

Butterfly Inventories

-2014-

A Continuing Study of Butterfly Populations and Other Species in Boulder County Open Spaces, Colorado



Field Crescent (*Phyciodes pulchella*) (ventral and dorsal) September 1, 2014
Heil Valley Ranch, Geer Watershed, Boulder County Open Space. Janet Chu

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Preface

Anne U. White – A Challenge Posed By Nature

Two unique Pale Crescents, flying together over the Fourmile Canyon Creek, their home habitat where these had prospered in good numbers before the 2013 flood event. Soil and sand, footholds for plants, were washed away leaving the sparkling clean granite bedrock along the sides of Anne U. White Trail. The nectar-rich Monarda and Bull Thistles were nearly through blossoming, and the blue fall Asters and white Yarrow, not often used for nectar, were ignored by the butterflies. The remaining Wild Buckwheat and white Erigeron were providing some nectar. Two-tailed Swallowtails and Weidemeyer's Admirals were flying high, likely from nearby surviving willows. Visitors, American Lady and one Reakirt's Blue found their way into our cherished canyon on this date, August 21.

A noisy flock made of mountain chickadees, red-breasted and pygmy nuthatches, hairy and downy woodpeckers reminded us that our feathered friends easily move from one site to another.

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I. ACKNOWLEDGMENTS

Boulder County Parks and Open Space has provided the Butterfly Inventory Team access to many of the fine open space lands which conserve habitats for the multitudes of animals and plants. We are appreciative of having access to these areas, often where the public is restricted. This includes three of the 2013 flood devastated areas. Susan Spaulding, Senior Wildlife Biologist, overseeing our study, issues a Special Research Permit and is supportive of the entire study process. Claire DeLeo, Plant Ecologist Supervisor, helps with identification of blossoming plants. Kevin Grady, Resource Protection Ranger, exchanges recent mammal sightings and updates maintenance situations. We appreciate Wildlife Program Volunteer Coordinator Michelle Durant and Ranger Amanda Hatfield accompanying us into Anne U. White, Susan Spaulding into Meyer's Homestead Trail, and Dennis Morris into Hall II. Volunteer Naturalists Kerrie Bryan and Paul Schultz helped lead a public hike into Meyer's Homestead Trail. Ken LaFollette has become a friend over the years and allows us to cross his private property to access the lower Red Gulch in Heil Valley Ranch Open Space. Boulder County Nature Association encourages our natural science studies.

Mentors Drs. Paul A. Opler, Robert Michael Pyle and Andrew Warren assist in understanding butterfly ecology and identification. My valuable field team, friends with sharp eyes and quick binoculars include Amy Chu, Larry Crowley, Venice Kelly, Chuck Lowrie, Jean Morgan, and Pam Piombino. Many photos are contributed by John Barr, Dan Fosco and Richard Holmes. I am indebted to Dr. Marc Swadener for formatting many annual reports, including this one.

II. ABSTRACT

This concluded the thirteenth consecutive year of butterfly inventories in Boulder County Open Space properties. Comparable data continue to be collected on four properties during eight years in Southeast Buffer, Heil Valley Ranch (Geer Watershed), Walker Ranch (Meyer's Homestead Trail), and Mud Lake-Caribou. All four open spaces showed lower numbers of Species/Research Hour (S/RH) in 2014 as compared to each area's eight-year average. Additional data was collected more recently during four years in Heil Valley (North) and Reynold's Ranch. In the preceding six open space study areas the habitat remained intact following the flood. Heil-Geer had higher numbers of Individuals/Research Hour (I/RH) than its

eight-year average; Southeast Buffer and Walker-Meyer's had lower numbers of I/RH; Mud Lake-Caribou had numbers equal to its eight year average of I/RH.

The flood of September, 2013, made three of our study sites nearly inaccessible: Anne U. White, Heil Valley Ranch (Plumely Canyon), and Hall II. With the escort by Open Space staff members we did access Anne U. White twice and Hall II Open Space once in 2014. Access to Heil-Plumely was difficult as we walked from the stream crossing of the service road only as far as the hops vines at the foot of the quarry.

III. OBJECTIVES

1. To identify indicator species, especially by continuing the detailed butterfly inventories within the Boulder County Open Space properties.
2. To garner data following the major flood event and discern how floods affected the study areas.
3. To continue exploration of a new area; Hall II.
4. To observe associated animals and blossoming plants in each biome.
5. To be sensitive to conditions in the habitat and report our findings.

IV. RESEARCH METHODS

The methodology used in 2014 is similar to that described in my earlier report, "Butterfly Inventory and Research on Open Space Properties" (Chu, 2005). This has become the protocol for butterfly research by our team in Boulder County.

"Butterfly surveys are conducted by walking on trails, near waterways, and other areas where butterflies congregate, rather than within strictly measured transects. Butterflies shift locations based on the availability of host plants, nectar and moisture. Therefore while inventorying large areas, researchers move 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 are sighted, they are identified on the wing by the unaided eye, by using close-focusing binoculars, or in the hand using a 'net and release' procedure. Locations of the inventory site, species and numbers (clearly identified at close range), the date, time in the field, temperature and useful notes about butterfly activities and blossoms are listed. Digital photos are often made in order to assist in identification" (Chu, 2006). Much of the time birds and other wildlife are noted. Blossoming plants are recorded since they provide nectar for

adults and possible food sources for caterpillars

The standard unit ‘Individuals per Research Hour’ (I/RH) is devised for this study. It describes the total number of individual butterflies sighted divided by the total number of hours of field research by the team for each specific study area. It is not dependent on the number of researchers on team that day, although this indeed may have influenced the findings. Since we do not follow a measured transect nor restrict our studies to a certain time period the unit, I/RH is used for comparison from one site to another and from one season to the next. The second unit ‘Species per Research Hour’ (S/RH) is also recorded.

V. RESULTS

In 2014, butterfly studies concentrated on six of our ten study sites; Southeast Buffer, Heil Valley Ranch (Geer Watershed and North Point), Walker Ranch (Meyer’s Homestead Trail), Reynold’s Ranch and Mud Lake-Caribou Ranch. The flood of September, 2013 made three of our study sites nearly inaccessible; Anne U. White Trail, Heil Valley Ranch (Plumely Canyon) and Hall II. The cause of the devastation is revealed by looking at the weather story.

Boulder saw 34.8 inches of precipitation during 2013; more than half fell as rain between Sept. 9 and 16. About 18 inches fell in the Boulder Canyon watershed and surrounding foothills during that time; whereas precipitation for a year is about 20.5 inches.

The Butterfly Inventories project was completed by volunteer naturalists who drove almost 1,200 miles and contributed about 110 research hours on site in 2014. No grants were received in 2014.

VI. DISCUSSION

A. Areas Affected by the 2013 Flood Event

1. The Anne U. White Trail along Fourmile Canyon was severely damaged by the 2013 flood and remained scoured of its sands and soils. Torn trees and bushes were left hanging on ten-foot stacks of debris. Butterflies were checked only once on August 21. Cabbage Whites (*Pieris rapae*) flew in greater numbers in August than shown by the previous five-year August average in this small canyon. Also numbers of local emergent butterflies were higher in August 2014, than during

August averages the past four previous years. There were many Woodland Skippers (*Ochlodes sylvanoides*) on our single day of observation. Several Taxiles Skippers (*Poanes taxiles*) were seen. Together those butterflies' joyous brilliant orange flashes overrode the feeling of loss with the devastation of the creek. Five Weidemeyer's Admirals (*Limenitis weidemeyerii*) emerged from the grove of willows. A visitor from the southern United States, the American Lady (*Vanessa virginiensis*) surprised us.

For comparison on August 16, 2013, there was a total of 10 species found, and 80 individuals per research hour (I/RH). This year on August 21, 2014 we found a higher number of species (17) and fewer (29) I/RH. August 16 and August 21 are five days apart in the season, but there can be a comparison one year to the next. Notably the Western Tiger Swallowtail (*Papilio rutulus*), Mourning Cloak (*Nymphalis antiopa*), Red Admiral (*V. atalanta*), and Small Wood Nymph (*Cercyonis oetus*) were seen in 2013, but not 2014. Woodland Skippers were 30 last year and 29 in mid-August 2014. Wherever they formed their chrysalises in September these were propitious survival choices. Common Checkered Skippers (*Pyrgus communis*) and Western Branded Skippers (*Hesperia colorado*) were not seen on this trail last year, but two of each was found in 2014. Not surprising to the butterfly researchers, three Cabbage Whites were found mid-August 2013, and 18 of the opportunistic aliens flew mid-August 2014.

2. Heil Valley Ranch (Plumely Canyon) was left with serious deep wash-outs, but had many hummocks and islands of stable residual plant materials. It was difficult walking from the stream crossing at the service road, along the now-widened streambed and into the Plumely only ½ mile. Walking on unstable river rock and climbing onto six-foot walls of newly-deposited sand slowed our progress. Plumely Canyon was visited by this team in May and June. A single rare Hops Azure (*Celastrina humulus*) was found over its host plant, the American hops in June. The hops briar patches did not seem to be torn away, but held their ground, as did other bushes and trees near the old quarry. In June the Orange Sulphurs (*Colias eurytheme*) were the most numerous of the butterflies. Nearly fifty were puddling close together in the fine sand near the stream. Study visits occurred only twice.

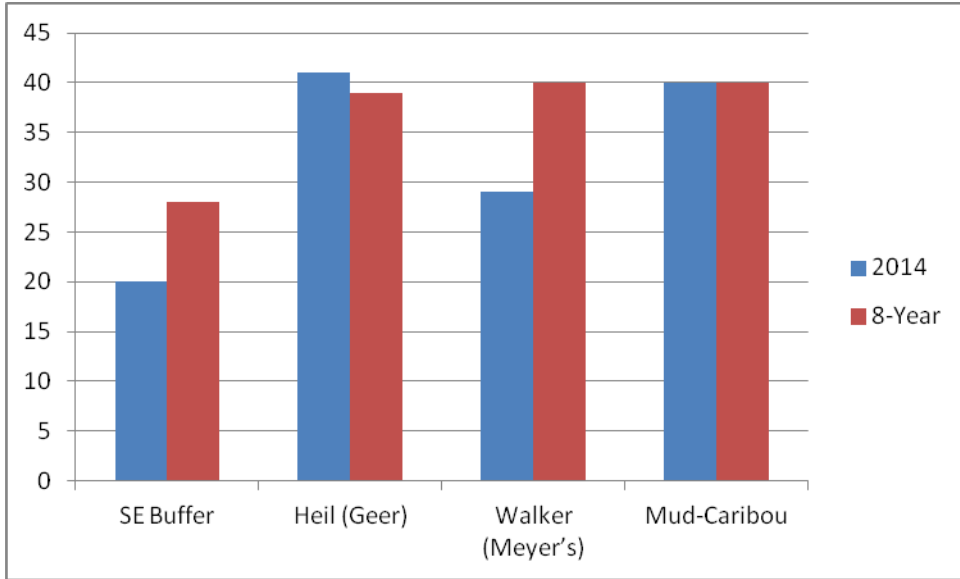
3. Hall II was an adventure for these usually easygoing butterfly watchers. We changed from boots to waterproof sandals and waded through the St. Vrain River. The water came nearly to our knees, and the current continued strong on September 4. Fortunately Ranger Dennis Morris accompanied us to make sure we were safe. The vegetated hills and old roadway showed no signs of flood damage; the shallow side canyon was little changed, but we remained on the hillside. We were able to do only a one-day inventory of butterflies at Hall II. One skipper was added to the Hall II 'first seen' list; Leonard's Skipper (*Hesperia leonardus pawnee*). Four of the Leonard's and one Western Branded Skipper were sighted. There was a grove of hackberry trees along the upper roadway, and four Hackberry Emperors (*Asterocampa celtis*) were nectaring on rabbit brush. In addition, a late flying Red Admiral was also head-deep nectaring on the yellow fragrant (species - *nauseosum*) rabbit brush. Thus we were able to complete a one-day inventory of butterflies at Hall II. On page 50 there is a comparison between an August 2013, observation (before the flood) and an August 2014 date.

B. Areas Unaffected by the 2013 Flood Event

Four of the open space areas where butterfly records have been kept for eight consecutive years, remained nearly unchanged as far as erosion and loss of soil after the flood. However, the grasses and herbs were noticeably taller in the Foothills because of higher ground water and extensive rainfall in 2014. Areas not destroyed by the torrents had the usual numbers of visits by the team. This is an opportunity to compare 2014 results to the eight-year averages of both individual and species per research hour.

Table I. 2014 Individuals/RH vs. the same area's Eight-year Average I/RH

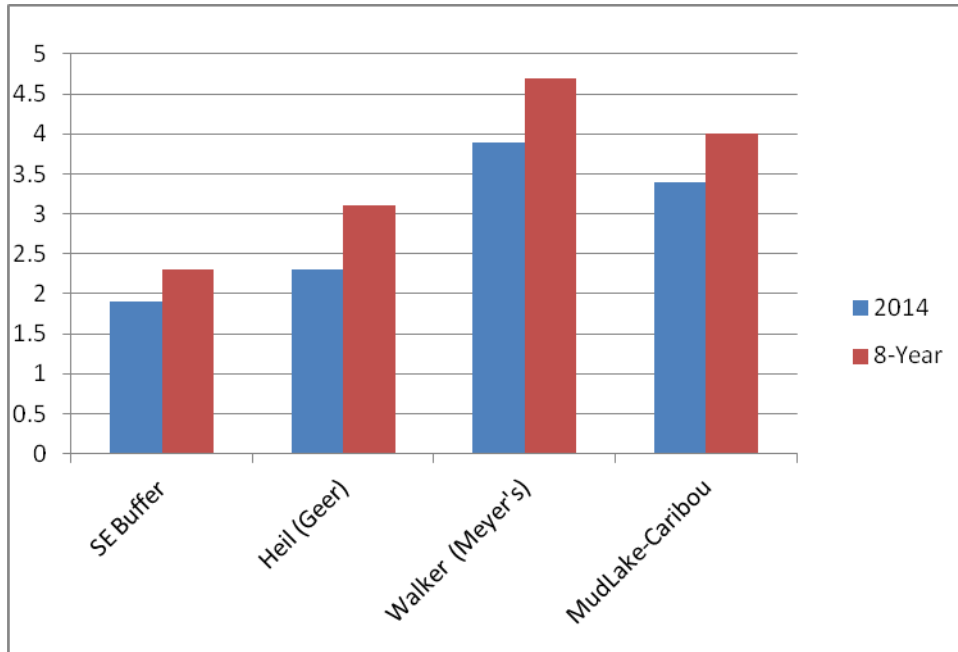
I/RH	2014	Eight/year Ave
SE Buffer	20	28
Heil-Geer	41	39
Walker-Meyer's	29	40
Mud Lake-Caribou	40	40



(Caption) In four study areas where the habitat remained intact, and counts occurred, two areas had lower numbers of Individuals/Research Hour in 2014 than their eight-year average (Southeast Buffer and Walker Ranch-Meyer's Homestead Trail); one had higher numbers of I/RH (Heil Valley Ranch – Geer Watershed). The 2014 I/RH in Mud Lake – Caribou Ranch was comparable to the eight-year average.

Table II. Species/RH 2014 vs. that same area's Eight-year Average S/RH

	2014	8/yr Ave
SE Buffer	1.9	2.3
Heil-Geer	2.3	3.1
Walker-Meyer's	3.9	4.7
Mud Lake-Caribou	3.4	4.0



(Caption) In every one of the four inventory areas the butterfly count of Species per Research Hour (S/RH) was lower than that area's eight-year average. In the Southeast Buffer, a rocky prairie, the number of Species per Research Hour was 1.9, lower than the eight-year average of 2.3. It seemed the gravelly ground became dry rapidly following showers, and the mixed-grass flowers were sparse. Also the reading was lower for Heil Valley Ranch (Geer Waterway), Walker Ranch (Meyer's Homestead Trail) and Mud Lake – Caribou Ranch.

1. Within the Southeast Buffer, off CO Highway 128, flowers were sparse and scattered and the grasses were predominant on July 2. The best place to see the few blossoms the summer of 2014 was on the hilltop, south of the long east-west small ravine north of Hwy 128. The second place was on the northern hilltop along the Rock Creek off Coalton Trail. Among the earliest butterflies were the Olympia Marbles (*Euchloe olympia*) on March 30 in the Southeast Buffer. One rare Ottoe Skipper (*Hesperia ottoe*) female was found nectaring in the thistle blossom on July 2. An uncommon Uncas Skipper (*H. uncas*) was found the same day with its head deep in the thistle blossom. Fritillaries were nectaring on knapweed and

Field Crescents (*Phyciodes pulchella*) on gumweed, illustrating the lack of favorite and rich blossoms. Field Crescents were numerous along with Orange Sulphurs (*Colias eurytheme*) and the Variegated Fritillaries (*Euptoieta claudia*).

2. Heil Valley Ranch (Geer Watershed) had 42 species identified in 2014 compared with a similar 43 species calculated as an eight-year average for Geer. The number of Species/Research Hour in 2014 was 2.3 as compared to 3.1, the average for eight years. The number of Individuals per Research Hour was 41, while 39 was the average for eight years. The notable rare Dusted Skipper (*Atrytonopsis hianna*) showed up on three days; one on May 6, and three in June. Cabbage Whites were the most numerous butterflies in Geer, which is typical around the old farm buildings. Field Crescents had a prolific season producing at least two generations, May into September, because the asters and fleabanes remained succulent following our spring moisture. We felt that there were fewer 'blue' butterflies in our research areas, but there were seven species in the Geer Watershed; Western Tailed Blue (*Cupido amyntula*), Arrowhead Blue (*Glaucopsyche piasus*), Silvery (*G. lygdamus*), Rocky Mountain Dotted-Blue (*Euphilotes ancilla*), Reakirt's Blue (*Echinargus isola*), Melissa (*Plebejus melissa*), and Boisduval's (*P. icarioides*). The Common Wood-Nymph (*Cercyonis pegala*) flew in usual numbers in August and September. Overall in Geer Watershed we recorded slightly higher numbers of I/RH, but lower numbers of S/RH.

The Frog Pond, found immediately beside the entrance road, remains an important puddling source for male butterflies. Its fluctuating size is about 4,000 sq. ft. and its surface varies seasonally and year to year, varying from being mostly open water to being nearly completely covered with algae. A total of twenty-nine swallowtails including the Indra (*Papilio indra*), Western Tiger (*P. rutulus*), Pale (*P. eurymedon*), and Two-tailed Swallowtails (*P. multicaudata*) gathered there on June 9. We watched for one hour on June 10, counting only in that small area, finding 16 species puddling. This observation compares with 28 species found during two hours searching from the barn along the streamlet toward Big Meadow.

3. Heil Valley Ranch (North) remains one of our favorite butterfly research areas. It contains several relatively inaccessible areas North Point (a former residence), Red Gulch (a shallow streambed) and Red Hill Saddle (on top of the hogback). The first butterflies observed at

Heil Valley were observed on March 16, 2014. Exceptionally small-sized Variegated Fritillaries (*Euptoieta claudia*) with 37-40 mm wingspans caught our attention. Usual size can be 36 mm up to 70 mm and most often is larger in our experience. In an e-mail personal message, Paul Opler explained that;

“They fly up here from southern Texas or New Mexico, even western Mexico where the climate is relatively benign. Many of our freeze intolerant insects colonize our area on air currents, usually from the southwest of here, including southern Arizona and northern Mexico. My guess is that may have happened with these *claudia*. An unlikely chance is that all the stores with garden centers had deliveries of pansy plants from some place in south Arizona or down in Texas and that these plants were loaded with pupae of *claudia* about to hatch out.” (1. Opler)

In addition, I have learned from Paul Schultz, meteorologist, that there is an low-level Jet Stream that often whirls birds out of their normal habitats. Perhaps this happened to the group of early and small Variegated Fritillaries and other unusual butterflies that we find together. On the Southeast Buffer, Amy Chu caught, in one swoop of her net, two Fulvia Checkerspots (*Chlosyne fulvia*), on July 21, 2011, the first recorded in Boulder County. These had likely been swept up here from perhaps in northern Arizona’s pinyon- juniper covered limestone substrate.

Heil Valley - North had more butterfly species (50) this year when compared to each of the last four seasons. However, in 2014, the number of S/RH (1.9) was lower than its four-year average (2.2). One reason for this seeming discrepancy is that researchers spent many more hours on site during 2014. One reason was finding the unusually small-sized Variegated Fritillaries early in the season on March 16, and returning to verify their identification. The second reason is the July 4 Cal-Wood Butterfly count was conducted in the Red Gulch, at the peak season, which had not occurred previously. More Individuals/Research Hour (40) were counted as compared with the four-year average of 36. Within a second area, Red Gulch, the total number of I/RH was higher in 2014, than in the past four year average. This was undoubtedly because of large numbers of Field Crescents (*Phyciodes pulchella*) (80 found on June 3), and on July 4, 110 Cabbage Whites and 50 Orange Sulphurs (*Colias eurytheme*). Plants and blossoms were abundant.

- a. Five early Mourning Cloaks (*Nymphalis antiopa*) were flying up from the willows in the ravine on March 16 on the North Point driveway. This driveway had two Rocky Mountain Dotted-Blues (*Euphilotes ancilla*) flying on June 1, with a notable subspecies (*E. a. barnesi*) identified by Paul Opler. A crisp new first brood of Juba Skippers (*Hesperia juba*) flew on June 1, dispersing from the western U.S. A dozen Orange Sulphurs were present each of the three days we were at North Point. We did not go to the high meadow to look for the rare Arogos Skippers (*Atrytone arogos*) on their host blue stems because of road damage.
 - b. The Red Gulch is an exceptional area, which ought to continue to be protected. The Red Gulch Road, leads through private property to the north of the Red Gulch in Heil Valley Ranch Open Space. Along the boundary between private property and open space, the owners are reluctant to access this open space property, because they know of the presence of rattlesnakes. We always ask permission of Ken LaFollette to cross his machinery storage area for entrance into the county property. More Cabbage Whites showed up there than in any other single day in any study area, i.e. 110 individuals on July 4, likely because of the several nearby vegetable gardens and cultivated plants. The blue butterflies were prominent: Silvery Blues (*Glaucopsyche lygdamus*), Reakirt's (*Echinargus isola*) and Melissa (*Plebejus melissa*). Four species of fritillaries flew: Aphrodite (*Speyeria aphrodite*), Edward's (*S. edwardsii*), Coronis (*S. coronis*), and Northwestern (*S. hesperis*) indicating that many violet plants were prospering in the undergrowth. The Common Sootywing (*Pholisora catullus*) is a resident in the lower gulch near its host plant, lamb's quarters.
4. Walker Ranch (Meyer's Homestead Trail) had many new ruts following the September flood. Consistent rains had us expecting moist puddles in the previously repaired roadway, but these were lacking. Relatively dry conditions from mid-May to the end of July (only 2.5" of precipitation) fell during that period which may have limited abundance of some blooming wild flowers. On June 17 the most common butterfly was the Rocky Mountain Dotted-Blue (*Euphilotes ancilla*), easily twice as numerous as the next common ones, flying and nectaring in their host plant, wild buckwheat. The Canyon Bramble Hairstreak (*Callophrys affinis*), Boisduval's Blue (*Plebejus icarioides*) and Common Ringlet (*Coenonympha tullia ochracea*) were also abundant. Small Wood Nymphs (*Cercyonis*

oetus) showed up on August 3. We inspected the stinging nettles bushes next to the deteriorating hay barn but found no Milbert's Tortoiseshell (*Aglais milberti*) caterpillars; sometimes we find dozens. Walker Ranch (Meyer's Homestead Trail) had the second lowest number of I/RH in eight years (29 individuals matching the 2011 count, compared to the lowest at 27 in 2010 and 2013; the highest at 64 in 2009). However the number of species identified during 2014 was the same as the eight-year average of 43 species.

5. Reynold's Ranch remained soggy this summer. In June we could barely find dry land beside the Giggey Pond and the North Bog. Saturated soils resulting from the September 2013 flooding event and from relative wet conditions from March through mid-May could have inhibited growth of some plants. There were few blooming flowers like blue bottle gentian and bush *Potentilla* which do not provide nectar. We did succeed in walking on somewhat dried ground to the east of Giggey Pond, and to our surprise and pleasure the grasses were four feet tall. So many varieties made this area look like a substantial prairie. Small Wood Nymphs were stopping shortly to nectar on the white *Erigeron*, but more often flying and mating. North Bog had cattle grazing; we found very few flowers and no butterflies. In previous years Ruddy Coppers were found in the *Potentilla* bushes near the north fence. In 2014 we found the lowest number of species in four years, and the fewest I/RH. The high water table may have prevented the local chrysalids from eclosing to emerge as adults, and thwarted the visitors finding nectar. In 2014 we compared the I/RH (12) to the four-year average (37) which was affected by only two days of counts, one early on June 5 and the other later on August 28. These were not within the peak butterfly season dates. The S/RH was 2.1 as compared to the four-year average of 3.0.

6. Mud Lake-Caribou Ranch complex was visited eight times, thanks to Venice Kelly who lives near there. Since we are not allowed into Caribou in the early season due to a closure to protect breeding elk, the 'Bridge Meadow' between Mud Lake and the Caribou entrance has become the often-visited area. Queen Alexandra's Sulphurs (*Colias alexandra*) were the most numerous species in June and July. The Common Alpine (*Erebia epipsodea*) appeared on June 22. Chryxus Arctic (*Oeneis chryxus*), our biennial butterfly which appears only during the even numbered years, was present in both June and July. The difficult to identify checkerspots flew in usual numbers: the uncommon *Arachne*

Checkerspot (*Poladryas arachne*), the shade-seeking Silvery (*Chlosyne nycteis*), and the Northern Checkerspot (*C. palla*). We saw singleton Ruddy Coppers (*Lycaena rubidus*) flying in mid-July to the end of August. Caribou Ranch-Mud Lake, the high elevation study area, had the highest number of I/RH (54 matching that number in 2008). This compares to the five-year average number of I/RH (49). The number of individual butterflies counted, (at 752), was the highest there in eight years.

7. Rabbit Mountain was visited only once, and on that day, May 4, two rare Dusted Skippers (*Atrytonopsis hianna*) were seen. Several Painted Ladies (*Vanessa cardui*) had already flown in from the southern U.S. and were nectaring on the aromatic three-lobed sumac.

VII. Weather

Changes in weather patterns influence the flight and survival of butterflies. If moisture and warmth come at the optimum time during the six-month “flight” season, then life processes are enhanced: the emergence from chrysalids, the mating and laying eggs, and the finding nectar and host plants. Rainfall amounts are noted with the 2014 monthly totals, compared with the monthly average precipitation for years 1971-2000. The source for these monthly averages is found in the National Oceanic and Atmospheric Administration (NOAA) website. Temperature extremes as reported in the Daily Camera are listed for some months.

Table III. NOAA Averages (1971-2000) vs. the Boulder Total Monthly 2014 Rainfall

	MAR	APR	MAY	JUN	JUL	AUG
AVE Inches	1.85	2.93	3.05	2.02	1.93	1.62
2014 Inches	1.62	1.87	4.43	0.84	4.57	1.60

(Caption) The months of March, April, June and August had lower rainfall than the NOAA averages. May and July had more than normal precipitation. In fact July was the fifth wettest on record for Boulder.

The average monthly precipitation (1971-2000) is compared with the monthly total for 2014 in Boulder. This only provides a comparison because our study areas are on the prairie by McCaslin Boulevard, Louisville, and into the Foothills.

Early spring on March 7 Boulder recorded 0.73” of rain falling which ousted the previous record of 0.41” in 1905, (2.) yet the March (NOAA) average was only a small amount higher

than the 2014 amount (by 0.23 inches)(4). March 17 strong winds delayed flights at DIA, and this wind is also a definite deterrent to butterfly flight. Also butterflies which emerge from overwintering may likely be hindered by early rainfall and snow.

April had seven days of freezing temperatures with the lowest at 21 degrees F. on April 17. The highest temperature occurred twice at 71 degrees F. on April 11 and 18. The NOAA monthly precipitation was higher than in April 2014, by 1.06 inches (2). As long as butterflies' flight muscles reach above 60 degrees F. they can fly on a sunny day.

May 11 saw over an inch of rain and the next day had another inch of moisture in the form of a record 8" of snow, and the water table rose to the surface. There's simply no room for soil absorption. Thus even a half-inch of rain, if it comes in a very short amount of time will cause flooding. A one-inch, 45 minute downpour caused streets and intersections to flood in Boulder. It was recorded that 40 per cent fell in just five minutes. (4). Average temperature was about normal for May, and the average low was 43 degrees as compared to the normal 46 degrees for the month. The precipitation in May was higher than the NOAA average reading by 1.38 inches. (3.) At this time in May, many of the summer butterflies would be emerging and the moisture could drown these or even keep them in diapause (hibernation) to emerge in 2015.

All of the days in June except for nine had high temperatures in the 80 degree F. range. The single lowest reading was on June 9 at 41 degrees. This made for gentle warming (6). June's NOAA precipitation average was higher than the lower reading for June 2014, by 2.42 inches (3). The high temperatures and higher precipitation could have kept the nectar-providing plants from fully blooming.

July was the fifth-wettest on record. Ten of the 14 days between July 8 and July 21 had measurable precipitation in Boulder. Hailstorms and deluges in many areas seemed common. Comparing the NOAA average to the July 2014 total, July precipitation was greater by 2.64 inches. This made 'normal' life processes difficult for the butterflies. Relatively wet conditions from July 27 through mid-September (about 8" of precipitation was recorded at the Boulder official weather station) (7) which may have contributed to fewer late summer butterflies. July 7 had the highest temperature for July at 97 degrees. (5). Many days seemed

cooler than normal with overcast skies and chances of rain, therefore preventing time in the field for the butterfly team.

VIII. CONCLUSION

During this Butterfly Inventory project nearly 1,200 miles were driven by volunteers who observed on site 110 hours. No grant monies were provided in 2014 by Boulder County or Boulder County Nature Association in 2014.

In five open space study areas where the habitat remained intact, counts appeared to be similar to those in other years. However, two areas had lower numbers of Individuals/Research Hour in 2014 than their eight-year average (Southeast Buffer and Walker Ranch-Meyer's Homestead Trail); one had higher numbers of I/RH (Heil Ranch – Geer Watershed). The 2014 I/RH in Mud Lake – Caribou Ranch was comparable to the eight-year average. In each of the four areas the count of species per research hour (S/RH) was lower than that study area's eight-year average. We can gather from this that the heavy rainfall in the early season may have prevented some local butterflies from emerging. In some areas the incoming butterflies found plenty of nectar in the lush vegetation.

Saturated soils resulting from the September 2013 flooding event and from relative wet conditions from March through mid-May could have inhibited growth of some host plants.

Notably rare butterflies sighted were: the Hops Azure in Heil Valley Ranch (Plumely Canyon); Dusted Skippers in Heil (Geer Watershed) and Rabbit Mountain; Ottoo Skipper in Southeast Buffer. Among the earliest butterflies were the Olympia Marbles on March 30 in the Southeast Buffer. The latest butterflies that our team noticed within the Open Space study areas were Pine Whites (*Neophasia menapia*), Ruddy Coppers (*Lycaena rubidus*), Mourning Cloak and Small Wood Nymph on August 30 in the Mud Lake Bridge Meadow near the Caribou Ranch entrance. On September 4, the Red Admiral, Hackberry Emperor, and Leonard's Skipper were flying at Hall II.

Subsequent to our designated inventory dates, Purplish Coppers (*Lycaena helloides*) were numerous this year at the Walden Lake (Duck Pond), on Boulder City Open Space Teller Lake (October 19) and Shanahan Ridge (October 25) often on gumweed and white aster.

IX. LITERATURE CITED

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X. DATA TABLES FOR 2014

The names listed on the charts are those butterflies seen over the years at each site. If there is no number listed, the butterfly species was not observed in 2014. Numbers listed are those seen each particular date.

Table 1. Southeast Buffer	2014	3/29	3/30	4/20	5/28	7/2	8/13
<i>Papilio polyxenes</i>	Black Swallowtail						
<i>P. zelicaon</i>	Anise Swallowtail						
<i>P. rutulus</i>	W. Tiger Swallowtail						
<i>P. multicaudata</i>	Two-tailed Swallowtail						
<i>Pontia protodice</i>	Checkered White					8	1
<i>P. occidentalis</i>	Western White						
<i>Pieris rapae</i>	Cabbage White				7	4	8
<i>Euchloe olympia</i>	Olympia Marble		8				
white sp.				3	1	10	1
<i>Colias philodice</i>	Clouded Sulphur			1	3	1	1
<i>C. eurytheme</i>	Orange Sulphur		3	2	6	7	9
sulphur sp.					1	3	
<i>Zerene cesonia</i>	Southern Dogface						
<i>Abaeis nicippe</i>	Sleepy Orange						
<i>Kricogonia lyside</i>	Lyside Sulphur						
<i>Nathalis iole</i>	Dainty Sulphur						

Table 1. Southeast Buffer	2014	3/29	3/30	4/20	5/28	7/2	8/13
<i>Lycaena dione</i>	Gray Copper						
<i>Strymon melinus</i>	Gray Hairstreak						
<i>Glaucopsyche lygdamus</i>	Silvery Blue						
<i>Euphilotes ancilla</i>	Rocky Mtn. Dotted-Blue						
<i>Echinargus isola</i>	Reakirt's Blue					3	
<i>Plebejus melissa</i>	Melissa Blue						
blue sp.							1
<i>Danaus plexippus</i>	Monarch						
<i>Agraulis vanilla</i>	Gulf Fritillary						
<i>Euptoieta claudia</i>	Variegated Fritillary					29	3
<i>Speyeria aphrodite</i>	Aphrodite Fritillary						
<i>S. edwardsii</i>	Edwards' Fritillary					3	
fritillary sp.	(silvered)					2	3
<i>Chlosyne fulvia</i>	Fulvia Checkerspot						
<i>C. gorgone</i>	Gorgone Checkerspot						
<i>Phyciodes tharos</i>	Pearl Crescent						1
<i>P. pulchella</i>	Field Crescent				15		14
<i>Aglais 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 Nymph					1	
<i>Erynnis afranius</i>	Afranius Duskywing						
<i>E. persius</i>	Persius Duskywing						
<i>Pyrgus communis</i>	Common Checkered-skipper				25		5
<i>Pholisora catullus</i>	Common Sootywing					1	
<i>Hesperia uncas</i>	Uncas Skipper					1 ph	
<i>H. ottoe</i>	Ottoe Skipper					1 f ph	
<i>H. leonardus</i>	Leonard's Skipper						
<i>Atrytone arogos</i>	Arogos Skipper						
<i>Anatrytone logan</i>	Delaware Skipper						

ph= photograph, f=female

Table 1 (continued). SE Buffer	2007	2008	2009	2010	2011	2012	2013	2014
# of Species identified during each year in SE Buffer	25	20	21	24	19	18	20	15
# Species 2007-2014 sighted in Southeast Buffer	21	23	33	37	41	44	44	44
Research Hours on Site	5	21	9	7.7	11.5	9	12	8
# Individual Butterflies Counted	256	373	353	443	160	227	169	178

# Individuals / Research Hour	51	18	39	40	14	25	14	22
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Table 1 (continued). Date, Conditions SE Buffer	Location in Open Space	Butterfly Activity	Blossoming Plants	Animals	Researchers
3/29/2014 12:15-1:15 p.m. 12- 16°C, 30% clouds, wind 0-40 mph	Entered along Coalton Trail, walked along Rock Creek		dandelion filaree mustard, small purple salt & pepper	flicker magpie meadowlark raven robin starling	Jan Chu, Larry Crowley
3/30/2014 12:20-1:40 p.m. 18-19 °C, overcast sky, wind 10-30 mph	Crossed gate off hwy 128 toward Swallowtail Hill.	Very little apparent	dandelion Easter daisy filaree mustard yellow, Alyssum salt & pepper	meadowlark	Jan Chu, Larry Crowley, Jean Morgan
4/20/2014 11:45-12:45 p.m. 15- 18°C, 50% cloudy,5-10 mph wind	Entered along Coalton Trail, walked along Rock Creek	Very few butterflies seen	dandelion filaree mustard 1.5 ' white mustard, short yellow salt & pepper	magpie meadowlark mourning dove red-tail hawk robin sharp shin hawk starling. prairie dog	Jan Chu, Larry Crowley
5/28/2014 10 – 11:15 a.m. 22-26 °C 90% clear, wind 0-5 mph	Coalton Trail, inside gate south, to Rock Creek	Very little apparent	Arnica, bindweed, blue flag, cactus, ball lime green clover, short, purple False salsify, false goat's beard (Podospermum laciniatum) Erigeron, evening primrose filaree, flax, Gaura, Geyer's onion golden banner, Lambert's loco medic, black, Melilotus, milk vetch Mertensia, penstemon, one-sided Salsify, scarlet globe mallow yarrow	w. kingbird Bullock's oriole Mallard Robin Sparrow, vesper Meadowlark Say's phoebe Hawk, red tail Magpie Mourning dove Chat, yellow- breasted. Prairie dog, frog, Woodhouse toad	Jan Chu, Larry Crowley, Amy Chu
7/2/2014 10:20 – 12:40 p. m. 23 °C wind 0-10 mph, 80% clear sky, hazy.	Gate, off Hwy 128 to Swallowtail Hill	Orange sulphur nectaring on thistle, as were the skippers.	Alfalfa, Arnica, bindweed, coneflower, Prairie Clover, Moth Mullein, thistle musk, thistle bull, Opuntia yel, Sunflower sp. Many tall grasses.	meadow lark, turkey vulture, vesper sparrow, nest	Jan Chu, Larry Crowley, Jean Morgan, Karen Kinsey
8/13/2014 9:30- 11:30	Coalton Trail thru	Fritillaries nectaring	'forget-me-not' aquatic Quincula lobata (purple) alfalfa, Arnica	bl. cap. chickadee, vesper sparrow.	Jan Chu, Larry

Table 1 (continued). Date, Conditions SE Buffer	Location in Open Space	Butterfly Activity	Blossoming Plants	Animals	Researchers
a.m. 23-24 °C, 60% broken clouds, wind 0-3 mph	Rock Creek to hilltop and out Hwy 128; some ground water in Rock Creek	on knapweed; crescents on tiny blue in- the-water forget-me- nots; field crescent on gumweed	bindweed, chickory, clover red, clover sweet cone flower, Erigeron, flax gayfeather; few flowers goldenrod, gumweed sunflower, Heterotheca pumalis knapweed, moth mullein prickly pear, prickly poppy smartweed, snakeweed, St. John's wort, toad flax	kestrel family of 6, mourning dove, Say's phoebe, meadowlark, w. kingbird. Prairie dog, cottontail rabbit.	Crowley

Table 2. Heil Valley– Geer Watershed	2014	4/21	5/6	6/9	6/10	6/10	8/17	9/1
<i>Papilio polyxenes</i>	Black Swallowtail							
<i>P. zelicaon</i>	Anise Swallowtail							
<i>P. indra</i>	Indra Swallowtail			7	2	3		
<i>P. rutulus</i>	Western Tiger Swallowtail			3		2		
<i>P. eurymedon</i>	Pale Swallowtail			13	1	1		
<i>P. multicaudata</i>	Two-tailed Swallowtail		1	6		1		
swallowtail sp.						1		
<i>Neophasia menapia</i>	Pine White							
<i>Pontia sisymbrii</i>	Spring White		1	1				
<i>P. protodice</i>	Checkered White							
<i>P. occidentalis</i>	Western White				1			
<i>Pieris rapae</i>	Cabbage White	7	5	8	2	11	69	39
<i>P. marginalis</i>	Mustard White							
<i>Euchloe ausonides</i>	Large Marble	3		6				
<i>E. olympia</i>	Olympia Marble							
<i>Anthocharis sara julia</i>	Julia Orangetip							
white sp.		13	5	6		8		
<i>Colias philodice</i>	Clouded Sulphur	2	2	2		3	1	2
<i>C. eurytheme</i>	Orange Sulphur	9+1 alba	1	11	1	3	6	4
<i>C. alexandra</i>	Queen Alexandra's Sulphur							
<i>Eurema mexicana</i>	Mexican Sulphur							
<i>Nathalis iole</i>	Dainty Sulphur							
sulphur sp.		8	2				2	
<i>Lycaena dione</i>	Gray Copper							
<i>L. heteronea</i>	Blue Copper							
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak		2	2	1	6		
<i>C. gryneus</i>	Siva Juniper Hairstreak							
<i>C. augustinus</i>	Brown Elfin							

Table 2. Heil Valley– Geer Watershed	2014	4/21	5/6	6/9	6/10	6/10	8/17	9/1
<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			4		1		
<i>Celastrina ladon sidara</i>	Echo Azure							
<i>Glaucopsyche piasus</i>	Arrowhead Blue			7		6		
<i>G. lygdamus</i>	Silvery Blue			13		9		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted- Blue			4		7		
<i>Echinargus isola</i>	Reakirt's Blue			1			7	2
<i>Plebejus melissa</i>	Melissa Blue			3	1	8		3
<i>P. saepiolus</i>	Greenish Blue							
<i>P. icarioides</i>	Boisduval's Blue			5		11		
<i>P. lupini lutzii</i>	Lupine Blue							
<i>P. glandon rustica</i>	Arctic Blue							
blue sp.			3	10		34	3	1
<i>Danaus plexippus</i>	Monarch							
<i>Apodemia nais</i>	Nais Metalmark							
<i>Euptoieta claudia</i>	Variegated Fritillary						1	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			6	1	2	4	9
<i>S. edwardsii</i>	Edwards' Fritillary			5	1	4		1
<i>S. coronis</i>	Coronis Fritillary							
<i>S. callippe</i>	Callippe Fritillary							
<i>S. hesperis</i>	Northwestern Fritillary							
<i>S. mormonia</i>	Mormon Fritillary							
fritillary sp.				25	4	19	18	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							
<i>P. cocyta</i>	Northern Crescent							
<i>P. pulchella</i>	Field Crescent			7	2	6	6	23
<i>Polygonia satyrus</i>	Satyr Comma							
<i>P. gracilis</i>	Hoary Comma	4		2				
** <i>Junonia coenia</i>	Common Buckeye		2				1	1
<i>Aglais milberti</i>	Milbert's Tortoiseshell				1			
<i>Nymphalis antiopa</i>	Mourning Cloak	2	1			2	1	
<i>N. californica</i>	California Tortoiseshell							
<i>Vanessa atalanta</i>	Red Admiral							
<i>V. cardui</i>	Painted Lady							

Table 2. Heil Valley– Geer Watershed	2014	4/21	5/6	6/9	6/10	6/10	8/17	9/1
<i>V. virginienensis</i>	American Lady							
<i>Limnitis weidemeyerii</i>	Weidemeyer's Admiral			1				
<i>Asterocampa celtis</i>	Hackberry Emperor							
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet			7	1	25		
<i>Cercyonis pegala</i>	Common Wood-Nymph						18	2
<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							
<i>Epargyreus clarus</i>	Silver-spotted Skipper				1	1		
<i>Thorybes pylades</i>	N. Cloudywing			3				
<i>Erynnis icelus</i>	Dreamy Duskywing					3		
<i>E. pacuvius</i>	Pacuvius Duskywing			6		5		
<i>E. afranius</i>	Afranius Duskywing							
<i>E. persius</i>	Persius Duskywing			5		3		
<i>Pyrgus communis</i>	Common Checkered-skipper			2	1	1		3
<i>Pholisora catullus</i>	Common Sootywing			2		1		
<i>Piruna pirus</i>	Russet Skipperling							
<i>Oarisma garita</i>	Garita Skipperling							
<i>Hesperia juba</i>	Juba Skipper			1	1	4		
<i>H. colorado</i>	Western Branded Skipper						3	5
<i>H. nevada</i>	Nevada skipper							
<i>Polites themistocles</i>	Tawny-edged Skipper							
<i>Ochlodes sylvanoides</i>	Woodland Skipper						8	
<i>Poanes taxiles</i>	Taxiles Skipper							
<i>Euphyes vestries</i>	Dun Skipper				2			
<i>Atrytonopsis hianna</i>	Dusted Skipper		1	2		1		
skipper sp.			1	2			3	7

** New for Geer Watershed in 2014 **alba** = alba form of sulphur, female

Table 2. Continued. Heil-Geer Watershed	2007	2008	2009	2010	2011	2012	2013	2014
# of Species Identified each year in Heil-Geer	42	56	44	49	36	38	38	42
Cumulative # of Species Sighted in Heil-Geer Watershed	81	87	90	91	91	91	91	92
Research Hours at Site	15.5	21	12.5	14	14	10	11	18
# Individual Butterflies Counted	569	1225	492	419	436	530	264	738
# Individuals / Research Hour	37	58	39	30	31	53	24	41
# Species / Research Hour	2.7	2.7	3.5	3.5	2.6	3.8	3.5	2.3

Table 2 (continued) Date, Conditions Heil-Geer	Location within Heil - Geer	Butterfly Activity	Blossoming Plants	Animals	Researchers
4/21/2014 11:40-1:55 p.m. 15-20 ° C, wind 5-10 mph, 50% clouds	Roadway from gate to barn, walked out near stream.	Sulphurs and whites were flying	Alyssum parviflorum, white mustard, dandelion filaree, Nuttall's violet, Pasque flower, sand lily, Single blossom each – buttercup, plum, spring beauty, wax currant	bluebird, western, bluebird, mountain, flicker, crow, magpie, Mallard, red tailed hawk. spotted towhee, Steller's jay, warbler, yel rumped Cricket frogs.	Jan Chu, Larry Crowley
5/6/2014 10:30-1:30 p.m. 14 - 20 ° C Overcast to 20% clouds, wind 0-5 mph	From barn, toward Big Meadow; rocky slope, across meadow to small stream return by Geer Stream	Few butterflies. Bramble hairstreak nectaring on rock cress	Spring beauties, sand lily, mouse ear, filaree, rock cress, salt & pepper, wavy leaf dandelion, puccoon, Nuttall's violet, golden banner, deer clover, daisy, white w/ pink under petals, wax currant, pasque flower, Mahonia, Mertensia, saxifrage	Frogs peeping	Jan Chu, Jean Morgan
6/9/2014 10:40 – 3:00 p.m. 22-26 °C, clear to 20% cloudy wind 0-10 mph	Geer Watershed. Gate toward Manager's cabin where stream crosses road.	Much puddling. Fritillaries nectaring on Jamesia, ringlet on Erigeron; pale swallowtail on Penstemon	Bindweed, sweet clover, dandelion, flax, Gaillardia, Gaura, Fremont's Geranium, golden banner, poison hemlock, Heterotheca, Jamesia, Lambert's loco, white lupine, Penstemon virens, one-sided Penstemon, herbaceous Potentilla, puccoon, rose, spider wort, stone crop, sulfur flower.	Turkey with 7 chicks, w. tanager, Am. crow, house wren, hairy woodpecker, violet-green swallow, cordilleran flycatcher Steller's jay, raven, br tail hummingbird, pine siskin, Amer robin, yellow-rump warbler chipping sparrow. Woodhouse immature toad.	Jan Chu, Jean Morgan, Larry Crowley, John Barr

Table 2 (continued) Date, Conditions Heil-Geer	Location within Heil - Geer	Butterfly Activity	Blossoming Plants	Animals	Researchers
6/10/2014 10:30-11:30 a.m. then 12:00- 2:00 22-26 °C, High, thin clouds, 5-10 mph wind.	Frog pond, then drove to barn. Walked by stream to Big Meadow	Frog pond had 16 species of butterflies.	Boulder raspberry, ball cactus, Ceanothus fendleri, chickweed, Geranium Fremont, honeysuckle, Hydrophyllum(dry land) Lambert's loco, small lilac loco, lupine white, black medic, mtn parsley, penstemon – blue, one-sided and virens, poison hemlock, Potentilla, rose, Senecio, spiderwort, sulfur flower, toad flax, yarrow	House wren, turkey vulture, flicker, robin, spotted towhee, w. wood pewee, magpie, mtn bluebird. immature Woodhouse toad	Jan Chu, Jean Morgan, Larry Crowley, John Barr
8/17/2014 9:15-12:15 p.m. 24-30 °C, clear sky, wind 0-3 mph	Frog pond, inside Manager's gate, then barn to stream to upper drive, by Big Meadow	Frog pond is covered with green algae.		Canyon wren, br. tail hummingbird, Townsend's solitaire, nuthatch, red tail hawk. Abert's squirrel, tiny toad.	Jan Chu, Jean Morgan, John Barr, Chuck Lowry, Richard Holmes
9/1/2014 11:00 – 1:45 P.M. 18-25 °C, Clear sky to 50% overcast 0- 10 mph wind.	Inside gate, along roadway to the first crossing of Geer Creek toward Manager's cabin, return by stream.	Crescents by stream; fritillaries flying.	aster, blue, gay feather Heterotheca spiderwort, white Erigeron	Bluebird. bro-tailed hummingbird green back goldfinch hawk red-tail (3 over ridge top) house wren pine siskin Steller's jay. W. terrestrial garter snake.	Jan Chu, Amy Chu, Abbey and Dan Fosco

Table 3. Heil Valley – North – North Point, Red Hill, Red Gulch	2014	3/16 N. Point	3/20 N. Point	6/1 N. Point	6/3 Red Hill	5/27 Red Gulch	7/4 Red Gulch	8/16 Red Gulch
<i>Papilio polyxenes</i>	Black Swallowtail							
<i>P. zelicaon</i>	Anise Swallowtail				1			1
<i>P. indra</i>	Indra Swallowtail				3			
<i>P. rutulus</i>	Western Tiger Swallowtail					2		
<i>P. eurymedon</i>	Pale Swallowtail				2			
<i>P. multicaudata</i>	Two-tailed Swallowtail			3	1			1
<i>Neophasia menapia</i>	Pine White							
<i>Pontia protodice</i>	Checkered White	7ph	7					1
<i>P. occidentalis</i>	Western White							
<i>P. sisymbrii</i>	Spring White				1			
<i>Pieris rapae</i>	Cabbage White	3			1	16	110	24
white sp.		1	8	10	22	5		
<i>Euchloe ausonides</i>	Large Marble			6	4	1		
<i>E. olympia</i>	Olympia Marble					5		
<i>Anthocharis sara julia</i>	Julia Orangetip							
<i>Colias philodice</i>	Clouded Sulphur	1	1	2	6	11		5
<i>C. eurytheme</i>	Orange Sulphur	12	12	12	3	13	50	18
<i>C. alexandra</i>	Queen Alexandra's Sulphur							
<i>Nathalis iole</i>	Dainty Sulphur				1			1
sulphur sp.				7	3			
<i>Lycaena dione</i>	Gray Copper							
<i>Lycaena heteronea</i>	Blue Copper							
<i>Callophrys affinis</i>	Canyon Bramble Hairstreak				1		1	
<i>C. gryneus</i>	Siva Juniper Hairstreak							
<i>C. eryphon</i>	Western Pine Elfin							
<i>Satyrium behrii</i>	Behr's Hairstreak						2	
<i>S. titus</i>	Coral Hairstreak							
<i>Strymon melinus</i>	Gray Hairstreak							2
<i>Leptotes marina</i>	Marine Blue							
<i>Cupido amyntula</i>	Western Tailed-blue					2		
<i>Celastrina ladon sidara</i>	Echo (Spring) Azure							
<i>Glaucopsyche piasus</i>	Arrowhead Blue							
<i>G. lygdamus</i>	Silvery Blue				7	8		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-blue			2				

Table 3. Heil Valley – North – North Point, Red Hill, Red Gulch	2014	3/16 N. Point	3/20 N. Point	6/1 N. Point	6/3 Red Hill	5/27 Red Gulch	7/4 Red Gulch	8/16 Red Gulch
<i>Euphilotes ancilla barnesi</i>	ssp. RM Dotted-blue ID P.A. Opler			1ph				
<i>Echinargus isola</i>	Reakirt's Blue						2	2
<i>Plebejus melissa</i>	Melissa Blue				2	20	3	6
<i>P. icarioides</i>	Boisduval's Blue							
<i>P. lupini lutzi</i>	Lupine Blue							
<i>P. glandon rustica</i>	Arctic Blue							
blue sp.				2	8	10	3	15
<i>Danaus plexippus</i>	Monarch							
	Viceroy							1
<i>Libytheana carinenta</i>	American Snout							
<i>Euptoieta claudia</i>	Variegated Fritillary	4ph	8	4	2		13	3
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			2	2ph		7	9
<i>S. edwardsii</i>	Edwards' Fritillary			2	3			1
<i>S. coronis</i>	Coronis Fritillary				1ph		14	
<i>S. callippe</i>	Callippe Fritillary							
** <i>S. hesperis</i>	Northwestern Frit							1
<i>S. mormonia</i>	Mormon Fritillary							
fritillary sp.				40	42	1	17	27
** <i>Euphydryas anicia</i>	Variable Checkerspot						1	
<i>Chlosyne gorgone</i>	Gorgone Checkerspot					1		
<i>C. nycteis</i>	Silvery Checkerspot							
<i>C. palla</i>	Northern Checkerspot							
<i>Phyciodes pallida</i>	Pale Crescent				1			
<i>P. tharos</i>	Pearl Crescent							
<i>P. cocyta</i>	Northern Crescent							
<i>P. pulchella</i>	Field Crescent			5	80	47		16
crescent sp.				7				1
<i>Polygonia satyrus</i>	Satyr Comma							
<i>P. gracilis</i>	Hoary Comma						1	
<i>Nymphalis antiopa</i>	Mourning Cloak	5	1	1	1	3		
<i>Junonia coenia</i>	Buckeye, Common							1
<i>N. californica</i>	California Tortoiseshell							
<i>Vanessa atalanta</i>	Red Admiral							
<i>Aglais milberti</i>	Milbert's Tortoiseshell		1					
<i>V. cardui</i>	Painted Lady			1		7		1
<i>V. virginiensis</i>	American Lady						1	

Table 3. Heil Valley – North – North Point, Red Hill, Red Gulch	2014	3/16 N. Point	3/20 N. Point	6/1 N. Point	6/3 Red Hill	5/27 Red Gulch	7/4 Red Gulch	8/16 Red Gulch
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			1			1	
<i>Asterocampa celtis</i>	Hackberry Emperor						6	15
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet			2	41	13	1	
<i>Cercyonis pegala</i>	Common Wood-Nymph						1	14
<i>C. oetus</i>	Small Wood-Nymph							
** <i>Erebia epipsodea</i>	Common Alpine							
<i>Epargyreus clarus</i>	Silver-spotted Skipper						1	
<i>Erynnis afranius</i>	Afranius Duskywing							
<i>E. persius</i>	Persius Duskywing							
<i>E. icelus</i>	Dreamy Duskywing					1		
<i>Pyrgus communis</i>	Common Checkered-skipper			2	1	17	2	37
<i>Pholisora catullus</i>	Common Sootywing					6		1
<i>Piruna pirus</i>	Russet Skipperling							
<i>Oarisma garita</i>	Garita Skipperling							
<i>Hesperia juba</i>	Juba Skipper			2ph				
<i>H. pahaska</i>	Pahaska Skipper							
<i>H. viridis</i>	Green Skipper				1ph			
<i>H. nevada</i>	Nevada Skipper							
<i>Polites themistocles</i>	Tawny-Edged Skipper							
<i>P. mystic</i>	Long Dash							
<i>Atrytone arogos</i>	Arogos Skipper							
<i>Ochlodes sylvanoides</i>	Woodland Skipper							6
<i>Poanes taxiles</i>	Taxiles Skipper						6	
<i>Euphyes vestries</i>	Dun Skipper						6	
<i>Atrytonopsis hianna</i>	Dusted Skipper				2	1		
skipper sp.				3	2	1		
**newly identified for Heil-North (Red Gulch) 2014								

Table 3. Continued. Heil Valley Ranch - North

Heil Valley Ranch-North	2005		2011	2012	2013	2014
# Species Identified During Each Year in Heil North	30		33	24	30	50
Cumulative # Species Sighted in Heil-North			81	85	86	89
Research Hours on Site	3		11.5	6.5	12	27
# Individual Butterflies Counted	194		272	188	402	1077
# Individuals/Research Hour	64		24	29	36	40
# Species/Research Hour			2.9	3.6	2.5	1.9

Table 3. Continued. Date, Conditions Heil Valley Ranch - North	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
3/16/2014 1:00 p.m. 3:10 p.m. 15-18 °C 95% clear 0-5 mph wind.	North Point Inside locked gate, ½ mile uphill on roadway.	Whites, sulphurs and cloaks flying. White nectaring on small yellow mustards.	Filaree, mustard, little yellow Alyssum parviflorum.	Canyon wren, magpie, golden eagle.	Jan Chu, Larry Crowley, Jon Chu
3/20/2014 11:15-12:50 p.m., 15 °C, wind 0-10 mph, 50% clouds	North Point Inside locked gate, ½ mile uphill on roadway	Observing the especially <u>small</u> Variegated Fritillaries	Alyssum parviflorum	magpie, Steller's jay, scrub jay	Jan Chu, John Barr, Carol Cushman

Table 3. <i>Continued.</i> Date, Conditions Heil Valley Ranch - North	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
5/27/2014 10:15 – 2:00 p.m., 23-26°C, no clouds to 60% clouds, 0-5 mph wind	Red Gulch. Walked through Ken LaFollette's back area	Painted lady nectaring on shepherd's purse and skunkbush, field crescent on shepherd's purse	Boulder raspberry, cactus ball, choke cherry, purple clover, dandelion, Erigeron, Fremont Geranium, filaree, flax, goat head, Lambert's loco, orange mallow, Mertensia, milk vetch, mouse- ear, Nuttall's violet, Oxalis, Penstemon viridens, Physaria, Potentilla, Salsify, sand lily, shepherd's purse, skunkbush, wall flower	House wren, spotted towhee, chickadee, magpie, mourning dove, meadowlark. Woodhouse toad, cricket frog.	Jan Chu, Larry Crowley, Jean Morgan. Met Kevin Grady.

Table 3. Continued. Date, Conditions Heil Valley Ranch - North	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
6/1/2014 10:00-12:55 p.m., 21 °C, 40% clouds to overcast, 5-25 mph wind,	North Point, inside gate up to juniper grove, second curve	Butterflies were very active, often flying too fast to catch or see well. Field crescent nectaring on Erigeron; fritillary nectaring on Arnica and Heterotheca. Variegated fritillaries mating. Hesperia juba, Euphilotes ancilla barnesi (ID P.Opler)	Arnica, bindweed butter and eggs catnip, Eriogonum geranium, Frem Filaree, Heterotheca Quincula lobata Penstemon, one-sided, and virens primrose evening Potentilla prickly poppy salsify, scarlet globe, mallow spiderwort		Jan Chu, Larry Crowley, Pam Piombino

Table 3.
Continued.
Date,
Conditions
Heil Valley
Ranch -
North

	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
<p>6/3/2014 9:45 – 2:20 p.m. 28 °C, all clear, wind 0-35 mph</p>	<p>Red Hill saddle, meadow above Plumely-Marietta, near elk exclosure. Frog pond.</p>	<p>Field crescents and ochre ringlet nectaring on Erigeron. Pale swallowtail, pale crescent puddling in the frog pond</p>	<p>Amica, black medic butter and eggs clover, purple Erigeron evening primrose flax Geranium Fremont Geyer’s onion golden banner Heterotheca, iris Lambert’s loco larkspur Mertensia milk vetch miner’s candle mouse ears, mustard, tower parsley Penstemon virens Physaria bellii Physaria sp Potentilla puccoon, fringed pussy toes Quincula lobata (purple) Salsify Senecio violet, Nuttall’s wall flower Zygadenus</p>		<p>Jan Chu, Larry Crowley, Jean Morgan</p>

Table 3. Continued. Date, Conditions Heil Valley Ranch - North	Location	Butterfly Behavior	Blossoming Plants	Animals	Researchers
7/4/2014 8:45 – 12:45 p.m. 27-31 96% sunshine, no wind	Red Gulch, through Ken LaFollette' s private property (with permission)	Lots of puddling including P. rapae males with one Hackberry. Orange Sulphurs, and again fritillaries in small groups			Lynn Monroe, Gene Monroe, Mary Jane Howell
8/16/2014	North Point				Pam Piombino
8/16/2014 9:20-12:10 p.m. 25-30 °C 85% clear, wind 3-5 mph	Red Gulch to the first damp spot full of honeybees. Entered through Ken LaFollette' s private property (with permission)	Fritillaries and blues flying too fast to catch or see well. Hackberry nectaring on mallow	alfalfa toadflax bindweed bull thistle catnip chickery clover sweet coneflower dandelion, flax Geranium Fre Heterotheca vulgaril, Hymenopsis rutulus Mentzelia moth mullein mullein Soldago spruge wild lettuce	spotted towhee scrub jay cowbird Lark sparrow. Sphinx moth Apricot moth Ichneumon wasp. Woodhouse toad	Jan Chu, Larry, Jean Morgan, Amy Chu, Chuck Lowry

Table 4. Walker Ranch, Meyer's Homestead Trail	2014	4/22	5/20	6/17	8/3
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian			6	
<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				

Table 4. Walker Ranch, Meyer's Homestead Trail	2014	4/22	5/20	6/17	8/3
<i>P. eurymedon</i>	Pale Swallowtail			1	
<i>P. multicaudata</i>	Two-tailed Swallowtail				
<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	4
white sp.			4	7	4
<i>Euchloe ausonides</i>	Large Marble			6	
<i>Anthocharis sara julia</i>	Julia Orangetip			1	
<i>Colias philodice</i>	Clouded Sulphur	1	2	1alb +3	
<i>C. eurytheme</i>	Orange Sulphur			3	4
<i>C. alexandra</i>	Queen Alexandra's Sulphur				
<i>Nathalis iole</i>	Dainty Sulphur			1	
sulphur sp.				2	6
<i>Lycaena heteronea</i>	Blue Copper				
<i>Satyrrium saepium</i>	Hedgerow Hairstreak				2
<i>Callophrys affinis</i>	Canyon Bramble Hairstreak		4	15	
<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		17		
<i>C. eryphon</i>	Western Pine Elfin				
<i>Strymon melinus</i>	Gray Hairstreak				1
<i>Cupido amyntula</i>	Western Tailed-Blue				
<i>Celestrina ladon sidara</i>	Echo Azure	1	5	1	
<i>Glaucopsyche piasus</i>	Arrowhead Blue			1	
<i>G. lygdamus</i>	Silvery Blue			2	
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted- Blue			31	
<i>Echinargus isola</i>	Reakirt's Blue			1	3
<i>Plebejus melissa</i>	Melissa Blue			1	
<i>P. saepiolus</i>	Greenish Blue				
<i>P. icarioides</i>	Boisduval's Blue			19	
<i>P. lupini lutzii</i>	Lupine Blue				
<i>Agriades glandon rustica</i>	Arctic Blue			2ph	
blue sp.			2	19	5
<i>Danaus plexippus</i>	Monarch			1	1
<i>Apodemia nais</i>	Nais Metalmark				
<i>Euptoieta claudia</i>	Variegated Fritillary				
<i>Speyeria aphrodite</i>	Aphrodite Fritillary				5
<i>S. edwardsii</i>	Edwards' Fritillary				1
<i>S. callippe</i>	Callippe Fritillary				
<i>S. hesperis</i>	Northwestern Fritillary				
<i>S. mormonia</i>	Mormon Fritillary				
fritillary sp.				4	9
<i>Chlosyne gorgone</i>	Gorgone Checkerspot				
<i>C. nycteis</i>	Silvery Checkerspot			7	
<i>C. palla</i>	Northern Checkerspot			4	

Table 4. Walker Ranch, Meyer's Homestead Trail	2014	4/22	5/20	6/17	8/3
<i>Phyciodes cocyta</i>	Northern Crescent			7	
<i>P. pulchella</i>	Field Crescent		1	5	
<i>Phyciodes pallida</i>	Pale Crescent				
<i>Euphydryas anicia</i>	Variable Checkerspot			2ph	
<i>Polygonia gracilis</i>	Hoary Comma	1	1		
<i>Aglais milberti</i>	Milbert's Tortoiseshell				
<i>Nymphalis antiopa</i>	Mourning Cloak		1		1
<i>N. californica</i>	California Tortoiseshell				
<i>Vanessa atalanta</i>	Red Admirable			1	
<i>V. cardui</i>	Painted Lady				7
<i>V. virginiensis</i>	American Lady				
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			1	
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet			28	
<i>Cercyonis pegala</i>	Common Wood Nymph				
<i>C. oetus</i>	Small Wood Nymph				12
<i>Erebia epipsodea</i>	Common Alpine			7	
<i>Oeneis chryxus</i>	Chryxus Arctic			1	
<i>O. uhleri</i>	Uhler's Arctic			5	
arctic sp.				2	
<i>Erynnis icelus</i>	Dreamy Duskywing				
<i>E. pacuvius</i>	Pacuvius Duskywing			2	
<i>E. persius</i>	Persius Duskywing			7	
duskywing sp.				3	
<i>Pyrgus communis</i>	Common Checkered-skipper				1
<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				
<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				
<i>Euphyes vestris</i>	Dun Skipper				2
skipper sp.				1	

ph=photo available **alb** = alba form of the sulphur

Table 4. Continued. Walker Ranch, Meyer's Homestead Trail	2007	2008	2009	2010	2011	2012	2013	2014
# Species Identified during each year in Meyer's Homestead Trail	30	35	45	35	50	47	62	43
# Species Sighted in Meyer's Homestead Trail 2007-2014	33*	38	60	70	72	75	75	75
# Research Hours on Site 2014	5	4	18	16	16.5	7	14.5	11
# Individual Butterflies Counted 2014	160	203	1144	437	472	399	394	322
# Individuals / Research Hour	32	54	64	27	29	57	27	29
# Species / Research Hour	6.0	8.8	2.5	2.2	3.0	6.7	4.3	3.9

Date Conditions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	Researchers
4/22/2014 11:15- 12:15 p.m. 17 °C 70% cloudy to light shower , wind 5 mph	Meyer's Homestead Trail to streamlet, kinnikinnick hill	Too cool for flight	candy tuft, dandelion, Filaree, Kinnikinnick, mouse ear, pasque flower	bluebird mtn, bluebird, west. chickadee, chipping sparrow, crow, flicker, house finch, nuthatch white breast, robin, Steller's jay, turkey vulture, warbler (myrtle) yel rumped junco	Jan Chu, Jean Morgan, Chuck Lowrie
5/20/2014 10:15- 12:15 p.m. 17-20 °C overcast, intermittent sunshine, 0- 10 mph wind	Meyer's Homestead Trail to upper seeps, beyond kinnikinnick patches	Few flying, some puddling	Kinnikinnick, mouse ear, Filaree, dandelion, candy tuft, pasque flower, strawberry, golden corydalis, rock jasmine, wax currant, wall flower, sand lily, fleabane daisy, pink pussy toes, Mertensia, Mountain parsley, purple locoweed, spring beauty	W. wood peewee, dusky flycatcher, crow, raven, mtn and w. bluebird, vesper sparrow, black headed grosbeak, yellow-rump warbler, robin, house wren, chipping sparrow, flicker, house finch, swallow sp. Steller's jay, br-tailed hummingbird	Jan Chu, Jean Morgan, Chuck Lowry, Dan Fosco, Susan Spaulding
6/17/2014 10:00- 2:30 p.m. 19- 23 °C wind 0- 5 mph 95% clear	Meyer's Homestead Trail to barn, to blackberry bushes on ridge. Few damp places where many were 'puddling.'	Dotted blue nectaring on white clover.	Arnica, black medic blue-eyed grass chamomile clover, alsike & red clover, white Dutch dandelion, death camus, Erigeron flax, Geranium Frem. and Richardson hawkweed, hound's tongue, Hydrophyllum iris, Lambert loco miners' candle mouse ears, mullein Penstemon virens and one-sided, Potentilla pussytoes, rose salsify, Senecio shooting star skullcap, spring beauty, stonecrop wild buckwheat tower mustard wall flower, yarrow	Am. Crow American Robin Broad-tailed Hummingbird Chipping Sparrow, Cordilleran Flycatcher House Wren Lesser Goldfinch Mountain Bluebird, No. Flicker, Pigmy Nuthatch Spotted Towhee Turkey Vulture, Vesper Sparrow W. Wood-Pewee Western Bluebird, White-breasted Nuthatch	Janet Chu, Larry Crowley, Jean Morgan

Date Conditions	Location Walker	Butterfly Behavior	Blooming Plants	Animals	Researchers
8/3/2014 9:30 – 2:00 p.m. 17-23 °C Clear to 50% high cirrus, wind 0-5 mph	Meyer's Homestead Trail as far as raspberries and pine trees. Jean and Larry searched both sides of the trail for the few butterflies. Only one puddle and we expected to find many puddles.	Orange sulfur nectar on gay feather, painted lady on Monarda, fritillaries and whites flying high.	bull thistle campanula, chickory clover owl and red and sweet Deptford pink Erigeron, flax Gaillardia, gayfeather Geranium, Fremont Geran. Richardson Gilia, white gunweed, hawkweed Helianthus pumulus, Heterotheca, Lupine Monarda, mullein onion Geyer's paintbrush red Penstemon, rose Rydbeckia ampla salsify, St. John's wort wild buckwheat Susan black-eyed umbrella wort, yarrow	Turkey vulture, w. wood pewee, flicker, Am. goldfinch, br .tail. hummingbird, house wren. Townsend's solitaire	Jan Chu, Larry Crowley, Jean Morgan, Kerrie Bryan and Paul Schultz Volunteer Naturalists, public walk. 13 adults.

Table 5. Reynold's Ranch	2014	6/5	6/5	8/28
<i>Parnassius smintheus</i>	Parnassian, Rocky Mtn.			
<i>Papilio polyxenes</i>	Black Swallowtail			
<i>P. zelicaon</i>	Anise Swallowtail			
<i>P. rutulus</i>	W. Tiger Swallowtail			
<i>P. eurymedon</i>	Pale Swallowtail			
<i>P. multicaudata</i>	Two-tailed Swallowtail			
<i>Neophasia menapia</i>	Pine White			
<i>Pieris rapae</i>	Cabbage White			
<i>Pontia protodice</i>	Checkered White			
white sp.		3	4	
<i>Euchloe ausonides</i>	Large Marble	3	1	
<i>Anthocharis julia</i>	Julia Orangetip		1	
<i>Colias philodice</i>	Clouded Sulphur			
<i>C. eurytheme</i>	Orange Sulphur	2		
<i>C. alexandra</i>	Queen Alexandra's Sulphur			
sulphur sp.		3	3	1
<i>Lycaena rubidus</i>	Ruddy Copper			
<i>L. helloides</i>	Purplish Copper			
<i>Callophrys spinetorum</i>	Thicket Hairstreak			
<i>C. eryphon</i>	W. Pine Elfin	1		
<i>Strymon melinus</i>	Gray Hairstreak			
<i>Celastrina ladon sidara</i>	Echo (Spring) Azure	1		
<i>Glaucopsyche lygdamus</i>	Silvery Blue	2		
<i>Echinargus isola</i>	Reakirt's Blue			
<i>Plebejus melissa</i>	Melissa Blue			1
<i>Euphilotes ancilla</i>	R Mtn Dotted Blue			
<i>Plebejus saepiolus</i>	Greenish Blue			
<i>Glaucopsyche piasus</i>	Arrowhead Blue			
<i>P. icarioides</i>	Boisduval's Blue			
<i>P. glandon rustica</i>	Arctic Blue			
<i>Danaus plexippus</i>	Monarch			
<i>Limnitis weidemeyerii</i>	Weidemeyer's Admiral			
blue sp.		1		1
<i>Euptoieta claudia</i>	Variegated Fritillary			
<i>Speyeria aphrodite</i>	Aphrodite Fritillary			
<i>S. edwardsii</i>	Edwards' Fritillary			
<i>S. coronis</i>	Coronis Fritillary			
<i>S. callippe</i>	Callippe Fritillary			
<i>S. hesperis</i>	Northwestern Fritillary			
<i>S. mormonia</i>	Mormon Fritillary			
<i>Boloria selene</i>	Silver-bordered Fritillary			
fritillary sp.			2	2
<i>Chlosyne palla</i>	Northern Checkerspot			
<i>Phyciodes pallida</i>	Pale Crescent			
<i>P. tharos</i>	Pearl Crescent			

Table 5. Reynold's Ranch	2014	6/5	6/5	8/28
<i>P. cocyta</i>	Northern Crescent			
<i>P. pulchella</i>	Field Crescent			
crescent sp.				
<i>Polygonia gracilis</i>	Hoary Comma			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			
<i>Cercyonis oetus</i>	Small Wood Nymph			14
<i>Erebia epipsodea</i>	Common Alpine			
<i>Oeneis chryxus</i>	Chryxus Arctic			
<i>Erynnis persius</i>	Persius Duskywing			
<i>Oarisma garita</i>	Garita Skipperling			
<i>Hesperia colorado</i>	W. Branded Skipper			
<i>Polites draco</i>	Draco Skipper			
<i>Ochlodes sylvanoides</i>	Woodland Skipper			
<i>Pyrgus communis</i>	Common Checkered- Skipper			
<i>Euphyes vestris</i>	Dun Skipper			

Table 5. Continued. Reynold's Ranch, Giggy Pond and North Bog	2011	2012	2013	2014
# Species Identified during each year in Reynold's Ranch	32	46	36	9
# Species Sighted in Reynold's Ranch 2011-2014	35	55	55	55
# Research Hours on Site	13	11.5	10.5	4
# Individual Butterflies Counted	541	635	395	47
# Individuals / Research Hour	41.6	55	37.6	12
# Species / Research Hour	2.5	4	3.4	2.1

Table 5 (continued) Date, Conditions	Location within Reynold's Ranch	Butterfly Behavior	Blossoming Plants	Animals	Researchers
6/5/2014 10:00-11:15 a.m. 14° C no clouds, 0- 10 mph wind	Giggey Pond was flooded. Walked along fence line then returned in pine forest to the east.		Bistort, dandelion, golden banner, Mertensia, strawberry, iris, pasque flower, candytuft, chickweed, buttercup, pussy toes, Senecio	Redwing blackbird, ruby cr kinglet, Steller's jay, hairy woodpecker in a nest hole in aspen, house wren, robin, junco, mtn chickadee.	Jan Chu, Larry Crowley, Venice and Galen Kelly, Wynne Whyman
6/5/2014 (con't) 11:20-12:10 p.m. 18 °C 0-5 wind 35% clouds	North Bog was totally saturated. Walked along the west aspen-pine	Few flying	Erigeron, parsley whiskbroom rock jasmine, tower mustard, wall flower	Swallow sp. magpie, mtn bluebird, red-tailed hawk, flicker, hermit thrush	Jan Chu, Larry Crowley, Venice and Galen Kelly, Wynne Whyman

Table 5 (continued) Date, Conditions	Location within Reynold's Ranch	Butterfly Behavior	Blossoming Plants	Animals	Researchers
	edge.				
8/28/2014 9:30 -11:30 a.m. 15-17° C, sky 90% clear to overcast, 5- 10 mph wind.	Giggy Pond inside fence along bog, return thru sunlight in Pines. North Bog had cattle and no butterflies.	Small wood nymphs were flying and mating.	bottle gentian, blue Potentilla, Erigeron white, yellow aster, yarrow. Many varieties of unusually (4') tall grasses, Campanula, Gaillardia, Heterotheca,	Chickadee, hummingbird, red-tailed hawk, chipping sparrow, flicker. Golden mantled ground squirrel, doe and fawn.	Jan Chu, Chuck Lowry, Venice Kelly

Table 6		6/22	6/28	7/9	7/10	7/18	7/25	8/12	8/30
Caribou- Mud Lake	2014								
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian	9	2	35	41	1	7		
<i>Papilio polyxenes</i>	Black Swallowtail								
<i>P. zelicaon</i>	Anise Swallowtail								
<i>P. rutulus</i>	W. Tiger Swallowtail				1				
<i>P. eurymedon</i>	Pale Swallowtail						1		
* <i>P. multicaudata</i>	Two-tailed Swallowtail								
swallowtail sp.							1		
<i>Neophasia menapia</i>	Pine White								2
<i>Pontia protodice</i>	Checkered White	3					1		
<i>P. occidentalis</i>	Western White								
<i>Pieris rapae</i>	Cabbage White				1	3	6		
<i>P. marginalis</i>	Mustard White								
<i>Euchloe ausonides</i>	Large Marble	3	1						
<i>Anthocharis sara julia</i>	Julia Orangetip								
white sp.		3				2	3		
<i>Colias philodice</i>	Clouded Sulphur	1							3
<i>C. eurytheme</i>	Orange Sulphur	4		2	4		5		1
<i>C. alexandra</i>	Queen Alexandra's Sulphur		3	30	61	12	23	1	
sulphur sp.							1	1	
<i>Eurema mexicana</i>	Mexican Sulphur								
<i>Abaeis nicippe</i>	Sleepy Orange								
<i>Nathalis iole</i>	Dainty Sulphur								
<i>Lycaena rubidus</i>	Ruddy Copper					1		1	1
<i>L. heteronea</i>	Blue Copper								
<i>L. helloides</i>	Purplish Copper								
<i>Callophrys affinis</i>									
<i>homoperplexa</i>	Canyon Bramble Hairstreak								
	White-lined Green Hairstreak								
<i>C. sheridanii</i>									
<i>C. spinetorum</i>	Thicket Hairstreak	1							
<i>C. augustinus</i>	Brown Elfin								
<i>C. polios</i>	Hoary Elfin								
<i>C. eryphon</i>	Western Pine Elfin								
<i>Satyrrium saepium</i>	Hedgerow Hairstreak								
<i>Strymon melinus</i>	Gray Hairstreak								
<i>Cupido amyntula</i>	Western Tailed-Blue						1		
<i>Celastrina ladon sidara</i>	Echo (Spring) Azure								
<i>Glaucopsyche piasus</i>	Arrowhead Blue								
<i>G. lygdamus</i>	Silvery Blue								
	Rocky Mountain Dotted- Blue		1	8	16		1		
<i>Euphilotes ancilla</i>									
<i>Echinargus isola</i>	Reakirt's Blue	1		1	5	1			
<i>Plebejus melissa</i>	Melissa Blue								1
<i>P. saepiolus</i>	Greenish Blue	2	2	1	2				
<i>P. icarioides</i>	Boisduval's Blue			5	16		11		
<i>P. lupini lutzii</i>	Lupine Blue	2		3	6	1			
<i>P. glandon rustica</i>	Arctic Blue	3			1	5			
blue sp.		15	3	13	16	4	4		1
<i>Euptoieta claudia</i>	Variegated Fritillary	1							
<i>Speyeria aphrodite</i>	Aphrodite Fritillary					1	2		

Table 6 (Continued) Caribou- Mud Lake	2014	6/22	6/28	7/9	7/10	7/18	7/25	8/12	8/30
<i>S. edwardsii</i>	Edwards' Fritillary			1			1	1	1
<i>S. coronis</i>	Coronis Fritillary								
<i>S. hesperis</i>	Northwestern Fritillary								
<i>S. mormonia</i>	Mormon Fritillary			1					
fritillary sp.					6	3	14		15
<i>Poladryas arachne</i>	Arachne Checkerspot			2				1	
<i>Chlosyne gorgone</i>	Gorgone Checkerspot								
<i>C. nycteis</i>	Silvery Checkerspot	1			12		4		
<i>C. palla</i>	Northern Checkerspot		2	9	6		10		
<i>Phyciodes pallida</i>	Pale Crescent								
<i>P. tharos</i>	Pearl Crescent				1				
<i>P. cocyta</i>	Northern Crescent				2	2	3		
<i>P. pulchella</i>	Field Crescent	8	7			1	2		1
<i>Euphydryas anicia</i>	Variable Checkerspot								
checkerspot sp.					4				
<i>Polygonia faunus</i>	Green Comma								
<i>P. gracilis</i>	Hoary Comma							1	5
<i>Nymphalis antiopa</i>	Mourning Cloak				1			1	1
<i>Vanessa atalanta</i>	Red Admiral								
<i>V. cardui</i>	Painted Lady			1		1			1
<i>V. virginiensis</i>	American Lady								
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral				1	1	3	1	
<i>Coenonympha tullia</i>									
<i>ochracea</i>	Common (Ochre) Ringlet	17	9	6	17	1			
<i>Cercyonis pegala</i>	Common Wood-Nymph								
<i>C. oetus</i>	Small Wood-Nymph					1	22	1	1
<i>Erebia epipsodea</i>	Common Alpine	10	2		2				
<i>Oeneis chryxus</i>	Chryxus Arctic	1		9	16	1	9		
<i>Thorybes pylades</i>	Northern Cloudywing								
<i>Erynnis icelus</i>	Dreamy Duskywing								
<i>E. pacuvius</i>	Pacuvius Duskywing								
<i>E. persius</i>	Persius Duskywing			3					
<i>Pyrgus communis</i>	Common Checkered-skipper						1		
<i>Piruna pirus</i>	Russet Skipperling					9	1		
<i>Oarisma garita</i>	Garita Skipperling			3	6		1		
<i>Hesperia juba</i>	Juba Skipper								
<i>H. colorado</i>	Western Branded Skipper								
<i>H. pahaska</i>	Pahaska Skipper				2				
<i>H. viridis</i>	Green Skipper								
<i>H. nevada</i>	Nevada Skipper								
<i>Polites draco</i>	Draco Skipper	1		5	7				
<i>Poanes taxiles</i>	Taxiles Skipper								
<i>Ochlodes sylvanoides</i>	Woodland Skipper				5				
<i>Euphyes vestries</i>	Dun Skipper						1		
skipper sp.		4			1	1			

	2007	2008	2009	2010	2011	2012	2013	2014
# of Species Identified during June through August, each year in Caribou Ranch - Mud Lake	48	48	40	20	46	28	38	47
# of Species Sighted in Caribou/Mud 2007-2014	75	75	80	80	81	82	83	83
# of Research Hours on Site	10	12	8.5	6	12.5	8	8	14
# of Individual Butterflies Counted	358	647	278	145	488	304	361	752
# Individuals /Research Hour	36	54	33	24	39	38	45	54
# Species /Research Hour	4.8	4.0	4.7	3.3	3.7	3.5	4.8	3.4

Table 6. Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	Researchers
6/22/2014 10:30 – 12:00 p.m. 18 ° C, partly sunny	Mud Lake and Mud Lake bridge meadow				Venice Kelly, Jeff Mclachlan
6/28/2014 10:20-11:20 a.m. 15°C, 90% sun, strong wind.	Bridge Meadow at Mud Lake				Venice Kelly
7/9/2014 9:15-11:30 a.m. 18-21° C, Breezy.	Caribou parking lot and meadows				Venice Kelly

Table 6. Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	Researchers
7/10/2014 9:00 – 12:15 a.m. 20-23 ° C, 85% clear, to 85% overcast 0-5 wind	Inside locked gate, follow fence into bog and meadow	Queen Alexandra's Sulphur nectar on Gaillardia.	Arnica, bedstraw black-eyed Susan blue-eyed grass Campanula Ceanothus fendleri clover, red, cow parsnip death camus, Erigeron Gaillardia, Geranium Frem. Geranium Rich. Gilia scarlet golden banner, green gentian iris, Lambert's loco, lily sego lupine, Mertensia, Monkshood onion Geier, Osha, paint- brush red, white, yellow mtn parsley, Penstemon one- sided Potentilla, pussy toes, rose salsify, shooting star stone crop, sulfur flower sunflower, sweet clover wallflower, wintergreen bog yarrow	Pigmy nuthatch family, house wren, hairy woodpecker Am goldfinch, Williamson's sapsucker (nest in aspen trunk), Golden mantle ground squirrel.	Jan Chu, Larry Crowley, Jean Morgan, Venice Kelly Amy Chu, Janet Hanley
7/18/2014 9:45 – 11:30 a.m. 18 ° C, Sunny to cloudy	Caribou open space inside locked gate to DeLonde Homestead, over looking Caribou.	Russet skipperlings puddling on roadway to Homestead	Many mariposa (sego) lilies.		Venice Kelly and Jeff Maclachlin
7/25/14 9:30 a.m.- 12:15 p.m. 23-24 ° C High overcast to 55% cloudy, wind 5-25 mph	Parking lot, then drove to the Monarda (invasive daisy) Meadow near the horse trail; then to Bluebell Mine area	N. checkerspot nectaring on black- eyed Susan. Butterflies hugging blossoms or plants in the wind.	bedstraw, bee plant clover, red and white Erigeron, evening primrose fireweed, Gaillardia Geranium Frem. and Rich. gumweed, hairbell Lambert's loco, lily sego lupine, Monarda mullein, paintbrush red and white, Penstemon one-sided Potentilla, pussy toes, rose, Senecio, sulfur flower, yarrow	Crossbills, w. wood pewee. Deer, golden mantled ground squirrel.	Jan Chu, Larry Crowley, Amy Chu, Chuck Lowry, Wynne Whyman, Skeet Howe- Soper
8/12/2014	Mud Lake, Bridge Meadow				Venice Kelly, Jeff Maclachlan

Table 6. Date, Conditions	Location Caribou, Mud Lake	Butterfly Behavior	Blossoming Plants	Animals	Researchers
8/30/2014 10-11:30 a.m. 21° C sunny	Mud Lake, Bridge Meadow	Pine white nectaring on short white composite.		Clark's nutcracker. Abert's squirrel (3 young playing). Mormon cricket	Venice Kelly, Jeff Maclachlan

Table 7. Rabbit Mountain	2014	5/4
<i>Papilio polyxenes</i>	Black Swallowtail	
<i>P. rutulus</i>	W. Tiger Swallowtail	
<i>P. multicaudata</i>	Two-tailed Swallowtail	1
<i>Pontia protodice</i>	Checkered White	1
<i>P. occidentalis</i>	Western White	
<i>Euchloe ausonides</i>	Large Marble	
white sp.		4
<i>Colias philodice</i>	Clouded Sulphur	1
<i>C. eurytheme</i>	Orange Sulphur	9
Sulphur sp.		2
<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	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	
<i>S. edwardsii</i>	Edwards' Fritillary	
<i>S. coronis</i>	Coronis Fritillary	
<i>Chlosyne gorgone</i>	Gorgone Checkerspot	
<i>Phyciodes pulchella</i>	Field Crescent	6
<i>Vanessa cardui</i>	Painted Lady	3
<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	2ph

Table 7. (Continued) Data Conditions	Location Rabbit Mountain	Butterfly Behavior	Blossoms	Animals	Researchers
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5/4/2014 11:15 – 1:00 p.m. 25 ° C 5-35 mph wind , 50% high cloud	Walked up the slope from the parking lot off trail and returned by roadway	Flying, often carried by wind. Painted lady nectaring on skunk bush.	skunk bush (Rhus aromatic) in full bloom, very aromatic! Mertensia, daisy (pink below petals) golden smoke, Filaree, mustard medium tall yellow, wavy- leaf dandelion, flax, sand lily, verbena, composite fuzzy- leaf short petal med. tall, Nuttall's violet, salsify, puccoon, tower mustard, wild plum, choke cherry	Meadow lark, spotted towhee, turkey vulture	Jan Chu Larry Crowley
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Table 8. Anne U. White Trail, — Fourmile Canyon Creek	2014	3/26	8/21
<i>Parnassius smintheus</i>	Rocky Mountain Parnassian		
<i>Papilio polyxenes</i>	Black Swallowtail		
<i>P. zelicaon</i>	Anise Swallowtail		
<i>P. indra</i>	Short-tailed Swallowtail		
<i>P. rutulus</i>	W. Tiger Swallowtail		
<i>P. eurymedon</i>	Pale Swallowtail		
<i>P. multicaudata</i>	Two-tailed Swallowtail		3
swallowtail, yellow sp.			
<i>Pontia protodice</i>	Checkered White		1
<i>P. sisymbrii</i>	Spring White		
<i>Pieris rapae</i>	Cabbage White		18
<i>Euchloe ausonides</i>	Large Marble		
<i>E. olympia</i>	Olympia Marble		
marble sp.			
white sp.			2
<i>Anthocharis sara julia</i>	Julia Orangetip		
<i>Colias philodice</i>	Clouded Sulphur		

Table 8. Anne U. White Trail, — Fourmile Canyon Creek	2014	3/26	8/21
<i>C. eurytheme</i>	Orange Sulphur	1	2
<i>Nathalis iole</i>	Dainty Sulphur		
sulphur sp.		1	
<i>Callophrys affinis 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		
<i>Satyrium titus</i>	Coral Hairstreak		
<i>Strymon melinus</i>	Gray Hairstreak		
<i>Cupido amyntula</i>	Western Tailed-Blue		
<i>Celastrina ladon sidara</i>	Echo Azure		
<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		2
<i>P. saepiolus</i>	Greenish Blue		
<i>Plebejus melissa</i>	Melissa Blue		1
<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		
<i>Euptoieta claudia</i>	Variegated Fritillary		
<i>Speyeria aphrodite</i>	Aphrodite Fritillary		6
<i>S. edwardsii</i>	Edwards' Fritillary		
<i>S. coronis</i>	Coronis Fritillary		
<i>S. callippe</i>	Callippe Fritillary		
<i>S. hesperis</i>	Northwestern Fritillary		7
<i>S. mormonia</i>	Mormon Fritillary		
fritillary sp.			22
<i>Chlosyne gorgone</i>	Gorgone Checkerspot		
<i>C. palla</i>	Northern Checkerspot		
<i>Phyciodes pallida</i>	Pale Crescent		5
<i>P. tharos</i>	Pearl Crescent		

Table 8. Anne U. White Trail, — Fourmile Canyon Creek	2014	3/26	8/21
<i>P. cocyta</i>	Northern Crescent		2
<i>P. pulchella</i>	Field Crescent		
<i>Polygonia satyrus</i>	Satyr Comma		
<i>P. gracilis</i>	Hoary Comma	4	1
<i>Junonia coenia</i>	Common Buckeye		
<i>Aglais milberti</i>	Milbert's Tortoiseshell	1	
<i>Nymphalis californica</i>	California Tortoiseshell		
<i>N. antiopa</i>	Mourning Cloak	6	
<i>Vanessa atalanta</i>	Red Admiral		
<i>V. cardui</i>	Painted Lady	1	
<i>V. virginensis</i>	American Lady		1
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral		5
<i>Coenonympha tullia ochracea</i>	Common (Ochre) Ringlet		
<i>Cercyonis pegala</i>	Common Wood-Nymph		
<i>C. oetus</i>	Small Wood-Nymph		
<i>Oeneis uhleri</i>	Uhler's Arctic		
<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		2
<i>Piruna pirus</i>	Russet Skipperling		
<i>Hesperia juba</i>	Juba Skipper		
<i>H. colorado</i>	W. Branded Skipper		1
<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		29
<i>Poanes taxiles</i>	Taxiles Skipper		4
<i>Euphyes vestris</i>	Dun Skipper		
<i>Atrytonopsis hianna</i>	Dusted Skipper		
skipper sp.			2

ph=photo

Table 8. Continued. Anne U. White Fourmile Canyon	2007	2008	2009	2010	2011	2012	2013	2014
# of Species identified annually in Anne U. White	44	45	35	31	47	50	29	'17'
Cumulative # Species sighted in Anne U. White 2007-2014	47	66	69	69	75	82	82	82
Research Hours on Site	9.5	16	10	10.5	19.5	13.5	11	6
# Individual Butterflies Counted	366	536	217	112	773	509	334	'105'
# Individuals / Research Hour (I/RH)	38.5	33.5	21.7	10.7	40	38	30	'17.5'
# Species / Research Hour	4.6	2.8	3.5	3.0	2.4	3.7	2.6	'3'

'affected severely by the flood'

Table 8. Continued. Date, Conditions	Location within Anne U. White	Butterfly Activity	Blossoming Plants	Animals	Researchers
3/26/2014 10:10 – 12:30 p.m. 14 – 16 °C, 60% clear with high clouds	Barricaded gate to about ½ mile.	Mourning cloaks were sailing overhead; others flying low or on the ground.	None. Ice and snow still present. Bottom-land soil all washed away. Sunny only against the south- facing cliff.	Brown creeper, crow, raven. Scaloporus lizard.	Jan Chu, Larry Crowley, Amy Chu, Michelle Durant
8/21/2014 9:10 -1:20 p.m. 20-27 °C, overcast to 50% cloudy, 0- 5 mph. wind	From barricade to first stream crossing where trail had been.	Skippers were jumping and landing repeatedly, many butterflies were nectaring	Much green algae in the water. Hymenoxys – Tetraneuris black medic, campanula catnip, chickory clover red, clover sweet Erigeron, Geranium Fremo. and Rich. goldenrod, gumweed Heterotheca, knapweed purple Monarda, mullein onion Geier's, phlox prickly poppy, sulfur flower wild lettuce, Yarrow	Crow, mtn chickadee, red-br. nuthatch, hairy and downy woodpecker, pygmy nuthatch, rufous hummingbird, w. wood pewee. Caddis fly larvae, colonial web-forming caterpillars doing walk- abouts- <i>Orgyia</i> <i>pseudotsugata</i> "Douglas-fir tussock moth." Pine squirrel, deer. W. fence lizard (6)	Jan Chu, Larry Crowley, Jean Morgan, Chuck Lowry, Wynne Whyman, Amanda Hatfield

Table 9. Heil Valley – Plumely Canyon	2014	5/19	6/13
<i>Papilio polyxenes</i>	Black Swallowtail		
<i>P. zelicaon</i>	Anise Swallowtail		
<i>P. indra</i>	Indra Black Swallowtail	4	7
<i>P. rutulus</i>	Western Tiger Swallowtail		
<i>P. eurymedon</i>	Pale Swallowtail		3
<i>P. multicaudata</i>	Two-tailed Swallowtail	2	3
<i>Neophasia menapia</i>	Pine White		
<i>Pontia protodice</i>	Checkered White		
<i>P. occidentalis</i>	Western White		1
<i>P. sisymbrii</i>	Spring White	1	
<i>Pieris rapae</i>	Cabbage White	3	9
<i>P. marginalis</i>	Mustard White		
<i>Euchloe ausonides</i>	Large Marble	4	1
<i>E. olympia</i>	Olympia Marble		
<i>Anthocharis sara julia</i>	Julia Orangetip		
white sp.		17	7
<i>Colias philodice</i>	Clouded Sulphur	4	
<i>C. eurytheme</i>	Orange Sulphur	2	45
<i>C. alexandra</i>	Queen Alexandra's Sulphur		
<i>Phoebis sennae eubule</i>	Cloudless Sulphur (Eastern)		
<i>Eurema mexicana</i>	Mexican Sulphur		
<i>Nathalis iole</i>	Dainty Sulphur		
sulphur sp.		13	
<i>Lycaena dione</i>	Gray Copper		
<i>C. mossii schryveri</i>	Moss' Elfin		
<i>C. polios</i>	Hoary Elfin		
<i>C. eryphon</i>	Western Pine Elfin		
<i>Callophrys affinis homoperplexa</i>	Canyon Bramble Hairstreak		
<i>C. sheridanii</i>	White-lined Green Hairstreak		
<i>C. gryneus</i>	Siva Juniper Hairstreak		
<i>Satyrium titus</i>	Coral Hairstreak		
<i>Strymon melinus</i>	Gray Hairstreak		
<i>Leptotes marina</i>	Marine Blue		
<i>Cupido amyntula</i>	Western Tailed-Blue	3	3
<i>Celastrina ladon sidara</i>	Echo Azure		
<i>C. humulus</i>	Hops Azure		1
<i>Glaucopsyche piasus</i>	Arrowhead Blue		7
<i>G. lydamus</i>	Silvery Blue	7	3
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue		6
<i>Echinargus isola</i>	Reakirt's Blue		
<i>Plebejus melissa</i>	Melissa Blue		2
<i>P. saepiolus</i>	Greenish Blue		
<i>P. icarioides</i>	Boisduval's Blue		6
<i>P. lupini lutzi</i>	Lupine Blue		
<i>P. glandon rustica</i>	Arctic Blue		

Table 9. Heil Valley – Plumely Canyon	2014	5/19	6/13
blue sp.		7	24
<i>Danaus plexippus</i>	Monarch		
<i>Euptoieta claudia</i>	Variiegated Fritillary		
<i>Speyeria aphrodite</i>	Aphrodite Fritillary		10
<i>S. edwardsii</i>	Edwards' Fritillary		1
<i>S. coronis</i>	Coronis Fritillary		
<i>S. callippe</i>	Callippe Fritillary		
<i>S. atlantis</i>	Atlantis Fritillary		
<i>S. hesperis</i>	Northwestern Fritillary		
fritillary sp.			23
<i>Polydryas arachne</i>	Arachne Checkerspot		
<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		4
<i>P. pulchella</i>	Field Crescent	7	11
crescent sp.			
<i>Polygonia interrogationis</i>	Question Mark		
<i>P. gracilis</i>	Hoary Comma	1	
<i>Aglais milberti</i>	Milbert's Tortoiseshell		
<i>Nymphalis antiopa</i>	Mourning Cloak	7	
<i>N. californica</i>	California Tortoiseshell		
<i>Vanessa atalanta</i>	Red Admiral		
<i>V. cardui</i>	Painted Lady		2
<i>V. virginiensis</i>	American Lady		
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral		3
<i>Asterocampa celtis</i>	Hackberry Emperor		
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet	7	12
<i>Cercyonis pegala</i>	Common Wood-Nymph		
<i>C. oetus</i>	Small Wood-Nymph		
<i>Erebia epipsodea</i>	Common Alpine		
<i>Epargyreus clarus</i>	Silver-spotted Skipper		2
<i>Thorybes pylades</i>	N. Cloudywing	2	
<i>Erynnis pacuvius</i>	Pacuvius Duskywing	3	1
<i>E. afranius</i>	Afranius Duskywing		
<i>E. persius</i>	Persius Duskywing	1	8
<i>Pyrgus communis</i>	Common Checkered-skipper	2	
<i>Pholisora catullus</i>	Common Sootywing		1
<i>Piruna pirus</i>	Russet Skipperling		
<i>Oarisma garita</i>	Garita Skipperling		
<i>Hesperia juba</i>	Juba Skipper		3
<i>H. colorado</i>	Western Branded Skipper		
<i>H. pahaska</i>	Pahaska Skipper	2	
<i>Polites draco</i>	Draco Skipper		
<i>P. themistocles</i>	Tawny-edged Skipper		

Table 9. Heil Valley – Plumely Canyon	2014	5/19	6/13
<i>P. mystic</i>	Long Dash		
<i>Ochlodes sylvanoides</i>	Woodland Skipper		
<i>Poanes taxiles</i>	Taxiles Skipper		
<i>Euphyes vestris</i>	Dun Skipper		
<i>Atrytonopsis hianna</i>	Dusted skipper		

Table 9. Continued. Heil Valley- Plumely Canyon	2007	2008	2009	2010	2011	2012	2013	2014
# of Species Identified Each Year in Plumely Canyon	45	37	44	36	44	41	48	‘33’
Cumulative # Species 2007-2014 sighted in Plumely Canyon	81	81	82	84	86	88	89	89
Research Hours on Site	8	13	17	6.5	18	7.5	16	8
# Individual Butterflies Counted	365	480	401	196	526	342	470	479
# Individuals / Research Hour	45	36	24	30	29	46	29	60
# Species / Research Hour	5.6	2.8	2.6	5.5	2.4	5.4	3.0	‘4.1’

‘flood related – only two visits’

Table 9. Continued. Date, Conditions	Location within Heil-Plumely	Butterfly Activity	Blossoming Plants	Animals	Researc hers
5/19/2014 9:45-1:30 p.m. 17-22°C clear sky, 0-5 mph wind	From second locked gate to streambed into the canyon perhaps 1/3 mi.	Marble nectaring on tower mustard. Many flying		canyon wren great horned owl, mourning dove, raven, spotted towhee, hummingbird, Turkey,	Jan Chu, Jean Morgan, Wynne Whyman
6/13/2014 9:30 – 1:30 p.m. 19-29 °C clear sky, no wind	From stream crossing at road inside first locked gate. Followed stream into Plumely as far as hops vines.	Field crescent, painted lady nectaring on Erigeron. Nearly 50 sulphurs puddling together. Many males in mud puddles. The bee colony fell completely from the surface of the dirt cliff during the flood.	Ceanothus, bindweed, lupine, sweet clover, Heterotheca, Salsify, globe mallow, Erigeron, Penstemon, Fr. Geranium, sulfur-flower, yucca, campanula, spiderwort, Gaillardia, rose	blue gray gnatcatcher w. wood pewee chipping sparrow cordilleran flycatcher Virginia’s warbler br.tail.hummingbird crow goldfinch lesser lazuli bunting plumbeus vireo mallards, raven. spotted towhee violet-green swallow, turkey vulture, w. tanager, whi.thr. swift. Chorus frog	Jan Chu, Larry Crowley, Jean Morgan, John Barr, Pam Piombino

Table 10. Hall II	Late Season comparison 2013- 2014	8/27 2013	9/4 2014
<i>Papilio rutulus</i>	W. Tiger Swallowtail		
<i>P. multicaudata</i>	Two-tailed Swallowtail		1
<i>Pontia protodice</i>	Checkered White	1	
<i>P. sisymbrii</i>	Spring White		
<i>Pieris rapae</i>	Cabbage White	7	4
white sp.		6	5
<i>Euchloe ausonides</i>	Large Marble		
<i>Colias philodice</i>	Clouded Sulphur		2
<i>C. eurytheme/philodice alba form</i>	Sulphur female		
<i>C. eurytheme</i>	Orange Sulphur	21	6
sulphur sp.			4
<i>Callophrys mossii</i>	Moss Elfin		
<i>Cupido amyntula</i>	W. Tailed-blue		
<i>Glaucopsyche lygdamus</i>	Silvery Blue		
<i>Echinargus isola</i>	Reakirt's Blue		1
<i>Plebejus melissa</i>	Melissa Blue	5	13
<i>P. glandon rustica</i>	Arctic Blue		
blue sp.		2	2
<i>Euptoieta claudia</i>	Variegated Fritillary		
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	7	8
<i>S. edwardsii</i>	Edwards' Fritillary		1
<i>S. hesperis</i>	Northwestern Fritillary		
fritillary species		7	9
<i>Phyciodes pulchella</i>	Field Crescent	11	18
<i>Polygonia gracilis</i>	Hoary Comma		
<i>Nymphalis antiopa</i>	Mourning Cloak		1
<i>Vanessa atalanta</i>	Red Admiral		2
<i>V. cardui</i>	Painted Lady		
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral	1	
<i>Asterocampa celtis</i>	Hackberry Emperor	1	4
<i>Coenonympha tullia ochracea</i>	Common Ringlet		
<i>Cercyonis pegala</i>	Common Wood- Nymph	1	3
<i>Pyrgus communis</i>	Common Checkered- skipper	5	5
<i>Pholisora catullus</i>	Common Sootywing		
<i>Hesperia colorado</i>	W. Branded skipper	21	1
<i>H. leonardus pawnee</i>	Leonard's Skipper		4
<i>Ochlodes sylvanoides</i>	Woodland Skipper	8	1
<i>Atrytonopsis hianna</i>	Dusted Skipper		
skipper sp.		4	

Table 10. Hall 2	2013	2014
# of Species Identified During Each Year in Hall 2	31	'17'
Cumulative # Species Sighted in Hall 2	31	32
Research Hours on Site	15	3.5
# Individual Butterflies Counted	319	'95'
# Individuals / Research Hour	21	27
# Species / Research Hour	2.1	4.8

'affected by the flood. Only one visit.'

Table 10. Continued. 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 bluejay, 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 and choke-cherry seed scats	Jan Chu Larry Crowley, Jean Morgan, Chuck Lowry

<p>9/4/2014 10:00-1:40 p.m. 19- 22°C , high overcast to partial clearing, wind 0-5 mph</p>	<p>Waded thru St Vrain Creek, along upper old roadway to ridge coming toward the creek</p>	<p>red admiral & hackberry nectaring on rabbit brush, field crescent on Erigeron</p>	<p>alfalfa gayfeather geranium Fremont's groundsel gumweed Helianthus knapweed white Mentzelia multiflora, yellow, moth mullein mullein rabbit brush, salsify snake weed</p>	<p>blue-gray gnatcatcher, goldfinch lesser magpie sharp shin hawk(2) Steller's jay towhee, spotted</p>	<p>Jan Chu, Larry Crowley, Ranger Dennis Morris, Dan Fosco, Cindy Maynard</p>
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