

Boulder County Parks and Open Space
and
Boulder County Nature Association

Butterflies

A Continuing Study of Species and Populations
In Boulder County Open Space Properties -
2011 Inventory and 2007-2011 Analyses



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December 2011

Boulder, Colorado

Table of Contents

Table of Contents ii

I. Acknowledgments 1

II. Abstract 1

III. Introduction 2

IV. Objectives 3

V. Research Methods 3

VI. Notes and Discussion for 2011 12

VII. Data Tables for 2011 12

 Table I. Survey Dates and Locations 12

 Table II. Southeast Buffer 14

 Table III. Anne U. White – Fourmile Canyon 18

 Table IV. Heil Valley – Geer Watershed 24

 Table V. Heil Valley – Plumely Canyon 29

 Table VI. Heil Valley – North 34

 Table VII. Walker Ranch – Meyer’s Gulch 38

 Table VIII. Reynold’s Ranch 44

 Table IX. Caribou Ranch and Mud Lake 49

 Table X. Rabbit Mountain 54

VIII. Analysis of 2007-2011 Butterfly Inventories ... 56

A. I/RH and Species /RH on Open Space Properties 56

 Table XI. Southeast Buffer 57

 Table XII. Anne U. White – Fourmile Canyon 58

 Table XIII. Heil Valley – Geer Watershed 59

 Table XIV. Heil Valley – Plumely Canyon 60

 Table XV. Heil Valley – North 61

 Table XVI. Walker Ranch – Meyer’s Gulch 62

 Table XVII. Caribou Ranch and Mud Lake 63

Continued on the next page.

B.	I/RH and Species/RH for Major Butterflies.....	64
C.	Annual I/RH - Totals for Major Butterflies.....	67
	Table XVIII. Annual I/RH - Totals for Major Butterflies	67
	Table XIX. Five-year Annual I/RH Totals vs. Average I/RH.....	67
	Table XX. Five-year Annual Species/RH vs. Average Species/RH.....	68
	Table XXI. Precipitation vs. I/RH for Boulder.....	69
IX.	Conclusions	70
X.	Recommendations.....	72
XI.	References	73
	Appendices	75
	Appendix A. Butterflies Observed During Surveys - 2004-2011	76
	Appendix B. Blooming Plants Observed During Butterfly Surveys	79
	Appendix C. Maps of Inventory Sites within Boulder County Open Spaces	83
	1. Southeast Buffer.....	84
	2. Anne U. White – Fourmile Canyon Trail	85
	3. Heil Valley Open Space, Geer Watershed.....	86
	4. Heil Valley Open Space, North and Plumely Canyon.....	87
	5. Walker Ranch, Meyer’s Gulch	88
	6. Reynold’s Ranch.....	89
	7. Caribou Ranch and Mud Lake	90
	8. Rabbit Mountain	91
	9. Steamboat Mountain.....	92

Cover photo: Hops Azure, a rare butterfly, July 5, 2011 at Heil Valley, by John S. Barr.

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I. Acknowledgments

Our research team has conducted butterfly surveys for ten consecutive years, from 2002 through 2011, with 2002-2005 introductory to the lands and butterfly species, and 2006-2011 more in depth. My valuable field team this year, friends with sharp eyes and quick binoculars, included: Larry Crowley, who recorded not only the butterflies, but blossoming plants and wildlife; Jean Morgan, Amy Chu and Joe Krieg, enthusiastic butterfly chasers. Venice Kelly and John Barr, took digital photos of many of the hard-to-identify butterflies. Our helpful mentors Paul A. Opler, Robert Michael Pyle, Ray E. Stanford and Andrew Warren readily assisted in identification and editing for scientific accuracy. I'm indebted to Marc Swadener who was the page editor and designer of this document.

A generous grant from Boulder County Parks and Open Space (BCPOS) funded fieldwork, writing and printing of the report. Therese Glowacki, Manager-Resource Manager, and Susan Spaulding, Wildlife Specialist, issued a Special Permit for access into the open space properties and oversaw research. Claire DeLeo, Plant Ecologist, provided botanical assistance and Meredith Dutlinger prepared maps. Kevin Grady and Amanda Hatfield, Ranch Caretaker and Resource Protection Rangers, provided useful information about wildlife sightings at Heil Valley and Walker Ranch respectively.

Boulder County Nature Association (BCNA) generously provided a research grant for furthering county records. President Sue Cass, and the Board of Directors encouraged the continuation butterfly inventories. In addition, the BCNA published "Butterflies of the Colorado Front Range" co-authored by Janet R. Chu and Stephen R. Jones. This field guide is available locally and on Amazon.com.

As a Boulder County volunteer naturalist, I presented a public program August 6 on the Lichen Trail with the help of Larry Crowley and Amy Chu. Thirty participants enjoyed the discovery of flying insects, while concentrating on butterflies. In addition, on June 13 a course through BCNA was held in Anne U. White for seven participants.

II. Abstract:

Butterfly inventories continue to contribute substantial data to the Boulder County Open Space natural history records. Field inventories during 50 days clocked 133 research hours as compared with 84 in 2010. Of the recorded 201 Boulder County species, 118 were observed in 2011; with 123 during 2004-2011. We conducted walking surveys on each of the following

seven properties, in 2011: Southeast Buffer (7 surveys); Anne U. White (10); Heil Valley - Geer Watershed (5), Heil - Plumely Canyon (7), Heil - North (4); Walker Ranch (4) Caribou Ranch and Mud Lake (4) Rabbit Mountain (3) and Steamboat Mountain (1).

Annual totals of butterfly Individuals per Research Hour (I/RH) were charted for five years. The calculated average for the five-years was 86 I/RH. The greatest numbers were in 2007 (112) with 2010 and 2011 (62 and 61 respectively) showing the lowest numbers. Common Ringlets were most numerous (94.2 I/RH) followed by Variegated Fritillaries (36.9 I/RH), Cabbage Whites (34.7 I/RH), Checkered Whites (10.9 I/RH) and Painted Ladies (9.1 I/RH).

Annual totals of species/RH were 4.4 in 2007, higher than the average of 3.4, and totals were lower than average in 2009 and 2011.

A new species, the Fulvia Checkerspot discovered in 2011, was added to the Boulder County sightings records. A Ruddy Copper, Silver-bordered Fritillary and Leonard's Skipper were the first we've observed during our ten years of butterfly surveys. Immigrant butterflies from southern U.S. and Mexico, so prevalent last year, were noticeably absent this year. This team has provided these detailed studies of natural resources to help with ongoing efforts to support management decisions.

III. Introduction:

In 2011, our team explored the interior areas of our county Open Spaces, learning more and more about the resident butterflies. Our prime objective was to add to the detailed multi-year inventories, where the locations and habitats were known to support butterfly species. Since the Walker and Reynold's Ranch Open Spaces were undergoing management review, we increased our annual number of visits to these areas. In addition, we continued inventories within the Southeast Buffer, Anne U. White, Heil Valley (three sites), and Caribou Ranch-Mud Lake. Fewer surveys were completed on Rabbit Mountain and Steamboat Mountain. Birds, flowers and additional fleeting animals were recorded.

Name changes: The butterfly long known as *Anthocharis sara julia* has been elevated to full species status as *A. julia*, resulting in our local butterfly now being called the Julia Orangetip. The Sara (or Pacific) Orangetip *A. sara* is found largely in California. The common 'Spring Azure' in this area, previously known as *Celastrina ladon sidara*, has become *C. echo sidara*, and should now be referred to as the Echo (or Rocky Mountain) Azure. What has been called *Plebejus acmon lutzii* in many books and lists has now been reassigned to the species known as the Lupine Blue,

and as such is properly designated *Plebejus lupini lutzii*. *P. acmon*, the Acmon (or Buckwheat) Blue, is a West Coast species not present in Colorado.

IV. Objectives:

1. Continue butterfly records of the previous nine years.
2. Inventory butterflies in Boulder County Open Space properties.
3. Support management review and decisions on Walker and Reynold's Ranches.
4. Integrate Boulder County data into the national data base for butterflies.
5. Encourage awareness and observations of butterflies by the general public, volunteer naturalists and BCPOS staff.
6. Enhance the public's understanding of the need for conservation and appreciation of butterfly habitats.

V. Research Methods:

The methodology used in 2011 is similar to that described in my earlier report, "Butterfly Inventory and Research on Open Space Properties" (Chu, 2005). This has become the protocol for butterfly research by our team in Boulder County.

"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 by the unaided eye, by using close-focusing binoculars, or in the hand using a 'net and release' procedure. Locations of the inventory site, species and numbers (clearly identified at close range), the date, time in the field, temperature and useful notes about butterfly activities and blossoms were listed. Digital photos were often made in order to assist in identification" (Chu, 2006). Much of the time birds and other wildlife were noted. Blossoming plants were recorded since they provide nectar for adults and possible food sources for caterpillars.

We devised the standard unit 'Individuals per Research Hour' (I/RH) for this study. It describes the total number of individual butterflies sighted divided by the total number of hours of field

research by the team for each specific study area. It is not dependent on the number of researchers on team that day. Since we do not follow a measured transect nor restrict our studies to a certain time period the unit, I/RH is used for comparison from one site to another and from one season to the next.

VI. Notes and Discussion for 2011

Noticeably, species encountered during previous years, but not seen this summer, included the resident Spring White and our favorite immigrants Dainty Sulphur and American Lady. Painted Lady appeared only twice and late in the season (one June 27, one July 11), however the local second brood was observed in other than study areas later during September and October. Numbers of spring butterflies were noticeably reduced, but summer butterflies made a good showing beginning in late May. Autumn butterflies had a long mild dry season to continue flying.

Southeast Buffer: Early on April 21 in the Southeast Buffer we saw an Olympia Marble flying along the west-facing crest of ‘Swallowtail Ridge,’ named such because swallowtails almost always appear there hill topping. We saw a pair of Anise Swallowtails circling at this spot the same day. Variegated Fritillary appeared unexpectedly late on June 6, because of cool wet spring weather; these usually arrive in spring when the Nuttall’s Violets bloom. We observed the uncommon Gray Copper only once July 24, 2011, and only at this ridge. This Copper generally lives much to the north and east, but this immigrant Gray Copper was seen previously on the Buffer prairie on July 19, 2010 and July 21, 2009. Fulvia Checkerspot was newly added to the Boulder County species list by Amy Chu who caught two in one swing of the net. Their resident area is southwest from central Kansas, Nebraska, central Texas, west through southeast Colorado, where the Indian paintbrushes *Castilleja integra* and *C. lamata* grow. We saw several Leonard’s Skippers, a species new to our survey, flying in numbers over the desolate dry prairie, and nectaring on remnant blossoms of Gayfeather on Aug 31 and September 2.

Anne U. White - Fourmile Canyon Trail. Heavy foot traffic and off-leash dogs continue to disturb trailside vegetation here. On April 15 there were 14 dogs, and three dogs off-leash. Their claws cut the undergrowth destroying blossoming and possible nectar producing plants for butterflies. On May 8, we observed W. Pine Elfin nectaring on Wild Plum and Oregon Grape-holly, with the Echo Azure on Willow. Mourning Cloaks found sustenance in Sapsucker holes on May 27. Julia

Orangetips which fly for a short time in May were observed in 2008 and 2011, but none was observed in 2009 or 2010.

On June 13 the row of Lilacs beside Pinto Drive leading to Anne U. White was in full bloom and filled with Pale Swallowtails and Western Tiger Swallowtails, Mourning Cloak, and fritillary species. Several Edwards' Fritillaries were nectaring in orange Wallflower blossoms. Twenty-six species were seen that very productive day. Blues, Uhler's Arctics, and two Short-tailed Swallowtails were puddling in mud and on wet wood. We saw three new butterflies on this trail for the first time: Callippe and Mormon Fritillaries, and Northern Checkerspots.

On August 12, 2011 Amy Chu wrote in her field journal, "The trail was just opened after a five-foot flood washed through here from the Fourmile burn area. It was rebuilt by 12 Youth Corps volunteers after flooding took many trees down and snapped the Willows. The stream previously was topsoil-edged about two to three feet wide, but now is sanded in five foot widths. The detritus is full of charcoal with at least two drowned orange Aphrodite Fritillaries among the black chunks."

Heil Valley Open Space – Geer Watershed. We saw the Dusted Skipper only once before 2009, three times in 2009, none in 2010 and 13 in 2011. On June 1 one was observed in Geer. This is an eastern butterfly whose range continues to expand. The Little and Big Bluestems, its host plants are fairly common and vigorous in this county.

Nectaring butterflies on June 1, 2011, were Dusted Skippers on Lambert's Loco and Common Ringlets on Dandelion. We unrolled Golden Banner leaves finding Persius Duskywing caterpillars, their silk threads pulling a protective tent around each one. On June 15 we saw Common Ringlets nectaring on Watercress; Persius Duskywings, Arrowhead Blues and Boisduval's Blues on blue Vetch and Wild Geranium. That day the weather continued extremely dry with very few puddles evident, but Jean Morgan and Amy Chu stopped at a shallow muddy puddle next to the Heil cattle ranch road. It was filled with cow hoofmarks, green algae and grazed plants. Visiting the mud they counted many Swallowtails – Anise, Short-tailed, W. Tiger, Pale and Two-tailed. What a colorful gathering. One of the nicest surprises was Amy rousing a bobcat that was drinking from the stream on April 2.

Heil Valley Open Space – Plumely Canyon. On April 17 the early W. Pine Elfin males were whirling in groups of 2's, 4's and 6's in the canyon below the trail celebrating the sunny spring

day. The rare Moss' Elfin appeared for the first time that we noted, in Plumely. On June 16 each of the six swallowtail species was viewed along with eight blues and sixteen additional species making a total of 30 species that day. It was the most productive in terms of species seen during a day in 2011. We located five Hops Azures on Hops trailing vines near the quarry; these are listed as rare according to Colorado Natural Heritage. On July 27 all the butterflies were tattered with damage on their wings after local mountain hail had apparently struck this area.

Steve Jones and I were comparing notes on August 6 and found two different fritillary species only five miles apart, both in the Foothills. My team arrived about 8:30 a.m. at the Heil Valley picnic pavilion for a county sponsored public walk. While people were assembling, we were amazed to see a stream of fritillaries all flying in the same direction downstream. Seventy-one Aphrodite Fritillaries were counted in 20 minutes. Apparently the butterflies were dispersing southward for better nectar and moisture. We found the nearby Lichen Trail to be exceedingly dry with only few Horsemint, Golden Aster and Gumweed in bloom. I complained about lack of moisture in my study areas east and north of Boulder; on the other hand, Steve reported 'measurable moisture' in the south of Boulder County. Steve wrote in his Long Canyon journal, "On August 6, we saw approximately 200-300 Northwestern Fritillaries and no Aphrodite Fritillaries. They were nectaring on Monarda where we usually see them in early August, and no sign that they had dispersed here. We see Aphrodite Fritillaries in upper Gregory and Long from mid-June through late July. It was actually pretty normally moist in upper Gregory and Long Canyon, with lots of Monarda in bloom." It pleased us to make this comparison.

Heil Valley Open Space – North. On May 31, along the long North Point hill a Dusted Skipper was nectaring on Fremont's Geranium. Cricket frogs sang in the 30 foot wide upper pond and also in the lower holding ponds. Many flowers were in bloom. Large Marbles, Silvery Blues and Gorgone Checkerspots were flying in usual numbers. Later on July 29 when water was only in the lower pond near the roadway, the flowers few and the land dry, we observed several pairs of Variegated Fritillaries mating. A single rare Arogos Skipper flew near the field of Small and Big Bluestem. It sipped nectar with Melissa Blues and fritillaries on the Fremont Geranium which grew in a shallow depression.

On July 19 we walked from behind a private home near the Red Gulch, a secluded canyon apparently free of grazing cattle, roaming dogs or human social trails. The Common Sootywing,

which lives on Lamb's Quarters and Cheeseweed, displayed in special weedy habitat, each small shiny black butterfly patrolling back and forth within its eight foot long shallow territory in the gulch. A Green Skipper and several Dun Skippers were nectaring on the long-blooming Fremont Geranium, a single Large Marble on frail blue Flax. A colorful mid-sized rattlesnake *Crotalus viridis* paused in front of me to see if this large mammal was a threat. I wasn't, so it allowed photos to be taken from a distance of two meters.

Walker Ranch, Meyer's Gulch. The team walked the Meyer's Homestead Trail on April 28, May 6 and May 22 with no butterfly sightings; midday was too cold at 14-17 °C on these days. On June 7 temperatures ranged from 17 to 25 °C, finally warm enough for the butterflies to be active. Three swallowtail species flew with an uncommon Mormon Fritillary. By this date the Large Marbles, Canyon Bramble Hairstreaks, Hoary Elfins, Common Ringlets, and Uhler's Arctics were flying, especially to puddle at a muddy rut in the road.

On July 13 the large patch of dogbane was in full bloom attracting fritillaries and skippers. In among the blossoms were three uncommon Checkerspots – Silvery, Northern and Variable. The fragrant white flowers attracted Dun Skippers, Callippe and Northwestern Fritillaries. Two species were nectaring each on its own host plant; Rocky Mountain Parnassian on Stonecrop and Rocky Mountain Dotted-blues on Sulphur-flower. Parnassians are uncommon at this low elevation.

A walk to the old barn on June 27 brought us to more than 80 Milbert's Tortoiseshell caterpillars, (1st through 4th instar stages) munching on Stinging Nettles. One Tortoiseshell female was searching around the plants for some fresh leaves on which to deposit more eggs. Rocky Mountain Dotted-blues were mating on their host, Sulphur-flower. In addition tiny orange Garita Skipperlings were nectaring on Fremont's Geranium. On August 25 late flying Hedgerow Hairstreaks, Small Wood Nymphs, Western Branded and Woodland Skippers put in their normal autumnal appearances.

Reynold's Ranch. Two portions of Reynold's were surveyed. Giggey Lake extended south from the Magnolia Road gate through some of the conifer forest, into the meadow along the boggy-lake to the south fence. June 11 was our first visit to this lake during our ten years of butterfly surveys. In 2009, we had surveyed at the Bog North portion, along and north of Magnolia Road.

On June 11, we found Large Marbles ovipositing on Tower Mustards and nectaring on Dandelions along Giggey Lake. We counted a magnificent flight of more than 100 Greenish Blues in a short three hours, many nectaring on Red Clover and Geyer Onions, and one pair mating. Hoary Commas were nectaring on onions; Queen Alexandra's Sulphurs on Arnica and ovipositing on Golden Banner. Black, Anise, and Western Tiger Swallowtails were hilltopping on the western high point. As we were hiking many Common Ringlets opened their ochre wings and accompanied us along the way.

On August 22 at the Bog North, we watched Ruddy Coppers landing on the tall matted grasses at the north fence. They would fly over the Shrubby Cinquefoil bushes, and rest in the sun before showing their brilliant colors on the grasses. Larry Crowley first noticed Silver-bordered Fritillary males alighting on the Cinquefoil while the females, landing deep into the bushes, determinedly crawled downward to locate their host Violets before egg-laying. In this team's surveying, these two butterflies had not been observed before, likely because we had not searched this bog late in the season. The Callippe Fritillaries were flying from onion to onion nectaring while a Queen Alexandra's Sulphur dazzled yellow on top of the Bull Thistles. On that date the cattle had grazed around Giggey Lake and the plants were chewed to the 'nubbins' except for certain grasses and Wild Iris they seemed to reject. Very little nectar to be found there. They had recently been moved to Bog North and were grazing their way around that meadow.

Caribou Ranch and Mud Lake. June 21 at Mud Lake, Thicket Hairstreaks, Silvery Blues, Common Ringlets, Common Alpines, and Northern Cloudywings were beginning to be active in the north-south depression. Otherwise the forest was too cold for activity. Hairstreaks were nectaring on white Pussytoes joined by Pine Elfins on Mountain Parsley. On July 1 Silvery and Northern Checkerspots were flying. We had rarely seen this species during previous years; only five total at this locale during 2007-2010, but we counted 17 on this single morning. Much nectaring was occurring; Common Ringlets and Boisduval's Blues on Geyer Onions, Northern Checkerspots on Erigeron sp., Parnassians on Arnica, and Common Alpines on Mouse-ear. In addition, Parnassians were ovipositing on Stonecrop. Twenty-five species were noted.

On July 1 we inventoried, beginning inside the locked gate of the Caribou service road, heading northeast toward a boggy depression to one of the best butterflying areas in Caribou. On this date the Common Alpines and Persius Duskywings were numerous. On July 22, walking

along the trail in the Pines, 21 species were noted at Caribou. On August 3 the Bluebell Mine and Monarda Meadows by the Horse Trail were explored. The Meadow was absent of butterflies which was unusual; however, the meadows to the south had many Northwestern Fritillaries nectaring on Blanketflower. A Dusky Grouse with two chicks watched warily as we sat in the aspen grove eating our lunches. It was unusual to see Bull Thistles at their peak and yet no butterfly nectaring at their purple blossoms on conspicuously cobwebby heads.

Rabbit Mountain. This area is not visited regularly, and yet reveals surprises when we hike up the long hill. On September 9 the hills were extremely dry with only Gumweed and Moth Mullein blooming. Yet at the hilltop near the intersection of several trails the grasses exploded with patches of Gayfeather. Bright orange Leonard's Skippers were busy dashing from one blossom to another. This was a new butterfly for our research team because our season usually ends in August. Aphrodite, Edwards' and Coronis Fritillaries joined the bright orange mêlée by displaying and imbibing a few last sips before frost.

Weather factors are complex and affect each butterfly species' populations, their parasites and predator populations in presumably complex and unpredictable ways. These have such powerful effects on life cycle successes – flying, mating, egg laying, caterpillars eating succulent greens and producing chrysalids. Each day before we go to the field, the temperature, clouds and winds affect our choices of endeavoring to inventory, and also choosing a location – prairie or montane. A look back at the 2011 weather, compared to the 112 years of Boulder weather history, shows that March began the season by being the fourth least snowy and the fifth driest on record. It was also the 18th warmest allowing high winds and very low relative humidity combined to fuel nearly 30 wildfires, which is 10 times the March average. Since 1970 the average snowfall has been nearly 20 inches; March 2011 had just 0.6 inch of snow and 0.33 inch of moisture. Drought, wind and extreme low humidity continuously for a number of days, signal to chrysalids and many adults to stay put, continue hibernation. Alternately we go into Roosevelt National Forest in neighboring Deadman's Gulch, a sheltered small canyon west of Lyons. It is one of our favorite March-April sites for locating rare elfins and there we saw one Mourning Cloak and one Hoary Comma on March 16. Our team is always looking forward to spring and hiking in the Open Space properties but during March 16, 20, and April 1, we saw no butterfly.

Steamboat Mountain. This property was visited only once in 2011. It is entered through a private

sandstone quarry. It is exciting to overlook Lyons with Olympia Marbles zipping past one's head at the far prominence.

The high temperature for April was 26°C on the second, with a monthly average of 18°C. On April 2 butterflies were attempting to come out on a warmer day and a few Mourning Cloaks and Hoary Commas were flying at Heil-Geer. April 4 had the lowest daytime temperature of -6°C. Later the Mourning Cloaks and Hoary Commas and were out on April 9 and 15, along with single Pine Elfins at Geer and Anne U. White. April continued relatively dry with 2.4" of precipitation rather like the average 99-year period which is 2.5". Boulder had 15 days with traces of rainfall and 3" of snow on April 14.

May began hot and dry, then became exceptionally wet with more than 5 inches of precipitation falling over a 14-day period with snow accumulation on the 11th. May was 1.5°C cooler than normal making it the 11th coolest May on record. This slowed fieldwork for us with marginally successful outings on cloudy wet days. June began dry and hot with the air clogged by smoke from fires in Arizona, New Mexico and southern Colorado. Evaporation reduced much of the May moisture, yet the record mountain snowpack began to fill reservoirs and streams. By June 13 summer butterfly populations began emerging in better numbers than we saw in May, but the Southeast Buffer remained dry. On June 20, more than an inch of rain fell in Boulder, which was 82% of the month's total.

July had 12 days in the 90's and July 4 had a high temperature of 36°C. This year the July moisture accompanied by a flow of moisture from the south did not materialize, and only 3" of rain were recorded. July 5-16 had traces of rain which made the field days about usual for surveying with the mornings clear and showers in the afternoons. Much of the rain fell on July 19, around the Fourmile Canyon fire area with a flood following through Anne U. White. See the notes for Anne U. White (p.8). August was the fourth warmest on record in Boulder with temperatures reaching higher later in the month, i.e. 36°C on Aug 23, and Aug. 25 hit 33° both breaking records. (Callahan, W. 2011) Mean daily temperatures were almost 1.5°C above average in Boulder during June – August, 2011. We noted 'lack of puddles', 'dry streams', 'very dry ground,' within many of our survey areas, recorded in the notes. All in all, the butterfly season was slow to begin, but summer butterflies emerged as usual. Autumn was long and mild offering a late season to butterfly watchers.

In the following, **Table I Survey Dates and Locations**, the main *leaders* are listed as follows: JC=Jan Chu, LC=Larry Crowley, AC=Amy Chu, JB=John Barr, CN=Christian Nunes.

In **Tables II – X**, butterfly scientific names are listed in **Appendix I** according to and in the order designated in *Catalogue of the Butterflies of the U.S. and Canada* (Pellham,2008) while common names are listed in the North American Butterfly Association Butterfly Counts.

Each list maintains the species we observed over the years. In the informal field notes, blossoming plants are listed alphabetically with common and scientific names given in **Appendix II**, while bird names follow the order in the Colorado County Birding Checklist.

Tables begin on the following page.

VII. Data Tables and Field Notes for 2011

Table I. Survey Dates and Locations

2011	Day	Southeast Buffer	Anne U. White	Heil- Geer	Heil- Plumely	Heil -North Point, Red Hill	Walker Ranch Meyers	Reynold's Ranch	Mud Lake, Caribou	Rabbit Mountain	Steamboat Mountain
Apr	1	JC									
	2			JC							
	9			JC							
	11									JC	
	15		JC								
	17				JC						
	21	JC									
	27							JC			
	28		JB		JB		JC				
May	3					JC					
	6						JC				
	8		JC								
	21				LC						
	22						LC				
	23	LC									
	27		LC								
31						LC			JC		
Jun	1			JC							
	2										JC
	6	JC									
	7						JC				
	11							JC			
	13		JC								
	15			JC							
	16				JC						
	19					JC					
	21								JC		
27						JC					

Continued on the next page.

Table I. Survey Dates and Locations (Continued)

2011	Day	South east Buffer	Anne U. White	Heil- Geer	Heil- Plumely	Heil- North Point, Red Hill	Walker Ranch Meyers	Reynold's Ranch	Mud Lake, Caribou	Rabbit Mountain	Steamboat Mountain
July	1								JC		
	8		JC								
	11							JC			
	13						JC				
	21	JC									
	22		JC								
	27				JC						
	29					JC					
	Aug	1							JC		
3									JC		
6				JC							
12			AC								
18			JC								
22								JC			
25							JC				
31		JC									
Sep	2	JC									
	9									JC	

Table II. Southeast Buffer

Southeast Buffer	2011	4/1	4/21	5/23	6/6	7/21	8/31	9/2
<i>Papilio polyxenes</i>	Black Swallowtail							
<i>P. zelicaon</i>	Anise Swallowtail		2	1				
<i>P. rutulus</i>	W. Tiger Swallowtail							
<i>P. multicaudata</i>	Two-tailed Swallowtail							
black swallowtail sp.								3
<i>Pontia protodice</i>	Checkered White							1
<i>P. occidentalis</i>	Western White						1	1
<i>Pieris rapae</i>	Cabbage White							
<i>Euchloe olympia</i>	Olympia Marble		10	9	1			
white sp.				3	2		2	
<i>Colias philodice</i>	Clouded Sulphur					2	5	
<i>C. eurytheme</i>	Orange Sulphur						1	
<i>Zerene cesonia</i>	Southern Dogface							
<i>Abaeis nicippe</i>	Sleepy Orange							
<i>Kricogonia lyside</i>	Lyside Sulphur							
<i>Nathalis iole</i>	Dainty Sulphur							
sulphur sp.							5	2
<i>Lycaena dione</i>	Gray Copper					2		
<i>Strymon melinus</i>	Gray Hairstreak		1		1			
<i>Glaucopsyche lygdamus</i>	Silvery Blue			1	2			
<i>Euphilotes ancilla</i>	Rocky Mtn. Dotted-Blue							
<i>Echinargus isola</i>	Reakirt's Blue					3		
<i>Plebejus melissa</i>	Melissa Blue							
blue sp.					2			
<i>Danaus plexippus</i>	Monarch						2	
<i>Agraulis vanillae</i>	Gulf Fritillary							
<i>Euptoieta claudia</i>	Variegated Fritillary				4	19	3	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary				1	3		
<i>S. edwardsii</i>	Edwards' Fritillary							
fritillary sp.	(silvered)				5	4		2
<i>Chlosyne fulvia</i>	Fulvia Checkerspot							2
<i>C. gorgone</i>	Gorgone Checkerspot			6	6			3
<i>Phyciodes tharos</i>	Pearl Crescent							
<i>P. pulchella</i>	Field Crescent							
<i>Nymphalis antiopa</i>	Mourning Cloak							
<i>Vanessa cardui</i>	Painted Lady							
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral							
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet							
<i>Cercyonis pegala</i>	Common Wood Nymph					6		
<i>Erynnis afranius</i>	Afranius Duskywing		1					
<i>Pyrgus communis</i>	Common Checkered-skipper							1
<i>Pholisora catullus</i>	Common Sootywing							
<i>Hesperia uncas</i>	Uncas Skipper							
<i>H. ottoe</i>	Ottoe Skipper							
<i>H. leonardus</i>	Leonard's Skipper						14	15
<i>Atrytone arogos</i>	Arogos Skipper							

Continued on the next page.

Table II. Southeast Buffer (Continued)

Date, Conditions	Location within Southeast Buffer	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Researchers
4/1/2011 11:00 – 12:00 p.m. 17 °C wind 10-20 mph, 80% overcast. Extremely dry.	Walked from gate through small N-S ravine.	None. Woolly bear caterpillar, black wasps, many locusts.	Very few and in bud and very short. Easter daisy Musineon, Nuttall’s violet, sand lily, salt & pepper	Western meadowlark. locusts, black wasps, crickets	5923’ gate N 39.53455 W105.10569	Larry Crowley Jan Chu, Amy Chu
4/21/2011 1:00 – 3:00 p.m. 18-20 °C 40% overcast to clear to cumulus	Small N-S ravine then east toward, Swallowtail Ridge, back along west-facing drop-off	Anise swallowtail circling at Swallowtail Ridge. Marbles flying ridge top.	Short plants: Astragalus purple, dandelion wavy-leaf, Easter daisy (old), Musineon, Nuttall’s violet, salt & pepper, sand lily	Franklin gulls (heard), western meadowlark		Jan Chu
5/23/2011 10:00 – 11:30 a.m. 16-18 °C 30% - 7% clouds; 5 mph wind	County ATV spraying between poles and Swallowtail Ridge		Cactus barrel, dandelion, evening primrose, flax, green gentian, Lambert loco, Mertensia, mouse-ear, Musineon, mustard sm. yellow, Nuttall’s violet, salsify, sand lily, Senecio wallflower	Western meadowlark, vesper sparrow		Larry Crowley

Continued on the next page.

Table II. Southeast Buffer (Continued)

Date, Conditions	Location within Southeast Buffer	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Researchers
6/6/2011 10:00-11:30 a.m. 24-31° C 30% clouds with AZ fire haze, 0-10 wind	From gate to Swallowtail Ridge and return.	Variegated fritillary nectaring on Geyer onion; gray hairstreak nectaring on cowboy's delight; Gorgone checkerspot nectaring on Physaria sp.	Astragalus, purple cactus, ball Castilleja sessiliflora, Coryphantha missouriensis cowboy's delight dandelion, Erigeron evening primrose flax, Gaillardia Gaura, Geyer onion green gentian Heterotheca Lambert loco Mertensia milk vetch mouse-ear Musineon Nuttall's violet Penstemon, one-sided Physaria belli, salt and pepper skull cap, toadflax wallflower, yarrow	Nighthawk, horned lark, Western meadowlark. Vesper sparrow flew from nest with 4 eggs in a grass tussock. Coyote	35 mi r.t.	Jan Chu, Larry Crowley
7/21/2011 8:15-9:45 a.m. 21 °C cloudless no wind	Gate on Hwy 128 to Swallowtail Ridge and return	Very dry. Amy caught new Boulder County record: Chlosyne fulvia	alfalfa, Arnica bull thistle chicory Dalmation toadflax Euphorbia, flax Gumweed knapweed Mexican hat moth mullein mullein prairie clover sunflower	Mourning dove. Meadow vole		Jan Chu, Larry Crowley, Amy Chu

Continued on the next page.

Table II. Southeast Buffer (Continued)

Date, Conditions	Location within Southeast Buffer	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Researchers
8/31/2011 9:00 – 11:00 a.m. 26-31 °C 90% blue sky wind 5-15 mph	Gate on Hwy 128 to Swallowtail Ridge and return	Skippers on Gayfeather; 2 'greenish' unmarked skippers mating	snakeweed Gayfeather Gumweed aster white goldenrod	red tail, kestrel, barn swallow, barn swallow, lark sparrow, vesper sparrow	pt #134 5904' N 39.91261 W105.18250 Swallowtail Ridge pt #135 5878' N 39.91781 W105.17983	Jan Chu, Larry Crowley
9/2/2011 9:00 – 11:30 a.m. 17-23°C 50% clear wind 5-15 mph	Coalton gravel road-path, both north and south	Skippers on gayfeather	chamomile chicory gayfeather ground cherry goldenrod Gumweed Helianthus pumilus, Senecio snakeweed sunflower	golden eagle dove, W. kingbird, barn swallow, lark sparrow, vesper sparrow, western meadowlark, goldfinch	pt #136 5696' N 39.92565 W 105.18411	Jan Chu, Larry Crowley, Jean Morgan

Table III. Anne U. White Trail

Anne U. White Trail, Fourmile Canyon Creek	2011	3/10	4/15	4/28	5/8	5/27	6/13	7/8	7/10	8/12	8/18
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian										
<i>Papilio polyxenes</i>	Black Swallowtail										
<i>P. zelicaon</i>	Anise Swallowtail						4				
<i>P. indra</i>	Short-tailed Swallowtail						2				
<i>P. rutulus</i>	W. Tiger Swallowtail			1	1		9	1			
<i>P. eurymedon</i>	Pale Swallowtail					1	6		4		
<i>P. multicaudata</i>	Two-tailed Swallowtail							1	1	3	2
<i>Pontia protodice</i>	Checkered White					1					
<i>P. sisymbrii</i>	Spring White										
<i>Pieris rapae</i>	Cabbage White			1	1	1	6	6	3	8	1
<i>Euchloe ausonides</i>	Large Marble					6	4				
<i>E. olympia</i>	Olympia Marble										
marble sp.				2	2						
white sp.				7	4	3	6	1	2		
<i>Anthocharis julia</i>	Julia (S. Rocky Mountain) Orangetip			5	2	1					
<i>Colias philodice</i>	Clouded Sulphur										
<i>C. eurytheme</i>	Orange Sulphur									2	
<i>Nathalis iole</i>	Dainty Sulphur										
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak			3	1	2	1				
<i>C. sheridanii</i>	White-lined Green Hairstreak										
<i>C. mossii schryveri</i>	Moss' Elfin										
<i>C. polios</i>	Hoary Elfin										
<i>C. eryphon</i>	Western Pine Elfin		2	14	9	20					
<i>Satyrium titus</i>	Coral Hairstreak										
<i>Strymon melinus</i>	Gray Hairstreak										
<i>Cupido amyntula</i>	Western Tailed-Blue			9		2					
<i>Celastrina echo sidara</i>	Echo (Spring) Azure			2	2	23					
<i>Glaucopsyche piasus</i>	Arrowhead Blue			8							
<i>G. lygdamus</i>	Silvery Blue			4		2	4				
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted- Blue			6			6		5	1	

Continued on the next page.

Table III. Anne U. White Trail (Continued)

Anne U. White, Fourmile Canyon Creek Trail		2011	3/10	4/15	4/28	5/8	5/27	6/13	7/8	7/10	8/12	8/18
<i>Echinargus isola</i>	Reakirt's Blue											
<i>Plebejus melissa</i>	Melissa Blue				1		6	1		2		
<i>P. icarioides</i>	Boisduval's Blue											
<i>P. lupini lutzi</i>	Lupine Blue										5	
<i>P. glandon rustica</i>	Arctic Blue											
blue sp.					1		5	4				
<i>Apodemia nais</i>	Nais Metalmark											
<i>Danaus plexippus</i>	Monarch											
<i>Euptoieta claudia</i>	Variegated Fritillary											1
<i>Speyeria aphrodite</i>	Aphrodite Fritillary									20+	39	42
<i>S. edwardsii</i>	Edwards' Fritillary							3				1
<i>S. coronis</i>	Coronis Fritillary											
<i>S. callippe</i>	Callippe Fritillary									4		
<i>S. hesperis</i>	Northwestern Fritillary										1	16
<i>S. mormonia</i>	Mormon Fritillary									1		
fritillary sp.								4	2	24+		9
<i>Chlosyne gorgone</i>	Gorgone Checkerspot											
<i>C. palla</i>	Northern Checkerspot									1		
<i>Phyciodes pallida</i>	Pale Crescent							11	5	3		
<i>P. tharos</i>	Pearl Crescent											4
<i>P. cocyta</i>	Northern Crescent									5		
<i>P. pulchella</i>	Field Crescent							1				
<i>Polygonia satyrus</i>	Satyr Comma											
<i>P. gracilis</i>	Hoary Comma	3	7	13	3		1			3		
<i>Junonia coenia</i>	Common Buckeye											
<i>Aglais milberti</i>	Milbert's Tortoiseshell	1										
<i>Nymphalis californica</i>	California Tortoiseshell											
<i>N. antiopa</i>	Mourning Cloak	2	8	10	9	4	1			2		
<i>Vanessa atalanta</i>	Red Admiral											
<i>V. cardui</i>	Painted Lady											
<i>V. virginiensis</i>	American Lady											
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral							1	3	1	6	3
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet							12				
<i>Cercyonis pegala</i>	Common Wood-Nymph										63	
<i>C. oetus</i>	Small Wood-Nymph										15	3
<i>Oeneis uhleri</i>	Uhler's Arctic				3	3	12	10				

Continued on the next page.

Table III. Anne U. White Trail (Continued)

Anne U. White, Fourmile Canyon Creek Trail		2011	3/10	4/15	4/28	5/8	5/27	6/13	7/8	7/10	8/12	8/18
<i>Epargyreus clarus</i>	Silver-spotted Skipper							1	3	26		
<i>Erynnis pacuvius</i>	Pacuvius Duskywing							1				
<i>E. persius</i>	Persius Duskywing											1
<i>Pyrgus communis</i>	Common Checkered-Skipper											
<i>Piruna pirus</i>	Russet Skipperling											
<i>Hesperia colorado</i>	W. Branded Skipper										1	4
<i>H. viridis</i>	Green Skipper							1				
<i>Polites themistocles</i>	Tawny-edged Skipper							1				
<i>P. mystic</i>	Long Dash											
<i>Ochlodes sylvanoides</i>	Woodland Skipper										1	26
<i>Poanes taxiles</i>	Taxiles Skipper								2	11		
<i>Euphyes vestris</i>	Dun Skipper								2	27		
<i>Atrytonopsis hianna</i>	Dusted Skipper						1					
dark skipper								4				

Table III. Anne U. White Trail (Continued)

Date, Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Researchers
3/10/2011 12:00 – 1:00 p.m. 16 °C wind 0-5 mph Sunny	Parking lot, Trail inside gate only 300'. Snow packed beyond this spot.	Butterflies flying only a little; basking on rocks and warm trail			N 40.03232 W 105.19378 6,216' 22 mi. r.t.	Jan Chu
4/15/2011 1:00 – 3:00 p.m. 15 °C 5-10 mph wind 40% overcast	Parking lot to near end of trail, at broken barbed wire fence. Many snowy banks in shade.	Butterflies basking and flying low	Very few Mahonia, Nuttall's violets, wild plum	3 dogs off leash, 14 dogs leashed	22 mi r.t.	Jan Chu
4/28/2011 2:00 – 4:00 p.m.				Townsend's solitaire, junco		John Barr

Continued on the next page.

Table III. Anne U. White Trail (Continued)

Date, Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Research- ers
5/8/2011 12:10 – 2:10 p.m. 26-28 °C clear sky	Trail to first stream crossing	Pine elfin nectaring on wild plum; echo azure nectaring on willow	Mahonia, wild plum wallflower, willow		20 mi r.t.	Jan Chu, Amy Chu
5/27/2011 9:45 – 12:15 p.m. 13-16 °C 70% clouds wind 5-10 mph	Trail	Pine elfin nectaring on Mahonia, mourning cloak nectaring in sapsucker holes	apple, B. raspberry Canada violet, chickweed, currant dandelion, geranium Fremont's, golden banner larkspur, Mahonia Mertensia, milk vetch mint purple, penstemon phlox, pussy toes white salsify, sand lily skullcap, Solomon seal false, spring beauty strawberry, wallflower	Turkey vulture Hummingbird broad-tailed, Steller's jay, crow, raven, chickadee mountain, house wren, house finch, warbleryellow spotted towhee W. tanager. Pine squirrel	30 mi. r.t.	Larry Crowley, Venice Kelly

Continued on the next page.

Table III. Anne U. White Trail (Continued)

Date, Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Researchers
6/13/2011 10:00 – 1:30 p.m. 23 – 27 °C no clouds wind 0-5 mph	Trail to first stream crossing	Pale and tiger swallowtails, mourning cloak, frit sp. nectaring on lilac; pale swallowtail and Edwards' fritillaries nectaring on wallflower. Blues, Arctic puddling. Swallowtails flying high overhead. 2 indra swallowtails puddling together on wet wood.	Boulder raspberry, Canada violet, Cardaria sp. white mustard, Dandelion Erigeron, evening primrose, Freemont geranium, golden banner, Geyer's onion, Hydrophyllum, Jamesia americana larkspur, lilac Mertensia, miner's candle, mouse-ear, Penstemon virens, P. secundiflorus, cinquefoil, puccoon, pussy toes, red clover, rose, salsify, Sedum, Senecio sp butterweed, shooting star, skull cap, spiderwort, sulfur-flower, false Solomon seal, wallflower, yarrow	Turkey vulture, broad tailed hummingbird, w. wood pewee, cordilleran flycatcher, Steller's jay, magpie, crow, raven, hermit thrush, yellow warbler, w. tanager, pine siskin, house finch. Sceloporus E. fence lizard	25 mi r.t. GPS pt 128	Jan Chu, Larry Crowley, Venice Kelly, Amy Chu, Jean Morgan, Jane Bunin, Janet Hanley, Rita Klees, Nancy Loving, Lysa Wegman-French
7/8/2011 9:30-10:30 a.m. 28 °C cloudy to overcast no wind	Trail to first crossing			11 dogs on leash, one off leash		Jan Chu

Continued on the next page.

Table III. Anne U. White Trail (Continued)

Date, Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Researchers
7/10/2011	Trail to end					Christian Nunes
8/12/2011 11:00 – 2:30 p.m. 25 – 28 °C. 98% clear no wind.	Trail just past Smokey Bear marker. Trail rebuilt by 12 Youth Corps after July 19 5ft. flooding. Many trees down, most willows missing or down. Stream was previously topsoil edged about 2-3 ft wide. Now heavily sanded in 5 ft. width. Many pieces of charcoal from Fourmile Canyon fire.			E. fence lizards, rock squirrel.	25 mi r.t.	Amy Chu, Molly Muller
8/18/2011 24 – 32 °C 9:30 – 11:30 a.m. light overcast to clear, no wind	Hiked to first stream crossing.	Fritillaries nectaring on tall blue asters; some frits and Weidemeyer's nectaring on goldenrod	Monarda mostly destroyed by flood. Many blue asters, goldenrod. Willows are sending vertical stalks from flattened branches.	Downy woodpecker, red-breasted nuthatch; pine squirrel. E. fence lizard.	25 r.t.	Jan Chu, Amy Chu, Venice Kelly

Table IV. Heil Valley - Geer Watershed

Heil Valley – Geer Watershed	2011	4-2	4-9	6-1	6-15	7-25
<i>Papilio polyxenes</i>	Black Swallowtail				1	
<i>P. zelicaon</i>	Anise Swallowtail			2	3	
<i>P. indra</i>	Short-tailed Swallowtail			1	9	
<i>P. rutulus</i>	Western Tiger Swallowtail				2	1
<i>P. eurymedon</i>	Pale Swallowtail			4	24	
<i>P. multicaudata</i>	Two-tailed Swallowtail				2	2
<i>Neophasia menapia</i>	Pine White					
<i>Pontia sisymbrii</i>	Spring White					
<i>P. protodice</i>	Checkered White					
<i>P. occidentalis</i>	Western White					
<i>Pieris rapae</i>	Cabbage White	1		15	20	50+
<i>P. marginalis</i>	Mustard White					
<i>Euchloe ausonides</i>	Large Marble			2		
<i>E. olympia</i>	Olympia Marble					
<i>Anthocharis julia</i>	Julia (S. Rocky Mtn) Orangetip					
white sp.				6		
<i>Colias philodice</i>	Clouded Sulphur					
<i>C. eurytheme</i>	Orange Sulphur					
<i>C. alexandra</i>	Queen Alexandra's Sulphur					
<i>Eurema mexicana</i>	Mexican Sulphur					
<i>Nathalis iole</i>	Dainty Sulphur					
<i>Lycaena dione</i>	Gray Copper					
<i>L. heteronea</i>	Blue Copper					
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak			4	5	
<i>C. gryneus</i>	Siva Juniper Hairstreak				1	
<i>C. augustinus</i>	Brown Elfin			1		
<i>C. eryphon</i>	Western Pine Elfin		1	5		
<i>Satyrium titus</i>	Coral Hairstreak					
<i>S. liparops</i>	Striped Hairstreak					
<i>S. saepium</i>	Hedgerow Hairstreak					
<i>Strymon melinus</i>	Gray Hairstreak					
<i>Leptotes marina</i>	Marine Blue					
<i>Cupido amyntula</i>	Western Tailed-Blue			1	1	
<i>Celastrina echo sidara</i>	Echo (Spring) Azure			2		
<i>Glaucopsyche piasus</i>	Arrowhead Blue			1	10	
<i>G. lygdamus</i>	Silvery Blue			17	4	

Continued on the next page.

Table IV. Heil Valley - Geer Watershed (Continued)

Heil Valley – Geer Watershed	2011	4-2	4-9	6-1	6-15	7-25
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue			13	1	
<i>Echinargus isola</i>	Reakirt's Blue			1		
<i>Plebejus melissa</i>	Melissa Blue				1	
<i>P. saepiolus</i>	Greenish Blue					
<i>P. icarioides</i>	Boisduval's Blue			1	37	
<i>P. lupini lutzi</i>	Lupine Blue					
<i>P. glandon rustica</i>	Arctic Blue					
blue sp.					14	2
<i>Apodemia nais</i>	Nais Metalmark					
<i>Danaus plexippus</i>	Monarch					
<i>Euptoieta claudia</i>	Variegated Fritillary					5
<i>Speyeria aphrodite</i>	Aphrodite Fritillary					11
<i>S. edwardsii</i>	Edwards' Fritillary				2	
<i>S. coronis</i>	Coronis Fritillary					
<i>S. callippe</i>	Callippe Fritillary					
<i>S. hesperis</i>	Northwestern Fritillary					
<i>S. mormonia</i>	Mormon Fritillary					
fritillary sp.					6	2
<i>Chlosyne gorgone</i>	Gorgone Checkerspot			2		
<i>C. nycteis</i>	Silvery Checkerspot					
<i>C. palla</i>	Northern Checkerspot					
<i>Phyciodes pallida</i>	Pale Crescent					
<i>P. tharos</i>	Pearl Crescent					
<i>P. cocyta</i>	Northern Crescent					
<i>P. pulchella</i>	Field Crescent					
crescent sp.					1	1
<i>Polygonia satyrus</i>	Satyr Comma					
<i>P. gracilis</i>	Hoary Comma	9	3	2		
<i>Aglais milberti</i>	Milbert's Tortoiseshell					
<i>Nymphalis antiopa</i>	Mourning Cloak	14		3	2	1
<i>N. californica</i>	California Tortoiseshell					
<i>Vanessa atalanta</i>	Red Admiral					
<i>V. cardui</i>	Painted Lady					
<i>V. virginiensis</i>	American Lady					
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral				2	
<i>Asterocampa celtis</i>	Hackberry Emperor					

Continued on the next page.

Table IV. Heil Valley - Geer Watershed (Continued)

Heil Valley – Geer Watershed	2011	4-2	4-9	6-1	6-15	7-25
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet			16	40	
<i>Cercyonis pegala</i>	Common Wood-Nymph					
<i>C. oetus</i>	Small Wood-Nymph					
wood nymph sp.						3
<i>Erebia epipsodea</i>	Common Alpine					
<i>Oeneis chryxus</i>	Chryxus Arctic					
<i>O. uhleri</i>	Uhler's Arctic					
<i>Epargyreus clarus</i>	Silver-spotted Skipper				8	
<i>Thorybes pylades</i>	N. Cloudywing					
<i>Erynnis icelus</i>	Dreamy Duskywing					
<i>E. pacuvius</i>	Pacuvius Duskywing				1	
<i>E. afranius</i>	Afranius Duskywing					
<i>E. persius</i>	Persius Duskywing			11	15	
<i>Pyrgus communis</i>	Common Checkered-skipper					
<i>Pholisora catullus</i>	Common Sootywing					
<i>Piruna pirus</i>	Russet Skipperling					
<i>Oarisma garita</i>	Garita Skipperling					
<i>Hesperia juba</i>	Juba Skipper				2	
<i>H. colorado</i>	Western Branded Skipper					
<i>H. nevada</i>	Nevada skipper					
<i>Polites themistocles</i>	Tawny-edged Skipper					
<i>Ochlodes sylvanoides</i>	Woodland Skipper					
<i>Poanes taxiles</i>	Taxiles Skipper					1
<i>Euphyes vestris</i>	Dun Skipper					3
<i>Atrytonopsis hianna</i>	Dusted Skipper			2		

Continued on the next page.

Table IV. Heil Valley - Geer Watershed (Continued)

Date, Conditions	Location within Geer	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Heil - Geer
						Research-ers
4/2/2011 11:45 – 1:15 p.m. 22°C, wind 5-10 mph clear sky.	Gate toward Manager's cabin. Lunch at fallen trees over streamlet	Flying fast over streamlet, Cloaks resting on willow branches in twos	Very few sand lily, Nuttall's violet, Spring beauty	Bob cat drinking at streamlet – ran up hill toward south, across from concave cliff face. Turkey, flicker Steller's jay, crow, raven, pygmy nuthatch	43 mi r.t.	Jan Chu, Larry Crowley, Amy Chu, Bea Butler
4/9/ 2011 11:40-2:00 p.m. 11°- 15 °C 5-10 mph wind, high overcast, bright, 10% clear	Barn near road, following streamlet toward Big Meadow, return drainage to the east	4 individuals	Dry soil. Thousands of tiny yel buttercup sp. in east drainage near single perfectly shaped juniper; Few dandelions, Mahonia, Nuttall's violet, pasque flower, spring beauty.	Red-tail hawk, flicker, Steller's jay, magpie, crow, raven, mountain chickadee, pygmy nuthatch, robin, dark-eyed junco. Rock squirrel.	35 mi r.t.	Jan Chu, Larry Crowley, Jean Morgan
6/1/2011 10:00 – 1:00 p.m. 17-22 °C 46% clouds no wind	Gate toward Manager's cabin, stream	Dusted skipper nectaring Lambert's loco; ochre ringlet on dandelion . persius duskywing caterpillar within rolled golden banner leaf	B. raspberry, Carex sp. chickweed choke cherry, dandelion Erigeron, filaree geranium Fremont, golden banner, hawthorn Lambert's loco larkspur, Mertensia mtn. parsley Nuttall's violet Penstemon, cinquefoil sand lily, spring beauty watercress	Mourning dove, broad-tailed hummingbird, flicker, w. wood pewee crow, raven, mtn. chickadee, violet- green swallow, house wren, robin, warbler yellow, spotted towhee, W. tanager		Jan Chu, Larry Crowley, Venice Kelly

Continued on the next page.

Table IV. Heil Valley - Geer Watershed (Continued)

Date, Conditions	Location within Geer	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip car mileage	Heil - Geer
						Research-ers
6/15/2011 10:00– 1:30 p.m. 16 - 28° C clear. 0-10 mph wind.	Barn, stream to upper Geer following road thru meadow, return near stream to the east	Scattered, but near stream or puddles; ringlets nectaring on watercress; persius, arrowhead and Boisduval's nectaring on pale blue vetch and geranium.	Borage, lavender Arnica, B. raspberry, bindweed, Campanula, clover, sweet, Erigeron, Geranium Fremont, Golden banner, Lambert loco, larkspur, lupine white, mouse-ear, mustard Jim Hill, mustard yellow, ninebark, penstemon one-sided, cinquefoil prickly poppy, Pussytoes, rose, salsify, sand lily, Senecio, skull cap, spiderwort	kestrel, b.t. hummingbird, w. wood pewee, cordilleran flycatcher, crow, house wren, robin yellow warbler, dark-eyed junco, pine siskin. Vole.	35 mi. r.t.	Jan Chu, Larry Crowley, Jean Morgan, Amy Chu, John Barr, Venice Kelly, Janet Hanley
6/16/2011 10-10:45 a.m. 23° C 0-10 mph wind Clear sky	Mud puddle with cow hoofmarks n. of road in Heil Ranch	Puddling Supreme!! On the Heil Ranch, not Open Space	Prickly poppy, Dandelion, algae in pond.	Cordilleran flycatcher, crow Brewer's blackbird, house wren		Jan Chu, Larry Crowley, Janet Hanley

Table V. Heil Valley – Plumely Canyon

Heil Valley– Plumely Canyon	2011	4/17	4/28	5/21	6/8	6/16	7/27	8/6
<i>Papilio polyxenes</i>	Black Swallowtail					2		
<i>P. zelicaon</i>	Anise Swallowtail		2			2		
<i>P. indra</i>	Short-tailed Black Swallowtail				3	1		
black swallowtail sp.				2		1		
<i>P. rutulus</i>	Western Tiger Swallowtail					2	1	2
<i>P. eurymedon</i>	Pale Swallowtail				2	10		
<i>P. multicaudata</i>	Two-tailed Swallowtail					2	3	1
<i>Neophasia menapia</i>	Pine White							
<i>Pontia protodice</i>	Checkered White							
<i>P. sisymbrii</i>	Spring White							
<i>Pieris rapae</i>	Cabbage White			2		1	3	2
<i>P. marginalis</i>	Mustard White							
white sp.			5	2		5	1	
<i>Euchloe ausonides</i>	Large Marble		3	2		5		
<i>E. olympia</i>	Olympia Marble							
<i>Anthocharis julia</i>	Julia (S. Rocky Mtn) Orangetip							
white sp.					6	6		
<i>Colias philodice</i>	Clouded Sulphur					2	1	
<i>C. eurytheme</i>	Orange Sulphur							3
<i>C. alexandra</i>	Queen Alexandra’s Sulphur							
<i>Phoebis sennae eubule</i>	Cloudless Sulphur (Eastern)							
<i>Eurema mexicana</i>	Mexican Sulphur							
<i>Nathalis iole</i>	Dainty Sulphur							
sulphur sp.						1	1	1
<i>Lycaena dione</i>	Gray Copper							
<i>Callophrys affinis</i>				1				
<i>homoperplexa</i>	Canyon Bramble Hairstreak							
<i>C. sheridanii</i>	White-lined Green Hairstreak							
<i>C. gryneus</i>	Siva Juniper Hairstreak							
<i>C. mossii schryveri</i>	Moss’ Elfin	2						
<i>C. polios</i>	Hoary Elfin							
<i>C. eryphon</i>	Western Pine Elfin	16	6	12	4	2		
elfin sp.		2						
<i>Satyrrium titus</i>	Coral Hairstreak							
<i>Strymon melinus</i>	Gray Hairstreak						1	
<i>Leptotes marina</i>	Marine Blue							
<i>Cupido amyntula</i>	Western Tailed-Blue			2		6	1	
<i>Celastrina echo sidara</i>	Echo (Spring) Azure			2		1		
<i>C. humulus</i>	Hops Azure					5		
<i>Glaucopsyche piasus</i>	Arrowhead Blue					1		
<i>G. lygdamus</i>	Silvery Blue			6		4		

Continued on the next page.

Table V. Heil Valley – Plumely Canyon (Continued)

Heil Valley– Plumely Canyon	2011	4/17	4/28	5/21	6/8	6/16	7/27	8/6
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue				1	2		
<i>Echinargus isola</i>	Reakirt's Blue						1	
<i>Plebejus melissa</i>	Melissa Blue					2	1	3
<i>P. icarioides</i>	Boisduval's Blue					4		
<i>P. lupini lutzi</i>	Lupine Blue							
<i>P. glandon rustica</i>	Arctic Blue				4			
blue sp.		3	1	10	20	9		
<i>Danaus plexippus</i>	Monarch							1
<i>Euptoieta claudia</i>	Variegated Fritillary						5	5
<i>Speyeria aphrodite</i>	Aphrodite Fritillary					2	62	146
<i>S. edwardsii</i>	Edwards' Fritillary					1		1
<i>S. coronis</i>	Coronis Fritillary							
<i>S. callippe</i>	Callippe Fritillary							
<i>S. atlantis</i>	Atlantis Fritillary							
<i>S. hesperis</i>	Northwestern Fritillary							
fritillary sp.					5	7		
<i>Polydryas arachne</i>	Arachne Checkerspot							
<i>Chlosyne gorgone</i>	Gorgone Checkerspot					5		
<i>Phyciodes pallida</i>	Pale Crescent					3		
<i>P. tharos</i>	Pearl Crescent							
<i>P. cocyta</i>	Northern Crescent					1		
<i>P. pulchella</i>	Field Crescent							
<i>Polygonia gracilis</i>	Hoary Comma	6	3	1	3			1
<i>Aglais milberti</i>	Milbert's Tortoiseshell							
<i>Nymphalis antiopa</i>	Mourning Cloak	10	7	2		2		
<i>N. californica</i>	California Tortoiseshell							
<i>Vanessa atalanta</i>	Red Admiral							
<i>V. cardui</i>	Painted Lady							
<i>V. virginiensis</i>	American Lady							
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral						3	3
<i>Asterocampa celtis</i>	Hackberry Emperor						2	1
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet				16	17		
<i>Cercyonis pegala</i>	Common Wood-Nymph						13	11
<i>C. oetus</i>	Small Wood-Nymph						1	
<i>Erebia epipsodea</i>	Common Alpine							
<i>Epargyreus clarus</i>	Silver-spotted Skipper					2		
<i>Thorybes pylades</i>	N. Cloudywing							
<i>Erynnis pacuvius</i>	Pacuvius Duskywing					1		
<i>E. afranius</i>	Afranius Duskywing							
<i>E. persius</i>	Persius Duskywing					1		
<i>Pyrgus communis</i>	Common Checkered-skipper							

Continued on the next page.

Table V. Heil Valley – Plumely Canyon (Continued)

Heil Valley– Plumely Canyon	2011	4/17	4/28	5/21	6/8	6/16	7/27	8/6
<i>Pholisora catullus</i>	Common Sootywing					1		
<i>Piruna pirus</i>	Russet Skipperling							
<i>Oarisma garita</i>	Garita Skipperling							
<i>Hesperia juba</i>	Juba skipper						1	
<i>H. colorado</i>	Western Branded Skipper							
<i>Polites draco</i>	Draco Skipper							
<i>P. themistocles</i>	Tawny-edged Skipper							
<i>P. mystic</i>	Long Dash							
<i>Ochlodes sylvanoides</i>	Woodland Skipper						2	4
<i>Poanes taxiles</i>	Taxiles Skipper							
<i>Euphyes vestris</i>	Dun Skipper						7	1
<i>Atrytonopsis hianna</i>	Dusted skipper					1	1	
skipper sp.						9	1	2

Table V. Heil Valley – Plumely Canyon (Continued)

Date, Conditions	Location within Heil- Plumely	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip mileage by car	Researchers
4/17/2011 10:00 – 11:40 a.m. (end 1:00) 14-18 °C, wind to 30 mph, 40% clouds to overcast	Drove to first locked gate, hiked the canyon to hilltop near stone ruins. No water in streamlets; some in upper Canyon	Pine elfins swirling and whirling around each other in 2's, 4's and even 6's. The mysterious blues eluded us. Rare Moss' elfin new for Plumely.	Very few blossoms on short stalks. Nuttall's violet, spring beauty. Willow in bloom. Mahonia in bud.	Turkey vulture, Great horned owl, raven, mtn. chickadee	35 mi r.t.	Jan Chu, Larry Crowley, Bea Butler
4/28/2011 11:00 – 1:30 p.m. 14 °C clear, 0-5 mph breezy wind	Gate to 'Crowley' lunch spot	Some flying short distances in sunny spots	Few blossoms, short plants. dandelion, Mahonia, Mertensia spring beauty	Turkey vulture, Steller's jay, warbler, yellow- rump. Fence lizard	36 mi. r.t.	Jan Chu John Barr

Continued on the next page.

Table V. Heil Valley – Plumely Canyon (Continued)

Date, Conditions	Location within Heil- Plumely	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip mileage by car	Researchers
5/21/2011 10:50- 2:15 p.m. 15 °C 0-10 mph wind 70% cloudy,			Currant, dandelion, Erigeron, Filaree, golden banner Hawthorn Lambert’s loco, larkspur, Mahonia, Mertensia, milk vetch white, mouse ear, mtn parsley, plum, sand lily, wallflower, sm. yel. composite	Turkey vulture, crow, raven, house wren, yellow warbler	40 mi. r.t.	Larry Crowley, Betty Parks
6/16/2011 10:00 - 2:30 p.m. 23-28 ° C 0-10 mph wind, 20% clouds to overcast, sprinkle	Inside 2 nd gate to stone house and return	Gorgone nectaring on Erigeron, others flying.	Arnica, B. raspberry bindweed, Erigeron flax, Gaillardia Gaura, geranium Fremont’s, Geyer’s onion, Gumweed Jamesia, lupine mouse-ear, ninebark Oxalis stricta Penstemon 1-sided cinquefoil, rose, skullcap Solomon seal, spiderwort sulfur-flower wallflower	Prairie falcon screaming for food delivery, Turkey, turkey vulture, cordilleran flycatcher, w. wood pewee raven, house wren, canyon wren, chat, spotted towhee, robin, yellow warbler, spotted towhee w. tanager. Fence lizard		Jan Chu, Larry Crowley
6/8/2011 2:30-4:30 p.m. 27-32 °C cloudy, breezy						John Barr

Continued on the next page.

Table V. Heil Valley – Plumely Canyon (Continued)

Date, Conditions	Location within Heil-Plumely	Butterfly Activity	Blossoming Plants	Animals	GPS, elevation, round trip mileage by car	Researchers
7/27/2011 9:10 – 12:00 p.m. 23-28° C wind 0-3 mph, 50% clear sky	Gate through meadow to 2 nd streamlet crossing. Extremely dry; only one small puddle in lowest part of streambed.	Butterflies looking old, much damage on wings. Aphrodite frit. nectaring on the many Monardas.	bindweed, catnip Cleome, cone flower Erigeron, Geranium Fremont's, Gaillardia, goldenrod Gumweed, Heterotheca Monarda, mullein prairie clover cactus, prickly pear prickly poppy, spiderwort sulfur-flower, toad flax lupine, white yarrow	broad tailed hummingbird, w. wood peewee, cordilleran flycatcher, pygmy and white br. nuthatch, robin, spotted towhee, w. tanager, oriole, crossbill, goldfinch		Jan Chu, Larry Crowley, Amy Chu
8/6/2011 8:40-11:30 a.m. 22-28° C 90% clear blue sky, no wind	Picnic pavilion to Lichen Trail, return beside the streambed. No water in streambed	Upon our arrival 71 Aphrodite Fritillaries were noted (within 20 minutes) flying 'downstream', all in the same direction. Remaining Aphrodites were in the moist streambed. Lichen Trail and meadows were extremely dry.	Only the Monarda seemed to attract the butterflies. Heterotheca, Gumweed were in bloom. Flowers were scarce.	Turkey, hairy woodpecker, w. wood pewee, cordilleran flycatcher, warbling vireo, raven, house wren, spotted towhee, green-tailed towhee, W. tanager, mtn bluebird, chipping sparrow, crossbill, pine siskin, goldfinch	Boulder County sponsored public walk. Volunteers Marty McDanel, Dave Leonard assisted. 23 people joined the program.	Jan Chu, Larry Crowley, Amy Chu, Venice Kelly, Kristie Lovett.

Table VI. Heil Valley – North

Heil Valley – North – Red Hill, Red Gulch, North Point	2011	5/3	5/31	6/19	7/29
<i>Papilio polyxenes</i>	Black Swallowtail				
<i>P. zelicaon</i>	Anise Swallowtail				
<i>P. indra</i>	Indra Swallowtail				
<i>P. rutulus</i>	Western Tiger Swallowtail		3		
<i>P. eurymedon</i>	Pale Swallowtail				
<i>P. multicaudata</i>	Two-tailed Swallowtail			1	2
<i>Neophasia menapia</i>	Pine White				
<i>Pontia protodice</i>	Checkered White				
<i>P. occidentalis</i>	Western White				
<i>P. sisymbrii</i>	Spring White				
<i>Pieris rapae</i>	Cabbage White		1		9
white sp.		1	15	10	
<i>Euchloe ausonides</i>	Large Marble		14	1	
<i>E. olympia</i>	Olympia Marble	1			
<i>Anthocharis julia</i>	Julia (S. Rocky Mtn) Orangetip				
<i>Colias philodice</i>	Clouded Sulphur		1		2
<i>C. eurytheme</i>	Orange Sulphur				1
<i>C. alexandra</i>	Queen Alexandra's Sulphur				
<i>Nathalis iole</i>	Dainty Sulphur				
<i>Lycaena heteronea</i>	Blue Copper				
<i>Callophrys affinis</i>	Canyon Bramble Hairstreak				
<i>C. gryneus</i>	Siva Juniper Hairstreak				
<i>C. eryphon</i>	Western Pine Elfin	2			
<i>Satyrium behrii</i>	Behr's Hairstreak				
<i>S. titus</i>	Coral Hairstreak				2
<i>Strymon melinus</i>	Gray Hairstreak				1
<i>Leptotes marina</i>	Marine Blue			1	
<i>Cupido amyntula</i>	Western Tailed-blue		7	2	
<i>Celastrina echo sidara</i>	Echo (Spring) Azure				
<i>Glaucopsyche piasus</i>	Arrowhead Blue				
<i>G. lygdamus</i>	Silvery Blue		10	2	
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-blue		1	2	
<i>Echinargus isola</i>	Reakirt's Blue				2
<i>Plebejus melissa</i>	Melissa Blue		1	5	6
<i>P. icarioides</i>	Boisduval's Blue			1	
<i>P. lupini lutzii</i>	Lupine Blue				
<i>P. glandon rustica</i>	Arctic Blue				
blue sp.			6	10	5
<i>Danaus plexippus</i>	Monarch				
<i>Libytheana carinenta</i>	American Snout				
<i>Euptoieta claudia</i>	Variegated Fritillary			1	15
<i>Speyeria aphrodite</i>	Aphrodite Fritillary				12

Continued on the next page.

Table VI. Heil Valley – North (Continued)

Heil Valley – North – Red Hill, Red Gulch, North Point	2011	5/3	5/31	6/19	7/29
<i>S. edwardsii</i>	Edwards' Fritillary				
<i>S. coronis</i>	Coronis Fritillary				
<i>S. callippe</i>	Callippe Fritillary				
<i>S. mormonia</i>	Mormon Fritillary				
fritillary sp.			1	4	
<i>Chlosyne gorgone</i>	Gorgone Checkerspot		16	1	1
<i>C. nycteis</i>	Silvery Checkerspot				
<i>C. palla</i>	Northern Checkerspot				
<i>P. tharos</i>	Pearl Crescent				
<i>P. cocyta</i>	Northern Crescent				
<i>P. pulchella</i>	Field Crescent			2	
<i>Polygonia satyrus</i>	Satyr Comma				
<i>P. gracilis</i>	Hoary Comma				
<i>Nymphalis antiopa</i>	Mourning Cloak		1		
<i>N. californica</i>	California Tortoiseshell				
<i>Vanessa atalanta</i>	Red Admiral				
<i>V. cardui</i>	Painted Lady				
<i>V. virginiensis</i>	American Lady				
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			3	
<i>Asterocampa celtis</i>	Hackberry Emperor				8
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet		11	17	
<i>Cercyonis pegala</i>	Common Wood-Nymph				17
<i>C. oetus</i>	Small Wood-nymph				
<i>Epargyreus clarus</i>	Silver-spotted Skipper		1	3	
<i>Erynnis afranius</i>	Afranius Duskywing				
<i>E. persius</i>	Persius Duskywing				
<i>Pyrgus communis</i>	Common Checkered-skipper			1	
<i>Pholisora catullus</i>	Common Sootywing			8	
<i>Piruna pirus</i>	Russet Skipperling				
<i>Oarisma garita</i>	Garita Skipperling				
<i>Hesperia juba</i>	Juba Skipper			2	
<i>H. pahaska</i>	Pahaska Skipper				
<i>H. viridis</i>	Green Skipper			1	1
<i>H. nevada</i>	Nevada Skipper				
<i>Polites themistocles</i>	Tawny-Edged Skipper				
<i>P. mystic</i>	Long Dash				
<i>Atrytone arogos</i>	Arogos Skipper				1
<i>Ochlodes sylvanoides</i>	Woodland Skipper				
<i>Poanes taxiles</i>	Taxiles Skipper				
<i>Euphyes vestris</i>	Dun Skipper			3	
<i>Atrytonopsis hianna</i>	Dusted Skipper		5		
skipper sp.			6	2	

Continued on the next page.

Table VI. Heil Valley – North (Continued)

Date, Conditions	Location Heil - North	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation, round trip mileage by car	Researchers
5/3/2011 10:30-11:00 a.m., then 11:35-12:35 p.m. 13-12°C 40% clouds to overcast, no wind	Red Hill meadow, then Red Hill saddle to ravine	Hiding, very sluggish.	Few plants and all very short. Physaria belli, buttercup, candy tuft, dandelion, dandelion wavy-leaf, Easter daisy, golden banner, Mahonia, Nuttall's violet, salt & pepper sand lily, spring beauty	Turkey, Turkey vulture, pygmy and wh breasted nuthatch, mtn. and western bluebird, junco, chipping sparrow. Deer, Abert's squirrel.	Pt 121 meadow above Marietta Canyon 6765 ' N 40.17478 W 105. 30065 Red Gulch saddle Pt. 122 6781' N 40.17481 W 105.30069 41 mi. r.t.	Jan Chu, Amy Chu, Jean Morgan Venice Kelly
5/31/2011 10:00 –1:30 p.m. 16 °C; wind 5 -15 mph; no clouds. Upper pond was 30' across with water in the lower holding ponds.	North Point. Drove to 'dismantled home site,' walk to north ridge and return.	Dusted skipper nectaring on Fremont's geranium. Wind whisking away several skippers.	Choke cherry, Erigeron, Lambert's loco, B. raspberry, Castilleja, cowboy's delight, dandelion, dandelion curly-leaf, filaree, flax, Geyer's onion, golden banner, geranium Fremont's, nightshade, Mertensia, milk vetch, mouse-ear, mtn. parsley, Nuttall's violet, Penstemon one-sided, cinquefoil, salsify, sand lily, skunkbush, spiderwort, stargrass lily yellow 1.4'' upright, wall flower	Turkey vulture, magpie, w. wood pewee, yellow-breasted chat, house wren, spotted towhee, w. tanager, Am. goldfinch, song sparrow. Cricket frogs	50 mi r.t.	Larry Crowley, Amy Chu, Venice Kelly, John Barr

Continued on the next page.

Table VI. Heil Valley – North (Continued)

Date, Conditions	Location Heil - North	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation, round trip mileage by car	Research-ers
6/19/2011 10:00 – 1:00 p.m. 19-20° C 0-10 mph wind; 50% clouds to overcast.	Red Gulch. Walked through friend's home and farm equipment up the canyon. No water at all.	Green skipper and dun skipper nectaring on Fremont geranium. Large marble nectaring on flax. Each Catullus patrolling an 8' long territory near ground in the gulch. Host plant pigweed and chickweed for Catullus not in bloom.	alfalfa, bindweed cowboy's delight dandelion, Erigeron flax, Gaillardia Gaura, geranium, Fremont's. Hydrophyllum lupine alba milk vetch poison hemlock skullcap, snowberry spiderwort, toadflax wild lettuce, willow yucca	Turkey vulture, collared dove, magpie, spotted towhee, yel br chat, house wren, western meadowlark, goldfinch. Rattlesnake (Crotalus viridis)	51 mi.r.t.	Jan Chu, Larry Crowley, Jean Morgan
7/29/2011 9:30-12:15 p.m. 23 - 30° C 0-15 mph 98% clear.	North Point walked from old house site upward to west crest of hill. Water in lowest pond only near lane.	Variegated fritillaries mating. Arogos, Melissa, Variegated nectaring on Fremont geranium. No bull thistle blossoms left. Hackberry butterflies among hackberry trees.	cactus, prickly pear prairie clover coneflower evening primrose, Oenothera howardii geranium, Fre. goldenrod Gumweed prickly poppy St. John's wort sulfur-flower sunflower, Verbena stricta	Kestrel, mourning dove, horned owl, w. wood pewee, magpie, chickadee, canyon wren, yel. br. chat, spotted towhee, goldfinch. Abandoned prairie dog holes		Jan Chu, Larry Crowley, Jean Morgan, Venice Kelly

Table VII. Walker Ranch – Meyer’s Gulch

Walker Ranch, Meyer’s Gulch	2011	6/7	6/27	7/13	8/25
<i>Papilio smintheus</i>	Rocky Mountain Parnassian		2	6	
<i>P. polyxenes</i>	Black Swallowtail				
<i>P. zelicaon</i>	Anise Swallowtail	5	2		
<i>P. indra</i>	Short-tail Swallowtail	2			
<i>P. rutulus</i>	Western Tiger Swallowtail	5		1	
<i>P. eurymedon</i>	Pale Swallowtail		3	3	
<i>P. multicaudata</i>	Two-tailed Swallowtail				
<i>Neophasia menapia</i>	Pine White				
<i>Pontia protodice</i>	Checkered White				
<i>P. sisymbrii</i>	Spring White				
<i>Pieris rapae</i>	Cabbage White			1	4
white sp.			4	2	3
<i>Euchloe ausonides</i>	Large Marble	13			
<i>Anthocharis julia</i>	Julia (S. Rocky Mountain) Orangetip	1			
<i>Colias philodice</i>	Clouded Sulphur	1			2
<i>C. eurytheme</i>	Orange Sulphur				3
<i>C. alexandra</i>	Queen Alexandra’s Sulphur			2	
<i>Nathalis iole</i>	Dainty Sulphur				
sulphur sp.					5
<i>Lycaena heteronea</i>	Blue Copper				
<i>Callophrys affinis</i>	Canyon Bramble Hairstreak	15	3	1	
<i>C. sheridanii</i>	White-line Green Hairstreak				
<i>C. augustinus</i>	Brown Elfin				
<i>C. polios</i>	Hoary Elfin	17			
<i>C. eryphon</i>	Western Pine Elfin	3			
<i>Satyrrium saepium</i>	Hedgerow Hairstreak				3
<i>Strymon melinus</i>	Gray Hairstreak				
<i>Cupido amyntula</i>	Western Tailed-Blue		2		
<i>Celestrina echo sidara</i>	Echo (Spring) Azure	1			
<i>Glaucopsyche piasus</i>	Arrowhead Blue		1		
<i>G. lygdamus</i>	Silvery Blue	3	1		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue	1	13	30	
<i>Echinargus isola</i>	Reakirt’s Blue				2
<i>Plebejus melissa</i>	Melissa Blue		1		6
<i>P. saepiolus</i>	Greenish Blue				
<i>P. icarioides</i>	Boisduval’s Blue		3	11	
<i>P. lupini lutzi</i>	Lupine Blue				
blue sp.		10	10	8	4
<i>Apodemia nais</i>	Nais Metalmark				
<i>Danaus plexippus</i>	Monarch				
<i>Euptoieta claudia</i>	Variegated Fritillary				
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			1	10

Continued on the next page.

Table VII. Walker Ranch – Meyer’s Gulch (Continued)

Walker Ranch, Meyer’s Gulch	2011	6/7	6/27	7/13	8/25
<i>S. edwardsii</i>	Edwards’ Fritillary				
<i>S. callippe</i>	Callippe Fritillary			1	
<i>S. hesperis</i>	Northwestern Fritillary		1	2	3
<i>S. mormonia</i>	Mormon Fritillary	1			
fritillary sp.		7		6	10
<i>Chlosyne gorgone</i>	Gorgone Checkerspot				
<i>C. nycteis</i>	Silvery Checkerspot			1	
<i>C. palla</i>	Northern Checkerspot			6	
<i>Phyciodes cocyta</i>	Northern Crescent		1	1	
<i>P. pulchella</i>	Field Crescent	1ph	3	3	2
<i>Euphydryas anicia</i>	Variable Checkerspot			16	
<i>Polygonia gracilis</i>	Hoary Comma	3			2
<i>Aglais milberti</i>	Milbert’s Tortoiseshell		1		
<i>Nymphalis antiopa</i>	Mourning Cloak				
<i>N. californica</i>	California Tortoiseshell				
<i>Vanessa atalanta</i>	Red Admiral				
<i>V. cardui</i>	Painted Lady		1		
<i>V. virginiensis</i>	American Lady				
<i>Limenitis weidemeyerii</i>	Weidemeyer’s Admiral			1	1
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet	19	25	5	
<i>Cercyonis pegala</i>	Common Wood Nymph				
<i>C. oetus</i>	Small Wood Nymph			5	32
<i>Erebia epipsodea</i>	Common Alpine	2	5	2	
<i>Oeneis uhleri</i>	Uhler’s Arctic	13	3		
<i>Erynnis icelus</i>	Dreamy Duskywing				
<i>E. pacuvius</i>	Pacuvius Duskywing	1			
<i>E. persius</i>	Persius Duskywing	5	4	2	
<i>Pyrgus communis</i>	Common Checkered-skipper	1		1	
<i>Piruna pirus</i>	Russet Skipperling			2	
<i>Oarisma garita</i>	Garita Skipperling		7		
<i>Hesperia juba</i>	Juba Skipper				1
<i>H. colorado</i>	Western Branded Skipper				8
<i>Polites themistocles</i>	Tawny-edged Skipper				
<i>P. mystic</i>	Long Dash				
<i>Ochlodes sylvanoides</i>	Woodland Skipper				11
<i>Poanes taxiles</i>	Taxiles Skipper			1	
<i>Euphyes vestris</i>	Dun Skipper			3	
skipper sp.		3	3	2	2

Continued on the next page.

Table VII. Walker Ranch – Meyer’s Gulch (Continued)

Date Condi- tions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	GPS, elevation, mileage by car	Research- ers
4/28/2011 10:00 – 12:30 p.m. 17 °C wind 0-45 mph partly sunny	Meyer’s Home- stead Trail Open, very dry, very few muddy spots. Walked to north end and return.	None sighted	Only alder blooming with catkins	Sharp shinned hawk, red-tailed, crow, raven, Steller’s jay, bl.cap. and mtn chickadee, robin, junco, hairy woodpecker, mtn .bluebird, wh. br. and pygmy nuthatch	7388’ N 39°57323 W105°20207 25 r.t.	Larry Crowley, Jean Morgan, John Barr, Jan Chu
5/6/2011 10:30 – 11:50 a.m. 14 °C wind 0-10 mph 80% cloud cover. Ground saturated with much running water.	Trail dry. Lacking muddy spots.	None apparent.	All very short from lack of moisture. Candy tuft, dandelion, pasque flower, sand lily, spring beauty	Hummingbird, Steller’s jay, wh. br nuthatch, mtn. bluebird, vesper sparrow, chipping sparrow	Pt. 123 trailhead 7053’ N 39°95777 W105°33870 Pt 124 turnaround by willows 7347’ N39.96356 W105.04327	Jan Chu, John Barr, Bea Butler
5/22/2011 10:15 – 11:30 a.m. 14 °C wind steady, sky 80% clouded	Walked on road, turn around at fire trail #2,3 on right	None sighted	Dandelion, Mertensia, mouse-ear, sand lily	Kestrel, raven, mtn chickadee, pygmy nuthatch, mtn. bluebird, robin, yel-rumped warbler, pine siskin, wh. crowned sparrow, dark-eyed junco. Golden mantled ground squirrel	33 mi r.t.	Larry Crowley, Venice Kelly

Continued on the next page.

Table VII. Walker Ranch – Meyer’s Gulch (Continued)

Date Condi- tions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	GPS, elevation, mileage by car	Research- ers
6/7/2011 9:30 – 1:30 p.m. 17 - 25°C no clouds, wind 20 mph	Walked on road, into meadow next to stream (because of lack of moisture), almost to Fire trail #2, and 3	Not easy to find, but butterflies were attracted to a muddy rut in the road Mormon Fritillary photos by Venice and Nancy.	alder, B. raspberry dandelion, death camus, Erigeron, Fremont’s geranium, iris, larkspur, mouse-ear, Mertensia, mtn parsley, Nuttall’s violet, pasque flower, one-sided Penstemon, cinquefoil, Plantensis sp., prairie smoke, ragwort, sand lily, shooting star, wallflower, wax currant	red-tail hawk chased by 4 ravens; w. wood pewee, crow, raven, chickadee, house wren, chipping sparrow, western meadowlark. Full- sized toad	28 mi r.t	Jan Chu, Larry Crowley, Venice Kelly, Amy Chu, John Barr, Janet Hanley, Nancy Lovell
6/27/2011 10:00-1:20 p.m. 14-16° C 60% clouds wind 0-5 mph	Parking lot on Meyer’s Homestead Trail to old barn in meadow. Walked far afield in meadows.	No mud puddles. Butterflies were dispersed. Garita skipperling nectaring on Fremont geranium. Dotted blue mating on sulfur- flowers. 80+ Milbert’s tortoiseshell caterpillars devouring stinging nettle 1 st thru 4th instars.	Androsace, B. raspberry, bog orchid, buttercup, Erigeron, flax, Gaillardia, Geranium Fre., green gentian, Heterotheca, Jim Hill mustard, Lambert’s loco, mouse-ear, mullein, Penstemon viridis, cinquefoil, red clover, rose, salsify, stonecrop, sulfur-flower, yarrow	red-tail hawk, hairy woodpecker, w. wood pewee, crow, w.br. nuthatch, house wren, mtn bluebird, w. bluebird, robin, w. tanager, spotted towhee, gr.-tailed towhee house finch, goldfinch	28 mi r.t.	Jan Chu, Larry, Crowley, Amy Chu, Venice Kelly BCNA class: Janet Hanley, Jane Bunin, Leslie Hopf, Tina Jones, Rita Klees, Nancy Loving, Lysa Wegman- French

Continued on the next page.

Table VII. Walker Ranch – Meyer’s Gulch (Continued)

Date Condi- tions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	GPS, elevation, mileage by car	Research- ers
7/13/2011 9:10-1:50 p.m. 16-23° C 0-15 mph wind, 95% clear	Walked on roadway 1 ½ mi; return by roadway.	Parnassian nectaring on Sedum; dotted-blues nectaring on sulfur- flower; callippe and northwester n fritillary and dun skipper nectaring on dogbane.	Bedstraw, bindweed, black-eyed Susan, bog orchid, bull thistle, buttercup, chamomile, campanula, Ceanothus fendleri, chicory, cow parsnip, dogbane, Erigeron, evening primrose common, false forget-me-not, flax, geranium Fremont’s, Gaillardia, Gilia, goldenrod, green gentian, Gumweed, Heterotheca, Hydrophyllum, Jack Hill mustard, Lambert’s loco, lupine, Mariposa lily, meadow rue, Mertensia, milk vetch, miner’s candle, Monarda, mullein, Penstemon one- sided, paintbrush, pea sp.tiny white, cinquefoil, red clover, salsify, stone crop	Hairy woodpecker, flicker, w.wood pewee, crow, raven chickadee, w.br. nuthatch, pygmy nuthatch, house wren, mtn bluebird, y ellow rumped warbler, w. tanager, goldfinch		Jan Chu, Larry Crowley, Jean Morgan, Nancy Loving

Continued on the next page.

Table VII. Walker Ranch – Meyer’s Gulch (Continued)

Date Condi- tions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	GPS, elevation, mileage by car	Research- ers
8/25/2011 9:30-1:00 p.m. 23 – 28 °C. cloudless to 40% clouds, wind 0-5 mph	Walked along willow- stream to rocky knoll	Aphrodite nectaring on tall blue aster; woodland skipper nectaring on blue aster, gay feather	Aster, purple, chicory, clover red, Erigeron white, evening primrose common, flax, gayfeather, geranium Fremont’s geranium Richardson, Gilia white, goldenrod, Gumweed, harebell, Heterotheca, lupine white, Monarda, monkshood, mullein, paintbrush red, Rudbeckia, thistle Canada, yarrow	Swainson’s hawk, Steller’s jay, crow, house wren, chipping sparrow	28 mi r.t	Jan Chu, Larry Crowley, Jean Morgan, Venice Kelly, Galen Kelly

Table VIII. Reynold's Ranch

Reynold's Ranch	2011	6/11	7/11	8/1	8/22
<i>Papilio polyxenes</i>	Black Swallowtail		1	1 fem.	
<i>P. zelicaon</i>	Anise Swallowtail	1	1		
<i>P. rutulus</i>	W. Tiger Swallowtail		3		
<i>Pontia protodice</i>	Checkered white			3	
white sp.		1	4		1
<i>Euchloe ausonides</i>	Large Marble	11			
<i>Colias eurytheme</i>	Orange Sulphur	6	44	32	13
<i>C. alexandra</i>	Queen Alexandra's Sulphur				3
<i>Lycaena rubidus</i>	Ruddy Copper				13
<i>Celastrina echo sidara</i>	Echo (Spring) Azure	1			
<i>Glaucopsyche lygdamus</i>	Silvery Blue	4			
<i>Euphilotes ancilla</i>	R Mtn Dotted Blue		4		
<i>Plebejus saepiolus</i>	Greenish Blue		102	3	
<i>P. icarioides</i>	Boisduval's Blue		2		
<i>P. glandon rustica</i>	Arctic Blue				
blue sp.		4	28		
<i>Euptoieta claudia</i>	Variegated Fritillary				
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			3	4
<i>S. edwardsii</i>	Edwards' Fritillary				1
<i>S. coronis</i>	Coronis Fritillary			5	
<i>S. callippe</i>	Callippe Fritillary				43
<i>S. hesperis</i>	Northwestern Fritillary				3
<i>S. mormonia</i>	Mormon Fritillary			1	
<i>Boloria selene</i>	Silver-bordered Fritillary			7	
fritillary sp.					9
<i>Phyciodes pallida</i>	Pale Crescent			1	
<i>P. cocyta</i>	Northern Crescent		3	4	
<i>P. pulchella</i>	Field Crescent		3	1	
checkerspot sp.					
<i>Polygonia gracilis</i>	Hoary Comma		1	3	
<i>Vanessa cardui</i>	Painted Lady		1		
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	2	108	2	
<i>Cercyonis oetus</i>	Small Wood Nymph			14	12
<i>Erebia epipsodea</i>	Common Alpine	2	10		
<i>Erynnis persius</i>	Persius Duskywing	3	1	1	
<i>Hesperia colorado</i>	W. Branded Skipper				
<i>Polites draco</i>	Draco Skipper		2		
<i>Pyrgus communis</i>	Common Checkered- Skipper			1	
skipper sp.		5	2	2	
<i>Euphyes vestris</i>	Dun Skipper		1		

Table VIII. Reynold's Ranch (Continued)

Date, Conditions	Location within Reynold's Ranch	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation, .t mileage by car	Researcher
4/27/2011 24-32 °F extreme cold wind, snow on ground	Initial visit Giggey pond, north marsh, utility line				58 mi r.t.	Jan Chu, Venice Kelly, John Barr, Susan Spaulding, Will Keeley
6/11/2011 10:00-1:30 p.m. 14-19° C 0-5 mph wind; 90 % clouds to total overcast	1. Magnolia Road gate, south beside 'Giggey' pond; 2. north of Magnolia Rd. beside bog in logging ruts to north fence.	Large marble ovipositing on tower mustard and nectaring on dandelion; few butterflies puddling in rut-mud	bistort buttercups 5" tall Gentiana white golden banner, iris Mertensia, mouse-ear Nuttall's violet Oxytropis white paintbrush red parsley mtn. parsley whiskbroom, Senecio, shooting star smartweed, strawberry tower mustard, wallflower	Turkey vulture, sapsucker, violet-green swallow, house wren, mtn bluebirds watching their several young feed between ground and branch; robin, chipping sparrow, lark sparrow, red-winged blackbird, cowbird, pine siskin	43 mi. r.t.	Jan Chu, Larry Crowley, Amy Chu, John Barr

Continued on the next page.

Table VIII. Reynold's Ranch (Continued)

Date, Conditions	Location within Reynold's Ranch	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation, time, mileage by car	Researcher
7/11/2011 9:30 – 1:00 p.m. 18-21° C 5-10 mph wind overcast to 60% clouds to overcast	Giggey Meadow south to fence, then return along north ecotone to car. North bog meadow off Magnolia Rd.	Greenish blue nectaring on red clover and onions, one pair mating; Hoary comma nectaring on onion; swallowtails hilltopping. Queen Alexandra's ovipositing on golden banner, nectaring on Arnica	Most beautiful meadow of flowers around Giggey. Arnica, Arnica, subalpine bedstraw, bistort black-eyed Susan chickweed, clover, red clover, sweet, columbine elephant, red, Erigeron Gaillardia, gentian, green geranium, Fremont's, Gilia, golden banner grass, blue-eyed? 1" flowers. harebell, iris Lambert loco, Mertensia onion, Geyer, paintbrush parsley, whiskbroom, Penstemon, one-sided, cinquefoil, pussytoes pink, rose, sedge, shooting star strawberry, sulfur-flower valerian, wallflower wood lily, yarrow	Red-tail, mourning dove, pygmy nuthatch, mtn. bluebird, violet-gr. swallow, house wren, robin, chipping sparrow, junco, red wing, cowbird, pine siskin, goldfinch		Jan Chu, Larry Crowley, Jean Morgan, Venice Kelly, John Barr, Joe Krieg

Continued on the next page.

Table VIII. Reynold's Ranch (Continued)

Date, Conditions	Location within Reynold's Ranch	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation, time, mileage by car	Researcher
8/1/2011 9:30 – 12:30 p.m. 21-22° C 40% to 50% cloudy, wind 5-25 mph.	North meadow-bog of Reynold's. Walked the ecotone to the east, through the bog, circled back on the west. Flowers in full bloom.	Queen Alexandra's sulphurs nectaring on bull thistle; silver-bordered fritillary nectaring on onion. Larry netted the first selene ever reported in our ten-years' of surveying.	alfalfa, bedstraw bistort black-eyed Susan, bull thistle, buttercup, white Campanula, Canada thistle, clover, pink clover, red, 'dandelion', Erigeron, evening primrose common, Gaillardia, globe flower, goldenrod Gumweed, Lambert loco larkspur, mariposa lily milk vetch, onion, Geyer's, onion, nodding orchid, bog paintbrush, yellow, paintbrush crimson red, Penstemon, cinquefoil, sandwort, Senecio, stonecrop, umbel, yarrow, white Zygadenus	Turkey vulture, red-tailed hawk Steller's jay, crow, raven, mtn. bluebird, mtn. chickadee. Wandering garter snake	43 mi. r.t.	Jan Chu, Larry, Crowley, Jean Morgan

Continued on the next page.

Table VIII. Reynold's Ranch (Continued)

Date, Conditions	Location within Reynold's Ranch	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation, time, mileage by car	Researcher
8-22-2011 9:30 – 12:30 p.m. 21 - 26° C, 10-20 mph wind, 50% overcast	Giggey pond – walked south near ecotone to fence; return near pond. Cattle had stripped flowers and only iris and grasses remain. North bog along west ecotone to fence then return near west pine edge.	Few flowers, but fritillaries nectaring on Canada thistles and purple asters. Callippe females flying into plants on ground, crawling to look for violets. Dragonflies and bluebirds chasing butterflies.	bottle gentian blue, bull thistle, Canada thistle, gumweed, Heterotheca purple aster, yellow clover	Immature red-tail hawk glided overhead just above us; pine siskin pulling seeds from Canada thistle – wind carried fluff as it ate seeds. Many bluebirds. Wilson's snipe. Vole	43 mi r.t.	Jan Chu, Venice Kelly, John Barr, Joe Krieg

Table IX. Caribou Ranch – Mud Lake

Caribou, Mud Lake	2011	6/21	7/1	7/22	8/3
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian		13	9	1
<i>Papilio polyxenes</i>	Black Swallowtail				
<i>P. zelicaon</i>	Anise Swallowtail			1	
<i>P. rutulus</i>	W. Tiger Swallowtail	1	2	2	2
<i>P. eurymedon</i>	Pale Swallowtail			2	
black swallowtail sp.			1	2	
<i>Neophasia menapia</i>	Pine White				
<i>Pontia protodice</i>	Checkered White			1	
<i>P. occidentalis</i>	Western White				
<i>Pieris rapae</i>	Cabbage White				5
<i>P. marginalis</i>	Mustard White				
white sp.		1	6		
<i>Euchloe ausonides</i>	Large Marble	1			
<i>Anthocharis julia</i>	Julia (S. Rocky Mountain) Orangetip				
<i>Colias philodice</i>	Clouded Sulphur				
<i>C. eurytheme</i>	Orange Sulphur				1
<i>C. alexandra</i>	Queen Alexandra's Sulphur		9	63	19
<i>Eurema mexicana</i>	Mexican Sulphur				
<i>Abaeis nicippe</i>	Sleepy Orange				
<i>Nathalis iole</i>	Dainty Sulphur				
<i>Lycaena rubidus</i>	Ruddy Copper				1
<i>L. heteronea</i>	Blue Copper				
<i>L. helloides</i>	Purplish Copper				3
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak				
<i>C. sheridanii</i>	White-lined Green Hairstreak				
<i>C. spinetorum</i>	Thicket Hairstreak	15	1		
<i>C. augustinus</i>	Brown Elfin	1	2		
<i>C. polios</i>	Hoary Elfin				
<i>C. eryphon</i>	Western Pine Elfin	8	2		
<i>Satyrium saepium</i>	Hedgerow Hairstreak				
<i>Strymon melinus</i>	Gray Hairstreak				
<i>Cupido amyntula</i>	Western Tailed-Blue		1		
<i>Celastrina echo sidara</i>	Echo (Spring) Azure				
<i>Glaucopsyche piasus</i>	Arrowhead Blue		1		
<i>G. lygdamus</i>	Silvery Blue	4	3		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue		8	2	
<i>Echinargus isola</i>	Reakirt's Blue			2	
<i>Plebejus melissa</i>	Melissa Blue				2
<i>P. saepiolus</i>	Greenish Blue				
<i>P. icarioides</i>	Boisduval's Blue	1	6	8	2
<i>P. lupini lutzi</i>	Lupine Blue			2	2
<i>P. glandon rustica</i>	Arctic Blue				2
blue sp.		6	22	12	3

Continued on the next page.

Table IX. Caribou Ranch – Mud Lake (Continued)

Caribou, Mud Lake	2011	6/21	7/1	7/22	8/3
<i>Euptoieta claudia</i>	Variegated Fritillary			1	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary				
<i>S. edwardsii</i>	Edwards' Fritillary				
<i>S. coronis</i>	Coronis Fritillary				
<i>S. hesperis</i>	Northwestern Fritillary				12
fritillary sp.		1			7
<i>Poladryas arachne</i>	Arachne Checkerspot				
<i>Chlosyne gorgone</i>	Gorgone Checkerspot				
<i>C. nycteis</i>	Silvery Checkerspot		7		
<i>C. palla</i>	Northern Checkerspot		17	5	3
<i>Phyciodes pallida</i>	Pale Crescent				1
<i>P. tharos</i>	Pearl Crescent				
<i>P. cocyta</i>	Northern Crescent			2	
<i>P. pulchella</i>	Field Crescent		1		
<i>Euphydryas anicia</i>	Variable Checkerspot				1
<i>Polygonia faunus</i>	Green Comma				
<i>P. gracilis</i>	Hoary Comma				1
<i>Nymphalis antiopa</i>	Mourning Cloak		1		
<i>Vanessa atalanta</i>	Red Admiral				
<i>V. cardui</i>	Painted Lady				
<i>V. virginienensis</i>	American Lady				
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			3	4
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	9	29	1	1
<i>Cercyonis pegala</i>	Common Wood-Nymph		2	2	1
<i>C. oetus</i>	Small Wood-Nymph			2	31
<i>Erebia epipsodea</i>	Common Alpine	2	28	5	
<i>Oeneis chryxus</i>	Chryxus Arctic				
<i>Thorybes pylades</i>	Northern Cloudywing	1			
<i>Erynnis icelus</i>	Dreamy Duskywing		2		
<i>E. pacuvius</i>	Pacuvius Duskywing				
<i>E. persius</i>	Persius Duskywing	4	18	2	1
<i>Pyrgus communis</i>	Common Checkered-skipper				1
<i>Piruna pirus</i>	Russet Skipperling				1
<i>Oarisma garita</i>	Garita Skipperling			1	
<i>Hesperia juba</i>	Juba Skipper		2		
<i>H. colorado</i>	Western Branded Skipper		1		
<i>H. pahaska</i>	Pahaska Skipper				
<i>H. viridis</i>	Green Skipper				
<i>H. nevada</i>	Nevada Skipper		1		
<i>Polites draco</i>	Draco Skipper		3	3	
<i>Poanes taxiles</i>	Taxiles Skipper				
<i>Euphyes vestris</i>	Dun Skipper				2?
skipper sp.			1		

Continued on the next page.

Table IX. Caribou Ranch – Mud Lake (Continued)

Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation or r.t. mileage by car	Researchers
6/21/2011 10:a.m. - 12:00 p.m. 12-18° C 5-35 mph wind, clouds 5% to 30%;	Mud Lake, to grassed shallow gulley, then toward highway; return via south side of lake	Thicket hairstreak nectaring on white pussytoes and mtn parsley; pine elfin nectaring on mtn parsley. Cold temp, so butterflies mostly in N-S gulley	anemone pink, Arnica heart-leaf golden banner golden smoke, green gentian, iris, larkspur lupine, Mertensia, mouse-ear, parsley mtn, whiskbroom parsley, Penstemon, Physaria cinquefoil, pussytoes, salsify, skull cap, strawberry, tower mustard, violet (purple), wallflower	Pied-bill grebe, crow, raven, v.gr swallow, w.br. nuthatch, ruby crowned kinglet, hermit thrush, robin, br. tailed hummingbird red wing, pine siskin	Point 132 Elev. 8388' N 39.97911 W105.50802 52 mi r.t.	Jan Chu, Larry Crowley, Amy Chu
7/1/2011 10:00-1:00 p.m. 17-22° C; clear blue sky, to 40% cloudy; no wind	Caribou meadow inside locked gate northeast toward bog	Ringlet and Boisduval's blue nectaring on Geyer onion; N. checkerspot nectaring on Erigeron; Parnassian nectaring on Arnica and ovipositing on Sedum; common alpine nectaring on mouse-ear	anemone pink multifida, Arnica blue-eyed grass coral root, Erigeron Gaillardia, geranium Fremont's., geranium Rich. Geyer onion golden banner green gentian Hydrophyllum, iris Lambert's loco larkspur, lupine Mertensia, milk vetch monkshood mouse-ear, mtn. parsley, ninebark paintbrush Penstemon blue Physaria sp pygmy bitterroot cinquefoil, Pussytoes rose, salsify Senecio, shooting star skullcap, stoncrop sulfur-flower wallflower, yarrow	Chipping sparrow, sapsucker, ruby c.kinglet, warbling vireo, house wren, hairy woodpecker, robin		Jan Chu, Larry Crowley, Jean Morgan, Amy Chu, Venice Kelly

Continued on the next page.

Table IX. Caribou Ranch – Mud Lake (Continued)

Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation or r.t. mileage by car	Researchers
7/22/2011 9:15 – 1:40 p.m. 21 - 27° C, blue sky, zero wind to 5 mph.	Caribou parking lot, along trail to interior roadway.	B'flies flying fast. Anise swallowtail nectaring on Lambert's loco. Queen Alexandra's sulphur zipping over the meadow, sometimes in a two-butterflies-spiral.	Angelica, bedstraw black-eyed Susan Campanula, cinquefoil clover purple clover sweet, coral root, Erigeron evening primrose fireweed, flax Gaillardia geranium Fremont's, geranium Richardson, Gilia, goldenrod green gentian Gumweed, hawkweed Lambert's loco, lupine Mariposa lily, Mertensia, milk vetch paintbrush Penstemon one-sided pine drop, pussytoes rose, sandwort Senecio, stonecrop sulfur-flower wallflower, yarrow	Mourning dove, night hawk, b.t. hummingbird, mtn chickadee, dark-eyed junco, pine siskin. Chipmunk, chicory squirrel, golden mantle ground squirrel, cotton tail.	50 mi. r.t.	Jan Chu, Larry Crowley, Jean Morgan, Mary Balzer, Elaine Hill, Pam Piombino

Continued on the next page.

Table IX. Caribou Ranch – Mud Lake (Continued)

Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation or r.t. mileage by car	Researchers
8/3/2011 9:30-12:30 p.m. 17 - 22° C, 98% blue sky, 0-5 mph wind following heavy rain last night.	Bluebell Mine,	Northwestern fritillary nectaring on Gaillardia. Bull thistle blossoms at their peak.	alfalfa, bedstraw black-eyed Susan bull thistle, Campanula, clover, red, clover, sweet clover, white, Erigeron evening primrose common, fireweed, Gaillardia geranium, Fre., Gilia goldenrod, gumweed hawkweed Lambert's loco, lupine Mariposa lily, Monarda monk's hood, mullein nodding onion oxeye daisy paintbrush, green paintbrush, red Penstemon, one-sided pussytoes rose, Rudbeckia, salsify sulfur-flower thistle, white yarrow	Dusky grouse and 2 chicks, Steller's jay raven, chickadee, b.t. hummingbird, cordilleran flycatcher, robin, dark-eyed junco		Jan Chu, Larry Crowley, Amy Chu, Venice Kelly, Jeff Moser

Table X. Rabbit Mountain

Rabbit Mountain	2011	4/11	5/31	9/9
<i>Papilio polyxenes</i>	Black Swallowtail			1
<i>P. multicaudata</i>	Two-tailed Swallowtail			
<i>Pontia protodice</i>	Checkered White		5	
<i>P. occidentalis</i>	Western White			
<i>Euchloe ausonides</i>	Large Marble		3	
white sp.		2		
<i>Colias philodice</i>	Clouded Sulphur			1
<i>Glycopsyche lygdamus</i>	Silvery Blue			
<i>Euphilotes ancilla</i>	Rocky Mtn. Dotted-Blue		4	
<i>Danaus plexippus</i>	Monarch			
<i>Euptoieta claudia</i>	Variegated Fritillary			5
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			3
<i>S. edwardsii</i>	Edwards' Fritillary			2
<i>S. coronis</i>	Coronis Fritillary			1
<i>Chlosyne gorgone</i>	Gorgone Checkerspot		3	
<i>Phyciodes pulchella</i>	Field Crescent			
<i>Vanessa cardui</i>	Painted Lady			
<i>Pyrgus communis</i>	Common Checkered-skipper		1	2
<i>Pholisora catullus</i>	Common Sootywing			
<i>Hesperia leonardus</i>	Leonard's Skipper			27
<i>Poanes taxiles</i>	Taxiles Skipper			
<i>Atrytonopsis hianna</i>	Dusted Skipper		3 ph	

Continued on the next page.

Table X. Rabbit Mountain (Continued)

Date Conditions	Location Rabbit Mountain	Butterfly Behavior	Blossoming Plants	Animals	Researchers
4/11/2011 11:00 - 1:30 p.m. 12 -16 ° C 0-5 mph wind 35% clouds	Walked the trail, across road onto upper trail	Cold and windy. Butterflies along sunny service road	chickweed, Corydalis curvisiliqua, dandelion wavy leaf, Easter daisy filaree, Musineon mustard small lavender, mustard weeds tiny yellow, Nuttall's violet, salt & pepper, violet violet color	Red-tail hawk, chickadee, white-br. nuthatch, canyon wren western meadowlark	Jan Chu, Larry Crowley
5/31/2011 2:15-4:15 p.m. 23 ° C clear sky, wind 0-5 mph	Walked up trail, returned by road	Few flying	Eriogonum Gaillardia geranium Fre. Geyer's onion Mertensia mouse-ear Nuttall's violet puccoon Senecio sp. spiderwort Spreading daisy toadflax Verbena bipinifolia, wallflower	Chat, blue grosbeak pair	Jan Chu, Jean Morgan
9/9/2011 9:30-1:15 p.m. 17-22°C 60% clear no clouds	Followed roadway to meadow at top of hiking trail and return by trail	Leonard's Skippers and fritillaries nectaring on Liatris. Schinia gaurae (Clouded crimson moth) caterpillars on Gaura parviflora	Brickellia eupatorioides, Gumweed Liatris punctata, moth mullein, Verbascum blattaria, white aster Virgulus falcatus	prairie dog, cottontail, barber-pole grasshopper Dactyloctenium bicolor, mourning cloak grasshopper Dissosteira Carolina, ebony grasshopper Boopendon nubilum	Jan Chu, Jean Morgan, Lynn and Gene Monroe

VIII. Analysis of 2007 – 2011 Butterfly Inventories

We conducted walking surveys in seven major areas within five open space properties annually from 2007-2011 concentrating on seven areas. What conclusions can be drawn from the data? For each area, the major butterflies are chosen, as determined from 2004-2007 records (Chu, Sportiello, 2007). Major butterflies with the largest populations are more likely to be statistically worthy and most likely to show a trend. Tables XI – XVII show the following numbers for these five years: a) RH; b) species identified annually; c) cumulative totals of species; d) total I/RH and e) Species/RH. Just to recap, the standard unit ‘Individuals per Research Hour’ (I/RH) describes the total number of individual butterflies sighted divided by the total number of hours of field research by the team for each specific study area. Species/RH refers to species per research hour. Tables XVIII – XX show results for Major Butterflies: a) Annual I/RH, b) Five-year Annual I/RH vs Five-year Average c) Five-year Annual Species/RH vs Average.

Five-year surveys 2007-2011, showed an average of 86 I/RH on seven sites (see Table XIX). We calculated a high of 112 I/RH during 2007; I/RH were 90 in 2008; 104 in 2009; 62 in 2010, and the number fell to 61 in 2011. In addition, the average number of species/RH was 3.4 (see Table XX). Species remained fairly steady with 4.3 in 2007; 3.5 in 2008; 3.2 in 2009; 3.4 in 2010 followed by the lowest numbers 2.7 in 2011.

A. I/RH and Species/RH on Open Space Properties

1. Southeast Buffer is entered by the steel gate west of McCaslin Boulevard and north of W. 120th, at Hwy 128 and includes a portion of Rock Creek entered on the west Coalton Road. The mixed-grass pasture is showing more vegetation than in past years. Cattle have not been left to graze for very long periods in the study area and through spraying, the county attempted limited weed control. In 2007, the greatest numbers of species and I/RH were sighted; however in 2010, the highest numbers of individuals were counted, this due in part because of a sizable immigration of southern butterflies. The highest number (14) of Black Swallowtails were here in the Southeast Buffer in 2007, but it must be noted that during 10 years of surveying, these numbers were not repeated in the Buffer nor ever seen in other areas.

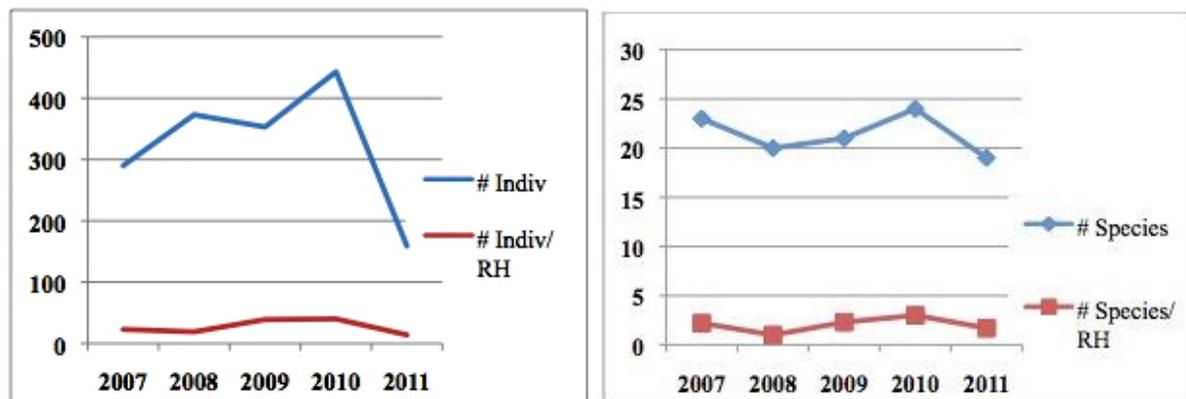
In 2008, the low I/RH may be due to the land being “extremely dry, hot and windy, with most plants desiccated and eaten to the ground by prairie dogs.” (Chu, 2008) In 2009, “the prairie dog burrows had been vacated and the cattle were grazing heavily. Three coyotes were

hunting mincing their steps along the far hillside. A large influx of Variegated Fritillaries flew May through the end of June 2009, raising the I/RH.” (Chu, 2009) During 2010, we saw numerous Checkered Whites, Dainty Sulphurs, Clouded Sulphurs, Melissa Blues, and Field Crescents along with Variegated Fritillaries. As has been pointed out before in 2011, the area was extremely dry all summer causing fewer adult butterflies to emerge. While June-August precipitation in Boulder was slightly above average, hot dry conditions from late July through early September contributed to desiccation of plants in this area (NIST, 2011). By 2011 the former prairie dog barrens are filling in with many blossoming plants, and good stands of Little Bluestem.

Table XI. Southeast Buffer

Southeast Buffer	2007	2008	2009	2010	2011
# of Species identified during each season in Southeast Buffer	23	20	21	24	19
Cumulative # Species sighted in Southeast Buffer for years 2007-2011	23	23	33	37	41
# Research Hours on Site	10.5	21	9	8	11.5
# Individual Butterflies	290	373	353	443	159
# Individuals / Research Hour	23	19	39	40	14
#Species / Research Hour	2.2	1.0	2.3	3.0	1.7

Graphs for Table XI. Southeast Buffer



- Anne U. White** is narrow and deep with well covered ponderosa pine and Douglas-fir slopes, a small stream and a few meadows. Its Fourmile Canyon Trail is fairly well-preserved except for traffic (dogs, runners and hikers) which has increased over the years.

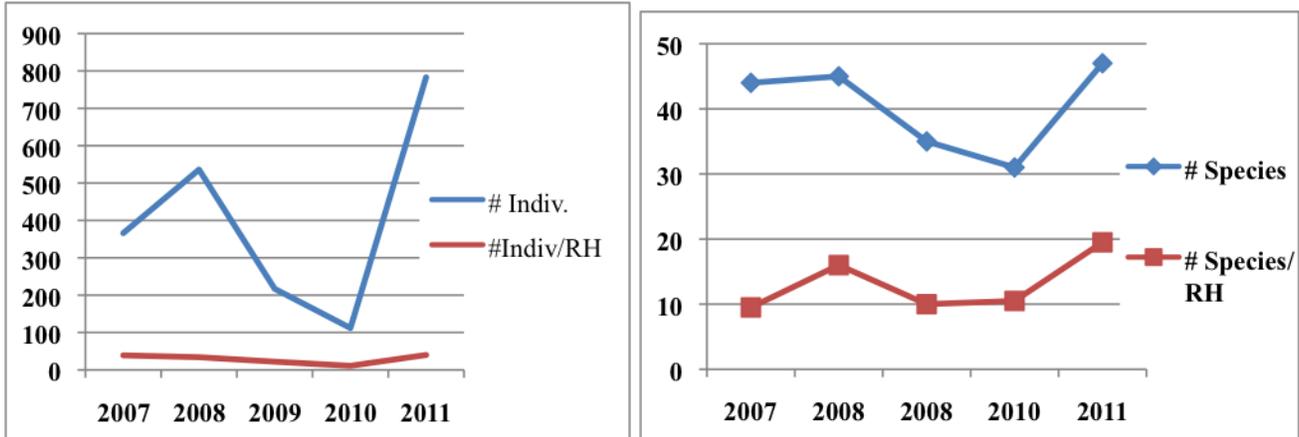
In 2010 there was a heavy late snowfall with 12” of snowpack on the slippery trail March 20 leaving a short season for the butterflies. Some of the bare ground patches continued to be exposed on the social off-trails. June 16 there were 16 dog-walkers and 2 off-leash dogs. By July 27 the fritillaries were numerous and nectaring on the Monarda blossoms.

In 2011, late spring rich vegetation and optimal weather conditions were conducive to butterfly life cycles resulting in the highest numbers of individuals, species and I/RH. Butterflies were numerous and active in June with much nectaring and many blossoms evident. Four species of Swallowtails and Common Ringlets were flying above the trail. A five-foot flood from the Fourmile Fire runoff tore the favorite nectar plant Bee Balm away and covered these with sand. In addition, the trail was closed for one month following the flood July 19 when no hikers or dogs were allowed providing, undisturbed conditions except for a repair crew. Fritillaries were left to nectar on goldenrod, a poor substitute nectar plant.

Table XII. Anne U. White – Fourmile Canyon

Anne U. White Fourmile Canyon	2007	2008	2009	2010	2011
# of Species identified annually in Anne U. White	44	45	35	31	47
Cumulative # Species sighted in Anne U. White 2007-2011	47	66	69	69	75
Research Hours on Site	9.5	16	10	10.5	19.5
# Individual Butterflies Counted	366	536	217	112	773
# Individuals / Research Hour (I/RH)	38.5	33.5	21.7	10.7	40
# Species / Research Hour	4.6	2.8	3.5	3.0	2.4

Graphs for Table XII. Anne U. White



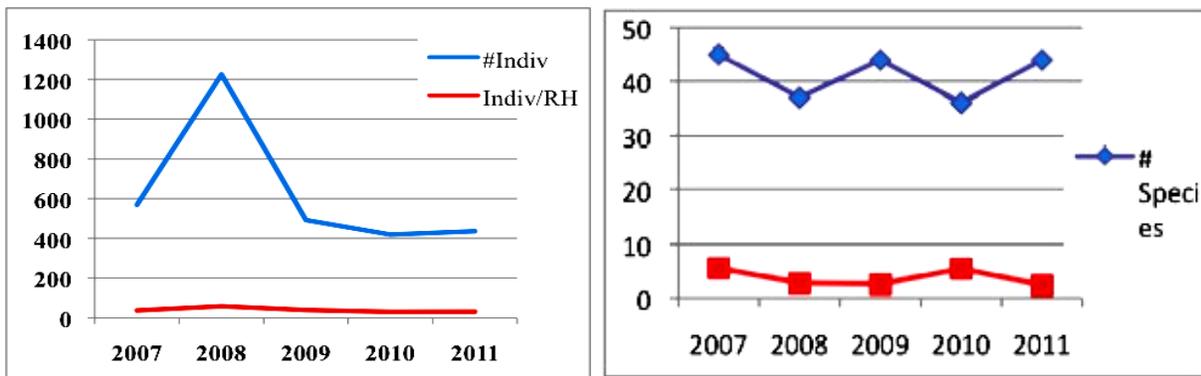
3. **Heil Valley Ranch Open Space** has diverse habitats with intermittent streams, wetlands, meadows, Ponderosa and Douglas-fir forests, and old disturbed sandstone quarries. The Overland Fire Burned nearly 2,000 of the 5,000 acres. Heil is our largest survey property prompting us to inventory in three divergent areas: 3a) Geer Watershed, 3b) Plumely Canyon and 3c) Heil North – Red Hill and Gulch and North Point.

3a. **Geer Watershed** begins at the gate to the manager’s cabin, following the stream past the barn where it divides into two forks. One fork veers northwest through fields and into exposed sandstone; the other follows the west stream where Ponderosa Pine and Douglas-fir remain on the burned-over and recovered slope with the Big Meadow higher to the west. Geer had the greatest number of I/RH and species seen at Heil; more than either Plumely Canyon or North Heil. 55 of the 87 previously observed species were observed in 2008. The only recorded ecological difference between Geer and the other two areas is the Overland Fire of 2003 which affected the Geer Watershed and not Plumely or North. Perhaps the optimum moisture fell in Geer in 2008. No trend is obvious in this watershed. The high numbers of individuals in 2008 skewed the results because Mike Sportiello covered about twice the amount of land and doubled the number of days. Discounting his observations the number of individuals would be about 530*, which fits more reasonably into the long-term data.

Table. Heil Valley – Geer Watershed

Heil-Geer Watershed	2007	2008	2009	2010	2011
# of species Identified annually in Heil-Geer	42	56	44	49	36
Cumulative # of Species Sighted in Heil-Geer	81	87	90	91	91
Research Hours at Site	15.5	21	12.5	14	14
# Individual Butterflies Counted	569	1225	492	419	436
# Individuals / Research Hour	37	58	39	30	31
# Species / Research Hour	2.7	2.7	3.5	3.5	2.6

Graphs for Table XIII. Heil Valley – Geer Watershed

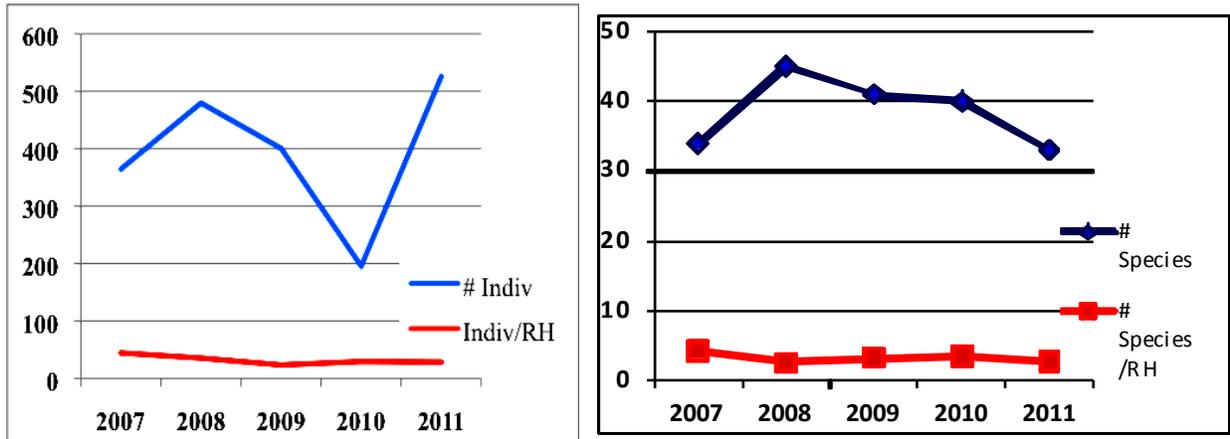


3b. Plumely Canyon begins inside the locked gate on the west side of the service road and continues past sandstone quarries to the high meadow beyond the old stone cabin. Plumely seems to have what might be noted as ‘normal fluctuations’. Noticeable during 2005, were the Painted Ladies which flew in streams of black and orange. This massive southern immigration has not recurred yet, but likely will in the future. The year 2011 had optimal conditions for the summer emergent butterflies.

Table XIV. Heil Valley – Plumely Canyon

Heil Valley-Plumely Canyon	2007	2008	2009	2010	2011
# of Species Identified During Each Year in Plumely Canyon	45	37	44	36	44
Cumulative # Species 2009-2011 sighted in Plumely Canyon	81	81	82	84	86
Research Hours on Site	8	13	17	6.5	18
# Individual Butterflies Counted	365	480	401	196	526
# Individuals / Research Hour	45	36	24	30	29
# Species / Research Hour	5.6	2.8	2.6	5.5	2.4

Graphs for Heil Valley – Plumely Canyon

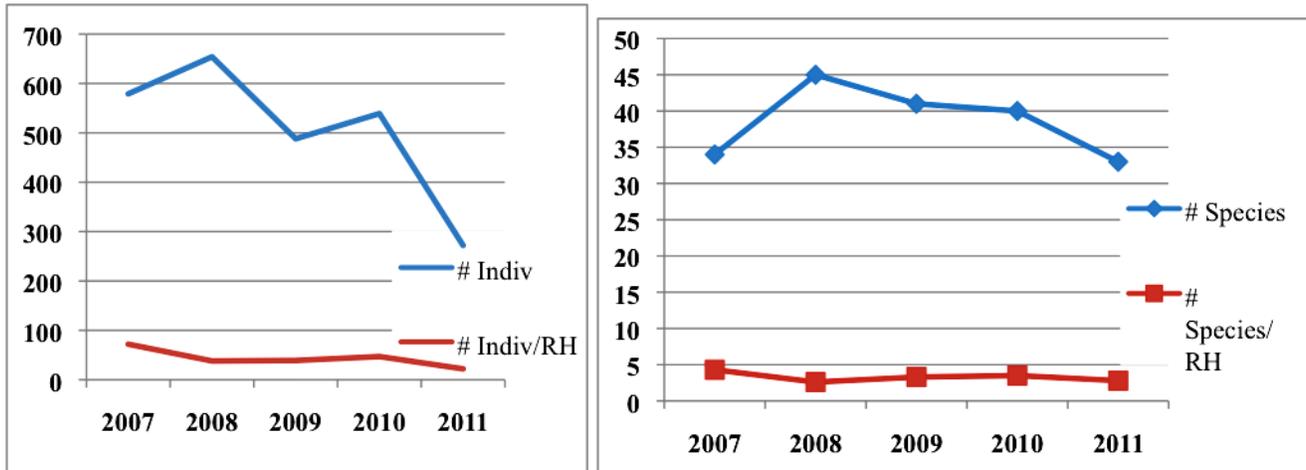


3c. Heil Valley-North includes the North Point property beginning west of Hygiene Road and Hwy 36, to the west ridge top, Red Hill meadow and saddle, and the Red Gulch at the bottom of the ravine paralleling the Picture Rock Trail. Relatively high numbers of butterflies seen during 2008 resulted from significant flights of Cabbage White during each visit; Silvery Blues on May 18; Aphrodite Fritillaries, June 29; and Hackberry Emperors July 22. In 2011, this area appeared particularly dry during March, early April, and late July through early September when the official Boulder weather station reported significantly below average precipitation. (National Institute of Standards, 2011). These relatively dry periods may have accounted for the three unusually low counts.

Table XV. Heil Valley – North

Heil Valley-North Point, Red Hill, Red Gulch	2007	2008	2009	2010	2011
# of Species Identified During Year in Heil-North	34	45	41	40	33
Cumulative # Species 2007-2011 sighted in Heil-North		67	77	81	83
Research Hours on Site	8	17	12.5	11.5	12
# Individual Butterflies Counted	579	654	488	539	260
# Individuals / Research Hour	72	38	39	47	21.5
# Species / Research Hour	4.3	2.6	3.3	3.5	2.8

Graph for Table XV. Heil Valley - North



4. Walker Ranch. We have surveyed butterflies at Walker Ranch since 2005. Our survey route follows the Meyer’s Homestead Trail to the northwest. We generally diverge from the road into the meadows and also follow the nearby Meyer’s Gulch streamlet.

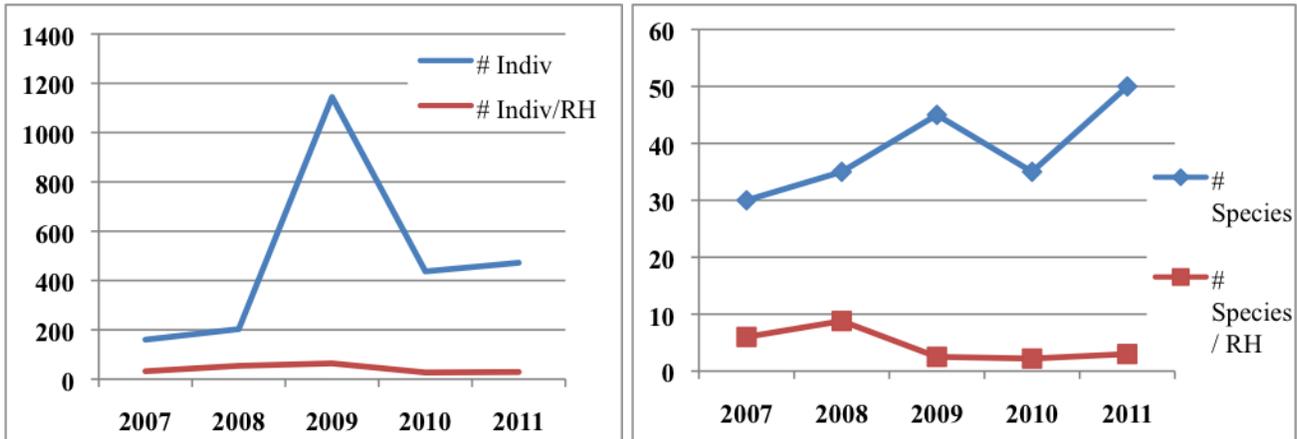
In 2009 there was an extremely high emergence of the Rocky Mountain Dotted-Blue between June 22 and July 9. The puddles on the road were filled with many Dotted-Blues and Boisduval’s Blues, Field Crescents and Common Ringlets. The extreme opposite situation showed in 2010 when we saw not one Dotted-blue, Boisduval’s Blue, Field Crescent or one Common Ringlet during June and August. Perhaps we missed their flights in July, but the extreme difference must be noted. In 2011 the numbers of species was high, yet the ground was very dry; the roadway had no wet mud for puddling butterflies, so the team followed the streamlet more closely.

Table XVI. Walker Ranch – Meyer’s Gulch

Walker Ranch Meyer’s Gulch	2007	2008	2009	2010	2011
# Species Identified during 2011 in Meyer’s Gulch	30	35	45	35	50
# Species Sighted in Meyer’s Gulch 2007-2011	33*	38	60	70	72
# Research Hours on Site	5	4	18	16	16.5
# Individual Butterflies Counted	160	203	1144	437	472
# Individuals / Research Hour	32	54	64	27	29
# Species / Research Hour	6.0	8.8	2.5	2.2	3.0

* # of Species was combined with nearby areas

Graph for Table XVI. Walker Ranch – Meyer’s Gulch



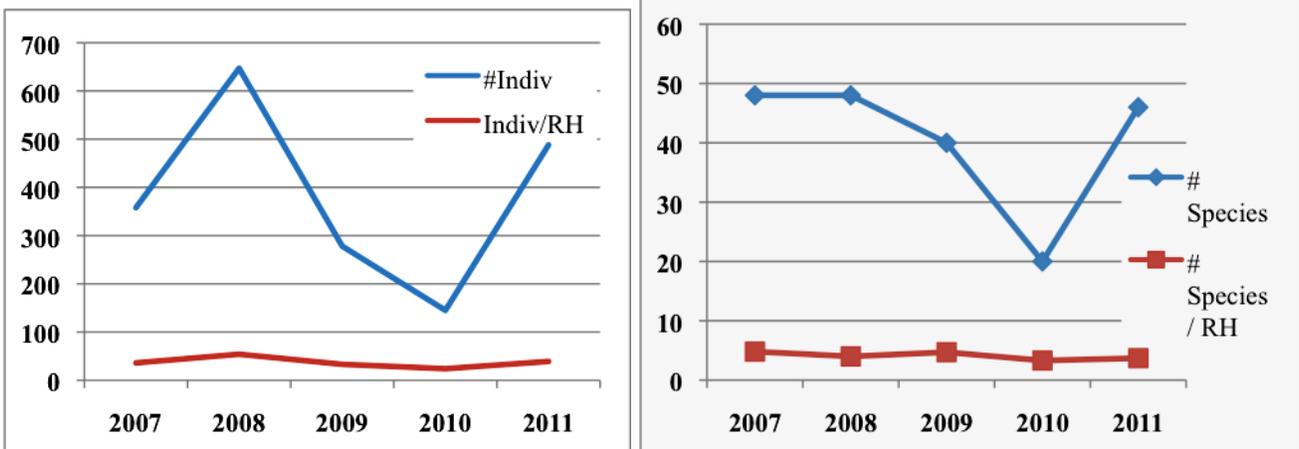
5. Caribou Ranch and Mud Lake. We begin our Mud Lake surveys in June, after the snow melts. The most productive area is the shallow depression near the western border and adjacent to the Peak to Peak Highway, CO Hwy 72, which leads to a small aspen bog, but most of the area around the lake is surveyed.

Once the closure is lifted in Caribou on July 1 we walk the trail from the parking lot or park inside the locked gate and work our way along the east boundary toward a boggy area. The road toward the Delonde home is productive where the water seeps onto the gravel. The Blue Bird Loop leads us to the highest point near the Blue Bird Mine. Survey occurs along the ‘horse trail’ through the Monarda Meadow where invasive Ox-eye Daisies have been hand-picked for years. Large game birthing closures continue to stave off research until July of each year.

Table XVII. Caribou Ranch and Mud Lake

Walker Ranch Meyer’s Gulch	2007	2008	2009	2010	2011
# of Species Identified during July and August, annually in Caribou Ranch and Mud Lake	48	48	40	20	46
# of Species Sighted in Caribou/Mud 2007-2011	75	75	80	80	81
# of Research Hours on Site	10	12	8.5	6	12.5
# of Individual Butterflies Counted	358	647	278	145	488
# Individuals / Research Hour	36	54	33	24	39
# Species / Research Hour	4.8	4.0	4.7	3.3	3.7

Graph for Table XVII. Caribou Ranch and Mud Lake



6. Rabbit Mountain – Insufficient information was gathered for Rabbit Mountain, so analysis cannot be made.

B. I/RH and Species/RH for Major Butterflies

We realize that five years’ records form a short time period from which to draw conclusions and do not necessarily represent a long-term trend. But I must ask, is there a trend shown by these inventories of butterflies within Boulder County Open Spaces? To determine this, I chose butterflies with the largest populations for the years 2004-2007 which are more likely to be statistically worthy and most likely to show a trend. (Chu, J and Sportiello, 2007. p. 22-23). The Individuals per Research Hour (I/RH) were determined for each of the recent five years. The grand totals are displayed in the graph on page 69.

1.		2007	2008	2009	2010	2011
Southeast Buffer	Research Hours on Site	10.5	21	9	8	11.5
<i>Scientific Name</i>	Common Name					
<i>Pontia protodice</i>	Checkered White	4.09	4.24	1.22	1.25	0.09
<i>Pieris rapae</i>	Cabbage White	0.06	0.29	1.78	0	0
<i>Euptoieta claudia</i>	Variegated Fritillary	7.24	0.76	14.33	11.38	2.26
<i>Colias philodice</i>	Clouded Sulphur	1.81	1.10	1.56	5.63	0.61
<i>Sub-total</i>		13.20	6.39	18.89	18.26	2.96

2.		2007	2008	2009	2010	2011
Anne U. White	Research Hours on Site	9.5	16	10	10.5	19.5
<i>Scientific Name</i>	<i>Common Name</i>					
<i>Papilio rutulus</i>	W. Tiger Swallowtail	3.05	0.75	0.70	0.38	0.62
<i>Pieris rapae</i>	Cabbage White	2.00	1.63	0.90	0.86	1.38
<i>Euphyes vestris</i>	Dun Skipper	0.84	1.50	1.50	1.24	1.49
<i>Euptoieta claudia</i>	Variegated Fritillary	0.53	0	0.10	0.29	0.05
<i>Polygonia gracilis zephyrus</i>	Hoary Comma	0.84	0.88	1.90	2.10	1.54
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	0.53	0.06	0.50	0.19	0.62
<i>Sub-total</i>		7.79	4.82	5.60	5.06	5.70

3a.		2007	2008	2009	2010	2011
Heil Ranch – Geer Watershed	Research Hours on Site	15.5	21	12.5	14	14
<i>Scientific Name</i>	<i>Common Name</i>					
<i>Pieris rapae</i>	Cabbage White	5.79	4.81	2.16	2.23	6.14
<i>Plebejus icarioides</i>	Boisduval's Blue	5.03	1.20	1.12	0.71	0.14
<i>Vanessa cardui</i>	Painted Lady	0.39	2.48	0.64	0.50	0
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	4.32	3.71	6.56	2.43	4.00
<i>Phyciodes pulchella</i>	Field Crescent	0.32	0.52	1.20	0.21	0
<i>Sub-total</i>		15.85	12.72	11.68	6.04	10.28

3b.		2007	2008	2009	2010	2011
Heil Ranch – Plumely Canyon	Research Hours on Site	8	13	17	6.5	18
<i>Scientific Name</i>	<i>Common Name</i>					
<i>Vanessa cardui</i>	Painted Lady	0.25	0.92	0.29	2.62	0
<i>Pieris rapae</i>	Cabbage White	1.13	1.38	0.82	0.92	0.44
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	0.89	8.77	0.80	0.77	11.67
<i>Hesperia colorado</i>	Common Branded Skipper	0	0.31	0	0	0
<i>Phyciodes pulchella</i>	Field Crescent	0.50	0.46	0.59	0	0
<i>Callophrys eryphon</i>	Western Pine Elfin	0.50	0.23	2.47	2.61	2.22
<i>Euphyes vestris</i>	Dun Skipper	1.13	1.62	0.53	0.92	0.44
<i>Sub-total</i>		4.40	13.69	9.89	7.84	14.77

3c.		2007	2008	2009	2010	2011
Heil Ranch – North, Red Hill	Research Hours on Site	8	17	12.5	11.5	12
<i>Scientific Name</i>	<i>Common Name</i>					
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	15.13	1.88	2.96	3.83	2.33
<i>Cercyonis pegala</i>	Common Wood-nymph	8.38	0.94	0	0	1.42
<i>Colias philodice</i>	Clouded Sulphur	7.88	2.12	1.04	2.00	0.25
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	4.75	2.59	0.56	2.09	1.00
<i>Plebejus melissa</i>	Melissa Blue	4.13	0.29	0.72	0.70	1.00
<i>Sub-total</i>		40.27	7.82	5.28	8.62	6.00

4.		2007	2008	2009	2010	2011
Walker Ranch – Meyer’s Gulch	Research Hours on Site	5	4	18	16	16.5
<i>Scientific Name</i>	<i>Common Name</i>					
<i>Parnassian smintheus</i>	Rocky Mt. Parnassian	1.60	8.50	1.28	0.06	0.48
<i>Papilio eurymedon</i>	Pale Swallowtail	1.00	1.25	0.22	0.06	0.36
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak	1.60	1.50	1.94	0.69	1.15
<i>Glaucopsyche lygdamus</i>	Silvery Blue	1.00	0.25	0.11	1.25	0.24
<i>Euphilotes ancilla</i>	Rocky Mt. Dotted-Blue	2.00	6.75	31.39	0	2.67
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	7.00	5.75	5.30	0	2.97
<i>Oeneis uhleri</i>	Uhler’s Arctic	1.60	0.25	0	0	0.96
<i>Sub-total</i>		15.8	24.25	40.27	2.06	8.84

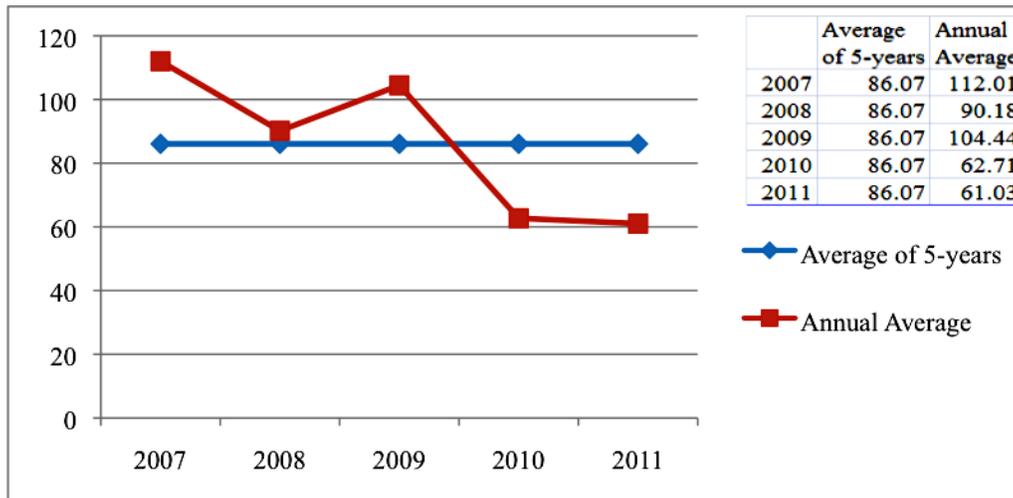
5.		2007	2008	2009	2010	2011
Caribou Ranch, Mud Lake	Research Hours on Site	10	12	8.5	6	12.5
<i>Scientific Name</i>	<i>Common Name</i>					
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	4.70	6.75	3.76	0	8.96
<i>Colias alexandra</i>	Queen Alexandra’s Sulphur	2.60	5.08	5.06	4.83	0.24
<i>Vanessa cardui</i>	Painted Lady	0.10	0.58	0.12	0.17	0.08
<i>Cercyonis oetus</i>	Small Wood-nymph	3.20	4.25	0.71	9.83	2.08
<i>Plebejus icarioides</i>	Boisduval’s Blue	1.70	2.75	1.18	0	0.16
<i>Erebia epipsodea</i>	Common Alpine	2.40	1.08	2.00	0	0.96
<i>Sub-total</i>		14.70	20.49	12.83	14.83	12.48

C. Annual I/RH - Totals for Major Butterflies is charted for five years for each of the seven study main areas. Further, averaging the five totals gives a baseline representing a five-year average on the following graph. The Annual Average I/RH is plotted against this baseline.

Table XVIII. Annual I/RH - Totals for Major Butterflies

	2007	2008	2009	2010	2011
1. SE	13.20	6.39	18.89	18.26	2.96
2. Anne	7.79	4.82	5.60	5.06	5.70
5. 3. Geer	15.85	12.72	11.68	6.04	10.28
4. Plumely	4.40	13.69	9.89	7.84	14.77
6. North	40.27	7.82	5.28	8.62	6.00
7. Walker	15.80	24.25	40.27	2.06	8.84
8. Caribou	14.70	20.49	12.83	14.83	12.48
Totals	112.01	90.18	104.44	62.71	61.03

Table XIX. Five-Year Annual I/RH Totals vs Average I/RH for Major Butterflies

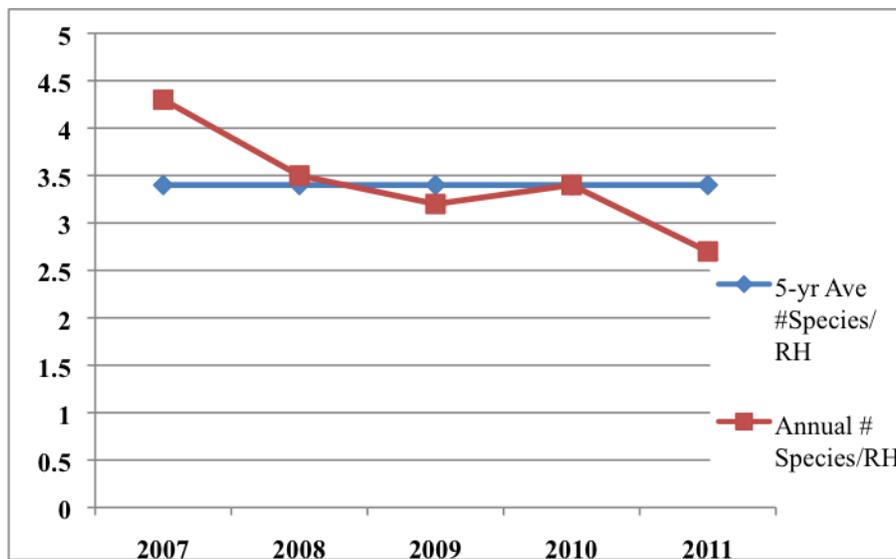


The Annual I/RH for major butterflies shows the greatest numbers in 2007 with 2010 and 2011 having the lowest numbers. 2007 and 2009 were above the five-year average and 2010 and 2011 below.

Table XX. Five-Year Annual Species/RH vs Average Species/RH for Major Butterflies

Species /R H	2007	2008	2009	2010	2011
1. Southeast Buffer	2.2	1.0	2.3	3.0	1.7
2. Anne U. White	4.6	2.8	3.5	3.0	2.4
3a. Heil – Geer	2.7	2.7	3.5	3.5	2.6
3b. Heil – Plumely	5.6	2.8	2.6	5.5	2.4
4. Heil – North	4.3	2.6	3.3	3.5	2.8
5. Walker – Meyer’s	6.0	8.8	2.5	2.2	3.0
6. Caribou – Mud	4.8	4.0	4.7	3.3	3.7
Ave. Species/RH	4.3	3.5	3.2	3.4	2.7

Graph of Five-Year Annual Species/RH vs Average Species/RH for Major Butterflies



Numbers of species/RH for the major butterflies were highest in 2007 and show a nearly continuous falling number. In 2007 the species/RH were higher than the average 3.4 with lower than average results in 2009 and 2011.

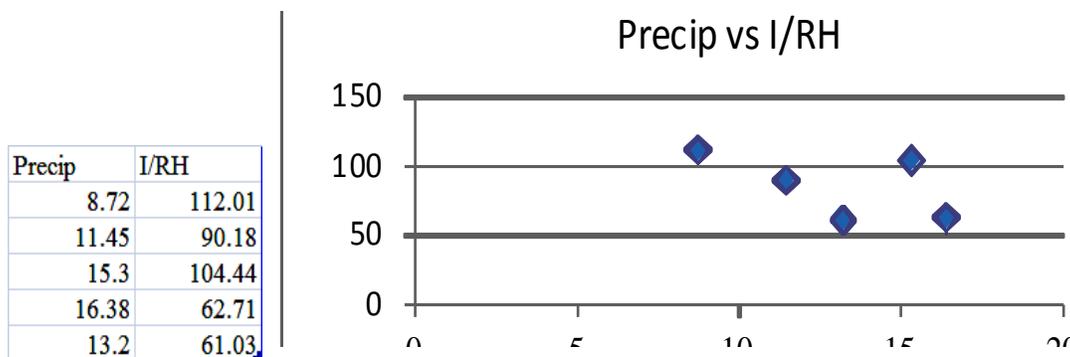
Indeed there does seem to be an overall trend with the populations and species numbers of butterflies dropping. However, five years is not a long enough period to actually determine a trend. Many more years of research, like that being carried out by Rich Bray in Rocky Mountain National Park for 15 years, or Art Shapiro for 34 years in California, are determining a statistically significant trend. “Butterfly diversity (the number of different species present) is falling fast at all the sites near sea level, in the central valley, and the foothills. It is also declining, but more slowly, in the mountains. Another surprising finding was that ruderal

(“weedy”) butterfly species that breed on “weedy” plants in disturbed habitats and are highly mobile are actually declining faster than “non-weedy” species — those that specialize in one habitat type.” (Forister, Shapiro, 2011)

Overall year-to-year averages for all of the properties should indicate some factors that affect the properties equally such as periods of drought, cold wet springs. Colonization of the low-medium elevations along the Colorado Front Range by the caterpillar predating European Paper Wasp, *Polistes dominula*, has been observed to have a severe negative effect on local butterfly populations, but this has not been quantified and no management solution is known according to entomologists at Colorado State University. Other factors affecting populations are invasive weeds, fire succession, and parasite levels.

Is it the relationship with the precipitation that has caused this trend? The amount of precipitation for March through August for Boulder was determined, and plotted against the annual average I/RH.

Table XXI. Precipitation vs. I/RH for Boulder



Even though the weather is very significant in influencing the populations, there is not a direct relationship between the precipitation for March through August and annual totals. Rather the national weather south of Colorado was a large influence. In 2011, so many of the immigrant butterflies did not make an appearance likely due to the hazardous crossing without nectar or host plants, through Texas which had raging fires, the second hottest temperatures and driest conditions ever on record. New Mexico also suffered droughts in 2011 preventing the usual influx of immigrant butterflies.

IX. Conclusions

1. During five years of surveys, we documented 123 species of butterflies on Boulder County Open Space properties. We observed 118 in 2011. The official Boulder County list stands at 201; this maintained by the Big Sky Institute, Montana State University (Opler and Lotts). One new species, *Fulvia Checkerspot*, was caught in the Southeast Buffer. One species, *Mylitta Crescent*, was misidentified in 2005, so that was removed from the list. Common (Ochre) Ringlets were most numerous (94.2/RH) followed by Variegated Fritillaries (36.9/RH), Cabbage Whites (34.7/RH), Checkered Whites (10.9/RH) and Painted Ladies (9.1/RH).
2. From one year to the next I/RH varied, with the highest numbers being observed during 2007 and the lowest numbers during 2011. Considering only the major butterflies we observed 112 I/RH in 2007, and 61 I/RH in 2011. This project's multi-year reports show continued successes of butterfly populations and species, although it is noted that numbers of species and populations decreased during the recent two years.
3. Heil Valley supported a higher number of species and individuals than did the other four properties. The variety of plant communities at Heil Valley, along with the presence of seeps and running water throughout much of the summer, probably contribute to butterfly species diversity there. Southeast Buffer supported the lowest number of species and individuals. This area has less acreage, fewer diverse blossoming plants and only a single intermittent stream.
4. Cool late spring conditions and dry summer conditions appeared to contribute to lower numbers of species and individuals observed per hour. For example, during spring 2011, March was the fourth least snowy and fifth driest on record. April had 15 days with traces of rainfall and 3" of snow; May began hot and dry, but became exceptionally wet with more than five inches of precipitation falling over a 14-day period. Then the heat of the summer followed with 12 days in the 30 °C range, and August was the fourth warmest on record in Boulder.
5. Boulder County Open Space Properties are generally large and uncut by social or public trails providing non-segmented continuous habitat for butterflies and host plants, except Anne U. White Fourmile Trail which is somewhat limiting because of heavy foot traffic. These multi-year records generally reflect excellent habitat vitality in blossoming plants and ground cover.

6. No imminent threat is perceived to the rare and resident butterflies because there is very little disturbance in the most productive areas. Rare butterflies, those of special concern are listed by Colorado Natural Heritage Watch List. The rare Hops Azures continue to live in Heil Valley – Plumely Canyon and Arogos Skippers in Heil North. In Heil – Geer Watershed, Dusted Skippers have been found three times in 2009, and 13 in 2011. Moss’ Elfin has been observed in Anne U. White and Heil Valley – Plumely Canyon. Ottoo Skipper has been seen on the Southeast Buffer.
7. Butterfly inventorying has continued to add data to the natural history records of nine properties. Heil Valley was visited since year 2000, providing ten years of observations; Southeast Buffer, Caribou and Walker Ranches were visited first in 2005, providing seven years data; Anne U. White 2006 for six years; Rabbit Mountain and Steamboat for four years each; Reynold’s Ranch for three summers; and for one year only – Carolyn Holmberg, Pella Crossing and Hall Ranch. In 2008, the county supported a special project on Benjamin for twenty visits covering 59 research hours.

Conclusions by Area:

1. **Southeast Buffer** can support some short time seasonal grazing, but not continuous use as illustrated by the base of the hills near water tanks next to Rock Creek where the plants are completely gone. It is a fragile prairie with so little moisture. Grasses and blossoming plants show good recovery.
2. **Anne U. White Fourmile Canyon Trail** is used heavily by the public. Dogs and families sometimes move off trail, cut new paths and destroy the lushness of the canyon bottom. The recent flood cut a new streambed which required intervention by the Youth Corps to rebuild some stream banks, crossings and remove downed trees. Conditions following the flood will renew ‘naturally’ as occurs in nature. On the other hand, peoples’ off-trail habits are difficult to change.
3. **Heil Valley** has been well planned and preserved. Butterflies needing meadows have many undisturbed acres.
4. **Walker Ranch, Meyer’s Homestead Trail** is heavily used, but its well worn path makes access convenient. The wetlands should be continued preserved as they are.

5. **Reynold's Ranch** has special characteristics due to its higher elevation, not found in Caribou and Mud Lake. It is an upper montane property with flowers and butterflies common at higher elevations. In July the flowers, birds and butterflies were outstanding.
6. **Mud Lake and Caribou Ranch** BCPOS staff and volunteers have continued to rid the land of Oxeye Daisies which compete with native vegetation.
7. **Rabbit Mountain** is an interesting area for butterflies because of its varied habitat.

X. Recommendations by Area:

1. **Southeast Buffer.** This property seems to be evolving, because of extended Coalton Trail, grazing cattle and prairie dogs, and should be continued as a study area for butterflies.
2. **Anne U. White.** As this trail is very productive in terms of butterfly diversity and abundance, it is recommended that this trail be maintained in a way that discourages off-trail travel, which impacts the riparian areas and adjacent forest.
3. **Heil Valley Ranch.** Maintain the many meadows from encroaching evergreens. Butterflies find many host plants and blooming flowers in meadows as opposed to cut-timber and dense stands of evergreens.
4. **Meyer's Homestead Trail on Walker Ranch.** The wet-lands should be continued preserved as they are, as they provide excellent butterfly habitat, as confirmed by our surveys.
5. **Reynold's Ranch.** Flowers and butterflies are those common at higher elevations and could provide a future educational opportunity. Encourage further baseline research.
6. **Caribou Ranch and Mud Lake.** Continuation of the attempts to rid the land of Oxeye Daisy is encouraged, as this invasive species out-competes native plants important for butterfly foraging and reproduction.
7. **Rabbit Mountain.** Continue managing the land as is presently done which provides good habitat for certain butterflies, as is shown by finding a species new to our inventories.

8. Steamboat Mountain. Continue managing the land as is presently done which provides good habitat for certain butterflies.

XI. References

Print sources:

- Bray, Richard O. 1996-2011. Season Summary to Rocky Mountain National Park, Historic Reports and Observations. Unpublished reports for Rocky Mountain National Park, Estes Park, CO.
- Brock, Jim P., and Kenn Kaufman. 2003. *Butterflies of North America*. Houghton Mifflin, Boston.
- Callahan, William. March Weather Review. Get Out! Boulder Daily Camera. April 7, 2011 p. 8C.
ibid. April Weather Report. www.esrl.noaa.gov/psd/boulder/
ibid. May Weather Review. June 3, 2011 p. 6C
ibid. June Weather Review. July 5, 2011. p. 8C.
ibid. July Weather Review. August 5, 2011. p. 10C.
- Chu, Janet and Sportiello, Mike. *Lepidoptera of North America; Journal #8. Butterfly Research in Boulder County, Colorado 2004-2007*. C. P. Gillette Museum of Arthropod Diversity, Colorado State University. Ft. Collins, CO.
- Chu, Janet and Mike Sportiello. 2008. *Changes in Butterfly Populations in Boulder County, 2004-2008*. Unpublished report for Boulder County Parks and Open Space and Boulder County Nature Association. Boulder. CO.
- Chu, Janet. 2009. *Inventories of Butterflies in Boulder County*. Unpublished report for Boulder County Parks and Open Space, Boulder, CO.
- Chu, Janet. 2010. *Butterfly Inventories in Boulder County Open Space Properties*. Unpublished report for Boulder County Parks and Open Space, Boulder, CO.
- Chu, Janet R. and Stephen R. Jones. 2011. *Butterflies of the Colorado Front Range*. Boulder County Nature Association, Boulder, CO.
- Fisher, Michael S. 2005-2006. *The Butterflies of Colorado; Lepidoptera of North America #7, Parts 1-4*. C.P. Gillette Museum of Arthropod Diversity, Colorado State University, Ft. Collins, CO.
- Forister, Matthew L., A. Shapiro, et al. *Compounded effects of climate change and habitat alteration shift patterns of butterfly diversity*. 2010 February 2. *Proc Natl Acad Sci U S A.*; 107(5): 2088–2092. Published online 2010 January 19. doi: 10.1073/pnas.0909686107.
- Glassberg, Jeffrey. 2001. *Butterflies Through Binoculars, The West*. Oxford University Press, New York.
- Opler, Paul A. 1999. *A Field Guide to Western Butterflies*. 2nd edition. Peterson Field Guide series. Houghton Mifflin, Boston.
- Opler, Paul A. and Andrew D. Warren. 2003. *Scientific Names List for Butterfly Species of North America, North of Mexico*. C.P. Gillette Museum of Arthropod Diversity, Colorado State University. Ft Collins, CO.

- Pelham, Jonathan P. 2008 A Catalogue of the Butterflies of the United States and Canada. *Journal of Research on Lepidoptera* 40:1-672. Lepidoptera Research Foundation, Inc. Beverly Hills, CA.
- Pyle, Robert Michael. 1992. *The Audubon Society Field Guide to North American Butterflies*. Alfred A. Knopf, New York.
- Pyle, Robert Michael. 2002. *The Butterflies of Cascadia*. Seattle Audubon Society, Seattle.
- Weber, William A. and Ronald C Wittmann. 2001. *Colorado Flora: Eastern Slope*. University Press of Colorado, Boulder.

Websites:

- Colorado Field Ornithologists. Boulder County. www.coloradocountybirding.com/checklists/
- Cook, Cathy, Donn Cook, Joe Krieg, and Joe Clark. "Butterflies of the Northern Colorado Front Range." www.coloradofrontrangebutterflies.com.
- North America Butterfly Association. "North American Butterfly Association." www.naba.org.
- Opler, Paul A., Kelly Lotts, and Thomas Naberhaus. 2011. "Butterflies and Moths of North America." Montana State University, Big Sky Institute . www.butterfliesandmoths.org .
- Xerces Society for Invertebrate Conservation. "The Xerces Society for Invertebrate Conservation." www.xerces.org.
- Warren, Andrew D., et al. 2011. "Butterflies of America." Butterflies of America Foundation. www.butterfliesofamerica.com.

Appendices

Appendix A. Butterflies We Observed During Surveys - 2004-2011

Parnassian and Swallowtails	Papilionidae Family
Parnassian, Rocky Mountain	<i>Parnassius smintheus</i>
Swallowtail, Black	<i>Papilio polyxenes</i>
Swallowtail, Anise	<i>P. zelicaon</i>
Swallowtail, Short-tailed.....	<i>P. indra</i>
Swallowtail, Western Tiger	<i>P. rutulus</i>
Swallowtail, Pale.....	<i>P. eurymedon</i>
Swallowtail, Two-tailed.....	<i>P. multicaudata</i>
Whites and Sulphurs	Pieridae
Sulphur, Lyside	<i>Kricogonia lyside</i>
Sulphur, Dainty	<i>Nathalis iole</i>
Sulphur, Mexican.....	<i>Eurema mexicana</i>
Orange, Sleepy	<i>Abaeis nicippe</i>
Sulphur, Clouded	<i>Colias philodice</i>
Sulphur, Orange	<i>C. eurytheme</i>
Sulphur, Queen Alexandra's.....	<i>C. alexandra</i>
Dogface, Southern.....	<i>Zerene cesonia</i>
Sulphur, Cloudless (Eastern)	<i>Phoebis sennae eubule</i>
Orangetip, Julia (S. Rocky Mtn).....	<i>Anthocharis julia</i>
Marble, Large.....	<i>Euchloe ausonides</i>
Marble, Olympia	<i>E. olympia</i>
White, Pine.....	<i>Neophasia menapia</i>
White, Mustard	<i>Pieris marginalis</i>
White, Cabbage.....	<i>P. rapae</i>
White, Checkered.....	<i>Pontia protodice</i>
White, Western	<i>P. occidentalis</i>
White, Spring	<i>P. sisymbrii</i>
Coppers, Hairstreaks, Blues	Lycaenidae
Copper, Gray	<i>Lycaena dione</i>
Copper, Ruddy	<i>L. rubidus</i>
Copper, Blue	<i>L. heteronea</i>
Copper, Purplish	<i>L. helloides</i>
Hairstreak, Behr's	<i>Satyrium behrii</i>
Hairstreak, Coral	<i>S. titus</i>
Hairstreak, Striped	<i>S. liparops</i>
Hairstreak, Hedgerow	<i>S. saepium</i>
Hairstreak, Canyon Bramble.....	<i>Callophrys affinis homoperplexa</i>
Hairstreak, White-lined Green	<i>C. sheridanii</i>
Hairstreak, Siva Juniper	<i>C. gyrneus siva</i>
Hairstreak, Thicket.....	<i>C. spinetorum</i>
Elfin, Brown.....	<i>C. augustinus</i>
Elfin, Moss'	<i>C. mossii schryveri</i>

Continued on the next page.

Appendix A. 123 Butterflies We Observed During Surveys - 2004-2011

Continued,

Elfin, Hoary.....	<i>C. polios</i>
Elfin, Western Pine.....	<i>C. eryphon</i>
Hairstreak, Gray.....	<i>Strymon melinus</i>
Blue, Marine.....	<i>Leptotes marina</i>
Tailed-Blue, Western.....	<i>Cupido amyntula</i>
Azure, Echo (Spring).....	<i>Celastrina echo sidara</i>
Azure, Hops.....	<i>C. humulus</i>
Dotted-Blue, Rocky Mountain.....	<i>Euphilotes ancilla</i>
Blue, Arrowhead.....	<i>Glaucopsyche piasus</i>
Blue, Silvery.....	<i>G. lygdamus</i>
Blue, Reakirt's.....	<i>Echinargus isola</i>
Blue, Melissa.....	<i>Plebejus melissa</i>
Blue, Greenish.....	<i>P. saepiolus</i>
Blue, Boisduval's.....	<i>P. icarioides</i>
Blue, Lupine.....	<i>P. lupini lutzii</i>
Blue, Arctic.....	<i>P. glandon rustica</i>
Metalmarks.....	<i>Riodinidae</i>
Metalmark, Nais.....	<i>Apodemia nais</i>
Brushfoots.....	<i>Nymphalidae</i>
Snout, American.....	<i>Libytheana carinenta</i>
Monarch.....	<i>Danaus plexippus</i>
Admiral, Weidemeyer's.....	<i>Limenitis weidemeyerii</i>
Fritillary, Gulf.....	<i>Agraulis vanillae</i>
Fritillary, Variegated.....	<i>Euptoieta claudia</i>
Fritillary, Silver-bordered.....	<i>Boloria selene</i>
Fritillary, Aphrodite.....	<i>Speyeria aphrodite</i>
Fritillary, Edwards'.....	<i>S. edwardsii</i>
Fritillary, Coronis.....	<i>S. coronis</i>
Fritillary, Callippe.....	<i>S. callippe</i>
Fritillary, Northwestern.....	<i>S. hesperis</i>
Fritillary, Mormon.....	<i>S. mormonia</i>
Emperor, Hackberry.....	<i>Asterocampa celtis</i>
Lady, American.....	<i>Vanessa virginiensis</i>
Lady, Painted.....	<i>V. cardui</i>
Admiral, Red.....	<i>V. atalanta</i>
Tortoiseshell, Milbert's.....	<i>Aglais milberti</i>
Tortoiseshell, California.....	<i>Nymphalis californica</i>
Cloak, Mourning.....	<i>N. antiopa</i>
Comma, Satyr.....	<i>Polygonia satyrus</i>
Comma, Hoary.....	<i>P. gracilis</i>
Comma, Green.....	<i>P. faunus</i>
Buckeye, Common.....	<i>Junonia coenia</i>

Continued on the next page.

Appendix A. 123 Butterflies We Observed During Surveys - 2004-2011
Continued,

Checkerspot, Variable	<i>Euphydryas anicia</i>
Checkerspot, Arachne	<i>Polydryas arachne</i>
Checkerspot, Fulvia	<i>Chlosyne fulvia</i>
Checkerspot, Silvery	<i>C. nycteis</i>
Checkerspot, Gorgone.....	<i>C. gorgone</i>
Checkerspot, Northern	<i>C. palla</i>
Crescent, Pale.....	<i>Phyciodes pallida</i>
Crescent, Pearl	<i>P. tharos</i>
Crescent, Northern	<i>P. cocyta</i>
Crescent, Field	<i>P. pulchella</i>
Ringlet, Common (Ochre)	<i>Coenonympha tullia ochracea</i>
Wood-Nymph, Common.....	<i>Cercyonis pegala</i>
Wood-Nymph, Small	<i>C. oetus</i>
Alpine, Common.....	<i>Erebia epipsodea</i>
Arctic, Chryxus	<i>Oeneis chryxus</i>
Arctic, Uhler's.....	<i>O. uhleri</i>
Skippers	<i>Hesperiidae</i>
Skipper, Silver-spotted.....	<i>Epargyreus clarus</i>
Cloudywing, Northern	<i>Thorybes pylades</i>
Sootywing, Common	<i>Pholisora catullus</i>
Duskywing, Dreamy	<i>Erynnis icelus</i>
Duskywing, Pacuvius.....	<i>E. pacuvius</i>
Duskywing, Afranius	<i>E. afranius</i>
Duskywing, Persius.....	<i>E. persius</i>
Checkered-skipper, Common	<i>Pyrgus communis</i>
Skipperling, Russet	<i>Piruna pirus</i>
Skipperling, Garita.....	<i>Oarisma garita</i>
Skipper, Uncas	<i>Hesperia uncas</i>
Skipper, Juba.....	<i>H. juba</i>
Skipper, Western Branded	<i>H. colorado</i>
Skipper, Ottoe	<i>H. ottoe</i>
Skipper, Leonard's.....	<i>H. leonardus pawnee</i>
Skipper, Pahaska	<i>H. pahaska</i>
Skipper, Green	<i>H. viridis</i>
Skipper, Nevada.....	<i>H. nevada</i>
Skipper, Draco	<i>Polites draco</i>
Skipper, Tawny-edged	<i>P. themistocles</i>
Long Dash.....	<i>P. mystic</i>
Skipper, Arogos	<i>Atrytone arogos</i>
Skipper, Taxiles	<i>Poanes taxiles</i>
Skipper, Woodland	<i>Ochlodes sylvanoides</i>
Skipper, Dun	<i>Euphyes vestris</i>
Skipper, Dusted.....	<i>Atrytonopsis hianna</i>

Appendix B. Blooming Plants Observed During Butterfly Surveys

Prairie, Foothills, Montane

'Pea' purple.....	<i>Astragalus</i>
Alder	<i>Alnus incana</i>
Alfalfa (medic).....	<i>Medicago sativa</i>
Anemone (pink)	<i>Anemone multifida</i>
Arnica.....	<i>Aster laevis</i>
Aster, Golden	<i>Heterotheca foliosa</i>
Badderpod, Double	<i>Physaria bellii</i>
Bedstraw, Northern	<i>Galium septentrionale</i>
Beeplant, Rocky Mountain	<i>Cleome serrulata</i>
Bindweed	<i>Convolvulus arvese</i>
Bistort.....	<i>Bistorta bistortoides</i>
Bitterroot, Pygmy.....	<i>Oreobroma pygmaea</i>
Blanket Flower.....	<i>Gaillardia aristata</i>
Bluestem, Big.....	<i>Andropogon gerardii</i>
Bluestem, Little.....	<i>Schizachyrium scoparium</i>
Borage	
Buckbrush	<i>Ceanothus fendleri</i>
Buttercup (yellow, tiny)	<i>Ranunculus sp.</i>
Cactus, Ball	<i>Pediocactus simpsonii</i>
Cactus, Nipple.....	<i>Coryphantha missouriensis</i>
Cactus, Prickly Pear	<i>Opuntia sp.</i>
Candytuft.....	<i>Iberis amara</i>
Catnip.....	<i>Nepeta cataria</i>
Chamomile.....	<i>Anthemis cotula</i>
Cheeseweed.....	<i>Malva neglecta</i>
Chickory.....	<i>Cichorium intybus</i>
Chickweed.....	<i>Stellaria sp.</i>
Chiming Bell.....	<i>Mertensia lanceolata</i>
Chokecherry.....	<i>Padus virginiana</i>
Cinquefoil, Shrubby	<i>Pentaphylloides floribunda</i>
Clover, Prairie	<i>Dalea purpurea</i>
Clover, Red	<i>Trifolium pratense</i>
Clover, Yellow	<i>Melilotus officinale</i>
Columbine.....	<i>Aquilegia coerulea</i>
Coralroot	<i>Corallorhiza sp.</i>
Coralroot	<i>Corallorhiza striata</i>
Cow Parsnip	<i>Heracleum sphondylium</i>
Cowboy's Delight	<i>Calylophus serrulatus</i>
Currant, Wax.....	<i>Ribes cereum</i>

Continued on the next page.

Appendix B. Blooming Plants Observed During Butterfly Surveys – Continued.

Daisy Fleabane.....	<i>Erigeron</i>
Daisy, Easter.....	<i>Townsendia hookeri</i>
Daisy, Oxeye.....	<i>Leucanthemum vulgare</i>
Daisy, Spreading.....	<i>Erigeron flagellaris</i>
Dandelion.....	<i>Taraxacum officinale</i>
Dandelion, Wavy-leaf.....	<i>Taraxacum scopulorum</i>
Death Camus.....	<i>Toxicoscordion venenosum and Zygadenus</i>
Dogbane.....	<i>Apocynum androsaemifolium</i>
Elephant, Red, Elephantella.....	<i>Pedicularis groenlandica</i>
False boneset.....	<i>Brickellia eupatorioides</i>
Filaree, Crane’s Bill.....	<i>Erodium cicutarium</i>
Fireweed.....	<i>Chamerion danielsii</i>
Flax, Wild Blue.....	<i>Adenolinum lewisii</i>
Gayfeather.....	<i>Liatris punctata</i>
Gentian, Bottle (blue).....	<i>Pneumonanthe parryi</i>
Gentian, Green, Monument Plant.....	<i>Frasera speciosa</i>
Gentiana (white).....	<i>Gentianella strictiflora</i>
Geranium, Fremont’s.....	<i>Geranium caespitosum</i>
Geranium, Richardson’s.....	<i>Geranium richardsonii</i>
Gilia.....	<i>Ipomopsis aggregata</i>
Globeflower.....	<i>Trollius albiflorus</i>
Goat’s Beard, Salsify.....	<i>Tragopogon dubius</i>
Golden Aster.....	<i>Heterotheca villosa</i>
Golden Banner.....	<i>Thermopsis divaricarpa ?</i>
Golden Smoke.....	<i>Corydalis curvisiliqua</i>
Goldenglow.....	<i>Rudbeckia ampla</i>
Goldenrod.....	<i>Solidago multiradiata</i>
Ground-cherry.....	<i>Physalis heterophylla</i>
Gumweed.....	<i>Grindelia squarrosa (subapina)</i>
Harebell, Common.....	<i>Campanula rotundiflora</i>
Hawthorne.....	<i>Crataegus erythropoda</i>
Hemlock, Poison.....	<i>Angelica ampla</i>
Holly, Oregon Grape.....	<i>Mahonia repens</i>
Hops.....	<i>Humulus lupulus</i>
Horsemint.....	<i>Monarda fistulosa</i>
Iris, Wild.....	<i>Iris missouriensis</i>
Knapweed.....	<i>Acosta sp.</i>
Lamb’s Quarters.....	<i>Chenopodium sp</i>
Larkspur.....	<i>Delphinium nuttallianum</i>
Leafy wild parsley.....	<i>Musineon divaricatum</i>
Lettuce, Prickly.....	<i>Lactuca serriola</i>

Continued on the next page.

Appendix B. Blooming Plants Observed During Butterfly Surveys – Continued.

Lilac	<i>Syringa vulgaris</i>
Lily, Mariposa.....	<i>Calochortus gunnisonii</i>
Lily, Sand.....	<i>Leucocrinum montanum</i>
Lily, Wood	<i>Lilium philadelphicum</i>
Loco, Lambert’s.....	<i>Oxytropis lambertii</i>
Meadowrue	<i>Thalictrum fendleri</i>
Mexican Hat, Coneflower.....	<i>Ratibida columnifera</i>
Milk Vetch (purple)	<i>Astragalus sp.</i>
Miner’s Candle.....	<i>Oreocarya virgata</i>
Mint (purple).....	<i>Mentha sp.</i>
Mouse-ear	<i>Cerastium strictum</i>
Mullein.....	<i>Verbascum thapsus</i>
Mullein, Moth.....	<i>Verbascum blattaria</i>
Mustard, Jim Hill	<i>Sisymbrium altissimum</i>
Mustard, Tower.....	<i>Turritis glabra</i>
Nettles, Stinging.....	<i>Urtica gracilis</i>
Nightshade (dark purple)	<i>Solanum heterodoxum</i>
Ninebark.....	<i>Physocarpus monogynus</i>
Onion, Geyer.....	<i>Allium geyeri</i>
Onion, Nodding.....	<i>Allium cernuum</i>
Orchid, Bog.....	<i>Limnorchis stricta ?or hyperborean?</i>
Paintbrush, Indian	<i>Castilleja integra</i>
Paintbrush, Indian	<i>C. lamata</i>
Paintbrush, Indian	<i>C. sessiliflora</i>
Parsley, Mountain	<i>Pseudocymopterus montanus</i>
Parsley, Whiskbroom.....	<i>Harbouria trachypleura</i>
Pasque flower.....	<i>Pulsatilla ludoviciana</i>
Penstemon, Beard-tongue, Low	<i>Penstemon virens</i>
Penstemon, One-sided.....	<i>Penstemon secundiflorus</i>
Phlox	<i>Phlox sp.</i>
Plantain	<i>Plantagon major</i>
Plum, Wild	<i>Prunus americana</i>
Poppy, Prickly.....	<i>Argemone polyanthemus</i>
Prairie Smoke, Avens.....	<i>Geum trifolium?</i>
Primrose, Common Evening.....	<i>Oenothera caespitosa</i>
Primrose, Evening.....	<i>Oenothera howardii</i>
Puccoon.....	<i>Lithospermum sp.</i>
Pussytoes, Pink or White	<i>Antennaria sp.</i>
Ragwort.....	<i>Ambrosia sp.</i>
Raspberry, Boulder	<i>Oreobatus deliciosus</i>
Rose, Wild.....	<i>Rosa woodsii</i>

Continued on the next page.

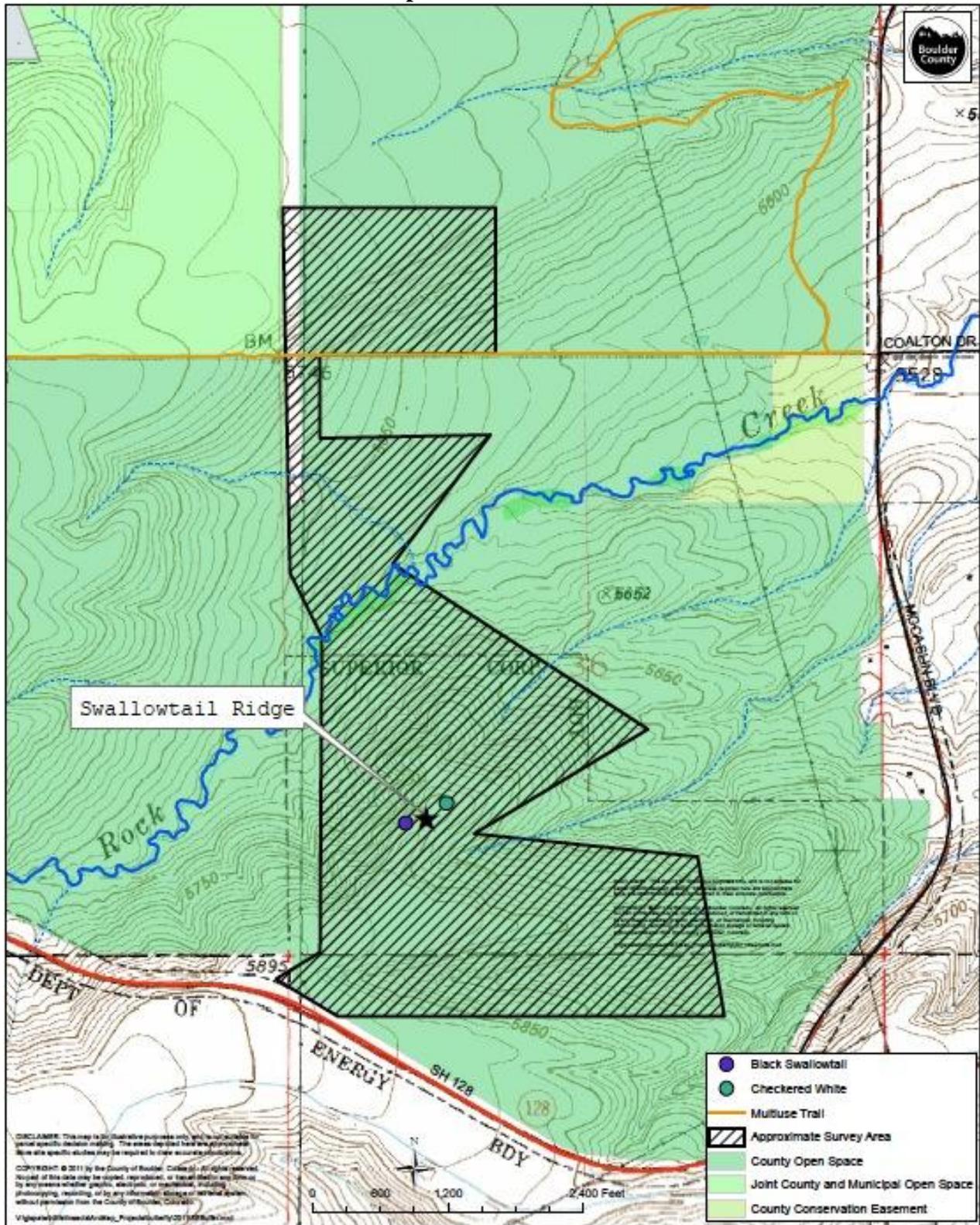
Appendix B. Blooming Plants Observed During Butterfly Surveys – Continued.

Rough White aster.....	<i>Virgulus falcatus</i>
Salt & Pepper	<i>Lomatium orientale</i>
Sandwort	<i>Arenaria serpyllifolia</i>
Sedge.....	<i>Carex sp.</i>
Senecio	<i>Senecio sp.</i>
Shootingstar	<i>Dodecatheon pulchellum</i>
Skull Cap.....	<i>Scutellaria galericulata</i>
Skunkbush.....	<i>Rhus aromatica ssp. trilobata</i>
Smartweed.....	<i>Persicaria pensylvanica</i>
Snakeweed	<i>Gutierrezia sarothrae</i>
Snowberry	<i>Symphoricarpos occidentalis</i>
Soloman Seal, False	<i>Maianthemum sp.</i>
Spiderwort, Blue Flag.....	<i>Tradescantia occidentalis</i>
Spring Beauty.....	<i>Clatonia rosea</i>
Spurge	<i>Euphorbia sp.</i>
St. Johnswort.....	<i>Hypericum perforatum</i>
Stargrass, yellow(lily) 1.4”upright.....	<i>Zosterella dubia?</i>
Stonecrop	<i>Amerosedum lanceolatum</i>
Strawberry.....	<i>Fragaria sp.</i>
Sulfur-flower.....	<i>Eriogonum umbellatum</i>
Sunflower.....	<i>Helianthus pumilus</i>
Sunflower	<i>Helianthus sp.</i>
Susan, Black-eyed.....	<i>Rudbeckia hirta</i>
Sweetclover.....	<i>Melilotus albus</i>
Thistle, Bull.....	<i>Cirsium vulgare</i>
Thistle, Canada	<i>Breca arvensis</i>
Toadflax, Dalmation	<i>Linaria dalmatica</i>
Vervain.....	<i>Verbena bipinnatifida</i>
Vervain, blue.....	<i>Verbena hastata</i>
Vetch, Blue	<i>Vicia sp.</i>
Vetch, Milk	<i>Astragalus sp.</i>
Violet (purple, Caribou).....	<i>Viola sp.</i>
Violet, Canada.....	<i>Viola scopulorum</i>
Violet, Nuttall’s.....	<i>Viola nuttallii</i>
Wallflower	<i>Erysimum asperum</i>
Watercress.....	<i>Nasturtium officinale</i>
Waterleaf.....	<i>Hydrophyllum fendleri</i>
Waxflower.....	<i>Jamesia americana</i>
Whirling Butterflies	<i>Gaura</i>
Whitetop.....	<i>Cardaria draba</i>
Willow.....	<i>Salix sp.</i>
Wood Sorrel	<i>Oxalis stricta</i>
Yarrow	<i>Achillea lanulosa</i>
Yucca	<i>Yucca glauca</i>

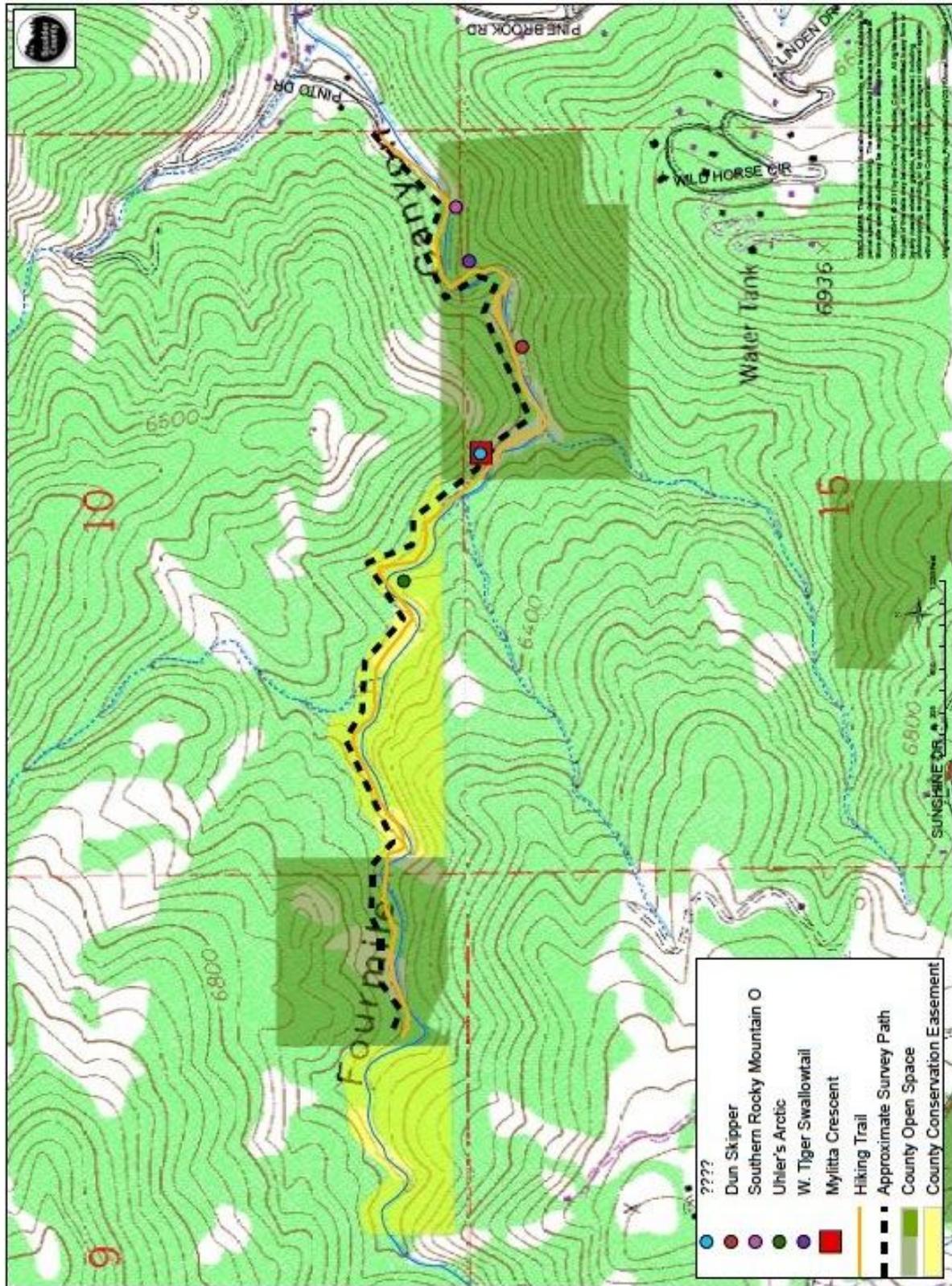
Appendix C.
Maps of Inventory Sites within Boulder County Open Space Properties

Maps begin on the next page.

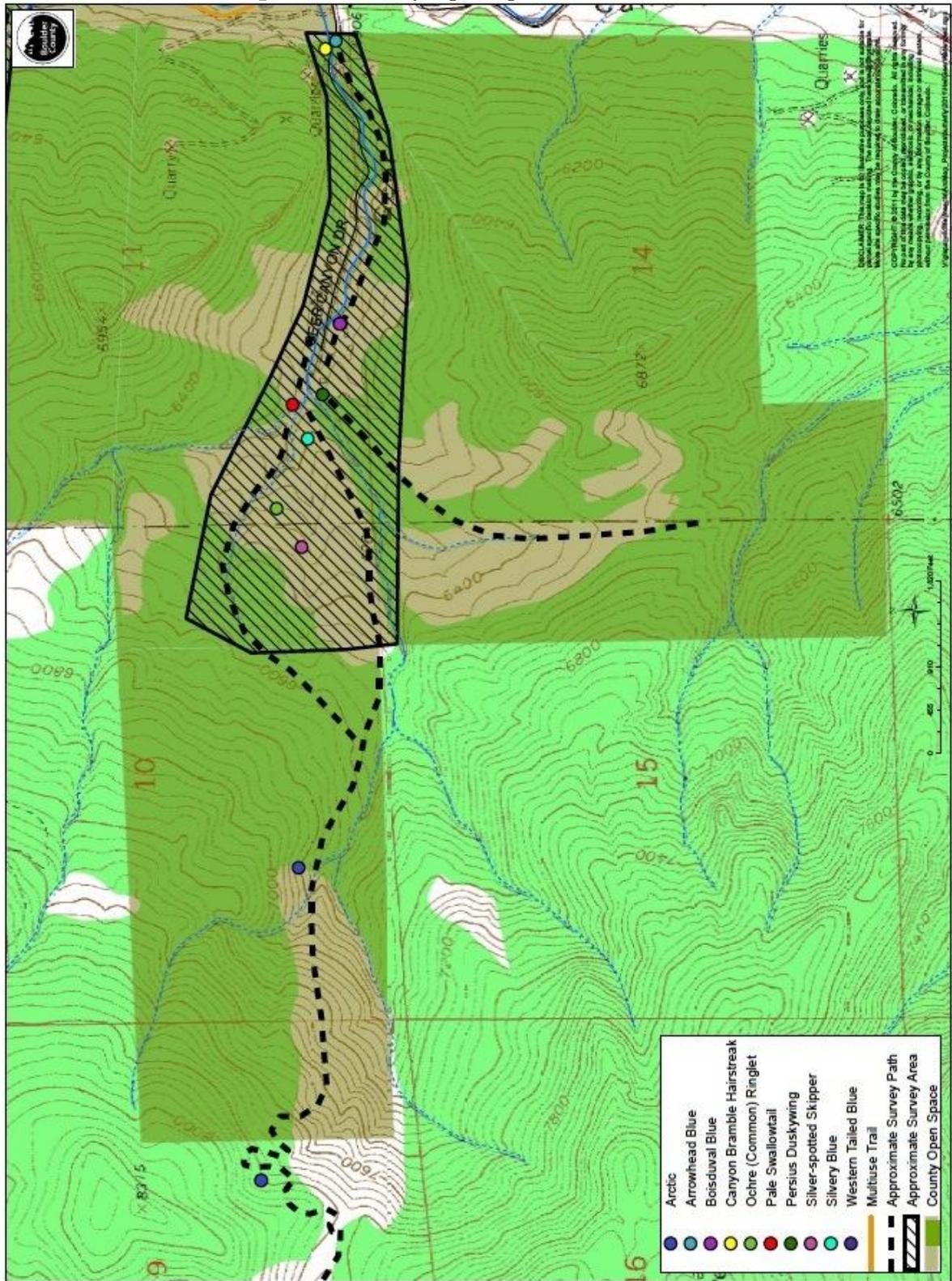
Map 1. Southeast Buffer



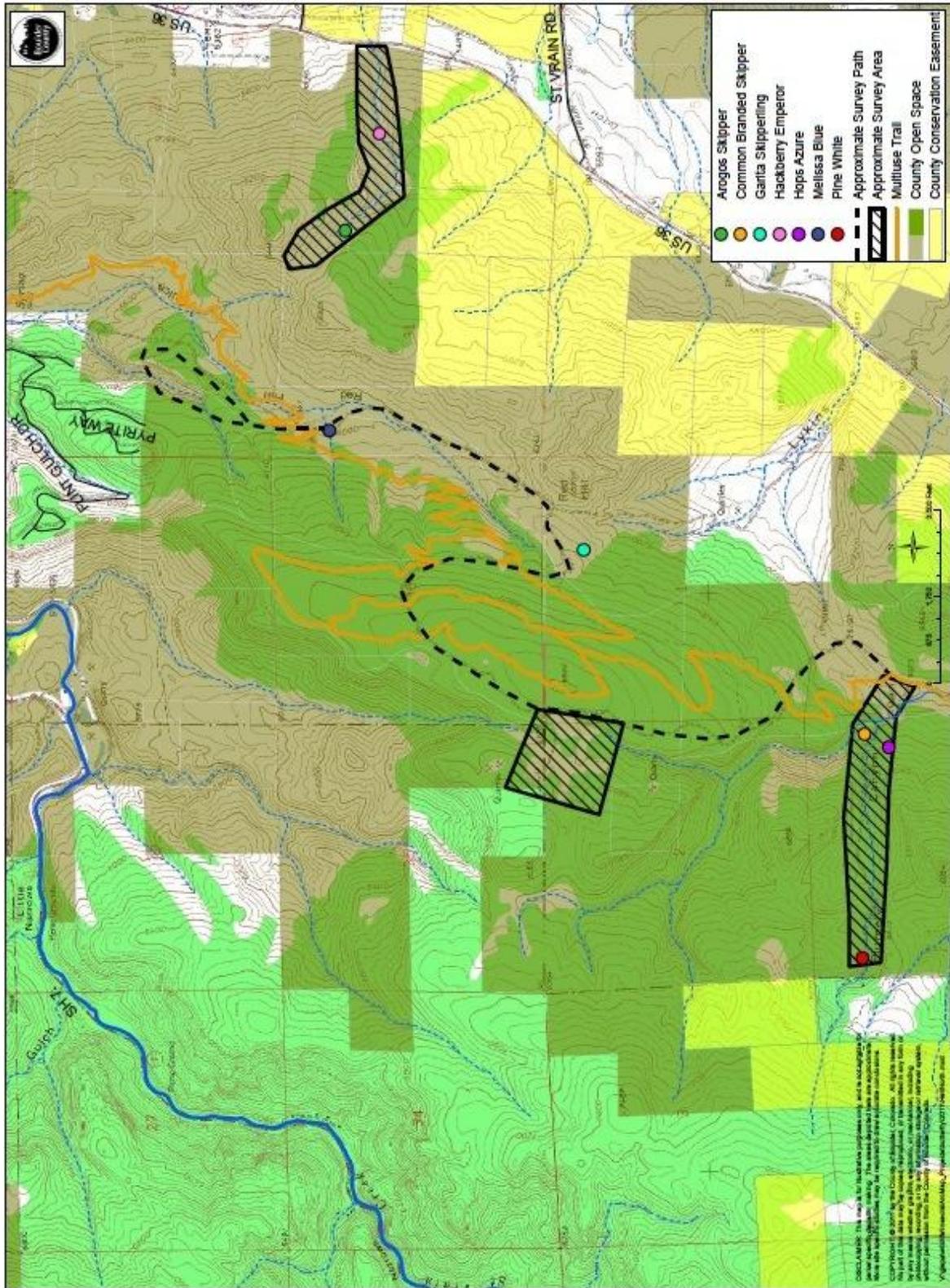
Map 2. Anne U. White - Fourmile Canyon Trail



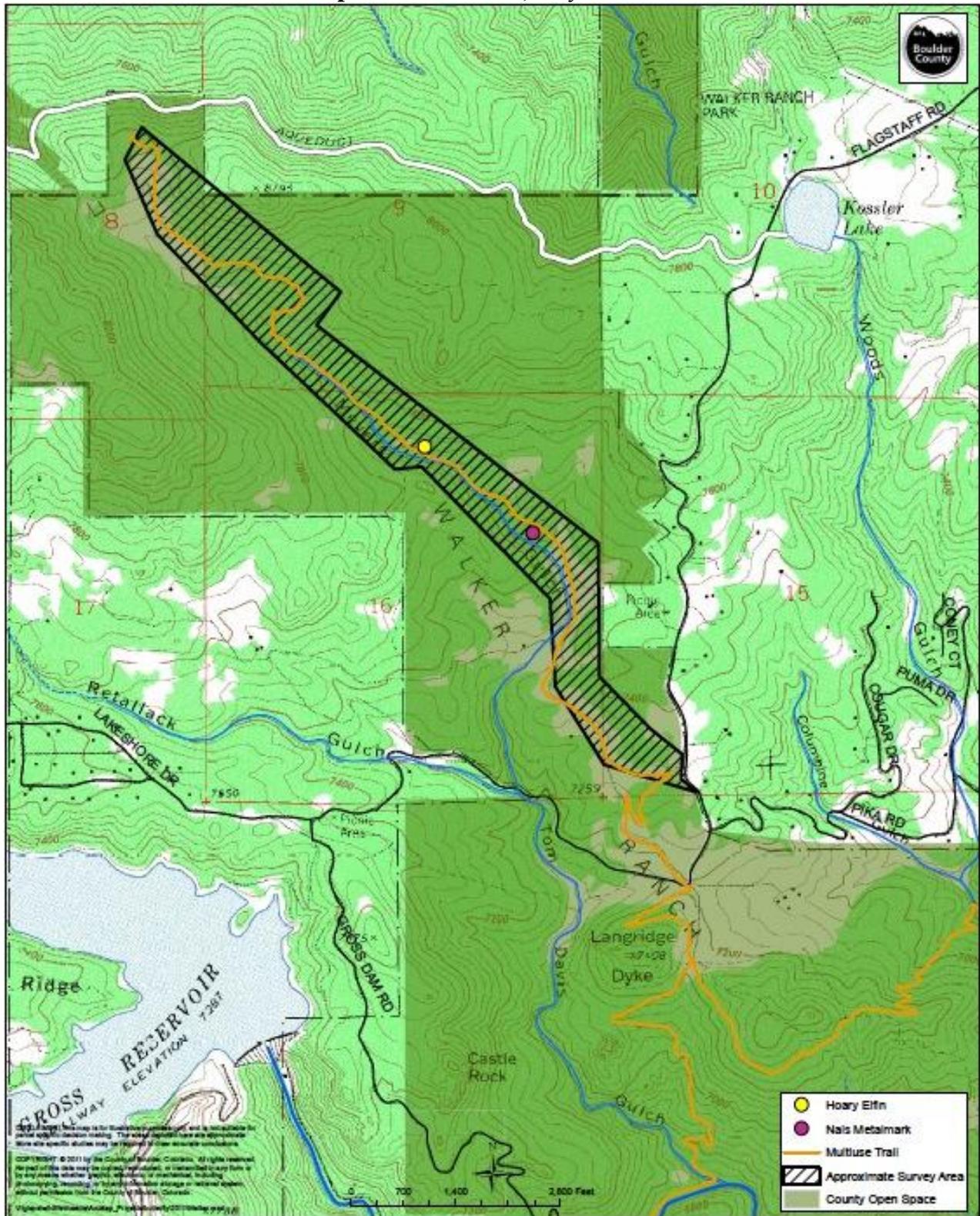
Map 3. Heil Valley Open Space, Geer Watershed



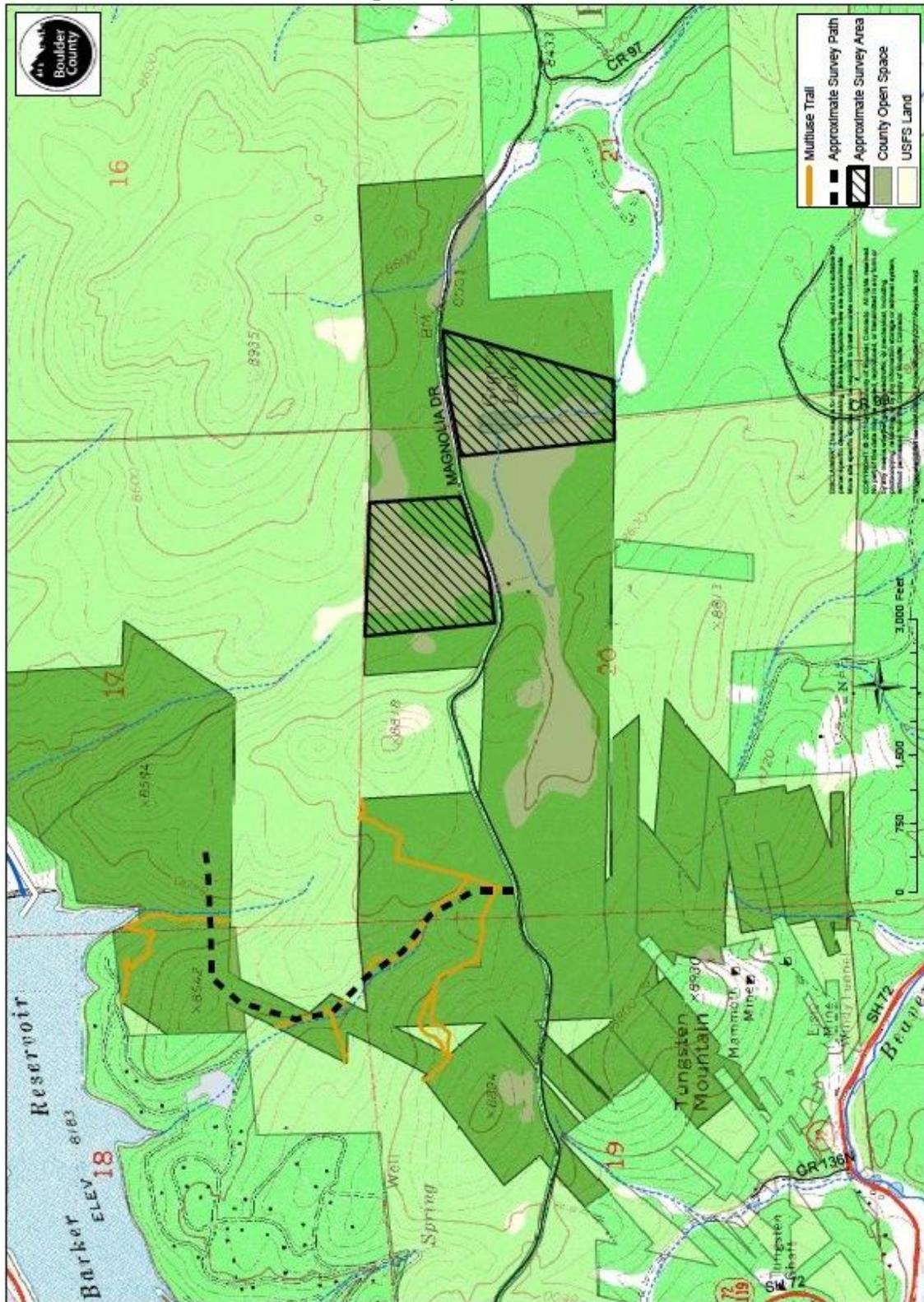
Map 4. Heil Valley Open Space, North and Plumely Canyon



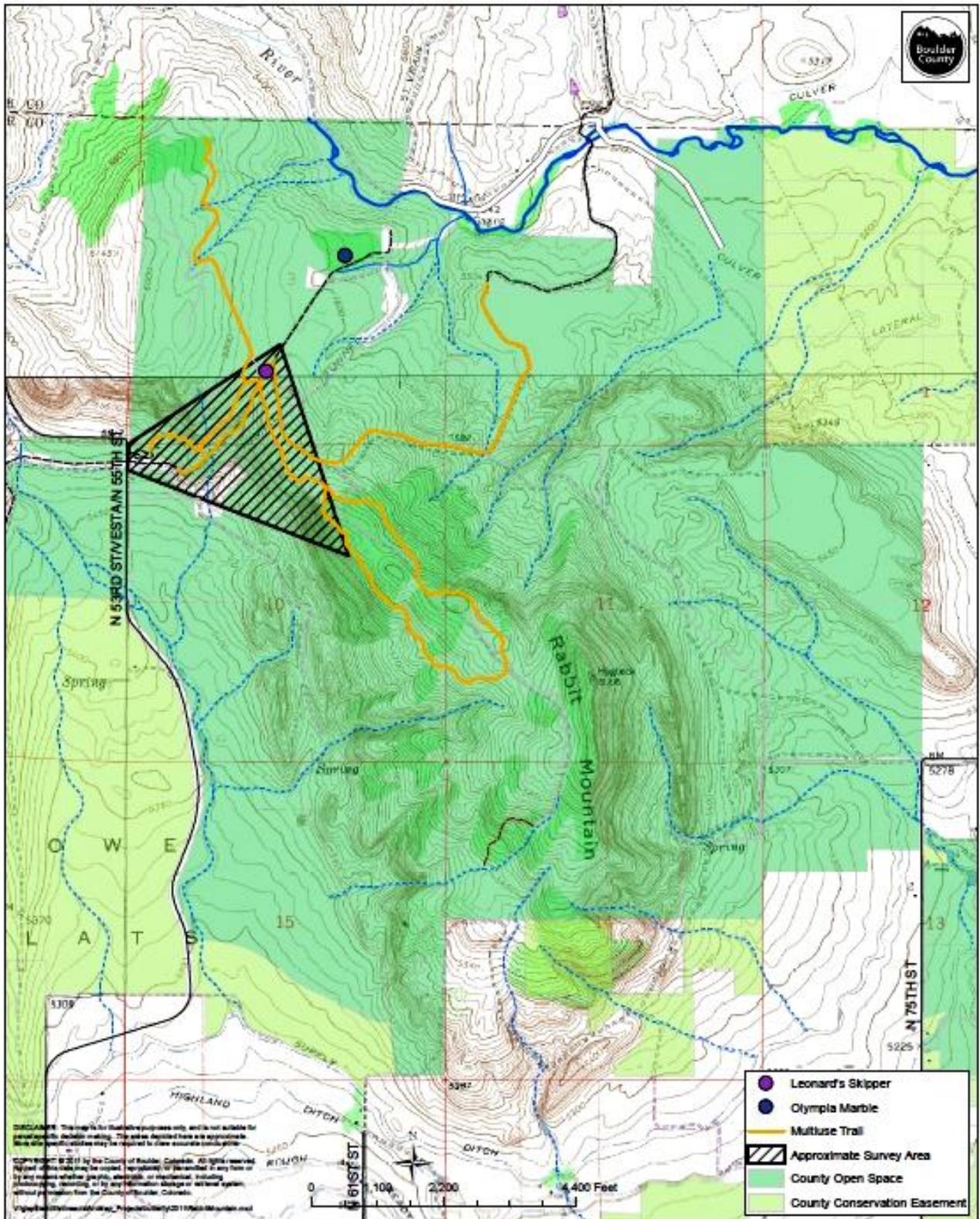
Map 5. Walker Ranch, Meyer's Gulch



Map 6. Reynold's Ranch



Map 8. Rabbit Mountain



Map 9. Steamboat Mountain

