

G5 - demonstrably widespread, abundant, secure

A portion of the *Watch List* is reproduced below:

State Scientific Name	State Common Name	Global Rank	State Rank	Federal Listing Status	BLM/USFS Sensitivity Status	CO Listing Status	CNHP Element Sensitive	CNHP Tracking Status	State Element ID
<i>Celastrina humulus</i>	Hops Feeding Azure	G2G3	S2				N	Full Tracking	20146
<i>Atrytone arogos</i>	Arogos Skipper	G3	S2				N	Full Tracking	16895
<i>Speyeria idalia</i>	Regal Fritillary	G3	S1		USFS		Y	Full Tracking	21896
<i>Hesperia ottoe</i>	Ottoe Skipper	G3G4	S2		USFS		Y	Full Tracking	19893
<i>Atrytonopsis hianna</i>	Dusted Skipper	G4G5	S2				N	Full Tracking	17734
<i>Callophrys mossii schryveri</i>	Moss' Elfin	G4T3	S2S3				N	Full Tracking	17546
<i>Paratrytone snowi</i>	Snow's Skipper	G5	S3				N	Watch-Listed Only	21993

Some of these butterflies have been located in Boulder County and photographed:

<i>Scientific Name</i>	Common Name	Location
<i>Celastrina humulus</i>	Hops Azure	Heil - Plumely Canyon
<i>Atrytonopsis hianna</i>	Dusted skipper	Anne U. White
<i>Callophrys mossii schryveri</i>	Moss' Elfin	Deadman's Gulch, Anne U. White
<i>Paratrytone snowi</i>	Snow's Skipper	Cal-Wood Education Center

These rare butterflies continue to be sought and have not been seen by this team:

<i>Atrytone arogos</i>	Arogos Skipper
<i>Hesperia ottoe</i>	Ottoe Skipper
<i>Speyeria idalia</i>	Regal Fritillary

H. General Findings of the Inventory

A survey of Boulder County butterflies in a variety of habitats was performed in 2007, with a total number of 89 butterfly species recorded by our team in Boulder County, contributing to the six-year inventory count of 106.

In the plains habitats, an increased number of butterfly species was reported in 2007 compared with survey year 2006. This increase is most likely due to two separate reasons. For the first time, our research team included the productive Southeast Buffer area, a BCPOS prairie habitat surrounding Rock Creek. This area was rich in wildflowers, due in part to being part of the Rock Creek drainage, and is nominally closed to the public, providing habitat conducive for a number of prairie species. In addition, we increased our number of plains research hours this year compared to last year, increasing the probability of seeing new species as they emerged throughout the butterfly season. In terms of population numbers, we observed an increase in the number of Variegated Fritillaries (*Speyeria claudia*) and Black Swallowtails (*Papilio polyxenes*) in the plains habitats compared to previous seasons.

Total numbers of butterfly species in the foothills remained relatively constant, as the Anne U. White at Four Mile Canyon Creek, our primary foothills research location, is a stable habitat. This productive narrow canyon is rich in its number and diversity of host and food plants. An increase in population numbers of Variegated (*Speyeria claudia*) and Aphrodite Fritillaries (*S. aphrodite*) was observed, while smaller numbers of Hoary Commas (*Polygonia gracilis*) and Northern (*Phyciodes cocyta*) and Field Crescents (*Phyciodes pulchella*) were observed compared to previous years.

The numbers of species in the Geer Creek watershed and in Plumely Canyon were lower this year than in the previous two years, but the numbers of individuals per research hour were higher. Plumely remains a relatively intact habitat, with no recent fires or selective cutting of timber, and Geer Canyon continues to be productive, with a wealth of wildflowers in the riparian areas, though there was some selective timbering in Upper Geer this season. In Plumely, population numbers of Western Pine Elfin (*Callophrys eryphon*), Hops Azures (*Celastrina humulus*), Aphrodite Fritillaries (*Speyeria aphrodite*), Hoary Commas (*Polygonia gracilis*), Field Crescents (*Phyciodes*

pulchella), and Common Branded Skippers (*Hesperia colorado*) were down compared to some of the previous years, but that may have been due to the decreased number and timing of research hours in the canyon. Similarly, decreased numbers of Western Pine Elfins (*Callophrys eryphon*), Hoary Commas (*Polygonia gracilis*), and Field Crescents (*Phyciodes pulchella*), as well as Pale Swallowtails (*Papilio eurymedon*) and Silvery Blues (*Glaucopsyche lygdamus*), were observed, but again, this may have been due to the decreased number and timing of research hours in the area. An increase in the number of Black Swallowtails (*Papilio polyxenes*) was observed in Geer Canyon, reflecting the increase in numbers of this species that was observed throughout the county in 2007. In the Red Hill/North Heil area of Heil Valley Ranch, increases in population numbers of Clouded Sulphurs (*Colias philodice*), and Variegated (*Speyeria claudia*) and Aphrodite Fritillaries (*Speyeria aphrodite*) were observed.

During 2004 - 2006 the Black Swallowtail (*Papilio polyxenes*) was noticeably absent from the count areas as well as from gardens in Boulder and Ft. Collins. During this period, the introduced paper wasp (*Polistes dominulus*) was seen taking Black Swallowtail caterpillars into its nests. In 2007, the huge snowfall of the previous winter, and the remaining long-term snow cover, may have contributed to a high mortality for the wasps, allowing the black swallowtails to return to these areas.

Melissa Blues (*Plebejus melissa*) seemed very prevalent in the deep grassy areas of a variety of habitats in late summer. The Variegated Fritillaries (*Speyeria claudia*) were numerous in May, adding their colors to the early-blossoming Nuttall's Violets and other spring wildflowers, and producing a second (and perhaps a third) brood in the county, remaining in our gardens into late October. There were fewer Western Pine Elfins (*Callophrys eryphon*), and their flight time seemed shorter, than in previous years.

Butterflies recorded for the first time on our team's list were as follows:

Scientific Name	Common Name	Location
<i>Zerene cesonia</i>	Southern Dogface	SE Buffer and Cal-Wood
<i>Abaeis nicippe</i>	Sleepy Orange	Caribou and Cal-Wood
<i>Lycaena heteronea</i>	Blue Copper	Caribou, North Heil
<i>Cyllopsis pertepida</i>	Canyonland Satyr	Coulson Lake
<i>Polydryas arachne</i>	Arachne Checkerspot	Heil Valley
<i>Pholisora catullus</i>	Common Sootywing	Heil Valley

Notable in 2007 was the number of migrant species observed in the county. The Common Buckeye (*Junonia coenia*) was seen on the Cal-Wood Count and unexpectedly was reported by a number of associates from different areas of the county (as late as November 4). These were not as numerous as the Painted Ladies (*Vanessa cardui*), which migrate by the thousands, but they added to the cumulative lists. A Canyonland Satyr (*Cyllopsis pertepida*) was observed and photographed by Cathy Cook near Coulson Gulch, west of Lyons, an area visited by our team for the first time. California Tortoiseshells (*Nymphalis californica*) were seen only once by our team in 2007; however, in 2006 several were seen as the first butterfly observed in the season.

These appearances in our county of butterflies normally found further south may be an indication of warming climate, and additional occurrences of such movements will be watched with interest in the future.

A rare butterfly, the Moss' Elfin (*Callophrys mossii schryveri*), was observed on April 9 in Deadman's Gulch, in Roosevelt National Forest, much earlier than most butterflies are flying. It had been reported by naturalist Michael G. Figgs as having been observed in the gulch three years in a row. The Brown Elfin (*C. augustinus*) and a Spring White (*Pontia sisymbrii*) were photographed on April 15 in the same Deadman's Gulch. Only one Hops Azure (*Celestrina humulus*) was noted by our team this year, probably because our visits to appropriate habitat did not coincide with the timing of their emergence. The rare Snow's Skipper (*Paratrytone snowi*) was seen for the only the second year out of 24 at Cal-Wood, with individuals observed in three different meadows.

Over 24 years of 4JBC at Cal-Wood Education Center, 113 species are on record with the NABA as having been observed at this event. Locating that many butterflies over the years at Cal-Wood, on a one-day count, is exceptional. Cal-Wood reached its highest-ever number of species in a day in 2007, in part because of the participation of professional lepidopterists, who successfully identified difficult species. In addition, the higher than usual number of 'netters' covered more ground than in years past, and there were four separate research groups covering a wide overall territory within a prescribed 7 1/2 mile radius. There are likely additional species yet unlocated; however, a single-day count misses the early-season and the late-season butterflies.

VI. Conclusions

- A. Overall butterfly fauna in county properties studied appear to be vigorous, helped by abundant winter snowmelt and spring rains.
- B. Fluctuations in population numbers of various species could be caused by a variety of factors, including natural population cycles, timing of research surveys, and variations in predation, disease, and other natural factors.
- C. Unusually high migration into the county was observed in 2007, as a number of species apparently took advantage of the favorable floral conditions produced by the preceding wet winter and early spring in our area, and perhaps were driven north by unfavorable conditions in their normal range.
- D. Well-publicized public education events, like the 2007 4th of July Butterfly Count at Cal-Wood Education Center, can draw a large number of attendees, providing valuable education opportunities, as well as helping to generate useful data on butterfly species and population numbers.
- E. Ottoe (*Hesperia ottoe*) and Arogos (*Atrytone arogos*) Skippers may still be present in the county, but were not observed by our team this year.

VII. Recommendations

- A. The annual butterfly inventories benefit the natural history of Boulder County, its long term conservation of butterflies and flora, and education of the public. These studies should be continued in future years to track migrant species (which may be correlated with climate change in the future), locate new and rare butterflies, and identify any changes in resident populations.
- B. The data presented in this report will be shared with BCNA and will be copied to the BCPOS staff. We are willing to present the findings to BCNA at a program or symposium. This butterfly inventory data should be made available to the public, providing valuable information regarding our county's wealth of butterfly populations.
- C. Sub-alpine and alpine regions not yet surveyed should be inventoried.

VIII. References

- Armstead, Stephen Bryan. 2003. "*A Butterfly Monitoring Program for Assessing the Composition and Distribution of Butterfly Communities in the City of Boulder Open Space and Mountain Parks.*" Thesis. University of Colorado, Boulder, Colorado.
- Armstead, Steve. 2004. "*A Butterfly Monitoring Program for Assessing the Composition and Distribution of Butterfly Communities in the City of Boulder Open Space and Mountain Parks.*" City of Boulder Open Space & Mountain Parks Department and the University of Colorado at Boulder. Paper presented at Boulder County Nature Association Symposium.
- Beidleman, Linda H., R. Beidleman, and B. Willard. 2000. *Plants of Rocky Mountain National Park*. Rocky Mountain Nature Association and Falcon Publishing, Inc. Helena, Montana.
- Brock, Jim and K. Kaufman. 2003. *Butterflies of North America*. Houghton Mifflin Company. New York, New York.
- Brown, F. Martin. 1957. *Colorado Butterflies*. Denver Museum of Natural History, Denver, Colorado.
- Butterflies of North America Web site. <http://www.butterfliesandmoths.org> Big Sky Institute at Montana State University and the NBII Mountain Prairie Information Node.
- Chu, Janet, C. Cook, D. Cook. "*An Inventory of Butterflies at Heil Valley Ranch Open Space 2003.*" Unpublished, Small Grants Program, Boulder County Parks and Open Space, Boulder, Colorado.
- Chu, Janet, C. Cook, and D. Cook. "*An Inventory of Butterflies at Heil Valley Ranch Open Space, 2002-2004; Caribou Ranch Open Space 2004.*" Unpublished, Small Grants Program, Boulder County Parks and Open Space, Boulder, Colorado.
- Chu, Janet, C. Cook, and D. Cook. "*An Inventory of Butterflies on Open Space Properties 2005.*" Unpublished, Small Grants Program, Boulder County Parks and Open Space, Boulder, Colorado.
- Chu, Janet. 2006 "*Butterfly Inventory and Research on Open Space Properties.*" Unpublished, Small Grants Program, Boulder County Parks and Open Space, Boulder, Colorado.

- CNHP, Pineda, P. M., and A. R. Ellingson. 1998. "A Systematic Inventory of Rare and Imperiled Butterflies on the City of Boulder Open Space and Mountain Parks." February, 1998. Colorado Natural Heritage Foundation. Fort Collins, Colorado.
- Frank Cross Clay. 1937. "Butterflies of Colorado." Proceedings of the Colorado later Denver Museum of Natural History, vol. 16. pp. 3-28. Denver, Colorado.
- Ferris, Clifford and F. Martin Brown. 1980. *Butterflies of the Rocky Mountain States*. University of Oklahoma Press, Norman, Oklahoma.
- Glassberg, Jeffrey. 2001. *Butterflies through Binoculars, the West*. Oxford University Press, Inc. New York, New York.
- Guennel, G.K. 1995. *Guide to Colorado Wildflowers. Volumes 1 and 2*. Westcliffe Publishers, Englewood, Colorado.
- Kershaw, Linda, A. MacKinnon, and J. Pojar. 1998. *Plants of the Rocky Mountains*. Lone Pine Publishers, Edmonton, Alberta, Canada.
- Kingery, Hugh E. 1990. "Colorado Breeding Bird Atlas, Field Worker's Handbook." pp. 11-13. Colorado Bird Atlas Partnership, Zoology Department, Denver Museum of Natural History, Denver, Colorado.
- North Foothills Open Space Management Plan, Draft*, 1996. Boulder County Parks and Open Space.
- Opler, P.A. 1994. *Conservation and Management of Butterfly Diversity in the United States*. Office of Information Transfer. U.S. Fish and Wildlife Service, Fort Collins, Colorado.
- Opler, Paul A. 1999. *A Field Guide to Western Butterflies*. Houghton Mifflin Company. New York, New York.
- Opler, Paul A., A.D. Warren. February 14, 2003. *Scientific Names for Butterfly Species of North America, North of Mexico*. C.P. Gillette Museum of Arthropod Diversity, Colorado State University.
- Pesman, M. Walter. 1992. *Meet the Natives, Tenth Edition*. Denver Botanical Gardens, Inc. Roberts Rinehart Publishers. Lanham, Maryland.
- Pyle, Robert Michael. 1981. *Audubon Society Field Guide to North American Butterflies*. Alfred A. Knopf, New York, New York.
- Pyle, Robert Michael. 2002. *The Butterflies of Cascadia*. Seattle Audubon Society, Seattle, Washington.
- Pyle, Robert Michael. 2006. Personal phone communication.
- Robertson, Leigh. 1999. *Southern Rocky Mountain Wildflowers*. Falcon Publishing, Inc. Helena, Montana.
- Simonson, Sara and P. Pineda. 1995. "Field Survey of Boulder County Open Space, Hall and Heil Ranches." Research sponsored by Natural Heritage Program.
- Stewart, Bob, P. and H. Brodtkin. 2001. *Butterflies of Arizona, a Photographic Guide*. West Coast Lady Press, Arcata, California.
- Weber, William A. and R.C. Wittmann. 2001. *Colorado Flora, Eastern Slope. Third Edition*. University Press of Colorado, Boulder, Colorado.

IX. Butterfly Survey Data

Table I. 2007 Survey Dates and Locations

Plains		Foothills		Foothills / Montane		Montane		Montane / Subalpine	
Date	Location	Date	Location	Date	Location	Date	Location	Date	Location
3/13	Coal Creek								
3/20	Doudy Draw								
		4/4	Deadman's Gulch						
		4/9	Deadman's Gulch						
		4/15	Hall Ranch						
		4/15	Deadman's Gulch						
		4/28	Deadman's Gulch	4/29	Heil- Plumely				
		5/16	Anne U. White	5/17	Heil- Geer				
		5/18	Steamboat Mountain						
5/25	SE Buffer	5/18	Deadman's Gulch	5/28	Heil- Red Hill				
5/26	SE Buffer			5/31	Heil-Plumely				
6/10	Carolyn Holmberg at Rock Creek	6/4	Anne U. White	6/6	Heil- Plumely	6/5	Reynold's Ranch - National Forest	6/5	Caribou Ranch
6/14	SE Buffer	6/17	Anne U. White	6/18	Heil-Geer	6/11	Meyers Gulch	6/19	Caribou Ranch
		6/21	Rabbit Mountain	6/28	Heil- Plumely	6/29	Meyers Gulch		
7/9	SE Buffer	7/16	Anne U. White	7/4	Cal-Wood Education Center			7/23	Caribou Ranch
		7/29	Anne U. White	7/10	Heil- Geer			7/30	Caribou Ranch
				7/20	Heil-North				
				7/24	Heil-North				
				8/2	Heil-Plumely				

Notes for Table II (2 pages)

Location	Research Hours	Habitat	Butterfly notes	Plant notes	GPS and Elevation	Re-searchers
Public Road to 120th St	2	Riparian, deciduous forest	none visible	Chinese Elm blooming		Jan Chu, Mike Sportiello
Trail crossing bridge to far S. fence, then ridge-top on the return	1.5	Midgrass prairie	White butterflies flying fast beyond us	A few Spring Beauty, Easter Daisy, Filaree, & Pasque flowers		Jan Chu
N. of Hwy 128, transect went north from parking to northern barbed wire fence.	2.5	Midgrass prairie, two swales	Collected 2 <i>claudia</i> caterpillars (ph) and raised these to adults. Geometrid moths (<i>Plataea trilinearia</i>) flying.	Full bloom large patches of <i>Arnica fulgens</i> (Orange Arnica) covering areas with bright yellow (ph.)	5,873 ft at gate N 39° 54' 45.9" W 105° 10' 57.1" Northern barbed-wire fence N 39° 55' 00" W 105° 10' 51.6"	
Gate down to Rock Creek; NE for 1/2 mi.; returned along creek, to hilltop	2	Riparian deciduous forest	Prairie dog burrows with no visible prairie dogs, grassy ridgetop	Bastard Toadflax <i>Comandra umbellatum</i> in bloom; Ground Plum <i>Astragalus crassicaarpus</i> in early fruit.	northern barbed wire fence	
Parking lot of Stearns Lake, on trail toward south	1.5	Former agricultural, riparian deciduous woodlands, lakeside,	found no <i>helooides</i> . two <i>protodice</i> ovipositing on mustards	Gumweed, a yellow composite sp., Alfalfa	5,285 ft N 39° 56' 49.6" W 105° 06' 32.8" Ended at 5,274 ft N 39° 56' 33.8" W 105° 06' 21.5"	Jan Chu, Larry Crowley, Skeet Howe-Soper

Location	Research Hours	Habitat	Butterfly notes	Plant notes	GPS and Elevation	Re-searchers
Gate, north to barbed wire fence;	1.5	Midgrass prairie	<i>V. claudia</i> searching for host violets or flax close to ground; 2 pair <i>claudia</i> mating; <i>protodice</i> mating; <i>polyxenes</i> still hilltopping. Were they the same males we saw 5/25, now tattered?	Mariposa (Sego lily) numerous and in full bloom whitened the hillsides. (ph)	#23 5873 ft N 39° 54' 45.9" W 105° 10' 57.1"	Jan Chu, Ron Butler, Marisa Pankowski
Return from barbed wire fence on western side of crest, just off ridgetop	1	Midgrass prairie, several swales	<i>polyxenes</i> were hilltopping at northern crest edge	Mariposa numerous and in full bloom. Wild Rose, Copper Mallow (Cowboy's Delight).	Fence N 39 55' 00" W 105 10' 51.6" West of ridgetop: 5682' N 39° 55' 17.2" W 105° 10' 48.8"	Jan Chu, Ron Butler, Marisa Pankowski
Gate to north fence		Midgrass prairie	Variegated Fritillary - one mating pair; Orange Sulphur nectaring on gumweed (<i>Grindelia squarrosa</i>)	Gumweed, a yellow composite sp., Alfalfa		Jan Chu, Larry Crowley
Return via the riparian area to the west then to gate		Riparian deciduous forest	Gray Hairstreak on alfalfa	Narrow-leaf Cottonwoods, Lead Plant (<i>Amorpha fruticosa</i>)		Jan Chu, Larry Crowley
12		Total Research hours				

Table III. Foothills and Montane (page 1 of 4)

# of individuals		Scientific Name		Location																				
				2005	2006	2007	Dead man's Gulch (F)	4/4	4/9	4/15	4/15	4/15	4/28	5/16	5/18	6/4	6/5	6/11	6/11	6/17	6/21	6/29	Anne U. White (F)	7/16
2	8	<i>Parnassius smintheus</i>	Rocky Mountain Parnassian		JC	JC, MS	JC																	
	2	<i>Papilio polyxenes</i>	Black Swallowtail																					
4	4	<i>P. zelicaon</i>	Anise Swallowtail							4														
1?	1	<i>P. indra</i>	Short-tailed Black Swallowtail										1ph											
		<i>black swallowtail sp</i>											1											
34	40	<i>P. rutulus</i>	W. Tiger Swallowtail							6			17											5
3	11	<i>P. eurymedon</i>	Pale Swallowtail										10											
4	7	<i>P. multicaudata</i>	Two-tailed Swallowtail							2			3											1
		<i>yellow swallowtail sp</i>								1														
14	10	<i>Pontia protodice</i>	Checkered White																					1
1		<i>P. occidentalis</i>	Western White																					
12	12	<i>P. sisymbrii</i>	Spring White																					
44	39	<i>Pieris rapae</i>	Cabbage White																					
26	12	<i>Euchloe ausonides</i>	Large Marble																					
11	8	<i>E. olympia</i>	Olympia Marble																					
7	13	<i>Anthocharis julia</i>	So. Rocky Mountain Orangetip																					
		<i>white sp.</i>																						
1	17	<i>Colias philodice</i>	Clouded Sulphur																					
	1	<i>C. philodice/eurytheme</i>	hybrid																					
6	1	<i>C. eurytheme</i>	Orange Sulphur																					
	1	<i>C. alexandra</i>	Queen Alexandra Sulphur																					
1	4	<i>Nathalis iole</i>	Dainty Sulphur																					
		<i>sulphur sp.</i>																						
2	2	<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak																					
		<i>C. sheridanii</i>																						
	1	<i>C. spinetorum</i>	Thicket Hairstreak																					
	2	<i>Callophrys augustinus</i>	Brown elfin																					
1	2	<i>C. mossii schryveri</i>	Moss Elfyn																					

Table III. Foothills and Montane (page 2 of 4)

Table III: Foothills (F) and Montane (M)		Location		Dead man's Gulch (F)	Dead man's Gulch (F)	Hall Ranch (F)	Dead man's Gulch (F)	Dead man's Gulch (F)	Dead man's Gulch (F)	Anne U. White (F)	Steamboat Mtn (F)	Anne U. White (F)	Reynold's Ranch (M)	Meyers Gulch (M)	Meyers Gulch return (M)	Anne U. White (F)	Rabbit Mtn (F)	Meyers Gulch (M)	Anne U. White (F)	
# of individuals	Scientific Name	Common Name	2007 Dates:	4/4	4/9	4/15	4/15	4/28	5/16	5/18	6/4	6/5	6/11	6/11	6/17	6/21	6/29	7/16	7/29	
2005	2006	2007	Researchers*:	JC	JC, MS	JC	JC	JC, MS	JC, MS	JC+	JC+	JC+	JC+	JC, LC	JC, LC	JC, LC	MS	CC, DC	JC, LC	
1	9	<i>C. polios</i>	Hoary Elfin						1			8								
10	14	17	<i>C. eryphon</i>					1	13		2									
1			<i>Satrium titus</i>																	
1			<i>S saepulum</i>																	
1			<i>S. behrii</i>																	
1	3		<i>Strymon melinus</i>														1			x
2			<i>Cupido amyntula</i>																	
3	16+	13	<i>Colastrina ladon sidara</i>						12					1						
			<i>Glycopsyche pius</i>														1			
5	6	7	<i>Glycopsyche lygdamus</i>								2			1	4					
20		15	<i>Euphitotes ancilla</i>											4			6			1
3	2		<i>Echinargus isola</i>																	
5	8		<i>Plebejus melissa</i>																	
1			<i>P. icaroides</i>																	
2	2		<i>P. lupini lutzii</i>								2									
			<i>P. glandon nustica</i>																	
			blue sp.						1											
			<i>Apodermia nais</i>																	
			<i>Danaus plexippus</i>																	
			Monarch																	
3	12	55	<i>Euptoieta claudia</i>																	
			Variegated Fritillary																	
11	4	34	<i>Speyeria aphrodite</i>								4									4
			Aphrodite Fritillary																	
1	15	1	<i>S. edwardsii</i>								2									24
			Edwards' Fritillary																	
2	5	1	<i>S. coronis</i>																	
			Coronis Fritillary																	
2	11	17	<i>S. hesperis</i>																	16
			Northwestern Fritillary																	
37	31		fritillary sp.																	
2	19		<i>Chiosyne gorgone</i>																	21
			Gorgone Checkerspot																	
9	4		<i>C. nycteis</i>																	
			Silvery Checkerspot																	
			<i>Chiosyne palla</i>																	
			N. Checkerspot																	
			checkerspot sp.																	

Table III. Foothills and Montane (page 3 of 4)

# of individuals 2005-2006/2007	Scientific Name	Location		Dead man's Gulch (F)	Dead man's Gulch (F)	Hall Ranch (F)	Dead man's Gulch (F)	Anne U. White (F)	Anne U. White (F)	Steam- boat Mtn (F)	Anne U. White (F)	Rey- nold's Ranch (M)	Meyers Gulch (M)	Meyers Gulch return (M)	Anne U. White (F)	Rabbit Mtn (F)	Meyers Gulch (M)	Anne U. White (F)		
		2007 Dates	Researchers*																	
	Common Name	4/4	4/9	4/15	4/15	4/15	4/28	5/16	5/18	6/4	6/5	6/11	6/11	6/11	6/17	6/21	6/29	7/16	7/29	
14	<i>Physiodes mylitta</i>	JC																		
3	<i>P. tharos</i>									9ph										
27	<i>P. cocyta</i>														1					
67	<i>P. pulchella</i>							1						2		3				
1	<i>P. pulchella camillus</i> ssp																			
2	<i>Junonia coenia</i>																			
17	<i>Polygonia satyrus</i>																			
4	<i>P. gracilis</i>		3 ph	2	2			7		1	1									
4	<i>Aglais milberti</i>																			
7	<i>Nymphalis antiopa</i>		4		3		3	1												
17	<i>Vanessa atalanta</i>							1	2					2	2	1				
65	<i>V. cardui</i>							1	2											
1	<i>V. virginensis</i>							1ph			1							x		2
21	<i>Limenitis weidemeyerii</i>									7					3					2
22	<i>Coenonympha tullia ochracea</i>									4			32	1	1	1	2			
4	<i>Ceryonis pegala</i>																			13
2	<i>C. oetus</i>																			
3	<i>Erebia epispodaea</i>													2	1					
10	<i>Oeneis uhleri</i>							1		10				7	1	2				
18	<i>Epargyreus clarus</i>														1					
10	<i>Erynnis pacuvius</i>													1ph						
2	<i>E. persius</i>									2	6			11ph			1			
	<i>E. icelus</i>																			
3	<i>Pyrgus communis</i>																1			8
1	<i>Piruna pirus</i>																			
	<i>Oarisma garita</i>																			

Table III. Foothills and Montane (page 4 of 4)

Table III: Foothills (F) and Montane (M)		Location																	
# of individuals 2005/2006/2007	Scientific Name	Common Name	2007 Dates:																
			Dead man's Gulch (F)	4/4	4/9	4/15	4/15	4/28	5/16	5/18	6/4	6/5	6/11	6/11	6/17	6/21	6/29	7/16	7/29
			Dead man's Gulch (F)	JC	JC, MS	JC	JC	JC, MS	JC, MS	JC+	JC+	JC+	JC+	JC, LC	JC, LC	MS	MS	CC, DC, JC, LC	
6	<i>Hesperia colorado</i>	Common Branded Skipper																x	
	<i>H. pahaska</i>	Pahaska Skipper																	
	<i>Polites themistocles</i>	Tawny-edged Skipper																	
1	<i>P. mystic</i>	Long Dash																	37
23	<i>Ochlodes sylvanoides</i>	Woodland Skipper																	1?
24	<i>Poanes taxiles</i>	Taxiles Skipper																x	3
71	<i>Euphyes vestris</i>	Dun Skipper											3					x	1
2	<i>Atrytonopsis hianna</i>	Dusted Skipper																	
	skipper sp												1						4
691	474	773	Total # of individuals																
58	50	55	Total # of species																
26	23	30	Research hours																
26.6	20.6	25.8	# of individuals/ research hour																

*Researchers: JC = Jan Chu, MS = Mike Sportiello, LC = Larry Crowley ph = photograph available

Notes for Table III. Foothills and Montane (4 pages)

2007 Foot-hills	Location	Party hours	Habitat	Butterfly notes	Plant notes	GPS & Elevation	Re-searchers
4/4 10:20 - 11:15 a.m. 9° C	Deadman's Gulch, W. of Lyons, Roosevelt National Forest	1	Riparian, narrow canyon	no sighting	fine variety of plants and blossoms; <i>Mahonia</i> , Spring Beauty, Wax Currant, Wild Plum		Jan Chu, Mike Figgs, Mike Sportiello, Jean Morgan
4/9 12:30 - 1:30 p.m. 19° C	Deadman's Gulch	1	Riparian narrow canyon	<i>mossii</i> Elfin on trail, <i>sisymbrii</i> on lichen-rock	Wild Plum buds, <i>Mahonia</i>		Jan Chu, Mike Sportiello
4/15 10:45 - 12:45 p.m. 17° C high clouds, slight wind	Hall Ranch Antelope Trail	2	Ponderosa Pine forest	small moth webs in Mountain Mahogany	Filaree, Nuttall's Violet		Jan Chu, Larry Crowley
4/15 2:30 - 3:30 p.m. clear sky	Deadman's Gulch	1	Riparian, narrow canyon	<i>antiopa</i> and <i>gracilis</i> chasing each other over the stream; Brown Elfin, Spring White	Wax Currant, Spring Beauties, <i>Mahonia</i> , Plums in bloom		Jan Chu, Larry Crowley
4/28 11:30 - 12:30 p.m.	Deadman's Gulch	1	Riparian	<i>antiopa</i> - old specimens continuing to fly	Wild Plum, <i>Mertensia</i>		Jan Chu, Mike Sportiello
5/16 9:45 - 11:45 a.m. 14.5° C. clear sky, no wind.	Anne U. White Gate to 2nd stream; following trail	2	Riparian, small meadow	Uhler's Arctic was in the small meadow			Jan Chu, Mike Sportiello, Ron Butler, Natalie Robinson

2007 Foot-hills	Location	Party hours	Habitat	Butterfly notes	Plant notes	GPS & Elevation	Re-searchers
5/18 10:30-12:00 p.m. 17° C. clear to sprinkles, no wind to stiff breeze	Steamboat Mountain Within locked gate. Parked at Junction on gravel road to (removed) house, then NW to peak	2 x 1.5 = 3	Open ponderosa pine forest; juniper shrub	<i>sisymbrii</i> hilltopping in the stiff breeze at the peak			Jan Chu, Mike Sportiello, Larry Crowley, Ron Butler, Natalie Robinson
6/4 9:40 - 11:10 a.m. 20° C. Clear to sprinkles	Anne U. White Road junction thru gate, not as far as stream crossing	2 x 1.5 hrs = 3	Riparian deciduous forest	Swallowtails were flying overhead. Mylitta chased a fritillary	<i>Jamesia americana</i> and Service Berry in bloom		Jan Chu, Larry Crowley, Cathy and Donn Cook
6/17 10:50 - 11:55 a.m. 26° C clear breezy	Anne U. White Gate entrance to meadow past stream crossing	1	Riparian deciduous forest	Uhler's Arctic 'getting to know flight' higher & higher; <i>atalanta</i> had huge beak-shaped chunk of wing missing	relatively scarce; Larkspurs		Mike Sportiello
6/21 9:00 - 11:00 a.m. 28° clear	Rabbit Mountain Thorough locked gate to ridgetop, Canal, then moist area near culvert (north)	2	Ponderosa pine forest, meadow	Many whites flying by fast; 2 Bramble Hairstreaks (<i>C. affinis immaculata</i>) (ph.)	<i>Heterotheca</i> a sp.		Jan Chu, Larry Crowley
6/16 9:00 - noon	Anne U. White	2		Fritillaries everywhere on Monarda			Cathy and Donn Cook observed separately.

2007 Foot-hills	Location	Party hours	Habitat	Butterfly notes	Plant notes	GPS & Elevation	Re-searchers
7/29 10:30 - 12:30 p.m. Clear	Anne U. White Trail to wild plum-aspen overgrowth; not as far as 1st stream crossing	2	Riparian deciduous forest	Numbers of Long Dash Skippers and <i>hesperis</i> Fritillaries			Jan Chu, Larry Crowley, Susan Spaulding, Deanna Williams
6/5 1:00 - 2:00 p.m. 17.5° C	Near Reynold's Ranch; National Forest entrance to stream crossing	2 parties, 1 hr = 2	Ponderosa pine forest	<i>polios</i> in Kinnikinnick under Aspen and Lodgepole Pine; <i>persius</i> over Golden Banner in prospector's pit near hilltop		8,666 ft N 39° 57' 12.1" W 105° 28' 30.4"; kinnikinnick grove 8,540 ft. N 39° 57' 24.9" W 105° 28' 25.6"	Jan Chu, Mike Sportiello, Cathy and Donn Cook, Joe Krieg, Carol Cushman
6/11 10:15 12:20 p.m. 26° C 30% cloudy, slight breeze	Meyer's Gulch Followed roadway	2 x 2 hrs = 4	Ponderosa pine forest, Midgrass prairie (meadows), some deciduous riparian	Some puddling; many Duskywings. Nais Metalmark found at the same area as previous seasons.		Parking lot 7339 ft; N 39° 57' 32.4" W 105° 20' 20.6	Jan Chu, Larry Crowley, Mike Sportiello
6/11 12:20 - 1:20 p.m. 26° over-cast, thundering	Meyer's Gulch Followed the streamlet	1	Ponderosa pine forest, Midgrass prairie (meadows), some deciduous riparian			Turn around point 7,322 ft; N 39° 57' 57.7" W 105° 20' 37.9"	
6/11				Nais Metalmark and Thicket Hairstreak found near streamlet		7,323 ft N 39° 57' 52.3" W 105° 20' 35.6"	

2007 Foot-hills	Location	Party hours	Habitat	Butterfly notes	Plant notes	GPS & Elevation	Re-searchers
6/29 10:30 - 12:45 p.m. 23° C sunny, slight breeze	Meyer's Gulch parking lot to old homestead meadow; stayed on trail	2.25	Ponderosa pine forest, Midgrass prairie (meadows), some deciduous riparian	fairly dry; numbers certainly undercounted, but fewer butterflies than expected	many Sulfur Flowers, one Mariposa only		Mike Sportiello and two junior associates
30 Total Research hours							

Notes on Table IV. Foothills/Montane Transition (Geer) - (2 pages)

Geer 2007	Location	Re-search hours	Habitat	Butterfly notes	Plant notes		GPS & Elevation,
5/17 10:10 a.m.- 12:30 p.m. 17° C 70% clear to overcast	Mike worked the Upper Geer - creekside near large culvert under gravel road, above barn. Followed creek about 5-10 m. from stream. Ended at 'spring' cliff'. Jan walked from Barn to W. fork of stream to meadow above	4	Agri-cultural cropland, ponderosa pine woodland, meadows	<i>rapae</i> near buildings in agricultural areas	Golden Banner, Nuttall's Violets	Jan Chu, Mike Sportiello	
5/18 9:50 a.m. - 12:00 p.m. clear	Drove to stopping point before Big Meadow and rocky stream to park. Hiked up the stream toward the south	2	Ponderosa pine woodland on east slope; midgrass prairie on west	New <i>pacuvius</i> ; <i>clarus</i> flew quickly and showed their silver spots	<i>Ceanothus fendleri</i> just blossoming Golden Banner, white Lupines	Jan Chu, Larry Crowley	
5/18 12:00 - 2 p.m. clear	Around culverts and streamlet to the N.	2	Midgrass prairie - riparian deciduous			con't - Jan, Larry	
6/18 9:50 - 12:20 p.m. 16° C clear	Drove to Big Meadow. Stopped at rocky streamlet and walked up near streamlet	2.5	Agri-cultural cropland (meadow), west of Ponderosa Pine forest	Duskywings were in the waterway;	<i>E. clarus</i> flying over the Wild Licorice <i>Glycyrrhiza lepidota</i>	Jan Chu, Larry Crowley	6,256 ft N 40° 09' 45.4" to 6,358 ft N 40° 08' 07.9" W105° 19' 10.7"

Geer 2007	Location	Re-search hours	Habitat	Butterfly notes	Plant notes		GPS & Elevation,
6/18 12:20 - 2:00 p.m. 16° C clear	Culverts besides streams to Manager's cabin	2 x 1.5= 3	Riparian deciduous, midgrass prairie (meadow)	many Boisduval Blues around Lupines; one Mexican Sulphur		con't Jan, Larry	to 6,420 ft N 40° 08' 51.9" W105° 18' 58.1"
7/10 9:20 - 11:11 a.m. 25° C clear	Gate to Manager's cabin	2	Riparian deciduous	<i>melinus</i> on purple <i>Verbena hastata</i>		Jan Chu, Jean Morgan	6,128 ft N 40° 08' 51.3" W105° 18' 47.6"

15.5 Total # Research hours

Table V. Foothills/Montane Transition (Plumely) - (page 2 of 3)

# of Individuals				Scientific Name	Common Name	2007 Dates:		Location:	Plumely Canyon							
2004	2005	2006	2007			2007	2007		2007	2007	4/29	5/31	5/31	6/6	6/28	6/28
						2007 Dates:	2007		JC, MS	JC, MS	JC, PO	MS	MS	JC, LC		
						Researchers*:			JC, LC	JC, MS	JC, PO	MS	MS	JC, LC		
18	4			<i>Echinargus isola</i>	Reakirt's Blue											
21	10	3	9	<i>Plebejus melissa</i>	Melissa Blue					1	5			3		
	11	5	16	<i>P. icarioides</i>	Boisduval's Blue				2	8	6					
	5			<i>P. lupini lutzii</i>	Lupine Blue											
	2			<i>P. glandon rustica</i>	Arctic Blue											
				blue sp.				9	4	1		3				
1	1			<i>Danaus plexippus</i>	Monarch											
2	16	1	20	<i>Euptoieta claudia</i>	Variegated Fritillary			12				6			2	
52	59	22	8	<i>Speyeria aphrodite</i>	Aphrodite Fritillary						4	1		1	2	
1	1	3	8	<i>S. edwardsii</i>	Edwards' Fritillary					2	4				2	
	1	5		<i>S. coronis</i>	Coronis Fritillary											
				<i>S. callippe</i>	Callippe Fritillary											
	1			<i>S. atlantis</i>	Atlantis Fritillary											
20		1	9	<i>S. hesperis</i>	Northwestern Fritillary								2		7	
				<i>S. mormonia</i>	Mormon Fritillary											
	89			fritillary sp.									16	3	9	
			1	<i>Polydryas arachne</i>	Arachne Checkerspot				5				1			
	8			<i>Chlosyne gorgone</i>	Gorgone Checkerspot											
	22		4	<i>P. tharos</i>	Pearl Crescent					4 ph						
42	16	8	3	<i>P. cocyta</i>	Northern Crescent						1	2				
12	69+	4	4	<i>P. pulchella</i>	Field Crescent					1	1	2				
				<i>Polygonia satyrus</i>	Satyr Comma											
1	22	33	6	<i>P. gracilis zephyrus</i>	Hoary Comma			2		2	1			1		
5	19	16	8	<i>Nymphalis antiopa</i>	Mourning Cloak			3		3	1			1		
			2	<i>N. californica</i>	California Tortoiseshell											
7	26		7	<i>Vanessa atalanta</i>	Red Admiral				1	3	1	1		1		
	382+		2	<i>V. cardui</i>	Painted Lady				1		1					
			1	<i>V. virginicensis</i>	American Lady							1				
1	6	5	8	<i>Limenitis weidemeyeri</i>	Weidemeyer's Admiral					2	3	2		1		
	1	3		<i>Asterocampa celtis</i>	Hackberry Emperor											
	9	8	33	<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet				10	7	14	2			8	
50	15	5	8	<i>Cercyonis pegala</i>	Common Wood-Nymph											
5	1	1		<i>C. oetus</i>	Small Wood-Nymph											
			3	<i>Epargyreus clarus</i>	Silver-spotted Skipper											
	2			<i>Thorybes pylades</i>	Northern Cloudwing											
				<i>Erynnis icelus</i>	Dreamy Duskywing											
	4	2	1	<i>E. pacuvius</i>	Pacuvius Duskywing									1		
			1	<i>E. afranius</i>	Afranius Duskywing									1		
	2	1	3	<i>E. persius</i>	Persius Duskywing					2	1					

Table V. Foothills/Montane Transition (Plumely) - (page 3 of 3)

# of Individuals				2007		2006		2005		2004		Location:	
Scientific Name		Common Name		2007 Dates:		2006 Dates:		2005 Dates:		2004 Dates:		2007 Researchers*:	
1	6	4	2	Pyrgus communis	Common Checkered-skipper								
			1	Pholisora catullus	Common Sootywing								
	5			Piruna pirus	Russet Skipperling								
	1			Oarisma garita	Garita Skipperling								
	56	75+		Hesperia colorado	Common Branded Skipper								
				H. pahaska	Pahaska Skipper								
				H. viridis	Green Skipper								
			1	Polites draco	Draco skipper								
			9	P. mystic	Long dash skipper								9
41	7	9		Ochlodes sylvanoides	Woodland Skipper								
	9	3	1	Poanes taxiles	Taxiles Skipper								
1	58	9	9	Euphyes vestris	Dun Skipper								
	1			Atrytonopsis hianna	Dusted Skipper								
	1?			Amblyscirtes aenus	Bronze Roadside-skipper								
1				A. vialis	Common Roadside-Skipper								
				skipper sp.									
339	1006	367	365	Total # of Individuals									
32	60	48	45	Total # of Species									
10	18.5	18	8	Research Hours									
33.9	54.4	20.4	45.6	# of Individuals / Research Hour									

*Researchers: JC = Jan Chu, PO = Paul Opler, MS = Mike Sportiello, & LC = Larry Crowley

Notes for Table V. Foothills/Montane Transition (Plumely) - (2 pages)

2007 Notes Plumely Canyon	Location	(Party) Re-search hours	Habitat	Butterfly notes	Plant notes	GPS & Elevation	Researchers
4/29 10:15 - 12:30 p.m. 23.5° C	Gate to upper end of meadow	2	Riparian deciduous forest, midgrass prairie	So. Rocky Mtn. Orange Tips in deep canyon	Wild Plums	Upper Plumely by stone house 6,310 ft. N 40° 09' 29.0" W 105° 18' 30.9"	Jan Chu, Larry Crowley
5/31 10:35 - 11:35 a.m. 16.5 - 18° C 60-90% overcast, breezy	Gate to upper end of meadow by stone house	1	Riparian deciduous forest, midgrass prairie				Jan Chu, Mike Sportiello
5/31 12:00 - 2:06 p.m. 19 deg. - 22° C. 60 % cloudy to clear windy	Return from Upper meadow, along stream in ravine, to gate	2	Riparian deciduous forest	<i>P. boisduval</i> ovipositing on Lupine; finger-sized caterpillar (moth sp.) (ph)	<i>Pentstemon viridis</i> and <i>P. secundiflora</i> , <i>Salvia</i> sp.		Jan Chu, Mike Sportiello
6/6 9:30 - 11:00 a.m. 22° C Partial sun, no wind to breezy, dark clouds	One stop at the stream crossing the road; then locked gate, to stone house meadow	2x(1.5)= 3	Riparian deciduous forest, midgrass prairie	No Hops Azures yet, <i>boisduval</i> on Lupines		Upper Plumely by stone house #016 6,310 ft. N 40° 09' 29.0" W 105° 18' 30.9"	Jan Chu, Dr. Paul Opler

2007 Notes Plumely Canyon	Location	(Party) Re-search hours	Habitat	Butterfly notes	Plant notes	GPS & Elevation	Researchers
6/28 10:45 - 12:15 p.m. 21° C 70% cloudy - sunny	Gate to stone house on trail				Thick growth of Sulphur-flowers <i>Erigeron umbellatum</i> 6,297 ft. N 40 9' 26.5" W 105 13' 20.7	Plumely gate 6,072 ft N 40° 9' 22.3" W 105° 18' 2.2"	Mike Sportiello
						Stone house 6,340 ft N 40° 9' 28.5" W 105° 18' 34.4"	Mike Sportiello
6/28 return 12:15 - 1:30 p.m. 22° C cloudy	Returned by following creek in ravine, then up to the trail		Riparian deciduous forest	smoky-gray worn Black Swallowtail	Large bed of Dogbane <i>Apocynum cannabinum</i> attracting Hops Azure, many Fritillaries and Skippers	Dogbane near "Wildlife Marker A-8"	Mike Sportiello
8/2 9:30 - 12:30 p.m. 20° C. 95% clear to hazy clouds from 10:30 to 1:30 p.m.	Locked gate to meadow by stone house	3	Riparian deciduous forest, midgrass prairie	one <i>N. menapia</i> in Ponderosa Pine top (ph)			Jan Chu, Larry Crowley, Jean Morgan
		8	Research hours				

Table VI. Foothills/Montane Transition (Red Hill/North Heil) - (page 1 of 4)

# of individuals		Scientific Name		Location		Stream crossing Roadway toward Red Hill	Upper Meadow (above Marietta Canyon)	Red Hill Saddle	North Heil, near 3' Right of Way	North Heil to roadway (ret.)	North Heil, quarry by silo
		2004	2005	2006	2007						
					Black Swallowtail						1
					Anise Swallowtail	1					
					Short-tailed Black Swallowtail						
1	2	4	1		Western Tiger Swallowtail						1
	1	4	5		Pale Swallowtail	5					
		1	5		Two-tailed Swallowtail			1		1	3
					Pine White						
	3		15		Checkered White						15
			1		Western White			1			
			1		Spring White			1			
	2		9		Cabbage White				7		2
					Mustard White						
2	2				Large Marble						
1		3	1		Olympia Marble			1			
					Southern Rocky Mountain Orangetip						
	5	3			white sp.				7	1	4
		7	63		Clouded Sulphur			6	25	12	20
	8		4		Orange Sulphur				1		3
	1		1		albino						1
					Queen Alexandra						
					Mexican sulphur						
					Dainty Sulphur						1
					sulphur sp.				6		9
					Gray Copper						
			2		Blue Copper				2		

Table VI. Foothills/Montane Transition (Red Hill/North Heil) - (page 2 of 4)

Table VI: Transition: Plumely-Red Hill Foothills/ Montane		# of individuals		Scientific Name	Common Name	2007 Dates: Researchers*:	Stream crossing Roadway toward Red Hill	Upper Meadow (above Marietta Canyon)	Red Hill Saddle	North Heil, near 3' Right of Way	North Heil to roadway (ret.)	North Heil, quarry by silo
2004	2005	2006	2007									
	8	4		<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak							
				<i>C. sheridanii</i>	Sheridan's Hairstreak (White-lined Green)							
	1			<i>C. gyneus</i>	Siva' Juniper Hairstreak							
2	2	1		<i>C. eryphon</i>	Western Pine Elfyn							
				<i>Satyrnum titus</i>	Coral Hairstreak							
	1		9	<i>Strymon melinus</i>	Gray Hairstreak				1	5		3
				<i>Leptotes marina</i>	Marine Blue							
	1			<i>Cupido amyntula</i>	Western Tailed-Blue							
1				<i>Celastrina ladon sidara</i>	Spring Azure							
				<i>C. humulus</i>	Hops Azure							
				<i>Glaucopsyche piasus</i>	Arrowhead Blue							
		2	18	<i>G. lygdamus</i>	Silvery Blue		3	10	5			
			6	<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue					2	4	
	9	1		<i>Echinargus isola</i>	Reakirt's Blue							
	3	14	34	<i>Plebejus melissa</i>	Melissa Blue		2		4	6	8	13
2	5	10	7	<i>P. icarioides</i>	Boisduval's Blue		3	3	1			
				<i>P. lupini lutzi</i>	Lupine Blue							
				<i>P. glandon rustica</i>	Arctic Blue							
	1	2		blue sp.					12	1	2	
1		3		<i>Danaus plexippus</i>	Monarch							
	13	1	35	<i>Euptoieta claudia</i>	Variogated Fritillary				1	6	4	24
	14	3	38	<i>Speyeria aphrodite</i>	Aphrodite Fritillary				1	4	5	28
	1	6	1	<i>S. edwardsii</i>	Edwards' Fritillary				1			
	10			<i>S. coronis</i>	Coronis Fritillary							

Table VI. Foothills/Montane Transition (Red Hill/North Heil) - (page 3 of 4)

Table VI: Transition: Plumely-Red Hill Foothills/ Montane				Location		Stream crossing Roadway toward Red Hill	Upper Meadow (above Marietta Canyon)	Red Hill Saddle	North Heil, near 3' Right of Way	North Heil to roadway (ret.)	North Heil, quarry by silo
# of individuals		Scientific Name	Common Name	2007 Dates:	Researchers*:						
2004	2005	2006	2007			5/28	5/28	5/28	7/20	7/20	7/24
	1			<i>S. callippe</i>	Callippe Fritillary	JC	JC	JC	JC, LC	JC, LC	JC, LC
				<i>S. atlantis</i>	Atlantis Fritillary						
	2			<i>S. hesperis</i>	Northwestern Fritillary						
	24	29		<i>S. mormonia</i>	Mormon Fritillary		1	6	13		37
		8		<i>Chlosyne gorgone</i>	Gorgone Checkerspot	1	1				
	4			<i>P. tharos</i>	Pearl Crescent						
				<i>P. cocyta</i>	Northern Crescent						
1	29	7		<i>P. pulchella</i>	Field Crescent						1
		1		crepuscular sp.							
	2			<i>Polygonia satyrus</i>	Satyr Comma						
	2		1	<i>P. gracilis</i>	Hoary Comma		1				
				<i>Aglais milberti</i>	Milbert's Tortoiseshell						
				<i>Nymphalis antiopa</i>	Mourning Cloak						
			1	<i>N. californica</i>	California Tortoiseshell		1				
7			1	<i>Vanessa atalanta</i>	Red Admiral	1					
1	15		2	<i>V. cardui</i>	Painted Lady				1		1
		1	6	<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral	5					1
		1	1	<i>Asterocampa celtis</i>	Hackberry Emperor					1	
12	61	121		<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet	6	85	30			
	17	67		<i>Cercyonis pegala</i>	Common Wood-Nymph				5	17	45
	1	7		<i>C. oetus</i>	Small Wood-Nymph				7		
				wood nymph sp.							
				<i>Epargyreus clarus</i>	Silver-spotted Skipper				6		
				<i>Thorybes pylades</i>	Northern Cloudwyring						

Table VI. Foothills/Montane Transition (Red Hill/North Heil) - (page 4 of 4)

# of individuals		2004		2005		2006		2007		Scientific Name	Location	Stream crossing Roadway toward Red Hill	Upper Meadow (above Marietta Canyon)	Red Hill Saddle	North Heil, near 3' Right of Way	North Heil to roadway (ret.)	North Heil, quarry by silo
		2004	2005	2006	2007	2004	2005	2006	2007								
										<i>E. pacuvius</i>	Common Name	JC	JC	JC	JC, LC	JC, LC	
				3	2					<i>Pacuvius Duskywing</i>	Pacuvius Duskywing		2				
				9	2					<i>E. persius</i>	Persius Duskywing				1	1	
1										<i>Pyrgus communis</i>	Common Checkered-skipper						
										<i>Pholisora catullus</i>	Common Sootywing			1			
2										<i>Piruna pirus</i>	Russet Skipperling					1	2
										<i>Oarisma garita</i>	Garita Skipperling						
										<i>Hesperia colorado</i>	Common Branded Skipper						
1										<i>H. pahaska</i>	Pahaska Skipper						
										<i>H. viridis</i>	Green Skipper						
										<i>Ochlodes sylvanoides</i>	Woodland Skipper						
										<i>Poanes taxiles</i>	Taxiles Skipper						
										<i>Euphyes vestris</i>	Dun Skipper						
5										<i>Atrytonopsis hianna</i>	Dusted Skipper						
										<i>Amblyscirtes aenus</i>	Bronze Roadside-skipper						
										<i>A. vialis</i>	Common Roadside-Skipper						
12	201	217	579	Total # of Individuals													
36	67	24	34	Total # of Species													
2.5	3	6	8	Research hours													
4.8	67	31.2	72.4	# of Individuals / Research Hour													

*Researchers: JC = Jan Chu, LC = Larry Crowley

Notes for Table VI. Foothills/Montane Transition (Red Hill/North Heil) - (2 pages)

2007 Notes Red Hill/North Heil	Location	Habitat	Research hours	Butterfly notes	Plant notes	GPS	Researchers
5-28 10:30 - 11:00 clear	Stream crossing on gravel roadway	Riparian deciduous	0.5	Multitude of butterflies puddling		N 40° 9' 12.2" W 105° 17' 59.2"	Jan Chu, Larry Crowley, Gordon Revey
5/28 11:35 - 12:00 clear	Upper meadow above Marietta Canyon	Midgrass prairie surrounded by ponderosa pine woodland	0.5	Emergence of <i>ochracea</i>		N 40° 10' 31.0" W 105° 18' 4.0"	Jan Chu, Larry Crowley, Gordon Revey
5/28 12:45 - 1:45 p.m. 27° C overcast	Red Hill Saddle to exposed red sandstone by small cliff-ravine	Midgrass prairie surrounded by ponderosa pine forest and mountain mahogany scrubland	2 x(1.0)= 2	This <i>catallus</i> individual was the only one seen in 2007		Begin 6,365 ft N 40° 10' 31.4" W105°17' 11.9" End 6,275 ft N40° 10.4' 24.5" W105° 17' 11.4"	Jan Chu, Larry Crowley, Gordon Revey
7/20 10:00 - 12:00 p.m. 19 - 25° C 50 % overcast	North Heil Valley Trail marked with pink ribbons	Midgrass prairie	2	Melissa Blues, newly emerged and spectacular	Ten-petaled Blazing Star <i>Mentzelia (Nuttallia) decapetala</i> and Hackberry trees	Turnaround point 5,617' 40° 12' 07.1" 105° 16' 10.9"	Jan Chu, Larry Crowley

2007 Notes Red Hill/North Heil	Location	Habitat	Research hours	Butterfly notes	Plant notes	GPS	Researchers
7/ 20 12:00 1:00 p.m. 25°C 50% overcast	Heil Valley	Visited Chris Malaney across the road, who had watered his lawn, so some damp mud in driveway.	1	Melissa Blues by the dozens, Reakirt's Blue, Hackberry (ph), and <i>P.catullus</i>			Jan Chu, Larry Crowley
7/24 10:00 - 12:00 p.m. 28.5 - 30.5° C Mostly clear, high cirrus	Red Hill Drove to Quarry near silo	Midgrass prairie, mountain scrub.	2	<i>Monarda</i> in the gully full of Fritillaries, <i>philodice</i> , Wood Nymphs	Looking for tall Bluestem with no success. Walked east from quarry thru shallow gully to midgrass prairie, returned thru ridge, then within gully		Jan Chu, Larry Crowley

8 Total Research hours

Table VII. Upper Montane (Caribou) - (page 1 of 3)

Table VII: Upper Montane (Caribou)				2007 Dates:		6/5		6/19		6/19 ret		7/23		7/30	
# of individuals				2006		2007		JC,CC,		JC,LC		JC,LC		JC,LC	
2004	2005	2006	2007	Scientific Name:		Common Name:		Researcher(s)*:		Common Name:		Researcher(s)*:		Common Name:	
2	29	18	13	<i>Parnassius smintheus</i>		Rocky Mountain Parnassian		11		2					
				<i>Papilio polyxenes</i>		Black Swallowtail				1					
1	1	2	1	<i>Papilio zelicaon</i>		Anise Swallowtail		1							
4	7	18	7	<i>P. rutulus</i>		W. Tiger Swallowtail		3		1		2		1	
3	2	9	2	<i>P. eurymedon</i>		Pale Swallowtail				2					
				<i>Neophasia menapia</i>		Pine White									
				<i>Pontia protodice</i>		Checkered White		2		3		1		5	
				<i>P. occidentalis</i>		Western White		1							
5	6	12	9	<i>Pieris rapae</i>		Cabbage White		1				7		1	
3	7	16		<i>P. marginalis</i>		Mustard White									
				white sp.								3		1	
1	10	7		<i>Euchloe ausonides</i>		Large Marble									
				<i>Anthocharis julia</i>		Southern Rocky Mtn Orangetip		2							
				<i>Colias philodice</i>		Clouded Sulphur		1				4		2	
2	8		14	<i>C. eurytheme</i>		Orange Sulphur		1		1		2		4	
				<i>C. eurytheme/philodice</i>		albino						2		1	
75	11	72	26	<i>C. alexandra</i>		Queen Alexandra's Sulphur								15	
				<i>Eurema mexicana</i>		Mexican Sulphur									
				<i>Abaeis nicippe</i>		Sleepy Orange				1 ph					
4	2		4	<i>Nathalis iole</i>		Dainty Sulphur		2				1		1	
				sulphur sp.				1				7		1	
5				<i>Lycaena rubidus</i>		Ruddy Copper									
				<i>L. heteronea</i>		Blue Copper						1		2	
				<i>L. helioides</i>		Purplish Copper						2		1	
				<i>Callophrys affinis homoperplexus</i>		Canyon Bramble Hairstreak									
				<i>C. spinetorum</i>		Thicket Hairstreak				2					
				<i>C. augustinus</i>		Brown Elfin									
1				<i>C. eryphon</i>		Western Pine Elfin									
1				<i>Strymon melinus</i>		Gray Hairstreak						3			
1	3	1		<i>Cupido amyntula</i>		Western Tailed-Blue									
1	16	4	1	<i>Celastrina ladon sidara</i>		Spring Azure		1							
				<i>G. piusius</i>		Arrowhead Blue									
1	5	7	1	<i>Glaucopsyche lygdamus</i>		Slivery Blue		1							
6	6	23	2	<i>Euphilotes ancilla</i>		Rocky Mountain Dotted-Blue								2	
				<i>Echinargus isola</i>		Reakirt's Blue		2?						1	
				<i>Plebejus melissa</i>		Melissa Blue								3	
5				<i>P. saepiolus</i>		Greenish Blue				2		1		1	
10	29	24	17	<i>P. icarioides</i>		Boisduval's Blue		8		5		2		1	

Table VII. Upper Montane (Caribou) - (page 2 of 3)

Table VII: Upper Montane (Caribou)				2007 Dates:		6/19		6/19 ret		7/23		7/23		7/30	
# of individuals				2006		2007		JC,CC,		JC,LC		JC,LC		JC,LC	
2004	2005	2006	2007	Scientific Name:		Common Name:		Researcher's*:		JC,LC		JC,LC		JC,LC	
13	2	5	1	<i>P. lupini lutzi</i>		Lupine Blue				1					
	3	8	1	<i>P. glandon rustica</i>		Arctic Blue								1	
				blue sp.						9		1		2	
1	10	1	5	<i>Euptoieta claudia</i>		Variegated Fritillary				1		4			
1		1	2	<i>Speyeria aphrodite</i>		Aphrodite Fritillary								2	
		3	2	<i>S. edwardsii</i>		Edwards' Fritillary								2	
		6		<i>S. coronis</i>		Coronis Fritillary									
1		21	7	<i>S. hesperis</i>		Northwestern Fritillary				4		1		2	
	1	48		fritillary sp.						6		4		7	
1				<i>Poladryas arachne</i>		Arachne Checkerspot									
	4			<i>Chlosyne gorgone</i>		Gorgone Checkerspot									
1		7	1	<i>C. nycteis</i>		Silvery Checkerspot		1							
9	8	11	3	<i>C. palla</i>		Northern Checkerspot		1				2			
				checkerspot sp.								1			
1				<i>Phycodes tharos</i>		Pearl Crescent									
14	2	6		<i>P. cocyta</i>		Northern Crescent									
1	4	10	2	<i>P. pulchella</i>		Field Crescent		1				1			
		9	1	<i>Euphydryas chalcedona</i>		Variable Checkerspot						1			
		1		<i>Polygonia faunus</i>		Green Comma									
2	2	10		<i>Polygonia gracilis</i>		Hoary Comma									
	1	2		<i>Nymphalis antiopa</i>		Mourning Cloak									
			1	<i>Vanessa atalanta</i>		Red Admiral		1							
	98		1	<i>Vanessa cardui</i>		Painted Lady				1					
	1		1	<i>V. virginensis</i>		American Lady								1	
5		13	3	<i>Limenitis weidemeyerii</i>		Weidemeyer's Admiral				1		1		1	
6	76	61	47	<i>Coenonympha tullia ochracea</i>		Common Ringlet		29		17		1			
	3	1		<i>Cercyonis pegala</i>		Common Wood-Nymph									
30	1	22	32	<i>C. oetus</i>		Small Wood-Nymph				13		1		18	
	38	13	24	<i>Erebia epipsodea</i>		Common Alpine		18		6					
5		20		<i>Oeneis chryxus</i>		Chryxus Arctic									
	3			<i>Thorybes pylades</i>		Northern Cloudywing									
	2	7	2	<i>Erynnis icelus</i>		Dreamy Duskywing		2?							
	5			<i>E. pacuvius</i>		Pacuvius Duskywing									
3	22	20	11	<i>E. persius</i>		Persius Duskywing		10						1	
				duskywing sp.				2				1			
	1		1	<i>Pyrgus communis</i>		Common Checkered-skipper				1					
35				<i>Piruna pirus</i>		Russet Skipperling									
			4	<i>Oarisma garita</i>		Garita skipperling									
1				<i>Hesperia colorado</i>		Common Branded Skipper									

Notes on Table VII. Upper Montane (Caribou) - (2 pages)

Caribou	Location	Habitat	Re-search hours	Plant notes	Butterfly notes	GPS & Elevation	Researchers
6/5 9:15 - 11:15 a.m. 12° C; 80% overcast	Locked gate to DeLonde Homestead	Agricultural cropland (meadow), ponderosa pine woodland	2	Lodgepole Pine, Douglas fir forest;	none sighted	Gate 8,677 ft; N 39° 59' 7.2" W 105° 31' 46.5"	Jan Chu, Mike Sportiello, Cathy and Donn Cook, Joe Kreig, Carol Cushman
						DeLonde Homestead 8,575 ft; N 39° 59' 24.3" W 105° 31' 55.0"	
6/19 9:45 - 11:30 a.m. Clear	Locked gate to DeLonde homestead	Mixed pine aspen, agricultural meadow	2			Gate 8,757 ft; N 39° 59' 04.9" W 105° 01' 45.0"	Jan Chu, Larry Crowley, Ron Butler, Joe Kreig
6/19 12:00 - 1:30 p.m.	Return along roadway					DeLonde picnic table 8,670 ft. N 39° 59' 05.0" W 105° 01' 45.2"	
7/23 9:30 - 11:30 a.m. 21.5° C	Drove inside locked gate; parked at base of 'horse trail'	Midgrass prairie, montane carr	2	<i>Monarda</i> Lush plants with blooms, Aspen-Pine mixed	No butterflies nectaring on weed white Aster	Base of 'horse trail' 8,684 ft N 39° 59' 26.0" W 105° (52'?) 19.2"	Larry Crowley, Jean Morgan

Caribou	Location	Habitat	Re-search hours	Plant notes	Butterfly notes	GPS & Elevation	Researchers
7/23 11:30 - 2:00 p.m.	Parked by work crew repairing buildings; Switzerland Bluebell Trail to buildings	Riparian coniferous	2.5				Larry Crowley, Jean Morgan
7/30 8:30 - 12:00 noon 11.5 - 21° C clear sky	Began near the DeLonde Homestead, on trail headed northward	Ponderosa pine woodland, riparian coniferous	3.5	<i>Monarda, Rudbeckia</i>		8,544 ft. N 39° 59' 27" W 105° 31' 44"	Larry Crowley, June & Gene Joerns, Susan Spalding, Deanna Williams, Christian Nunes, Alison Haraminac
7/30 Noon	Turn-around on Switzerland Trail					8,790 ft. N 40° 00' 13" W 105° 31' 40"	Larry Crowley, June & Gene Joerns, Susan Spalding, Deanna Williams, Christian Nunes, Alison Haraminac
10 Research hours							

Table VIII. Montane (Cal-Wood Education Center/4th of July Count) - (4 pages)*Note: Data for 1984-2005 is available on request.*

- Cal-Wood Education Center, Jamestown, Boulder County, CO
- North America Butterfly Count for BCNA
- The butterflies on this list have been recorded since Xerces counts began at Cal-Wood in 1984.

7/4/06 # of individuals counted 2006	7/4/07 # of individuals counted 2007	Scientific name	Common name
		<i>PAPILIONIDAE</i>	Swallowtails
8	38	<i>Parnassius smintheus</i>	Rocky Mtn. Parnassian
4	1	<i>Papilio eurymedon</i>	Pale Swallowtail
		<i>P. indra</i>	Indra Swallowtail
21	20	<i>P. multicaudata</i>	Two-tailed Swallowtail
	6	<i>P. polyxenes</i>	Black Swallowtail
3	13	<i>P. rutulus</i>	W. Tiger Swallowtail
		<i>P. zelicaon</i>	Anise Swallowtail
		<i>Phoebis sennae</i>	Cloudless sulphur
		<i>PIERIDAE</i>	Whites/Sulfurs
	9	White sp.	
	8	Sulphur sp.	
		<i>Neophasia menapia</i>	Pine White
1	2	<i>Pontia occidentalis</i>	Western White
2	36	<i>P. protodice</i>	Checkered White
1		<i>Pieris napi</i>	Mustard White
8	78	<i>P. rapae</i>	Cabbage White
		<i>Euchloe ausonides</i>	Large Marble
34	33	<i>Colias alexandra</i>	Queen Alexandra's sulphur
4	69	<i>C. eurytheme</i>	Orange sulphur
	5	<i>Colias philodice/eurytheme</i>	Colias albino
3	38	<i>C. philodice</i>	Clouded sulphur
	2 *	<i>Zerene cesonia</i>	Southern Dogface
	1 *	<i>Abaeis (Eurema) nicippe</i>	Sleepy orange
	6	<i>Nathalis iole</i>	Dainty sulphur
		<i>LYCAENIDAE</i>	Coppers
	4	<i>Lycaena heteronea</i>	Blue Copper
		<i>L. rubidus</i>	Ruddy Copper
		<i>LYCAENIDAE</i>	Hairstreaks
1		<i>Satyrium behrii</i>	Behr's Hairstreak

7/4/06 # of individuals counted 2006	7/4/07 # of individuals counted 2007	Scientific name	Common name
		<i>S. saepium</i>	Hedgerow Hairstreak
4		<i>Callophrys affinis homoperplexa</i>	Green Bramble Hairstreak
		<i>C. eryphon</i>	W. Pine Elfin
	1	<i>Satyrium titus</i>	Coral Hairstreak
		<i>C. gryneus (siva)</i>	Siva Hairstreak
1	15	<i>Strymon melinus</i>	Gray Hairstreak
	2 *	<i>Mitoura spinatorum</i>	Thicket hairstreak
11		LYCAENIDAE	Blues
	6	blue sp.	
	8	<i>Agriades glandon rustica</i>	Arctic Blue
		<i>Hemiargus isola</i>	Reakirt's Blue
2		<i>Everes amyntula</i>	W. Tailed-blue
21	156	<i>Euphilotes enoptes ancilla</i>	Dotted Blue
	1	<i>Glaucopsyche piasus</i>	Arrowhead Blue
	6	<i>G. lygdamus</i>	Silvery Blue
	17	<i>Lycaeides melissa</i>	Melissa Blue
2	19	<i>Plebejus 'lupini' lutzii</i>	Lupine Blue
3	10	<i>P. icarioides</i>	Boisduval's Blue
	2	<i>P. saepiolus</i>	Greenish-blue
	2 *	<i>Leptotes marina</i>	Marine blue
		NYMPHALIDAE	Brushfoots
	2 *	<i>Libytheana carinenta</i>	American Snout
	25	Fritillary sp.	
	81	<i>Euptoieta claudia</i>	Variegated Fritillary
34	20	<i>Speyeria aphrodite</i>	Aphrodite Fritillary
	3	<i>S. atlantis</i>	Atlantis Fritillary
1	1	<i>S. hesperia</i>	N.W. Fritillary (not silvered)
4		<i>S. coronis</i>	Coronis Fritillary
9		<i>S. callippe</i>	Callippe Fritillary
	1	<i>S. edwardsii</i>	Edwards' Fritillary
2	2	<i>Poladryas arachne</i>	Arachne Checkerspot
		<i>Chlosyne gorgone</i>	Gorgone Checkerspot
	1	<i>C. palla</i>	Northern Checkerspot
	1	<i>C. nycteis</i>	Silvery Checkerspot
5	1	<i>Phyciodes pulchella</i>	Field Crescent

7/4/06 # of individuals counted 2006	7/4/07 # of individuals counted 2007	Scientific name	Common name
		<i>P. tharos</i>	Pearl Crescent
		<i>P. mylitta</i>	Mylitta Crescent
4	7	<i>Polygonia gracilis zephyrus</i>	Hoary Comma
	1 *	<i>P. satyrus</i>	Satyr Comma
2		<i>Euphydryas chalcedona</i>	Variable Checkerspot
	2 *	<i>Junonia coenia</i>	Common Buckeye
	3	<i>Nymphalis antiopa</i>	Mourning Cloak
2		<i>N. californica</i>	California Tortoiseshell
	3	<i>N. milberti</i>	Milbert's Tortoiseshell
		<i>Limenitis archippus</i>	Viceroy
	4	<i>L. weidemeyerii</i>	Weidemeyer's Admiral
	7	<i>Vanessa cardui</i>	Painted Lady
	17	<i>V. atalanta</i>	Red Admiral
		<i>V. virginiensis</i>	American Lady
		NYMPHALIDAE	Satyrs
		<i>Cylloosis pertepida</i>	Canyonland satyr
5	60	<i>Coenonympha tullia ochracea</i>	Common Ringlet
6	7	<i>Cercyonis oetus</i>	Small Wood Nymph
7	2	<i>Erebia epipsodea</i>	Common Alpine
4		<i>Oeneis chryxus</i>	Chryxus Arctic
		NYMPHALIDAE	Milkweed
	2	<i>Danaus plexippus</i>	Monarch
		HESPERIIDAE	Spreadwing Skippers
	1	skipper sp.	
	6	<i>Erynnis pacuvius pacuvius</i>	Pacuvius Duskywing
6	19	<i>E. persius</i>	Persius Duskywing
		<i>E. icelus</i>	Dreamy Duskywing
		<i>E. martialis</i>	Mottled Duskywing
	15	<i>Pyrgus communis</i>	Common Checkered Skipper
		HESPERIIDAE	Grass Skippers
10	7	<i>Oarisma garita</i>	Garita Skipperling
2	8	<i>Piruna pirus</i>	Russet Skipperling
		<i>Hesperia nevada</i>	Nevada Skipper
	2	<i>H. pahaska</i>	Pahaska Skipper
1	5	<i>H. (comma) colorado</i>	Common Branded Skipper

7/4/06 # of individuals counted 2006	7/4/07 # of individuals counted 2007	Scientific name	Common name
		<i>Polites draco</i>	Draco Skipper
2	7	<i>P. mystic dacotah</i>	Long Dash Skipper
	7	<i>Paratrytone snowi</i>	Snow's skipper
18		<i>Ochlodes sylvanoides</i>	Woodland Skipper
40	28	<i>Poanes taxiles</i>	Taxiles Skipper
22	9	<i>Euphyes vestris</i>	Dun Skipper
320	986	Total # of individuals	
39	61	Total # of species	
	32.8	# of individuals / party hour	5 parties x 6 hours = 30 party hours

* = New species to this 24th annual Cal-Wood Count.

Notes on Table VIII. Montane (Cal-Wood Education Center/4th of July Count)

Location	Within a 7 1/2 mile radius of the Calvert Lodge at the Cal-Wood Education Center, County Road 87, Jamestown, CO, including the John Geier and Cal-Wood meadows; Riparian (Intermittent stream and two ponds on the Cal-Wood property); Overlook (over the historical town of Balarat); Solitude Point (a ridge top viewing the Continental Divide); Button Rock Preserve roadway (riparian).
Habitat, GPS position	40 deg. 09' N, 105 deg. 22' W. Ponderosa pine woodland, midgrass prairie, riparian deciduous forest with some aspen and river birch.
Butterfly notes	In 2007 there were seven new species, not found in the previous 23 years of July 4 Counts at Cal-Wood: <p>Nine species were unusual immigrants from the southern US and Mexico.</p> <p>Mating pairs of Common Checkered Skippers, Queen Alexandra's Sulphur and Variegated Fritillaries.</p> <p>In addition the rare fire moth (<i>Schinia masoni</i>) was found on <i>Gaillardia pulchella</i>. It lives only in the northern Front Range.</p> <p>Immature Western Tiger Swallowtail caterpillars and the eggs of Queen Alexandra's and Orange Sulphurs, and Variegated Fritillary were located.</p> <p>Seven of the Snow's Skipper (<i>Paratrytone snowi</i>), indicated as threatened on the Colorado Endangered and Threatened List, were counted.</p>
Plant notes	<i>Erigonum umbellatum</i> was numerous and in full bloom. This is favorite host plant for caterpillars and nectar source for many species of butterflies.
Researchers	Professional Lepidopterist Paul Opler, Robert Michael Pyle and experienced butterfly volunteer researchers contributed their expertise including Rich Bray, Ron Butler, Wanee Butler, Amy Chu, Cathy and Donn Cook, Larry Crowley, Susan Harris, Joe Krieg, Jeff Moline, Jean Morgan, Marisa Pankowski, and Gordon Revey.
Participants	M Broughall, Sean Burns, Marina and Darryl Dargita, Charles Ernst, Carrie Evans, Judy Feland, Mary Jane Foley, Joyce Gellhorn, Anita and Gerry Gershten, Karen Hollweg, Mary Jane Howell, Ben Hudack, Kathleen and Sophie Krauth, Betina Mattesen, Carolina Quintero, Emi Lehman and Bay Roberts, Ellen Shannon, Jim and Kathy Snow, Lewis Taylor, Lauren Tracey, Olivia and Julia Weed, Lysa and Mort Wegman-French, Joshua and Jeffrey Whitaker, Ru Wing

Table IX. GPS Readings and Elevations - (2 pages)**Definition:** "Turnaround" is the extent of that day's inventory recorded in the GPS position.

Life Zones	Place	Location within property	Elevation	Latitude	Longitude	
Plains	SE Buffer, BCPOS	Entrance gate at south end, north of Hwy 128	5,873 ft	N 39° 54' 45.9"	W 105° 10' 57.1"	
		northern barbed wire fence		N 39° 55' 00"	W 105° 10' 51.6"	
	Carolyn Holmberg at Rock Creek BCPOS	Parking lot	5,285 ft	N 39° 56' 49.6"	W 105° 06' 32.8"	
		Turnaround on the trail	5,274 ft	N 39° 56' 33.8"	W 105° 06' 21.5"	
		Watercress in irrigation ditch	5,274 ft	N 39° 56' 33.8"	W 105° 06' 21.5"	
Foothills/ Montane Transition	Heil Valley - Geer BCPOS	North end of Big Meadow, at rocky streamlet parking	6,256 ft	N 40° 09' 45.4"	<i>unavailable</i>	
		Turnaround near streamlet in Big Meadow	6,358 ft	N 40° 08' 07.9"	W 105° 19' 10.7"	
		Culverts above manager's cabin	6,420 ft.	N 40° 08' 51.9"	W 105° 18' 58.1"	
		Access gate on road leading to manager's cabin	6,128 ft.	N 40° 08' 51.3"	W 105° 18' 47.6"	
	Heil Valley - Plumely Canyon BCPOS	Locked gate on roadway near mouth of canyon	6,072 ft	N 40° 09' 22.3"	W 105° 18' 02.2"	
		Stone remains at upper meadow	6,310 ft.	N 40° 09' 29.0"	W 105° 18' 30.9"	
		Heil Valley, BCPOS	Roadway toward Red Hill or Plumely; stream crossing		N 40° 09' 20.4"	W 105° 17.9' 86"
		Upper Meadow above Marietta Canyon near roadway		N 40° 10' 51.6"	W 105° 18' 06.6"	
		Red Hill Saddle	6,365 ft	N 40° 10' 23"	W 105° 17' 19.9"	
		Turn around down slope toward the north; exposed red sandstone	6,275 ft	N 40° 10' 09"	W 105° 17' 19.0"	
		Heil Valley North - right- of-way	Right-of-way thru electric fences; followed pink ribbons - Turnaround point	5,617 ft	N 40° 12' 07.1"	W 105° 16' 10.9"
	Montane	Reynold's Ranch	National Forest entrance, Magnolia Road	8,666 ft	N 39° 57' 12.1"	W 105° 28' 30.4"
Meyers Gulch, BCPOS		Parking lot	7,339 ft	N 39° 57' 32.4"	W 105° 20' 20.6"	
		Turn-around	7,322 ft	N 39° 57' 57.7"	W 105° 20' 35.6"	
		Following streamlet	7,334 ft	N 39° 58' 00.4"	W 105° 20' 39.8"	
		Kinnikinnick patch	8,540 ft	N 39° 57' 24.9"	W 105° 28' 25.6"	

Life Zones	Place	Location within property	Elevation	Latitude	Longitude
Upper Montane	Caribou BCPOS	Locked gate	8,677 ft	N 39° 58' 52.7"	<i>unavailable</i>
	Caribou BCPOS	Meadows near horse trail	8,664 ft	N 40° 55' 24.5"	W 105° 32' 22.9"
		Far end (west) of meadow before horse trail goes into evergreens	8,475 ft	N 39° 59' 23.6"	W 105° 32' 24"
		DeLonde Homestead picnic table	8,575 ft	N 39° 59' 24.3"	W 105° 31' 55.0"
	Caribou BCPOS	DeLonde Homestead at closed gate on driveway toward the north	8,544 ft	N 39° 59' 27"	W 105° 31' 44"
		Switzerland Trail - turnaround	8,790 ft	N 40° 00' 13"	W 105° 31' 40"

Table X. Mileage to Research Site

Location of Research	Miles per trip	# of trips	Total Miles of Research Travel	Cost to Driver	Budgeted	Out-of-pocket
Coal Creek	33	x 1 =	33			
Deadman's Gulch	80	x 5 =	400			
Rock Creek - SE Buffer	26	x 4 =	104			
Rock Creek - Stearn's Lake	20	x 1 =	20			
Hall Ranch	50	x 1 =	50			
Anne U. White	30	x 5 =	150			
Steamboat Mountain	57	x 1 =	57			
Rabbit Mountain	55	x 1 =	55			
Heil - Geer	32	x 3 =	96			
Heil - Plumely	34	x 4 =	136			
Heil - Red Hill	44	x 1 =	44			
Heil - North	50	x 2 =	100			
Reynold's Ranch	48	x 1 =	48			
Meyers Gulch	24	x 2 =	48			
Caribou Ranch	54	x 4 =	216			
Total	\$0.45 per mile x		1557	\$700.65	\$594	\$106.64

Table XI. Budget and Expenses

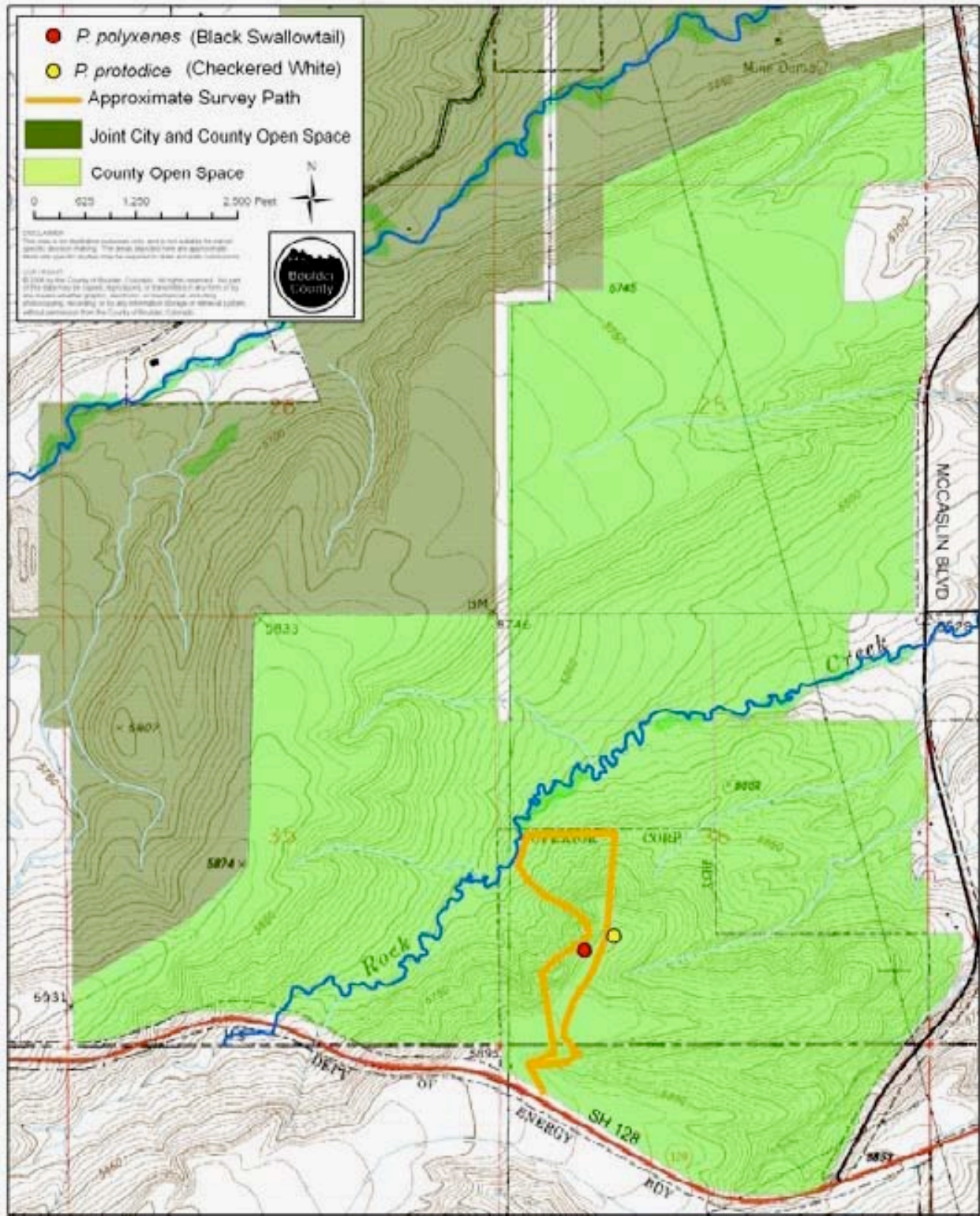
Budget and Expenses	Budget	Expenditure
<i>Salaries</i> : 33 field days x 2 researchers/day = 66 days@ \$25/day =	\$1650	
<i>Actual</i> : 35 field days x 2 researcher/day		\$1750
<i>Office work</i> (report and presentation preparation, data analysis): 15 hours x \$10/hr. =	\$150	
<i>Actual</i> : 140 hours		\$1400
<i>Travel</i> : 33 field days x 40 mi. /day x \$0.45/mi. =	\$594	
<i>Actual</i> :		\$701
<i>Office supplies</i> : computer paper, photocopying, etc. Including materials for one half-day class	\$106	
<i>Actual</i> :		\$106
Budget	\$2,500	\$3,957

In-kind contribution by author:

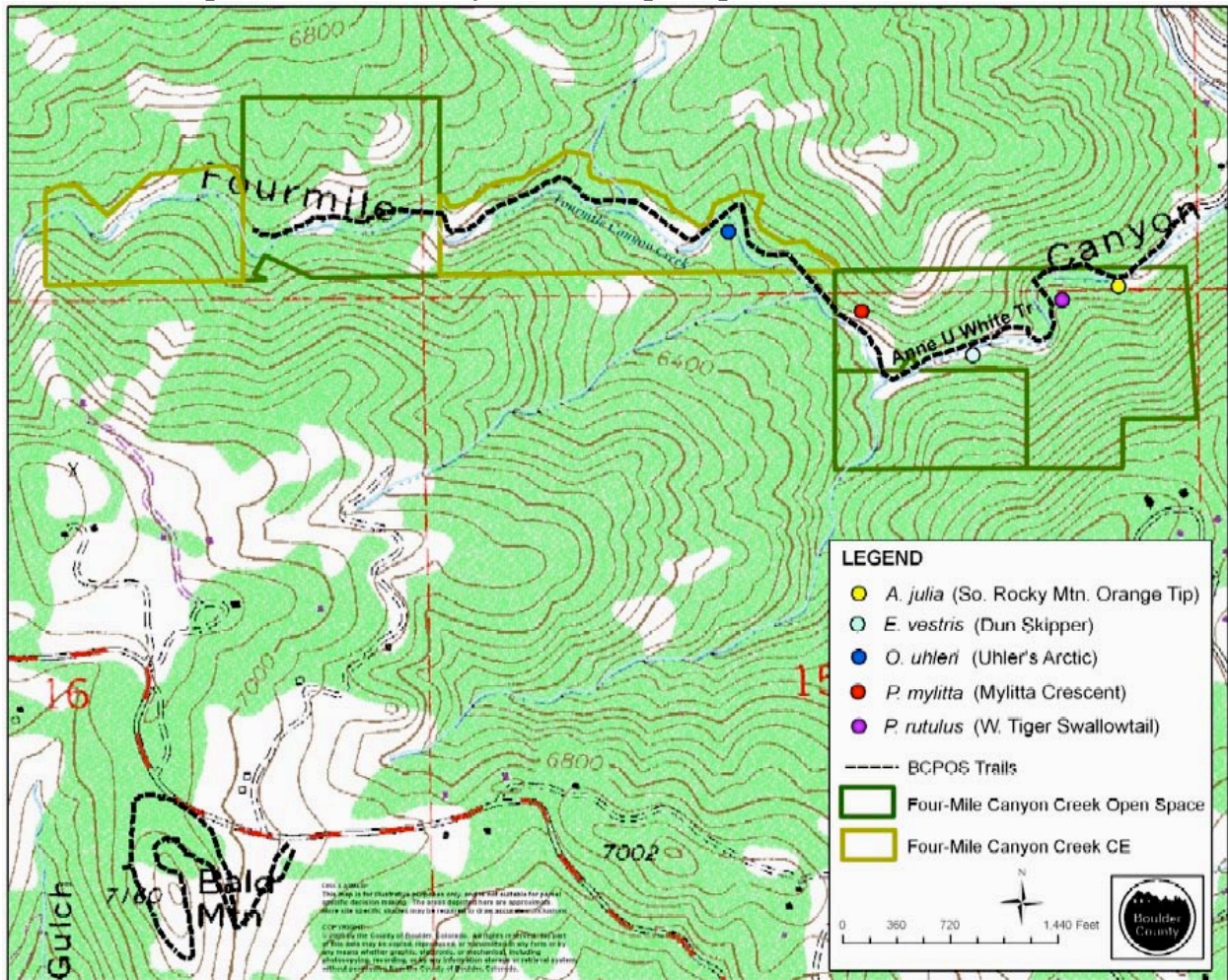
Equipment (digital camera) =	\$400 (on hand)
Computer/printer supplies =	
One black HP cartridge =	\$120
Basic back-up GPS unit =	\$140 (author received as a gift)
Field guides (butterfly and flora): =	\$50
<u>Weatherproof field notebooks/pens: =</u>	<u>\$44</u>
Total in-kind contribution	\$754

Maps of Research Areas

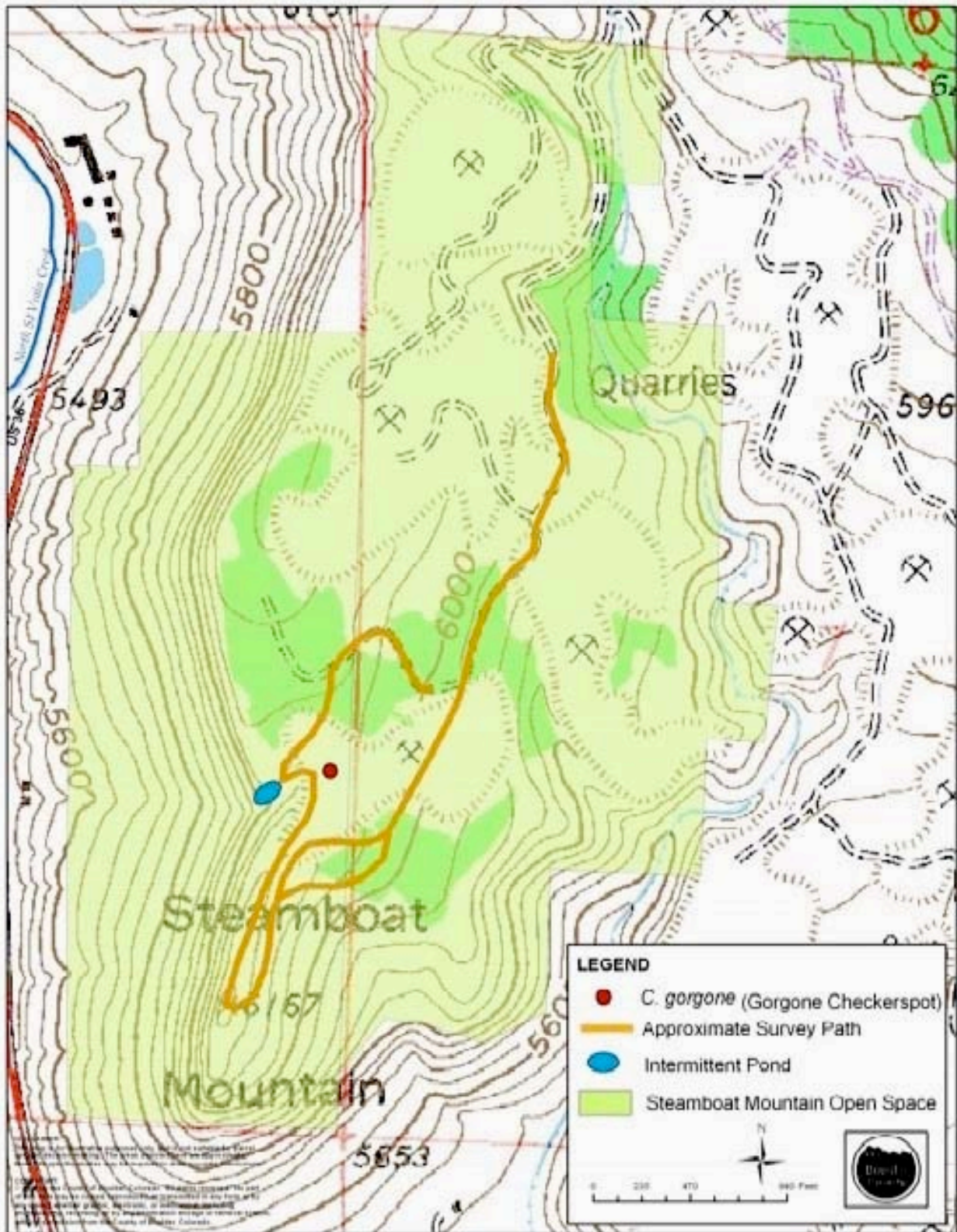
Map A. Southeast Buffer Open Space



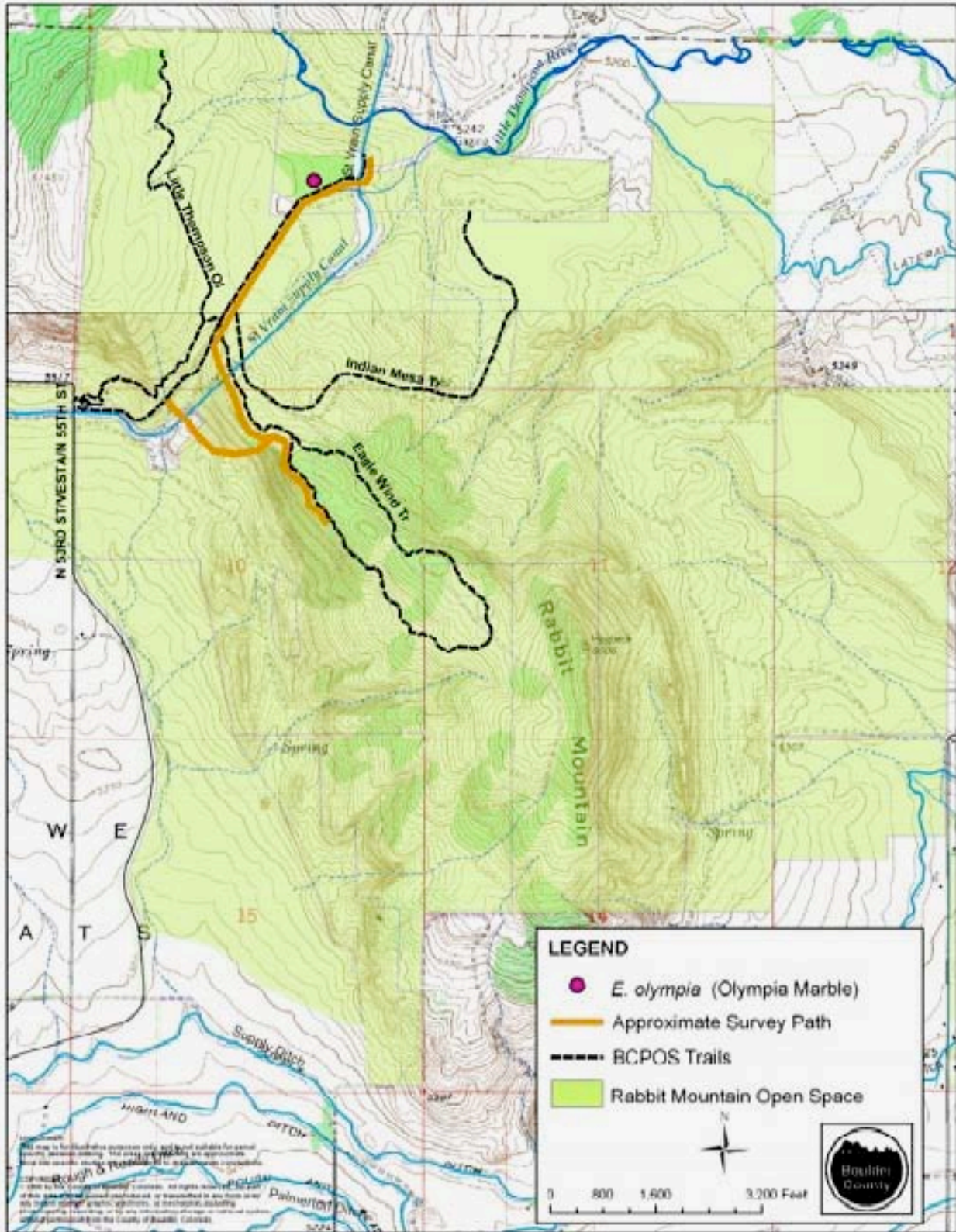
Map C. Four-Mile Canyon Creek Open Space: Anne U. White Trail



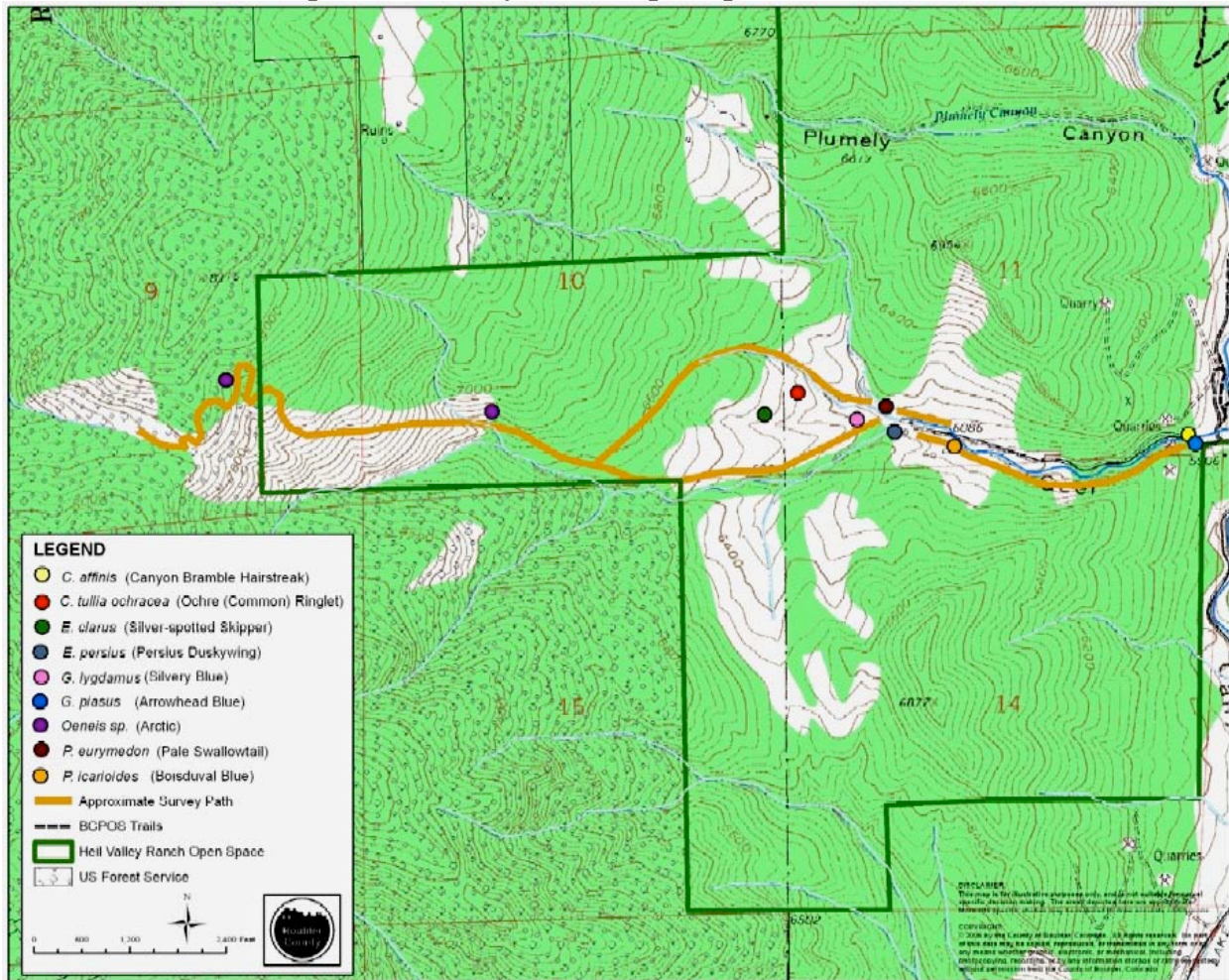
Map D. Steamboat Mountain Open Space



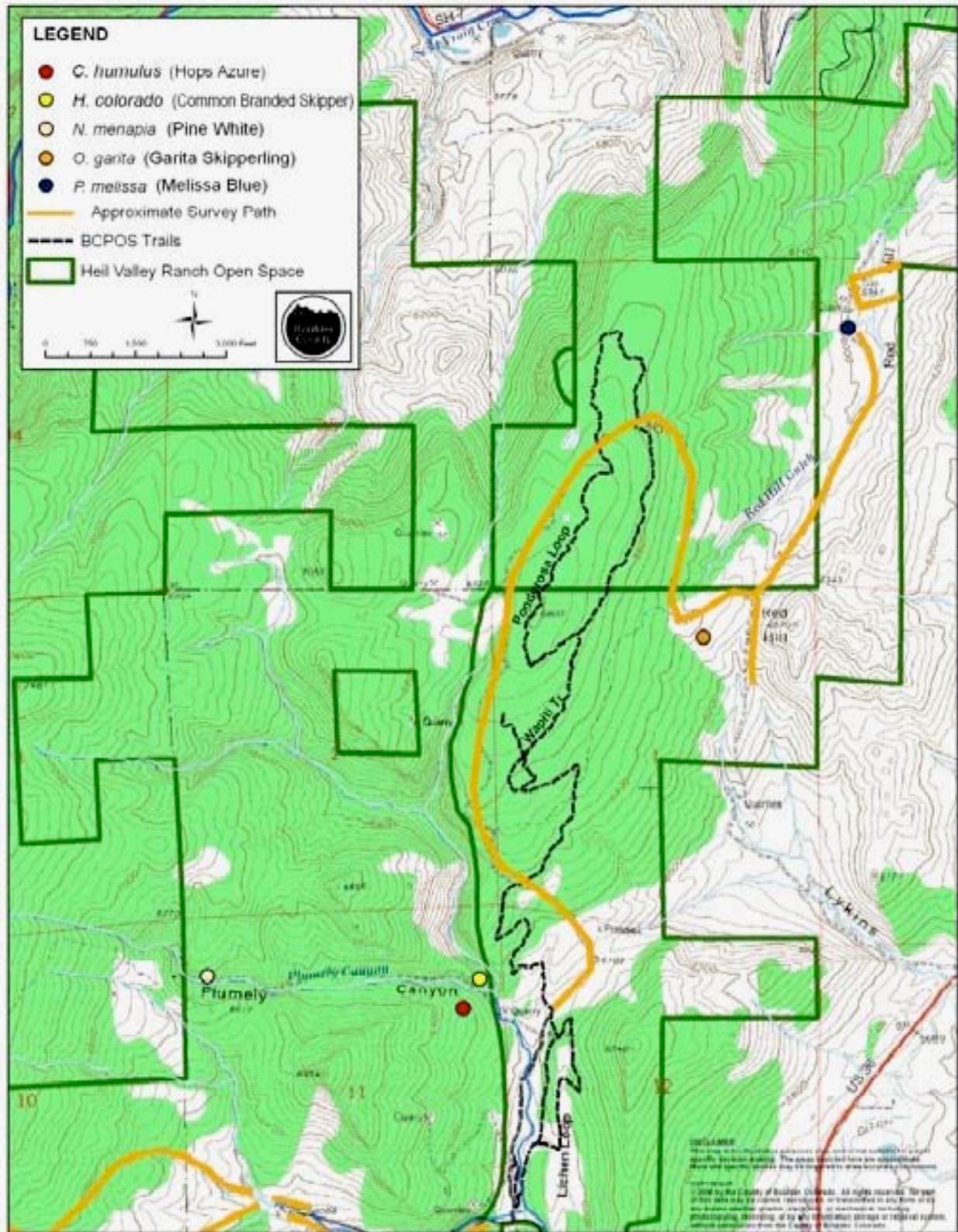
Map E. Rabbit Mountain Open Space



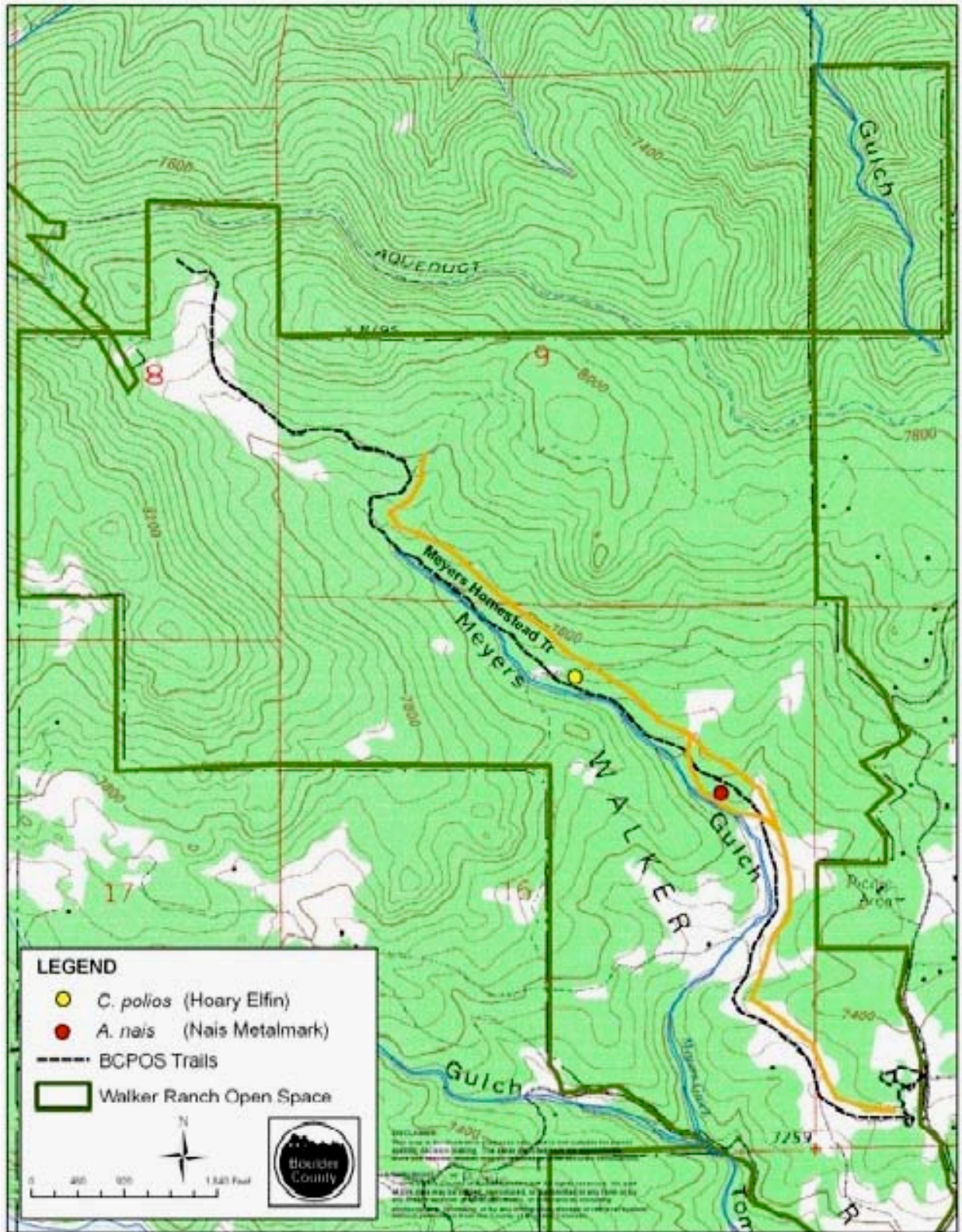
Map F. Heil Valley Ranch Open Space: South (Geer)



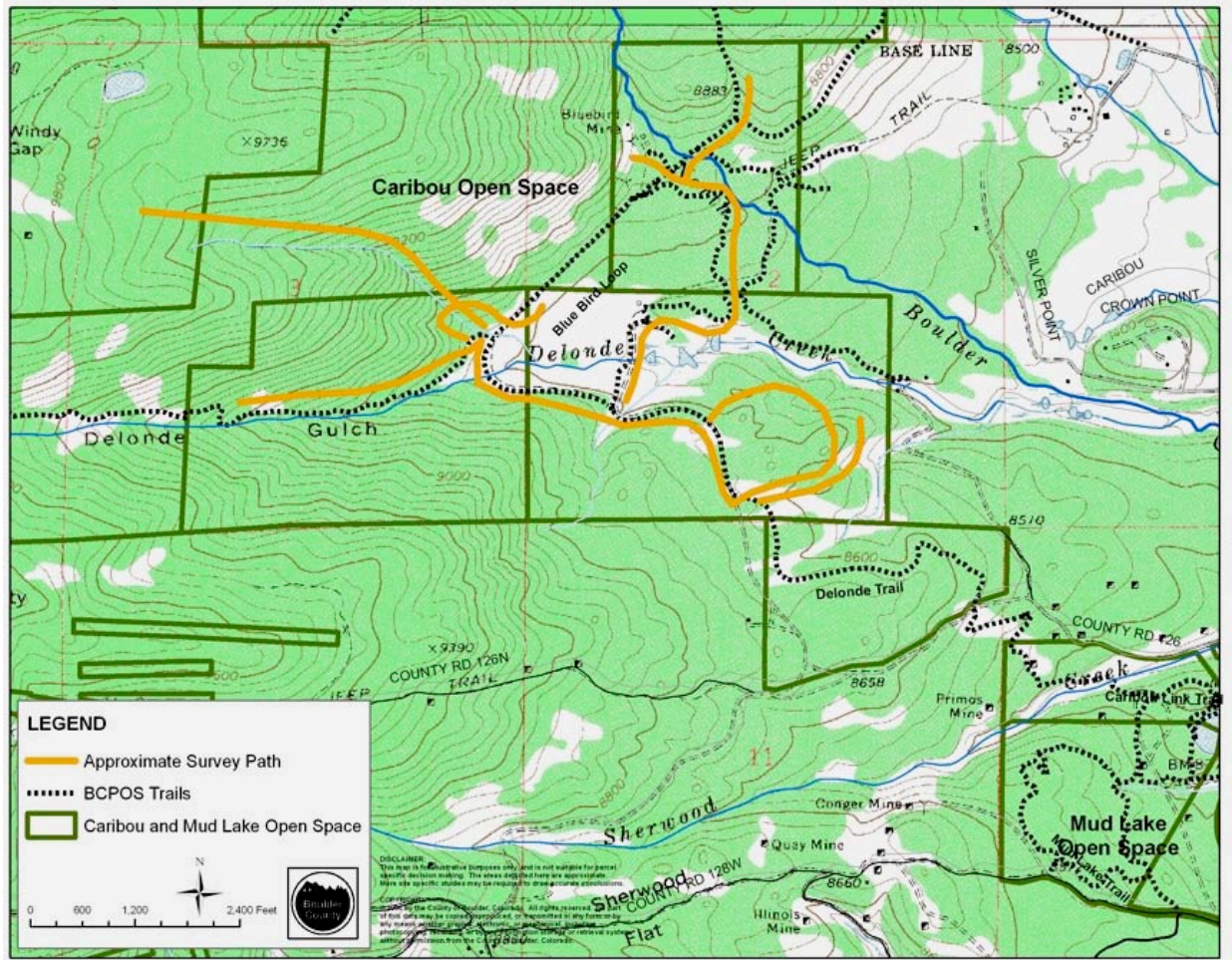
Map G. Heil Valley Ranch Open Space: North (Plumely, Red Hill, North Heil)



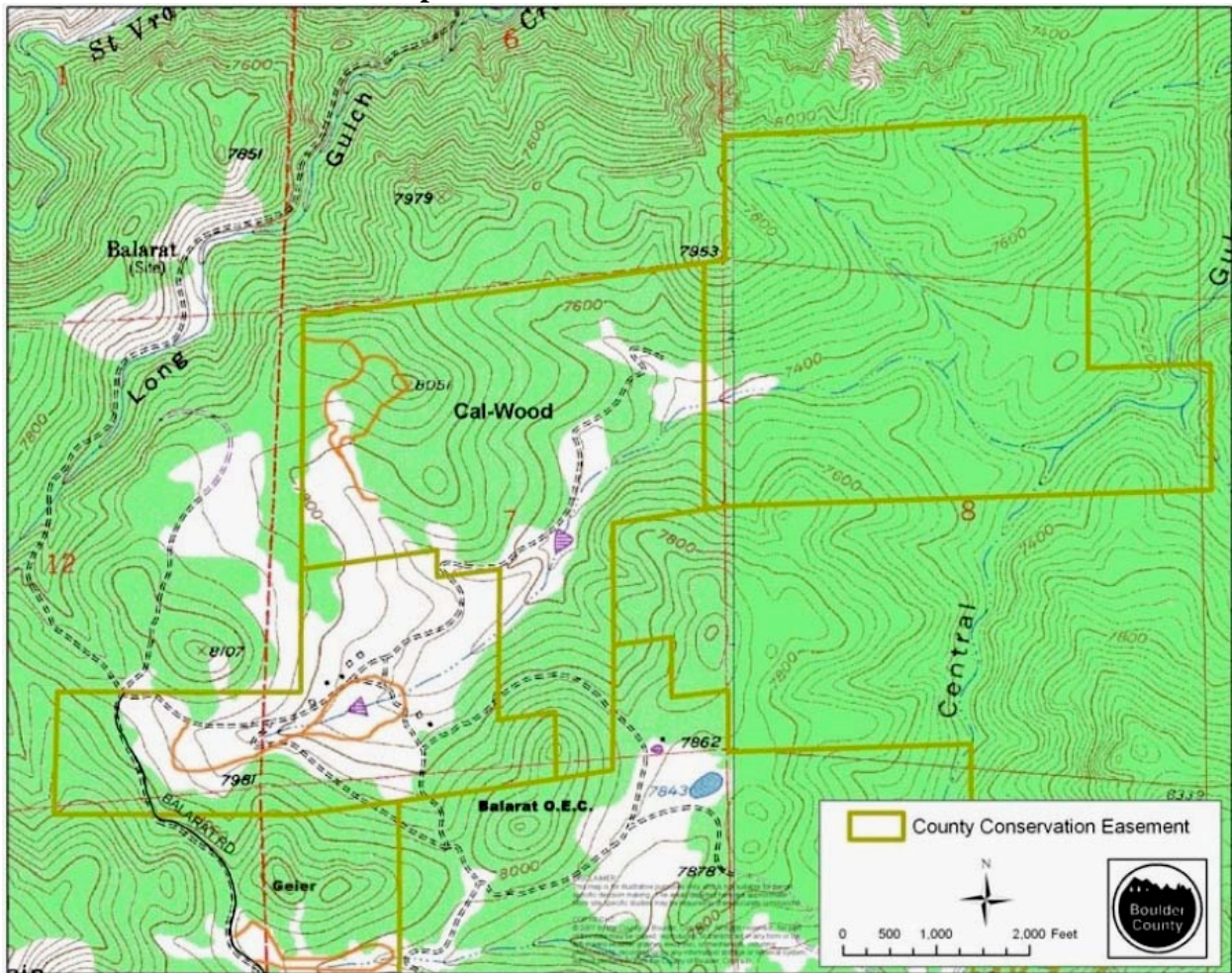
Map H. Walker Ranch Open Space: Meyers Homestead Trail



Map I. Caribou and Mud Lake Open Space



Map J. Cal-Wood Education Center



↑ Located on County Road 87