

**Butterflies along Three Trails**  
**- Showing Affects of the 2013 Flood**  
**On Boulder County Open Space Properties -**



**For Boulder County Nature Association**

By

Janet Chu

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Cover photo: Ottoo Skipper *Hesperia ottoe* – a rare butterfly. Photo by Karen Kincy. July 4, 2014

Janet Chu  
964 Ravenwood Road  
Boulder, CO 80303  
[chuhouse@hotmail.com](mailto:chuhouse@hotmail.com)  
Ph. 303-494-1108

This author invites you to refer to other previous reports which are stored at Boulder County Open Space office and in her home. Many of these butterflies are pictured in Butterflies of the Colorado Front Range - a Photographic Guide to 80 Species, published by Boulder County Nature Association, Boulder, Colorado, co-authored by Janet Chu and Stephen Jones.

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**I. Purpose.** This study is to observe changes following the September 2013 flood within three Boulder County Open Space (BCPOS) properties. The goal is to document changes in the butterfly populations making up these recovering communities. The properties are a) Hall II b) Anne U. White Trail - Fourmile Canyon and c) Plumely Canyon - Heil Valley Ranch.

**II. Hypothesis.** If butterfly inventories proceed on these recently flooded properties, then our natural resources data bank will expand for these much changed properties. If inventories continue, the post-flood data will enrich the earlier baseline records adding to their historical value.

**III. Objectives.** The overall objectives were:

A. To add to the detailed multi-year inventories, where the location and nature of habitats is known to have supported butterfly species.

B. To explore Open Space areas Hall II, Anne U. White Trail, and Plumely Canyon, devastated by flood of 2013.

C. To garner data following the major flood by locating recovering host plants depended upon by butterflies.

D. To inventory the numbers of butterfly species and populations.

**IV. Methodology.** Each field day in Hall II and Anne U. White we were required to be escorted by a Boulder County Ranger, because of dangerous wash-outs. However the team entered Plumely Canyon by hiking from a service road in Heil Valley Ranch. A research permit was issued by BCPOS for each team member.

On each field day we hiked about three hours following, in general, stream beds, washed out trails and old quarry roads, and concentrated our survey efforts in areas containing adequate water, flower blossoms, and host plants which support significant numbers of butterflies. We

observed butterflies on the wing and when necessary, resorted to a catch and release live technique with the aid of a net, recording both species identities and numbers. Extensive use of digital photography enhanced field identification. In BCPOS properties, previously noted rare butterflies were sought: Arogos Skipper *Atrytone arogos*, Ottoo Skipper *Hesperia ottoe*, Hops Azure *Celastrina humulus*, Dusted Skipper *Atrytonopsis hianna*, and Moss' Elfin *Callophrys mossii schryveri*.

Total numbers of individual butterflies observed on each field day were recorded and analyzed for patterns for the **2013-2015** seasons and for any significant changes in populations and species. For each location, 'Individuals per Research Hour' (I/RH) were calculated using the number of individual butterflies observed (I) divided by the research hours (RH) surveyed in the field. 'Species per Research Hour' (S/RH) were also determined. These were standard comparisons from year to year that I developed. Further, we made some effort to determine species richness and diversity as far as butterfly data were available. In addition, blossoms available for nectar, as well as incidental birds and other animals were listed.

**V. Timeline.** Observations are generally made from May into September, but for this study the late summer, August data, were available for several years.

Hall II and Anne U. White Trail were visited only once each in 2015. It was required that Rangers accompanied us because there is no trail in Anne U. White, and no road into Hall II. Our entrance to Hall II was by fording the St. Vrain River. Plumely Canyon was visited five times in 2015. It was fortunate that this canyon could be accessed by walking from the service road.

**VI. Management Plan.** The coordination was handled by this author primarily choosing good weather; enough warmth, few clouds, no precipitation and little or no wind. We carried waterproof booklets into the field and recorded each day's observations. The team worked in the

field to accomplish a comprehensive search. Often the members would disperse across the meadows and stream banks to locate more specimens. The data were transferred to a spread sheet for later analysis. This study incorporated a ‘meandering’ method to gain a more complete inventory of butterflies, rather than a prescribed transect. Two areas have been inventoried up to nine years, Anne U. White and Plumely Canyon; Hall II, a more recently purchased property, provided data for three years.

**VII. Values.** Data have been referenced by county employees when initiating management changes or incorporating new plans. These data were included in the recent Boulder County Comprehensive Plan Update, Environmental Resource Element. The flood-ravaged area, especially Anne U. White, will likely have the trail rebuilt in 2016 with full use of volunteers and staff members. They will be aware of highly diverse sections to be preserved. Already the county has cleared many fallen trees and large bushes previously blocking the waterway. There is tremendous pressure from the public to reopen this trail.

This study has enhanced visitor experiences during county public walks and will for future classes because many of the Volunteer Naturalists, trained by both the county and city, are interpreting butterfly life histories, identification, and the important values of preserving ‘undisturbed’ habitats. The identification, life cycles, and natural habitats are explained to the Boulder community during teaching in many visiting school classes and public walks. These properties will have the natural resources data bank expanded in preparation for future references.

## VIII. Field Data for Butterflies.

### A. Hall II Open Space –

#### 1. Comparing Late Season - 2013 pre-flood, to 2014-2015 post-flood

Hall II	Late Season comparison 2013-2014 - 2015	8/27 2013	9/4 2014	8/17 2015
<i>Papilio multicaudata</i>	Two-tailed Swallowtail		1	
<i>Pontia protodice</i>	Checkered White	1		2
<i>Pieris rapae</i>	Cabbage White	7	4	23
white sp.		6	5	
<i>Colias philodice</i>	Clouded Sulphur		2	1
<i>C. eurytheme</i>	Orange Sulphur	21	6	22
sulphur sp.			4	
<i>Echinargus isola</i>	Reakirt's Blue		1	5
<i>Plebejus melissa</i>	Melissa Blue	5	13	15
blue sp.		2	2	4
<i>Danaus plexippus</i>	Monarch			1
<i>Euptoieta claudia</i>	Variegated Fritillary			5
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	7	8	1
<i>S. edwardsii</i>	Edwards' Fritillary		1	
fritillary species		7	9	3
<i>Phyciodes cocyta</i>	Northern Crescent			1
<i>P. pulchella</i>	Field Crescent	11	18	1
<i>P. tharos</i>	Pearl Crescent			2
<i>Nymphalis antiopa</i>	Mourning Cloak		1	
<i>Vanessa atalanta</i>	Red Admiral		2	
<i>V. virginensis</i>	American Lady			1
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral	1		
<i>Asterocampa celtis</i>	Hackberry Emperor	1	4	2
<i>Cercyonis pegala</i>	Common Wood-Nymph	1	3	5
<i>Pyrgus communis</i>	Common Checkered- skipper	5	5	9
<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>Poanes taxiles</i>	Taxiles Skipper			1
skipper sp.		4		
<b>Numbers of butterflies each day in Hall II</b>		108	95	104
<b>Research Hours in Field</b>		3.5	3.5	4
<b># Individuals /RH</b>		31	27	26
<b># of Species /RH</b>		3.4	4.8	4

## 2. Field Notes from Late Season Study, 2013, 2014, 2015

Date, Conditions	Location Hall II	Butterfly Behavior	Blossoming Plants	Animals	Researchers
<b>8/27/2013</b> 9:30 – 1:00 p.m. 22- 28 °C , clear, wind 0-5 mph	Walked from Parking thru ‘Carcass Crossing’ along old ‘roadway’ to rocky cliff to the right (north) near stream.	Cabbage whites and fritillaries nectaring on rabbit brush and gay feather.	bouncing bet flax Erigeron white gay feather geranium Fremont’s knapweed, white Solidago prickly poppy gumweed rabbit brush snakeweed wild lettuce	blue jay mourning dove nuthatch wh. br wren canyon wren house spotted towhee swallow vio green goldfinch Am. goldfinch lesser robin w. wood pewee downywoodpecker chickadee bl. cap. 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
<b>9/4/2014</b> 10:00-1:40 p.m. 19-22 °C , high overcast to partial clearing, wind 0-5 mph	Waded thru St Vrain Creek, along upper old roadway to ridge, returning to cross the creek	Red admiral & hackberry nectaring on rabbit brush; field crescent on Erigeron	alfalfa gayfeather geranium Fremont’s groundsel gumweed Helianthus knapweed, white Mentzelia multiflora, yellow moth mullein mullein rabbit brush Salsify snake weed	blue-gray gnatcatcher, goldfinch, lesser magpie sharp shin hawk(2) Steller’s jay towhee, spotted	Dennis Morris, Ranger, Dan Fosco Cindy Maynard Jan Chu Larry Crowley



8/17/2015 9:10-1:00 p.m. 20 – 19 °C clear sky, wind 0-5 mph	Waded St Vrain near a Hall family washed-out cabin. Hiked past Carcass Crossing into Bobcat Canyon.	Few butterflies flying. Variegated Fritillary nectaring on gumweed.	alfalfa black-eyed Susan catnip chickory clematis clover, red clover, Melilotus Erigeron flax Geranium, Frem. gumweed knapweed, white Liatris Mexican hat wild lettuce Monarda mullein primrose, evening rabbit brush snakeweed Solidago thistle, bull toad flax	canyon wren catbird chickadee bl cap falcon, prairie gnatcatcher, bl gr goldfinch, Am goldfinch, lesser humming bl throat hummingb, br tail kestrel lazuli bunting oriole, Bullock's owl gr horned. pine siskin rock wren spotted towhee warbler, yellow wood peewee, w. woodpecker, downy. Garter snake Woodhouse toad bear scat and trails	Dave Hoerath, Wildlife Specialist Dan Fosco Jan Chu Larry Crowley Jean Morgan Amy Chu Pam Piombino Venice Kelly
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### 3. 2013 records before the September 2013 flood

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

<i>V. cardui</i>	Painted Lady			1	
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			1	1
<i>Asterocampa celtis</i>	Hackberry Emperor			1	1
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet		1		
<i>Cercyonis pegala</i>	Common Wood-Nymph			25	1
<i>Pyrgus communis</i>	Common Checkered-skipper		3	6	5
<i>Pholisora catullus</i>	Common Sootywing			3	
<i>Hesperia colorado</i>	W. Branded Skipper				21
<i>Ochlodes sylvanoides</i>	Woodland Skipper			1	8
<i>Poanes taxiles</i>	Taxiles Skipper				
<i>Euphyes vestries</i>	Dun Skipper				
<i>Atrytonopsis hianna</i>	Dusted Skipper		2		
skipper sp.				1	4

#### 4. Cumulative Records for Hall II 2013-2015

Hall II	2013	2014	2015
# of Species Identified Each Year in Hall II	31	17	17
Cumulative # Species Sighted in Hall II	31	32	37
Research Hours on Site	15	3.5	4
# Individual Butterflies Counted During the Day	319	95	104
# Individual Butterflies / Research Hour	21	27	26
# Species / Research Hour	2.1	4.8	4

Hall II was visited four times in 2013, but only once in each 2014 and 2015. Therefore the hours on site are 15 in 2013 and fewer in 2014 and 2015. Entering into Hall II was difficult because the road was completely washed out. We were required to wait for the St Vrain River to subside before we could wade across and to have a ranger with us. During our first two visits to Hall II, before the flood in May 2013, five of the rare butterflies Moss' Elfin (*Callophrys mossii*) were nectaring on salt-and-pepper. One rare Dusted Skipper (*Atrytonopsis hianna*) and the early uncommon Spring White (*Pontia sisymbrii*) were also found. Following the 2013 flood we accessed the area only in August and no rare butterflies were seen. The numbers of late summer W. Branded Skippers (*Hesperia colorado*) and Woodland Skippers (*Ochlodes sylvanoides*)

declined noticeably in 2014 and 2015. The invasive Cabbage White (*Pieris rapae*) and resident Orange Sulphur (*Colias eurytheme*) numbers were higher.

Numbers of individual butterflies in 8/2013 was nearly the same as 8/2015; fewer in 9/2014, It may be that looking for the butterflies later in September 2014, was one reason that the numbers were lower. The number of individuals per research hour was higher in 8/2013. This was before the flood and conditions may have been optimum. The number of species per research hour was higher in 2014 and 2015. It is possible weather may have affected these numbers, like a drought in late summer 2013.

## B. Anne U. White Trail, Fourmile Canyon Creek

### 1. Comparing Late Season 2012-2013 pre-flood to 2014-2015 post-flood

Anne U. White Trail, Fourmile Canyon Creek	2012, 2013 Before Flood 2014, 2015 After Flood	2012 8/30	2013 8/16		2014 8/21	2015 8/7
<i>Papilio rutulus</i>	W. Tiger Swallowtail		1			
<i>P. multicaudata</i>	Two-tailed Swallowtail	1	3		3	
<i>Pontia protodice</i>	Checkered White				1	
<i>Pieris rapae</i>	Cabbage White	3	3		18	3
white sp.					2	1
<i>Colias eurytheme</i>	Orange Sulphur	3			2	1
<i>Strymon melinus</i>	Gray Hairstreak					1
<i>Echinargus isola</i>	Reakirt's Blue				2	
<i>Plebejus melissa</i>	Melissa Blue				1	
blue sp.			1		1	
<i>Danaus plexippus</i>	Monarch					1
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	15	7		6	5
<i>S. coronis</i>	Coronis Fritillary	1				
<i>S. callippe</i>	Callippe Fritillary	2				
<i>S. hesperis</i>	Northwestern Fritillary		19		7	
fritillary sp.		10	9		22	3
<i>Phyciodes pallida</i>	Pale Crescent				5	
<i>P. cocyta</i>	Northern Crescent				2	
<i>Polygonia gracilis</i>	Hoary Comma				1	
<i>Nymphalis antiopa</i>	Mourning Cloak	1	2			1
<i>Vanessa cardui</i>	Painted Lady					2
<i>V. virginiensis</i>	American Lady				1	3

<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral	4	3		5	
<i>Cercyonis oetus</i>	Small Wood-Nymph		1			
wood-nymph sp						2
<i>Pyrgus communis</i>	Common Checkered-Skipper				2	
<i>Hesperia colorado</i>	W. Branded Skipper	10			1	
<i>Ochlodes sylvanoides</i>	Woodland Skipper	26	30		29	7
<i>Poanes taxiles</i>	Taxiles Skipper				4	3
skipper sp.					2	
<b>Total numbers of butterflies in Anne U. White</b>		76	79		115	33
<b>Research Hours in Field</b>		2	2		4	3
<b># Individuals /RH</b>		38	39		29	11
<b># of Species/RH</b>		5	4.5		4	3

## 2. Field notes from 2014 and 2015

Date, Conditions	Location Anne U. White	Butterfly Activity	Blossoming Plants	Animals	Researchers
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 alga 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-about- Orgyia pseudotsugata "Douglas-fir tussock moth." Pine squirrel, deer. W. fence lizard (6)	Jan Chu, Larry Crowley, Jean Morgan, Chuck Lowry, Wynne Whyman, Ranger Naturalist Amanda Hatfield
8/7/2015 9:00-12:00p.m. 24°C, cloudy, no wind	From barricade about ¾ mile in and return.	Butterflies were few	Generally poor flowers; black-eyed daisy chickory, Erigeron evening primrose Fremont geranium goldenrod, gumweed harebell Melilotus , Monarda mullein nodding onion oxeye daisy pearly everlasting prickly poppy thistle	chickadee pygmy nuthatch crow flycatcher, cordilleran and nest with young; spotted towhee vireo, plumbeous. 6 fence lizards.	Jan Chu, Larry Crowley, Dan Fosco, Chuck Lowry, Greg Muench, Wynne Whyman, Rangers Graham Fowler Jason Vroman

### 3. 2013 Counts pre-flood

Anne U. White Trail, Fourmile Canyon Creek	2013	3/14	4/29	5/19	7/20	8/1	8/16
<i>Papilio zelicaon</i>	Anise Swallowtail			1			
<i>P. rutulus</i>	W. Tiger Swallowtail			1		1	1
<i>P. eurymedon</i>	Pale Swallowtail						
<i>P. multicaudata</i>	Two-tailed Swallowtail				3	5	3
<i>Pontia sisymbrii</i>	Spring White			7			
<i>Pieris rapae</i>	Cabbage White			2	4	3	3
<i>Euchloe ausonides</i>	Large Marble			6			
white sp.			1	12			
<i>Anthocharis sara julia</i>	Julia Orangetip			5			
<i>Colias philodice</i>	Clouded Sulphur				1		
sulphur sp.			1				
<i>Callophrys eryphon</i>	Western Pine Elfin			10			
<i>Celastrina ladon sidara</i>	Echo Azure			8			
<i>Echinargus isola</i>	Reakirt's Blue					1	
<i>Plebejus saepiolus</i>	Greenish Blue						
<i>P. melissa</i>	Melissa Blue					3	
blue sp.							1
<i>Danaus plexippus</i>	Monarch					2	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary						7
<i>S. edwardsii</i>	Edwards' Fritillary					1	
<i>S. hesperis</i>	Northwestern Fritillary				8	30	19
fritillary sp.					7	4	9
<i>Polygonia gracilis</i>	Hoary Comma		4	5			
<i>Aglais milberti</i>	Milbert's Tortoiseshell	1					
<i>Nymphalis californica</i>	California Tortoiseshell		1				
<i>N. antiopa</i>	Mourning Cloak	3	9	4			2
<i>Vanessa atalanta</i>	Red Admiral				2		1
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral				6	3	3
<i>Cercyonis oetus</i>	Small Wood-Nymph				1	5	1
<i>Oeneis uhleri</i>	Uhler's Arctic			1			
<i>Piruna pirus</i>	Russet Skipperling				1		
<i>Ochlodes sylvanoides</i>	Woodland Skipper				6	40	30
<i>Poanes taxiles</i>	Taxiles Skipper				15	16	
<i>Euphyes vestris</i>	Dun Skipper					1	
<i>Atrytonopsis hianna</i>	Dusted Skipper			1		2	
<b>Total numbers of butterflies 2013 in Anne U. White</b>		4	16	63	54	118	80
<b>Research Hours in Field</b>		1	1.5	3	1.5	3	2
<b># Individuals /RH</b>		4	11	21	36	39	40
<b># of Species/RH</b>		2	2	4	6.5	4.5	5

#### 4. Cumulative Records for Anne U. White 2007-2015

Anne U. White Fourmile Canyon	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of Species identified annually in Anne U. White	44	45	35	31	47	50	29	17	10
Cumulative # Species sighted in Anne U. White 2007-2014	47	66	69	69	75	82	82	82	82
Research Hours on Site	9.5	16	10	10.5	19.5	13.5	11	6	3
# Individual Butterflies Counted	366	536	217	112	773	509	334	105	33
# Individuals / Research Hour (I/RH)	38.5	33.5	21.7	10.7	40	38	30	17.5	11
# Species / Research Hour	4.6	2.8	3.5	3.0	2.4	3.7	2.6	3	3

Compare the Individuals /RH to note the drop in numbers of butterflies following the 2013 flood. The exception is 2010 when snowpack kept the trail closed and butterflies from emerging.

#### C. Plumely Canyon - Heil Valley Open Space

##### 1. Comparing Counts – pre-flood June 2013 to post-flood June 2014 and 2015

Heil Valley – Plumely Canyon	2013 / 2014 and 2015	5/12 2013	6/22 2013	7/19 2013	8/26 2013	5/19 2014	6/13 2014	6/24 2015	6/26 2015	8/25 2015
<i>Papilio polyxenes</i>	Black Swallowtail								1	
<i>P. zelicaon</i>	Anise Swallowtail		1							
<i>P. indra</i>	Indra Swallowtail					4	7			
<i>P. rutulus</i>	Western Tiger Swallowtail		1	1	1					
<i>P. eurymedon</i>	Pale Swallowtail		3	2			3			
<i>P. multicaudata</i>	Two-tailed Swallowtail		2	5	1	2	3		2	1
yellow swallowtail sp.			4	3						
<i>Pontia protodice</i>	Checkered White			1						
<i>P. sisymbrii</i>	Spring White					1				
<i>Pieris rapae</i>	Cabbage White		1		8	3	9	3	9	39
<i>Euchloe ausonides</i>	Large Marble	1				4	1			
white sp.		2	5	6		17	7	15		
<i>Colias philodice</i>	Clouded Sulphur			3		4		2		
<i>C. eurytheme</i>	Orange Sulphur	15	18	8	6	2	45	4	2	7
<i>Nathalis iole</i>	Dainty Sulphur			1	2					
sulphur sp.		1		5		13				
<i>C. mossii schryveri</i>	Moss' Elfin	2								
<i>Strymon melinus</i>	Gray Hairstreak			1						1

<b>Plumely Canyon – Heil Valley Ranch</b>	<b>2013 / 2014 and 2015</b>	<b>5/12 2013</b>	<b>6/22 2013</b>	<b>7/19 2013</b>	<b>8/26 2013</b>		<b>5/19 2014</b>	<b>6/13 2014</b>		<b>6/24 2015</b>	<b>6/26 2015</b>	<b>8/25 2015</b>
<i>Cupido amyntula</i>	Western Tailed-Blue		5	4			3	3		4		
<i>Celastrina ladon sidara</i>	Echo Azure	1									1	
<i>C. humulus</i>	Hops Azure							1		4		
<i>Glaucopsyche piasus</i>	Arrowhead Blue		2					7				
<i>G. lygdamus</i>	Silvery Blue		1				7	3		2		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue		3					6		4		
<i>Echinargus isola</i>	Reakirt's Blue				2							1
<i>Plebejus melissa</i>	Melissa Blue		1		3			2			1	1
<i>P. icarioides</i>	Boisduval's Blue		4					6		2		
blue sp.		1	10		5		7	24		15	2	3
<i>Euptoieta claudia</i>	Variiegated Fritillary		1	2							1	1
<i>Speyeria aphrodite</i>	Aphrodite Fritillary		4	13	32			10			3	10
<i>S. edwardsii</i>	Edwards' Fritillary		1	3				1				
<i>S. hesperis</i>	Northwestern Fritillary			7								2
fritillary sp.			12	22	11			23		10	1	13
<i>Chlosyne gorgone</i>	Gorgone Checkerspot			2								
<i>C. palla</i>	*Northern Checkerspot		3									
<i>P. tharos</i>	Pearl Crescent				1							
<i>P. cocyta</i>	Northern Crescent		1					4		1		
<i>P. pulchella</i>	Field Crescent		3	2	3		7	11		7	2	
crescent sp.				1	14							
<i>P. gracilis</i>	Hoary Comma	6	4	1			1			2		
<i>Aglais milberti</i>	Milbert's Tortoiseshell	1		1								
<i>Nymphalis antiopa</i>	Mourning Cloak	4		2			7					
<i>Vanessa atalanta</i>	Red Admiral		1	1						2		
<i>V. cardui</i>	Painted Lady							2		5	1	1
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral		8	3	2			3		3	1	
<i>Asterocampa celtis</i>	Hackberry Emperor			1	2							
<i>Coenonympha tullia ochracea</i>	Common Ringlet		15				7	12		6	3	1
<i>Cercyonis pegala</i>	Common Wood-Nymph			1								
<i>C. oetus</i>	Small Wood-Nymph			1								
<i>Epargyreus clarus</i>	Silver-spotted Skipper		1					2			7	
<i>Thorybes pylades</i>	N. Cloudywing		1				2					
<i>Erynnis pacuvius</i>	Pacuvius Duskywing						3	1		1		

Heil Valley – Plumely Canyon	2013 / 2014 and 2015	5/12 2013	6/22 2013	7/19 2013	8/26 2013	5/19 2014	6/13 2014	6/24 2015	6/26 2015	8/25 2015
<i>E. persius</i>	Persius Duskywing		3			1	8			
<i>Pyrgus communis</i>	Common Checkered-skipper		1		5	2			1	4
<i>Pholisora catullus</i>	Common Sootywing						1			
<i>Piruna pirus</i>	Russet Skipperling							1		
<i>Hesperia juba</i>	Juba Skipper						3			
<i>H. colorado</i>	Western Branded Skipper				38					
<i>H. pahaska</i>	Pahaska Skipper					2				
<i>P. mystic</i>	Long Dash			2						
<i>Ochlodes sylvanoides</i>	Woodland Skipper			1	6					1
<i>Poanes taxiles</i>	Taxiles Skipper			17						
<i>Euphyes vestris</i>	Dun Skipper		3	6				4	8	
<i>Atrytonopsis hianna</i>	Dusted skipper			1						
skipper sp.					2					1
Total # Individuals in Plumely Canyon			123				208		143	
Hours in Field			2				4		6.5	
# Individuals /RH			61.5				52		22	
# of Species/RH			13.5				6		3.8	

This chart contains data from May, June and August in 2013, 2014 and 2015. The 2013 dates are pre-flood. The 2014 and 2015 are post-flood dates. The 7/19/2013 column was included as a demonstration showing butterflies during the height of the season. This column was left to show what an excellent field day look like when the butterflies are at their best.

The numbers of individuals per research hour was 61.5 in pre-flood 2013. Compare this to the lower numbers of 52 in 2014 and 22 in 2015. The field data in June were chosen to compare because data was available in each of the three years. In 2015 the two June data were averaged. Cabbage Whites were greater after the flood; Orange Sulphurs were greater in 2014 than in 2013. Common Ringlets and Weidemeyer's Admirals were more numerous before the flood.



## 2. Counts in Plumely Canyon during Five Field Days in 2015

Plumely Canyon – Heil Valley Ranch	2015	3/28	4/22	6/24	6/26	8/25
<i>Papilio polyxenes</i>	Black Swallowtail				1	
<i>P. multicaudata</i>	Two-tailed Swallowtail					1
swallowtail, yellow			1		2	
<i>Neophasia menapia</i>	Pine White					1
<i>Pieris rapae</i>	Cabbage White	2	4	3	9	39
<i>Euchloe ausonides</i>	Large Marble		1			
<i>Anthocharis sara julia</i>	Julia Orangetip		1			
white sp.		5	15	15		
<i>Colias philodice</i>	Clouded Sulphur			2		1
<i>C. eurytheme</i>	Orange Sulphur			4	2	7
sulphur sp.		1				
<i>C. eryphon</i>	Western Pine Elfin		5			
<i>Strymon melinus</i>	Gray Hairstreak					1
<i>Cupido amyntula</i>	Western Tailed-Blue			4		
<i>Celastrina ladon sidara</i>	Echo Azure		8		1	
<i>C. humulus</i>	Hops Azure			4		
<i>G. lygdamus</i>	Silvery Blue			2		
<i>Euphilotes ancilla</i>	Rocky Mountain Dotted-Blue			4		
<i>Echinargus isola</i>	Reakirt's Blue					1
<i>Plebejus melissa</i>	Melissa Blue				1	1
<i>P. icarioides</i>	Boisduval's Blue			2		
blue sp.				15	2	3
<i>Euptoieta claudia</i>	Variegated Fritillary				1	1
<i>Speyeria aphrodite</i>	Aphrodite Fritillary				3	10
<i>S. hesperis</i>	Northwestern Fritillary					2
fritillary sp.				10	1	13
<i>P. cocyta</i>	Northern Crescent			1		
<i>P. pulchella</i>	Field Crescent		4	7	2	
<i>P. gracilis</i>	Hoary Comma	1	5			
comma sp.				2		
<i>Nymphalis antiopa</i>	Mourning Cloak	8	6			
<i>N. californica</i>	California Tortoiseshell		1			
<i>Vanessa atalanta</i>	Red Admiral			2		
<i>V. cardui</i>	Painted Lady		1	5	1	1
<i>V. virginiensis</i>	American Lady			3	1	2
<i>Limenitis weidemeyerii</i>	Weidemeyer's Admiral			3	1	
<i>Asterocampa celtis</i>	Hackberry Emperor					
<i>Coenonympha tullia ochracea</i>	Ochre (Common) Ringlet			6	3	1
wood nymph						1
<i>Erebia epipsodea</i>	Common Alpine				1	
<i>Epargyreus clarus</i>	Silver-spotted Skipper				7	
<i>Erynnis pacuvius</i>	Pacuvius Duskywing			1		
<i>Pyrgus communis</i>	Common Checkered-skipper				1	4
<i>Piruna pirus</i>	Russet Skipperling			1		
<i>Ochlodes sylvanoides</i>	Woodland Skipper					2
<i>Poanes taxiles</i>	Taxiles Skipper					
<i>Euphyes vestris</i>	Dun Skipper			4	8	

### 3. Field Notes from 2015

Date, Conditions	Location within Plumely - Heil-	Butterfly Activity	Blossoming Plants	Animals	Researchers
3/28/2015 10:40-1:10 p.m. 19-23°C, clear sky, 0-20 mph wind.	From second locked gate to streambed into the canyon perhaps 1/3-1/2 mi.	Fewer than expected	dandelions spring beauties. Just beginning; willow, tiny yellow mustard, Mahonia, Filary	canyon wren crow Steller's jay Townsend's solitaire chickadee Turkeys 12	Jan Chu, Larry Crowley Jean Morgan Chuck Lowry
4/22/2015 Noon – 3:15 p.m. 13 °C. Mostly sunny with intermittent sun/clouds to cloudy-rain. Light breeze.	Upper parking lot along roadway into Plumely Canyon to the Ochs private gate.	Orange tip and yellow swallowtail flying. Good activity when sun was shining.		br.tail.hummingbird canyon wren, 2-turkey vulture. Mule deer	Dan Fosco
6/24/2015 11:30-3:30 p.m. 27-30 °C. mixed high clouds, sun, partly cloudy	Locked gate at service road to the stone home remains in Plumely	Field crescents mating.		Rattlesnake at stone home remains	Dan Fosco
6/26/2015 10:05-12:45 21 °C. 50% to total overcast. Wind 0-5 mph	frog pond, thru second gate to foot of hill. Stream crossing no longer sandy soil =no puddling	butterflies were flying very little. We disturbed these out of plants. Black swallowtail is uncommon.	alfalfa Antennaria bindweed black medic bull thistle coneflower dandelion Erigeron flax Gaillardia geranium Frem Heterotheca Hydrophyllum Hymenopappus Lambert's loco leadplant lily, mariposa lupine mullein Penstemon one-sided poison hemlock Potentilla prickly pear prickly poppy salsify spiderwort toadflax Verbascum violet, white yarrow yucca	bunting, lazuli chickadee bl cap crow finch, house flycatcher, cordilleran flycatcher, w goldfinch, Am goldfinch, lesser hummingbird, br tl junco lark bunting lark sparrow magpie meadowlark nuthatch, pygmy peewee, w.wood raven sparrow, chipping towhee, spotted turkey, chicks vireo, plumbeous warbler, Virginia's  rattlesnake, large toad, Woodhouse	Jan Chu Larry Crowley Pam Piombino John Barr Dan Fosco

8/25/2015 9:15- 12:50p.m. 23-29 °C blue sky, wind 0-5 mph	Streambed (dry) into <b>Plumely</b> entrance to canyon	Few butterflies; fritillaries flying. American lady, Aphrodite nectaring on thistle; orange sulphur on gumweed; checkered skipper on Heterotheca	Poor blossoms. alfalfa bindweed chickory cone flower geranium, Fre. geranium, Rich. goldenrod gumweed Heterotheca knapweed, white mullein prickly poppy rabbit brush snakeweed sunflower thistle, bull toadflax wild lettuce yarrow	chickadee, bla cap crow goldfinch, Am. goldfinch, lesser house wren hummingbird, br. tail magpie mourning cloak pygmy nuthatch red tail Steller's jay turkey vulture. Woodhouse toad	Jan Chu, Larry Crowley, Pam Piombino, Chuck Lowry, Patti Echelmeyer
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#### 4. Cumulative Records for Plumely Canyon - Heil Valley Ranch - 2007 through 2015

Heil Valley-Plumely Canyon	2007	2008	2009	2010	2011	2012	2013	2014	2015
# of Species Identified Each Year in Plumely Canyon	45	37	44	36	44	41	48	33	38
Cumulative # Species 2007-2015 sighted in Plumely Canyon	81	81	82	84	86	88	89	89	89
Research Hours on Site	8	13	17	6.5	18	7.5	16	8	16.5
# Individual Butterflies Counted	365	480	401	196	526	342	470	479	310
# Individuals / Research Hour	45	36	24	30	29	46	29	60	10
# Species / Research Hour	5.6	2.8	2.6	5.5	2.4	5.4	3.0	4.1	2.3

In 2014 the observations were on 6/13, two weeks earlier than the combined data for 2015 dates 6/24 and 6/26, and this may account for a lower number of individuals per research hour, in 2015. Comparably the numbers of species per research hour were higher in 2014 than either 2013 or 2015. The resident butterflies noticeably absent after the flood were Western Branded Skipper (*Hesperia colorado*) and Taxiles Skipper (*Poanes taxiles*). The invasive Cabbage Whites were more numerous after the flood especially on 8/25 with 39 individuals sighted. The rare Hops Azure (*Celastrina humulus*) was seen in June, after the flood in 2014 and 2015. These are known to live only about two weeks and likely were not visited on the emergent dates in 2013. The American Hops, their host vines, live on a slope away from the torrents below. There are not great enough numbers of other species to draw comparisons.

## **XI. Conclusions.**

A. Detailed multi-year inventories were continued in 2015, where the location and nature of habitats is known to have supported butterfly species.

B. Exploration of the Boulder County Open Spaces Hall II, Plumely Canyon - Heil Valley Ranch and Anne U. White - Fourmile Canyon- devastated by flood of 2013, were continued as much as possible due to serious washed out trails and roads and availability of Rangers.

C. Blossoming host plants were noted each field day. Many of these were torn from their substrate and absent following the major flood. In August many of the blossoms were in poor condition reducing the nectaring possibilities depended upon by butterflies. The close-in flowers have not recovered; Monarda has poor blooms and the Melilotus clover has overfilled spaces. Some Leucanthemum oxeye-daisy aliens are showing along with many Verbascum mullein.

D. The numbers of butterfly species and populations were recorded, both in 2013, before the flood and following in 2014 and 2015.

The Anne U. White trail has been closed since September, 2013. Some work has happened to clear timbers from the creek and prevent further debris accumulation. Volunteers and staff have begun some trail recovery, but this won't be completed until the 2016 season. Overall recovery is slow and will be occurring for many years in the future. Species richness has declined for butterflies. Diversity of plants is somewhat reduced; birds seem to be recovering.

## **XII. References:**

Chu, Janet. <http://bcna.org/researchdata.html> *Butterfly Inventories -2014; A Continuing Study of Butterfly Populations and Other Species in Boulder County Open Spaces, Colorado*. By Janet Chu. 2014.

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