

**Butterflies, Birds and Blossoming Plants ...**  
**A Continuing Study of Populations**  
**On Boulder County Parks and Open Space**  
**With A Look at Herptiles**



**Cover Photos by**  
**Jan Chu: Woodland Skipper, Sage Thrasher, Fence Lizard**

**By Janet Chu**

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## **I. Acknowledgments**

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Boulder County Nature Association (BCNA) provided a second grant to encourage this further research in Boulder County. In addition, the association published “Butterflies of the Colorado Front Range” co-authored by this author and Stephen R. Jones in 2012. We are appreciative of both grants.

Our mentors Drs. Paul A. Opler, Robert Michael Pyle and Andrew Warren readily assisted in identification of butterflies. My valuable field team, friends with sharp eyes, good cameras and quick binoculars, included: Larry Crowley, Jean Morgan, Venice Kelly, John Barr, Pam Piombino, Chuck Lowrie, Amy Chu and Richard Holmes. Photos were received from John Barr, Richard Holmes and Christian Nunes. I am indebted to Dr. Marc Swadener for formatting this paper.

## **II. Abstract**

Butterflies were inventoried within six Boulder County Parks and Open Space properties including nine varying habitats. This was the first year on the Hall II property, which was inventoried four times. Our team continued for the seventh continuous year in Southeast Buffer, Anne U. White Fourmile Canyon Trail, Heil Valley containing Geer Watershed, Plumely Canyon, and North Point Red Gulch. This was the third year in Reynold's Ranch containing Giggey Pond and North Bog. One trip was made to Rabbit Mountain. Blossoming plants, associated animals and birds were recorded.

For Butterflies, the unit of measure in our study is the number of Individual Butterflies per Research Hour recorded in the field (I/RH). The average number of Individual Butterflies per Research Hour (I/RH) was lower in 2013, compared to each study area's average number for seven years in Southeast Buffer, three areas in Heil - Geer, Plumely and North; Walker - Meyer's Homestead Trail, and Reynold's. Only in Caribou was the number of I/RH higher and in Anne U. White the numbers were equal. The 7-year average in all eight study areas was 36; the higher average annual numbers of I/RH were higher during 2007, 2008, 2009, and 2012; lower in 2010, 2011 and 2013. The local weather and overriding winds are important in affecting numbers of butterflies, whether they emerge locally or disperse from other states. Our team has located 125 species within Boulder County Parks and Open Space properties during eleven years of study.

This year for the first time special attention was paid to herptiles, when and where these were seen. Photographs are included.

## **III. Introduction**

Butterfly inventories continue in a variety of county habitats. Exploration was mainly on **a)** Hall II, **b)** Southeast Buffer and **c)** Anne U. White - Fourmile Canyon Creek, with four visits to each of Heil's areas **d)** Geer Watershed, **e)** Plumely Canyon, and **f)** North Point – Red Gulch; **g)** Walker Ranch and **h)** Reynold's Ranch - Giggey Pond and North Bog. Only three surveys occurred at

i) Caribou and one to j) Rabbit Mountain. The research team was often composed of this author, Larry Crowley, Jean Morgan, Venice Kelly, John Barr, Amy Chu and Pam Piombino. Other naturalists joined us during some inventories; Chuck Lowrie, Richard Holmes, Wynne Whyman, Donn and Cathy Cook. In 2013, we contributed forty days and about 98 hours for field research. I drove about 1,517 miles within Boulder County.

Boulder County supports some of the highest recorded butterfly species diversities in the United States, matched only by Gilpin County, Colorado and by the southern tier of states. The national record for Boulder County held steady this year at 202 species. Our studies during eleven years within the Boulder County Open Spaces remained at 125 species.

The extended winter-like days in 2013 had a negative effect on the numbers of emergent spring butterflies. There was continuous cold, snow, rain and fog, causing butterflies to remain in their chrysalises or emerge and die. The few local butterflies which did emerge were two or three weeks late. Midsummer weather was good for the numbers of local butterflies, but soon the heat and drought stopped the nectar-blossoms earlier than usual, causing a drop in numbers seen. The late summer skippers and wood-nymphs did emerge about as expected. The migrant butterflies did not show up until into July, if at all, when they normally show up May. Many of the dispersing butterflies expected from the south and southwest did not fly into Boulder County in 2013.

#### **IV. Objectives**

- A.** Add to the previous years of detailed inventories of butterfly populations and species.
- B.** Explore the new Hall II Open Space.
- C.** Record the herptiles seen in the Open Spaces.
- D.** Report to Boulder County to provide information toward development of management strategies and the Comprehensive Plan.
- E.** Integrate Boulder County data into the national data base for butterflies.
- F.** Encourage awareness and observations of butterflies by the general public, volunteer naturalists and BCPOS staff.
- G.** Enhance the publics' understanding of the need for conservation and appreciation of butterfly habitats.
- H.** Take note of weather and other influences on butterfly populations (dogs off-leash, trail rebuilds, floods, and fires).

#### **V. Research Methods**

The methodology used in 2013 follows that described in "Butterfly Inventory and Research on Open Space Properties" (Chu, 2006). 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 into other areas where butterflies congregate, rather than within strictly measured transects. Butterflies shift locations based on the availability of host plants, nectar and moisture. Therefore while inventorying large areas, researchers moved along trails, streams and roadways to observe as many different plant communities and habitats as possible. However, the tendency was to repeatedly survey productive habitats over the course of the

research, within a field season as well as from one year to the next. As butterflies were sighted, they were identified on the wing either by the unaided eye or 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 to assist in identification."

For each location, Individuals per Research Hour I/RH are calculated using the number of individual butterflies observed (I) during the research hours (RH) in the field. The number of observers may change however, four people for one hour equals one RH. This is a standard which allows me to compare the vitality of butterfly populations from area to area and year to year.

## **VI. Discussion of the Butterfly Records for 2013**

### **A. Southeast Buffer**

We noticed new vegetation-study monument-markers on Swallowtail Hill. This summer thick Mexican feather grass covered the top of Swallowtail Hill. The grasses provide no food for the caterpillars or nectar for the adults. The Variegated Fritillaries (*Euptoieta claudia*) which often migrate into these hills in mid-May did not show until July 22. The consistently cold-wet weather kept these from dispersing into Boulder County. This was true of many immigrating species.

The richest spots for butterflies are the a) ravine running east-west just 200 feet from the locked gate on Hwy 128; b) Coalton Trail through the locked gate in the parking lot, then through a locked gate to the south near the hilltop. This dirt road goes to the solar watering station. Native flowers are profuse on the west bank top near Rock Creek; c) Swallowtail Hill is important if the blossoms are rich and abundant.

Twenty-three Dainty Sulphurs (*Nathalis iole*) were nectaring on the scarce alfalfa (*Medicago sativa*) and gay feather (*Liatriis punctata*), and several pairs were mating on August 18. Fall skippers added their orange flashes to the dry hillsides. Both Uncas Skipper (*Hesperia uncas*) and Leonard's Skipper (*H. leonardus*) were active in late August flying over their host plants blue grama. A special find was the bird, Sage Thrasher, identified by Chuck Lowrie.

The Southeast Buffer had the lowest number of Individuals per RH (14), which matched the count during 2011. Conversely in 2007, 51 were noted; while in 2009, 39 were listed and 40 I/RH butterflies were counted in 2010.

### **B. Anne U. White – Fourmile Canyon Creek**

This continues to be an ideal trail for close-up nature with the stream beside and often below, and canyon walls close to the trail. It is heavily used by picnickers, trail runners, people with dogs (mostly on leash). The newly instituted noon closure has actually allowed some vegetation to recover. On May 19 the seldom seen Spring Whites (*Pontia sisymbrii*) and Julia Orangetips (*Anthocharis sara julia*) were flying. One of the two Uhler's Arctics during this season was seen here; the other was at Heil - Geer. This meadow butterfly is usually more common. In August the Northwestern Fritillaries (*Speyeria hesperis*), Taxiles (*Poanes taxiles*) and

Woodland Skippers (*Ochlodes sylvanoides*) were flying by the dozens and nectaring on Heterotheca, Fremont geranium, Canada thistle, bull thistle and Solidago. An abundance of nectar, energy provided for great activity, including Skippers chasing up and around the Fritillaries.

Concerning herptiles, many fence lizards (*Sceloporus undulatus*) were noted. A yellow-bellied racer (*Coluber constrictor mormon*) was next to the parking lot; a large bull snake (*Pituophis catenifer*) and garter snakes (*Thamnophis elegans vagrans*) were new finds for us. It was the first time seeing a mule deer browsing— near the first stream crossing.

### **C. Heil Valley – Geer Watershed**

Mourning Cloaks (*Nymphalis antiopa*) were unusually numerous with 15 on March 15 and 17 on March 31, with their common flight-companions Hoary Comma (*Polygonia gracilis*) coming in at 5 and 9 on those dates. Common Ringlets (*Coenonympha tullia ochracea*) were the most common butterfly on June 10. Pale Swallowtails (*Papilio eurymedon*) often puddle in groups near their host buckthorn or wild plum. We found 15 Pacuvius Duskywings (*Erynnis pacuvius*), an unusually large number. Many caterpillars, namely Persius Duskywings (*E. persius*) hid within ‘tented’ golden banner leaves, and Boisduval’s Blue (*Plebejus icarioides*) in lupine leaves.

In 2013, the lowest ever number of I/RH (24) occurred; the seven-year average was 39. Part of the reason was three counts in March were too early and cold for most butterflies. June and July were affected by the drought while August 3 experienced heavy rain and wind

In other observations, the final thrill of the public walk on August 4 on the Lichen Trail was to encounter a prairie rattlesnake (*Crotalis viridis*) on the trail by the bridge. The snake appeared to have taken water from the nearly-empty stream and was making its way back into the grass-covered rocks.

We were delighted that John Barr photographed two Abert’s squirrels, one black and one gray, at the picnic pavilion. A 4½ inch Woodhouse’s Toad (*Anaxyrus woodhousii*) had made a flattened bed of grass at the base of the Big Geer Meadow. It easily scrunched backwards into a hiding spot when I attempted to photograph it. On June 22, a garter snake swam across the frog pond on the Heil Ranch Road. The frog pond remained flooded from spring runoff, resulting in very little butterfly ‘puddling’ this summer from the dilution of any nutrient salts. However, at the end of the season, Richard Holmes photographed two garter snakes during the same hour, each with a salamander (*Ambystoma tigrinum*) trapped in its mouth.

### **D. Heil Valley - Plumely Canyon** (adjacent to Marietta Canyon)

The mouth of Plumely Canyon near the quarry and the upper canyon are strikingly different habitats. The mouth has a small drainage visited by myriad butterflies and a rattlesnake or two as the stream normally dries up in late season. The forested canyon is narrow, with wild plums and river birch – which often provide nectar from broken limbs. Orange Sulphurs, Common Ringlets, and Western Branded Skippers (*Hesperia colorado*) are often at the mouth. We hunt through the viney hops plants (*Humulus lupulus americanus*) for the rare Hops Azure (*Celestrina humulus*), but found none this summer. On May 12, the cold and dryness seemed to keep the butterfly numbers down.



A Northern Checkerspot was newly sighted in Plumely Canyon June 22. On that day, Western Tailed Blues were sighted near the plum blossoms and water seep, 2/3 of the way up the canyon. Swallowtails, Hoary Commas and Mourning Cloaks flew over the canyon bottom in good numbers.

The number of Individuals per Research Hour was lowest in 2009 (24), but 2013 and 2011 had the second lowest number (29). The average for Plumely is 34 I/RH.

#### **E. Heil Valley – North**

This area is a composite of North Point, Red Hill saddle and Red Gulch behind the Ron Follette residence toward the Picture Rock Trail. North Point had only one pond with water; otherwise the habitat was very dry. The Red Hill had many flowers and on June 20, fritillaries were nectaring on *Hymenopappus* sp; Boisduval's blues were flying among the lupine and skippers were in the hot high meadow.

The Red Gulch is a special treasure. No dogs, no trail and no hikers venture here, as this is a protected area. Five Common Buckeyes (*Junonia coenia*) showed up on August 1. This was a new butterfly for this area. Several people reported a number of these in August in the county. Dainty Sulphurs (*Nathalis iole*) and Reakirt's Blues (*Echinargus isola*) dispersed from the south. The local swallowtails were present along with numerous Cabbage Whites (*Pieris rapae*) and Orange Sulphurs (*Colias eurytheme*). Melissa Blues (*Plebejus melissa*) and Hackberry Emperors (*Asterocampa celtis*) were common on August 15. We go there looking for Common Sootywing (*Pholisora catullus*) butterflies, which we didn't see, on the lamb's quarters and pigweed.

Individuals per Research Hour (36) showed up near the nine-year average (38) in 2013. Four years during the past seven had higher I/RH readings than average; five were below.

#### **F. Walker Ranch – Meyer's Homestead Trail**

The most productive places to find butterflies are the puddles or seeps on the road and along the small, vegetated irrigation ditch. Rocky Mountain Parnassians (*Parnassius smintheus*) and Rocky Mountain Dotted-Blues were most numerous this summer. The only Indra Swallowtail (*Papilio indra*) during 2013 was seen here. Near patches of dogbane, the Edward's Fritillaries (*Speyeria edwardsii*) were nectaring on July 14 as were the Boisduval's Blues on Fremont's geranium. We were delighted to find five uncommon Nais Metalmarks (*Apodemia nais*) on the same day puddling in some moist spots. On August 16 we used this opportunity to unscramble the similarly appearing Silvery Checkerspots (*Chlosyne nycteis*), Northern Checkerspots (*C. palla*), Northern Crescents (*Phyciodes cocyta*), Pale Crescents (*Phyciodes pallida*) and Variable Checkerspots (*Euphydryas anicia*). We always check the stinging nettles (*Urtica gracilis*) patch near the old barn and this year found dozens of Milbert's Tortoiseshell (*Aglais milberti*) caterpillars.

This year's survey and 2010 had the lowest numbers of Individuals per Research Hour (27). The average over seven years was 41. Meyer's Trail, however, had the highest number of species (52) identified in the 2013 summer. Springtime was very cold, cloudy and foggy, but by late June and July many local butterflies were flying. By August the blossoms were dried, limiting numbers seen.

In other observations, Golden-mantled ground squirrels, chipmunks and pine squirrels were busily harvesting food for the winter.

## **G. Reynold's Ranch**

On June 3, the water around Giggey Pond was so high we walked inside the clear-cut pine forest to the south and saw not one butterfly.

In June and July, Queen Alexandra's Sulphurs (*Colias alexandra*) were numerous, as were the Common Ringlets and Common Alpines (*Erebia epipsodea*). However, Silvery Blues (*Glaucopsyche lygdamus*), Greenish Blues (*Plebejus saepiolus*) and Arctic Blues (*P. glandon rustica*), butterflies typically from higher elevations were few. Uncommon Mormon Fritillaries (*Speyeria mormonia*) were sighted this summer. We saw no Ruddy Coppers (*Lycaena rubidus*), often observed near the national forest fence, but the Pearl Crescents (*Phyciodes tharos*), Northern Crescents and Field Crescents (*P. pulchella*) were present. Only one of the uncommon Silver-bordered Fritillaries (*Boloria selene*) was sighted on June 23. The shrubby cinquefoil (*Pentaphylloides floribunda*) in the North Bog is where the *B. selene* host plant violets (*Viola* sp.) are hidden below in the low grasses. The associated cinquefoil and violets have not been found near Giggey. The leaves have been photographed, but the violet flowers have not yet been found, thus remain unidentified as to species. The North Bog's latitude is more southern and the elevation of 8,300 ft. is low for these native *B. selene* to be found here in a colony.

Although we had successful inventories at Giggey Pond and the North Bog at Reynold's Ranch during June-July, our observations were cut short on August 5. This area had a new electric fence installed in August cutting our access at the Giggey Pond area to one-half.

The number of Individuals per Research Hour was the lowest in 3 years (38) while the average was 45 I/RH. Both areas remained very wet all summer from the spring precipitation.

## **H. Hall II**

"One of the most beautiful spots in Boulder County Open Spaces," I said during a visit on May 7. Water was falling over the rocks at the merging of two streams; the hillside to the northeast was a long gentle slope where ancient sandstone oblique ridges jutted out gently, covered with blackened lichens, short vegetation and sheltered ferns. What a contrast between open-faced raw, mined surfaces near the entrance and the undisturbed natural hillsides. On May 28 large beds of shooting stars (*Dodecatheon pulchellum*) were in full bloom near the now-shallow stream.

Five rare Moss Elfin (*Callophrys mossii*) nectared on salt-and-pepper (*Lomatium orientale*). These elfins are on the Colorado Natural Heritage Watch List because they are 'imperiled due to a restricted range, population, and steep decline in Colorado'. Another 'watched' species, the flowering twinpod (*Physaria bellii*) was in full bloom. A few sand lilies (*Leucocrinum montanum*), Nuttall's violets (*Viola nuttalli*) and holly bushes (*Mahonia repens*) had blossoms. During the summer Orange Sulphurs outnumbered Clouded Sulphur by 4 to 1 and small groups of these were puddling in the sandy depressions. Western Tailed-blues (*Cupido amyntula*) and Melissa Blues (*Plebejus melissa*) were scattered over the grassy hillside. The southern visitors, which were seasonally late in arriving, Variegated Fritillaries

(*Euptoieta claudia*), Painted Ladies (*Vanessa cardui*) and Red Admirals (*V. atalanta*) were flying on July 26. The abundant natives flying on the same day were Western Tiger Swallowtails (*Papilio rutulus*), Two-tailed Swallowtails (*P. multicaudata*), and Common Wood-Nymphs (*Cercyonis pegala*).

Numbers of Individuals per Research Hour at Hall II were 21 with 31 butterfly species identified during this first year of observation.

## **I. Caribou – Mud Lake**

When we arrived inside the locked gate at Caribou we were greeted by a loud chorus of coyotes on July 2. Draco Skippers (*Polites draco*) were flying over the bank to the right (north) as they often do. Queen Alexandra's Sulphurs, Rocky Mountain Parnassians, Lupine Blues (*Plebejus lupine lutzi*) and Small Wood Nymphs (*Cercyonis oetus*) were numerous. Queen Alexandra's Sulphurs, Arctic Blues and the Common Ringlets were nectaring on sulfur-flowers (*Eriogonum umbellatum*); Wood Nymphs and Alexandra's were nectaring on blue fall asters. The 'blue' butterflies were noticeably missing overall during the summer of 2013, but at Caribou on July 2, the following blues were all identified: Lupine, Silvery (*Glaucopsyche lygdamus*), Rocky Mountain Dotted-Blue (*Euphilotes ancilla*), Reakirt's (*Echinargus isola*), Melissa (*Plebejus melissa*), Boisduval's (*P. icarioides*), and Arctic (*P. glandon rustica*). Uncommon Mustard Whites (*Pieris marginalis*) were flying on July 30. These immaculate whites are often associated with cooler, wet meadows and shady forests. Also the uncommon Blue Coppers (*Lycaena heteronea*) and Purplish Coppers (*L. helloides*) were sighted on July 30 and August 2.

We expect to find many butterflies in the 'Monarda Meadow' near the old horse trail, but during the last two years the count has been way down. Was spraying done for the weed daisies, besides hand-pulling? We did not get to Mud Lake this season. Of course, we do not visit Caribou before July 1 due to Moose and Elk birthing closures, and have no information about the success of spring butterflies.

The record of Individuals per Research Hour was the second highest in seven years (45) with the average at 38 I/RH. It seems that the drought occurring at lower elevations did not affect the numbers of butterflies flying at Caribou in 2013. It is possible there was no drought at Caribou's elevation.

## **J. Rabbit Mountain**

I went to Rabbit Mountain only once in 2013 hoping to find the late season Leonard's Skippers (*Hesperia leonardus*), but there were none. The hillside was very dry. To my surprise Orange Sulphurs, Variegated Fritillaries (*Euptoieta claudia*) and Field Crescents were nectaring in a dry low dense patch of (*Verbena braciata*) by the roadside.

## **VII. Data Tables and Field Notes**

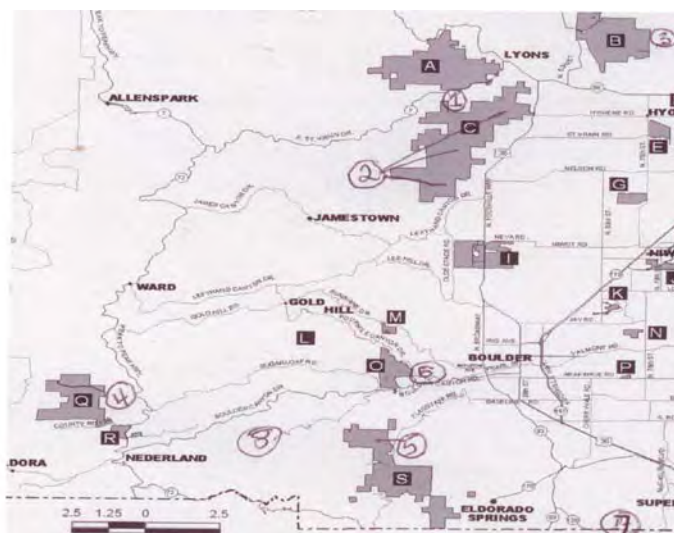
Each table contains the species that have been sighted over the years at that site. During some seasons we do not see certain species; therefore dates are left with no number. The number shows how many individuals were sighted on that date.

**Table I. Dates and Locations of Surveys – April through August, 2013**

Month	Day	Heil- Geer	Heil- Plumely	Heil-North	Hall II	SE Buffer	Anne U. White	Caribou	Walker Ranch – Meyer's	Reynold's Ranch	Rabbit Mtn
Apr	5					JC					
	27					JC					
	28			JC							
	29						JC				
May	7				JC						
	12		JC								
	13								JC		
	19						JC				
	26					JC					
	28				JC						
	23	JC									
	23	JC									
Jun	3									JC	
	10	JC									
	14								JC		
	20			JC							
	22		JC								
	23					JC					
	27									JC	
July	2							JC			
	11			JC							
	16									VK	
	16								JC		
	19		JC								
	20						JC				
	22					JC					
	25	JC									
	26				JC						
	30							JC			
	30							JC			
Aug	1						JC				
	2							JC			
	5									VK	
	8	JC									
	10										JC
	15			JC							
	16						JC				
	18					JC					
	22								JC		
	26		JC								
	27				JC						
	29					JC					

**Note:** 'JC' means Jan Chu, and 'VK' means Venice Kelly

**Table II: Survey Sites in Boulder County Open Spaces**

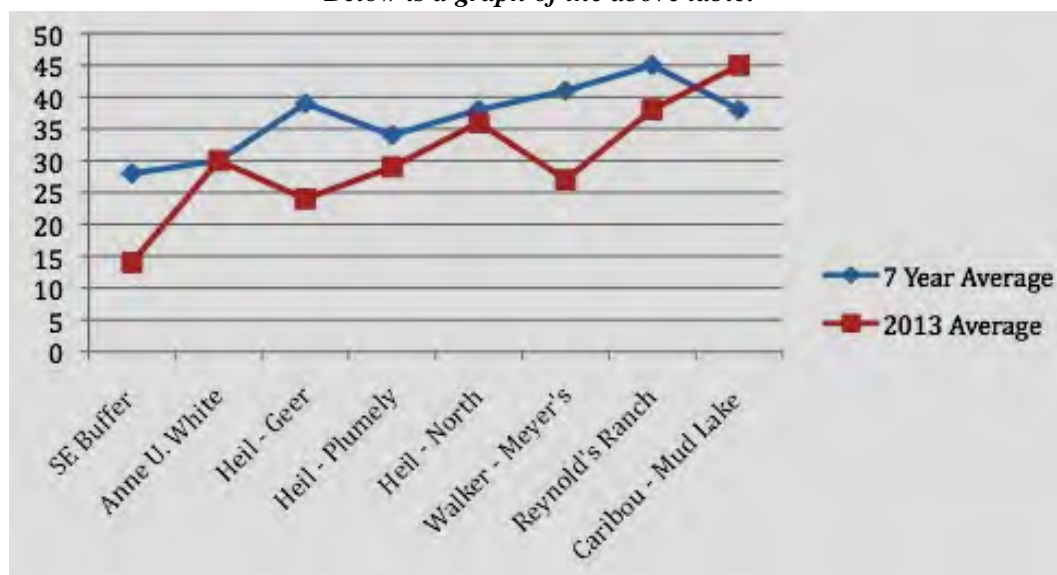


1. Hall II
2. Heil Valley
3. Rabbit Mountain
4. Caribou Ranch
5. Walker Ranch – Meyer’s Homestead Trail
6. Anne U. White - Fourmile Canyon
7. Southeast Buffer
8. Reynold’s Ranch

**Table III. Seven Year I/RH Average at Eight Sites vs. 2013 I/RH Average**

I/RH at Eight Study Sites	7 Year Average	2013 Average
SE Buffer	28	14
Anne U. White	30	30
Heil - Geer	39	24
Heil - Plumely	34	29
Heil - North	38	36
Walker - Meyer’s	41	27
Reynold’s Ranch	45	38
Caribou - Mud Lake	38	45

*Below is a graph of the above table.*



**Table III** compares the seven year average numbers of Individual butterflies per Research Hour with this year’s average numbers of I/RH, it is clear to see that the populations of butterflies in 2013 were lower at six sites, the same at one site and higher at one.

We can look at the results of the population counts in 2013. When comparing the average number I/RH over a seven-year period in eight study areas, with the average number found in 2013, six of the eight study areas had fewer Individuals/Research Hour. SE Buffer, Heil Ranch, Walker-Meyer's and Reynold's Ranch were all affected by the late cold, wet springtime and the serious drought that occurred in early summer. Anne U. White had a number equal to the seven-year average. Anne U. is a protected area in a narrow canyon, and quite stable (before the flood). Caribou had a greater number in 2013. It is likely Caribou Ranch, at a higher elevation, was not as affected by the July-August drought. This was the first year of observation at Hall II so no comparison can be made.

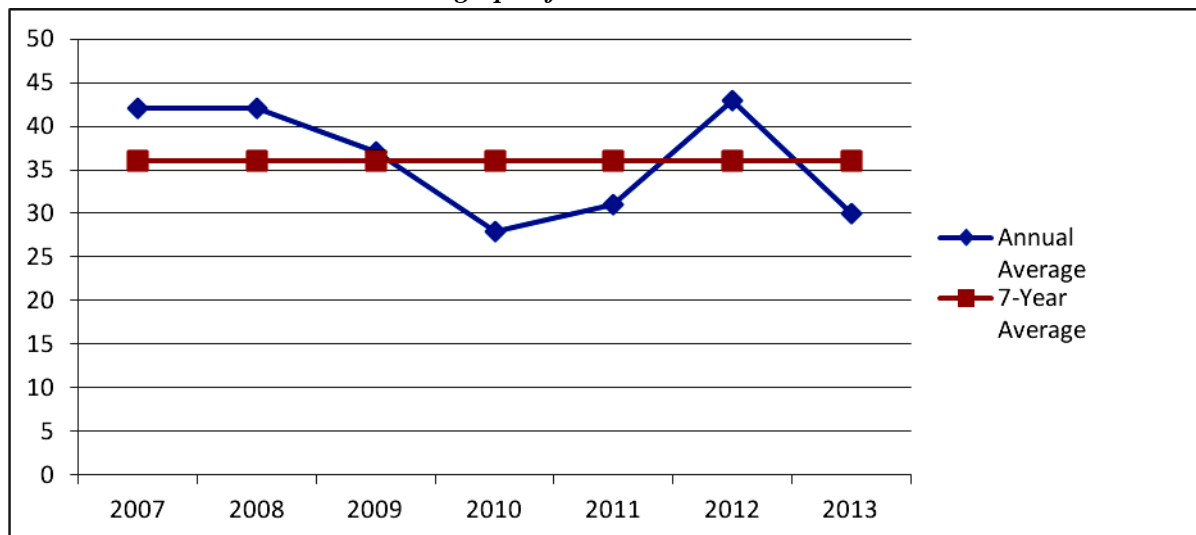
**Table IV. I/RH - Annual Total and Average # of Individuals from Eight Study Areas**

Site	Year of Study ->	2007	2008	2009	2010	2011	2012	2013
SE Buffer		51	18	39	40	14	25	14
Anne U. White		39	34	22	11	40	38	30
Heil - Geer		37	58	39	30	31	53	24
Heil - Plumely		45	36	24	30	29	46	29
Heil - North		52	38	39	37	24	29	36
Walker - Meyer's		32	54	64	27	29	57	27
Reynold's Ranch		0	0	0	0	41.6	55	39
Caribou - Mud Lake		36	54	33	24	39	38	45
<b>I/RH Annual Total</b>		292	292	260	199	248	341	243
<b>I/RH Annual Average</b>		42	42	37	28	31	43	30

**Table V. I/RH Annual Average vs. Seven-Year I/RH Average**

Year	2007	2008	2009	2010	2011	2012	2013
<b>I/RH Annual Average</b>	42	42	37	28	31	43	30
<b>I/RH 7-year Average</b>	36	36	36	36	36	36	36

*Below is a graph of the data in the above table.*



In **Table V** above, the Individuals per Research Hour (I/RH) are compared in an annual average, for years 2007 through 2013, with the seven-year average. It is apparent that during years 2007, 2008 and 2012. The annual average of the population of butterflies was higher than the seven-year average. During 2010, 2011, and 2013 the annual averages were lower than the seven-year average.

The seven-year average number of I/RH during the years 2006-2013, is 36. The Average Annual

Number of I/RH is higher during 2007, 2008, 2009, and 2012; lower in 2010, 2011 and 2013.

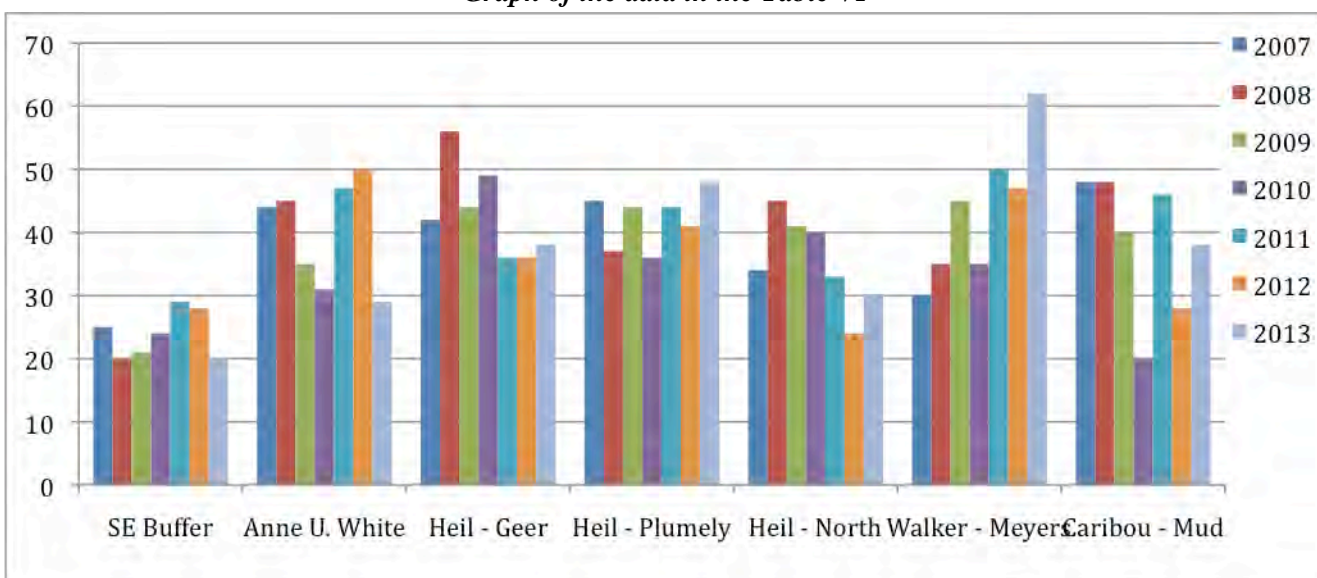
**Table VI. Species Richness**

The number of species seen each year at each study site is considered from 2007 to 2013. Species numbers or richness in this paper is the varying numbers of butterfly species which are counted each year. The species numbers between 2007 and 2013 vary from 7 to 32. Below is the range.

Southeast Buffer	7	Heil – North	21
Anne U. White	21	Walker – Meyer’s	32
Heil – Geer	20	Caribou, Mud Lake	28
Heil – Plumely	12		

Year Area ->	SE Buffer	Anne U. White	Heil Geer	Heil Plumely	Heil North	Walker Meyers	Caribou Mud Lake
<b>2007</b>	25	44	42	45	34	30	48
<b>2008</b>	20	45	56	37	45	35	48
<b>2009</b>	21	35	44	44	41	45	40
<b>2010</b>	24	31	49	36	40	35	20
<b>2011</b>	29	47	36	44	33	50	46
<b>2012</b>	28	50	36	41	24	47	28
<b>2013</b>	20	29	38	48	30	62	38

*Graph of the data in the Table VI*



Southeast Buffer's species richness is comparatively low because of its lack of habitat variation and low moisture in the short-midgrass prairie. It's quite constant in a range of 18-25 during the 2007 observations and 2013. The range of species (21) at Anne U. White is consistently rather high because of the trail's diversity of plant species, and protected habitat. The counts range from 50 down to 29. Heil – North has the same variation in numbers (21). These are both smaller areas with very little researcher meandering off the narrow and somewhat restricted trail when looking for butterflies.

Heil-Geer is a much larger area with mid-grass meadows and ponderosa sided canyon. The roadway is a good place to see the male butterflies as they come out to puddle in the rain-moistened gravel.

Usually, the ‘frog pond’ on the west side of the Heil Ranch road attracts male butterflies in high concentrations to its muddy banks in a compact area. This year’s spring runoff limited numbers seen. Heil-Plumely has a wide variation between 36 and 48, but a small range (12) of different species. Caribou – Mud Lake are visited only during July and August the range of different species is 28. Again, we miss the April through June spring and early summer butterflies in Caribou. We did not visit Mud Lake at all in 2013.

### **VIII. Summary of Butterfly Inventories 2013**

This 2013 was a poor year for butterfly numbers. The cold, wet weather was prolonged in the spring. The usual expected butterflies that disperse into Boulder County did not arrive until mid-July, and then they were fewer than expected numbers. A short successful summer for local emergent butterflies was followed by drought conditions that decreased the richness of nectar plants. Local late summer butterflies seemed to fly as usual. This report stops on August 31, short of the phenomenal September flooding in 2013.

Heil II is an undisturbed habitat behind the old quarry walls. Its luxuriant slopes and stream-bed are rich with diverse mini-ecosystems, varieties of blossoming plants, birds and butterflies.

Plumely Canyon is likely included in the Marietta Canyon Wildlife Habitat. We have not ventured into the canyon further than where the Plumely stream forks. We do check the meadow at the head of Marietta.

At the Reynold’s Ranch in August, researchers were excluded from surveying Giggey Pond by the addition of an electric barbed wire fence. The field around Giggey Pond also remained flooded.

The Western Tiger Swallowtails were located in all nine areas including Hall II. Not surprisingly, Cabbage Whites, Reakirt’s Blues and Variegated Fritillaries were found in eight of the nine areas this year. Clouded Sulphurs, Silvery Blues, Aphrodite and Edwards’ Fritillaries, Field Crescents, Hoary Commas, Mourning Cloaks, Common Ringlets, and Common Wood-Nymph were found in seven of the nine study areas.

The most numerous butterflies in the study areas were the Common Ringlet at 119 I/RH; the following most numerous were the Variegated Fritillaries (46 I/RH) and Cabbage Whites (44 I/RH).

Significant variation from one year to the next requires diligent and continuous monitoring to provide valuable data that will influence management decisions and register faunal changes that may correlate with changing climate patterns.

The average number of Individual butterflies per research hour (I/RH) in 2013, as compared to each area’s average number (for seven years) was lower in six areas: Southeast Buffer, Heil – Geer, Plumely, North; Walker- Meyer’s, and Reynold’s. Only in one area, Caribou, was the number higher and in one, Anne U. White, the butterfly number was the same. The seven-year average in all eight study areas was 36; the annual average numbers of I/RH were higher during 2007, 2008, 2009, and 2012; lower in 2010, 2011 and 2013. The most common species in our study area was the Common Ringlet with 119 I/RH.

Detailed studies of natural resources are being provided by this team and other lepidopterists, to help with ongoing efforts to identify local effects of regional and global climate change and provide additional information regarding this phenomenon. In years following the September floods, these records will prove valuable for comparisons.



## Butterfly Inventories 2013

The names of butterflies listed on the charts are those seen over the years at each site. If there is no number listed, the butterfly was not observed in 2013. Numbers listed are those seen each particular date.

<b>Southeast Buffer</b>	<b>2013</b>	<b>4/5</b>	<b>4/27</b>	<b>5/26</b>	<b>6/23</b>	<b>7/22</b>	<b>8/18</b>	<b>8/29</b>
<i>Papilio polyxenes</i>	Black Swallowtail							
<i>P. zelicaon</i>	Anise Swallowtail							
<i>P. rutulus</i>	W. Tiger Swallowtail				1			
<i>P. multicaudata</i>	Two-tailed Swallowtail							
<i>Pontia protodice</i>	Checkered White					3		
<i>P. occidentalis</i>	Western White							
<i>Pieris rapae</i>	Cabbage White							4
<i>Euchloe olympia</i>	Olympia Marble							
white sp.						2	1	2
<i>Colias philodice</i>	Clouded Sulphur				1		5	1
<i>C. eurytheme</i>	Orange Sulphur				2	5	3	6
<i>Zerene cesonia</i>	Southern Dogface							
<i>Abaeis nicippe</i>	Sleepy Orange							
<i>Kricogonia lyside</i>	Lyside Sulphur							
<i>Nathalis iole</i>	Dainty Sulphur				1	3	23	4
<i>Lycaena dione</i>	Gray Copper						2	
<i>Strymon melinus</i>	Gray Hairstreak			1			3	2
<i>Glaucopsyche lygdamus</i>	Silvery Blue							
<i>Euphilotes ancilla</i>	Rocky Mtn. Dotted-Blue							
<i>Echinargus isola</i>	Reakirt's Blue					3	1	
<i>Plebejus melissa</i>	Melissa Blue					2	1	
blue sp.				1	1		1	
<i>Danaus plexippus</i>	Monarch							
<i>Agraulis vanilla</i>	Gulf Fritillary							
<i>Euptoieta claudia</i>	Variegated Fritillary				1	30	2	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary							
<i>S. edwardsii</i>	Edwards' Fritillary				2			
fritillary sp.					5		1	3
<i>Chlosyne fulvia</i>	Fulvia Checkerspot							
<i>C. gorgone</i>	Gorgone Checkerspot							
<i>Phyciodes tharos</i>	Pearl Crescent							
<i>P. pulchella</i>	Field Crescent			5				7
<i>Aglaia milberti</i>	Milbert's Tortoiseshell							
<i>Nymphalis antiopa</i>	Mourning Cloak							
<i>Vanessa cardui</i>	Painted Lady					1		
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral							
<i>Coenonympha tullia ochracea</i>	Common(Ochre) Ringlet							
<i>Cercyonis pegala</i>	Common Wood						2	

<b>Southeast Buffer</b>	<b>2013</b>	<b>4/5</b>	<b>4/27</b>	<b>5/26</b>	<b>6/23</b>	<b>7/22</b>	<b>8/18</b>	<b>8/29</b>
	Nymph							
<i>Erynnis afranius</i>	Afranius Duskywing							
<i>E. persius</i>	Persius Duskywing							
<i>Pyrgus communis</i>	Common Checkered-skipper			2		2	2	3
<i>Pholisora catullus</i>	Common Sootywing							
<i>Hesperia uncas</i>	Uncas Skipper						7	
<i>H. ottoe</i>	Ottoe Skipper							
<i>H. leonardus</i>	Leonard's Skipper						7	7 ph
<i>Atrytone arogos</i>	Arogos Skipper							
<i>Anatrytone logan</i>	Delaware Skipper							
skipper sp.								2

<b>SE Buffer</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# of Species identified during the year in SE Buffer	25	20	21	24	19	18	20
# Species 2007-2013 sighted in Southeast Buffer	21	23	33	37	41	44	44
Research Hours on Site	5	21	9	7.7	11.5	9	12
# Individual Butterflies Counted	256	373	353	443	160	227	169
# Individuals / Research Hour	51	18	39	40	14	25	14

<b>Date, Conditions SE Buffer</b>	<b>Location in Open Space</b>	<b>Butterfly Activity</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>GPS , or round trip mileage</b>	<b>Researchers</b>
4/5/2013 12 – 1:00 p.m. 17 °C 90% overcast	Gate to Swallowtail Hill	None apparent	Nuttall's violet, salt and pepper	Meadowlark. Black wasps, spider, locusts		Jan Chu, Jean Morgan
4/27/2013 1:30-3 p.m. 18 °C 0- 25 mph wind, clear sky	Gate to Swallowtail Hill	Only moths	Many Nuttall's violet, few sand lily & salt and pepper	Meadowlark, locusts	BPZA21ORI benchmark PE vegetation research at Swallowtail Hill	Jan Chu

<b>Date, Conditions SE Buffer</b>	<b>Location in Open Space</b>	<b>Butterfly Activity</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>GPS , or round trip mileage</b>	<b>Researchers</b>
5/26/2013 10:30- 12:00 p.m. 23-29 °C 20% to 50% open sky. wind 1-15 mph.	Gate, off hwy 128 to Swallowtail Hill	Gray hairstreak nectaring on Geyer's onion.	Death camas, skull cap, golden banner, yellow- eyed Susan, salsify, toadflax, pink loco, Musineon, white vetch, choke cherry, skunk bush, Mertensia, Geyer's onion, hawthorn, hound's tongue, flax, one-sided penstemon, Erigeron, Filary, little yellow mustard	Yel. breast chat, flicker, magpie, kestrel, meadowlark, horned lark, mourning dove house wren, spotted towhee, w. kingbird, song sparrow, Bullock oriole, Swainson's hawk, e. kingbird, vesper sparrow.		Jan Chu, Larry Crowley
6/23/2013 8:45 – 10:40 a.m. 17 °C, 95% clear sky, 0-5 mph wind	Gate, off hwy 128 to Swallowtail Hill	Very few flying.	Mariposa lily, flax, Arnica, salsify, prairie clover, yucca, white larkspur, alfalfa, Geyer's onion, candy tuft, toad flax, evening primrose, rose, scarlet globe mallow, Gaura, white prairie clover, prickly pear, green gentian, sun flower.	Meadowlark, barn swallow, robin (nestling), mourning dove, nighthawk, horned lark nest (ph), turkey vulture, Am. goldfinch, vesper sparrow.		Jan Chu, Larry Crowley
7/22/2013 9:00 – 11:00 a.m. 26 °C wind 0-5 mph, clear sky, sunny.	Gate, off hwy 128 to Swallowtail Hill	Variegated Fritillaries ovipositing on toadflax.	Alfalfa, Arnica, Prairie Clover, Horsemint, Moth Mullein, Sunflower sp. Toadflax	Bald Eagle immature, meadow lark	Gate 2012 N 39.9126 W 105.1824. 2013 Monuments: BPZA16 ORI, BPZA 17 FND, VSspot 19 BND, Hilltop 21	Jan Chu, Amy Chu

Date, Conditions SE Buffer	Location in Open Space	Butterfly Activity	Blossoming Plants	Animals	GPS , or round trip mileage	Researchers
8/18/2013 10:00 - 11:30 a.m. 27-32 °C, clear, no wind	Gate to Swallowtail Hill.	Dainty Sulphurs mating. Some nectaring on alfalfa, gay feather	Gay feather, cowboy's delight, sunflower (Arnica), wild alfalfa, fleabane daisy, blue vervain	meadowlarks		Jan Chu, Amy Chu
8/29/2013 9:30- 11:30 a.m. 27-32 °C, 45% broken clouds, wind 0-5 mph	Coalton Trail to Rock Creek to solar water tank; very dry	Leonard's Skippers nectaring on gayfeather	gayfeather; few other flowers- sunflower, snakeweed, chickory, Heterotheca pumalis	Sage thrasher, Red-tail hawk, horned lark, meadowlark, kestrel, mourning dove, Say's phoebe, prairie falcon, turkey vulture ph = photo		Jan Chu, Larry Crowley, Jean Morgan, Chuck Lowry

Anne U. White Trail, Fourmile Canyon Creek	2013	3/14	4/29	5/19	7/20	8/1	8/16
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian						
<i>Papilio polyxenes</i>	Black Swallowtail						
<i>P. zelicaon</i>	Anise Swallowtail			1ph			
<i>P. indra</i>	Short-tailed Swallowtail						
<i>P. rutulus</i>	W. Tiger Swallowtail			1		1	1
<i>P. eurymedon</i>	Pale Swallowtail						
<i>P. multicaudata</i>	Two-tailed Swallowtail				3	5	3
swallowtail, yellow sp.							
<i>Pontia protodice</i>	Checkered White						
<i>P. sisymbrii</i>	Spring White			7			
<i>Pieris rapae</i>	Cabbage White			2	4	3	3
<i>Euchloe ausonides</i>	Large Marble			6			
<i>E. olympia</i>	Olympia Marble						
marble sp.							
white sp.			1	12			
<i>Anthocharis sara julia</i>	Julia Orangetip			5			
<i>Colias philodice</i>	Clouded Sulphur				1		
<i>C. eurytheme</i>	Orange Sulphur						
<i>Nathalis iole</i>	Dainty Sulphur						

Anne U. White Trail, Fourmile Canyon Creek	2013	3/14	4/29	5/19	7/20	8/1	8/16
Sulphur sp.			1				
<i>Callophrys affinis</i> <i>homoperplexa</i>	Canyon Bramble Hairstreak						
<i>C. sheridanii</i>	White-lined Green Hairstreak						
<i>C. gyrneus siva</i>	Siva Juniper Hairstreak						
<i>C. mossii schryveri</i>	Moss' Elfin						
<i>C. polios</i>	Hoary Elfin						
<i>C. eryphon</i>	Western Pine Elfin			10			
<i>Satyrrium titus</i>	Coral Hairstreak						
<i>Strymon melinus</i>	Gray Hairstreak						
<i>Cupido amyntula</i>	Western Tailed-Blue						
<i>Celastrina ladon sidara</i>	Echo Azure			8			
<i>Glycopsyche piasus</i>	Arrowhead Blue						
<i>G. lygdamus</i>	Silvery Blue						
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue						
<i>Echinargus isola</i>	Reakirt's Blue					1	
<i>P. saepiolus</i>	Greenish Blue						
<i>Plebejus melissa</i>	Melissa Blue					3	
<i>P. icarioides</i>	Boisduval's Blue						
<i>P. lupini lutzi</i>	Lupine Blue						
<i>P. glandon rustica</i>	Arctic Blue						
blue sp.							1
<i>Apodemia nais</i>	Nais Metalmark						
<i>Danaus plexippus</i>	Monarch					2	
<i>Euptoieta claudia</i>	Variegated Fritillary						
<i>Speyeria aphrodite</i>	Aphrodite Fritillary						7
<i>S. edwardsii</i>	Edwards' Fritillary					1	
<i>S. coronis</i>	Coronis Fritillary						
<i>S. callippe</i>	Callippe Fritillary						
<i>S. hesperis</i>	Northwestern Fritillary				8	30	19
<i>S. mormonia</i>	Mormon Fritillary						
fritillary sp.					7	4	9
<i>Chlosyne gorgone</i>	Gorgone 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						
<i>Polygonia satyrus</i>	Satyr Comma						
<i>P. gracilis</i>	Hoary Comma		4	5			
<i>Junonia coenia</i>	Common Buckeye						
<i>Aglaia milberti</i>	Milbert's Tortoiseshell	1					

<b>Anne U. White Trail, Fourmile Canyon Creek</b>	<b>2013</b>	<b>3/14</b>	<b>4/29</b>	<b>5/19</b>	<b>7/20</b>	<b>8/1</b>	<b>8/16</b>
<i>Nymphalis californica</i>	California Tortoiseshell		1ph				
<i>N. antiopa</i>	Mourning Cloak	3	9	4			2
<i>Vanessa atalanta</i>	Red Admiral				2		1
<i>V. cardui</i>	Painted Lady						
<i>V. virginienensis</i>	American Lady						
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral				6	3	3
<i>Coenonympha tullia ochracea</i>	Common (Ochre ) Ringlet						
<i>Cercyonis pegala</i>	Common Wood- Nymph						
<i>C. oetus</i>	Small Wood-Nymph				1	5	1
<i>Oeneis uhleri</i>	Uhler's Arctic			1			
<i>Epargyreus clarus</i>	Silver-spotted Skipper						
<i>Pholisora catullus</i>	Common Sootywing						
<i>Erynnis pacuvius</i>	Pacuvius Duskywing						
<i>E. persius</i>	Persius Duskywing						
<i>Pyrgus communis</i>	Common Checkered- Skipper						
<i>Piruna pirus</i>	Russet Skipperling				1		
<i>Hesperia juba</i>	Juba Skipper						
<i>H. colorado</i>	W. Branded Skipper						
<i>H. viridis</i>	Green Skipper						
<i>Polites themistocles</i>	Tawny-edged Skipper						
<i>P. mystic</i>	Long Dash						
<i>Ochlodes sylvanoides</i>	Woodland Skipper				6	40	30
<i>Poanes taxiles</i>	Taxiles Skipper				15	16	
<i>Euphyes vestris</i>	Dun Skipper					1?	
<i>Atrytonopsis hianna</i>	Dusted Skipper			1ph		2ph	

<b>Anne U. White Fourmile Canyon</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# of Species identified annually in Anne U. White	44	45	35	31	47	50	29
Cumulative # Species sighted in Anne U. White 2007-2013	47	66	69	69	75	82	82
Research Hours on Site	9.5	16	10	10.5	19.5	13.5	11
# Individual Butterflies Counted	366	536	217	112	773	509	334
# Individuals / Research Hour (I/RH)	38.5	33.5	21.7	10.7	40	38	30
# Species / Research Hour	4.6	2.8	3.5	3.0	2.4	3.7	2.6

<b>Date, &amp; Conditions</b>	<b>Location within Anne U. White</b>	<b>Butterfly Activity</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researcher s</b>
3/14/2013					Cathy and Donn Cook

Date, & Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals		Researchers
4/29/2013 12:30 – 2:00 p.m. 22-23 °C 40% broken clouds, 0-5 mph Wind, snow banks along stream	2 <sup>nd</sup> stream crossing and top of steep hill	Mourning cloaks flying short distances; gracilis & californica basking on rocks.	Mahonia beginning to bloom, few sand lilies and Nuttall's violets	Steller's jay, crow, red-tailed hawk. 2- lizards Sceloporus (ph).		Jan Chu
5/19/2013 10:00-1:00 p.m. 17-18 °C 15% clouds, winds 5-20 mph	2 <sup>nd</sup> stream crossing to base of steep hill	Hoary comma nectaring on willows; azures down on moist trail; anise, comma, spring whites puddling.	'garden-mint', many dandelions, larkspur, Filary, Nuttall's violet, small yellow mustard, mouse ears, Mahonia, sand lily, puccoon, currant, wall flower, Canada violet, spring beauty. Lilac in tight bud.	Kestrel, broad-t hummingbird, house wren, flicker, Steller's jay, house finch, crow, mtn chickadee. Sceloporus, Yellow-bellied Racer.	8 dogs on leash, 2 dogs off leash, but politely leashed; 4 large dogs off lease and owner very reluctant to leash.	Jan Chu, Larry Crowley
7/20/2013 10:30-12:00 p.m. 21-26 °C, clear sky, no wind.	1 <sup>st</sup> stream crossing			2 Sceloporus, 1 garter snake, bull snake, and deer.		Jan Chu, Amy Chu
8/1/2013 9:15-12:00 p.m. 23-27 °C 93% cloudy, wind 0-5 mph	To first stream crossing	Skippers nectaring on Heterotheca & geranium; hesperis nectaring on Canada thistle and Monarda. Cabbage nectaring on catnip. Skippers chasing fritillaries.	Fr. Geranium, sulfur-flower, Clematis, mullein, prickly poppy, Scottish thistle, larkspur, Monarda, bouncing bet, Salsify, evening primrose, Solidago, Heterotheca, gumweed, yarrow, white clover	Goldfinch Am. W.tanager, wh. br. nuthatch crow, pygmy nuthatch, cordilleran flycatcher. Sceloporus.		Jan Chu, Larry Crowley, Richard Holmes, Wynne Whyman

Date, & Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals		Researchers
8/16/2013 9:30-11:45 a.m. 17-26 °C high haze, 0-5 mph wind	2 <sup>nd</sup> stream crossing and top of steep hill	Hesperis nectaring on bull thistle; fritillaries and skippers nectaring on Solidago and some on blue aster. Butterflies were chasing each other.	Goldenrod, blue fall aster, Fremont's geranium, gay feather, old Monarda.	Nuthatch, chickadee. Pine squirrel. Western Terrestrial Garter Snake Thamnophis elegans	2 dogs off leash.	Jan Chu, Jean Morgan

Heil Valley– Geer Watershed	2013	3-15	3-31	6-10	7/25	8/4
<i>Papilio polyxenes</i>	Black Swallowtail					
<i>P. zelicaon</i>	Anise Swallowtail			1		
<i>P. indra</i>	Short-tailed Swallowtail			4?		
<i>P. rutulus</i>	Western Tiger Swallowtail			1	2	
<i>P. eurymedon</i>	Pale Swallowtail			10		
<i>P. multicaudata</i>	Two-tailed Swallowtail			2		
<i>Neophasia menapia</i>	Pine White					
<i>Pontia sisymbrii</i>	Spring White					
<i>P. protodice</i>	Checkered White				3	
<i>P. occidentalis</i>	Western White					
<i>Pieris rapae</i>	Cabbage White			5	10	
<i>P. marginalis</i>	Mustard White					
<i>Euchloe ausonides</i>	Large Marble			1		
<i>E. olympia</i>	Olympia Marble					
<i>Anthocharis sara julia</i>	Julia Orangetip			1		
white sp.					3	1
<i>Colias philodice</i>	Clouded Sulphur		1		1	
<i>C. eurytheme</i>	Orange Sulphur		3	1		5
<i>C. alexandra</i>	Queen Alexandra's Sulphur					
<i>Eurema mexicana</i>	Mexican Sulphur					
<i>Nathalis iole</i>	Dainty Sulphur					
sulphur sp.			1		1	
<i>Lycaena dione</i>	Gray Copper					
<i>L. heteronea</i>	Blue Copper					
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak			2		
<i>C. gryneus</i>	Siva Juniper Hairstreak					
<i>C. augustinus</i>	Brown Elfin					
<i>C. eryphon</i>	Western Pine Elfin					
<i>Satyrrium titus</i>	Coral Hairstreak					
<i>S. liparops</i>	Striped Hairstreak					
<i>S. saepium</i>	Hedgerow Hairstreak					
<i>Strymon melinus</i>	Gray Hairstreak					1
<i>Leptotes marina</i>	Marine Blue					
<i>Cupido amyntula</i>	Western Tailed-Blue					
<i>Celastrina ladon sidara</i>	Echo Azure			1		
<i>Glaucopsyche piasus</i>	Arrowhead Blue			1		



Heil Valley– Geer Watershed	2013	3-15	3-31	6-10	7/25	8/4
<i>G. lygdamus</i>	Silvery Blue			6		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue					
<i>Echinargus isola</i>	Reakirt's Blue			1		1
<i>Plebejus melissa</i>	Melissa Blue					1
<i>P. saepiolus</i>	Greenish Blue					
<i>P. icarioides</i>	Boisduval's Blue			3+ cat		
<i>P. lupini lutzii</i>	Lupine Blue					
<i>P. glandon rustica</i>	Arctic Blue					
blue sp.					3	
<i>Danaus plexippus</i>	Monarch					
<i>Apodemia nais</i>	Nais Metalmark					
<i>Euptoieta claudia</i>	Variegated Fritillary					1
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			2	2	4
<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				16	7	6
<i>Chlosyne gorgone</i>	Gorgone Checkerspot					
<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			2		
<i>Polygonia satyrus</i>	Satyr Comma					
<i>P. gracilis</i>	Hoary Comma	5	9			1
<i>Aglais milberti</i>	Milbert's Tortoiseshell					
<i>Nymphalis antiopa</i>	Mourning Cloak	15	17	1		
<i>N. californica</i>	California Tortoiseshell		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			2	2	
<i>Asterocampa celtis</i>	Hackberry Emperor					
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet			40		
<i>Cercyonis pegala</i>	Common Wood-Nymph				21	
<i>C. oetus</i>	Small Wood-Nymph					
<i>Erebia epipsodea</i>	Common Alpine					
<i>Oeneis chryxus</i>	Chryxus Arctic					
<i>O. uhleri</i>	Uhler's Arctic			1		
<i>Epargyreus clarus</i>	Silver-spotted Skipper			1	1	
<i>Thorybes pylades</i>	N. Cloudywing					
<i>Erynnis icelus</i>	Dreamy Duskywing					
<i>E. pacuvius</i>	Pacuvius Duskywing			15		
<i>E. afranius</i>	Afranius Duskywing					

<b>Heil Valley– Geer Watershed</b>	<b>2013</b>	<b>3-15</b>	<b>3-31</b>	<b>6-10</b>	<b>7/25</b>	<b>8/4</b>
<i>E. persius</i>	Persius Duskywing			3 cat*		
<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				2	
<i>Poanes taxiles</i>	Taxiles Skipper					1
<i>Euphyes vestries</i>	Dun Skipper				3	
<i>Atrytonopsis hianna</i>	Dusted Skipper					
skipper sp.						2

\*Cat - caterpillar

<b>Heil-Geer Watershed</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# of Species Identified Annually	42	56	44	49	36	38	38
Cumulative # of Species Sighted in Heil-Geer Watershed	81	87	90	91	91	91	91
Research Hours at Site	15.5	21	12.5	14	14	10	11
# Individual Butterflies Counted	569	1225	492	419	436	530	264
# Individuals / Research Hour	37	58	39	30	31	53	24
# Species / Research Hour	2.7	2.7	3.5	3.5	2.6	3.8	3.5

<b>Date, Conditions</b>	<b>Location within Heil - Geer</b>	<b>Butterfly Activity</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researchers</b>
3/15/2013 18 ° C	Picnic pavilion and roadway			Raven, 21 wild turkeys, junco, crow, white breasted nuthatch. Pine squirrel, 2 Abert's squirrels (black and gray) coyote,	Jan Chu, Pam Piombino, Wynne Whyman, John Barr
3/31/2013 11:00-1:30 p.m. 14 ° C Clear sky, wind 0-20 mph	Near barn, Geer Stream, meadow; roadway from parking lot to cabin		Spring beauties	Steller's jay, chickadee, kestrel, Townsend's solitaire, pygmy nuthatch, mtn bluebirds	Jan Chu, Larry Crowley, Jean Morgan, Pam Piombino; Donn Cook, Cathy Cook

<b>Date, Conditions</b>	<b>Location within Heil - Geer</b>	<b>Butterfly Activity</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researchers</b>
6/10/2013 9:30-1:30 p.m. 20 – 33 ° C, Overcast to clear, wind 0-20 mph	Parking lot along streamlet to gate (1 1/2 hours); Barn, stream, to cliff across hot meadow, return by pine slope	Swallowtails flying fast; pacuvius puddling.	Mouse ears, Boulder raspberry, golden banner, yellow mustard, Penstemon virens.	mourning dove, w. tanager, Am crow, spotted towhee, house wren, br.tailed hummingbird, green-tailed towhee hairy woodpecker w. wood peewee, cordilleran flycatcher, Steller's jay black bill magpie Am robin w. tanager chipping sparrow vesper sparrow dark-eyed junco, black-headed grosbeak, lazuli bunting w. meadowlark pine siskin	Jan Chu, Jean Morgan, Pam Piombino, John Barr, Linda Andes George, Paula Hansley, Joy Master, Cathy Comstock, Anita Rae, Melissa Barton, Sandy Hollingsworth,
7/25/2013 9:30-11:00 a.m. 20°C, High, thin clouds, 5 mph wind.	Drove past barn to dry creek bed, walked in Big Meadow	pegala mating	Prairie clover, chickory, Monarda, bull thistle, Freemont geranium	W. tanager, towhee. full grown Woodhouse's toad	Jan Chu, Jean Morgan
8/4/2013 9:00 – 11:30 a.m. 21-24 ° C 90% clear, wind 0-5 mph	Lichen Trail loop	Previous day had heavy rain and wind. Butterflies few. 3 ft healthy prairie rattlesnake on trail by bridge.		American and lesser goldfinch, Steller's jay, broad tail hummingbird, w. wood pewee, pygmy nuthatch. w. tanager, dark-eyed junco, chipping sparrow, mtn chickadee, mtn bluebird,	Jan Chu, Larry Crowley, Pam, Linda. Public walk with 10 adults and one 6-year old.

Date, Conditions	Location within Heil - Geer	Butterfly Activity	Blossoming Plants	Animals	Researchers
				plumbeous vireo, bl. head. Grosbeak. Dragon fly, lacewing, beetle, locust, prairie rattlesnake.	

Heil – Plumely Canyon	2013	3/14	3/15	3/31	4/22	5/12	6/22	7/19	8/26
<i>Papilio polyxenes</i>	Black Swallowtail								
<i>P. zelicaon</i>	Anise Swallowtail						1		
<i>P. indra</i>	Short-tailed Black Swallowtail								
<i>P. rutulus</i>	Western Tiger Swallowtail						1	1	1
<i>P. eurymedon</i>	Pale Swallowtail						3	2	
<i>P. multicaudata</i>	Two-tailed Swallowtail						2	5	1
yellow swallowtail sp.							4	3	
<i>Neophasia menapia</i>	Pine White								
<i>Pontia protodice</i>	Checkered White							1	
<i>P. sisymbrii</i>	Spring White								
<i>Pieris rapae</i>	Cabbage White						1		8
<i>P. marginalis</i>	Mustard White								
<i>Euchloe ausonides</i>	Large Marble					1			
<i>E. olympia</i>	Olympia Marble								
<i>Anthocharis sara julia</i>	Julia Orangetip								
white sp.						2	5	6	
<i>Colias philodice</i>	Clouded Sulphur							3	
<i>C. eurytheme</i>	Orange Sulphur					15	17+1 *alb	8	6
<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							1	2
sulphur sp.						1		5	
<i>Lycaena dione</i>	Gray Copper								
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak								
<i>C. sheridanii</i>	White-lined Green Hairstreak								

Heil – Plumely Canyon	2013	3/14	3/15	3/31	4/22	5/12	6/22	7/19	8/26
<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								
elfin sp.									
<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						5	4	
<i>Celastrina ladon sidara</i>	Echo Azure					1			
<i>C. humulus</i>	Hops Azure								
<i>Glaucopsyche piasus</i>	Arrowhead Blue						2		
<i>G. lygdamus</i>	Silvery Blue						1		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue						3		
<i>Echinargus isola</i>	Reakirt's Blue								2
<i>Plebejus melissa</i>	Melissa Blue						1		3
<i>P. saepiolus</i>	Greenish Blue								
<i>P. icarioides</i>	Boisduval's Blue						4		
<i>P. lupini lutzi</i>	Lupine Blue								
<i>P. glandon rustica</i>	Arctic Blue								
blue sp.						1	10		5
<i>Danaus plexippus</i>	Monarch								
<i>Euptoieta claudia</i>	Variegated Fritillary						1	2	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary						4	13	32
<i>S. edwardsii</i>	Edwards' Fritillary						1	3	
<i>S. coronis</i>	Coronis Fritillary								
<i>S. callippe</i>	Callippe Fritillary								
<i>S. atlantis</i>	Atlantis Fritillary								
<i>S. hesperis</i>	Northwestern Fritillary							7	
fritillary sp.							12	22	11
<i>Polydryas arachne</i>	Arachne Checkerspot								
<i>Chlosyne gorgone</i>	Gorgone Checkerspot							2	
<i>C. palla</i>	*Northern Checkerspot						3		
<i>Phyciodes pallida</i>	Pale Crescent								
<i>P. tharos</i>	Pearl Crescent								1
<i>P. cocyta</i>	Northern Crescent						1		
<i>P. pulchella</i>	Field Crescent						3	2	3
crescent sp.								1	14

<b>Heil – Plumely Canyon</b>	<b>2013</b>	<b>3/14</b>	<b>3/15</b>	<b>3/31</b>	<b>4/22</b>	<b>5/12</b>	<b>6/22</b>	<b>7/19</b>	<b>8/26</b>
<i>Polygonia interrogationis</i>	Question Mark								
<i>P. gracilis</i>	Hoary Comma	1	5	5	2	6	4	1	
<i>Aglaia milberti</i>	Milbert's Tortoiseshell					1		1	
<i>Nymphalis antiopa</i>	Mourning Cloak	7	15	2	3	4		2	
<i>N. californica</i>	California Tortoiseshell								
<i>Vanessa atalanta</i>	Red Admiral						1	1	
<i>V. cardui</i>	Painted Lady								
<i>V. virginensis</i>	American Lady								
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral						8	3	2
<i>Asterocampa celtis</i>	Hackberry Emperor							1	2
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet						15		
<i>Cercyonis pegala</i>	Common Wood-Nymph							1	
<i>C. oetus</i>	Small Wood-Nymph							1	
<i>Erebia epipsodea</i>	Common Alpine								
<i>Epargyreus clarus</i>	Silver-spotted Skipper						1		
<i>Thorybes pylades</i>	N. Cloudywing						1		
<i>Erynnis pacuvius</i>	Pacuvius Duskywing								
<i>E. afranius</i>	Afranius Duskywing								
<i>E. persius</i>	Persius Duskywing						3		
Duskywing sp.									
<i>Pyrgus communis</i>	Common Checkered-skipper						1		5
<i>Pholisora catullus</i>	Common Sootywing								
<i>Piruna pirus</i>	Russet Skipperling								
<i>Oarisma garita</i>	Garita Skipperling								
<i>Hesperia juba</i>	Juba Skipper								
<i>H. colorado</i>	Western Branded Skipper								38
<i>Polites draco</i>	Draco Skipper								
<i>P. themistocles</i>	Tawny-edged Skipper								
<i>P. mystic</i>	Long Dash							2	
<i>Ochlodes sylvanoides</i>	Woodland Skipper							1	6
<i>Poanes taxiles</i>	Taxiles Skipper							17	
<i>Euphyes vestris</i>	Dun Skipper						3	6	
<i>Atrytonopsis hianna</i>	Dusted skipper							1	

<b>Heil – Plumely Canyon</b>	<b>2013</b>	<b>3/14</b>	<b>3/15</b>	<b>3/31</b>	<b>4/22</b>	<b>5/12</b>	<b>6/22</b>	<b>7/19</b>	<b>8/26</b>
skipper sp.									<b>2</b>

\*alb=albino

<b>Heil Valley-Plumely Canyon</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# of Species Identified Each Year in Plumely Canyon	45	37	44	36	44	41	48
Cumulative # Species 2007-2013 sighted in Plumely Canyon	81	81	82	84	86	88	89
Research Hours on Site	8	13	17	6.5	18	7.5	16
# Individual Butterflies Counted	365	480	401	196	526	342	470
# Individuals / Research Hour	45	36	24	30	29	46	29
# Species / Research Hour	5.6	2.8	2.6	5.5	2.4	5.4	3.0

<b>Date, Conditions</b>	<b>Location within Heil-Plumely</b>	<b>Butterfly Activity</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researchers</b>
3/31	Lichen, Wapiti		One Easter Daisy		John Barr Jean Morgan
2/15/13 10:00 – 2:00 p.m. 17 °C, high overcast sky, wind 0-5 mph.	Picnic pavilion to Quarry at mouth of Plumely	Antiopa flying some; many basking	none	Raven, junco, crow, white breasted nuthatch, 22 wild turkeys. 2 Abert's squirrels – gray and black morph. Pine squirrel. Coyote.	Jan Chu, John Barr, Whynne Wyman, Pam Piombino
4/22/13 10:00 a.m.- 1:15 p.m. 16-17 °C, wind 5-10 mph, clear sky – 90% cloudy	Gate off road to first stream crossing at mouth of Plumely	Few butterflies just flew short distances ahead of us.	Few Filary, some dandelions	Raven, junco, white br nuthatch, robin, flicker.	Jan Chu, Larry Crowley, Ron Butler
5/12/13 10:00-1:00 p.m. 18-24 °C, 50% cloudy to all cloudy many times. 0-10 mph wind	Second locked gate to stone cabin meadow	Butterflies at seep half way up trail. Red sandstone and plum blossoms there	Mahonia, Filary, dandelions, little yellow and white mustards, winter cress, rock jasmine, spring beauty, golden smoke, Mertensia, willow, plum, Nuttall's violet sand lily, Canada violet	Turkey vulture, crow, 2-golden eagles, raven, robin, chipping sparrow, broad tailed hummingbird, spotted towhee, canyon wren. 3- Sceloporus fence lizards	Jan Chu, Larry Crowley, Amy Chu

Date, Conditions	Location within Heil-Plumely	Butterfly Activity	Blossoming Plants	Animals	Researchers
6/22/2013 9:30-2:45 p.m. 20 °C Clear sky to 60% cloudy, 0-10 mph wind	Second locked gate to stone cabin and ravine beside it	Ceanothus used as nectar source today for Aphrodite, field crescent, Red admiral, N. checkerspot, n. crescent. Butterflies nectaring on sap of river birch. Orange sulfur ovipositing on vetch.	Ceanothus, bindweed, lupine, sweet clover, Heterotheca, Salsify, globe mallow, scarlet, Erigeron, Penstemon, Fr. Geranium, sulfur-flower, yucca, campanula, spiderwort, Gaillardia, rose	W. wood pewee, Am. Goldfinch, robin, crow, cordilleran flycatcher, spotted towhee, flicker, raven, w. tanager, Steller's jay. Toad.	Jan Chu, Larry Crowley, Jean Morgan, Wynne Whyman
7/19/2013 10:00-12:00 p.m. 21 °C, 40% cloudy to clear, 0-5 mph wind	Second locked gate to stone cabin	Aphrodite nectaring on alfalfa and Monarda, Edward's fritillary nectaring on Rudbeckia		Rock wren, lazuli bunting.	Jan Chu, Jean Morgan, Amy Chu, Venice Kelly, John Barr
8/26/2013 9:30 - 12:30 p.m. 23 °C 90% clear no wind	Second locked gate to second stream crossing	Puddle party in the last remaining moisture. Blue fall asters used for nectar.	Snakeweed, Liatris, Heterotheca, yellow composite, Solidago, gumweed, white daisies, blue fall aster	Steller's jay, vesper sparrow, chickadee, rufous hummingbird. Golden mantle ground squirrel	Jan Chu, Jean Morgan, Venice Kelly, Chuck Lowry, Wynne Whyman

Heil Valley – North – Red Hill, Red Gulch, North Point	2013	4/28	6/20	7/11	8/15
<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		2		1
<i>P. eurymedon</i>	Pale Swallowtail		1		1
<i>P. multicaudata</i>	Two-tailed Swallowtail		1	3	7
yellow swallowtail			5	1	1
<i>Neophasia menapia</i>	Pine White				
<i>Pontia protodice</i>	Checkered White				
<i>P. occidentalis</i>	Western White				



Heil Valley – North – Red Hill, Red Gulch, North Point	2013	4/28	6/20	7/11	8/15
<i>P. sisymbrii</i>	Spring White				
<i>Pieris rapae</i>	Cabbage White			3	40
white sp.		3	6		
<i>Euchloe ausonides</i>	Large Marble				
<i>E. olympia</i>	Olympia Marble				
<i>Anthocharis sara julia</i>	Julia Orangetip				
<i>Colias philodice</i>	Clouded Sulphur	2	1 +1 alb	1	
sulphur sp.		12	8	4	
<i>C. eurytheme</i>	Orange Sulphur	25	11	7	15
<i>C. alexandra</i>	Queen Alexandra's Sulphur				
<i>Nathalis iole</i>	Dainty Sulphur				8
sulphur sp.			8		
<i>Lycaena dione</i>	Gray Copper				
<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				
<i>Satyrrium behrii</i>	Behr's Hairstreak				
<i>S. titus</i>	Coral Hairstreak				
<i>Strymon melinus</i>	Gray Hairstreak				3
<i>Leptotes marina</i>	Marine Blue				
<i>Cupido amyntula</i>	Western Tailed-blue				
<i>Celastrina ladon sidara</i>	Echo (Spring) Azure				
<i>Glaucopsyche piasus</i>	Arrowhead Blue		1		
<i>G. lygdamus</i>	Silvery Blue		1		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-blue				
<i>Echinargus isola</i>	Reakirt's Blue		3		3
<i>Plebejus melissa</i>	Melissa Blue			1	10
<i>P. icarioides</i>	Boisduval's Blue		13		
<i>P. lupini lutzi</i>	Lupine Blue				
<i>P. glandon rustica</i>	Arctic Blue				
blue sp.			2		10
<i>Danaus plexippus</i>	Monarch				1
<i>Libytheana carinenta</i>	American Snout				
<i>Euptoieta claudia</i>	Variegated Fritillary			12	10
<i>Speyeria aphrodite</i>	Aphrodite Fritillary		5	1	17
<i>S. edwardsii</i>	Edwards' Fritillary			2	2
<i>S. coronis</i>	Coronis Fritillary				
<i>S. callippe</i>	Callippe Fritillary				
<i>S. mormonia</i>	Mormon Fritillary				
fritillary sp.			16	14	7
<i>Chlosyne gorgone</i>	Gorgone Checkerspot				
<i>C. nycteis</i>	Silvery Checkerspot				
<i>C. palla</i>	Northern Checkerspot				
<i>Phyciodes pallida</i>	Pale Crescent				
<i>P. tharos</i>	Pearl Crescent				
	Northern Crescent				
	Field Crescent		2		13

<b>Heil Valley – North – Red Hill, Red Gulch, North Point</b>	<b>2013</b>	<b>4/28</b>	<b>6/20</b>	<b>7/11</b>	<b>8/15</b>
	Satyr Comma				
	Hoary Comma	3			
	Mourning Cloak				
	Buckeye, Common				5
	California Tortoiseshell				
	Red Admiral				
	Milbert's Tortoiseshell				
	Painted Lady				
	American Lady		1		
	Weidemeyer's Admiral		2	1	2
	Hackberry Emperor			1	5
	Ochre (Common) Ringlet		18		
	Common Wood-Nymph				7
	Small Wood-Nymph				
	Common Alpine			1	
	Silver-spotted Skipper				
	Afranius Duskywing				
	Persius Duskywing				
	Common Checkered-skipper		4		15
	Common Sootywing				
	Russet Skipperling				
	Garita Skipperling				
	Juba Skipper				
	Pahaska Skipper		3		
	Green Skipper				
	Nevada Skipper				
	Tawny-Edged Skipper				
	Long Dash				
	Arogos Skipper				
	Woodland Skipper				6
	Taxiles Skipper				
	Dun Skipper				
	Dusted Skipper				

<b>Heil Valley-North Point, Red Hill, Red Gulch</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# of Species Identified During Each Year in Heil-North	30	24	34	45	41	40	33	24	30
Cumulative # Species 2007- 2013 Sighted in Heil-North			53	67	77	81	81	85	86
Research Hours on Site	3	6	11	17	12.5	11.5	11.5	6.5	12
# Individual Butterflies Counted	194	216	579	654	488	429	272	188	402
# Individuals / Research Hour	64	31	52	38	39	37	24	29	36
# Species / Research Hour			4.3	2.6	3.3	3.5	2.9	3.6	2.5

Date, Conditions	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
4/28/2013 11:15-1:30 p.m. 22 °C 40% cloudy 0-30 mph wind.	From car at parking site to the upper pond. Wind too strong.	Orange sulphur nectaring on dandelion.	Dandelion, Filary, Nuttall's violet, candy tuft, mustard, little yellow, blue woodland violet, golden pea – small, sand lilies	Spotted towhee, canyon wren	Jan Chu, Larry Crowley, Jean Morgan, Chuck Lowrie
6/20/2013 10:05 – 2:20 p.m. 23-25 °C Sky blue, no clouds, smoke from fire, wind 0-10 mph	Meadow above Marietta, Red Hill and saddle	Fritillaries nectaring on Hymenopappus; Boisduval's blues flying in lupines; skippers in hot high meadow	Physaria belli in young seed heads. Hymenopappus blossoms widespread and numerous. Hymenopappus Arnica, bindweed, Erigeron, flax Fr. geranium Gaillardia Gaura, harebell Lambert's loco larkspur, lupine mallow, scarlet globe milk vetch mouse ear mtn parsley Penstemon virens, prickly pear cactus prickly poppy Salsify, sego lily, Senecio sp. stonecrop, toad flax, wallflower yarrow, yucca	Pygmy nuthatch, crow, w. wood pewee, robin, w. tanager, flicker, chipping sparrow (nest with one egg on ground), cordilleran flycatcher, meadowlark, song sparrow, spotted towhee, Am. goldfinch, yel.br. chat, broad tailed hummingbird blue-gray gnatcatcher, raven. Garter snake swimming across frog pond.	Jan Chu, Larry Crowley, Bea Butler, Richard Holmes
7/11/2013 9:00-11:30 a.m. 23 – 34°C clear sky, wind 0-5 mph	Near hilltop above the highest retaining pond which was dry. Lower pond had water.	Fritillaries nectaring on Senecio and flying around the Skunkbush trifolium sumac. VERY dry	Alfalfa, coneflower goldenrod flax, toad flax Geranium, Fr. Geranium Rich. prickly poppy, prairie clover, rose, Senecio, sunflower,	Wood pewee, chat, spotted towhee, wh.br.nuthatch, Am. goldfinch, canyon wren. Young striped chorus frogs <i>Pseudacris triseriata</i>	Jan Chu, Larry Crowley

Date, Conditions	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
8/15/2013 9:15 – 12:30 p.m.	Red Gulch behind Ron La Follette's home to a cliff in the stream with slight moisture	Great deal of nectaring: Field crescent, common checkered skipper, dainty sulfur on Heterotheca; two-tailed swallowtail on prickly pear; Aphrodite fritillary on bull thistle; Gray hairstreak on Fremont geranium, Weidemeyer's on catnip.	bull thistle catnip chickory coneflower geranium Fremont's, goldenrod harebell Heterotheca mullein prairie blazing star, prickly poppy St. John's wort sunflower toad flax wild lettuce	Sceloporus	Jan Chu, Larry Crowley, Jean Morgan, Richard Holmes

Walker Ranch, Meyer's Homestead Trail	2013	5/13	6/14	7/14	7/16	8/22
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian		1	27	16	
<i>Papilio polyxenes</i>	Black Swallowtail					
<i>P. zelicaon</i>	Anise Swallowtail					
<i>P. indra</i>	Indra Swallowtail			1		
<i>P. rutulus</i>	Western Tiger Swallowtail			7		
<i>P. eurymedon</i>	Pale Swallowtail		6	3	1	
<i>P. multicaudata</i>	Two-tailed Swallowtail		1	1	3	
<i>Neophasia menapia</i>	Pine White					
<i>Pontia protodice</i>	Checkered White					1
<i>P. sisymbrii</i>	Spring White	1				
<i>Pieris rapae</i>	Cabbage White			3	9	
white sp.		1	3			
<i>Euchloe ausonides</i>	Large Marble		2			
<i>Anthocharis sara julia</i>	Julia Orangetip					
<i>Colias philodice</i>	Clouded Sulphur					
<i>C. eurytheme</i>	Orange Sulphur				8	2
<i>C. alexandra</i>	Queen Alexandra's Sulphur			1	1	
<i>Nathalis iole</i>	Dainty Sulphur				1	1
<i>Lycaena heteronea</i>	Blue Copper			3	6	
<i>Satyrrium saepium</i>	Hedgerow Hairstreak			1	2	

Walker Ranch, Meyer's Homestead Trail	2013	5/13	6/14	7/14	7/16	8/22
<i>Callophrys affinis</i>	Canyon Bramble Hairstreak		7	4	6	
<i>C. sheridanii</i>	White-line Green Hairstreak					
<i>C. gyrneus siva</i>	Siva Juniper Hairstreak					
<i>C. spinetorum</i>	Thicket Hairstreak					
<i>C. augustinus</i>	Brown Elfin					
<i>C. polios</i>	Hoary Elfin		2			
<i>C. eryphon</i>	Western Pine Elfin					
<i>Strymon melinus</i>	Gray Hairstreak				1	1
<i>Cupido amyntula</i>	Western Tailed-Blue					
<i>Celestrina ladon sidara</i>	Echo Azure	1				
<i>Glaucopsyche piasus</i>	Arrowhead Blue					
<i>G. lygdamus</i>	Silvery Blue		1			
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue		12	30	5	
<i>Echinargus isola</i>	Reakirt's Blue		2			2
<i>Plebejus melissa</i>	Melissa Blue					2
<i>P. saepiolus</i>	Greenish Blue					
<i>P. icarioides</i>	Boisduval's Blue			13	3	
<i>P. lupini lutzi</i>	Lupine Blue					1
blue sp.					3	
<i>Danaus plexippus</i>	Monarch					
<i>Apodemia nais</i>	Nais Metalmark			5	1	
<i>Euptoieta claudia</i>	Variegated Fritillary					
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			4		
<i>S. edwardsii</i>	Edwards' Fritillary			5	1	
<i>S. callippe</i>	Callippe Fritillary					
<i>S. hesperis</i>	Northwestern Fritillary			3	4	
<i>S. mormonia</i>	Mormon Fritillary					
fritillary sp.				25	9	3
<i>Chlosyne gorgone</i>	Gorgone Checkerspot			2		
<i>C. nycteis</i>	Silvery Checkerspot				5	
<i>C. palla</i>	Northern Checkerspot				5	
<i>Phyciodes cocyta</i>	Northern Crescent			5	3	
<i>P. pulchella</i>	Field Crescent			1		
<i>Phyciodes pallida</i>	Pale Crescent			5	2	
<i>Euphydryas anicia</i>	Variable Checkerspot			4	5	
<i>Polygonia gracilis</i>	Hoary Comma	3		3	3	
<i>Aglaia milberti</i>	Milbert's Tortoiseshell		1+cat			
<i>Nymphalis antiopa</i>	Mourning Cloak			3	1	
<i>N. californica</i>	California Tortoiseshell			1		
<i>Vanessa atalanta</i>	Red Admirable			1	1	
<i>V. cardui</i>	Painted Lady				3	
<i>V. virginiensis</i>	American Lady			1		
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			1	2	
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet		15	2	1	
<i>Cercyonis pegala</i>	Common Wood Nymph					3

Walker Ranch, Meyer's Homestead Trail	2013	5/13	6/14	7/14	7/16	8/22
<i>C. oetus</i>	Small Wood Nymph			2	12	
<i>Erebia epipsodea</i>	Common Alpine		2			
<i>Oeneis chryxus</i>	Chryxus Arctic					
<i>O. uhleri</i>	Uhler's Arctic					
<i>Erynnis icelus</i>	Dreamy Duskywing					
<i>E. pacuvius</i>	Pacuvius Duskywing					
<i>E. persius</i>	Persius Duskywing		5	1		
<i>Pyrgus communis</i>	Common Checkered-skipper					4
<i>Piruna pirus</i>	Russet Skipperling			2	3	
<i>Oarisma garita</i>	Garita Skipperling					
<i>Hesperia juba</i>	Juba Skipper					
<i>H. colorado</i>	Western Branded Skipper					
<i>Polites themistocles</i>	Tawny-edged Skipper					
<i>P. mystic</i>	Long Dash					
<i>Ochlodes sylvanoides</i>	Woodland Skipper					
<i>Poanes taxiles</i>	Taxiles Skipper			4	2	
<i>Euphyes vestris</i>	Dun Skipper			3	4	
skipper sp.				2	1	

Walker Ranch, Meyer's Homestead Trail	2007	2008	2009	2010	2011	2012	2013
# Species Identified during 2013 in 'Meyer's	30	35	45	35	50	47	62
# Species Sighted in 'Meyer's 2007-2013	33*	38	60	70	72	75	75
# Research Hours on Site	5	4	18	16	16.5	7	14.5
# Individual Butterflies Counted	160	203	1144	437	472	399	394
# Individuals / Research Hour	32	54	64	27	29	57	27
# Species / Research Hour	6.0	8.8	2.5	2.2	3.0	6.7	4.3

Date Conditions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	Researchers
5/13/2013 10:30 – 1:00 p.m. 20 - 25 °C Wind 0-5 mph, high clouds to 90% cloudy	Meyer's Homestead Trail to 1 <sup>st</sup> high rocky point for lunch.	Very little flight.		magpie, robin, chipping sparrow, mtn. bluebird, western bluebird, green-tailed towhee, house wren, hairy woodpecker, n. flicker, pygmy nuthatch, turkey vulture, crow, raven, vesper sparrow, house finch, broad tail hummingbird, mockingbird.	Jan Chu, Pam Piombino, Bea Butler

<b>Date Conditions</b>	<b>Location Walker</b>	<b>Butterfly Behavior</b>	<b>Blooming Plants</b>	<b>Animals</b>	<b>Researchers</b>
6/14/2013 9:30 a.m.- 1:30 p.m. 20 °C Wind 0-25 mph, 30-65% clouds	Meyer's Homestead Trail to barn, to Trail. Stopped near kinnikinnick patches for lunch	Swallowtails flying high. Bramble hairstreak on roadway. Dozens of Milbert's tortoiseshell caterpillars on stinging nettles by barn.	Many iris in moist depressions. Sand lily	Mtn bluebird, cordillerian flycatcher, spotted towhee. Striped chorus frog.	Jan Chu, Jean Morgan, Venice Kelly, Larry Colbenson and Volunteer Naturalists
7/14/2013 9:00- 12:15 p.m. 16- 22 °C wind 0-5 mph 40% clear	Meyer's Homestead Trail to barn, to blackberry bushes on ridge. Few damp places where many were 'puddling.'	Boisduval's nectaring on Fremont's geranium; Edward's fritillary on dogbane; variable checkerspot 2 pair mating; red admiral laying eggs on thistle		Red-tailed Hawk, Broad-tailed Hummingbird (lots) Hairy Woodpecker (one) No. Flicker, W. Wood-Pewee Cordilleran Flycatcher Violet-green Swallow Steller's Jay, Black-billed Magpie, Am. Crow Common Raven Mountain Chickadee Red-breasted Nuthatch White-breasted Nuthatch House Wren Western Bluebird, Mountain Bluebird, Townsend's Solitaire American Robin Plumbeous Vireo Warbling Vireo Virginia's Warbler MacGillivray's Warbler Western Tanager Black-headed Grosbeak Lazuli Bunting Green-tailed Towhee (several) Chipping Sparrow, Vesper Sparrow, Song Sparrow Gray-headed Junco Brown-headed Cowbird House Finch, Red Crossbill Pine Siskin, Lesser Goldfinch Species: 37 Pine squirrel.	Paula Hansley, Janet Chu, Amy Chu, Joy Farquahar, Richard Pautsch, Boulder Bird Club

Date Conditions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	Researcher s
7/16/2013 9:00-1:45 p.m. 16-21 °C wind 5 mph, 98% clear sky	Meyer's Homestead Trail to old barn, to blackberry bushes on ridge. Fewer damp places on the roadway for puddling.	Nectaring: two-tailed swallowtail on bull thistle; dun skipper on Monarda; Parnassian on Heterotheca; variable checkerspot on dogbane; dotted blue and Weidemeyer 's admiral on sulfur flower; hedgerow hairstreak on white yarrow; Gray and hedgerow hairstreaks on Ceanothus .	bedstraw black-eyed Susan Ceanothus fendleri chickory clover, red cow parsnip dogbane Erigeron sp. fireweed Gaillardia geranium, Fremont geranium Richardson's, Gilia globe flower gumweed hawkweed Heterotheca Lambert's loco lily, mariposa lupine Mertensia Monarda mullein Oenothera, yellow paintbrush, red Penstemon, Potentilla rose, wild Senecio skullcap Soldago stonecrop sulfur-flower Thistle, bull yarrow	Red-tailed Hawk, Broad- tailed Hummingbird, No. Flicker, W. Wood-Pewee, Steller's Jay, Am. Crow Common Raven, Turkey Vulture, Mountain Chickadee White-breasted Nuthatch, Pygmy Nuthatch, American Robin Lazuli Bunting Chipping Sparrow, Song Sparrow	Jan Chu, Larry Crowley, Jean Morgan, Amy Chu



Date Conditions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	Researchers
8/22/2013 9:15 -12:45 p.m. 15 -21 °C overall clouds with broken blue sky ¼ of the time	Meyer's Homestead trail to berry bramble on hill crest	Gray hairstreak nectaring on mullein	aster, blue tall aster, shorter Ceanothus chickory clover, red daisy, white fleabane flax gayfeather Gilia, white 'grass' fuchsia-eyed harebell knapweed lupine, white Monarda primrose, evening rose thistle, Canada	house wren chickadee flicker goldfinch house finch hummingbird broad tail, nuthatch pygmy, nuthatch white breasted, wood pewee sparrow, chipping swallow v. green swift tanager, w. golden mantle chipmunk pine squirrel	Jan Chu, Jean Morgan, Chuck Lowry, Wynne Whyman

Hall II	2013	5/7 2013	5/28 2013	7/26 2013	8/27 2013
<i>P. rutulus</i>	Western Tiger Swallowtail			2	
<i>P. multicaudata</i>	Two-tailed Swallowtail		2	3	
<i>Pontia protodice</i>	Checkered White			1	1
<i>P. sisymbrii</i>	Spring White	1			
<i>Pieris rapae</i>	Cabbage White			9	7
white sp.		10	10		6
<i>Euchloe ausonides</i>	Large Marble	1	2		
<i>Colias philodice</i>	Clouded Sulphur		1	3	
<i>C. philodice alba form</i>	Sulphur female			1	
<i>C. eurytheme</i>	Orange Sulphur	1	1	16	21
sulphur sp.		15	3		
<i>C. mossii</i>	Moss Elfin	5 ph			
<i>Cupido amyntula</i>	Western Tailed-blue		11		
<i>G. lygdamus</i>	Silvery Blue		1		
<i>Plebejus melissa</i>	Melissa Blue			5	5
<i>P. glandon rustica</i>	Arctic Blue			2	
blue sp.			10	2	2
<i>Euptoieta claudia</i>	Variegated Fritillary			9	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary				7
<i>S. hesperis</i>	Northwestern Fritillary			1	
<i>S. mormonia</i>	Mormon Fritillary				
fritillary species			1	24	7
<i>P. pulchella</i>	Field Crescent		5		11

Hall II	2013	5/7 2013	5/28 2013	7/26 2013	8/27 2013
crescent species			1	1	
<i>P. gracilis</i>	Hoary Comma		1		
<i>Nymphalis antiopa</i>	Mourning Cloak		2		
<i>Vanessa atalanta</i>	Red Admiral			3	
<i>V. cardui</i>	Painted Lady			1	
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			1	1
<i>Asterocampa celtis</i>	Hackberry Emperor			1	1
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet		1		
<i>Cercyonis pegala</i>	Common Wood-Nymph			25	1
<i>Pyrgus communis</i>	Common Checkered-skipper		3	6	5
<i>Pholisora catullus</i>	Common Sootywing			3	
* <i>H. colorado</i>	W. Branded Skipper				21
<i>Ochlodes sylvanoides</i>	Woodland Skipper			1	8
<i>Atrytonopsis hianna</i>	Dusted Skipper		2		
skipper sp.				1	4

Hall II	2013	2014
# of Species Identified During Each Year in Hall II	31	
Cumulative Species 2013- Sighted in Hall II	31	
Research Hours on Site	15	
# Individual Butterflies Counted	319	
# Individuals / Research Hour	21	
# Species / Research Hour	2.1	

Date, Conditions	Location Hall 2	Butterfly Behavior	Blossoming Plants	Animals	Researchers
5/7/2013 9:00 – 1:00 p.m. 11 – 18 °C; 50 % sunny to overcast repeatedly, wind 0-5 mph	Parking area, thru 'carcass crossing' to confluence	Mossii nectaring on Lomatium orientale (salt-and-pepper); flying low near ground; other butterflies flying freely	Physaria belli in full bloom in upper old roadway. Few sand lilies, Nuttall's violets, Mahonia. Plums not in bud.	Kestrel, canyon wren, gnatcatcher building nest in juniper tree. Emerald wasp. spiky Buck Moth Hemileuca eglanderina caterpillar, ph.	Jan Chu, Michelle Durant, Susan Spaulding

Date, Conditions	Location Hall 2	Butterfly Behavior	Blossoming Plants	Animals	Researcher s
5/28/2013 10:10 a.m. – 3:10 p.m. 16-23 °C; 40 % blue sky, wind 0- 10 mph	Parking thru carcass crossing to near confluence	Mourning cloak nectaring on Boulder raspberry	vetch, milk Arnica sp.w/ ‘lance-leaf’ choke cherry currant dandelion dandelion, curly leaf Death camus Erigeron sp. Filary flax Gaura, Geranium Fremont’s Geranium Richardson’s, vetch, milk globe mallow golden banner golden smoke hawthorn Hydrophyllum Lambert’s loco larkspur Mertensia mouse-ear Mtn. mahogany onion, Geyer’s parsley, wild pea vine, pink Penstemon virens penstemon, one- sided Physaria sp. Potentilla primrose, white evening puccoon raspberry, Boulder Salsify sand lily Senecio shooting star skull cap skunk bush spiderwort stone crop sulfur-flower	hummingbird br.tailed, dove, mourning gnatcatcher, blue-gray goldfinch, Am goldfinch, lesser grosbeak, black-headed hawk, red-tail lazuli bunting magpie oriole, Bullock’s swift, white throated. towhee, rufous-sided towhee, green-tail warbler, yellow warbling vireo wren, house wren, canyon	Jan Chu, Larry Crowley, Jean Morgan, John Barr, Pam Piombino

<b>Date, Conditions</b>	<b>Location Hall 2</b>	<b>Butterfly Behavior</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researcher s</b>
7/26/2013 9:10 a.m. – 12:40 p.m. 20-24°C; 100% clear to cloudy at 12:30; wind 0-5 mph	Parking thru stream basin, meadows, to roads end by slanted vertical cliff, then return	Red admirable and pegala nectaring on catnip; puddling, flying; sootywing puddling with orange sulfurs in the muddy silt of the quarry.	Richardson's and Freemont geranium, gumweed, Solidago, Monarda, snowberry	dove mourning blue-gray gnatcatcher, Am goldfinch, lesser goldfinch, grosbeak, black-headed hawk red-tail lazuli bunting magpie oriole, bullock's swift, white thr towhee rufous- sided warbler, yel , towhee, green- tail warbling vireo wren, canyon wren, house wren, rock yel.br. chat. Toads (two) Woodhouse's, Mud-dabber wasps digging in mud	Jan Chu, Larry Crowley, Jean Morgan, Richard Holmes

Date, Conditions	Location Hall 2	Butterfly Behavior	Blossoming Plants	Animals	Researchers
8/27/2013 9:30 – 1:00 p.m. 22- 28 °C , clear, wind 0-5 mph	Parking thru 'Carcass Crossing' along old 'roadway' to rocky cliff to the right near stream.	Cabbage white and fritillaries nectaring on rabbit brush and also gay feather.	Rabbit brush, gay feather, prickly poppy, gumweed, wild lettuce, Erigeron white, flax, snakeweed, white knapweed, Solidago, Fremont's geranium, bouncing bet	Violet-green swallow, Am. & lesser goldfinch, robin, Am blue jay, spotted towhee, w. wood pewee, downy woodpecker, bl. cap chickadee, mourning dove, wh. br. nuthatch, canyon wren, house wren. Rattlesnake Crotalis viridis, Woodhouse's toad – adult and juvenile. Bear paw print with choke-cherry seed scats	Jan Chu Larry Crowley, Jean Morgan, Chuck Lowry

Reynold's Ranch	2013	6/3	6/13	6/23	6/27	7/16	8/5
<i>Parnassius smintheus</i>	Parnassian, Rocky Mtn.		2	1	3	2	
<i>Papilio polyxenes</i>	Black Swallowtail						
<i>P. zelicaon</i>	Anise Swallowtail			1			
<i>P. rutulus</i>	W. Tiger Swallowtail		7	2	4	7	
<i>P. eurymedon</i>	Pale Swallowtail			1			
<i>P. multicaudata</i>	Two-tailed Swallowtail				2		
<i>Neophasia menapia</i>	Pine White						
<i>Pieris rapae</i>	Cabbage White				2		2
<i>Pontia protodice</i>	Checkered White			1	1		
white sp.			2		5	2	
<i>Euchloe ausonides</i>	Large Marble				4		
<i>Colias philodice</i>	Clouded Sulphur			3			1
<i>C. eurytheme</i>	Orange Sulphur		3		3	3	1
<i>C. alexandra</i>	Queen Alexandra's Sulphur		34		13	34	6
sulphur sp.					1		
<i>Lycaena rubidus</i>	Ruddy Copper						
<i>L. helloides</i>	Purplish Copper						
<i>Callophrys spinetorum</i>	Thicket Hairstreak						
<i>Strymon melinus</i>	Gray Hairstreak		1			1	

Reynold's Ranch	2013	6/3	6/13	6/23	6/27	7/16	8/5
<i>Celastrina ladon sidara</i>	Echo (Spring) Azure						
<i>Glaucopsyche lygdamus</i>	Silvery Blue			1			
<i>Echinargus isola</i>	Reakirt's Blue		1	1	5	1	1
<i>Plebejus melissa</i>	Melissa Blue				1f		
<i>Euphilotes ancilla</i>	R Mtn Dotted Blue						
<i>Plebejus saepiolus</i>	Greenish Blue		1			1	
<i>Glaucopsyche piasus</i>	Arrowhead Blue						
<i>P. icarioides</i>	Boisduval's Blue		2			2	
<i>P. glandon rustica</i>	Arctic Blue						1ph
<i>Danaus plexippus</i>	Monarch						
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			1			
blue sp.					11		
<i>Euptoieta claudia</i>	Variegated Fritillary		1			1	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary						
<i>S. edwardsii</i>	Edwards' Fritillary					1	
<i>S. coronis</i>	Coronis Fritillary						
<i>S. callippe</i>	Callippe Fritillary						1
<i>S. hesperis</i>	Northwestern Fritillary						
<i>S. mormonia</i>	Mormon Fritillary		2			2	
<i>Boloria selene</i>	Silver-bordered Fritillary			1			
fritillary sp.			4		6	4	4
<i>Chlosyne palla</i>	Northern Checkerspot				2		
<i>Phyciodes pallida</i>	Pale Crescent						
<i>P. tharos</i>	Pearl Crescent		1			1	
<i>P. cocyta</i>	Northern Crescent		5		2	5	
<i>P. pulchella</i>	Field Crescent			1	9		
crescent sp.			1			1	
<i>Polygonia gracilis</i>	Hoary Comma		2			2	
<i>Vanessa virginiensis</i>	American Lady						
<i>Vanessa cardui</i>	Painted Lady						
<i>Nymphalis antiopa</i>	Mourning Cloak						
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet		6	15	36	6	
<i>Cercyonis oetus</i>	Small Wood Nymph						19
<i>Erebia epipsodea</i>	Common Alpine		6	9	17	6	
<i>Oeneis chryxus</i>	Chryxus Arctic						
<i>Erynnis persius</i>	Persius Duskywing		1	2	2	1	
<i>Oarisma garita</i>	Garita Skipperling						
<i>Hesperia colorado</i>	W. Branded Skipper						
<i>Polites draco</i>	Draco Skipper				2	1	1
<i>Ochlodes sylvanoides</i>	Woodland Skipper					2	
<i>Pyrgus communis</i>	Common Checkered- Skipper				1		1
<i>Euphyes vestris</i>	Dun Skipper						
skipper sp.					2		

<b>Reynold's Ranch, Giggey and North Bog</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# Species Identified during 2013 in Reynold's	32	46	36
# Species Sighted in Reynold's 2011-2013	35	55	55
# Research Hours on Site	13	11.5	10.5
# Individual Butterflies Counted	541	635	395
# Individuals / Research Hour	41.6	55	37.6
# Species / Research Hour	2.5	4	3.4

<b>Date, Conditions</b>	<b>Location within Reynold's Ranch</b>	<b>Butterfly Behavior</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researchers</b>
6/3/2013 10:00- 12:00 p.m. 20° C 50% clouds, haze, 0-35 mph wind	Giggey Pond was flooded. Walked mostly in pine forest to the east. (clear- cut)	None sighted	Bistort, dandelion, pussy toes, candytuft, chickweed buttercup, broom parsley, Erigeron, kinnikinnick, golden smoke, Mertensia, strawberry	Mtn bluebirds, red- tail hawks scolding from their nest site west of the pond; flycatcher sp. swallow sp. redwing blackbird, Steller's jay, hairy woodpecker. Coyote, cottontail. Cricket frog	Jan Chu, Larry Crowley, Thomas and Cole Chu
6/13/2013 10:30- 12:00 p.m. 18 °C Clear sky with few puffy clouds	North Reynold's Bog				Venice Kelly, Jeff Maclachlan
6/23/2013 9:50 – 11:10 a.m. 17° C quite breezy. but the sky was clear and sunny	Giggey Pond; With a riot of colors	Greenish-blue laying eggs on red clover.			Venice Kelly, Jeff Maclachlan

<b>Date, Conditions</b>	<b>Location within Reynold's Ranch</b>	<b>Butterfly Behavior</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>Researchers</b>
6/27/2013 9:30-12:30 p.m. 24-27 °C. Sky 95% clear, some moving clouds. Wind 5-25 mph.	North Reynold's Bog to Nat'l Forest fence, return along w. ecotone.	Fritillaries and blues flying fast Field crescent nectaring on Erigeron. Iris, Arnica, bistort outstanding bloom.	Arnica bistort buttercup chickweed dandelion Erigeron Gaillardia Geyer's onion golden banner grass, blue-eyed Indian paintbrush, yellow and red iris Lambert's loco Mertensia milk vetch mustard, tower parsley broom Pedicularis, Penstemon, virens Potentilla Pussytoes, white & & pink Salsify saxifrage shepherd's purse shooting star stonecrop sulfur-flower wallflower Yarrow	b.t.hummingbird, Steller's jay, chipping sparrow, hairy woodpecker, turkey vulture, house wren, magpie, raven	Jan Chu, Larry Crowley, Jean Morgan, Venice Kelly
7/16/2013 10:30- 12:00 p.m. 18 °C 95% blue sky	North Reynold's. Many flowers, very wet	Greenish blue ovipositing on red clover			Venice Kelly, Jeff Maclachlan
8/5/2013 9:15-10:35 a.m. 18 – 20 °C	North Reynold's Bog to Nat'l Forest fence and return by western forest				Jan Chu, Venice Kelly



<b>Caribou, Mud Lake</b>	<b>2013</b>	<b>7/2</b>	<b>7/30</b>	<b>8/2</b>
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian	20		7
<i>Papilio polyxenes</i>	Black Swallowtail			
<i>P. zelicaon</i>	Anise Swallowtail	4		
<i>P. rutulus</i>	W. Tiger Swallowtail	3	1	
<i>P. eurymedon</i>	Pale Swallowtail			
<i>*P. multicaudata</i>	Two-tailed Swallowtail	1	2	
swallowtail sp.			2	
<i>Neophasia menapia</i>	Pine White			
<i>Pontia protodice</i>	Checkered White			
<i>P. occidentalis</i>	Western White		1	
<i>Pieris rapae</i>	Cabbage White			
<i>P. marginalis</i>	Mustard White		8	
<i>Euchloe ausonides</i>	Large Marble			
<i>Anthocharis sara julia</i>	Julia Orangetip			
white sp.		2	3	1
<i>Colias philodice</i>	Clouded Sulphur			
<i>C. eurytheme</i>	Orange Sulphur		1	3
<i>C. alexandra</i>	Queen Alexandra's Sulphur	27	15	25
sulphur sp.				3
<i>Eurema mexicana</i>	Mexican Sulphur			
<i>Abaeis nicippe</i>	Sleepy Orange			
<i>Nathalis iole</i>	Dainty Sulphur			1
<i>Lycaena rubidus</i>	Ruddy Copper			
<i>L. heteronea</i>	Blue Copper		1	
<i>L. helloides</i>	Purplish Copper		1	2
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak			
<i>C. sheridanii</i>	White-lined Green Hairstreak			
<i>C. spinetorum</i>	Thicket Hairstreak			
<i>C. augustinus</i>	Brown Elfin			
<i>C. polios</i>	Hoary Elfin			
<i>C. eryphon</i>	Western Pine Elfin			
<i>Satyrium saepium</i>	Hedgerow Hairstreak			
<i>Strymon melinus</i>	Gray Hairstreak			1
<i>Cupido amyntula</i>	Western Tailed-Blue			
<i>Celastrina ladon sidara</i>	Echo (Spring) Azure			
<i>Glaucopsyche piasus</i>	Arrowhead Blue			
<i>G. lygdamus</i>	Silvery Blue	1		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue	4		
<i>Echinargus isola</i>	Reakirt's Blue	4	1	2
<i>Plebejus melissa</i>	Melissa Blue	1		
<i>P. saepiolus</i>	Greenish Blue			
<i>P. icarioides</i>	Boisduval's Blue	8	3	2
<i>P. lupini lutzi</i>	Lupine Blue	9		
<i>P. glandon rustica</i>	Arctic Blue	4		
Blue sp.		3	4	1
<i>Euptoieta claudia</i>	Variegated Fritillary			4
<i>Speyeria aphrodite</i>	Aphrodite Fritillary		2	
<i>S. edwardsii</i>	Edwards' Fritillary			
<i>S. coronis</i>	Coronis Fritillary			

<b>Caribou, Mud Lake</b>	<b>2013</b>	<b>7/2</b>	<b>7/30</b>	<b>8/2</b>
<i>S. hesperis</i>	Northwestern Fritillary		4	1
<i>S. mormonia</i>	Mormon Fritillary			
fritillary sp.			5	5
<i>Poladryas arachne</i>	Arachne Checkerspot		1	
<i>Chlosyne gorgone</i>	Gorgone Checkerspot			
<i>C. nycteis</i>	Silvery Checkerspot	13		
<i>C. palla</i>	Northern Checkerspot	4		
<i>Phyciodes pallida</i>	Pale Crescent			
<i>P. tharos</i>	Pearl Crescent			
<i>P. cocyta</i>	Northern Crescent	1	5	
<i>P. pulchella</i>	Field Crescent			
<i>Euphydryas anicia</i>	Variable Checkerspot			
checkerspot sp.			5	
<i>Polygonia faunus</i>	Green Comma			
<i>P. gracilis</i>	Hoary Comma			
<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		2	1
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet	23		
<i>Cercyonis pegala</i>	Common Wood-Nymph			
<i>C. oetus</i>	Small Wood-Nymph		28	46
<i>Erebia epipsodea</i>	Common Alpine	16		
<i>Oeneis chryxus</i>	Chryxus Arctic			
<i>Thorybes pylades</i>	Northern Cloudywing			
<i>Erynnis icelus</i>	Dreamy Duskywing	2		
<i>E. pacuvius</i>	Pacuvius Duskywing	1		
<i>E. persius</i>	Persius Duskywing	3	1	
<i>Pyrgus communis</i>	Common Checkered-skipper		1	
<i>Piruna pirus</i>	Russet Skipperling	2		
<i>Oarisma garita</i>	Garita Skipperling			
<i>Hesperia juba</i>	Juba Skipper			
<i>H. colorado</i>	Western Branded Skipper			
<i>H. pahaska</i>	Pahaska Skipper			
<i>H. viridis</i>	Green Skipper			
<i>H. nevada</i>	Nevada Skipper			
<i>Polites draco</i>	Draco Skipper	6		
<i>Poanes taxiles</i>	Taxiles Skipper			
<i>Euphyes vestries</i>	Dun Skipper	1		
skipper sp.		1		

<b>Caribou Ranch, Mud Lake</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
# of Species Identified during July and August, annually in Caribou Ranch and Mud Lake	48	48	40	20	46	28	38
# of Species Sighted in Caribou/Mud 2007-2013	75	75	80	80	81	82	83
# of Research Hours on Site	10	12	8.5	6	12.5	8	8
# of Individual Butterflies Counted	358	647	278	145	488	304	361
# Individuals / Research Hour	36	54	33	24	39	38	45
# Species / Research Hour	4.8	4.0	4.7	3.3	3.7	3.5	4.8

<b>Date, Conditions</b>	<b>Location Caribou, Mud Lake</b>	<b>Butterfly Behavior</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>GPS, elevation or r.t. mileage</b>	<b>Researchers</b>
7/2/2013 9:00 – 11:30 a.m. 16-18 ° C, 80 – 45 % clear, 5-20 wind	Inside locked gate, follow fence into bog and meadow	Queen Alexander's Sulphur, arctic blue and common ringlet nectar on sulfur- flower.	anemone angelica black-eyed Susan blue-eyed grass cow parsnip Gaillardia gentian, green geranium, Fremont geranium, Richardson harebell iris Lambert's loco larkspur lupine Mertensia milk vetch miner's candle mouse-ear mustard, tower ninebark onion, Geyer's paintbrush, red parsley, whiskbroom Potentilla pussytoes rose Salsify shooting star stonecrop strawberry sulfur flower wall flower yarrow	Dark-eyed junco, house wren, hairy woodpecker, mtn. chickadee, flicker, br. tailed hummingbird.  Coyote chorus all yelping.		Jan Chu, Larry Crowley, Jean Morgan, Venice Kelly

<b>Date, Conditions</b>	<b>Location Caribou, Mud Lake</b>	<b>Butterfly Behavior</b>	<b>Blossoming Plants</b>	<b>Animals</b>	<b>GPS, elevation or r.t. mileage</b>	<b>Researchers</b>
7/30/2013 9:45 – 1:20 p.m. 18 – 22 °C, 60 % blue sky, wind 0-25 mph	DeLonde Homestead, Monarda meadow near ‘horse trail’, Blue Bird Mine	2-tailed sw nectaring on thistle	black-eyed Susan blanket flower clover, white Erigeron gumweed harebell hawkweed Lambert loco lupine mullein oxeye daisy paintbrush, red penstemon Salsify saxifrage, white Sego lily Solidago sulfur-flower yarrow	Pygmy nuthatch, w. bluebird, robin, red-tail, hummingbird. Chipmunk, golden-mantle ground squirrel		Jan Chu, Larry Crowley, Linda Ferth

Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	GPS, elevation or r.t. mileage	Researchers
8/2/20 9:30-11:45 a.m. 22 – 26 °C, clear sky, wind 5-40 mph.	Inside locked gate, follow fence into bog and meadow. Wind made observation difficult.	Butterflies hugging low plants! Small wood nymph, Queen Alexandra nectaring on blue fall asters	Aster, blue fall bedstraw black-eyed Susan clover, red Gaillardia geranium Fremont's geranium, Richardson's Gilia gumweed harebell Lambert's loco lily, sego lupine monkshood, blue onion, drooping and Geyer's paintbrush, red paintbrush, white Potentilla Solidago sulfur-flower yarrow	House wren.		Jan Chu Larry Crowley, Pam Piombino, Linda Ferth, Venice Kelly

Rabbit Mountain	2013	8/10
<i>Papilio polyxenes</i>	Black Swallowtail	
<i>P. rutulus</i>	W. Tiger Swallowtail	
<i>P. multicaudata</i>	Two-tailed Swallowtail	
<i>Pontia protodice</i>	Checkered White	
<i>P. occidentalis</i>	Western White	
<i>Euchloe ausonides</i>	Large Marble	
white sp.		1
<i>Colias philodice</i>	Clouded Sulphur	
<i>C. eurytheme</i>	Orange Sulphur	6
<i>Glycopsyche lygdamus</i>	Silvery Blue	
<i>Euphilotes ancilla</i>	Rocky Mtn. Dotted-Blue	
<i>Danaus plexippus</i>	Monarch	
<i>Euptoieta claudia</i>	Variegated Fritillary	34
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	
<i>S. edwardsii</i>	Edwards' Fritillary	
<i>S. coronis</i>	Coronis Fritillary	

<b>Rabbit Mountain</b>	<b>2013</b>	<b>8/10</b>
<i>Chlosyne gorgone</i>	Gorgone Checkerspot	
<i>Phyciodes pulchella</i>	Field Crescent	12
<i>Vanessa cardui</i>	Painted Lady	
<i>Pyrgus communis</i>	Common Checkered-skipper	7
<i>Pholisora catullus</i>	Common Sootywing	
<i>Hesperia leonardus</i>	Leonard's Skipper	
<i>Poanes taxiles</i>	Taxiles Skipper	
<i>Atrytonopsis hianna</i>	Dusted Skipper	

<b>Date Conditions</b>	<b>Location Rabbit Mountain</b>	<b>Butterfly Behavior</b>	<b>Blossoms</b>	<b>Elevation, GPS</b>	<b>Animals</b>	<b>Researchers</b>
8/10/2013 10:40 - 11:30 a.m. 22 ° C 0-5 mph wind , 40% cloudy	Walked up the slope from the parking lot on trail and returned by roadway	Very dry. Butterflies gathered on a patch of 'verbena'	Very few gay feathers; many sunflowers. Patch of Verbena braciota near top of road.	5,530 ft N 40.24651 W 105.22377		Jan Chu

## IX. Herptile Records and Photographs

(NOTE: Many of the following species are on more than one page. The photos were taken over several years and not all in the county open spaces.)

This following Boulder County herptile records and photographs are included.

- Fence lizards (*Sceloporus undulatus*)
- Woodhouse's toad (*Anaxyrus woodhousii*)
- Western chorus frog (*Pseudacris triseriata*)
- Western terrestrial garter snake (*Thamnophis elegans vagrans*)
- Bull snake (*Pituophis catenifer*)
- Milk snake (*Lampropeltis triangulum*)
- Prairie rattlesnake (*Crotalus viridis*)
- Yellow-bellied Racer (*Coluber constrictor mormon*)
- Tiger salamander (*Ambystoma tigrinum*)
- Common snapping turtle (*Chelydra serpentina*)

**Fence lizards (*Sceloporus undulatus*)**



Anne U. White 4/29/2013 (006)



Deadman's Gulch, Roosevelt National Forest 4/7/2013 (052)



Heil - Geer 7/30/2008





Anne U. White 7/20/2013 (0046)



Red Gulch 8/15/2013 Fence Lizard (056)



Heil – Plumely 4-6-2012 John Barr (3730)



Heil - Plumely 5/12/2013 Fence Lizard – (003)



Anne U. White 5/19/2013 (028)



**Woodhouse's Toad (*Anaxyrus woodhousii*)**



Hall 2 8/27/2013 – Woodhouse's Toad (0121)



Heil – Geer 7/26/2013 Woodhouse's Toad



Hall 2 8/27/2013 Woodhouse's Toad - 1<sup>st</sup> year - (134)

**Western chorus frog (*Pseudacris triseriata*)**



Heil – North Point 7/11/2013 Chorus Frog (047)



Steamboat Mountain 5-23-2010 Chorus Frog (004)

**Western terrestrial garter snake (*Thamnophis elegans vagrans*)**



Mesa Trail- 6-16-2011 Garter Snake - John Barr (7006)





Frog Puddle - Heil Ranch Road 8/31/2013–  
2 Garter Snakes each with a Tiger salamander (*Ambystoma tigrinum*)  
- Richard Holmes

**Bull snake (*Pituophis catenifer*)**



Bull Snake- Mark Hayes property next to SE Buffer 6/17/2013 (0031)



Pella Crossing, May 17, 2013 John Barr



**Milk Snake (*Lampropeltis triangulum*)**



Heil Ranch - Plumely Canyon April 28, 2012 John Barr



**Prairie rattlesnake (*Crotalus viridis*)**



Table Mesa Trail – October 15, 2010 – John Barr



Heil – Plumely 6/27/2013 - John Barr (6681)





Table Mesa – 10/15/2010 John Barr (2332)



Heil - Plumely *Crotalus viridis* 6/25/2010 (029)





Heil - Rattlesnake drinking from nearly dried Geer streamlet - near mouth of Plumely 8/27/2009



7/3/2013 (Cannon Power Shot) (028)





Yellow-bellied Racer (*Coluber constrictor mormon*) Boulder 10-3-2013 Christian Nunes

**Common snapping turtle (*Chelydra serpentina*)**



Adjacent to Walden –Maybe 75 pound snapper May 28, 2011 John Barr

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